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Web Intelligence Extension Points:
Building Custom Functions

Web Intelligence BO XI 3.1 SP2

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Manual abstract:

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External functions External functions are visible and usable like the other Web Intelligence standard functions. You can build a formula with functions that implement your own logic. Note: You can define as many functions as you need. Only functions that use single value parameters are supported. You can have a maximum of five single value parameters.

To define a function: 1. Declare in an XML file the description of the external function using a given XML structure. 2. Implement the function in a C++ library using a given API. 3.

Copy the XML file and library to the appropriate folder in your Business Objects Enterprise installation directory folder for the server and the desktop client.

4. @@@@The BusinessObjects administrator must place the XML file and related library DLL file in the library folder for the server, as well as on any desktop rich-client. Caution: Replace or adding a library in the custom library folder can represent a threat to the system. Since the library is automatically loaded, an external library can access internal critical data or processes, putting the system in danger. Ensure that the site administrator implements the appropriate security access to the related folder, so that only authorized people access the custom library folder. The library declaration The library file extensions are different depending on the operating system: · DLL for Windows · SO for Linux or UNIX The file types are: Type Description There is only one file of this type, and it should be XML catalogs declanamed externalcatalogs.xml. This file contains ration the list of all XML function definition files. Web Intelligence Extension Points: Building Custom Functions 7 1 Overview of calculation extensions Using the Web Intelligence sample files Type Description This file defines a list of functions and their associated library and is listed in the XML catalogs declaration XML functions decla- file.

ration Note: The catalogs file can either contain or reference the function declaration libraries. This file contains the code in C++ for the user functions. library file The library file contains the user function implementation as defined in the XML function declaration. Using the Web Intelligence sample files You need to have installed the following applications: · Visual Studio C++ · Web Intelligence XI 3.1 SP2 The examples in this document use the sample files in the VS2005_Samples.zip file located in [Install directory]\userlibs\Web\Samples\ Note: The samples also work with VS2008; however VS2008 migrates the samples when you open VS2008. 1. Uncompress VS2005_Samples.zip.

2. To open the samples, launch OpenSolution.bat. The OpenSolution.bat sets the temporary WEBICALCPLUGINAPI variable environment that is used by the solution to find Web Intelligence specific headers files.

Caution: If the required version of Web Intelligence is not installed, you cannot use the OpenSolution.bat. Set manually the WEBICALCPLUGINAPI variable 8 Web Intelligence Extension Points: Building Custom Functions Overview of calculation extensions Using the Web Intelligence sample files 1 environment with the path of the folder that contains the Web Intelligence headers files. Open VS2005_SamplesWebIcalcPlugIn. Related Topics · Examples on page 21 Web Intelligence Extension Points: Building Custom Functions 9 1 Overview of calculation extensions Using the Web Intelligence sample files 10 Web Intelligence Extension Points: Building Custom Functions Defining a custom calculation 2 2 Defining a custom calculation XML function objects To customize a function within Web Intelligence: 1.

Define the XML function declaration 2. Define the XML catalog declaration. 3. Implement the library in C++ using the specific API for external function. 4. Compile the source file. 5. Copy the XML definition and the library into the dedicated WebIcalcPlu gin folder (server side and any rich client). 6. Restart the Web Intelligence server.

Note: The chapter's examples use the sample files delivered with Web Intelligence. The system automatically adds the function to the function list in the formula editor and formula bar contextual help. If a formula is using a function for which no external library is available, the #EXTERNAL error message appears. Note: Only functions that use single value parameters are supported. XML function objects The XML definition contains objects define the custom function. @@@@The library extension should not be specified. @@@@Use only alphanumeric characters. @@@@Set the XML root tag to CATALOG. 2. @@@@This is the file attribute.

4. To the LIBRARY add FUNCTION tags. @@@@The ARG type can be Boolean, Numeric, Date, or String. @@ · a RETURN tag which defines a type attribute. The RETURN type can be Boolean, Numeric, Date, or String.



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· a CATEGORY tag which defines a type attribute. @@· a HINT tag which defines a value attribute. 5. Place the XML definition into the dedicated folder (server side and any rich client). Example: SampleMath.

xml &lon", select All configurations. @@Click Apply. In "Configuration", select Debug. @@Click Apply. In "Configuration", select Release. @@Click OK. Add the code to the CPP file. @@@@MyHelloWorld, // Name of the return value object. retVal // Don't use parameter. @@{ // Create an std::wstring with wide char Hello world.

22 Web Intelligence Extension Points: Building Custom Functions Examples 3 std::wstring helloWorldStr = L"Hello world!!!"; // Initialise the return value. retVal = helloWorldStr; } catch(...) { // Unkonwn exception so notify Web Intelligence return BOERROR; } return BONOERROR; // It's OK } Related Topics ·

Using the Web Intelligence sample files on page 8 Web Intelligence Extension Points: Building Custom Functions 23 3 Examples 24 Web Intelligence Extension Points: Building Custom Functions Error messages 4 4 Error messages #EXTERNAL error message #EXTERNAL error message The #EXTERNAL error message is caused by the following problems: · · · · A formula refers to an external function that is not in the external library folder. A document contains an external method and the system cannot load it. The library file is not found, or there is an inconsistent declaration. An external method does not initialize the return value. An external method initialized the return type with bad type. For example, a double was set to a string.

An external method returns an error code. Ask the BusinessObjects administrator to deploy the correct library that implements this function. Trace log message errors If an error appears during XML parsing/validation, a message appears to the user and errors are entered in the trace logs. Log type Error messages File cannot be read or is missing. XML logs Bad XML structure due to: · Parent/Children relation invalid.

· Missing field (ID function, name function). · Invalid field value. File is missing. DLL logs DLL cannot be loaded. Function is not found in the DLL.

26 Web Intelligence Extension Points: Building Custom Functions Error messages Trace log message errors 4 Log type Error messages Function name is already in use. Function ID is already used. Function name is missing. Function logs Return type is invalid. ID is invalid. Number of parameters is invalid. Parameter name is missing. Parameters logs Parameter type is invalid. The user function does not initialize the return value. Runtime logs The user function initializes the return value with a bad type.

The user function returns the BOERROR error code. Web Intelligence Extension Points: Building Custom Functions 27 4 Error messages Trace log message errors 28 Web Intelligence Extension Points: Building Custom Functions More Information A A More Information Information Resource Location SAP BusinessObjects product <http://www.sap.com> information Select <http://help.sap.com> > SAP BusinessObjects. You can access the most up-to-date documentation covering all SAP BusinessObjects products and their deployment at the SAP Help Portal. You can download PDF versions or installable HTML libraries. SAP Help Portal Certain guides are stored on the SAP Service Marketplace and are not available from the SAP Help Portal. These guides are listed on the Help Portal accompanied by a link to the SAP Service Marketplace.

@@To obtain an ID, contact your customer support representative. <http://service.sap.com/bosap-support> > Documentation · · Installation guides: <https://service.sap.com/bosap-inst> guides Release notes: <http://service.sap.com/releasenotes> SAP Service Marketplace The SAP Service Marketplace stores certain installation guides, upgrade and migration guides, deployment guides, release notes and Supported Platforms documents. @@Contact your customer support representative to obtain an ID. @@@@http://service.sap.com/bosap-support The SAP Support Portal contains information about Customer Support programs and services. It also has links to a wide range of technical information and downloads. @@To obtain an ID, contact your customer support representative.

<http://www.sap.com/services/bysubject/businessobjectsconsulting> Online customer support Consulting Consultants can accompany you from the initial analysis stage to the delivery of your deployment project. Expertise is available in topics such as relational and multidimensional databases, connectivity, database design tools, and customized embedding technology. Web Intelligence Extension Points: Building Custom Functions 31 A More Information 32 Web Intelligence Extension Points: Building Custom Functions Index #EXTERNAL 12, 26 functions (continued) XML declaration 15 B BO_DECLARE_USER_FCT 17 G GUID 6, 12 C C++ file implementing 17 L library files structure 7 E errors in functions 26 trace logs 26 ExternalFunc.xml 6 S source files compiling 19 F Formula Editor 12 functions errors in 26 structure 12 XML catalog declaration 17 T trace logs error messages 26 W WebiCalcPlugIn 7, 20 Web Intelligence Extension Points: Building Custom Functions 33 Index 34 Web Intelligence Extension Points: Building Custom Functions .



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