

BIRT: The Eclipse Reporting Framework

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Agenda

- What is BIRT?
- BIRT Features and Report Gallery
- Scripting BIRT
- Deploying BIRT Reports
- BIRT APIs
- Extension Points



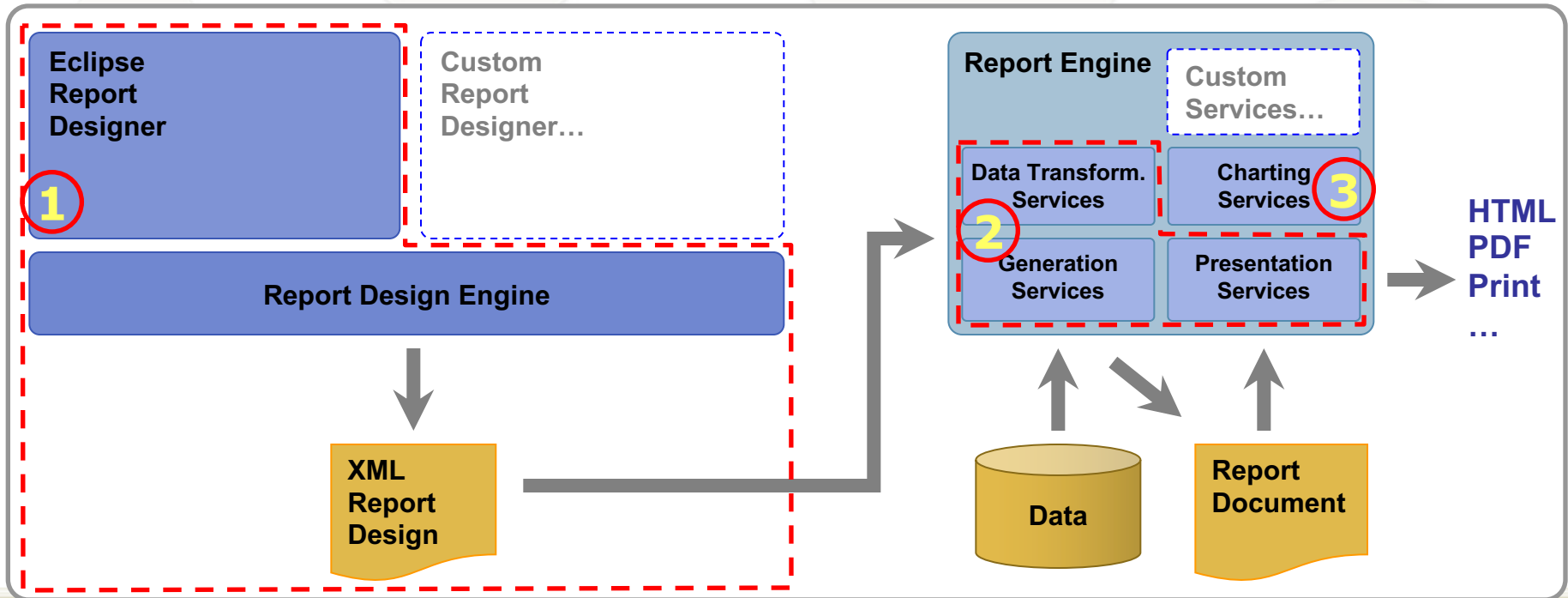
What Is BIRT?

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What is the BIRT Project?

- Business Intelligence and Reporting Tools based on Eclipse
- Initially focused on embedded reporting for Java developers
- Three initial components as part of BIRT project



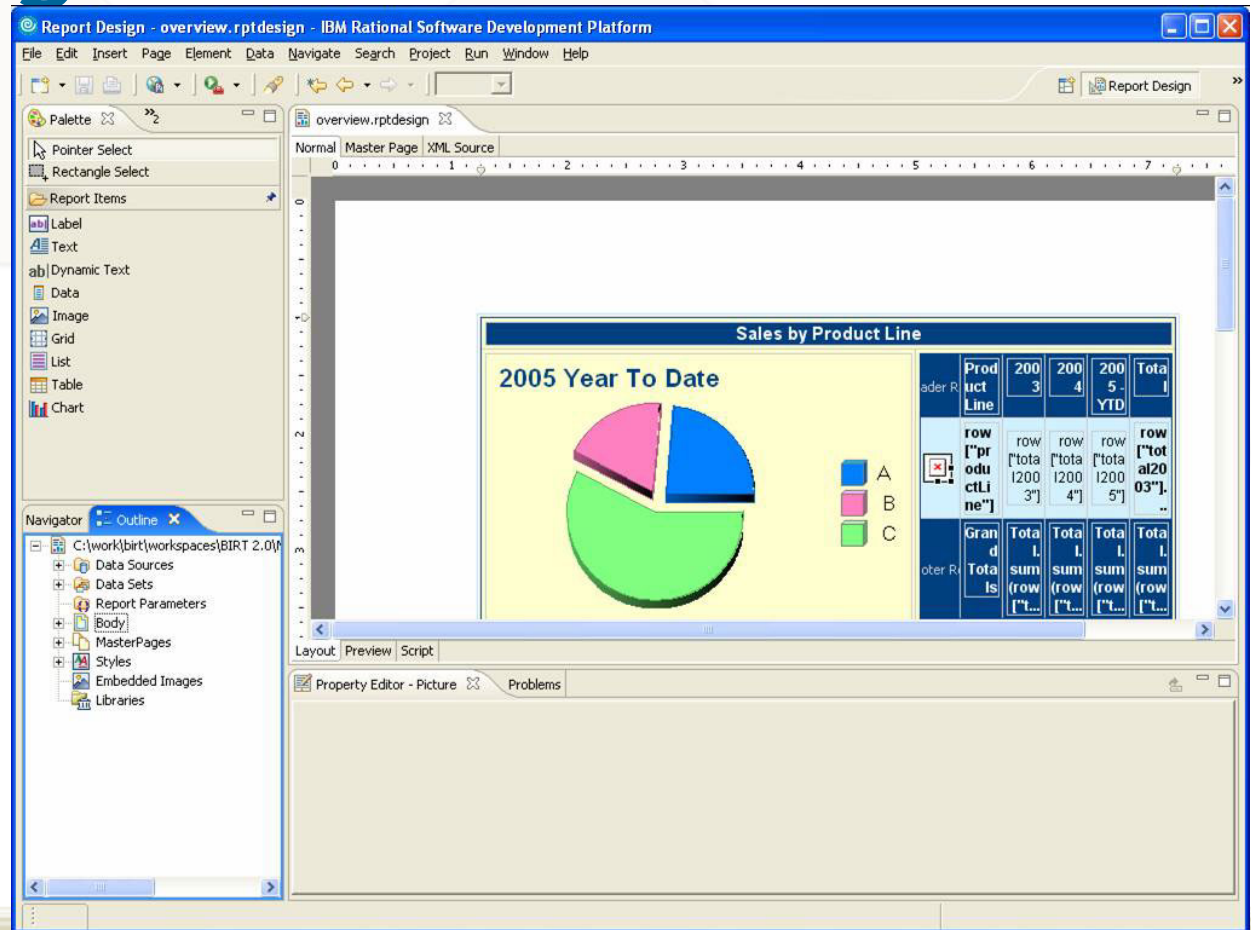
BIRT What is available

- **birt-report-designer-all-in-one-2_0_1**
 - BIRT Designer and most required plug-ins
- **birt-report-framework- 2_0_1**
 - BIRT Designer Eclipse plug-in
- **birt-rcp-report-designer- 2_0_1**
 - RCP Version of the BIRT Designer
- **birt-runtime- 2_0_1**
 - BIRT web application
 - report engine runtime and examples
 - chart engine runtime.
- **birt-charts- 2_0_1**
 - Stand alone chart engine plug-ins.
- **Samples**



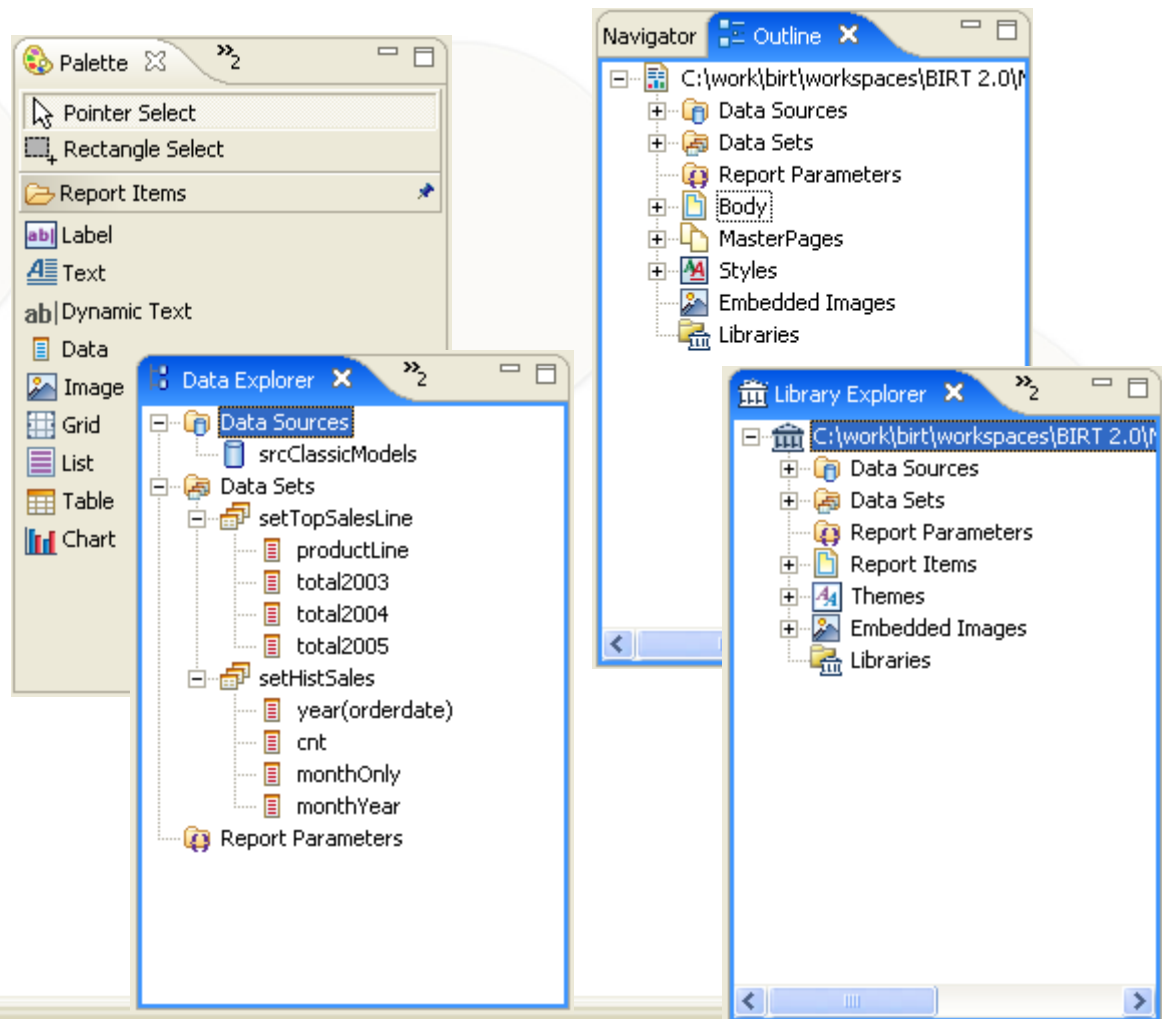
BIRT Designer

- WYSIWYG
- Drag and Drop



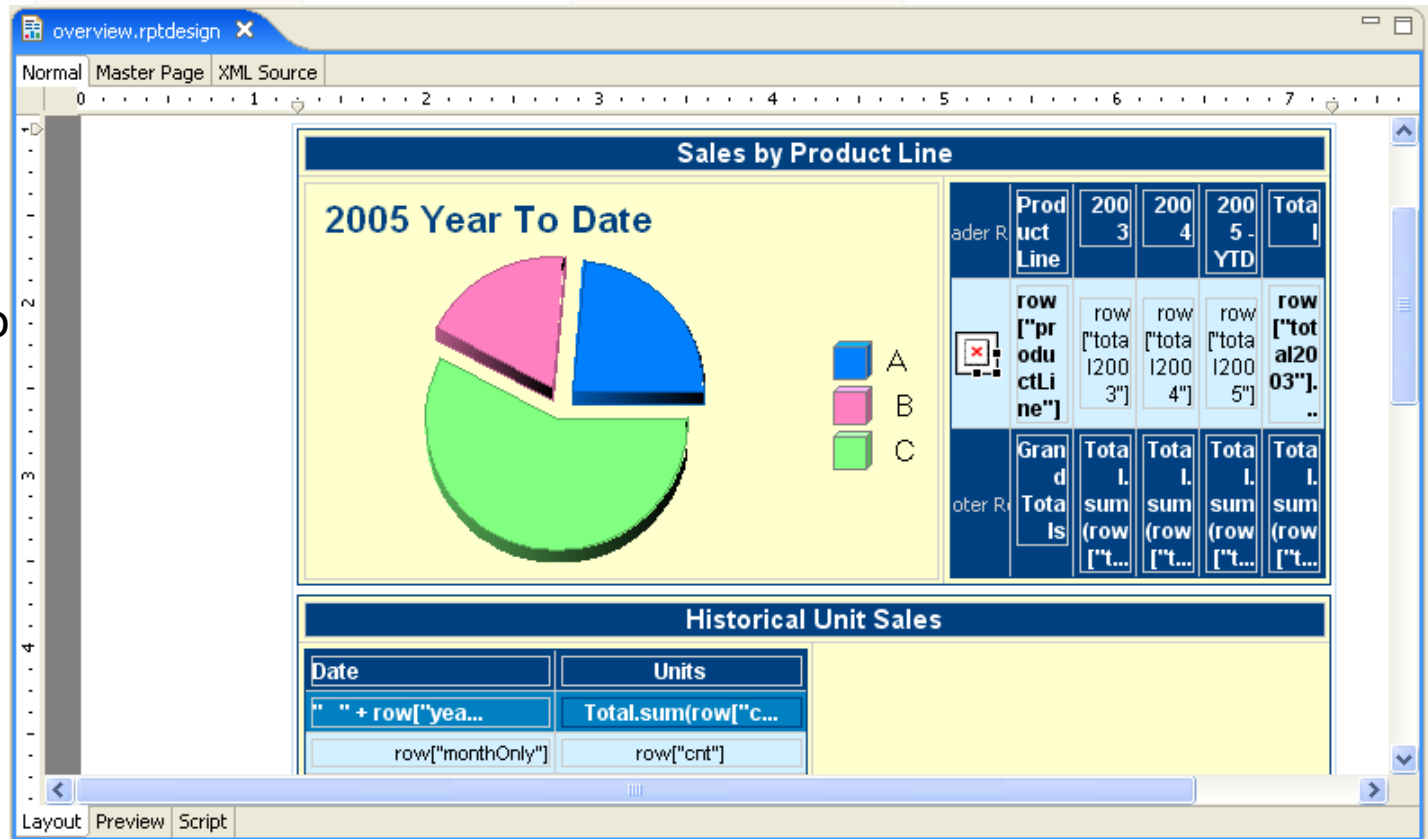
BIRT Views

- Extendable Palette
- Graphical outline of Report
- Multiple Data Sources
- Static and Dynamic parameters including cascaded
- Reuse work with Libraries and Templates
- Import Style sheets

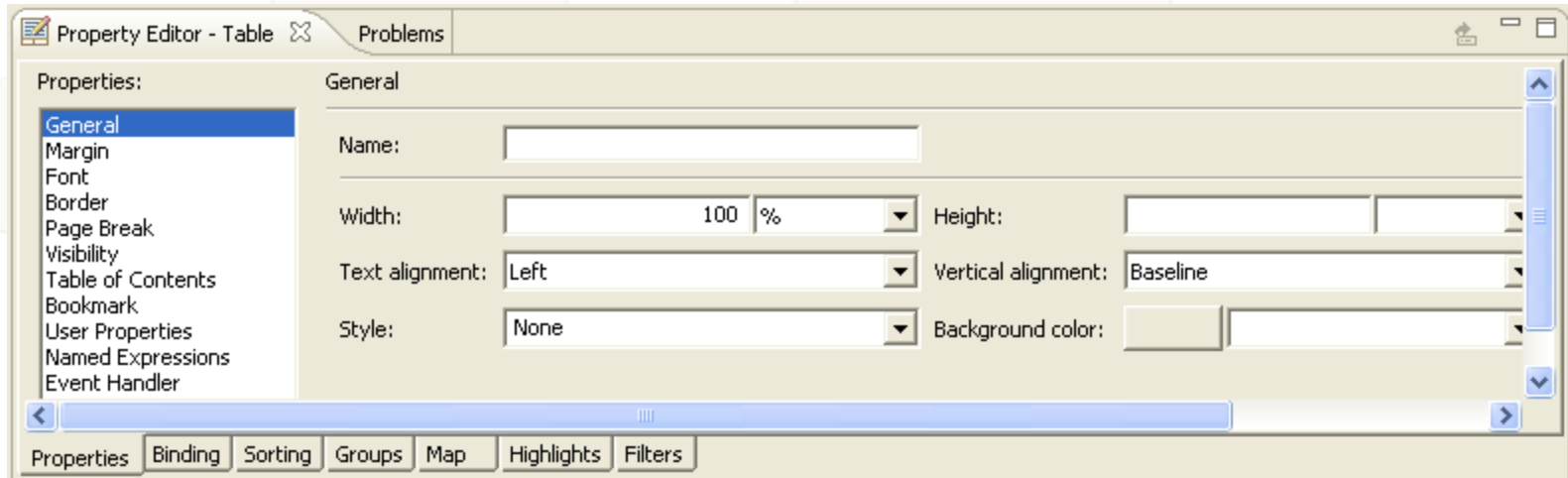


BIRT Editor

- Layout and Scripting Views
- Quick access to graphical components or edit XML Directly



Property Editor View



- Simple Property Editor
- Mapping and Highlighting
- Sorting and Filters



Previewing BIRT Reports

- Preview Reports while building
- View Data in HTML or PDF
- Cached Data

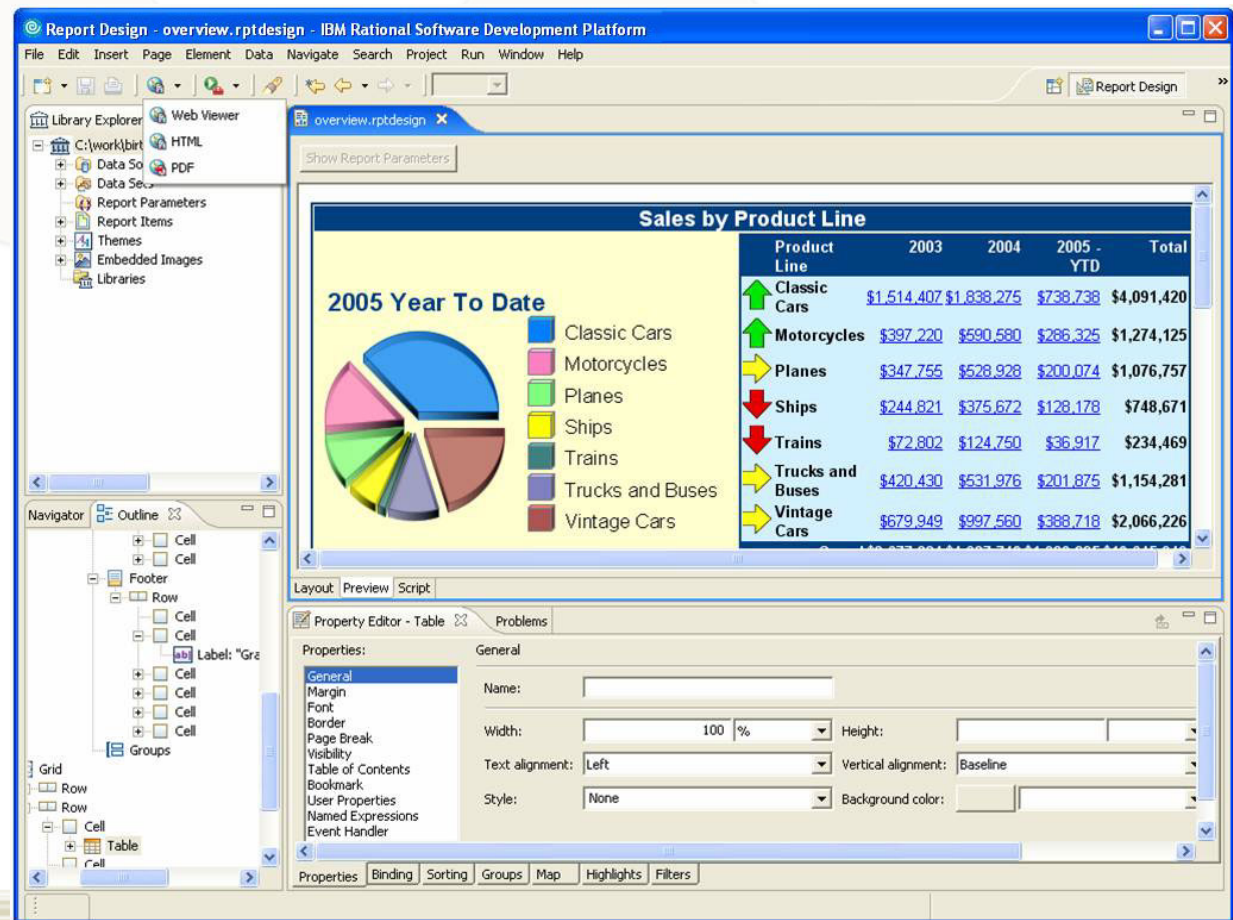
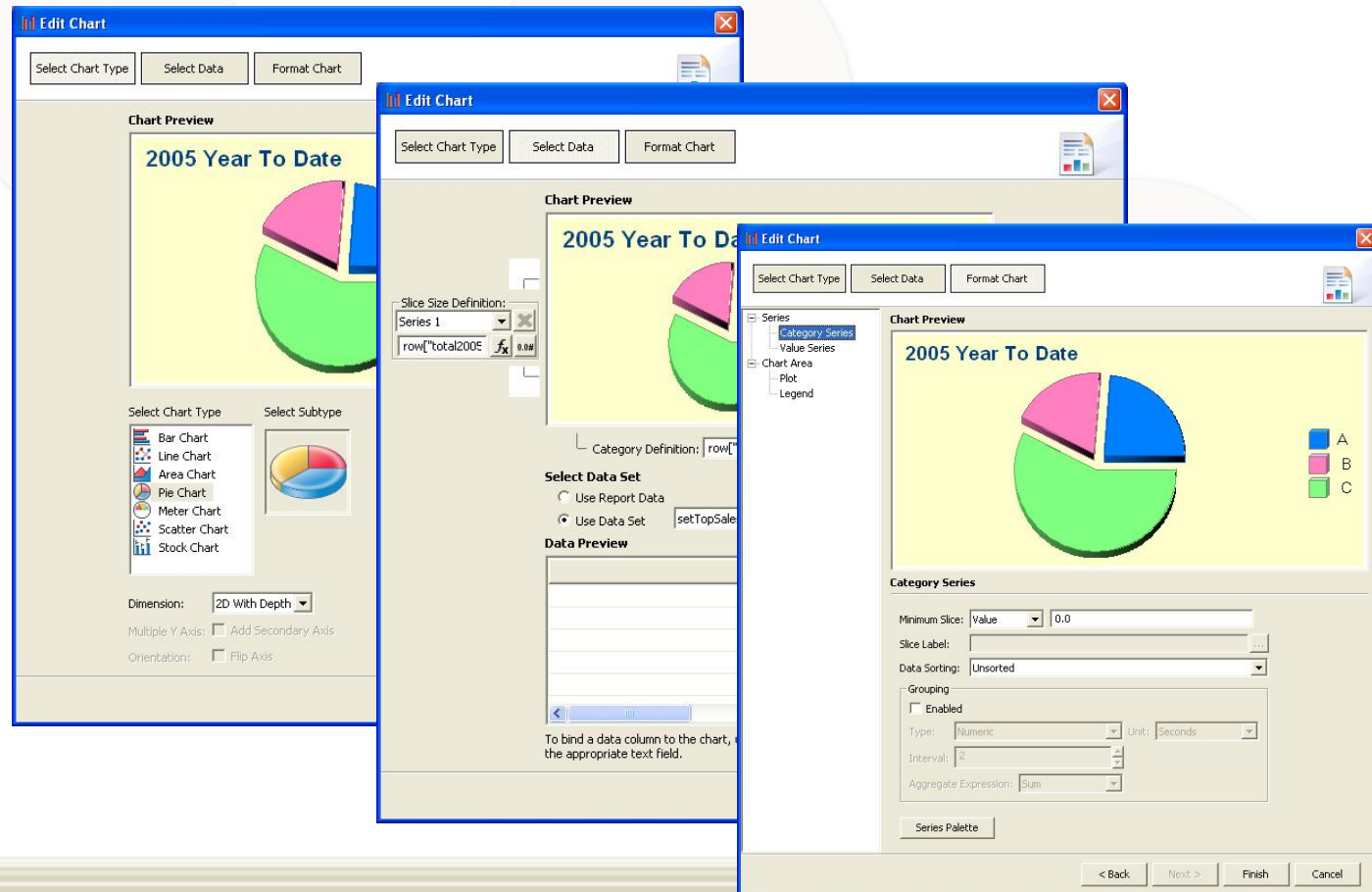


Chart Builder

- Simple Wizard
- Seven Chart types
- Many Sub types
- SVG
- PNG
- GIF
- JPG
- BMP
- Filtering



BIRT Features and Report Gallery

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BIRT Features

- Palette of report components - Text (CLOB's, HTML), data, images (BLOBs), tables, grids, lists, labels
- Sorting, grouping, filtering, conditional highlighting, mapping
- Scripting in JavaScript/Java
- Cascading & dynamic report parameters
- Hyperlinking, bookmarks
- TOC, Paging
- Direct XML source editor for report design
- Multi-pass processing (top N/bottom N)
- Data sources: POJO's, JDBC, CSV, XML
- WYSIWYG Editor
- Integrated Chart Wizard
- Report Component Libraries
- Report Templates
- Styles, import CSS, themes
- Wizards for guided development
- Report outline
- Preview within report designer for iterative development
- Context pass through to data source
- Call stored procedure




BIRT Designer Demo



Sales Invoice Report

Embedded images
(including BLOBS)

	Classic Models, Inc. 701 Gateway Boulevard, San Francisco, CA 94107 Sales Invoice																																															
Customer Details Online Diecast Creations Co. Dorothy Young 2304 Long Airport Avenue Boston, NH 62005 USA	Invoice Details Customer Number: 363 Order Number: 10100 Order Date: Jan 6, 2003 Ship Date: Jan 10, 2003 Office: Boston Sales Representative: Steve Patterson																																															
<table><thead><tr><th>Code</th><th>Description</th><th>Quantity</th><th>MSRP (\$)</th><th>Discount</th><th>Unit Price (\$)</th><th>Total (\$)</th></tr></thead><tbody><tr><td>S18_1749</td><td>1917 Grand Touring Sedan</td><td>30</td><td>170.00</td><td>20.00%</td><td>136.00</td><td>4,080.00</td></tr><tr><td>S18_2248</td><td>1911 Ford Town Car</td><td>50</td><td>60.54</td><td>9.00%</td><td>55.09</td><td>2,754.50</td></tr><tr><td>S18_4409</td><td>1932 Alfa Romeo 8C2300 Spider Sport</td><td>22</td><td>92.03</td><td>18.00%</td><td>75.46</td><td>1,660.12</td></tr><tr><td>S24_3969</td><td>1936 Mercedes Benz 500k Roadster</td><td>49</td><td>41.03</td><td>13.99%</td><td>35.29</td><td>1,729.21</td></tr><tr><td colspan="6">TOTAL \$</td><td>10,223.83</td></tr></tbody></table>							Code	Description	Quantity	MSRP (\$)	Discount	Unit Price (\$)	Total (\$)	S18_1749	1917 Grand Touring Sedan	30	170.00	20.00%	136.00	4,080.00	S18_2248	1911 Ford Town Car	50	60.54	9.00%	55.09	2,754.50	S18_4409	1932 Alfa Romeo 8C2300 Spider Sport	22	92.03	18.00%	75.46	1,660.12	S24_3969	1936 Mercedes Benz 500k Roadster	49	41.03	13.99%	35.29	1,729.21	TOTAL \$						10,223.83
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TOTAL \$						10,223.83																																										

Layout flexibility

Rich formatting control
(Including conditional
formatting)

Computed
column

Comprehensive aggregation
functions



Stock Price & Volume Report

Classic Models Corp.

From: 1/2/02 12:00 AM

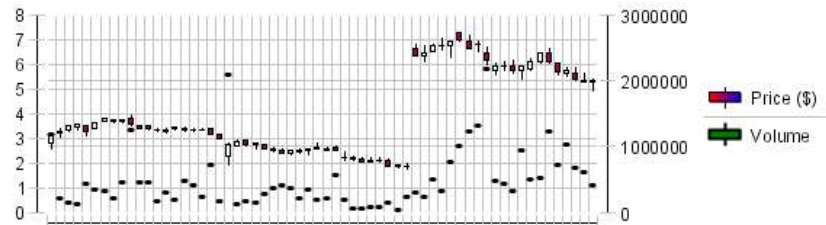
To: 12/31/04 12:00 AM

2002

January

High: 7.25
Avg. Open: 6.158
Max. Vol: 2,183,700

Low: 4.91
Avg. Close: 6.185
Min. Vol: 235,500



Grouping & sorting

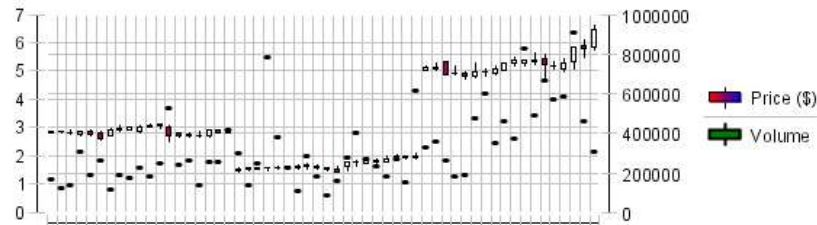
Parent table

Integrated Charting
as a child of parent table

February

High: 6.6
Avg. Open: 5.279
Max. Vol: 904,700

Low: 4.7
Avg. Close: 5.203
Min. Vol: 180,000



Organization Report



Classic Models, Inc.

701 Gateway Boulevard,
San Francisco, CA 94107

Employee Report

Office Code: 1		Office Code: 4	
Diane Murphy	President	Mary Patterson	VP Sales
Mary Patterson	VP Sales	Gerard Bondur	Sale Manager (EMEA)
Jeff Firrelli	VP Marketing	Gerard Bondur	Sale Manager (EMEA)
Mary Patterson	VP Sales	Loui Bondur	Sales Rep
Anthony Bow	Sales Manager (NA)	Gerard Hernandez	Sales Rep
Anthony Bow	Sales Manager (NA)	Pamela Castillo	Sales Rep
Leslie Jennings	Sales Rep	Martin Gerard	Sales Rep
Leslie Thompson	Sales Rep		

Table level filter for
Office Code 1

Parallel layout

Table level filter for
Office Code 4



Orders Summary

Drill through
from Orders
Summary

Classic Models, Inc.
701 Gateway Boulevard,
San Francisco, CA 94107

Orders Summary

Order Detail

Order Number: 10101

Prod. Code	Qty	Price Per	Line Total
S18_2795	26	167.06	\$4,343.56
S24_2022	46	44.35	\$2,040.10
S24_1937	45	32.53	\$1,463.85
S18_2325	25	108.06	\$2,701.50
Order Total			10,549.01

Jan 1, 2000 10:49 AM

Apr 29, 2003 12:00 AM

May 5, 2003 12:00 AM

May 8, 2003 12:00 AM

May 13, 2003 12:00 AM

Apr 26, 2003 12:00 AM

May 2, 2003 12:00 AM

May 1, 2003 12:00 AM

May 13, 2003 12:00 AM

Status: Shipped

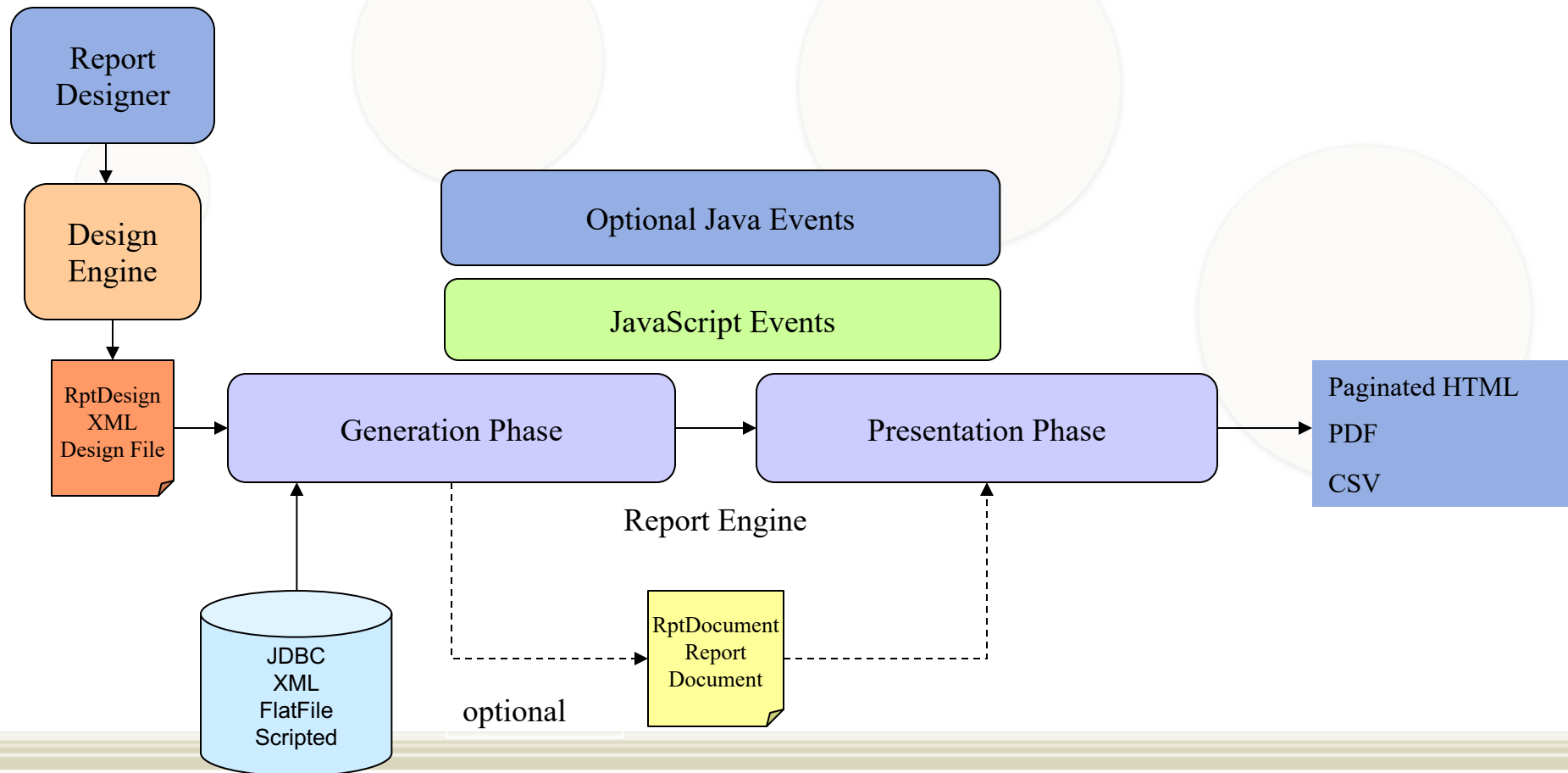
Order details report for
specific Order Number

Scripting BIRT

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BIRT Pipeline



Scripting

- BIRT JavaScript
 - Based on Mozilla Rhino
 - This is Server Side Scripting not Browser Based Scripting
 - Two types of Scripting
 - Expression Scripts - Scripts that return a data value. Available in the Expression Builder.
 - Element Scripts - JavaScript methods that are called on events. Customize the behavior of the Report. Available in the Script view. Context of when the event occurs is important.



Expression Scripting

Expression Builder

Type an expression in the Expression field. Browse the lists of available objects and

```
1 if(((row["total2005"])/5) / (row["total2004"])/12)) >= .95 )
2 "up.gif"
3 else if(((row["total2005"])/5) / (row["total2004"])/12)) <= .85 )
4 "down.gif"
5 else
6 "even.gif"
```

Operators: + - * / ! = < > & | ()

Category: Available Data Sets, Report parameters, Native JavaScript Functions, BIRT Functions, Operators

Sub-Category:

Expression Builder

Type an expression in the Expression field. Browse the lists of available objects and double-click to copy into your expression.

```
1 if ( params["Production"] ){
2 "jdbc:mysql://localhost/production";
3 }else{
4 "jdbc:mysql://localhost/qa";
5 }
```

Operators: + - * / ! = < > & | ()

Category: Report parameters, Native JavaScript Functions, BIRT Functions, Operators

Sub-Category:

Double Click to insert:

OK Cancel



Expression Scripting - Locations

- Creating the display value for a report item
- Creating a computed field in Data Explorer
- Specifying a filter condition
- Specifying a data series for a chart
- Specifying a map condition
- Specifying a highlight condition
- Specifying a group key
- Specifying a hyperlink
- Specifying the URI for an image
- Specifying dynamic data in a text control



BIRT Event Model

Optional Java Event Handlers

JavaScript Event Handlers

Generation Phase

Presentation Phase

Report Level

Initialize
beforeFactory
afterFactory

Data Source/Set

beforeOpen
afterOpen
onFetch
beforeClose
afterClose

Report Level

Initialize
beforeRender
afterRender

Report Element

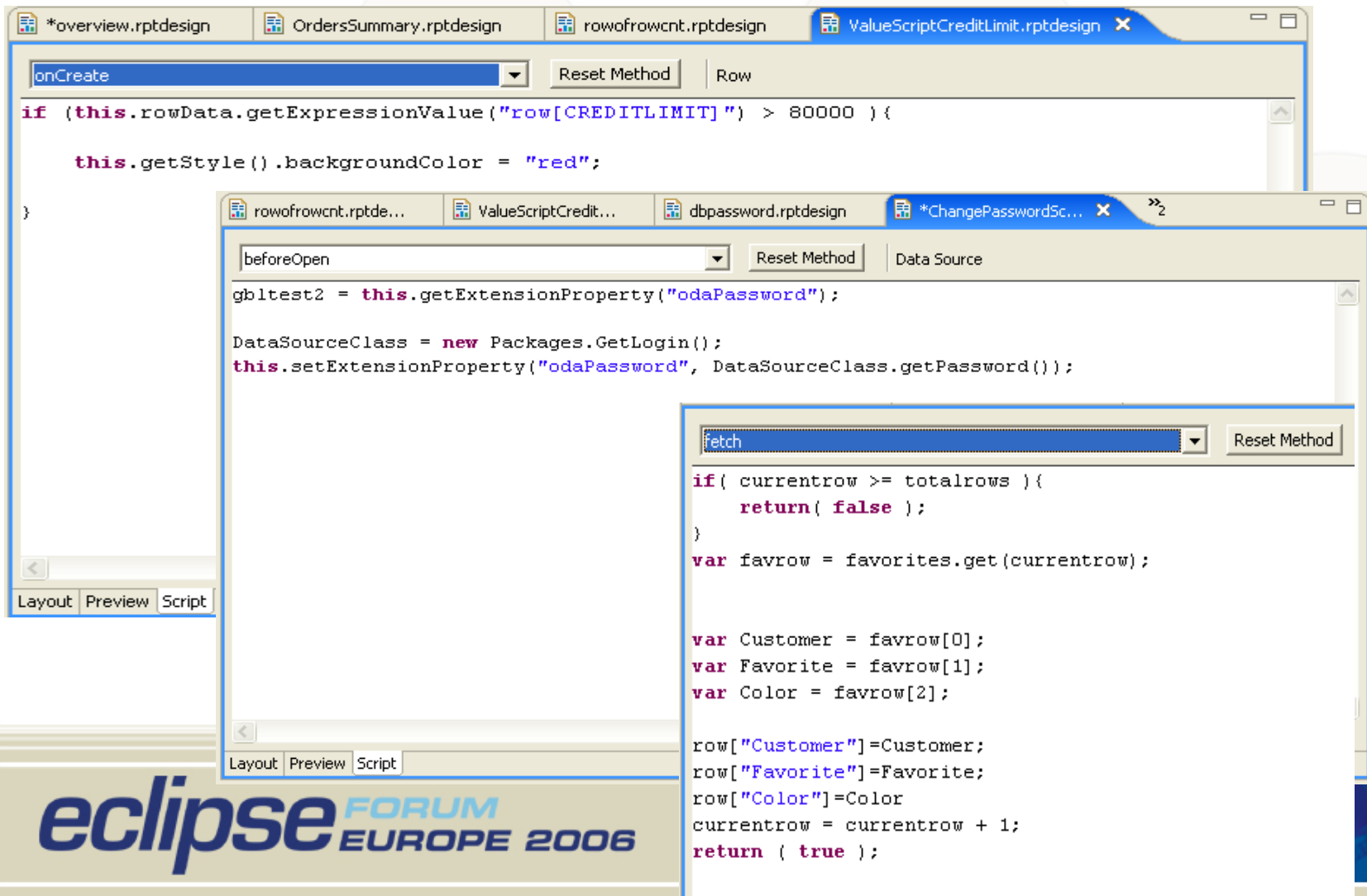
onRender

Report Element

onPrepare
onCreate



Element Scripting



The screenshot displays the Eclipse IDE interface with multiple RPT Design windows open. The top window, titled 'ValueScriptCreditLimit.rptdesign', shows a script for the 'onCreate' event of a 'Row' element. The script checks if the 'row[CREDITLIMIT]' value is greater than 80000 and sets the background color to 'red' if true.

```
if (this.rowData.getExpressionValue("row[CREDITLIMIT]") > 80000 ) {  
  
    this.getStyle().backgroundColor = "red";  
  
}
```

The bottom window, titled '*ChangePasswordSc...', shows a script for the 'beforeOpen' event of a 'Data Source' element. The script initializes a 'DataSourceClass' and sets the 'odaPassword' extension property.

```
gbltest2 = this.getExtensionProperty("odaPassword");  
  
DataSourceClass = new Packages.GetLogin();  
this.setExtensionProperty("odaPassword", DataSourceClass.getPassword());
```

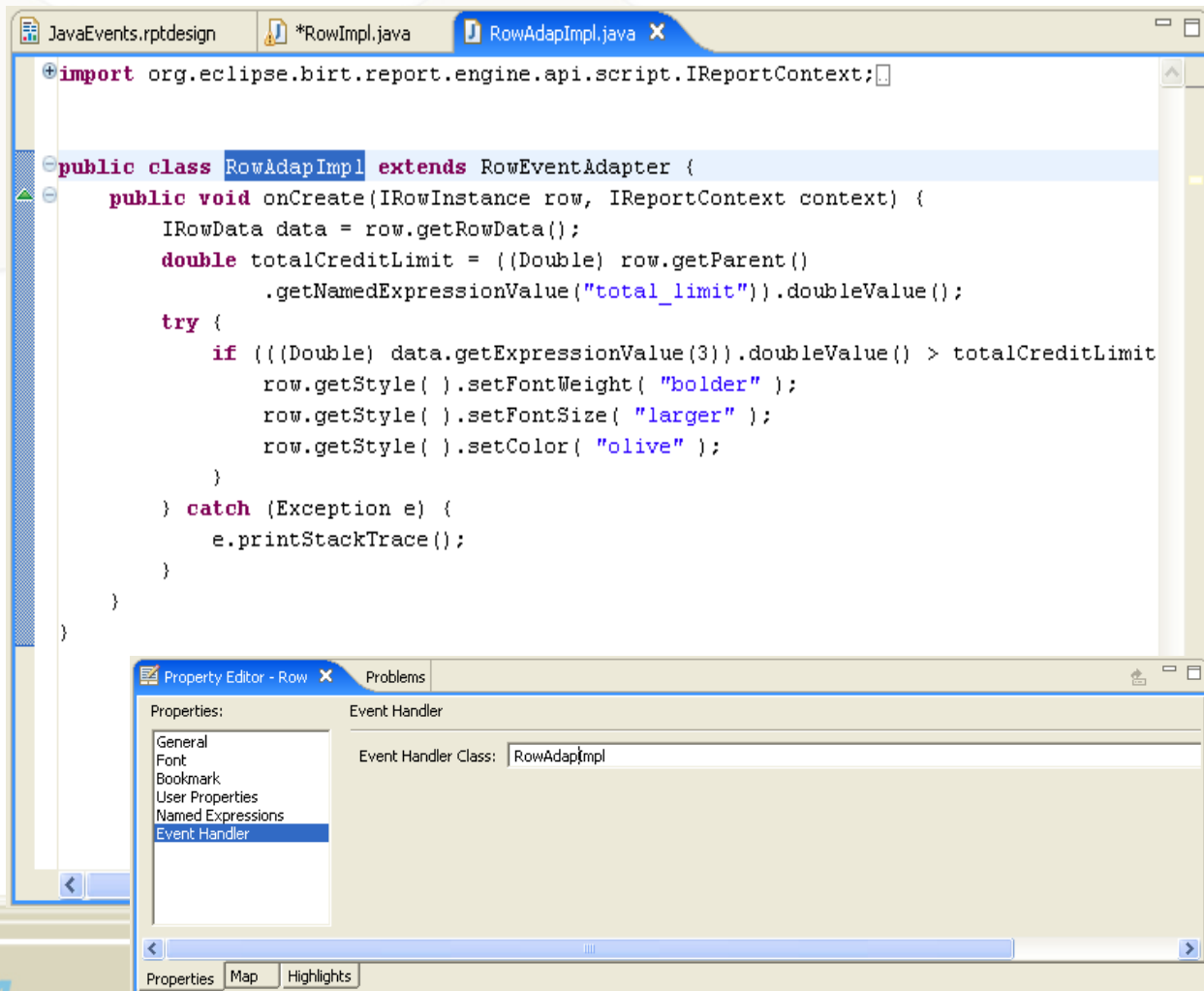
A third window, titled 'fetch', shows a script for the 'fetch' event. It checks if the current row is greater than or equal to the total rows, returns false if true, and then sets row properties for 'Customer', 'Favorite', and 'Color' based on the current row's data.

```
if( currentrow >= totalrows ){  
    return( false );  
}  
  
var favrow = favorites.get(currentrow);  
  
var Customer = favrow[0];  
var Favorite = favrow[1];  
var Color = favrow[2];  
  
row["Customer"]=Customer;  
row["Favorite"]=Favorite;  
row["Color"]=Color  
currentrow = currentrow + 1;  
return ( true );
```

The Eclipse IDE interface includes a 'Layout' tab at the bottom of each window, and the overall theme is 'eclipse FORUM EUROPE 2006'.

Element Event Handlers using Java

- A set of Adapters are supplied that allow all event handlers to be built in Java.
- The class is a property of the element.
- Can be debugged with JDT using the BIRT Report Configuration.



BIRT Scripting Demo



Deploying BIRT Reports

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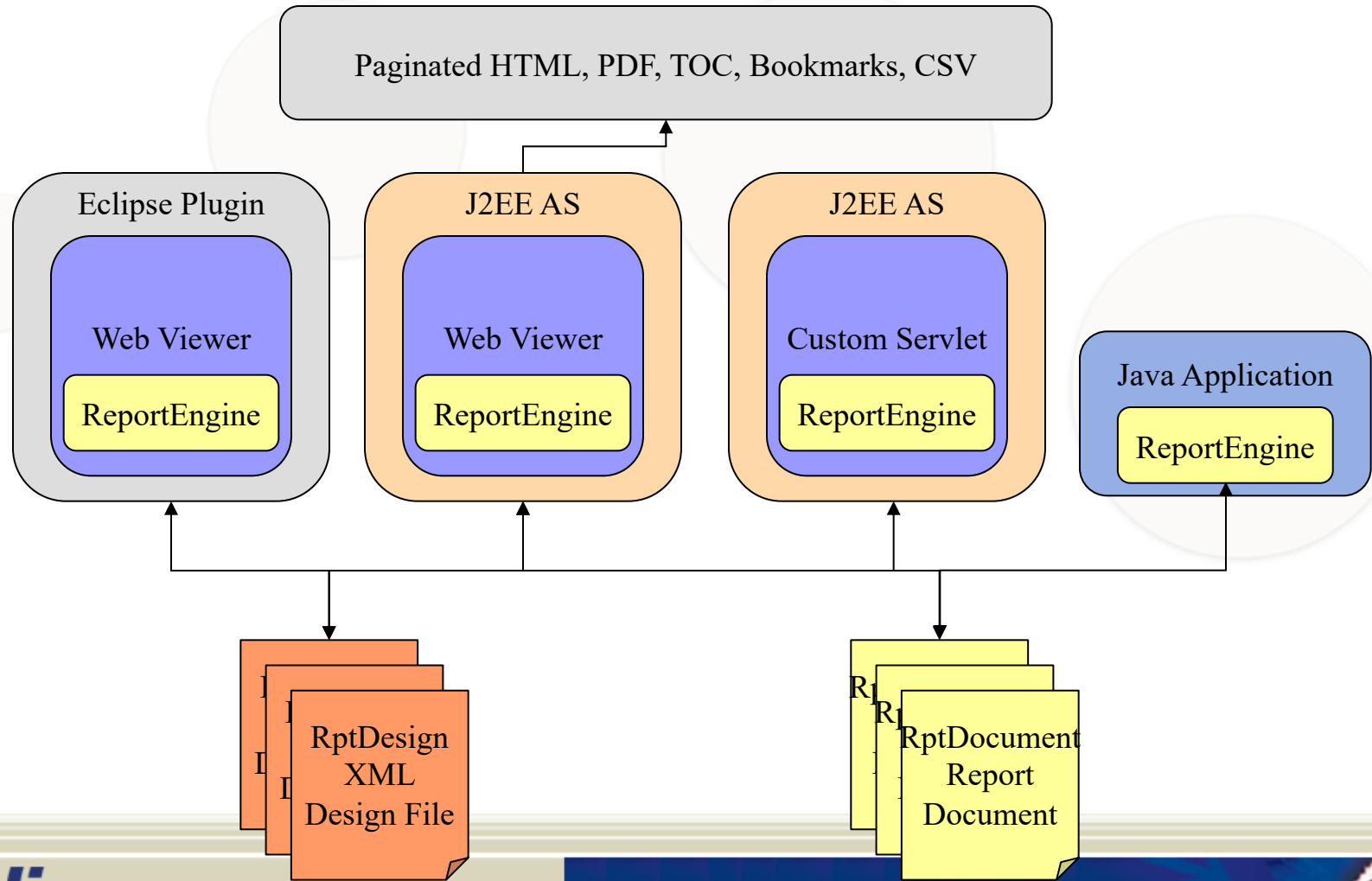


Deploying Options

- Deploy the Web Viewer Example
- Deploy BIRT Under an RCP application
- Build your own Servlet using the BIRT Engine
- Use the BIRT Engine in your own Java Application (Discussed in APIs)



Deploying BIRT Reports



BIRT Web Application

- Generate report and return as PDF or HTML.
- Supports Paginated HTML.
- Export to CSV.
- Retrieves Images and Chart Output.
- Supports TOC and Bookmark Functionality.
- Parameter Entry.



BIRT Viewer

The BIRT Report Viewer interface displays a list of reports on the left and a report preview on the right. The report preview shows a pie chart titled "2005 Year To Date" with a legend for various vehicle categories. The legend includes: Classic Cars (blue), Motorcycles (pink), Planes (green), Ships (yellow), Trains (dark green), Trucks and Buses (purple), and Vintage Cars (brown). The report is dated 2005.

Report Name	Count
AV Stores, Co.--	187
Alpha Cognac--	242
Amica Models &	
Anna's Decorati	
Order: 1014	
Order: 1016	
Order: 1037	
Order: 1039	
Atelier graphiqu	
Australian Colle	
Australian Colle	
Australian Gift M	
Auto Associés 8	
Auto Canal+ Pe	
Auto-Moto Clas	
Baane Mini Imp	

The "Export Data" dialog box shows the "Available result sets" list with "ELEMENT_22_1" selected. The "Available Columns" list includes: row["productLine"], row["total2003"], row["total2004"], row["total2005"], and row["total2003"] + row["total2004"]. The "Selected Columns" list is currently empty.

The "Parameter" dialog box displays a message: "Parameters marked with * are required." Below this, a "CascadingParameterGroup" is shown with two required parameters: "Customer's Country: *" and "Customer's City: *". The "Customer's Country" dropdown is set to "USA" and the "Customer's City" dropdown is set to "NYC".

BIRT Deployment Examples

Demo



BIRT APIs

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BIRT APIs

- Report Engine API - Loads and executes design files.
- Design Engine API - Creates and modifies report designs.
- Charting API - Builds and renders charts.



Report Engine API

- Used to integrate run-time portion of BIRT into your application.
- Used to discover and set parameters.
- Run a report and output PDF/HTML.
- Combine or Split Run and Render Task
- Save to Intermediate format.
- Extract data.
- Fetch an image or chart for a report.
- 2.0 Engine supports additional features for paging, cascaded and dynamic parameters, etc.
- Example in the runtime download.



Design Engine API

- Create and modify report designs.
- Create and delete report elements..
- Put report elements into slots.
- Retrieve metadata from report elements, properties and slots
- Undo/Redo.
- Semantic Checks on report designs.



BIRT Chart Engine API

- Stand Alone Chart Generator
- Does not require the use of the Chart User Interface
- Does not require the use of the Report Engine API
- Data is provided in a static data structure
 - When Charts render in Reports, Report Engine builds static structure from the specified ODA data and creates the static structure
 - Charts running stand-alone require a data feed
 - `org.eclipse.birt.chart.datafeed-Custom User Data Set Interface`
 - `org.eclipse.birt.chart.model.data-Interfaces` defines data structure
- JavaScript events support addition of custom business logic



Extension Points

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BIRT Extensions Points

- BIRT is not just a tool but a framework.
- Predominant Extension Points.
 - Emitter - Used to create additional output formats.
 - ODA - DTP - Used to add customized Data Source Drivers
 - Report Item - Used to extend the Palette with additional items.
 - Chart Types - Used to add or extend chart types



BIRT API Demo



More on BIRT

- www.eclipse.org/birt
- www.eclipse.org/newsportal/thread.php?group=eclipse.birt
- Source code for examples will be posted to the Eclipse site after the conference



Questions?

