K2 LEARNING™

K2 blackpearl Extensions Training Course

sourcecode

K2

Course Overview: Contents

000.P15
Version: 1
Revision: 2

Questions, Comments or Feedback about this training course?

Please E-mail learning@k2.com with your comments or feedback. We appreciate any feedback that helps us to improve the quality of our learning material.

1. Course Description

The *K2 blackpearl Extensions* training course is designed to give developers the knowledge required to consume the K2 runtime APIs in their custom applications and to extend the K2 platform with custom components.

During this course, participants will learn:

- How to write .NET code that integrates with K2 workflows at runtime
- How to write .NET code that integrates with K2 SmartObjects at runtime
- How to create custom reports in the K2 platform, including SSRS reports and Excel PowerPivot reports
- How to extend the K2 platform with custom Service Brokers and expose LOB systems as K2 SmartObjects
- How to extend the K2 platform with custom inline functions

2. Intended Audience

The *K2 blackpearl Extensions* training course is intended for developer and programmer roles that will create solutions on the K2 platform by writing .NET code. Typical roles that fit this description include analyst developers, .NET developers, web developers and solution architects with coding experience.

Participants should have completed the K2 Core competency or training course before attempting this training course

3. Outcomes

At the end of this course, participants should understand how to write .NET code that interacts with the K2 platform at runtime and how to create custom reports on the K2 platform. They will also understand how to extend the K2 platform with custom components.

4. Course Prerequisites

To get most out of this training course, it is highly recommended that the participants have the following skills and proficiency levels. (There is no requirement to be familiar with K2, or have experience working with K2 blackpearl or K2 blackpoint)

Technology/Skill	Proficiency	Notes and examples
C# .NET development experience	Intermediate	Creating ASP.NET applications with Microsoft Visual Studio Designing reports with SQL Server Reporting Services (SSRS) Consuming web services (WCF and REST) in .NET code

5. Course Materials and resources

5.1 Learning Module Materials

This training course is divided into several modules (see Course Content for a listing of the course modules). Modules are named in the format nnn.AAA (where nnn represents to complexity level of the module, and AAA is a random 3-letter identifier code). Each module typically has the following resources:

- **Participant Guide/Handbook** (*nnn.AAA – Module Name.pdf*)
  A .pdf file or printed hard copy containing the student notes for each Module. Participants may keep these guides and use them for reference and refreshing knowledge at a later stage. The participant guides are usually provided in soft-copy .pdf format.

- **Lab Guide** (*nnn.AAA – Module Name.LABS.pdf*)
  A .pdf file or printed hard copy containing the step-by-step guides to complete the practical exercises. Participants may keep these guides and use them for reference and refreshing knowledge at a later stage.

The lab guides are usually provided in soft-copy .pdf format. Wherever possible, we recommend that participants copy the provided .pdf files to a separate e-reader device, since it makes it easier to follow along with the exercises in the training material. Participants may also print out the materials in hard-copy format, if desired.

▪ **Prerequisites installer** (*K2 Learning-nnn.AAA.exe*)
Learning modules that contain demonstrations or practical exercises typically have certain prerequisites that must be installed before the exercises can begin. These prerequisites include SharePoint sites and artifacts, pre-defined processes, SmartObjects, forms, report, databases and more. Each module contains detailed instructions on using the prerequisites installer and executing the setup scripts. These prerequisite installers are usually executed in the Virtual Server Environment provided for each course attendee.

▪ **Presentation** (*nnn.AAA – Module Name.pptx*)
A Microsoft PowerPoint 2010 slide deck used by the course instructor for guiding topic discussions. The module slide decks are usually not shared with participants since the handbooks contain snapshots of each slide used in the presentation.

5.2 Other Materials

In addition to the modular training materials, the course may include other resources such as Quick-Reference sheets and posters.

> ⚠ The Learning Module materials and virtual server environments may not be shared with or exposed to organizations without valid licensing agreements with K2, or individuals who are not associated with a valid K2 customer, partner or distributor. Please check with your K2 representative if you have specific questions about the acceptable use of these materials and resources

5.3 Virtual Server Environment

The practical exercises for the course are completed on a Virtual Server environment provided by K2 (unless otherwise noted). These practical exercises are specifically created for the K2 blackpearl Solutions demonstration virtual servers provided by K2, and cannot be installed in any other environment unless noted otherwise.

The K2 Solutions virtual machine will be provided in either local (virtual machine) or hosted (cloud) modes. Depending on the course logistics and delivery mechanism, K2 may provision the hosted environments ahead of time or participants will use on-demand provisioning to set up their virtual environments. Please refer to the K2 knowledge base article KB001397 for more information about the different modes and the prerequisites for each approach.

Note that participants will not be able to share the same environment to complete the practical exercises. Each participant that will complete the practical exercises will need their own instance of the virtual server environment, but in some circumstances the course instructor may ask participants to team up when completing the practical exercises. Depending on the course location and delivery mechanism, participants will be required to bring their own computers or K2 may provide computers for each attendee. The course confirmation e-mail will specify whether participants should provide their own computers.

6. Course Compatibility

The *K2 blackpearl Extensions* course is specifically created for K2 blackpearl 4.6 or later. Earlier versions of the K2 platform may not include the functionality and features discussed in this training course, and later versions or updates of K2 may add additional functionality not described in this course.

7. Course Schedule

The course start and end dates and class hours will be scheduled separately. The Course Content section describes a recommended schedule, but modules and timing may be adjusted at the instructor's discretion.

8. Course Content and Duration

This course will take approximately 10-16 hours to complete (excluding breaks and meal times). The table below lists the content for the course, the sequence in which the content should be presented and a suggested day and duration for each module. This training course is typically presented over 2 days, but logistical and delivery requirements may change the recommended schedule. When training is confirmed, participants will receive instructions on the logistical arrangements and scheduling for the course.

Module	Overview	Outcomes	Duration**
Day 1*			7 hours
300.NRT **K2 Workflow APIs and Services – Runtime**	This learning module discusses the available APIs and services that are used to interact programmatically with K2 workflows at runtime.	At the end of this module, participants will have a good understanding of the available APIs and Services used to interact programmatically with K2 workflows at runtime. They will understand how to create custom code to retrieve K2 tasks, start workflows, complete worklist items and administer K2 workflows. Participants will also understand the basic principles behind interacting with K2 workflows programmatically.	3.5 hours
300.YOK **K2 SmartObject Runtime APIs and Services – Runtime**	This learning module describes the APIs and services that developers can use to interact with K2 SmartObjects at runtime	At the end of this module, participants will have a good understanding of the available APIs and Services used to interact programmatically with K2 SmartObjects at runtime. They will understand how to create custom code to call scalar and list methods for K2 SmartObjects using the SmartObject Client .dll, ADO.NET provider, WCF and REST services.	3.5 hours
Day 2*			3-7 hours
300.UKY **Creating Custom Reports with Report Design Tools**	This learning module describes how to create custom reports against K2 SmartObjects with tools like K2 Workspace Report Designer, SQL Server Reporting Services (SSRS) and Excel PowerPivot. It also describes how to expose and consume SSRS reports as K2 SmartObjects	At the end of this module, participants will have a good understanding of the available tools and technologies that are used to design custom reports in K2 and how K2 SmartObjects are used as a data source when creating custom reports with various report design tools. Participants should also understand how to expose SSRS reports as SmartObjects and then use these SmartObjects in a K2 workflow.	2

*The course content may be regrouped into different days depending on scheduling and delivery requirements

**Module duration is estimated and may be shorter or longer depending on delivery and participant skill

9. Additional content, self-study and directed readings

The following content supports the core course content listed above. This content may be covered during instruction sessions if time allows, or may be assigned as self-study or directed readings.

This additional content will assist participants who wish to undertake the certification test for the *K2 blackpearl Extensions* competency. Participants are encouraged to review the additional content before attempting the test.

9.1 Self-study Training modules		
Depending on logistics and scheduling, the following learning modules may need to be completed as self-study		
Module	**Overview**	**Outcomes**
400.BLR **Custom Service Brokers**	This learning module describes how to extend the K2 platform with custom Service Brokers. Service Brokers are used to expose back-end systems as K2 SmartObjects, and it is possible to create and register custom Service Brokers when K2 does not provide an out-of-the-box broker for a particular technology. In this module, we will discuss the architecture of the K2 SmartObject component and describe how to implement, register and use custom service brokers to expose non-standard providers as K2 SmartObjects.	At the end of this module, participants should be able to create and register custom SmartObject Service Brokers to expose back-end systems as K2 SmartObject Service Objects, along with a good understanding of the implementation considerations and approaches for creating custom Service Brokers. Participants should understand the differences between the Static and Dynamic Service Broker approach and should be able to create a service broker using either approach.
400.CCU **Custom Inline Functions**	This learning module discusses the criteria, use and implementation of custom Inline Functions	At the end of this module, participants will understand when custom Inline Functions should be used, how to create and register custom Inline Functions on the K2 platform, and how these custom Inline Functions are used by workflow designers

9.2 K2 Learning Quick-Reference Sheets		
These documents are intended as quick-reference resources and support the knowledge gained through the training modules for this course		
Quick-Reference Sheet	**Description**	**Link**
QRS.014 **Quick Reference - K2 Logging and troubleshooting**	Describes the logging options available in K2 blackpearl and describes common troubleshooting procedures	http://help.k2.com/K2LS-QRS014.aspx

9.3 Whitepapers and knowledge base articles

These documents are intended as quick-reference resources and support the knowledge gained through the training modules for this course

Article	Description	Link
.NET Best Practices Relevant to K2 Scalability	Contains the recommended .NET best practices for custom code usage with K2 systems	http://help.k2.com/en/kb001246.aspx
How to change .NET Framework Versions	Describes how to change the .NET Framework version used by the K2 Server and Visual Studio 2010	http://help.k2.com/en/KB000686.aspx
K2 Host Server Logging	Discusses the available Host Server logging options, how to configure them, and performance considerations for their use	http://help.k2.com/en/KB000309.aspx
K2 blackpearl Developer Reference	Online version of the K2 blackpearl developer's reference	http://help.k2.com/en/k2devref.aspx
Creating a Custom Security Provider	Describes how to create and register a custom security provider for K2 blackpearl	http://help.k2.com/helppages/k2blackpearlDevRef4.6.4/Creating_a_Custom_User_Manager.html