



AVEVA™ Edge 2020 R2

Course Description

The AVEVA™ Edge 2020 R2 course is a 2-day, instructor-led class designed to provide a fundamental understanding of the features and functionality of the AVEVA Edge 2020 R2 software. The software enables users and machine builders to quickly create intuitive, secure, and highly maintainable HMI applications for intelligent machines on a variety of platforms, including Windows, Windows IoT, and Linux, as well as on low-level devices. The course provides lectures and hands-on labs to supply and reinforce the knowledge needed to use the software to develop an HMI for a plant floor environment, using basic software elements. The HMI application will be developed using AVEVA Edge software features, such as tags, classes, indirect addressing, animation, symbols, scripting, alarms, real time and historical trending, reports, and recipes. The HMI application also will have connections to databases, including SQL Server, Oracle, and MySQL; AVEVA™ Historian; PLC drivers; and OPC UA. It will provide remote troubleshooting, remote client project security, and application backup.

Objectives

Upon completion of this course, you will be able to:

- Create a complete HMI application
- Configure tags
- Implement basic navigation
- Create symbols and animations
- Configure alarms and events
- Create trends and recipes
- Describe and use scripting
- Configure a driver to communicate with a PLC
- Configure security
- Connect to a database

Audience

Individuals who need to use AVEVA Edge to create HMI applications for intelligent machines on a variety of platforms

Prerequisites

Knowledge of the following tools, features, and technologies is required:

- Manufacturing industry
- Basic PLC
- Personal computers and the Windows operating system

Course Outline

Module 1 – Introduction

Section 1 – Course Introduction

This section describes the objectives of the course, intended audience, prerequisites, and course agenda.



Section 2 – AVEVA Edge Overview

This section provides an overview of AVEVA Edge 2020 R2 (formerly InTouch Edge HMI and InTouch Machine Edition).

Module 2 – Installation and Licensing

Section 1 – Installation

This section describes the AVEVA Edge R2 components: Studio, SCADA, Embedded HMI, Compact HMI, and IoT View. It also explains installation requirements and discusses SCADA and project runtime software on a Windows Embedded device, such as Embedded HMI and Compact HMI.

Section 2 – Licensing

This section discusses the license settings for any machine running Studio, Windows runtime, or embedded runtime software. The topics covered are: protection type, version, product type, execution mode, and thin clients. It also discusses licensing steps, such as how to get a license and where to get information on installing a license.

Module 3 – Getting Started

Section 1 – Studio

This section describes the AVEVA Edge 2020 R2 graphic user interface (GUI). It discusses the File Menu, Quick Access Toolbar, Ribbon Interface, Project Explorer, Workspace, Watch (previously Database Spy), Output Window, Title Bar, and Status Bar. It also discusses customizable styles, which can be applied to everything in the main GUI, dialog boxes, buttons, and worksheets. The customizable styles include custom colors, a dark theme, and a theme similar to the GUI in the previous version of the software.

Section 2 – Tags and the Project Database

This section provides an overview of tags and discusses the following tag categories: Project, Shared, and System. It explains the tag properties Tag Name, Data Type, Scope, and Array tags and also explains classes and describes indirect tags.

Section 3 – Distributing an Edge Application

This section explains how to download the embedded runtime software and the project to a production computer using Remote Management. It discusses how to connect to the runtime device using the Remote Management tool, install runtime on the production computer, and license the installed software. It also discusses how to download the project to the target, and how to run or stop the project.

Module 4 – Communicating with External Devices

Section 1 – Communication Drivers

This section provides an overview of communication drivers and discusses driver Help files separate from the main Help file. It discusses how to add and configure a driver task, which includes the Main Driver Sheet and the Standard Driver Sheet. It also explains how to run communication between the project and field equipment.

Section 2 – OPC UA

This section provides an overview of OPC UA. It explains how to configure an OPC UA connection to an OPC Server, create a new OPC UA Client worksheet, and create a group of redundant OPC connections.

Section 3 – Tag Integration

This section provides an overview of tag integration. It explains how to integrate tags from a thirdparty control application or device into a project. It discusses the sources that can be used and describes how to add a tag



integration source, noting that one PLC corresponds to one configuration integration. It also explains how to use the Object Finder to select integrated tags and how to check used tags in a shared database.

Section 4 – Monitoring and Troubleshooting

This section provides an overview of the monitoring and troubleshooting tools, explaining why they are needed. It discusses how to remotely connect to runtime running on a different machine from Studio, using the following tools: Watch, the Output window, and LogWin.

Module 5 – Native Screens and Native Graphics

Section 1 – Native Screens and Screen Groups

This section provides an overview of screens, explaining why they are needed. It explains how to create screens, describing the following screen attributes: screen style and screen background color or image. It also explains how to rename existing screens, provides an overview of screen groups, and explains how to create, rename, and modify screen groups. In addition, it describes the Layout Tool.

Section 2 – Shapes

This section provides an overview of shapes. It explains how to add shape objects and configure the line, open polygon, closed polygon, rectangle, rounded rectangle, and ellipse shape objects.

Section 3 – Formatting

This section provides an overview of formatting. It explains how to format graphics using the Draw and Format ribbons. It describes the format options on the Draw ribbon: Selection, Disable Drag, Replace, Object Properties, Grid Settings, and Arrange. It also explains the format options on the Format ribbon: Arrange, Position, Size, Style, and Fonts.

Section 4 – Active Objects

This section provides an overview of active objects and discusses the Active Objects toolbar, which you can use to create interactive objects. It describes the common object properties: Font, Color buttons, Key area, Disable, Security, Virtual Keyboard, Align, Auto Format, Auto gray out, Enable Focus, Enable Translation, E-Sign, Force, Multiline, Require Confirmation, and Wrap Text. It also describes the following objects and corresponding properties on the Draw tab: Text, Text Box, Button, Pushbutton, Check Box, Radio Button, Combo Box, List Box, and Smart Message.

Section 5 – Animations

This section provides an overview of animations. It discusses animation types, explains how to add an animation to an object, and describes how to configure an animation in an object.

Section 6 – The Symbols Library

This section provides an overview of symbols. It discusses project symbols versus system symbols, explains how to insert system symbols to be used by the project, and describes how to configure symbols.

Section 7 – Project Localization

This section explains how to translate a project's user interface into multiple languages, using machine translation (for example, Google Translate) if you do not use a human translator. It also explains how to switch the project's language during runtime with a simple function call.

Module 6 – Overview of Scripting

Section 1 – Client-Side Scripts

This section discusses screen scripts, screen logic, and graphics scripts. It explains where to access them and describes the different triggers, including On Open, While Open, and On Close. It addresses the screen scripts



execution interval. It also discusses graphics scripts. It explains where to access them and describes the three different triggers: On Start, While Running, and On End. It addresses the screen scripts execution interval for these scripts.

Section 2 – Background Tasks

This section discusses the math, script, and scheduler worksheets. It discusses where to access the sheets and describes the trigger points to run the scripts for each worksheet. For the math worksheet, it also explains the Description and Execution header parameters and the Tag Name and Expression body parameters. In addition, it covers the math scripts execution interval. For the script worksheet, it also explains the Description and Execution header parameters and the VBScript and Built-in body parameters. It also describes the Startup Script worksheet. For the scheduler worksheets, it also explains the Description header parameter and the Event, Trigger, Time, Date, Tag, Expression, and Disable body parameters.

Module 7 – Alarms and Events

Section 1 – Alarms

This section provides an overview of alarms. It discusses the alarm tasks: Level Alarms, Rate Alarms, and Deviation Alarms. It describes the alarm task worksheet's purpose to log alarms and describes the worksheet's Header and Body areas. It also explains the Alarm/Event Control object's purpose to display alarms and describes how to embed and configure the object.

Section 2 – Events

This section discusses events. It explains how to enable Event Logger by enabling the following events: Security system, Display, Recipe, Report, Custom Messages, System Warning, and Tag changes. It also describes the event display.

Module 8 – Data Logging and Display

Section 1 – Trend

This section provides an overview of data logging. It discusses data logging by explaining how to create a Trend worksheet, and describes a Trend Control object. It explains how to plot the trend, describing the Trend Control object properties, and explains how to convert Trend History files from binary to text.

Section 2 – Grid Control

This section discusses the Grid object, explaining read/write data. It describes the Grid object properties: Data Source, Columns, Advanced, and Fonts and Colors.

Module 9 – Recipes and Reports

Section 1 – Recipes

This section discusses recipes. It explains how to create a recipe worksheet, describing the Recipe Header and Recipe Body, and explains the built-in recipe function.

Section 2 – Reports

This section discusses reports. It explains how to create a report worksheet, describing the Report Header and Report Body, and explains the built-in report function.



Module 10 – Project Security

Section 1 – Security Overview

This section provides an overview of the Security mode and Access level. For the Security mode, it describes the following: Local Only, Distributed – Server, Distributed – Client, and Domain (LDAP). For the Access level, it discusses permission based on groups. It also explains how to configure a security system.

Section 2 – Protecting Your Intellectual Property

This section explains how to configure passwords for the application, screens, symbols, and worksheets.

Module 11 – Remote Clients

Section 1 – Mobile Access

This section provides an overview of remote clients. It discusses the prerequisites to run remote clients and explains how to use Mobile Access to deploy an HTML5-enhanced web interface for smartphones and tablets. It also describes how to configure the Mobile Access web interface: Alarm, Process Values, Trend, and Screens.

Module 12 – Using Databases

Section 1 – The Project Database

This section provides an overview of databases. It explains how to configure a project database for alarms, events, and trends. It discusses SQL relational databases and describes how to link the database through a remote DB provider.

Section 2 – Database/ERP Task

This section explains how to configure a connection with a SQL Database, using the Database/ERP task. It explains how to create a connection by configuring a Database/ERP connection, configuring a Database/ERP worksheet, and sending commands to a database using built-in functions.

Module 13 – Integrating with Other AVEVA Software Products

Section 1 – AVEVA Historian

This section provides an overview of Historian. It explains how to connect to an on-premise Historian and a Historian hosted by AVEVA Online.

Section 2 – System Platform

This section provides an overview of System Platform. It discusses the ITMEViewApp object, explaining how to create a new AVEVA Edge HMI application and import an existing AVEVA Edge HMI application. It describes how to download and run a project on a target device from ITMEViewApp. It also discusses general configuration attributes and runtime object attributes.

Module 14 – Industrial Graphics

Section 1 – Industrial Graphics and Situational Awareness Visualization

This section discusses the prerequisites to use Industrial Graphics and Situational Awareness graphics. It describes how to import the symbol libraries and create a new symbol. It explains where Industrial Graphics can be embedded and explains the types of screen groups to which the graphics can be added. It discusses the custom properties for Industrial Graphics and Situational Awareness graphics and explains Wizard Options for Situational Awareness graphics. In addition, it discusses known limitations of Industrial Graphics concerning the Layout tool, Element Style, User Input Keyboard, and Thin Clients.



Section 2 – Using the Industrial Graphics Editor

This section introduces the Industrial Graphics Editor and explains the advantages of working with graphics as assemblies in the editor. It describes how to easily embed the graphics from symbol libraries and user-created symbols. It discusses how to maintain the integrity and relationship of all the elements as a single symbol. It also describes Static Text versus Reference or Expression fields and discusses description text and Enable Private.

Section 3 – Custom Properties and Animations in Symbols

This section explains that when the library does not have what you need, you can customize. It describes how to create custom properties and provides an overview of the different types of animations.

Section 4 – QuickScript.NET for Industrial Graphics

This section provides an overview of QuickScript.NET and describes the use of the Industrial Graphics Script Editor. It explains the different triggers of scripts: Predefined Scripts, Named Scripts, and Action Scripts. It also describes the basic features of the ShowGraphic function.