

Citect Educational SERVICES

Advanced Configuration Concepts Exam Study Guide

Version 6.00

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Chapter 1: Advanced Configuration Concepts

Overview

Introduction

You can configure a CitectHMI/SCADA monitoring and control system to suit any industrial application. Because CitectHMI/SCADA has been designed with flexibility in mind, you can design a system to suit your exact requirements.

CitectHMI/SCADA suits both small and large applications. Because it is flexible, CitectHMI/SCADA will keep pace with your plant and information requirements as they change and expand.

CitectHMI/SCADA is easy to learn and use. Programming techniques may be used to customise your application to suit your requirements. Features such as templates, genies, forms and wizards reduce the time and effort required to configure your CitectHMI/SCADA system, as well as maximising performance.

Contents

In this chapter you will cover these topics:

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Custom Templates

Common Objects on all Pages

If the pages in your project contain items that are common to all pages such as toolbars and status bars you can create your own template (containing all common objects) to use as a base for the pages. You can then create the pages based on the template, and add individual objects to each page.

If you subsequently decide to delete or change the location of a common object, or to add a new common object, you do not have to change each page - you can change the template. CitectHMI/SCADA automatically updates all pages based on the template.

Suggested Exercises

- Create a custom template in the Example project.
 - Change various pages in the project to use the custom template
 - Make a change to the template then Update Pages. Check the pages.
 - Create an Alarm Template. Use the function AlarmDsp() to populate the page with the current alarms.
-

Further Reading

- CitectSCADA Help Topic – *Reserved ANs*.
 - Citect Knowledge Base Article Q2365: *Animation Numbers in V5.XX*.
-

Smart Genies and Supergenies

IFDEF Macro One of the key benefits of using genies is that they are reusable. However, sometimes you may wish to use a genie that has been configured for multiple tags but you do not need to use all of the tags. This creates a problem when adding the tags and compiling.

The **IFDEF** macro allows you to define two possible outcomes based on whether or not a specified tag exists within a project at the time of compiling. The macro can be implemented anywhere a simple expression is used, including fields within relevant CitectHMI/SCADA dialogs. By allowing a "0" or "1" to be generated within the **Hidden When** field of a genie's properties, elements could simply be hidden if a required tag was missing, allowing the genie to still be pasted onto a graphics page.

The macro accepts three arguments: the first specifies the tag that requires confirmation, the second defines the outcome if the tag exists and the third defines the outcome if it does not exist. In the case of a genie being pasted on a graphics page, the IFDEF function would be configured as follows in the **Hidden When** field of the object properties dialog:

```
IFDEF( "Tag1_PV" , 0 , 1 )
```

If the tag "**Tag1_PV**" is defined in the tag database, the value in the **Hidden When** field will be 0. If **Tag1_PV** is undefined, the value will be 1. Since the object is hidden when the value is TRUE (1), the object will be hidden when **Tag1_PV** is undefined. See the topic Hiding Graphics Objects for more information.

Beyond this purpose, the IFDEF macro can be broadly used as a conditional variable. The [<value if defined>] and <value if not defined> arguments can support any variable, expression, or constant. The [<value if defined>] argument is optional – if you leave it blank it will generate the current variable. You can also use nested IFDEF macros.

Continued on next page

Smart Genies and Supergenies, Continued

Suggested Exercises

- Create Genies using the IfDef() Macro.
 - Create a Genie form to filter tags of a certain type in a drop down list
-

Further Reading

- CitectSCADA Help Topic - *Understanding Genies.*
 - CitectSCADA Help Topic - *Using Genies and Super Genies.*
 - CitectSCADA Help Topic - *Hiding Graphics Objects.*
 - CitectSCADA Help Topic - *Using structured tag names.*
 - CitectSCADA Help Topic - *Using structured tag names with Genies and Super Genies.*
 - Citect Knowledge Base Article Q1416: *Templates based on templates.*
 - Citect Knowledge Base Article Q1724: *SuperGenies on Pages and Templates.*
 - Citect Knowledge Base Article Q1764: *Writing Genie Form Files.*
 - Citect Knowledge Base Article Q2706: *Demystifying why windows display where they do.*
 - Citect Knowledge Base Article Q2541: *Default values for Genie substitutions.*
 - Citect Knowledge Base Article Q1589: *#ASS displays in my Super Genie.*
-

Forms

Reading and Writing Data

Forms may be used to read and write values into variable tags, send and receive information from databases and pass data into functions. Standard forms are provided with CitectSCADA to enter information into the CitectSCADA databases but you also have the facility to create your own custom forms.

Suggested Exercises

- Create a form that will display the value of a tag when it is called and allow you to input a value into a tag.
-

Further Reading

- CitectSCADA Help Topic - *Form Functions*.
-

Graphics Builder Automation Interface

Automation

The CitectSCADA Graphics Builder now offers support for "automation," an OLE service that allows applications to expose their functionality, or to control the functionality of other applications on the same computer or across a network. As a result, applications can be integrated and automated with programming code.

The two key elements of automation are:

- Applications or software components, called **automation Servers**, that can be controlled because their functionality has been exposed and made accessible to other applications. Examples of Microsoft Automation servers are all Microsoft Office applications and Microsoft Project. These Automation servers expose their functionality through object models.
- Other applications or development tools, called **automation controllers**, that can control OLE Automation servers through programming code, by accessing the functionality exposed by the Automation servers. Examples of Microsoft Automation controllers are Microsoft Visual Basic, Microsoft Visual C++, and Microsoft Visual Basic for Applications (which is built into Microsoft Access, Microsoft Excel, and Microsoft Project).

Suggested Exercises

- Use the Graphics Builder Automaton Interface to draw a page of objects in CitectSCADA.

Further Reading

- CitectSCADA Help Topic - *Graphics Builder Automation Interface*.
 - CitectSCADA Help Topic - *Graphics Builder Automation Interface Functions*.
 - Citect Advanced Configuration Concepts Training Course
-

CitectSCADA and Other Applications

Transferring Data

You can transfer data between CitectSCADA and a wide range of software applications for storage, analysis, and post processing, or to control and tune your CitectSCADA system. In this chapter we will discuss methods for exchanging data with CitectSCADA and other applications.

Suggested Exercises

- Create a Data Source Name (DSN) that will connect to a recipe in dBase format.
 - Use the CiRecipe control to:
 - view the recipes
 - edit the recipes
 - upload the values into CitectSCADA tags
-

Further Reading

- CitectSCADA Help Topic - *Using ActiveX Objects*.
 - CitectSCADA Help Topic - *Using ODBC drivers*.
 - CitectSCADA Help Topic - *SQL Functions*.
-

Kernel and Debugging

Multi-Threaded

As CitectSCADA was originally designed as a true Multi-Threaded, Multi-Tasking system, it was found that as the system got more and more complicated the programmers needed a way to observe what their changes were actually doing within the program at run time without having any performance impact on the running version of CitectSCADA. Since CitectSCADA was handling all of the tasks it needed in order to operate, it was decided to build a window into the running instance of CitectSCADA. This was how the Kernel was developed. It was called a Kernel because of the similarities between CitectSCADA and a real operating system.

Suggested Exercises

- Write a function that will increment the value of a variable indefinitely.
 - Call the function from a command button.
 - Call the function from a command button using TaskNew().
 - Compare the two running threads using the Page Cicode in the kernel and the Thread Window in the Cicode Editor.
-

Further Reading

- CitectSCADA Help Topic - *Foreground and background tasks.*
-

Graphics

True Color

True Color support allows CitectSCADA users to create graphically rich display pages more easily by supporting a far greater number of colours than the 256-colours available in previous releases.

True Color is supported for all animation objects and static objects, including page backgrounds, imported images, symbols, metafiles, and bitmaps (with the exception of colour floods).

Suggested Exercises

- Create a new flashing colour using the **Edit Favourite Colors** tool.
 - Create a new colour label to use in a custom font.
 - Import a JPEG graphic onto your page.
 - Import a flashing Graphic onto your page.
 - Add a Windows Media Player Active X object to a graphics page and configure it to play avi files.
-

Further Reading

- CitectSCADA Help Topic - *Colors*.
 - Citect Knowledge Base Article Q4046: *Anisotropic Resizing of Windows Now Available in CitectSCADA V6.0*.
-

Process Analyst

Active X Control

The CitectSCADA Process Analyst is an ActiveX control designed to allow operators to view trend data from a CitectSCADA trend server, and alarm tag data from a CitectSCADA alarm server. The Process Analyst provides a visual means to analyse and compare trend data (real-time and historical) in a more intuitive manner than CitectSCADA's trend templates.

The Process Analyst is highly configurable. All components may be changed to suit the needs of the individual.

Suggested Exercises

- Create a new page and add a Process Analyst Active X object to the page.
 - Add Trends and Alarms to the Process Analyst
 - Save the View
 - Drag the Analyst pane to the left and right to view values through time.
 - Add another instance of the same trend tag to the Process Analyst. Unlock the pens and compare the value of the trend to the values of the same trend at another time.
 - Add another pane to the view.
 - Add another cursor to the view.
 - Turn on the cursor labels.
 - Examine the properties of all pen types.
-

Further Reading

- Process Analyst Help - All of it!
-

Chapter 2: Navigating the Knowledge Base

Overview

Introduction The Knowledge Base contains three navigational tools to help you quickly find relevant information:

- Contents - so you can always find the start and also lists the Latest Articles.
 - Index - Lists all articles in numeric order
 - Search - the quickest way to find relevant articles. It allows you to query all of the text in the entire Citect Knowledge Base.
-

Contents This chapter contains the following topics:

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➤ Searching	2-2

Searching

Search Queries Learning about effective queries will help you to locate relevant articles. The simplest query consists of just one word. For example, to find articles about alarm pages, you could enter the word alarm. This query would return a list of all articles that contain the word 'alarm'. If the query word is common, a large number of articles will be displayed, and you may need to further narrow your search.

Enter Multiple Words To narrow your search, enter more than one word. For example, to find articles about alarm pages, you could enter the words alarm page. This query would return all articles that contain both the words 'alarm' and 'page'. Some search engines require the keyword AND to be used for this kind of search - it is not necessary here.

Operators Customize your queries with the NEAR, NOT and OR keyword operators. For example, the query alarms page not hardware, would exclude an article about the "hardware alarms page".

Literal phrases Put quotation marks around keywords if you want to search for a literal expression. For example, searching for "alarm page" would find articles that contain that exact phrase. This can be quite useful if you need to use a keyword in your search. For example, "exclusive or" contains the keyword OR, and would cause an error without the quotes.

Wild Cards Use wild cards (* and ?) where you are uncertain about the form of a word. For example, if you are uncertain about whether to search for "alarms", "alarm", or "alarming", search instead for alarm*. The ? is similar, but works only for one character.
