

CONSUME, PRODUCE AND TRANSFORM XML

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1. Produce and Transform XML with the new Crystal Reports
 1. Crystal Reports Export to XML using XSLT
 2. Demo #1: Application integration through XSLT
 3. XML exporting in the EROM SDK
 4. Demo #2: XML exporting SDK usage
2. Consume XML XML (and WebService) Data with the New Crystal Reports
 1. Overview: XML and Web Services
 2. Demo #3: XML over HTTP – Xtreme Sample XML Data
 3. Demo #4: Secure Web Service data
3. Q&A
4. Appendix: Structure your XML for performance

Exporting XML from the new Crystal Reports

NEW XML EXPORTER

- ▶ All new Crystal Reports XML exporter
- ▶ New Crystal Reports XML schema
 - ▶ Easy to use
 - ▶ Designed for developers
- ▶ Transform XML to industry-standard schemas and file interchange formats
 - ▶ XBRL, HL7, JXDM
 - ▶ HTML, CSV, RSS
 - ▶ Custom formats – anything that's text-based
- ▶ Embed multiple XML transformations in each report
- ▶ Export directly to the desired format with built-in transform engine

NEW XML EXPORTER - DEMO

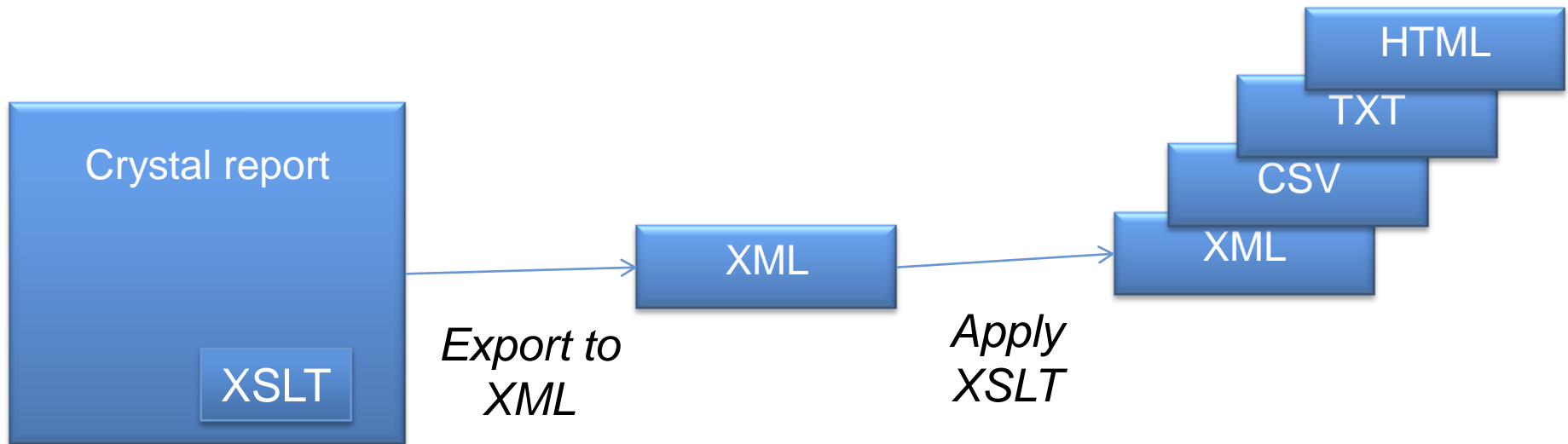
- ▶ Export to XML transformed to HTML

NEW XML EXPORTER

- ▶ XML exporting now fully featured in the New Business Objects suite:
 - ▶ Crystal Report Viewers
 - ▶ New Business Objects Scheduling and Publishing
- ▶ EROM SDK exposure: Java and .NET

NEW XML EXPORTER INTERNALS

- ▶ Internal engine workflow



NEW XML EXPORTER – DEMO #1 1/2

- ▶ XML Export Format Manager
- ▶ Exporting workflow
- ▶ Crystal Reports XML (new schema!)
- ▶ CSV XSLT

NEW XML EXPORTER – DEMO #1 2/2

- ▶ Scenario: Application Integration
- ▶ Microsoft Outlook 2007 – Address Book import
 - ▶ CSV-based Address Book format
- ▶ Crystal Reports Xtreme sample data – Customer Table
- ▶ Format transform: XML to Outlook Address Book CSV
- ▶ Semantic transform: field name match-up
 - ▶ CustomerName to Company

XML exporting with the EROM SDK

- ▶ EROM SDK exposure: Java and .NET
 - ▶ CrystalDecisions.ReportAppServer.ReportDefModel:
 - ▶ XMLExportFormat
 - ▶ XMLExportFormats
 - ▶ XMLExportFormatOptions

```
XMLExportFormats xmlFormats =  
    reportDocument.ReportClientDocument.  
    PrintOutputController.GetSavedXMLExportFormats();  
  
XMLExportFormatOptions xmlExportFormatOptions = new  
    XMLExportFormatOptions();  
xmlExportFormatOptions.ExportSelection = formatIndex;  
  
exportOptions.ExportFormatType =  
    CrReportExportFormatEnum.crReportExportFormatXML;
```

NEW XML EXPORTER SDK – DEMO #2

- ▶ Crystal Report with XML HTML transform
- ▶ Use SDK to export to HTML then send as email message through Microsoft Outlook 2007
 - ▶ Same code workflow for all applications (i.e., vertical systems)

Reporting on XML data with Crystal Reports 2008

CONSUMING XML OVERVIEW

- ▶ What is XML? (Extensible Markup Language)
 - ▶ A standard that allows information and services to be encoded with meaningful structure and semantics that computers and humans can understand
 - ▶ Can be easily extended to include user-specified and industry-specified tags
 - ▶ Includes both the document content and information about that content (metadata)
- ▶ What is a Web Service?
 - ▶ A collection of protocols and standards based on XML that are used for exchanging data between applications or systems
- ▶ Both enable easier integration and information sharing

- ▶ It provides a very “loosely coupled” (i.e. easy, robust) integration point between systems providing the data and your Crystal report
 - ▶ Exchange structured data between relatively disconnected entities
- ▶ Access to information that is not yet in or would be difficult to get in your data warehouse

Real life scenario

▶ Objective

- ▶ Update reporting (to Crystal Reports) for a legacy application

▶ Issue

- ▶ Legacy application had a very complicated data model, with business logic on data assembly in the application (not the database)

▶ Solution

- ▶ Add XML generation to the application (combining all the necessary data into one XML file).
- ▶ Create Crystal reports on the XML

HOW DOES CRYSTAL REPORTS SUPPORT CONSUMING XML?

- ▶ Crystal Reports Native XML data driver
 - ▶ Consumes both XML and Web Services
 - ▶ Listed in the Report Creation Wizard in the New Crystal Reports as “XML and Web Services”
- ▶ ADO.NET
 - ▶ Create an ADO.NET data set based on XML
 - ▶ Pass the ADO.NET data set object to Crystal Reports using the ADO.NET data driver
 - ▶ .NET Developer Focused

Note: Demos in this presentation will focus on the native XML data driver

XML AND WEB SERVICES DATA DRIVER

- ▶ XML and Web Services driver features in the New Crystal Reports
- ▶ Parameters
- ▶ Common security standards
 - ▶ SSL
 - ▶ WS-Security
- ▶ RPC encoding
- ▶ Overall Web Service compatibility improvements

CONSUMING XML DATA: COUNTING THE WAYS

1. Direct file access to the XML file
2. HTTP and HTTPS access to the XML file
 - ▶ Just drop your XML files on a Web server
3. Web Services
 - ▶ Inherently XML
 - ▶ Expose Web Service data as an XML data set

XML CONSUMPTION: HTTP – DEMO #3

- ▶ XML and XSD (schema) files ‘dropped’ in a Web site’s virtual directory
 - ▶ Simple
 - ▶ No code necessary – just export XML from your app
- ▶ Xtreme Sample Access Database – exported to XML
- ▶ Drop the Xtreme Sample Data exported to XML into a virtual IIS folder

Web Services

WHY REPORT ON WEB SERVICES?

- ▶ Financial data services on the Web
 - ▶ Industry-specific comparisons
 - ▶ Currency conversions
- ▶ Business Objects QaaWS (Query as a Web Service)
- ▶ Salesforce.com
 - ▶ New Crystal Reports has a Salesforce.com driver
- ▶ Securely expose and access your data without direct access to the back-end
 - ▶ Branch offices
 - ▶ Departmental services

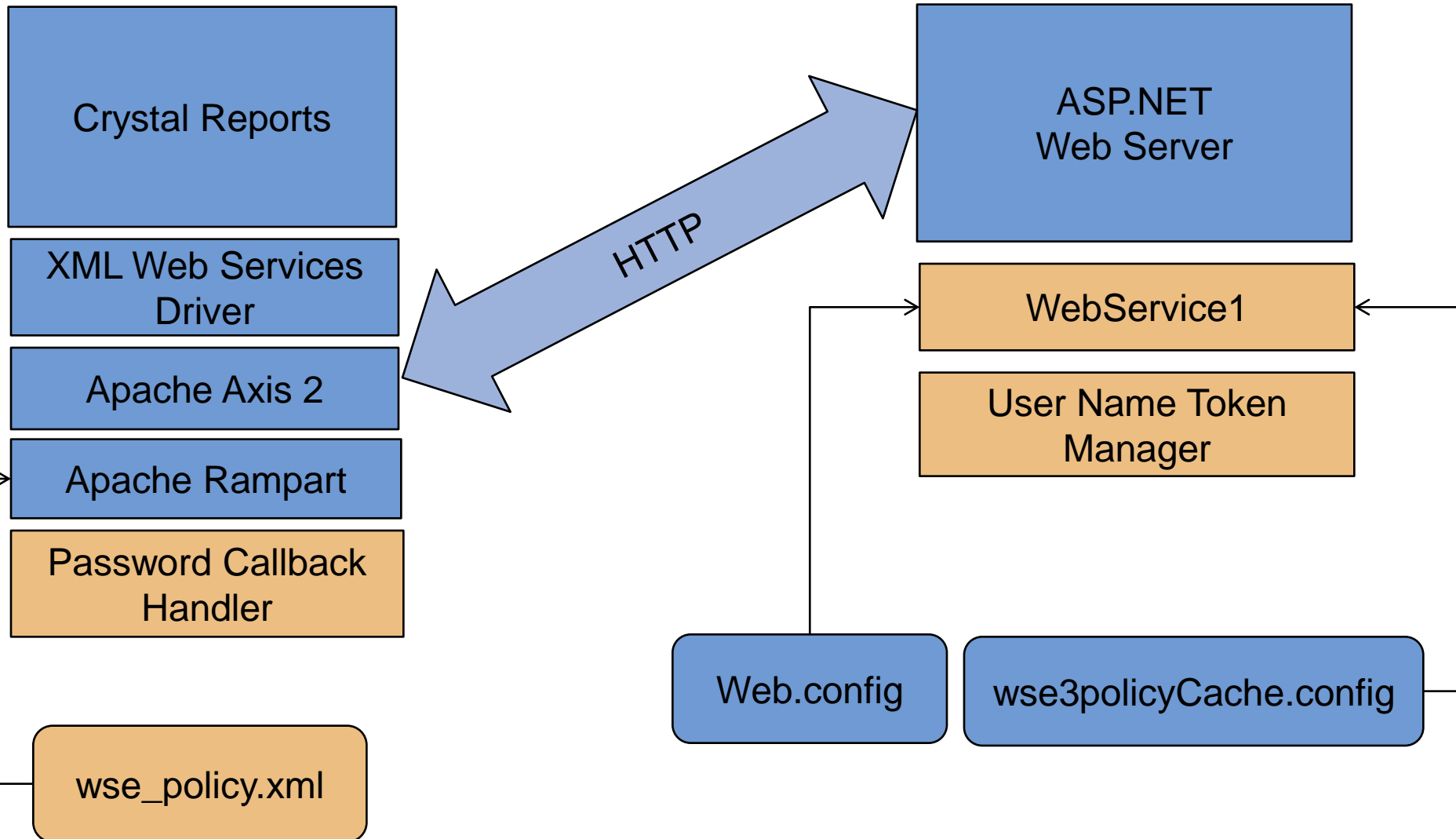
CONSUMING XML FROM MODERN WEB SERVICES

- ▶ XML over HTTP
 - ▶ SSL secures the channel, still need to control access
- ▶ Web Services
 - ▶ Now have WS-* Support in Crystal Reports
 - ▶ XML and Web Services driver uses Apache Axis 2
 - ▶ WS-Security configuration
- ▶ Parameters
 - ▶ New digest and body parameter support allows for various types of authentication (email, user ID and password)

CONSUMING XML: WEB SERVICES – DEMO #4

- ▶ Microsoft Windows Communication Foundation-based Web Service (WCF)
- ▶ Parameters

WS-Security Moving Parts



CONSUMING XML: WEB SERVICES – DEMO #5

- ▶ WS-Security using UsernameToken authorization
- ▶ ASP.NET (ASMX) with WSE 3.0 Implementation
 - ▶ SOAP 1.1
- ▶ WS-Security configuration for the Crystal Reports XML and Web Services driver
- ▶ Security Policy File

- ▶ **Goal scenario:** publishing secure reports to your Web App or BusinessObjects Enterprise – no user interaction required

CONCLUSION

- ▶ New XML exporter lets you create your own custom exports using transforms
- ▶ XML exporting SDK lets you integrate further
- ▶ XML and Web Services support greatly enhanced
 - ▶ Parameters
- ▶ WS-* Standards support, including WS-Security
- ▶ Compatibility with Java Web Service community through Axis 2 and .NET Web Service community (ASP.NET and WCF)

- ▶ Questions
 - ▶ Ian Treleaven, Program Manager, Business Objects
 - ▶ I will repeat questions to ensure everyone can hear

- ▶ Contact information
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- ▶ Check out the Developer Library at <http://devlibrary.businessobjects.com>

- ▶ Visit us at the Crystal Reports Bar
- ▶ **Don't miss the Crystal Reports Power Hour!**

APPENDIX

CONSUMING XML: STRUCTURING XML FOR PERFORMANCE

- ▶ In many cases, (i.e. a web service) the XML is already created for you
- ▶ In other situations, (i.e. an integration project) the XML or web service may be created *specifically* to support reporting
- ▶ If you have the flexibility, here are some tips to improve performance...

STRUCTURING XML: ORGANIZE DATA IN BLOCKS (1)

- ▶ Structure XML data for streaming
 - ▶ One table per XML file
- ▶ Structure your schema so the driver knows it can stream the data
- ▶ Results: increase performance and lower resource requirements
 - ▶ Driver knows it doesn't need to load the entire XML file into memory
 - ▶ Processes it with a “sliding window” over the XML

STRUCTURING XML: ORGANIZE DATA IN BLOCKS (2)

► Avoid:

```
<library>
  <book>
    <title>Pride and Prejudice</title>
    <author>Jane Austen</author>
  </book>
  <book>
    <title>Great Expectations</title>
    <author>Charles Dickens</author>
  </book>
  <libraryInfo>
    <name>Main Public Library</name>
  </libraryInfo>
</library>
```

Instead, do this:

File 1

```
<library>
  <book>
    <title>Pride and Prejudice</title>
    <author>Jane Austen</author>
  </book>
  <book>
    <title>Great Expectations</title>
    <author>Charles Dickens</author>
  </book>
</library>
```

File 2

```
<libraryInfo>
  <name>Main Public Library</name>
</libraryInfo>
<totalCirculation>130,000</totalCirculation>
```

STRUCTURING XML:

AVOID MANY-TO-MANY RELATIONSHIPS

- ▶ Driver will attempt to resolve interrelated elements while processing the XML
- ▶ Driver needs to keep all the XML in memory for many-to-many case - can cause performance issues
- ▶ Suggest making more than one XML file or describe the relationships clearly in the schema

- ▶ Modeling many-to-many relationships is very difficult in XML.
- ▶ Apply relational approaches to avoid many-to-many
 - ▶ Eliminate data to produce one-to-many relationships
 - ▶ Use ID reference tables

CONSUMING XML: STRUCTURING XML FOR PERFORMANCE

White Paper available on the Web:

“Structuring XML Data for the Crystal Reports XI Native XML Driver”

[http://support.businessobjects.com/communityCS/
TechnicalPapers/cr_xi_native_xml_driver.pdf.asp](http://support.businessobjects.com/communityCS/TechnicalPapers/cr_xi_native_xml_driver.pdf.asp)

CONSUMING XML: WEB SERVICES - DEMO

- ▶ Amazon Web Service DVD/book query