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# СИСТЕМЫ УПРАВЛЕНИЯ

## Руководство пользователя

### на Experion Application

### Control Environment (ACE)

# Application Control Environment (ACE)

## Overview

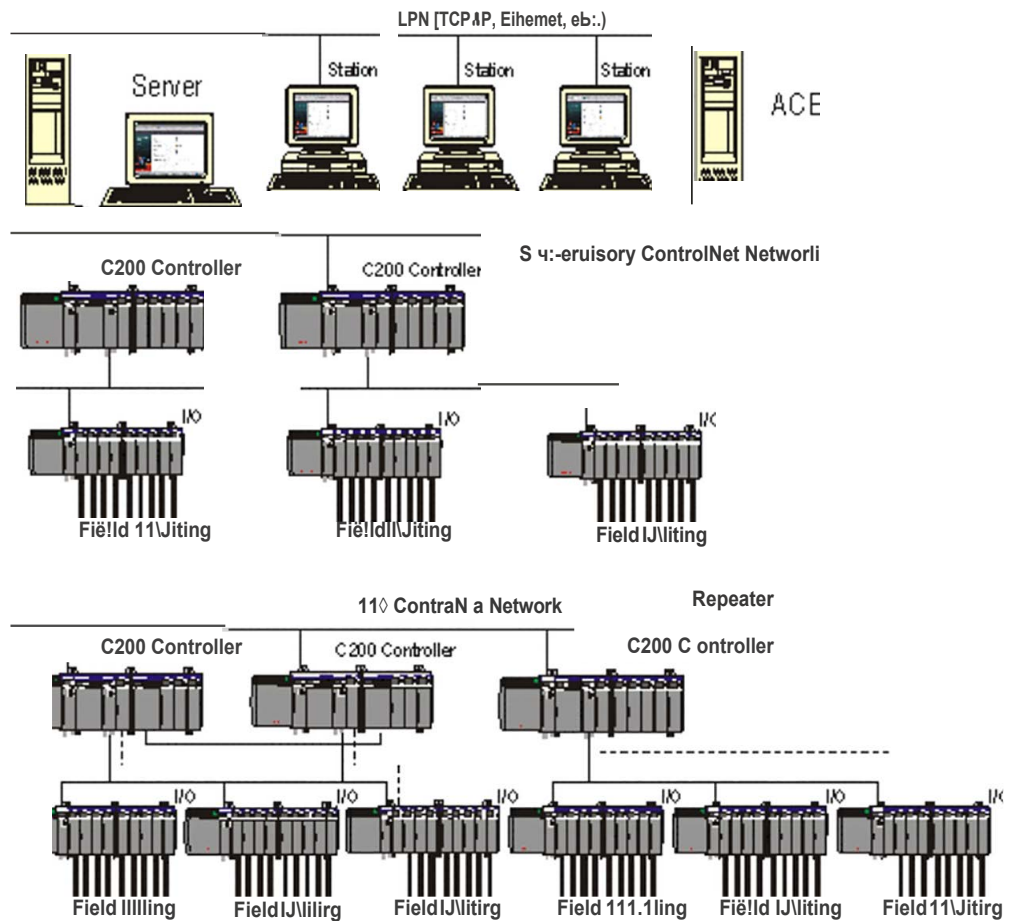
The ACE controller provides the basic operations of a Control Process Module (CPM). It provides the additional capability of communicating with OPC Servers through a Fault Tolerant Ethernet (FTE) or Ethernet-based Network. The ACE provides a secure, high-performance, multi-processor Windows 2000 Server operating system. Users can optionally connect an ACE controller directly to a supervisory Fault Tolerant Ethernet (FTE) or Control Network to support peer-to-peer communications with C200 Process Controllers.

ACE can be implemented in the following network topologies:

- As part of an existing Total Plant Solution (TPS) system with Application (APP) Node, Network Interface Module/Universal Control Network (NIM/UCN) and/or Highway Gateway (HG)/TDC2000 Highway
- As part of a new Expert system with C200 Controller's and FTE Bridge
- As part of an existing Expert system with C200 Controller's

The location of the ACE in a typical medium-size control system is illustrated below:

## Application Control Environment (ACE) Overview



### ACE as Part of an Experion Control System

#### ACE and OPC Gateway

The ACE communicates with OPC Servers via the OPC gateway. See Using OPC Gateway to Interface ACE to an OPC Server.

### ACE process architecture

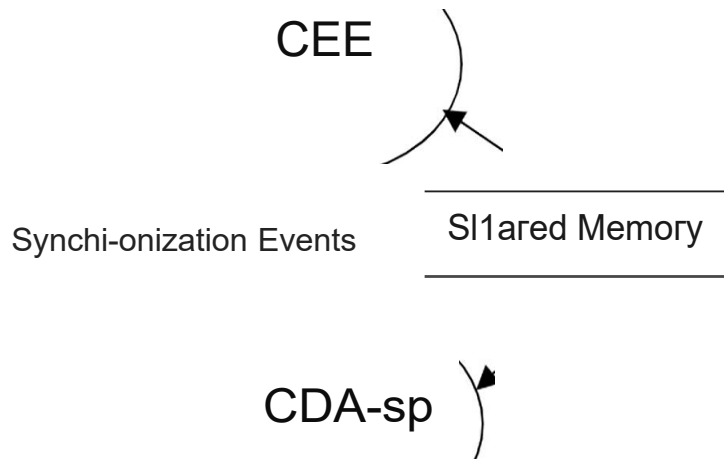
The figure below illustrates the process architecture of the ACE controller. It identifies the following subsystems:

- Control Execution Environment (CEE)

- Control Data Access - supervisor (CDA-sp)

The subsystems communicate through two basic mechanisms:

- Shared memory
- Windows  
Synchronization Events



### ACE Process Architecture

#### ACE/CEE database

The ACE/CEE architecture does not contain any persistent, hard-disk-based database. Upon load ACE/CEE configuration information and command its state (CEE state of the controller) is loaded into memory.

Application Control Environment (ACE)  
Overview

Interface between ACE and TPS

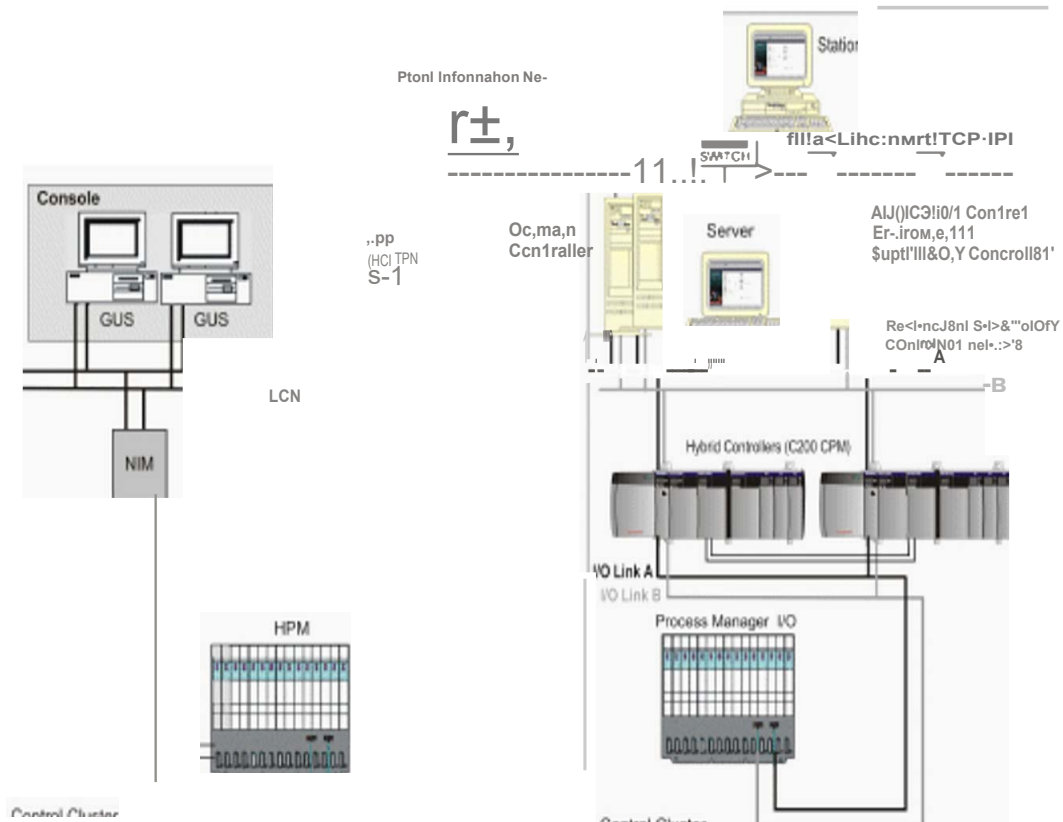
The ACE controller interfaces to the TPS system through an Application (APP) node providing Total Plant Network (TPN) services as all OPC services. The TPN services provide both OPC data access and Honeywell Communications Interface (HCI) extensions to OPC. The ACE controller recognizes whether it is communicating with all OPC services that includes HCI, such as the APP node, and provides appropriate functionality.



**TIP**

The additional HCI related functions are transparent to the Control Modules and Sequential Control Modules in control strategies that are executing in the ACE controller. No changes are required in control strategy configurations through Control Builder whether the OPC server being accessed supports HCI or not.

The relationship between ACE and TPS is illustrated below.



Relationship Between ACE and TPS

# Configuration


## Creating an ACE and CEE

Use the following procedure to create an Application Control Environment (ACE) controller and associated Control Execution Environment (CEE) blocks in the Project Tree that will represent an installed ACE controller. The CEE supports execution of a set of Function Blocks for solving control applications. It runs in the ACE controller as a software layer built on top of the control software infrastructure.

Details of the contents and usage of the Application Control Environment (ACE) Block can be found at [Application Control Environment Block](#). The details and usage of the Control Execution Environment (CEE) block can be found at [Control Execution Environment Application Control Environment Block](#).

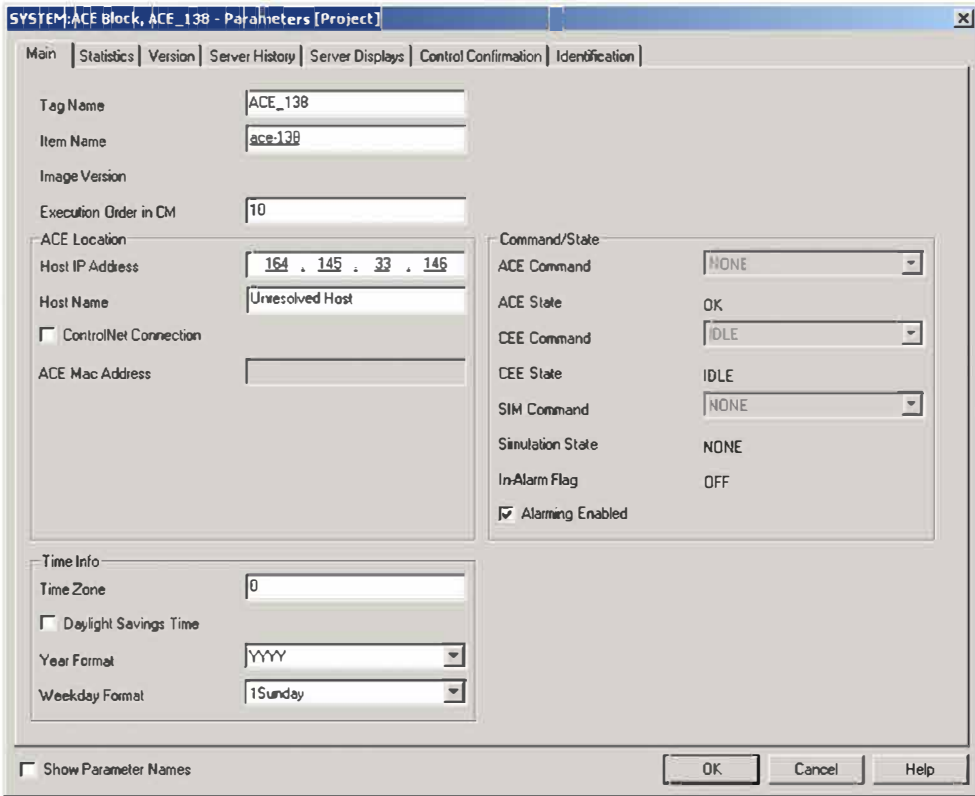
The following procedure assumes that Control Builder is running and two tree windows are open. All illustrations used in the procedure are for example purposes only.

| Step | Action  | Result   |
|------|---|--|
| 1    | Click File -> New -> Controllers -> ACE - <a href="#">Application Control Environment</a> . | Calls up the ACE Block configuration form with Name field highlighted. |




**Configuration**  
**Creating an ACE and CEE**

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| Step | Action  | Result   |
|------|---|--|
|      |  |  |
| 2    | Key in desired name of up to 16 characters or accept the default. Press <Tab>       | Moves cursor to Item Name field.                 |
| 3    | If the CEE is part of an Enterprise Model, enter its Item Name here. Press <Tab>    | Moves cursor to the Execution Order in CM field. |
| 4    | Retain the default execution order of 10, or enter a new value. Press <Tab>.        | Moves cursor to Host IP Address field.           |




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| Step  | Action  | Result   |
|---|---|--|
|  | <p><b>TIP</b></p> <p>Host name and Host IP Address are interactive entries. We recommend that you key in the Host IP Address first and let the system determine the Host Name automatically. This is especially true if you are configuring the ACE block with the ACE node offline. In this case, entering the Host IP address first generates a Warning message, but entering the Host Name first generates an error message. When keying in an IP address, use the mouse or the left and right arrow keys to move the cursor to locations within the field. Do not press the &lt;Tab&gt; key until the complete address is keyed in.</p> |  |
| <p><b>5</b></p>   | <p>Key in the host pc IP address for the ACE node. Press &lt;Tab&gt;.<br/>Or, press &lt;Tab&gt; to skip this field and enter Host Name instead.<br/>Acknowledge any error message prompts.</p>  | <p>System automatically determines the Host Name, when ACE node is online, and moves cursor to Host Name field. (Valid IP address entry results in system automatically determining the Host Name, when ACE node is online.)</p> |
| <p><b>6</b></p>   | <p>If Host Name has been automatically determined, press &lt;Tab&gt;.<br/>Or, key in name assigned to the host pc for the ACE node. There is a 255-character limit on this field. Press &lt;Tab&gt;<br/>(Valid Host Name entry results in system automatically determining the Host IP Address, when ACE node is online.)</p>   | <p>Moves cursor to ControlNet Connection field.</p>  |
| <p><b>7</b></p>   | <p>Leave the box unchecked, if ACE is not connected to the ControlNet network. Check the box, if ACE is connected to the ControlNet network. Press &lt;Tab&gt;.</p>   | <p>If the box is unchecked, cursor moves to Alarm Enabled selector, since the preceding fields are unavailable. Go to Step 9.<br/>If the box is checked, cursor moves to ACE Mac Address field.</p>                              |
| <p><b>8</b></p>   | <p>Key in the Media Access Control (MAC) address assigned to the PCIC card installed the ACE node for ControlNet connections. Press &lt;Tab&gt;.</p>  | <p>Moves cursor to the Alarm Enabled selector.</p>   |
| <p><b>9</b></p>   | <p>The default is alarming enabled. Remove the check to disable alarming. Press &lt;Tab&gt;</p>   | <p>Moves cursor to the Time Zone field.</p>  |



**Configuration**  
**Creating an ACE and CEE**

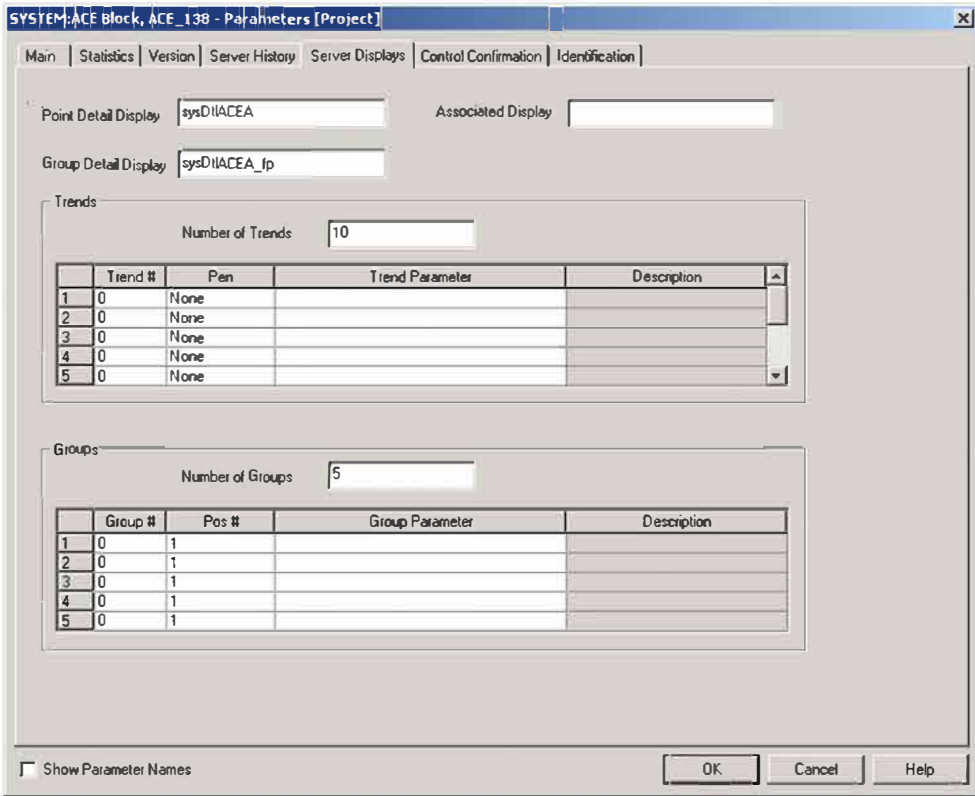
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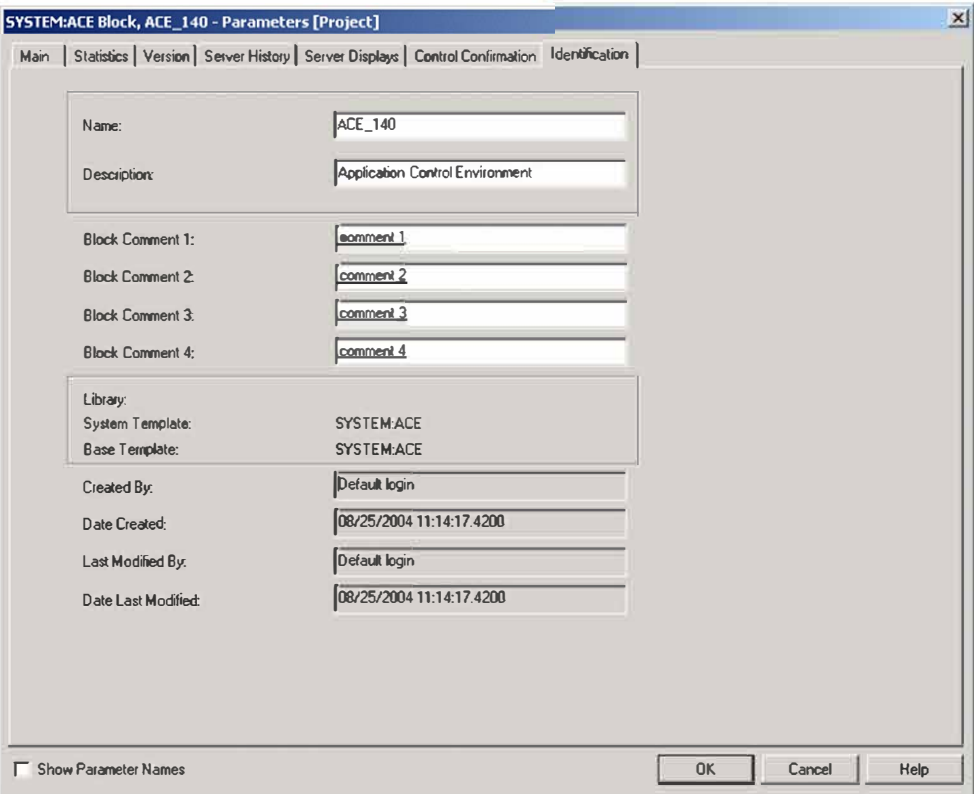
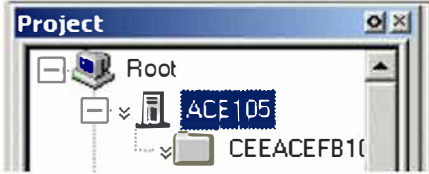
| Step  | Action  | Result   |
|---|---|--|
|  | <p><b>TIP</b><br/>           The time zone represents the offset value from the Greenwich Mean Time (GMT) based on your geographical location. For example, the time zone value for a CPM located in the Eastern time zone of the United States that is currently not observing daylight savings time would be -05.0 or -5. Always use the offset value that is not adjusted for daylight savings time as the entry for the Time Zone field. For example, the adjusted offset value for the Eastern time zone of the United States is -04.0, but use the unadjusted value of -5 instead.<br/>           You may want to visit the <a href="http://www.worldtimeserver.com/">http://www.worldtimeserver.com/</a> website, if you have a question about the appropriate offset value for your given location.</p> |  |
| 10  | Key in the appropriate time zone offset value for the location where the ACE is installed. Press <Tab>.   | Moves cursor to Daylight Savings Time check box. |
| 11  | Leave box unchecked, if Daylight Savings Time is not currently being observed at your location. Or, Check the box, if Daylight Savings time is currently being observed at your location. Press <Tab>.  | Moves cursor to Year Format field.               |
| 12  | Accept default or click  down-arrow button and select desired format from the list. Press <Tab>.   | Moves cursor to Weekday Format field.            |
| 13  | Accept default or click  down-arrow button and select desired format from the list. Click the <b>Server History</b> tab.   | Calls up the Server History configuration form.  |

| Step | Action   | Result   |
|------|--|--|
|      |  |  |
| 14   | Use the on-line help as a guide to complete the configuration entries on this tab. Click the <i>Server Displays</i> tab. | Calls up the Server Displays configuration form. |

**Configuration**  
**Creating an ACE and CEE**

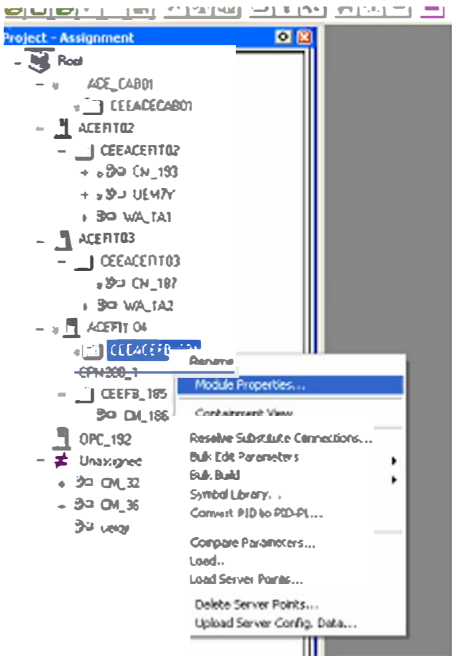
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| Step | Action  | Result   |
|------|---|--|
|      |                                  |  |
| 15   | Use the on-line help as a guide to complete the configuration entries on this tab. Click <b>Identification</b> tab. | Calls up the Identification configuration form |

| Step | Action   | Result  |
|------|--|---|
|      |  |    |
| 16   | Use the on-line help as a guide to complete the configuration entries on this tab. Click the <b>OK</b> button. | <p>Closes the form and creates ACE/CEE block icons in Project tab.</p>  |

**Configuration**  
**Creating an ACE and CEE**

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| Step | Action                         | Result  |
|------|--------------------------------|---|
| 17   | Right-click CEEACE block icon. | <p data-bbox="912 499 1166 524">Calls up shortcut menu.</p>  <p>The screenshot shows a 'Project - Assignment' window with a tree view. The tree structure includes: <ul style="list-style-type: none"> <li>Root <ul style="list-style-type: none"> <li>ACE_CAB01 <ul style="list-style-type: none"> <li>CEEACECAB01</li> </ul> </li> <li>ACEPT02 <ul style="list-style-type: none"> <li>CEEACEPT02 <ul style="list-style-type: none"> <li>CM_193</li> <li>UEM7Y</li> <li>WA_TA1</li> </ul> </li> </ul> </li> <li>ACEPT03 <ul style="list-style-type: none"> <li>CEEACEPT03 <ul style="list-style-type: none"> <li>CM_187</li> <li>WA_TA2</li> </ul> </li> </ul> </li> <li>ACEPT04 <ul style="list-style-type: none"> <li>CEEACEPT04 (highlighted)</li> <li>CEEFB_185 <ul style="list-style-type: none"> <li>DM_186</li> </ul> </li> </ul> </li> <li>OPC_192</li> <li>Unassigned <ul style="list-style-type: none"> <li>CM_32</li> <li>CM_36</li> <li>veqy</li> </ul> </li> </ul> </li> </ul>   A context menu is open over the CEEACEPT04 block, listing options such as 'Module Properties...', 'Container View', 'Resolve Substructure Connections...', 'Bulk Edit Parameters', 'Bulk Build', 'Symbol Library...', 'Convert PID to PDD-P1...', 'Compare Parameters...', 'Load..', 'Load Server Points...', 'Delete Server Points...', and 'Upload Server Config. Data...'.</p> |
| 18   | Click Module Properties.       | Calls up <a href="#">CEE Block</a> configuration form.  |

**Configuration**  
Creating an ACE and CEE

| Step   | Action   | Result                                       |                       |                          |                       |                      |                        |   |      |    |   |   |
|--|--|--|-----------------------|--------------------------|-----------------------|----------------------|------------------------|---|------|----|---|---|
| <p>The screenshot displays the configuration page for 'SYSTEM:CEEACEFB Block, CEEACEFB_139 - Parameters [Project]'. The interface includes a navigation menu at the top with options like 'CDB Types Info', 'Prefetch And BPS', '24 Hours Overruns', 'Version', 'Server History', 'Server Displays', 'Control Confirmation', 'Identifi', 'Main', 'Statistics', 'CPU Loading', 'CPU Overruns', 'Block Types Info', 'Peer Communications', 'Display Communications', 'Memory', and 'CAB Type'. The main configuration area contains several fields: 'Tag Name' (CEEACEFB_139), 'Item Name' (empty), 'ACE Application Process ID' (0), 'Base Execution Period' (500mS), 'Subscription Period' (DEFAULT), 'Store Expiration Time' (15), 'CEE Command' (IDLE), 'CEE State' (IDLE), 'SIM Command' (NONE), and 'In-Alarm Flag' (OFF). There are also checkboxes for 'Inhibit Notifications - CEE and Contents', 'Simulation Enable', and 'Alarming Enabled'. At the bottom, there is a 'Number of Peer Environments' field (0) and a 'Peer Environment Table' with the following data:</p> <table border="1"> <thead> <tr> <th>Peer Environment Name</th> <th>Peer Subscription Period</th> <th>Store Expiration Time</th> <th>Avg Get Request Rate</th> <th>Avg Store Request Rate</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2sec</td> <td>15</td> <td>0</td> <td>0</td> </tr> </tbody> </table> |  |  | Peer Environment Name | Peer Subscription Period | Store Expiration Time | Avg Get Request Rate | Avg Store Request Rate | 1 | 2sec | 15 | 0 | 0 |
| Peer Environment Name  | Peer Subscription Period   | Store Expiration Time                        | Avg Get Request Rate  | Avg Store Request Rate   |                       |                      |                        |   |      |    |   |   |
| 1  | 2sec   | 15   | 0                     | 0                        |                       |                      |                        |   |      |    |   |   |
| 19   | Key in desired name of up to 16 characters or accept the default. Press <Tab>    | Moves cursor to the Item Name field          |                       |                          |                       |                      |                        |   |      |    |   |   |
| 20   | If the CEE is part of an Enterprise Model, enter its Item Name here. Press <Tab> | Moves cursor to Base Execution Period field. |                       |                          |                       |                      |                        |   |      |    |   |   |
| 21   | Accept the default. Press <Tab>.   | Moves cursor to Subscription Period field.   |                       |                          |                       |                      |                        |   |      |    |   |   |

**Configuration**  
 Creating an ACE and CEE

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| Step  | Action  | Result   |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
|---|---|--|-----------------------|-----------------------|--------------------------|-----------------------|----------------------|------------------------|---|--|------|----|---|---|---|--|--|--|--|--|
| 22  | Accept the DEFAULT or click  down-arrow button and select desired period. Press <Tab>.   | Moves cursor to Store Expiration Time field.   |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 23  | Accept the default or key in desired value. Press <Tab>.  | Moves the cursor to the Simulation Enable selector.  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 24  | Select if this node is to be used as a SIM ACE. (See SIM ACE User Guide for additional details). Press <Tab>.   | Moves cursor to Alarming Enabled field.  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 25  | The default is alarming enabled. Remove the check to disable alarming. If peers are to be configured, move to the <i>Number of Peer Environments</i> field and go to item 25. Otherwise, click on the <b>Server History</b> tab and go to Step 30 |  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| <b>Peer Configuration</b>   |   |  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
|  <p>The screenshot shows a configuration window with a checked 'Alarming Enabled' option. Below it, the 'Number of Peer Environments' is set to 2. A table titled 'Peer Environment Table' is displayed with the following data:</p> <table border="1"> <thead> <tr> <th></th> <th>Peer Environment Name</th> <th>Peer Subscription Period</th> <th>Store Expiration Time</th> <th>Avg Get Request Rate</th> <th>Avg Store Request Rate</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td>2sec</td> <td>15</td> <td>0</td> <td>0</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |   |  |                       | Peer Environment Name | Peer Subscription Period | Store Expiration Time | Avg Get Request Rate | Avg Store Request Rate | 1 |  | 2sec | 15 | 0 | 0 | 2 |  |  |  |  |  |
|   | Peer Environment Name   | Peer Subscription Period   | Store Expiration Time | Avg Get Request Rate  | Avg Store Request Rate   |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 1   |   | 2sec   | 15                    | 0                     | 0                        |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 2   |   |  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
|    | <b>TIP</b><br>The Number of Peer Environments and Peer Environment Table are interactive. The value entered for the Number of Peer Environments determines how many rows appear in the Peer Environment Table.                                    |  |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |
| 26  | Key in number of peer environments for this ACE. Press <Tab>. Or, skip this field, if no peer environments will be used, click the <b>Server History</b> tab and go to Step 30  | If peer environments will be used, cursor moves to the Peer Environment Name column in the Peer Environment Table. |                       |                       |                          |                       |                      |                        |   |  |      |    |   |   |   |  |  |  |  |  |

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