Eclipse BIRT: The Open Source Reporting Framework

Paul Clenahan
Eclipse BIRT Project Management Committee
VP Product Management, Actuate Corporation
Agenda

BIRT Project = Business Intelligence and Report Tools Project

- Business Intelligence and Reporting Primer
- How Developers Solve the Problem Today
- Open Source and the Eclipse Platform
- The Emergence of the BIRT Project
- Demonstration
- Gallery
- API’s, Extensibility
- Actuate BIRT
- Summary
Most applications have some type of reporting need
Simple reporting is easy, but users demand more
Real-world report development is challenging
  - Non-relational data sources
  - Sorting, aggregation and calculations on data
  - Professional presentation of information
Meeting user demand for reporting is key to application success
How Developers Solve the Problem Today

Build

Custom Developed Solution

Buy

Closed Source Commercial Products

Java JSP JFaces

XSLT XML JavaScript

HTML

Build

Custom Developed Solution

Buy

Closed Source Commercial Products

Crystal Reports

ReportNet

JReports StyleReports
**Open Source Creates New Choices**

<table>
<thead>
<tr>
<th>Build</th>
<th>Custom Developed Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build using</td>
<td>Leverage Open Source in a Custom Solution</td>
</tr>
<tr>
<td>Open Source</td>
<td>Open Source Based Products</td>
</tr>
<tr>
<td>Code</td>
<td></td>
</tr>
<tr>
<td>Open Source</td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td></td>
</tr>
<tr>
<td>Buy</td>
<td>Closed Source Commercial Products</td>
</tr>
</tbody>
</table>
What is Eclipse?

- **Open Source Community** builds **Universal Development Platform**.
- **Member Supported Foundation** supports **Ecosystem**.
- **Ecosystem** enables **Universal Development Platform**.
- **Universal Development Platform** enables **Ecosystem**.
Java Use and Awareness Study – Dec 2005

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## Current Eclipse Architecture

### Frameworks
- **Java Dev Tools**
- **C/C++ Dev Tools**
- **Device Software Development Platform**
- **Web Tools**
  - J2EE
  - Web Services
  - Web apps
- **Data Tools Platform**
- **Business Intelligence & Reporting BIRT**
- **Test and Performance**

### Tools Platform
- **Modeling Frameworks**
- **Graphical Frameworks**
- **Project Model**
- **Runtime (OSGi)**
- **Generic Workbench**
- **Update**

### Rich Client Platform
Business Intelligence and Reporting Tools

BIRT Project Goals

- Next generation reporting technology
- Web centric design metaphor
- Open source and extensible
- XML report design format
- Foundation for commercial products
- Build community and ecosystem

BIRT Project Committers

- Actuate (http://www.actuate.com)
- Innovent Solutions (http://www.innoventssolutions.com)
- IBM (http://www.ibm.com)
- InetSoft (http://www.inetsoft.com)
## Business Intelligence and Reporting Landscape

<table>
<thead>
<tr>
<th>Operational Reporting</th>
<th>Ad hoc Query &amp; Reporting</th>
<th>Analytics/OLAP/Data Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Characteristics:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operational reports</td>
<td>• Simple ad hoc exploration of data</td>
<td>• Complex “Slice and Dice” of data</td>
</tr>
<tr>
<td>• Developer creates reports</td>
<td>• Business user creates reports</td>
<td>• Business user creates reports</td>
</tr>
<tr>
<td>• Very easy end user access</td>
<td>• Fairly easy to use</td>
<td>• More complex to use</td>
</tr>
<tr>
<td>• Highly formatted</td>
<td>• Typically limited formatting</td>
<td>• Minimal formatting</td>
</tr>
<tr>
<td>• Multiple output formats</td>
<td>• Interactive</td>
<td>• Very interactive</td>
</tr>
<tr>
<td>• No end user training needed</td>
<td>• Minimal training</td>
<td>• Requires training</td>
</tr>
<tr>
<td>• Data access can be complex</td>
<td>• Semantic layer hides complexity</td>
<td>• Semantic layer/data cubes</td>
</tr>
</tbody>
</table>

### BIRT Initial Focus

- **Business Intelligence Continuum**
BIRT Target Users & Benefits

Managers
- Focused on $, developer productivity
- End user satisfaction
- Minimizes Eclipse developer training
- Increase developer productivity
- Lower costs

End Users
- Reports that support business activities
- Ever changing business requirements
- Quick availability of reports
- Reports that also look good
- Content as HTML and PDF

Java Developers
- Saves calories vs. JSP/Java
- Minutes vs. days for HTML, vs. weeks for PDF
- Minutes to modify as user requirements change
- Iterative development gets the right reports quicker

Report Developers
- Powerful and easy to use report designer
- Creates & uses report libraries & templates
- Flexible, web page design metaphor
- Ability to leverage complex components

- Embed pre-designed reports in application
- Designs reports using Eclipse-based designer
- Creates report libraries & templates

- Focused on $, developer productivity
- End user satisfaction
- Minimizes Eclipse developer training
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- Lower costs

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- End Users

- Java Developers

- Report Developers

- Managers
High Level BIRT Architecture

Report Designer
- Eclipse Report Designer
- Eclipse DTP ODA
- Chart Designer
- Custom Designer

Report Design Engine

XML Report Design

Report Engine
- Data Transform. Services
- Generation Services
- Charting Engine
- Presentation Services

Data

Report Document

HTML PDF Print
# BIRT: Feature Rich Open Source Technology

## Open Source BIRT Report 2.1 New Features
- Enhanced chart interactivity and scripting
- New chart marker, scale and legend control
- Additional Y-axis support in charts
- Percentage Pie chart type
- Central location for resource files
- Hyperlinks to Table of Contents entries
- Automatic parameter discovery for hyperlink
- Connection pooling for JDBC data sources
- Multiple Master page support
- Improved usability in parameter management
- Cascading parameters with multiple sources
- Ability to JOIN datasets in BIRT
- Advanced control on data bindings
- More page break and heading control
- Connection profile support

## Open Source BIRT Report 2.0 New Features
- Table of Contents Support in Viewer UI
- Chart Interactivity at View Time in Reports
- Ability to Export Report Data as CSV
- Data Extraction from a Report
- Table of Contents API Support in Engine
- Top N / Bottom N Report Layout
- Multi-pass Aggregate, Sorting and Filtering Support
- Hyperlinks to Other Reports
- Multi-page Reports
- Persistent Storage of Report Output
- Basic XML as a Data Source
- Improvements to Chart components
- Provide Methods for Controlling Chart Behavior
- Provide support for Displaying CLOB (Text) Data from Database
- Provide support for Displaying BLOB (Image) Data from Database
- Bookmarks (Hyperlinks into a Report Body)
- Expanded JavaScript Support
- New and improved chart types
- Controlled/bounded use of System Memory
- Disk-Based Sorting and Data Manipulation
- Page-on-Demand Report Viewing APIs
- Cache Query Results while Developing
- Page-on-Demand Navigation UI/UI Framework
- Concurrent User Scalability for large numbers of Active Users
- Improve PDF Output Generation
- Dynamic Parameter List Support
- Cascading Dynamic Parameter Lists
- Chart Builder/Wizard
- Ability to use Property Editor for Chart Elements
- New Expression Builder for Improved Usability
- Syntax color coding in Expression Builder
- Auto-complete in Expression Builder
- Custom Template Support for New Reports
- Enhance Report Object Model API for Ease of Use
- Improvements to Chart Engine API
- Improve and Publish Chart Model
- Library Support for Reusable Report Items and Objects
- External Style Sheets for Use Across Multiple Report Designs
- Perspective for Java Code Editing in Report Designs
- Ability to import CSS Code Editing in Report Designs
- Pass-through of External Context Objects to ODA Data Providers
- Support Data Set Output Parameters
- Move ODA Runtime Extension Point and Java Interfaces to DTP
- Provide Plug-in Adapter for BIRT ODA Drivers to DTP ODA

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BIRT in Action!
Report Gallery

Employee Directory

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Email</th>
<th>Extension</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary Patterson</td>
<td>VP Sales</td>
<td><a href="mailto:mary.patterson@classicmodels.com">mary.patterson@classicmodels.com</a></td>
<td>5011</td>
<td>101</td>
</tr>
<tr>
<td>Jeff Fink</td>
<td>VP Marketing</td>
<td><a href="mailto:fink@classicmodels.com">fink@classicmodels.com</a></td>
<td>5073</td>
<td></td>
</tr>
<tr>
<td>William Patterson</td>
<td>Sales Manager</td>
<td><a href="mailto:william.patterson@classicmodels.com">william.patterson@classicmodels.com</a></td>
<td>5071</td>
<td>5</td>
</tr>
<tr>
<td>Gerard Marinier</td>
<td>Sales Manager</td>
<td><a href="mailto:gerard.marinier@classicmodels.com">gerard.marinier@classicmodels.com</a></td>
<td>5105</td>
<td>5</td>
</tr>
<tr>
<td>Anthony Bow</td>
<td>Sales Manager (NA)</td>
<td><a href="mailto:abow@classicmodels.com">abow@classicmodels.com</a></td>
<td>5432</td>
<td>5101</td>
</tr>
<tr>
<td>Mary Whitt</td>
<td>Sales Rep</td>
<td><a href="mailto:mwhitt@classicmodels.com">mwhitt@classicmodels.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>William Patterson</td>
<td>Sales Manager (JPAC)</td>
<td><a href="mailto:william.patterson@classicmodels.com">william.patterson@classicmodels.com</a></td>
<td>5471</td>
<td>5</td>
</tr>
<tr>
<td>Andy Fallows</td>
<td>Sales Rep</td>
<td><a href="mailto:afallows@classicmodels.com">afallows@classicmodels.com</a></td>
<td></td>
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</tr>
<tr>
<td>Peter Kusnierek</td>
<td>Sales Rep</td>
<td><a href="mailto:pkusnierek@classicmodels.com">pkusnierek@classicmodels.com</a></td>
<td></td>
<td></td>
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<tr>
<td>Tom King</td>
<td>Sales Rep</td>
<td><a href="mailto:tking@classicmodels.com">tking@classicmodels.com</a></td>
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<td></td>
</tr>
<tr>
<td>Gerard Marinier</td>
<td>Sales Manager (JHREA)</td>
<td><a href="mailto:gerard.marinier@classicmodels.com">gerard.marinier@classicmodels.com</a></td>
<td>5488</td>
<td>5103</td>
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<tr>
<td>Luis Barron</td>
<td>Sales Rep</td>
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<tr>
<td>Pamela Carroll</td>
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<td><a href="mailto:pcarrall@classicmodels.com">pcarrall@classicmodels.com</a></td>
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<tr>
<td>Larry Bird</td>
<td>Sales Rep</td>
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<td>Peter Kusnierek</td>
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<tr>
<td>Mark Gontor</td>
<td>Sales Rep</td>
<td><a href="mailto:mgontor@classicmodels.com">mgontor@classicmodels.com</a></td>
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<tr>
<td>Anthony Bow</td>
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<td><a href="mailto:abow@classicmodels.com">abow@classicmodels.com</a></td>
<td>5498</td>
<td>5101</td>
</tr>
</tbody>
</table>

Product Catalog

Classic Models Inc. Product Catalog

Model trains are a rewarding hobby for enthusiasts of all ages. Whether you're looking for collectible wooden trains, electric streetcars or locomotives, you'll find a number of great choices for any budget within this category. The intricate aspect of trains makes toy trains perfect for young children. These wooden train sets are ideal for children under the age of 15.

<table>
<thead>
<tr>
<th>Name</th>
<th>Vendor</th>
<th>City or State</th>
<th>MSRP</th>
<th>Scals</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calabar Designs Trains</td>
<td>Calabar Designs</td>
<td>Trains</td>
<td>$199</td>
<td>1:80</td>
<td>1/18 Hand-crafted two-toned model, about 1/18 scale, 28 inches tall, includes hook &amp; loop track, features interior lights, wireless remote control, and four per train.</td>
</tr>
<tr>
<td>HO Scale Chinese Trains</td>
<td>Ho Scale Chinese</td>
<td>Trains</td>
<td>$99</td>
<td>1:87</td>
<td>1:87 HO scale, includes hook &amp; loop track, features interior lights, wireless remote control, and four per train.</td>
</tr>
<tr>
<td>1982 City of Detroit Streetcar</td>
<td>Classic Motor Car</td>
<td>Streetcar</td>
<td>$99</td>
<td>1:80</td>
<td>1:80 HO scale, includes hook &amp; loop track, features interior lights, wireless remote control, and four per train.</td>
</tr>
</tbody>
</table>
Report Gallery

Crosstab/Matrix Report

Classic Models, Inc.
701 Gateway Boulevard
South San Francisco, CA 94080

Annual Sales By Product Lines

<table>
<thead>
<tr>
<th>Year</th>
<th>Classic Cars</th>
<th>Motorcycles</th>
<th>Planes</th>
<th>Ships</th>
<th>Trains</th>
<th>Trucks &amp; Buses</th>
<th>Vintage Cars</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$857,581</td>
<td>$33,467</td>
<td>$37,316</td>
<td>$2,446</td>
<td>$7,819</td>
<td>$43,593</td>
<td>$406,902</td>
<td>$409,013</td>
</tr>
<tr>
<td>Q2</td>
<td>$894,761</td>
<td>$48,479</td>
<td>$50,387</td>
<td>$6,175</td>
<td>$9,044</td>
<td>$45,484</td>
<td>$421,506</td>
<td>$409,289</td>
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<tr>
<td>Q3</td>
<td>$943,970</td>
<td>$59,084</td>
<td>$50,447</td>
<td>$14,772</td>
<td>$7,617</td>
<td>$73,242</td>
<td>$410,306</td>
<td>$564,140</td>
</tr>
<tr>
<td>Q4</td>
<td>$788,535</td>
<td>$95,377</td>
<td>$160,257</td>
<td>$162,533</td>
<td>$38,033</td>
<td>$196,416</td>
<td>$391,941</td>
<td>$1,785,578</td>
</tr>
<tr>
<td>Total</td>
<td>$3,168,386</td>
<td>$340,800</td>
<td>$380,827</td>
<td>$204,844</td>
<td>$105,832</td>
<td>$376,657</td>
<td>$1,016,538</td>
<td>$3,271,101</td>
</tr>
</tbody>
</table>

2001

| Q1   | $917,386     | $53,648     | $65,599 | $64,782 | $21,828 | $42,342       | $439,849     | $414,738 |
| Q2   | $805,165     | $86,194     | $66,769 | $84,789 | $48,002 | $75,694       | $419,732     | $423,575 |
| Q3   | $419,674     | $127,119    | $105,973 | $66,859 | $21,724 | $198,833     | $199,426     | $1,048,599 |
| Q4   | $723,776     | $234,150    | $204,551 | $148,695 | $39,278 | $285,578     | $290,979     | $1,525,257 |
| Total| $3,278,473   | $657,234    | $445,434 | $366,956 | $106,397 | $483,393     | $323,937     | $4,166,914 |

2002

| Q1   | $282,920     | $112,344    | $163,392 | $60,395 | $86,235 | $199,332     | $405,461     | $712,799 |
| Q2   | $295,723     | $138,878    | $135,470 | $98,942 | $44,976 | $188,778     | $200,143     | $656,095 |
| Q3   | $618,183     | $121,250    | $130,175 | $81,375 | $44,857 | $234,915     | $210,656     | $1,405,193 |
| Q4   | $4,216,903   | $1,147,417  | $885,959 | $569,804 | $473,830 | $940,566     | $1,477,622   | $9,528,084 |
| Grand Total| $5,418,816 | $2,344,652  | $2,026,638 | $1,443,053 | $894,887 | $2,586,297   | $2,621,897   | $27,709,918 |

Form Letter

Dear Violeta,

Thank you for your recent order 10231. We are currently processing your order. If you have any questions please contact your sales rep at 1-800-555-5555.

Sincerely,

Your friendly sales assistant
Chart Gallery

Population Census Results

Population Growth

Histogram Chart

Hayfever Occurrences
API Overview

Report Designer
- Design Engine API
- Open Data Access
- Chart UI API

XML Report Design

Report Viewer
- Report Engine API
- Chart Engine API

HTML or PDF

Report Document
Extension Point Overview

- Extensibility is a key principle for the BIRT project
- Data source extensibility
  - Application specific design-time query builders
  - Custom design-time & run-time data access
- Custom business logic extensibility
  - Incorporate complex business logic scripting
  - Access existing and new Java code
- Visualization extensibility
  - Build new visual data presentation ‘widgets’
  - Extend charting with new chart types; new output formats
- Rendering reports for output
  - Target report output for specific devices & formats
BIRT Market Momentum and Uptake

Sample Adopters To Date Since BIRT 1.0 Released in June 2005
“From my research, BIRT is a really big deal, it has legitimate traction in the market.”

Stephen O’Grady, RedMonk
New Publications Available From Amazon

- BIRT: A Field Guide to Reporting
- Integrating and Extending BIRT
Case Study – Scapa Technology

Scapa Technologies is privately-held, based in Edinburgh, UK

Build and sell system performance & analysis solutions into vertical sectors, including telecommunications, retail & financial services

Scapa Test and Performance Platform is a powerful application performance testing, diagnosis & monitoring product applicable across a wide range of commercial software technologies at multiple points in the application lifecycle

http://www.scapatech.com/
Case Study – Scapa Technology

- BIRT runtime component is embedded in Scapa Test and Performance Platform
- Scapa application leverages the BIRT API to invoke the runtime component
- Users run reports & select the report layout, structure & visual preferences from within the Scapa user-interface
- BIRT runtime component adopts the look & feel of the Scapa application
- Built hooks within application that drive what the report should look like & create a report template programmatically
Case Study – Ivis Technologies

Ivis Technologies is privately held, based in Arizona, USA.

Build and sell software solutions that enable organizations to merge process improvement with live project execution.

xProcess is the premier process improvement and project execution environment that captures & creates processes, generates project plans and supports continuous process improvements.

Case Study – Ivis Technology

- xProcess embeds BIRT
  - BIRT designer for built in reports
  - Custom built wrapper for DE API
  - Report lib => ~10 data sets
  - Runtime launched from xProcess
- Project Summary Report provides snapshot of a project at any time
Case Study – MAXIMUS

MAXIMUS is a public company (NYSE: MMS) headquartered in Reston, Virginia, USA. Leading government services company with over 5,200 employees providing consulting, systems and outsourcing services.

FacilityMAX is a web based application that enables organizations to improve, automate and integrate all of their facility management, asset management and maintenance operations. FacilityMAX has over 150 customers.

http://www.assetsolutions.maximus.com
Case Study – MAXIMUS

- BIRT is embedded in the FacilityMAX web application
- MAXIMUS selected BIRT because:
  - Low total cost of ownership
  - Solid technology and architecture
  - Comprehensive support for variety of report layouts
  - Ability to report on large volumes of data
  - Open standards, including 100% Java and J2EE standard
  - Support from the Eclipse project and large open source community
- BIRT reports include work order status and trends; facility and project budgets; and employee productivity
- Initial integration completed in a few days
- Reports created in real-time and can refresh automatically on application screen

“The BIRT Reports technology offers a significantly lower total cost of ownership and high-quality Web-based reports to our customers.”

Trey Drake, Software Architect, Asset Solutions Group at MAXIMUS
Actuate Provides Flexible Deployment Choices

OPEN SOURCE PROJECTS
- Eclipse BIRT

COMMERCIAL PRODUCTS
- iPortal
- BIRT Reports

iServer Services
- Report Scheduling & Management
- Notification & Distribution
- Clustering & High Availability
- Security & Application Integration

Information Objects

Common Technology and Skill Set
- Embedded Reporting Engine
- Workgroup Reporting
- Enterprise Reporting
Actuate BIRT Report Technology Family

Actuate BIRT Report Designer Pro
Desktop tool for professional IT developers
Full power of scripting in Java; Eclipse IDE; and more

Actuate BIRT Report Designer
Desktop tool for report developers and power users
Easier to use; can leverage components created in Pro

Actuate BusinessReport Studio
Web tool for report creation by business users
Simple to use yet powerful template based model

Actuate BusinessReport / BIRT Report Interactive Viewer
Web tool for exploring and manipulating report documents
Answer ad hoc business questions without writing a report
BIRT: What is Next?

- Continue to add reporting capabilities for existing components
  - BIRT 2.1.1 – September 2006: Maintenance Release
  - BIRT 2.1.2 – February 2007: Maintenance Release
  - BIRT 2.2 – June 2007: Feature Release
- BIRT 2.2: Initial Project Plan at [www.eclipse.org/birt](http://www.eclipse.org/birt)
  - Expanded support for report types (Example: Dynamic crosstab)
  - New and improved data sources (Example: Web Services)
  - Additional output formats (Example: Excel)
  - Developer productivity (Example: integration components)
  - Additional charts types and Smart Formatting
  - … See project plan for many more
- Expand project into Analytics area of Business Intelligence
  - Looking for additional community participation in this area
BIRT Project Summary

- Top level Eclipse project
- 100% Java, Open Source, powerful, extensible reporting technology
- Easy to use, with a web centric design metaphor
- Supported by an active community
- Open source and free, with a commercial friendly license

- Getting started & learning more:
  - BIRT pages on Eclipse Web site http://www.eclipse.org/birt
  - BIRT pages on Actuate Web site http://www.actuate.com/birt
  - BIRT related blog http://birtworld.blogspot.com
  - BIRT Newsgroup news://news.eclipse.org/eclipse.birt
THANK YOU!