

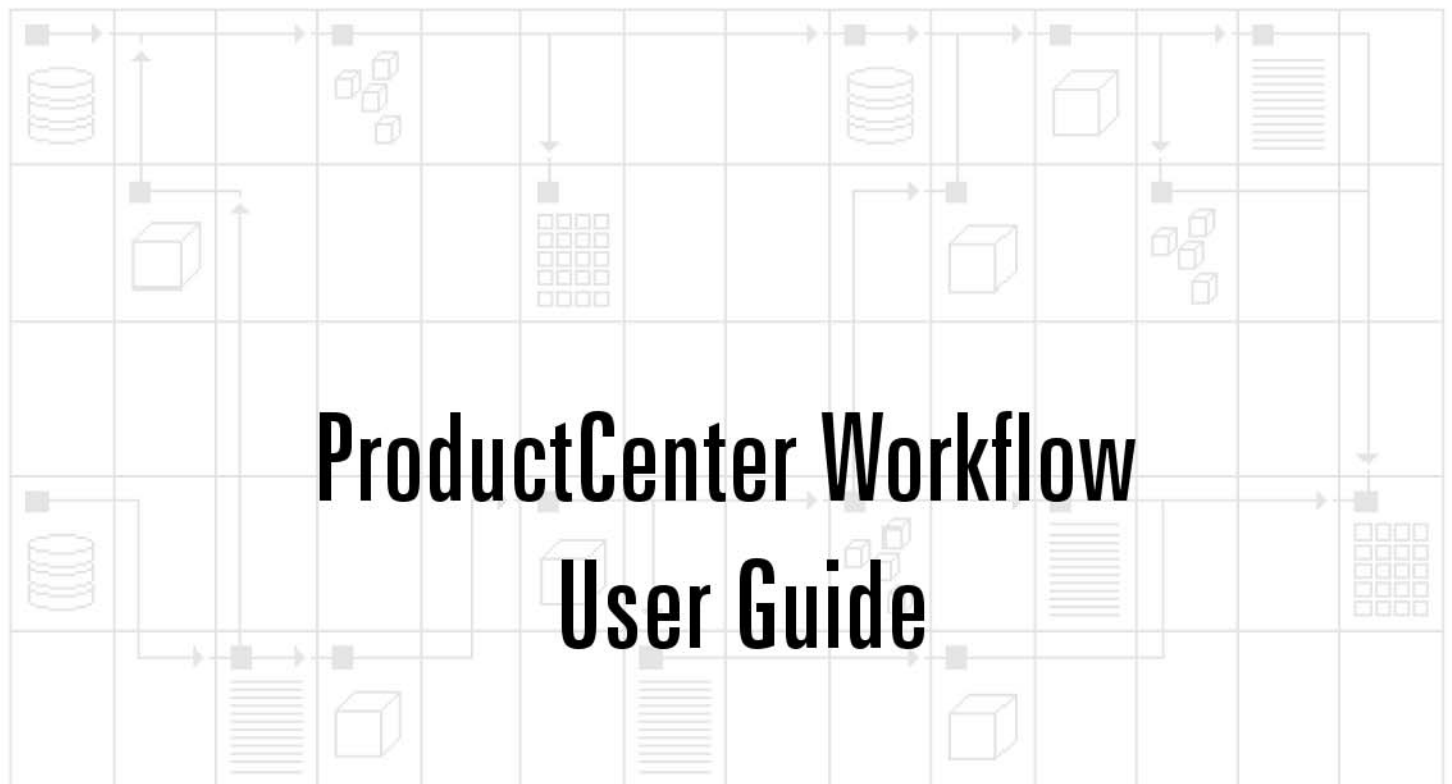


P R O D U C T L I F E C Y C L E M A N A G E M E N T



ProductCenter[®]

AT THE CENTER OF YOUR ENGINEERING SUCCESS



ProductCenter Workflow User Guide

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ProductCenter Workflow User Guide

CONTENTS

About this book

ProductCenter Workflow	xi
About this manual	xi
Typographical conventions	xi
ProductCenter Documentation	xii

Chapter 1: Overview

Introduction to Workflow	2
Who uses ProductCenter Workflow?	2
What does ProductCenter Workflow do?	3
Key ProductCenter Workflow concepts and terminology	4
Processes and process instances	4
Route-based and form-based processes	5
Assignments	5
Activities	6
Send forward and send back	6
Workflow windows and viewers	6
Audit trail, comments, and work instructions	7
States	8
Workflow Activity State (status)	8
Workflow Assignment State	8
Windows and Web Client versions	12
Starting ProductCenter Workflow	13
Setting up ProductCenter Workflow	13
ProductCenter Workflow basics	14
Web Client Interface	14
Windows interface	16
The Claimable Work window	16
The Work List window	20
Work List icons	20
To have Work List appear when you log in	23

The Workflow menu	23
Summary of Workflow Toolbar icons	25

Chapter 2: Designing a Workflow Process

Understanding the Process Editor	28
Diagram view	28
List view	29
Designing a process	32
Process Editor basics	32
Activities and connectors	32
Start object	33
Resources	33
Voting weights and thresholds	34
Informational Activity Assignments	36
Branch Rules and Operations	41
Loops	42
Creating, modifying, and saving processes	42
To create a new process	44
To open an existing process	45
To save a process	45
To save a process with a new name	46
To make a process active or inactive	47
To list items using a process definition	48
To delete processes definitions	48
To delete a process definition	48
Considerations when using Merge All	49
Loops	51
Termination	52
Cross-dependencies	53
Validating a process	55
To validate a process	55
Working with activities	56
To add an activity to the process	56
To create multiple activities	56
To remove an activity or connector from the process	57
To connect activities	58
Understanding the Properties window	59

To use the Properties window's General tab	60
To use the Properties window's Branch Rules tab.	62
To use the Display Settings tab.	63
To use the Operations tab.	64
To use the Permissions tab	67
Understanding the Activity Notebook	68
To use the Notebook's General tab	69
To use the Dependencies tab	70
To use the Post-operations tab	71
To use the Notebook's Branch Rules tab.	72
Using the View functions	73
To zoom on a particular area	73
To align activities.	74
Assigning a resource to an activity	75
To assign a resource to an activity	75
To assign the same resource to multiple activities	76
Claimability.	77
To make an activity assignment claimable	78
To specify Voting Weight and Thresholds.	78
Working with branch rules	80
Branch rule syntax	80
Examples	87
To create a branch rule	87
To modify a branch rule	88
Evaluation of Branch Rules and Server Logging	88
Working with operations	92
Workflow variables.	93
To create a pre- or post-operation for a process	94
To create a post-operation for an activity	95
Workflow Pre/Post-Operation Server Log	99

Chapter 3: Coordinating and Administering Workflow

Responsibilities of Administrators and Coordinators	104
Activity Operations	106
Assignment Operations.	107
Setting ProductCenter Workflow resource variables	111
cms.workflow.enabled	111

cms.workflow.update_interval	111
cms.workflow.bypass_assignment_user	111
Group and user roles	112
Specifying a bypass user	113
Setting up a bypass user	114
Using the bypass user feature	114
Dealing with activities that are On Hold	115
Suspended/Held By column in Work List	116
Reassigning an activity assignment On Hold (coordinator procedure)	116
To reassign an activity assignment On Hold	117
Reassigning a Suspended activity (coordinator procedure)	118
To reassign a Suspended activity	118
To cancel an activity that is On Hold	119
Suspending and activating activities	120
Having a coordinator or DBA-enabled user reassign any activity	122
To reassign an activity from Process Viewer (coordinator procedure)	122
To reassign an activity from Search Results (coordinator or DBA procedure) ..	123
Restarting an Activity	124
Cancelling vs. deleting a process	125
Permissions	126
Restrictions	126
Cancelling and deleting process instances	126
To cancel a process instance	126
To delete a process instance	127

Chapter 4: Using ProductCenter Workflow

Using ProductCenter Workflow	130
Claimable and Work List windows	130
Claimable activities	131
To claim an activity	132
Responding to an assigned activity	132
Using the Work List window	133
Sending an activity forward	134
To send an activity forward	134
Sending back an activity	136
To send back an activity	136

Reassigning an activity (user procedure)	137
Viewing a process	138
To display the Process Viewer	138
Process Viewer Diagram view	139
The Process Viewer Properties window	140
Process Viewer Properties window: General tab	141
Process Viewer Properties window: Branch Rules tab	142
Process Viewer Properties window: Display Settings tab	142
To use the Display Settings tab in the Viewer	143
Process Viewer Properties window: Operations tab	144
Process Viewer Properties window: Permissions tab	145
The Process Viewer Activity Notebook	146
To use the Notebook's General tab	146
To use the Status tab	149
To use the Dependencies tab	150
To use the Post-operations tab	152
To use the Notebook's Branch Rules tab	153
Process Viewer List view	154
Work instructions	157
To view Work Instructions	157
The audit trail	158
To view the audit trail	160
Starting a workflow process	161
To start a form-based process	162
To assign roles when issuing a form	164
To start a route-based process	165
Workflow queries	167
To find a Workflow process instance or activity	175
Workflow Reports	176
Generating a Workflow SQL report	176
To generate a Workflow SQL report	176
Generating Workflow XML reports	177
To generate a Workflow XML report	179
Administrator notes: Workflow attributes	181
Reassigning an activity	186
Other Work List window operations	188
Placing an activity assignment On Hold	188
To place an activity On Hold	188

To take an activity Off Hold	189
Assigning an activity	190
To assign an activity when sending forward	191
To request that the coordinator assign an activity.	191
Closing the assignment dialog will place activity On Hold.	191
Working with files and projects attached to a process	192
Operations on attachments in Work List.	193
Floating and fixed release states	194
Reviewing other processes	195
To review other processes	195
To view attached processes	196

Appendix A: Administration Procedures

Adding a non-O.S. user account	200
To enable direct entry at the User Administration window	200
To add a list of user accounts from an import file	201
Adding roles	202
To define roles in ProductCenter.	202
Localization of the User and Group Role Assignments	206
Ambiguous Role Names	206

Appendix B: The Workflow Email Utility

Introduction	212
Setup and Configuration	213
What gets installed?	214
Editing the cms_site file	214
Editing the resource file	215
Editing the email template files	217
Mail Message Substitution Keywords	218
Mail Message Template File Samples.	219
Define the post-operations.	222
Activity Post-Operation Trigger on Send Back.	225
Arguments summary	228
Troubleshooting	231
Using SQL to determine ids.	231
Executing from the command line.	232

Time stamps	233
Error messages	233
Implementing overdue warnings	234
Command line arguments	235
Batch File Example:	235
Escalation file	236
Examples:	237
Time threshold value	237
Message substitution keywords	237

Appendix C: Workflow Pre/Post-Operation Script Logging

Introduction	240
Manual Configuration	241
Configuration Resources	243
User Interface Configuration	245
Tools for debugging wfemail issues connecting to the mail host	247
<i>Index</i>	249



About this book

ProductCenter Workflow

This manual explains how to configure and use ProductCenter Workflow, a graphical process management tool that runs on Windows clients. ProductCenter provides a subset of Workflow functionality through the WebClient. UNIX users needing access to Workflow functionality must use the WebClient.

About this manual

This manual is intended for administrators who install and configure the software, coordinators who oversee the use of Workflow, and users who depend on Workflow to receive task assignments and report status on those tasks.

Typographical conventions

This manual uses the following conventions for instructions on user entry:

- Italics denotes variable text for which the user should substitute an appropriate value. For example, “Enter **ReadOnlydir=*folder_path***” means enter “ReadOnlydir=” just as shown, followed by an actual pathname.
- Text in square brackets represents an optional entry. For example, “Type **opc [-verbose]**” means “-verbose” may be omitted.

ProductCenter Documentation

- *ProductCenter Installation Guide*— A guide for installing and configuring ProductCenter on Windows® and UNIX systems using either Oracle® or SQL Server® RDBMS.
- *ProductCenter Administrator Guide* — A guide to all procedures involved in setting up and maintaining ProductCenter for use once it has been installed.
- *ProductCenter for Windows User Guide* — A guide for users who work with ProductCenter on a Microsoft® Windows® platform.
- *ProductCenter Web Client User Guide* — A guide for users who work with ProductCenter through a web browser.
- *ProductCenter Workflow Guide* — A guide to all procedures for setting up, maintaining and using ProductCenter Workflow.
- *ProductCenter Office Integrator User Guide* — A guide for MS-Office users who manage Microsoft Office® documents with ProductCenter.
- *ProductCenter Inventor Integrator User Guide* — A guide for Inventor Integrator users who manage Autodesk® Inventor® designs with ProductCenter.
- *ProductCenter AutoCAD Integrator User Guide* — A guide for AutoCAD Integrator users who manage Autodesk® AutoCAD® Mechanical and Electrical designs with ProductCenter.
- *ProductCenter SolidWorks Integrator User Guide* — A guide for SolidWorks Integrator users who manage SolidWorks® designs with ProductCenter.
- *ProductCenter CADRA Integrator User Guide* — A guide for CADRA Integrator users who manage CADRA® designs with ProductCenter.
- *ProductCenter Pro/ENGINEER Integrator User Guide* — A guide for Pro/ENGINEER Integrator users who

manage Pro/ENGINEER™ designs with ProductCenter.

- *ProductCenter C/C++ and Perl Toolkits Programmer Guide* — A guide to the C/C++ and Perl Application Programming Interfaces to customize the ProductCenter environment.
- *ProductCenter WebLink™ Toolkit Programmer Guide* — A guide to the Web-based Application Programming Interface to customize the ProductCenter environment.
- *ProductCenter BatchLoader Guide* — A guide to the use of BatchLoader to automate the process of loading legacy data into ProductCenter.
- *ProductCenter BatchGetCopy Guide* — A guide to the use of BatchGetCopy to automate retrieving copies of multiple files from ProductCenter.
- *ProductCenter GenView™ Guide* — A guide to the use of GenView to automate the generation of viewable files.
- *ProductCenter Release Notes* — A description of all product changes for a specific ProductCenter release.

Chapter 1

Overview

Just Ahead:

Introduction to Workflow	2
Starting ProductCenter Workflow	13
ProductCenter Workflow basics	14

Introduction to Workflow

ProductCenter Workflow adds process management to your ProductCenter environment.

While basic ProductCenter manages your product-related documents and other information by keeping track of each document version, and controls access to stored documents, ProductCenter Workflow helps you to automate work processes. It does this by routing work requests (and the information needed to perform the work) to appropriate individuals and groups.

ProductCenter Workflow keeps detailed records of each job step, including who is assigned to perform each activity (task), and the date and time that activities are started and completed. ProductCenter Workflow closely integrates its user interface with the core ProductCenter components.

Who uses ProductCenter Workflow?

You might use or administer ProductCenter Workflow in one or more of the following roles:

- Administrator — The administrator installs and configures ProductCenter Workflow.
- Designer — The designer creates process definitions so that ProductCenter Workflow works in your particular environment. The designer may or may not be the same person as the coordinator or the administrator, but must have administrator privileges to access the Process Editor.
- Coordinator — The coordinator is a special user who is responsible for resolving certain ProductCenter Workflow issues. A coordinator does not necessarily have Administrator privileges, but any DBA-enabled user can perform coordinator operations. Note that

different users could be coordinators for different processes.

- User — If you use ProductCenter to check your files in and out, you will now use additional ProductCenter Workflow functions to complete an activity or reject a piece of work. You might use Workflow from the graphical Windows interface or from the simplified Web interface.

What does ProductCenter Workflow do?

ProductCenter Workflow:

- Delivers to the appropriate users the *activities* or tasks that they must work on. Assigned activities appear in the user's *Work List* window. Activities that are to be claimed by one person out of a group of people appear first in the *Claimable Work* window of every member of that group. When one person claims that activity, it disappears from everybody's Claimable Work window and appears in the Work List window of the person who claimed it.

The activity may include documents and other information related to the activity. Workflow allows easy access to the Desktop and to core ProductCenter functions such as view, check out, and check in.

- Provides easy access to a process's state (status), activity assignments and history, and comments made by people involved in the process.
- Provides the ability to define expressions that determine which path a flow takes under what conditions. Also

allows workflow process designers to specify executables to be invoked at the completion of an activity.

- Allows activities to be assigned in the process definition, or dynamically, as an assignment is needed.
- Gives users assigned to each activity the option to send the process forward when they are done, put the activity assignment On Hold, or send it back to a previous activity for rework.
- Asks users for their sign-off and optional comments upon activity completion.

Key ProductCenter Workflow concepts and terminology

This section introduces you to the key terms and concepts used in this manual.

Processes and process instances

The heart of any workflow management system is the process. The process designer uses the ProductCenter *Process Editor* to develop a *process definition* that specifies how a repeatable operation is to be done. (See “Understanding the Process Editor” on page 28.)

A process is a job that can involve input of work from more than one person in a workgroup. A process can specify:

- One or more *activities* (tasks) required to complete the process.
- The order in which the activities are to be performed.
- Who will perform each activity.

The process definition resides in the database. When you set a process in motion, ProductCenter creates an instance of that process definition. The process instance also resides in the database. While the entities that ProductCenter lists are,

strictly speaking, process instances, we generally speak of them simply as processes.

Route-based and form-based processes

When you define a process, you decide whether it should be route-based (that is, you use the process to route an existing item such as a document) or form-based (that is, you create an online form in ProductCenter, such as an ECO request that gets routed). A form-based process must be defined for a project class, not a file class. Route-based processes can handle documents or non-file items such as parts and forms.

Once this is done, the process appears as an option when you select either **Issue Form** or **Route Selected Item** from the **Workflow** menu. If the process was defined with a default class, it appears on the **Issue Form** list. If the process was defined with no default class, it appears on the **Route Selected Item** list. ProductCenter creates a process instance from the process definition. See “Starting a workflow process” on page 161 for more information.

NOTE: Issue Form operations may result in an Electronic Signature form being displayed, while Route Selected Item operations do not. This is because Issue Form creates a new item, and this is the action that invokes the signature requirement.

Assignments

Assignments are the linkage between an activity and each of the users or groups of users (sometimes referred to simply as "resources") that are supposed to perform the work that is modeled by the activity.

Activities

An activity is a specific item of work to be performed. Examples of activities include revising a document or approving a change to an engineering drawing.

Send forward and send back

When you are assigned to an activity, you indicate your completion of that activity by *sending it forward*. You have the option of rejecting work by *sending it back* to an earlier activity.

Workflow windows and viewers

Users who have access to the Windows version of Workflow do their work within the following windows and viewers. UNIX users (and Windows users who choose to do so) access a subset of Workflow features through the ProductCenter Web Client (see “Windows and Web Client versions” on page 12).

- Work List window — This window displays a list of active or On Hold activities currently assigned to you (the ProductCenter user) along with a list of the process attachments. See “The Work List window” on page 20 for more information.

- **Claimable Work window** — This window displays activities that are assigned to a group to which you belong. You, or anybody else in that group, can take responsibility for (claim) that activity. When you claim an activity, it appears in your Work List, and disappears from the Claimable Work windows of group members. See “The Claimable Work window” on page 16 for more information.
- **Process Editor and Viewer** — The Windows version of Workflow provides these two interactive graphical displays for designing and using workflow processes. The workflow designer uses the Process Editor to create process definitions. See “Process Editor basics” on page 32 for more information. The workflow user accesses the read-only Process Viewer (available in both the Windows and Web Client interfaces) to examine information about activities in a process instance. See “Viewing a process” on page 138 for more information.
- **Search window** - The standard Search window in both the Windows and Web Client provides two tabs for performing Workflow-related queries:
 - Process Instances
 - Activities

Both tabs provide Workflow-specific query criteria. For additional information see “Workflow queries” on page 167.

Audit trail, comments, and work instructions

ProductCenter Workflow provides options for entering and viewing text that helps people understand the state (status) of an activity and any special requirements that it might have. The audit trail automatically keeps a log of events in the life cycle of a process and includes comments entered at various stages.

States

Workflow processes, activities and assignments can be in any of several states as described in the following sections. You do not need to concern yourself too much with these states, but you will see references to them in various windows, and you can perform queries on them (see “Workflow queries” on page 167). Please refer to Table 1-1 for a summary of Workflow states.

Workflow Activity State (status)

ProductCenter Workflow categorizes activities as being in one of six states:

- Initiated
- Unclaimed
- Claimed
- Suspended
- Completed
- Cancelled

Workflow Assignment State

ProductCenter Workflow categorizes assignments as being in one of six states:

- Unclaimed
- Claimed
- Approved
- Disapproved
- On Hold
- Cancelled

Table 1-1: Workflow states

Type	Value Stored in DB	Displayed Value	Description
Process Definition	Active	Active	The process definition has been released for public use.
	Inactive	Inactive	The process definition is under development and can only be initiated by the last user to edit the definition, or it has been superseded by a newer version of the definition that is active.
Process Instance	Initiated	Initiated	This state exists only briefly as the process instance gets created, and is never displayed in the UI. If the state persists, an error has occurred.
	Active	Active	"Busy" state.
	Cancelled	Cancelled	The Process Coordinator or DBA-enabled user has canceled the process instance.
	Completed	Completed	This state exists when all of the activities of the process have been sent forward.
Activity	Initiated	Initiated	This state exists only briefly in the midst of a transition from one activity to the next before the activity is claimed, and is never displayed in the UI.
	Unclaimed	Unclaimed	This state indicates a claimable activity that has not yet been claimed. That is, there is still at least one unclaimed claimable assignment to the activity.
	Claimed	Claimed	The activity is in a user's worklist, either through direct assignment or by the user claiming it.

Table 1-1: Workflow states

Type	Value Stored in DB	Displayed Value	Description
	Suspended	Suspended	This state indicates that the activity has been suspended by the Process Coordinator or a DBA-enabled user or that it has become deadlocked. When an activity is leaving the Suspended state, the activity state will be set to either the Unclaimed or Claimed state based on the existence of one or more unclaimed assignments.
	Completed	Completed	The activity has been sent forward to the next activity or it has been sent backward to some other activity.
	Cancelled	Cancelled	The activity has been cancelled by the Process Coordinator or a DBA-enabled user.
	---	On Hold	This activity state exists only in communications between the client and server. It indicates that one or more assignments are On Hold while the activity itself is in the Unclaimed or Claimed state.
	---	Not initiated	This state exists only in definition and is displayed only in the list-based Process Viewer.
Assignment	Unclaimed	Unclaimed	This assignment of the activity instance is to the assigned user as a member of a group and has not yet been claimed by any member of the group. It therefore appears in the Claimable window of this user and all the other members of the group.

Table 1-1: Workflow states

Type	Value Stored in DB	Displayed Value	Description
	Claimed	Claimed	This assignment of the activity instance has been Claimed (or was not a claimable group assignment in the first place) but has not yet been Sent Forward or Sent Back and is not On Hold.
	Approved	Approved	This assignment of the activity instance has been Sent Forward by the assigned user.
	Disapproved	Disapproved	This assignment of this activity instance has been Sent Back by the assigned user.
	On Hold	On Hold	This assignment has been placed On Hold. The state of the activity is still Claimed, Unclaimed or Suspended.
	Cancelled	Cancelled	This assignment of the activity instance has been Canceled by the Process Coordinator or a DBA-enabled user.

NOTE: It should be noted that an activity can become deadlocked when all assignments for a specific activity are completed but the Activity Done or Back Threshold (see “Voting weights and thresholds” on page 34) has not been achieved. ProductCenter will represent the activity as Suspended which will require the Process Coordinator or a DBA-enabled user to resolve.

Windows and Web Client versions

ProductCenter for Windows users have access to full Workflow functionality, including administration and graphical process editor and process viewer. You must be DBA-enabled to access the administration functions. There are screen permissions that can be used to extend authorization for some administrative functions to ordinary users. Specifically, this is true for the Process Editor and the Reassign command.

Users on UNIX access Workflow functionality through the ProductCenter Web Client.

The Web Client provides access to a subset of Workflow features from a user point of view that include:

- Send Forward
- Send Back
- Put On Hold
- Take Off Hold
- Claim task
- Suspend
- Resume
- Reassign
- Audit Log
- View Process
- List all process instances

NOTE: Workflow functions do not appear in the Windows or Web Client interfaces unless Workflow is enabled. See “Starting ProductCenter Workflow” on page 13 for more information. Also, ProductCenter does not display Workflow menus unless an Administrator has set Screen Access permissions for Hold, Start Workflow, Send Forward, Send Back, Show Workflows, and View Workflow. See Chapter 4, “Managing Users and Groups” in the *ProductCenter Administrator Guide* for more information.

Starting ProductCenter Workflow

Your ProductCenter administrator will need to set up ProductCenter Workflow to enable workflow functions when you log in.

Setting up ProductCenter Workflow

You must have a license to use the Workflow component of ProductCenter. See the *ProductCenter Installation Guide* and *ProductCenter Administrator Guide* for more information about ProductCenter licensing.

When your site has a Workflow license, your administrator can set the following resource variable in the cms_site file to turn on ProductCenter Workflow:

```
cms.workflow.enabled = TRUE
```

You may not be aware of the setting of this variable, but you know it is enabled if:

- A **Workflow** menu appears on your menubar whenever you run ProductCenter for Windows
- **Claimable Work** and **Work List** tabs appear on the ProductCenter Web Client browser

Windows users can tell if they have access to Workflow administrative functions by checking for the existence of a **Process Editor** option on the **Administration** menu. If you are a DBA-enabled user, you have access to the Workflow administration functions.

ProductCenter Workflow basics

When Workflow is enabled, you will notice several additions to the ProductCenter user interfaces.

Web Client Interface

Figure 1-1 shows the Work List functions available from the ProductCenter Web Client. ProductCenter for UNIX users use this interface to gain access to a subset of Workflow functionality.

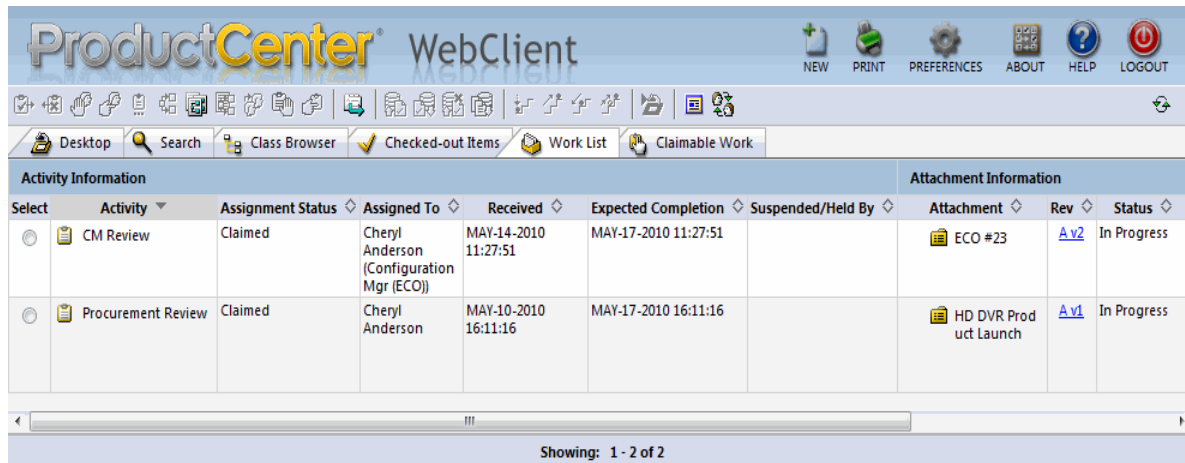


Figure 1-1: Workflow Web Client interface

Click the **Work List** tab underneath the toolbar to display any assigned activities. Click the **Claimable Work** tab to display any activities waiting to be taken by you or another member of a group to which you belong.

Click **Select** beside an activity of interest and use the buttons found in the toolbar along the top of the browser. If multiple activities are listed in your Claimable Work window, you may claim one or more Workflow activities at a time.

See the *ProductCenter Web Client User Guide* for more specific information about using the Workflow Web Client user interface, but refer to this manual for general Workflow function descriptions and concepts.

Windows interface

Figure 1-2 shows the various elements of ProductCenter Workflow available in Windows, including Work List, Claimable Work, Process Viewer, and Process Editor.

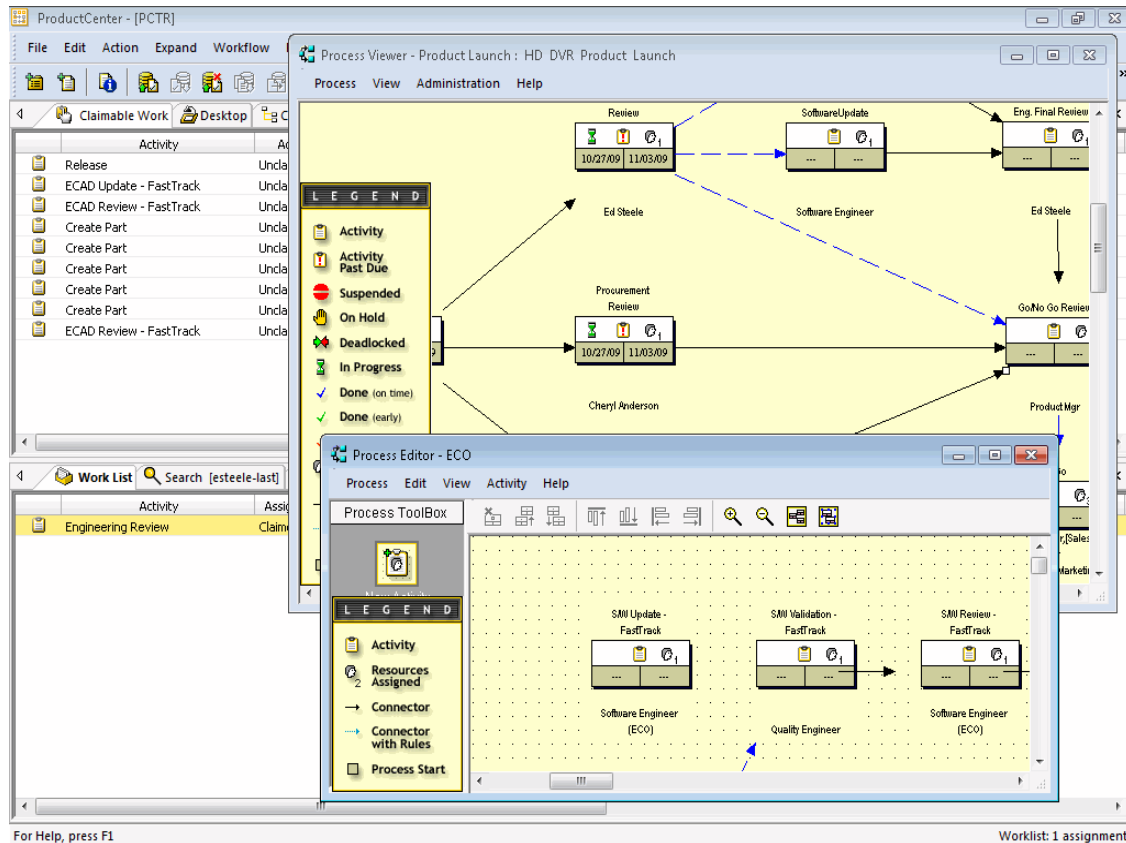


Figure 1-2: Workflow Windows interface

The following sections describe these windows.

The Claimable Work window

The Claimable Work window contains activities that are assigned to a group of which you are a member and of which one person will take on responsibility for the activity.

For example, suppose that you belong to a group called ECAD. If an activity that becomes active is assigned to that group, and if the process designer specified that this activity was to be claimable, then every member of the ECAD group sees the activity in his/her Claimable Work window.

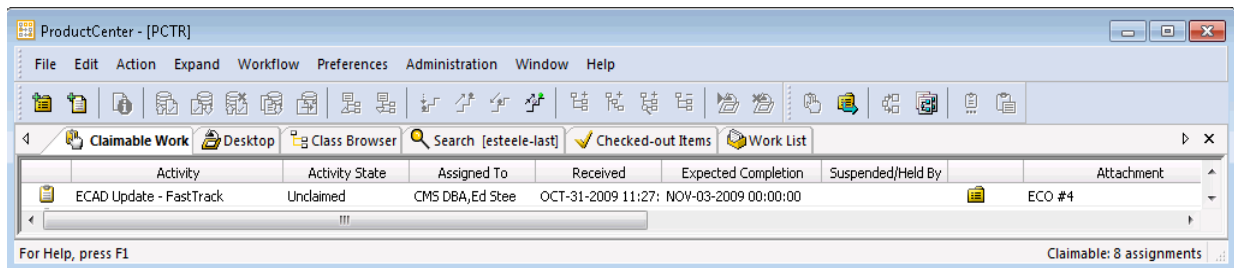


Figure 1-3: Claimable window showing unclaimed activity

The first person to grab or claim the activity becomes its assigned resource. The activity disappears from everybody's claimable window and re-appears only in the Work List of the person who claimed it.

Claimable Work window context menu

When you are in the Claimable Work window, click the right-mouse button to display a pop-up context menu that provides the following commands:

- Attachment
- Claim
- View Process
- View Assignment Status
- View Comments
- Reports

NOTE: As a note, **Attachment** in a workflow menu is a heading for a sub-menu of commands, such as View Info, Check Out, and Put On Desktop.

Claimable Work toolbar

When you are in the Claimable Work window, ProductCenter provides two groups of toolbar icons as shown in Figure 1-4 and Figure 1-5.

The following set of icons shown in Figure 1-4, with the exception of Issue Form and List Processes, operate on the selected activity assignments.

- **Claim Activity(ies)** (see “Claimable activities” on page 131)
- **Issue Form** (see “To start a form-based process” on page 162)
- **View process** (see “Viewing a process” on page 138)
- **List Processes** (see “Reviewing other processes” on page 195)
- **View Comments** (see “To view the audit trail” on page 160)
- **Work Instructions** (see “Work instructions” on page 157)



Figure 1-4: Toolbar options when Claimable Work window is active

The set of icons shown in Figure 1-5 that are described below, with the exception of New Project (create a new project in ProductCenter) and New File (store a new file in ProductCenter), operate on the attached form or item of the selected activity assignment.

- New Project, New File (see the *ProductCenter User Guides*)
- View Info, Check In, Check Out, Return Unmodified, Get Copy and Save As (see the *ProductCenter User Guides*)
- Store Hierarchy, Retrieve Hierarchy (see the *ProductCenter User Guides*)
- Submit, Approve, Disapprove, Re-release (see the *ProductCenter Administrator Guide* for information on these release management options)
- Expand One Level, Expand All Levels, Expand Non-Hierarchical, Expand (Using Filter), Collapse Links, Expand Filter (see the *ProductCenter User Guides*)
- Put on Desktop (see the *ProductCenter User Guides*)

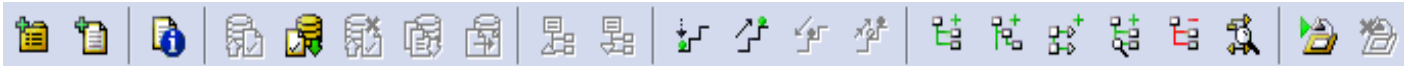


Figure 1-5: Toolbar options when Claimable Work window is active

The Work List window

The Work List contains a list of active and On Hold activities that are assigned to you, along with attached ProductCenter files and projects you may need to complete those activities. It also shows any activities that are On Hold for processes you coordinate. The coordinator's Work List will list each On Hold assignment separately. However, if the activity is Suspended (either by the command or by being deadlocked), then there will be just one instance in the list. The instance will show that the activity is suspended, but will not provide clues about how many of its assignments may be On Hold.

Work List icons

Active and On Hold activity assignments appear with the following icons in the Work List window:



Figure 1-6: Active (left) and On Hold activities icons

Figure 1-7 shows a Work List window with two activities, one of which is On Hold.

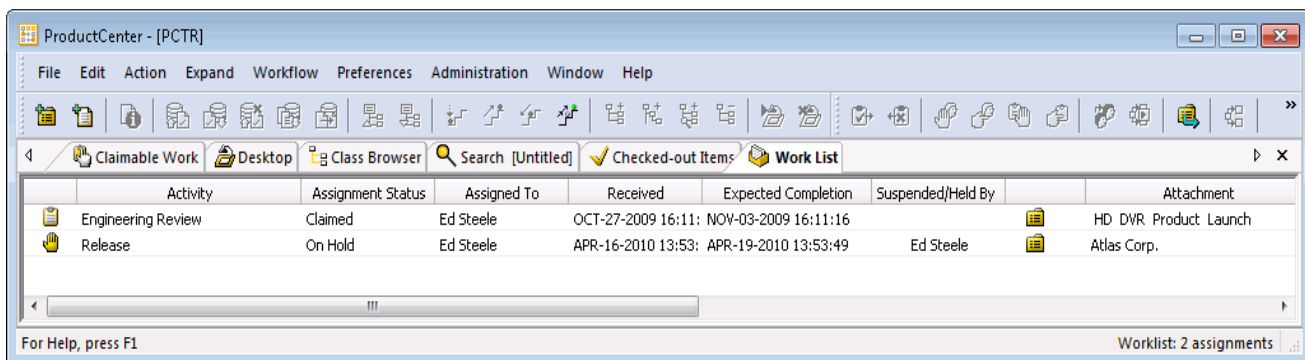


Figure 1-7: Sample Work List window

**Work List window
context menu**

The Attachment column shows a process form, or a file or project being routed for review or editing.

When you are in the Work List window, click the right-mouse button to display a pop-up context menu, which provides the following commands:

- Attachment
- Send Forward
- Send Backward To
- Put On Hold
- Take Off Hold
- Suspend Activity
- Resume Activity
- Restart
- Reassign
- Work Instructions
- View Process
- View Assignment Status
- View Comments
- Reports

NOTE: As a note, **Attachment** in a workflow menu is a heading for a sub-menu of commands, such as View Info, Check Out, and Put On Desktop.

Work List toolbar

When you are in the Work List window, ProductCenter provides two groups of toolbar icons as shown in Figure 1-8 and Figure 1-9.

The following set of icons shown in Figure 1-8, with the exception of Issue Form and List Processes, operate on the selected activity assignments.

- **Send Forward** (see “Sending an activity forward” on page 134)
- **Send Back** (see “Sending back an activity” on page 136)
- **Put On Hold** (see “Placing an activity assignment On Hold” on page 188)
- **Take Off Hold** (see “Placing an activity assignment On Hold” on page 188)
- **Suspend** (see “Suspend an Activity” on page 106)
- **Resume** (see “Resume an Activity” on page 106)
- **Reassign** (see “Reassigning an activity assignment On Hold (coordinator procedure)” on page 116)
- **Restart** (see “Restart an Activity” on page 106)
- **Issue Form** (see “To start a form-based process” on page 162)
- **View Process** (see “Viewing a process” on page 138)
- **List Processes** (see “Reviewing other processes” on page 195)
- **View Comments** (see “To view the audit trail” on page 160)
- **Work Instructions** (see “Work instructions” on page 157)



Figure 1-8: Toolbar options when Work List is active

The set of icons listed in Figure 1-9 that are described below, with the exception of New Project (create a new project in ProductCenter) and New File (store a new file in ProductCenter), operate on the attached form or item of the selected activity assignment

- New Project, New File (see the *ProductCenter User Guides*)
- View Info, Check In, Check Out, Return Unmodified, Get Copy and Save As (see the *ProductCenter User Guides*)
- Store Hierarchy, Retrieve Hierarchy (see the *ProductCenter User Guides*)
- Submit, Approve, Disapprove, Re-release (see the *ProductCenter Administrator Guide* for information on these release management options)
- Expand One Level, Expand All Levels, Expand Non-Hierarchical, Expand (Using Filter), Collapse Links, Expand Filter (see the *ProductCenter User Guides*)
- Put on Desktop (see the *ProductCenter User Guides*)

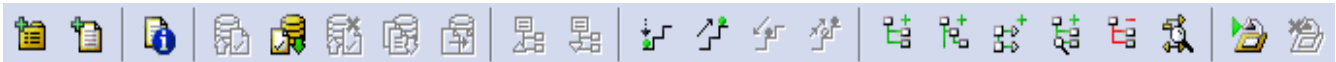


Figure 1-9: Toolbar options when Work List is active

To have Work List appear when you log in

You can set up ProductCenter for Windows so that it displays the Work List window automatically whenever you start ProductCenter by using the following steps:

1. Select **User** from the **Preferences** menu.
2. When the User Preferences window appears, find the **Preferred Window** field and select **Work List**.
3. Click **OK**.

The Workflow menu

When ProductCenter Workflow is enabled, a Workflow menu appears on the menu bar whenever the Work List, Claimable Work, Desktop, Checked-out Items, Class Browser or Search windows are active. The options and

operations provided by this menu vary depending upon which window is active. The Claimable Work window also provides the Claim command, which isn't available on the menus for the other windows.

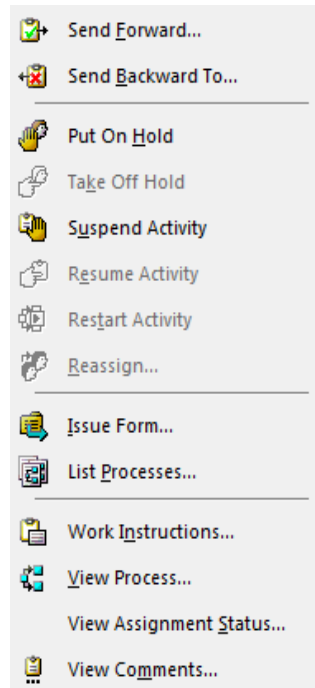























Figure 1-10: The ProductCenter Workflow menu (Work List version)

Summary of Workflow Toolbar icons

A summary of Workflow toolbar icons is presented in Table 1-2. Workflow icons are covered throughout this *ProductCenter Workflow Guide*.

Table 1-2: Workflow toolbar icon summary

Icon	Description	Icon	Description	Icon	Description
	Copy Activity		Cut Activity		Claim Activity
	Cancel Process		Delete Process		Issue Form
	Work Instructions		List Processes		Route Selected Item
	Paste Activity		Reassign User		View Comments
	Send Back		Send Forward		Zoom Out
	View Process		Zoom In		Align Bottom
	Zoom to Fit		Zoom to Selection		Align Top
	Align Left		Align Right		Put On Hold
	Take Off Hold		Suspend		Resume
	Restart				

Chapter 2

Designing a Workflow Process

Just Ahead:

Understanding the Process Editor	28
Designing a process	32
Process Editor basics	32
Creating, modifying, and saving processes	42
Understanding the Properties window.	59
Understanding the Activity Notebook	68
Using the View functions	73
Assigning a resource to an activity.	75
Working with branch rules	80
Working with operations.	92

Understanding the Process Editor

ProductCenter Workflow provides a graphical *Process Editor* for an efficient, interactive way to create and modify workflow process definitions. You access this editor by clicking **Process Editor** in the **Administration** menu. You must have Administrator privileges to access this menu. (Non-DBA enabled users can be allowed to access the Process Editor if they have the appropriate screen permission.)

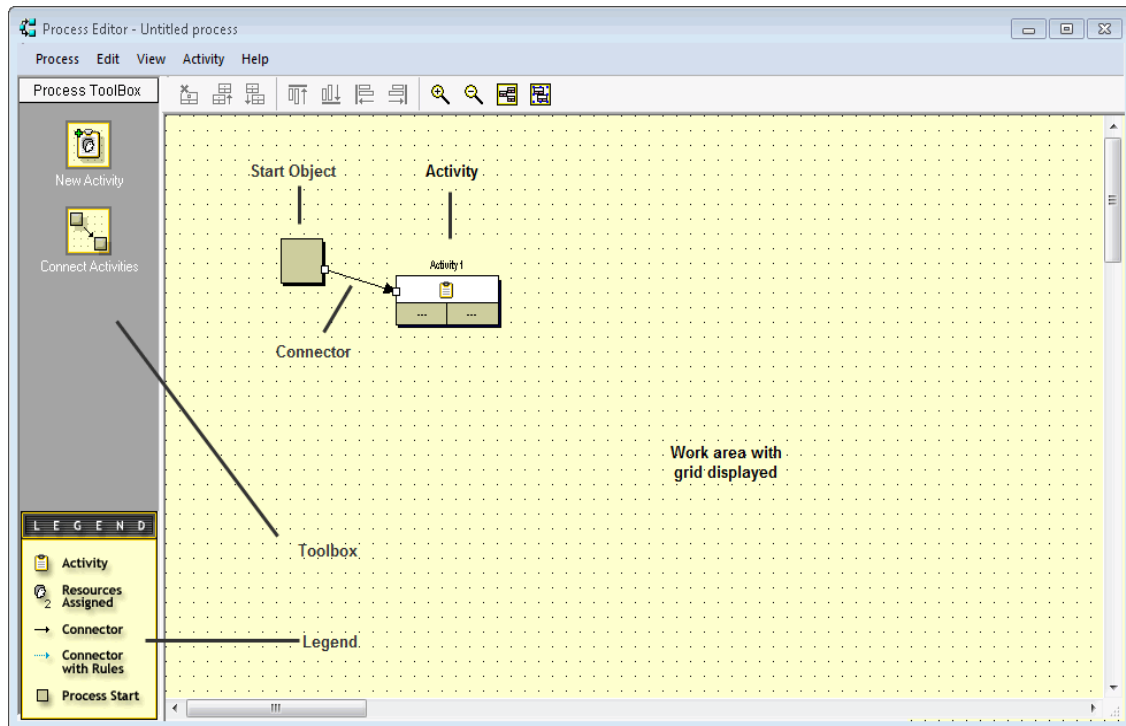
NOTE: ProductCenter Workflow also provides a read-only *Process Viewer* version of this window for users who want to examine process instances to which they are assigned. See “Viewing a process” on page 138 for more information.

The Process Editor offers two main views:

- Diagram
- List

Diagram view

By default, the editor comes up in Diagram or graphical view. This is where you do most of your work.



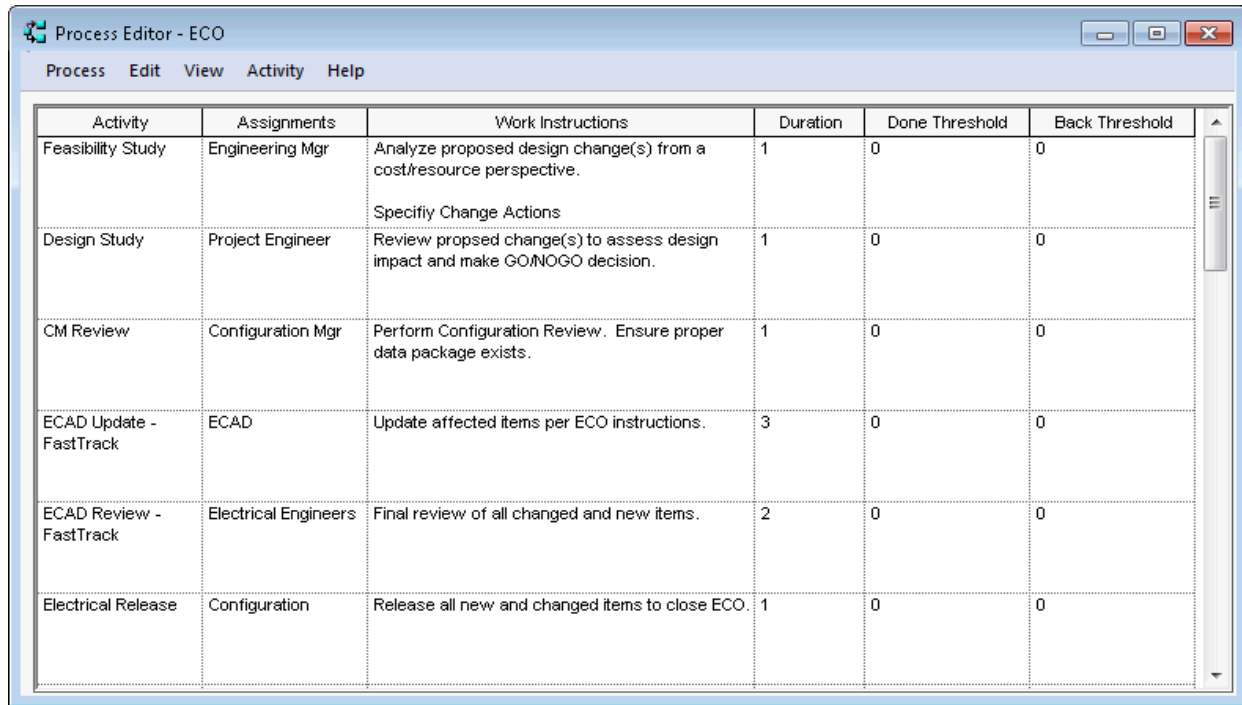
2

Figure 2-1: Process Editor Diagram view

In this view, in the work area, you can add, move, modify, and delete activities and the connectors that define the flow between them. You can specify the size of the work area in pixels, and whether or not Workflow should display a fixed-size grid within this area. You can also specify whether or not items snap to this grid. Dashed lines indicate page breaks when printing the view.

List view

The List view provides a text-based summary of the activities in your process, the resources assigned to them, and other information.



Activity	Assignments	Work Instructions	Duration	Done Threshold	Back Threshold
Feasibility Study	Engineering Mgr	Analyze proposed design change(s) from a cost/resource perspective. Specify Change Actions	1	0	0
Design Study	Project Engineer	Review proposed change(s) to assess design impact and make GO/NOGO decision.	1	0	0
CM Review	Configuration Mgr	Perform Configuration Review. Ensure proper data package exists.	1	0	0
ECAD Update - FastTrack	ECAD	Update affected items per ECO instructions.	3	0	0
ECAD Review - FastTrack	Electrical Engineers	Final review of all changed and new items.	2	0	0
Electrical Release	Configuration	Release all new and changed items to close ECO.	1	0	0

Figure 2-2: Process Editor List view

You may find this more convenient for viewing and editing details about your process. To switch between the List view and the Diagram view, you may use the View menu.

The List View columns include:

- Activity — Displays all activities that make up this process definition.
- Assignments — Shows all resources (users, groups, or roles) that are assigned to this activity. If the list is too large to fit in the column, click in this field and then

click the resulting drop-down menu to show the complete list of assignments.

- **Work Instructions** — Provides a description of what the user should do when assigned to this activity. See “Work instructions” on page 157 for more information.
- **Duration** — Shows the time in days allotted for this task by the workflow designer. The duration is simply the designer’s best guess at how long the task will take, in days. Workflow uses duration values to calculate estimated completion dates seen in the Process Viewer (see “Process Viewer Diagram view” on page 139.) Workflow records the time of day when the activity actually starts, and will display the time if the user has selected a date format that includes the time of day. Each elapsed "day" of an activity occupies (the working part of) a 24 hour period, so a one-day activity is expected to end exactly 24 hours after it began. Saturdays and Sundays are assumed to be non-working days, so a one-day activity that starts at 10:15:20 on a Friday is expected to finish at 10:15:20 on the following Monday. No other holidays are accounted for in the calculation.
- **Done Threshold** — When Voting Weight is in effect, this value represents the point at which the activity is “done”, and so can be sent forward. For example, if the Done Threshold = 2 and three assigned resources each have a Vote Weighting of 1, the activity is considered complete when two out of the three assigned resources send it forward. See “Voting weights and thresholds” on page 34 and “To specify Voting Weight and Thresholds” on page 78 for more information.
- **Back Threshold** — Similar to Done Threshold, but applies to sending an activity back.

Designing a process

The workflow designer analyzes the way things are done in an organization, and then divides each type of job or process into a number of activities.

The workflow designer also identifies who is to perform each activity (by name or role), the various paths that a job might take through the organization, and the activity sequences and dependencies.

For example, Workflow can manage the ECO process. The designer identifies all the separate activities and possible outcomes, then models the process.

The designer then uses this information to define a workflow process that ProductCenter uses to route information and activity requests automatically.

The designer defines the process in the Process Editor.

You need to be a ProductCenter Administrator or a user with the relevant screen permission to access the Process Editor.

Process Editor basics

This section introduces the terms that you encounter when using the ProductCenter Workflow Process Editor. For explanations of basic Workflow terms, see “Key ProductCenter Workflow concepts and terminology” on page 4.

Activities and connectors

You define a process definition using building blocks called activities. Each activity models a specific task that must occur to complete the process.

You define the flow of the work through the activities with connectors. Activities with multiple connectors exiting toward subsequent activities can define branch rules to specify which connectors get followed under what conditions. Activities with multiple connectors leading into them can specify Merge all (all activated preceding activities must be completed) or Merge one (only a single preceding activity must be completed) before the current activity can begin.

NOTE: If you have three parallel activities going into a Merge All and only two of those three activities execute based on branching rules, the process waits only for those two activities to complete. The third, unused branch is ignored.

Start object

In ProductCenter, all processes begin at the Start object. This is not an activity, but a system-defined point from which all processes begin. Like an activity, the Start object supports branch rules. If you define more than a single activity that can be performed at the start of a process, you must define branch rules that specify which activity is performed under what conditions. (Branch rules for the Start object are mandatory, while those for activities are optional.)

The most basic process in ProductCenter consists of a Start object, a connector, and one activity with one assigned resource.

Resources

You must assign one or more resources to each activity. Resources are responsible for completing the work specified by

the activity. A resource can be a specific *user* or *group* of users, or a user or group *role* that can be filled at the time that the activity begins.

A role is a placeholder assignment or job description which is filled by one or more people as the process progresses (for example, Editor or Engineer).

The resource assigned to the previous activity can specify how to fill the role, or that responsibility can be given to the coordinator. Activities assigned to groups or group roles can be specified as *claimable*. The first person from the group to accept the activity takes total responsibility for the group for that activity. If the activity is not claimable, all members of the group are responsible.

There may be cases when more than one resource was assigned to the previous activity or that there was more than one previous activity (with this one being Merge all). In this case the resource who does the Send Forward that meets the Done threshold of the last previous activity is the resource who would get to specify how to fill the role for this activity's assignment. As a note, if the assigned role is an attribute of the attached item, then the current value of the attribute is used instead of letting any of these resources specify how to fill the role.

NOTE: The designer of the workflow process or another DBA-enabled user must define roles in ProductCenter. For additional information see “Adding roles” on page 202.

Voting weights and thresholds

If you assign multiple resources to an activity, you can assign “Done” and “Back” threshold values to that activity and a voting weight value to each of those resources. As the various resources report either that they have completed the

activity (by sending it forward), or that they feel the activity needs more work (by sending it back), Workflow adds up the voting weights and takes action when the sum of the voting weight is equal to or greater than the threshold value.

For example, if you assign a done threshold of 2 to an activity and then assign three resources, each with a voting weight of 1, the activity is completed when any two of the resources send the activity forward.

If two or more resources have to send back an activity by the time the back threshold is reached, the activity goes back to the point specified by the last person to perform the send back operation.


If some resources send an activity forward, and others send it back, the first threshold to be reached (Done or Back) determines the outcome. Table 2-1 provides a summary of threshold behavior.

Table 2-1: Effect of threshold settings

Threshold Setting	Behavior
Done Threshold = 0	Activity is sent forward only when all assignees have sent forward.
Done Threshold = n	Activity is sent forward only when the total of the voting weights for all assignees that have sent forward is greater than or equal to n.

Table 2-1: Effect of threshold settings

Threshold Setting	Behavior
Back Threshold = 0	Activity is sent back as soon as any assignee has sent backward.
Back Threshold = n	Activity is sent back only when the total of the voting weights for all assignees that have sent backward is greater than or equal to n.

If an activity has a Back threshold and enough assignees have sent the activity either forward or backward to determine that no threshold value can be reached, the activity becomes *deadlocked* and a note to this effect is added to the audit log. Deadlocked activities become Suspended and appear in the Work List or Claimable Work windows of the coordinator and remaining assignees, and are designated by a special  icon. The only option for the coordinator is to Restart the activity (see “Restart an Activity” on page 106).

NOTE: The coordinator must communicate to the users to ensure that any issues causing the deadlock are resolved so that all users can agree to send the activity either forward or back when restarted.

Note that you cannot specify **Voting Weights** when both the **Done** and **Back Threshold** is 0. **Voting Weights** can be specified as long as at least one of the thresholds is greater than zero.

Informational Activity Assignments

Regular ProductCenter workflow activity assignments imply that the user has work to be accomplished and when

completed then the user would use the Send Forward operation to indicate work completion or approval. But then there are situations where an activity must be assigned to a user or group of users for notification or informational purposes, which is an "informational" assignment. When a user is assigned to an Informational assignment then he/she will receive the activity assignment in his/her Work List but this activity does not require action as it is distributed simply for informational or notification purposes.

The user does have the ability to Send Forward or Send Backward the Informational assignment, which will remove the activity from the user's Work List, but this action will not result in a change in status of the activity as this is based on the actions of the regular "approval" assignments. The action of Send Forward of an Informational assignment is always recorded in the Audit Trail (but not distinguished from an approval assignment). It will also be recorded in the Transaction Log (and distinguished from Approval assignments) if that is enabled. The E-Sigs dialog will be presented to allow the user to enter a comment if E-Sigs are enabled, in which case the comment will be included in the information recorded in those log(s).

The following shows the Assignment Type column in the Assignment dialog, which is used to designate each assignment as either Approval or Informational.

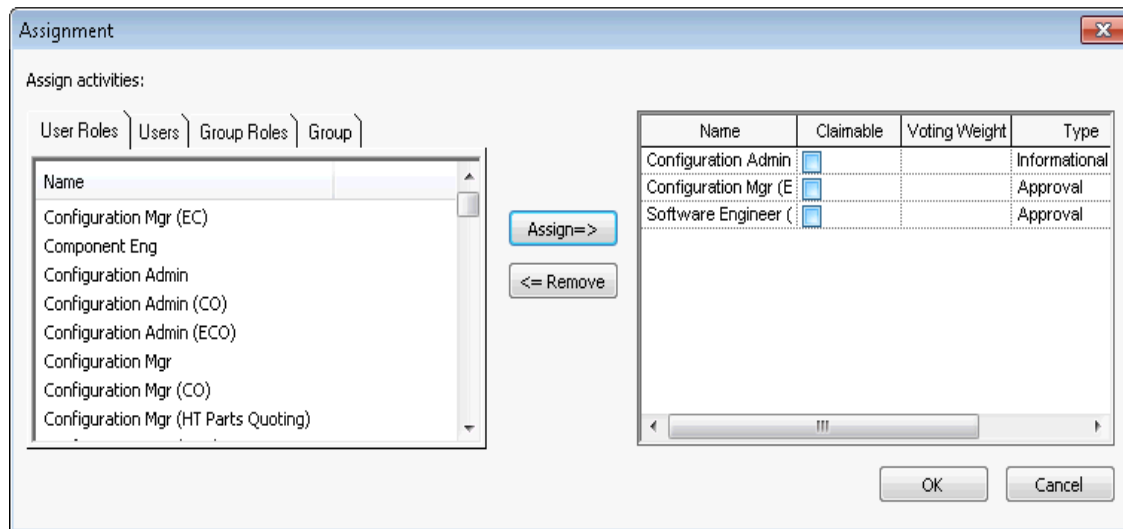




Figure 2-3: Informational Activity Assignments

When a user has been assigned to an activity as an Informational assignment, there will be two differences in the GUI associated with the user's Work List and Claimable Work windows:

- Those activities which are Informational will be indicated by a special icon at the beginning of the line in

the table. Instead of , the  icon will be displayed as shown in Figure 2-4.

- In the Assigned To column the user's name (and any other assigned Informational users' names) will be enclosed in square brackets.

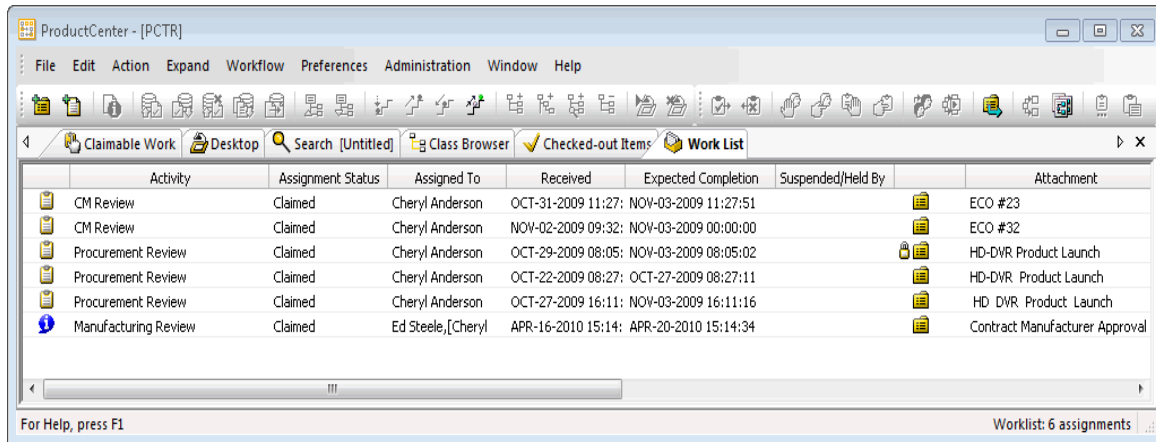


Figure 2-4: Informational Activity Assignment in Work List

Since the Informational assignment is for information purposes only, there is no real action to be taken as the activity will be removed from the user's Work List once the Approval assignees have completed their assigned work. If the Informational assignee decides to clear the activity from his/her Work List with the Send Forward or Send Backward operation, then ProductCenter will display the E-Sig dialog as defined by the Administrator and then the activity will be removed from his/her Work List view just as it would for an Approval assignment. Also, in this case, the Send Forward or Send Backward will not be tracked towards the Forward or Back Threshold Counts, and this action will not initiate any Post-Operation Triggers.

Wherever the names of assigned users are displayed, Informational assignees' names will be distinguished by being enclosed in square brackets. When there is more than

one name in a list of names, all the informational assignee names will be grouped at the end of the list.

Voting Weight set to Zero

It should also be noted that defining an assignment as Informational is different from setting the voting weight to zero. In earlier ProductCenter releases that did not support Informational Assignments, an activity with a non-zero threshold treated assignments that had zero voting weights as if they had a voting weight of one. When moving from an older version that does not support Informational Activity Assignments to ProductCenter 9, the ProductCenter database upgrade process preserves this behavior by actually changing those voting weight values from zero to one in the process definitions.

But also knowing that the Process Designer could manually set the voting weight to zero, this specific behavior needs to be defined. The following table shows the difference between an Informational assignment with any voting weight and an Approval assignment with a zero voting weight.

Table 2-2: Informational Activity Assignment, Voting Weight.

Threshold Setting	Behavior for Approval Assignment with Voting Weight set to Zero	Behavior for Informational Assignment
Done > 0 and Back > 0	Send Forward: ignored, i.e. not counted toward meeting the threshold Send Back: ignored, i.e. not counted toward meeting the threshold	Send Forward: ignored, i.e. not counted toward meeting the threshold Send Back: ignored, i.e. not counted toward meeting the threshold
Done > 0 and Back = 0	Send Forward: ignored, i.e. not counted toward meeting the threshold Send Back: activity is immediately sent back	Send Forward: ignored, i.e. not counted toward meeting the threshold Send Back: ignored, i.e. not counted toward meeting the threshold

Threshold Setting	Behavior for Approval Assignment with Voting Weight set to Zero	Behavior for Informational Assignment
Done = 0 and Back > 0	<p>Send Forward: counted toward meeting the "threshold" of all assignments</p> <p>Send Back: ignored, i.e. not counted toward meeting the threshold</p>	<p>Send Forward: ignored, i.e. not counted toward meeting the threshold</p> <p>Send Back: ignored, i.e. not counted toward meeting the threshold</p>

2

It should be noted that a user could be assigned to a particular activity multiple times, e.g. as a member of several groups or filling several user roles. In such situations, the multiple assignments are consolidated according to the following rules:

- There will only be one assignment of any given user to a particular activity instance.
- If a user would have both an Approval and an Informational assignment, then the Approval assignment will be used and the Informational assignment will be discarded.
- If a user has two Approval or two Informational assignments, one of which is as a member of a claimable group while the other is not, then the claimable group membership assignment will be discarded.

Branch Rules and Operations

ProductCenter Workflow includes two features that help the designer define the way a process works:

- Branch rules — Expressions that determine what course a flow takes under what conditions when you have multiple connectors exiting an activity or the Start object. Branch rules for the Start object are mandatory and those for activities are optional, although if you

define a rule for one activity branch, you must define rules for all the branches of that activity. (See “Working with branch rules” on page 80 for more information.)

- Pre- and post-operations — Scripts that are invoked at the start of a process (*pre-operations*) or at the completion of an activity or a process (*post-operations*). (The operation may be implemented as an interpreted script or as a compiled program, but we will always refer to them as scripts in this manual.) (See “Working with operations” on page 92 for more information.) The Workflow email notification utility uses pre- and post-operations to send messages to users informing them that they have been assigned to activities (see “The Workflow Email Utility” on page 211).

Loops

You can construct a process with branch rules so that it loops back and re-executes the same activities. However, you cannot create a loop that goes back to an activity that specifies Merge All for multiple incoming connectors. See “Loops” on page 51 for more details.

Creating, modifying, and saving processes

After you have examined processes and understand the way your company currently does things, you can begin to create a process definition with ProductCenter Workflow.

To create a process definition, enter the Process Editor and use the **Process ToolBox**, the **Activity** menu, and the context menus to create activities and sequence them with connectors. For each activity that you add, you must assign at least one resource with an Approval assignment.

Optionally, you can define expression-based branching to specify the flow of work from activities that lead into

multiple subsequent activities, and you can assign scripts to be executed at the end of an activity as a post-operation.

You can rearrange activities by clicking and dragging them, or by using the Align icons at the top of the work area or the **Align** menu items on the **View** menu.

When done, you save a new process definition under a unique name.

NOTE: You cannot save using an existing name and overwrite an existing process. The only way to save to an existing name is to open that process, modify it, and save it.

Inactive (in-development) processes

While you are developing or editing a process, it is considered *inactive*, which means that only you (the person editing the process definition) are able to initiate the process to test it. No other users see this process in the Issue Form or Route Selected Item windows. Inactive processes that you are editing appear in your version of these windows with “[TestV nm]” appended to their name, as shown in Figure 2-5.

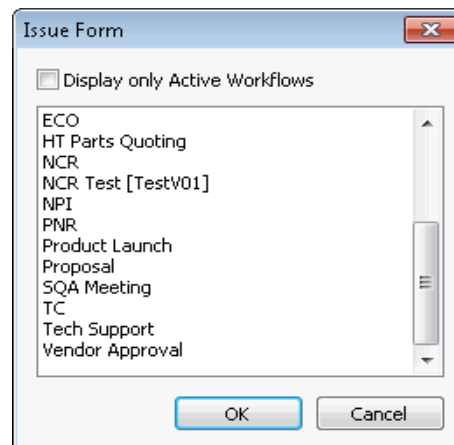


Figure 2-5: Issue Form window showing inactive process

Although only you can initiate an inactive process, other users will receive activities in their Work Lists as usual when you test it.

When you have finished developing and testing a process, and wish to make it publicly available, you use the Administer Process Definitions window (available from the **Process** menu in the Process Editor) to set the process *active*.

If you update an existing, active workflow process and save the revised definition as inactive, then the existing version continues to be available to your users from the **Issue Form** or **Route Selected Item** menus. As the process author, you see both the existing version and the new version that you have under development (with “[TestVnn]” appended to the name). When you activate the updated version, any existing process instances continue to completion (using the old version of the process definition), but any new process instances that get issued reflect the newly-activated version of the process definition.

To create a new process

1. If the Process Editor is not already running, start it by selecting **Process Editor** from the **Administration** menu. You must be logged into ProductCenter as an administrator to access this menu.
2. In the Process Editor window, select **New** from the **Process** menu.
3. If a process already exists in the editor, ProductCenter prompts you to save it.
4. To add, connect, and remove activities, see “Working with activities” on page 56.
5. To assign resources to activities, see “Assigning a resource to an activity” on page 75.
6. To use the view and alignment tools when working with activities, see “Using the View functions” on page 73.

7. To define branch rules for an activity, see “Working with branch rules” on page 80. To define operations for an activity or the process, see “Working with operations” on page 92.
8. When done, save the process. See “To save a process” on page 45 for more information. Note that a new process will be saved as “inactive” until you choose to activate it. See “Inactive (in-development) processes” above for more details.

To open an existing process

1. In the Process Editor window, select **Open** from the **Process** menu.
2. If an unsaved process exists in the Editor, ProductCenter first prompts you to save it.
3. You then see the Open Process window. By default, this window displays only the most recent version of each process. This makes the display more manageable if you have many processes with multiple versions. You may uncheck the **Show latest versions only** checkbox if you want to see all versions of all saved processes.
4. Select the process you want to open, and then click **OK**.

To save a process

1. In the Process Editor window select **Save** from the **Process** menu.
2. If you have saved this process definition before, but have never created a process instance from this version (that is, you have never used **Route Selected Item** or **Issue Form** using this version of the definition), Workflow saves this definition with the same version number it had when you opened it.

If you have saved this process definition before and have used it to create a process instance, Workflow increments the version number.

If you have never saved this process before, ProductCenter displays the Save As window. See “To save a process with a new name” on page 46.

3. ProductCenter performs a Validate Process operation when trying to save the process. If your process is valid, ProductCenter saves it; otherwise, it displays an error message describing the first problem found. Fix the problem and try to save again. See “To validate a process” on page 55 for more information.
4. If a process with the same name already exists, ProductCenter Workflow prompts you to enter a unique name.

To save a process with a new name

1. In the Process Editor window select **Save As** from the **Process** menu.
2. In the resulting Save As window, fill in the **Process Name** field (maximum of 63 characters). Ensure that the name you choose for your workflow process adheres to any standards or naming conventions that are in effect at your company. The **Description** field is mandatory. Check the Activate now box if you wish to activate the process.

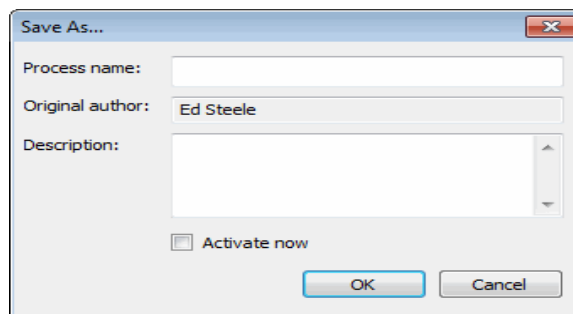


Figure 2-6: *Save As*

3. Click **OK** when done.
4. ProductCenter performs a Validate Process operation when trying to save the process. If your process is valid, ProductCenter saves it, otherwise it displays an error message describing the first problem found. Fix the problem(s) and try to save again.

To make a process active or inactive

1. In the Process Editor window select **Administer Process Definitions** from the **Process** menu. The window appears as shown in Figure 2-7.

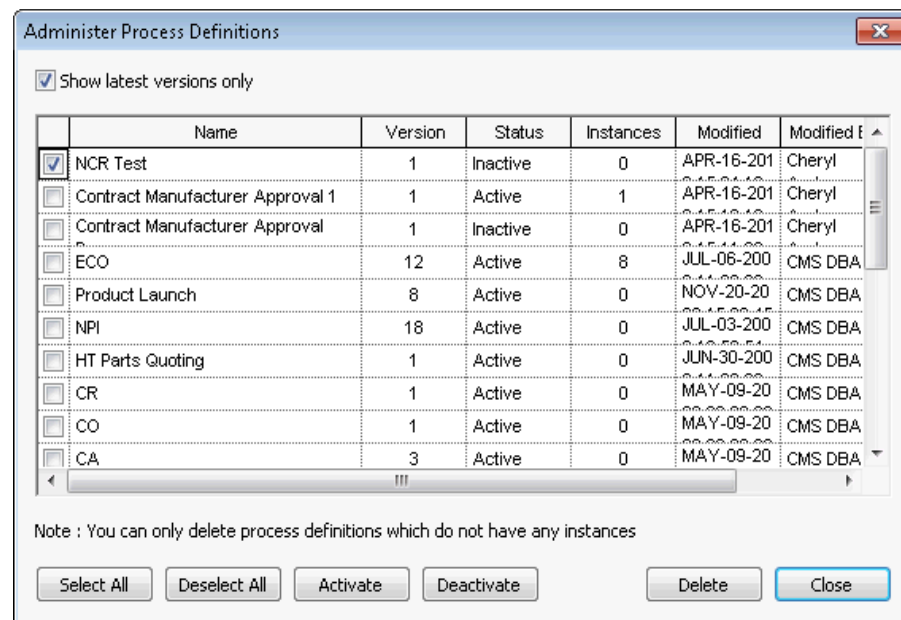


Figure 2-7: Administer Process Definition Window

2. In the list, find the process name you wish to activate or deactivate, and click its box in the left column. (You can check multiple boxes for operating on more than one process at a time.)
3. Click the **Activate** or **Deactivate** button.

To list items using a process definition

To view what, if any items, are in use with a particular version of a process definition:

1. In the Process Editor, open the version of the process definition you want to examine (see “To open an existing process” on page 45).
2. After the process opens, click **List items using** from the **Process** menu.
3. Workflow displays a List Items window, showing any files or projects using the process.
4. Click **OK** when done.

To delete processes definitions

Process coordinators or DBA-enabled users can delete and cancel process *instances* from the Process Viewer or from the Process Instances Search results (see “Cancelling and deleting process instances” on page 126). DBA-enabled users delete process *definitions* from the Process Editor as described in the next section.

NOTE: You can delete only process definitions that have no instances.

To delete a process definition

1. In the Process Editor, select **Administer Process Definitions** from the **Process** menu. The following window appears.

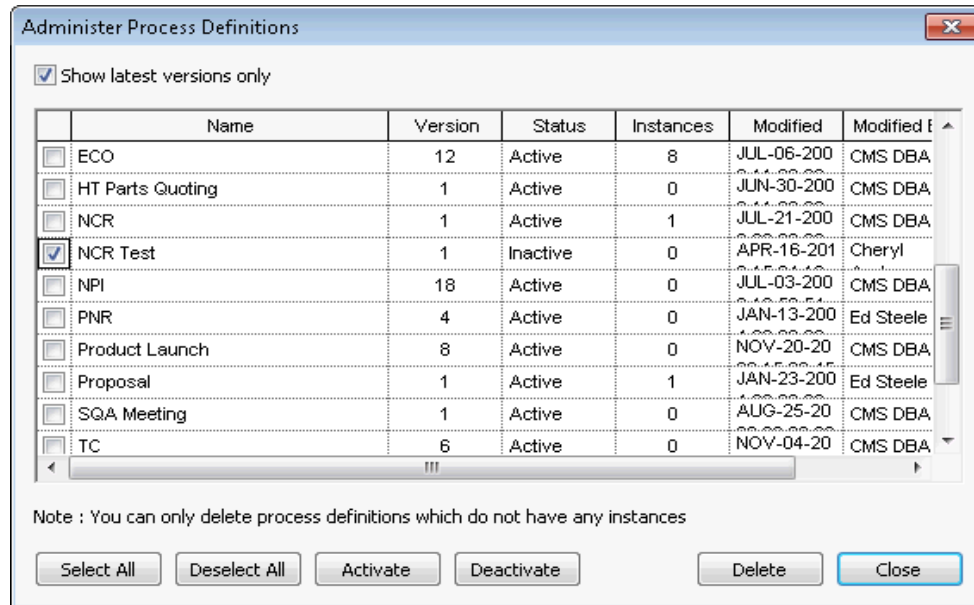


Figure 2-8: Administer Process Definitions window

2. Inspect the **Instances** column and ensure that the count is “0”. If it is not, you will need to delete any existing instances. (See “Cancelling and deleting process instances” on page 126.)
3. Check the boxes of the process definition or definitions that you want to delete.
4. Click **Delete**.

For more information about cancelling and deleting process definitions and instances, see “Cancelling vs. deleting a process” on page 125.

Considerations when using Merge All

It is possible to design workflow processes that will pass basic validation (see “Validating a process” on page 55), but which may not complete the way you expect them to.

Most of these issues concern Merge All nodes in very complex processes. Wherever possible, you should:

- Keep your workflow branches relatively simple.
- Ensure that branches and merge nodes are “symmetrical” (that is, if a node branches out to three different paths, those paths should eventually terminate in a single merge node).

Figure 2-9 shows the basics of an ideal workflow process design. The more you deviate from this kind of design, particularly with Merge All nodes, the more likely you will encounter workflow processes that either complete too soon (leaving activities that have never executed) or that never complete.

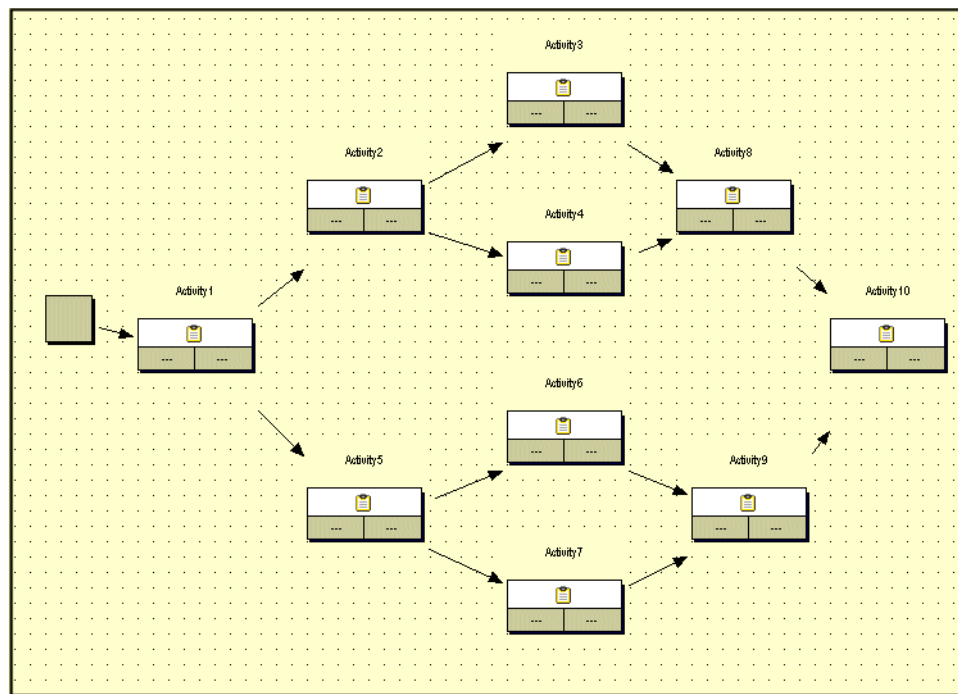


Figure 2-9: Symmetrical workflow process design

Merge All issues tend to fall in one of three areas:

- loops
- termination
- cross-dependencies

Loops

In Figure 2-10 a loop from Activity 6 (far right) cannot terminate in any of the three activities within the box if Activity 5 specifies **Merge All**. You should always terminate the loop in the activity where the branching occurs -- in this example, Activity 2. (This particular scenario is caught by the validation process, but similar, more subtle examples may not.)

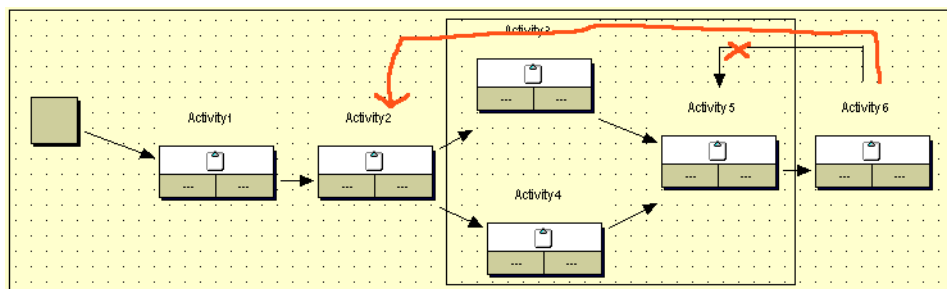


Figure 2-10: Loops cannot terminate at any activity in a Merge All

Termination

Some workflow process designs might result in a process terminating before all of its components have completed. The branch and Merge All problem shown in Figure 2-11 illustrates that if one branch terminates in a Merge All node, all branches should eventually terminate in that same Merge All node. This condition is not flagged by the validation process. In this example, Activity 10 should terminate in Activity 6 rather than in Activity 7.

In general, a process with a symmetrical design is apt to be more reliable than one with unbalanced branches.

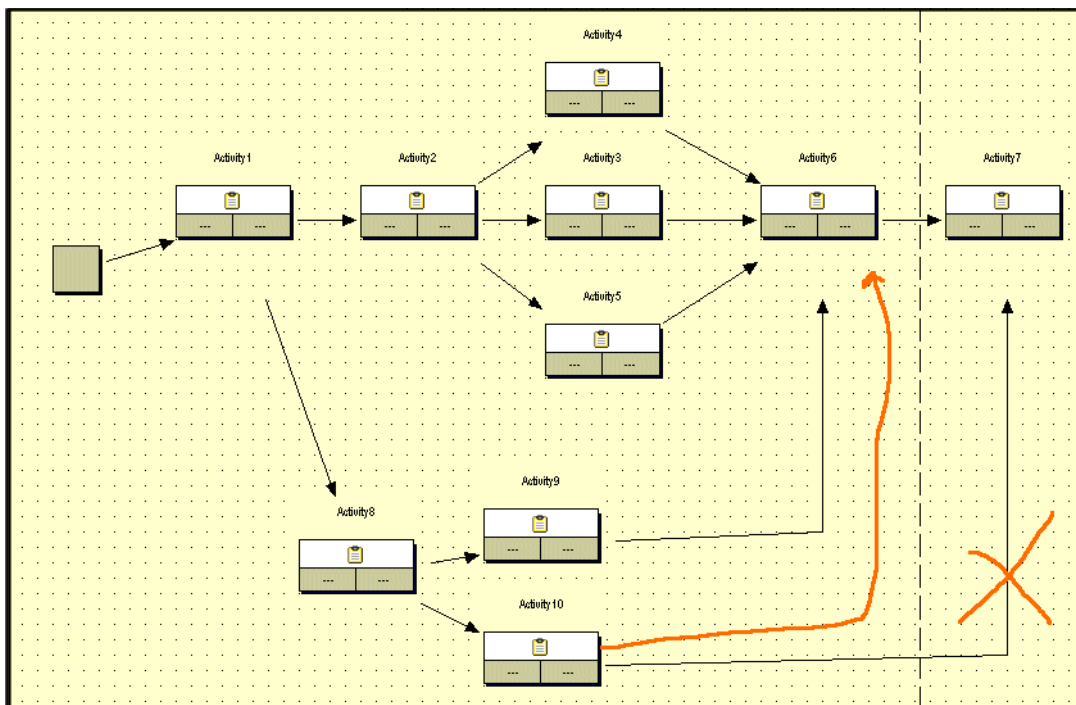


Figure 2-11: Branches should terminate at same node, and should be balanced

Cross-dependencies

The final issue concerns early activation of an activity; in other words an activity starts up before all its prerequisites have completed.

In Figure 2-12, the Merge All node at Activity 6 depends on the completion not only of Activities 4 and 5, but of Activity 1. All the other Merge All nodes also depend on the completion of Activity 1. This means that multiple activities, some of which are downstream of each other, all depend on each other to successfully complete.

2

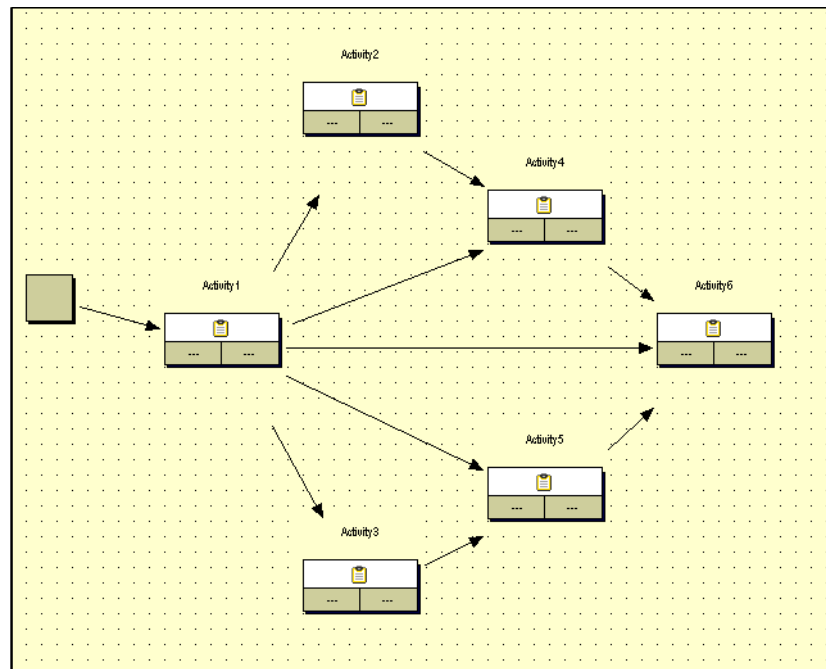


Figure 2-12: Branches and Merge All nodes should be balanced

Even though Figure 2-12 is symmetrical, Activity 6 is either 1, 2, or 3 steps away from Activity 1 depending upon which branch you follow. Wherever possible, you should try to keep parallel activities within discrete stages. For example, Activity 1 should not proceed to both Activity 2 and

Activities 4 and 6 at the same time. Look out for “triangular logic” (such as exhibited by Activities 1, 2, and 4, or 1, 4, and 6).

Again, the simpler, more symmetrical, and balanced your process design, the more likely it will work the first time, and the easier it will be to debug.

Validating a process

The Process Editor provides a **Validate Process** utility to ensure that your process is logically correct. This utility runs automatically whenever you save a process. You can also run this utility manually whenever you want to check the state of the process you are currently editing.

Validate process checks for the following conditions:

- Every activity must have an assigned Approval resource
- Every activity must have a unique name
- Loops must be intentional and cannot proceed into an activity that specifies **Merge All** (see “Loops” on page 51 for details)
- Check that all assigned role names are valid
- If the Start object has connectors to more than one activity, then there must be a branch rule for each activity
- Every activity has at least one predecessor, which is either the Start object or another activity
- If an activity has more than one predecessor and any of the connectors from predecessors have branch rules, then the successor activity must be Merge One, not Merge All

However, the validate process does not catch every potential issue, particularly in the area of very complex branch rules and Merge All nodes. See “Considerations when using Merge All” on page 49 for suggestions on designing your processes.

To validate a process

1. From the **Process** menu, select **Validate the Process**.
2. Check to see if ProductCenter reports any issues.

If an activity does not have an assigned resource, assign one. If the process contains loops, confirm that they


were intentionally designed. If an intentionally designed loop flows into an activity that specifies **Merge All**, change the condition to **Merge One**, or re-think the logic of the loop. If an activity has no predecessor, create a connector between it and another activity, or remove the activity. If an assigned resource is a role name that is no longer defined, remove the assignment.

3. Repeat steps 1 and 2 until the process is valid.

Working with activities

Most of your work in the Process Editor focuses on activities: adding them, positioning them, connecting them, assigning resources to them, defining rules to determine which activities get executed, etc. **New Activity** and **New Connector** are also available from the context menu (available by right-clicking when the cursor is over a clear spot in the work area).

To add an activity to the process

1. Click the **New Activity** icon () in the **Process ToolBox**.
2. Position your cursor in the work area and click where you want to place the activity.
3. Repeat this procedure for additional activities.

To create multiple activities

1. In the Work area, select the activity from which you want the new activities to proceed. This activity cannot have any existing successors.
2. On the **Activity** menu, select either **Create Sequential Activities** or **Create Parallel Activities**.
3. In the resulting window, enter the number of new activities you want to create and click **OK**.

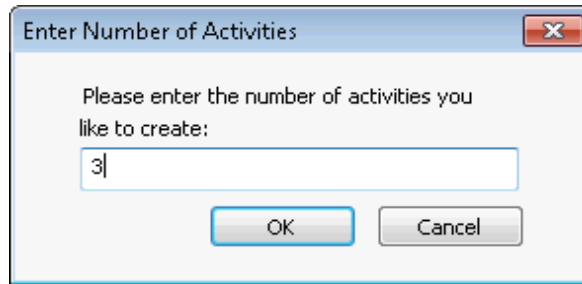


Figure 2-13: Create multiple activities


4. Complete the definition for each of the new activities by assigning users, groups, or roles, defining branch rules, positioning them in the work area, adding connectors, etc.

To remove an activity or connector from the process

1. Select the activity or connector that you want to remove by placing the cursor over it and clicking the left button.
2. If you want to remove multiple activities or connectors, hold down the **Control** key and select the additional entities that you want to delete.
3. Select **Delete** from the **Edit** or context menus. (You can also use the **Delete** key.)

NOTE: You cannot cut and paste connectors. You can cut and paste activities, but any connectors attached to the cut activities are lost. If you paste multiple copies of an activity, you need to give the copies unique names.

To connect activities

1. Select the **Connect Activities** icon () in the **Process ToolBox**.
2. In the Work Area, select the activity that you want to start the connection.
3. If you want to include angles in the connector line, click along its intended path in clear areas of the Work Area. (You can modify connectors by selecting them and dragging their corners into position.)

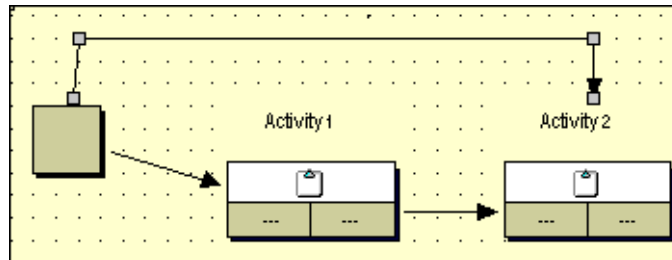


Figure 2-14: Connector with corners

4. Select the activity where you want to close the connection.

NOTE: Although you can later drag corners/angles/vertices to new locations, you cannot add more corners/angles/vertices to a connector after you have selected the successor activity.

Understanding the Properties window

The Properties window displays information about the overall process definition and allows you to specify or modify certain attributes. (Contrast this with the Notebook which displays information about an individual activity. See “Understanding the Activity Notebook” on page 68 for more information.)

The Process Viewer provides a read-only version of this Properties window (see “The Process Viewer Properties window” on page 140 for more information).

The Properties window consists of the following five tabs:

- **General** — Displays basic information such as process name and who is assigned as coordinator. Specifying a Default Class value in this tab changes the process from route-based to form-based.
- **Branch Rules** — Looks identical to the tab of the same name in the Notebook, but this tab applies specifically to the **Start object**. That is, it determines which activity or activities the process starts with if it starts with more than one activity in parallel. If only one starting activity exists, this tab remains blank. If you have more than one starting activity, you must define branch rules for each of them.
- **Display Settings** — Provides control over the size and appearance of the work area.
- **Operations** — Allows you to specify scripts that execute at the beginning or completion of a process.
- **Permissions** - Provides control over which users are allowed to create process instances from the process definition. This is called having launch permission for the process definition.

As a note, in the Process Editor there are three ways to open the Properties window:

- You may select **Properties** from the **Process** menu
- You may select **Properties** from the context menu by utilizing the right mouse button
- You may double-click on the Start object

In the Process Viewer, double-clicking the Start object is the only way to open the Properties window.

NOTE: The Properties window is resizable by clicking and dragging the corners or edges of the window.

To use the Properties window's General tab

1. On the **Process** menu, select **Properties**.
2. Select the **General** tab.

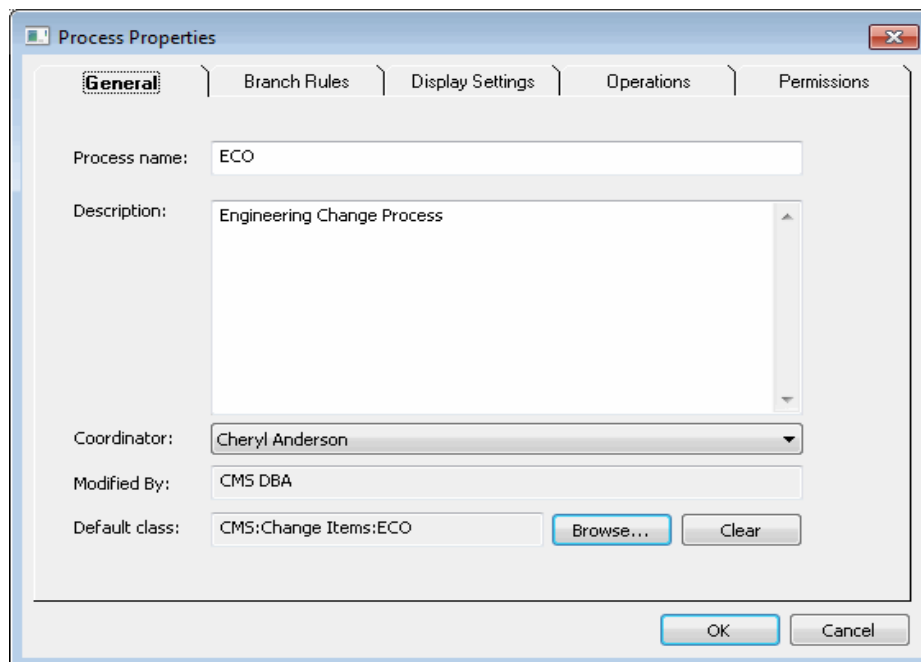


Figure 2-15: Properties General tab

NOTE: The **General** tab is not editable from the Process Viewer.

3. In the **Process Name** field, enter the name that you want to assign to this process (maximum of 63 characters). Be sure to observe any naming conventions that are in effect at your company.
4. Fill in or edit the **Description** field.
5. Use the **Coordinator** choice list to assign or re-assign a coordinator to this process.
6. To specify or change the class for this process, click **Browse** next to the **Default class** field. Leaving this field blank causes the process to be route-based. Specifying a value for this field causes the process to be form-based. The class specified must be a project class, not a file class. See “Route-based and form-based processes” on page 5 for more information.



To use the Properties window's Branch Rules tab

1. On the **Process** menu, select **Properties**.
2. Select the **Branch Rules** tab.

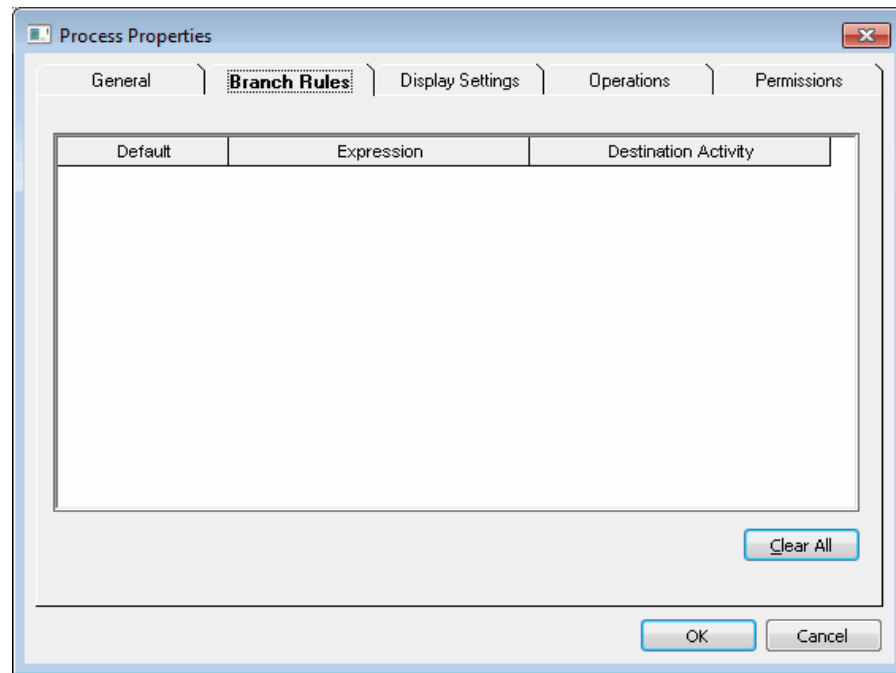


Figure 2-16: Properties Branch Rules tab

NOTE: The **Branch Rules** tab is not editable from the Process Viewer.

3. If the tab is blank, the Start object has only one activity to choose from, and therefore no branch rules. If the tab is active, click in the **Expression** column and edit the branch rules.
4. Click on an item in the **Default** column to determine which activity proceeds by default. For additional information see “Working with branch rules” on page 80.

To use the Display Settings tab

1. On the **Process** menu, select **Properties**.
2. Select the **Display Settings** tab.

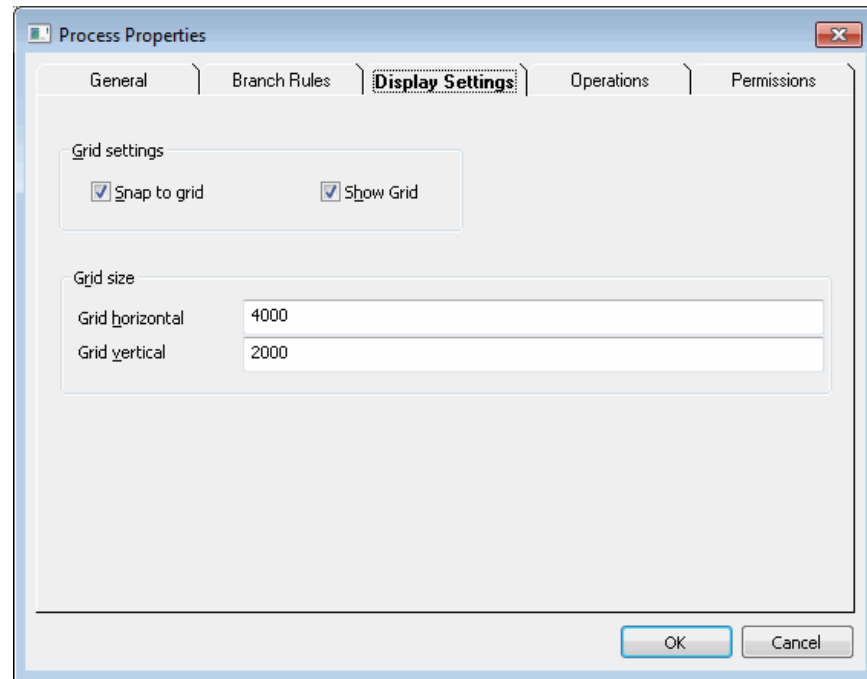


Figure 2-17: Properties Display Settings tab

3. To enable the display of grid points in the work area, click the **Show grid** checkbox.
4. To cause activities and connectors to be positioned exactly over grid points when adding and moving, click the **Snap to grid** checkbox.

NOTE: You do not need to display the grid to snap to it.

5. To change the size of the work area, enter values in pixels in the fields labeled **Grid horizontal** and **Grid vertical**. Workflow displays a fixed-size grid within the area specified.

To use the Operations tab

1. On the **Process** menu, select **Properties**.
2. Select the **Operations** tab.

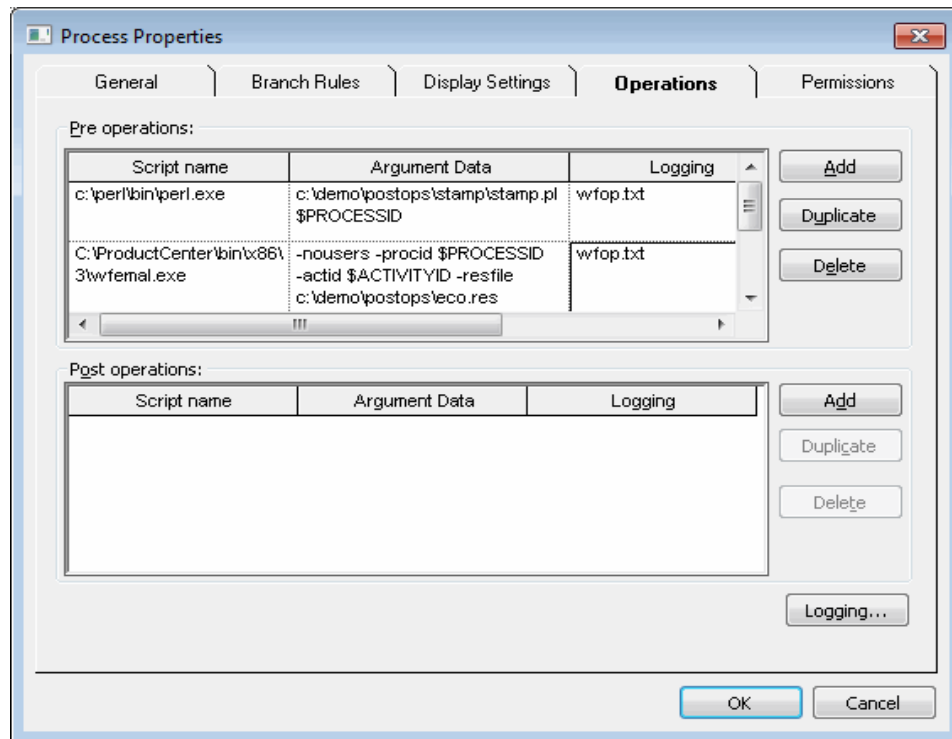


Figure 2-18: Properties Operations tab

3. If you want to specify a script that executes at the *beginning* of the process, use the **Pre-operations** pane. If you want to specify a script that executes at the *completion* of the process, use the **Post-operations** pane. Click the **Add** button to create a row in the table for each script that you want to specify.
4. Click in the **Script Name** field and type in the pathname of the script that is to be activated at the start or completion of the process.
5. Click in the **Argument Data** field and enter any arguments that this script requires.

NOTE: If you notice the text in these fields looking garbled, you may need to check that your video driver is the most up-to-date available.

6. To remove a selected operation, click **Delete**. To make a copy of a selected operation so that you can easily create and edit multiple, similar operations, click **Duplicate**.

See the procedures detailed in “To create a pre- or post-operation for a process” on page 94 for information about how to develop your scripts and specify their arguments.

7. The Process Properties Operations tab includes a “Logging” button that brings up a dialog box (Figure 2-19) for setting the three default resources and for disabling all logging in the process. The operations tables in the Activity Notebook Post-operations tab and the Process Properties Operations tab includes a third column labeled “Logging”. In each row of the tables this column shows the options and file resources that apply to that row. (If no options value has been set by any resources, then none is shown. If logging has not been enabled for the row, then the entire column is blank.) Clicking on or attempting to change the text in this third column brings up a dialog box for choosing options with check boxes and a box for typing in the log file name.

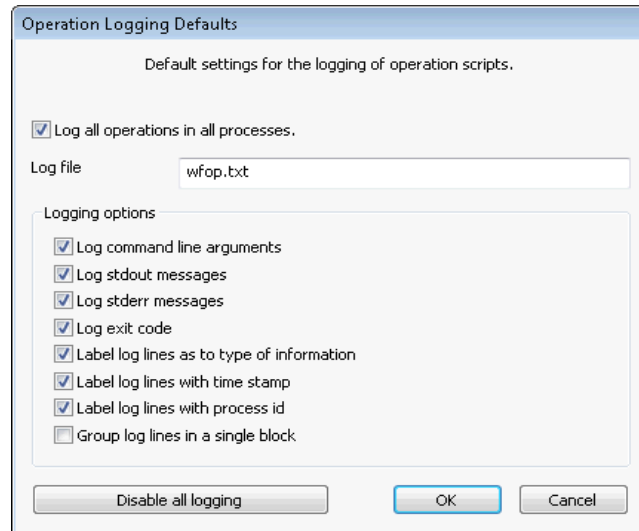


Figure 2-19: Operation Logging Defaults

Using the Process Editor in the Windows client to edit resources in the `cms_site` file is subject to one limitation: the Windows client may not be running on the server computer where the file is stored (or the program may not have write access to the file for some other reason). Because that may be the case, the Process Editor will always write out a local disk file containing the complete set of **site.workflow.oplog** resources that should be placed into the `cms_site` file and instruct the user to put them there using a text editor. Whenever the Process Editor is started, it will use the **site.workflow.oplog** resources from the server.

Using the Process Editor rather than manually editing the resource entries eliminates the possibility of incorrectly typing process or activity names and may make it easier to visualize what will be done. On the other hand, because the Process Editor focuses on a single process it tends to hide the status of logging for all the other workflow processes.

For additional information on workflow logging refer to Appendix C.

To use the *Permissions* tab

1. On the **Process** menu, select **Properties**.
2. Select the **Permissions** tab.

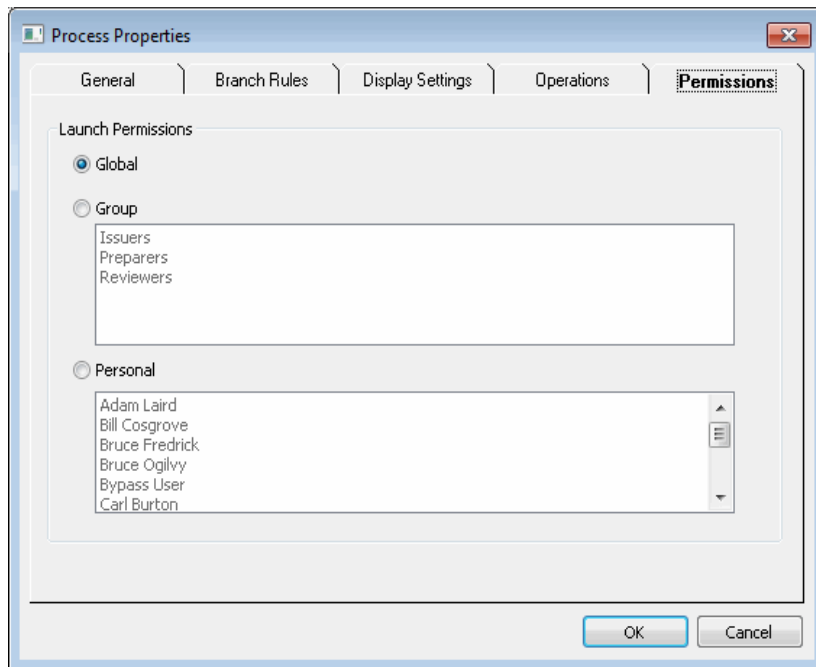


Figure 2-20: *Properties Permissions* tab

2

3. Click **Global** to give all your users launch permission for this process definition, or use the **Group** or **Personal** options to restrict it to specific users or members of specific groups.

NOTE: If the user who is editing the process definition is not included in the permission list, then the user will not be able to launch it. If the user saves the process definition without activating it so that he can test it, but does not give himself launch permissions, then not only will other users not be able to launch it but he will not be able to launch it for testing, either.

Understanding the Activity Notebook

The Activity Notebook lets you display and edit information related to specific activities. This is similar to the Properties window, which gives you access to information related to the process as a whole. (See “Understanding the Properties window” on page 59.)

- **General** — Provides access to basic information such as activity name and assignments.
- **Dependencies** — Displays information about the activities that occur just before and just after the current one, and provides Merge buttons that let you specify whether or not all prior activities must be completed before the current one starts.
- **Post-operations** — Enables you to specify a script to activate upon completion of the current activity.
- **Branch Rules** — Enables you to specify conditions under which one or more of multiple following activities get

executed. If you define a rule for one branch in an activity, you must define rules for all branches in that activity.

Like the Properties window (see previous section), the Activity Notebook is resizable by clicking and dragging the corners or edges of the window.

2

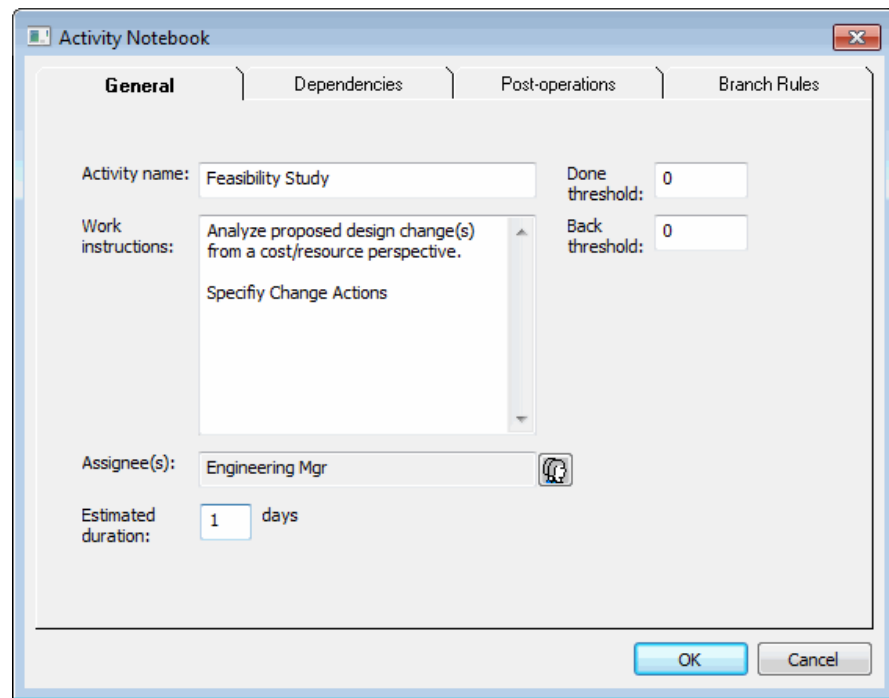



Figure 2-21: Activity Notebook General tab

To use the Notebook's General tab

1. Double-click while the cursor is over an activity to display the Notebook. In the Process Editor but not in the Process Viewer, you can also display the Activity Notebook by right-clicking while the cursor is over an activity and then selecting "Notebook" from the context menu.
2. Ensure that the **General** tab is displayed.

NOTE: The **General** tab cannot be edited from the Process Viewer.

3. To modify the name of the activity, edit the **Activity Name** field. Replace the default “Activity n” name with a descriptive label.
4. In the **Work Instructions** field, enter any directions that you want to communicate to the user who is to perform this activity. The assigned user can view this text in the Process Viewer or by right-clicking over the activity in the Work List. **Work Instructions** can also be viewed by use of the Workflow menu in the Work List window. See “Work instructions” on page 157 for more information.
5. Optionally, specify values for the **Done** and **Back** thresholds. (See “Voting weights and thresholds” on page 34 and “To specify Voting Weight and Thresholds” on page 78.)
6. To assign or reassign the activity, click the people icon () next to the **Assignee(s)** field. (See “Assigning a resource to an activity” on page 75.)
7. Enter a value for **Estimated Duration** in days. ProductCenter uses this to calculate estimated completion dates and to determine if an activity should be shown as late.

NOTE: Enter a value of at least 1 day. Entering 0 causes activities to be flagged in the Process Viewer as *late* as soon as they become active.

8. Click **OK** when done.

To use the Dependencies tab

1. Right-click while the cursor is over an activity and select **Notebook**.

2. Select the **Dependencies** tab.
3. View the information about the previous and next activities.
4. In the Process Editor, if multiple activities lead into the current activity, you can specify that all active branches must be complete before the current activity begins, by clicking **Merge All** (default). (You cannot change these settings from the Process Viewer.) To specify that only one previous activity need be completed, click **Merge One**.

For more information about Merge All considerations, see “Activities and connectors” on page 32 and “Validating a process” on page 55.

To use the Post-operations tab

1. Right-click while the cursor is over an activity and select **Notebook**.
2. Select the **Post-operations** tab.

NOTE: The **Post-operations** tab cannot be edited from the Process Viewer.

In the **Post-operations** tab there are two tables. One table is for operations to run when a Send Forward meets the Done threshold. The other table is for operations to be run when a Send Back meets the Back threshold.

3. Click **Add**.
4. Click in the **Script Name** field and type in the pathname of the script that is to be executed upon activity completion.
5. Click in the **Argument Data** field and enter any arguments that this script requires.

6. To remove a selected Post-operation, click **Delete**. To make a copy of a selected Post-operation so that you can easily create and edit multiple, similar post-operations, click **Duplicate**.
7. The operations tables in the Activity Notebook Post-operations tab and the Process Properties Operations tab include a third column labeled “Logging”. In each row of the tables this column shows the options and file resources that apply to that row. (If no options value has been set by any resources, then none is shown. If logging has not been enabled for the row, then the entire column is blank.) Clicking on or attempting to change the text in this third column brings up a dialog box for choosing options with check boxes and a box for typing in the log file name (Figure 2-19). For additional information on Workflow logging refer to Appendix C.
8. For more information about Post-operations, see “Working with operations” on page 92.

To use the Notebook’s Branch Rules tab

1. Right-click while the cursor is over an activity with multiple exiting connectors and select **Notebook**.
2. Select the **Branch Rules** tab.

NOTE: This tab cannot be edited from the process viewer.





3. Click in the **Expression** field and enter a rule as described in “Working with branch rules” on page 80. If you define a rule for one branch from an activity, you must define rules for all branches from that activity.
4. Click the button in the first column of the rule that you want to set as a default.

Using the View functions

The Process Editor provides zoom functions for focusing your view on a particular part of the work area. It also provides alignment functions for positioning the activities in your process. You access these functions as options on the **View** menu or as icons along the toolbar.

2

To zoom on a particular area

1. To focus on just selected objects, click the **Zoom to Selection** icon ().
2. To focus on all elements of the process and exclude empty areas of the work area, click the **Zoom to Fit** icon ().
3. To zoom in by one increment, click the **Zoom in** () icon.
4. To zoom out by one increment, click the **Zoom out** () icon.
5. To specify an exact zoom factor, go to the **View** menu and select **Zoom Custom** from the **Zoom** cascade menu. In the resulting Zoom window, select a predefined scale factor.

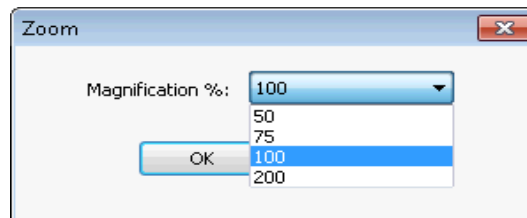






Figure 2-22: Zoom settings window

6. Click **OK**.

To align activities

1. Select the activities that you want to align. To select multiple activities, hold down the **Ctrl** key while clicking, or click and drag a selection box over the activities. The other activities will be moved to align with the last activity that you selected. Compare how this feature was described for the Form Editor in the ProductCenter Administrator Guide (see "To use the Alignment palette" in Chapter 7).
2. To align along activity tops, click . The icon shows two vertical bars with an upward-pointing arrow on the right side.
3. To align along activity bottoms, click . The icon shows two vertical bars with a downward-pointing arrow on the right side.
4. To align along activity left sides, click . The icon shows two horizontal bars with a leftward-pointing arrow on the bottom side.
5. To align along activity right sides, click . The icon shows two horizontal bars with a rightward-pointing arrow on the bottom side.

Assigning a resource to an activity


You must assign a resource to every activity in your process. An activity without an Approval-type assignment of a resource causes the process to fail validation, and you cannot save it.

You can assign specific users or groups to an activity, or you can assign user or group roles. See “Administration Procedures” on page 199, and the *ProductCenter Administrator Guide* for more information about users, groups, and roles.

2

To assign a resource to an activity

1. Place the cursor over the activity and right-click; select **Assign To** from the context menu. You may also select the activity and then select **Assign To** from the **Activity** menu in the menu bar.

Alternatively, in the Activity Notebook, click the people icon () next to the **Assignee(s)** field.

This displays the Assignment window.

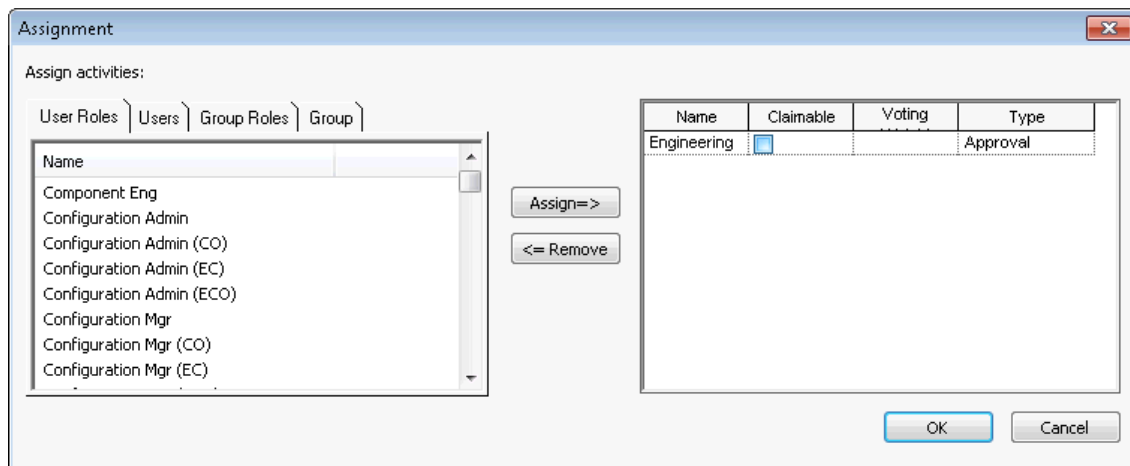


Figure 2-23: Assignment window

2. In the Assignment window, select the appropriate tab (User Roles, Users, Group Roles, Groups).

3. From this tab, select the user(s), group(s), or role(s) that you want to assign to this activity, and click **Assign**.

You can make use of some special features of user roles in defining your process. ProductCenter provides two system defined user roles, **Preparer** and **Last User**, to assign to an activity. For more details, see “System-defined roles” on page 112. User roles can also be defined to limit candidates to members of a specific group. If no group is specified when the user role is defined, then the end user will be presented with a list of all users when prompted to fill the role. See “Adding roles” on page 202 for more details.

4. If you assign a group and want to make the activity claimable by the members of the group, check the **Claimable** checkbox. See “Claimability” on page 77 for more information.
5. If either a positive Done or Back threshold has already been specified for the activity in the Activity Notebook, then you must enter a voting weight value for each assigned resource.
6. If the assignment is to be of type Informational, then that must be set in the last column.
7. Repeat steps 2 and 3 until you have made all assignments. To unassign if necessary, click **Remove**.
8. Click **OK** when done.

To assign the same resource to multiple activities

When creating a new process definition, you sometimes want to assign the same resource to many activities at once. For example, you might assign to most activities a user role that does not get filled until the activity is about to become active. Rather than select each activity one at a time and assign the resource over and over, you can do this all at once:

1. Select all the activities that will be assigned the same resource. You can select multiple activities by holding down the **Ctrl** key while clicking each activity. (You can also click and drag a selection box around the activities, but you must be careful not to include connectors in your selection, or the **Assign To** menu item will not be active.)
2. Select **Assign to** on the Activity menu. (If **Assign to** is not active, check to ensure that you have not included connectors or the Start object in your selection.)
3. In the Assignment window, select the appropriate tab (**User Roles**, **Users**, **Group Roles**, **Groups**).
4. From this tab, select the user(s), group(s), or role(s) that you want to assign to the selected activities, and click **Assign**.
5. Repeat steps 2 and 3 until you have made all assignments. To unassign if necessary, click **Remove**.

NOTE: When you assign the same resource(s) to multiple activities, the new assignment replaces any existing assignments that any of the selected activities may have had. This does not add the new assignment(s) to the old assignment(s).

6. Click **OK** when done. Ensure that all activities to which you intended to assign the resource now have the assignment.

Claimability

If you assign an activity to a group or group role, all members of the group must mark the activity as complete before the work can proceed to the next step. However, you can specify that the activity assignment is claimable. (A single activity could be assigned to two groups, one with a


claimable assignment and the other with a non-claimable assignment.) A claimable assignment initially appears in the Claimable Work window of each group member. When the first person from the assigned group “claims” the activity assignment, it is removed from the Claimable Work windows of the group members and is added to that user's Work List window. Claimability applies only to groups; it does not apply to multiple assignments. If an assigned group consists of only one user, the assignment still appears in the user's Claimable Work window, not automatically in the user's Work List window.

To make an activity assignment claimable

1. Place the cursor over the activity and right-click; select **Assign to** from the context menu.
2. In the Assignment window, locate the group(s) or group role(s) to which you want to grant claimability rights.
3. Turn on the **Claimable** checkbox in this group's row. You can activate the checkboxes only for **Groups** and **Group Roles**. You cannot activate checkboxes for **Users** or **User Roles**.

To specify Voting Weight and Thresholds

1. Place the cursor over the activity for which you want to specify the **Done Threshold** or **Back Threshold**.
2. Bring up the Activity Notebook by right-clicking and selecting **Notebook** from the context menu.
3. Make sure the **General** tab is displayed, and enter a value in the **Done Threshold** field. For example, if you want the activity to be complete when two out of three resources have sent it forward, enter **2** in this field. (This example is oversimplified, but gets you started.) Do the same for **Back Threshold**. For example, you might decide that any one person can send an activity back, and therefore enter **1** in this field.

4. Click the people icon () next to the **Assignee(s)** field.
5. In the Assignment window, choose the resources you want to assign to this activity. To continue with our simple example, use the tabs and the **Assign** button to assign three users or user roles.
6. Double-click in the **Voting Weight** column for each assignee and enter a value. To continue our simple example, enter **1** for each user. If you cannot edit the **Voting Weight** column, make sure that the **Threshold** fields on the Notebook are not set to 0. You cannot specify **Voting Weights** when the **Done** and **Back Threshold** are 0.
7. Click **OK** on the Assignment window, and click on the Notebook.

NOTE: To simplify this example, we gave voting weights of 1 to each resource. You can be much more creative by giving a wide range of voting weight values to various resources. If you do so, make sure that you enter **Threshold** values that make sense for these voting weights.

Also, if you implement a bypass user (see “Specifying a bypass user” on page 113), you need to allow for the fact that bypass users do not qualify as a yes vote.

If the assignment is claimable, then there will be just one user who gets the specified voting weight. If the assignment is non-claimable, then each member of the group will get the specified voting weight.

Working with branch rules

You can define expressions that determine the path a process follows upon the completion of an activity. If an expression evaluates to `True`, control passes to the destination activity. Multiple expressions can evaluate to `True`, allowing parallel paths for the process. You must define one of the branch expressions as the default. If none of the other branch expressions evaluate to `True`, then control will pass to just the destination activity of the default branch. This will happen even if that branch's expression is also `False`. But if one or more of the other branch expressions evaluate to `True`, then the default branch's destination will only get control if its expression evaluates to `True`.

If you define a rule for one branch within an activity, you must define rules for all branches within the activity. The Start object, unlike an activity, must always have rules defined for all branches.

Branch rule syntax

NOTE: There is no hierarchy or precedence among the operators. You should always use parentheses to indicate how complex branch rules are supposed to be evaluated.

Table 2-3 describes the ProductCenter branch rules.

Table 2-3: Branch rule syntax

Syntax	Description
()	parentheses
"string"	double-quoted strings (if no quotes, integer is assumed)
=	equal operator

Table 2-3: Branch rule syntax

Syntax	Description
!=	not equal operator
<	less than operator
>	greater than operator
contains	substring comparison operator
and	Boolean AND operator
or	Boolean OR operator

2

Supported attributes

Table 2-4 lists the process, activity, and item attributes supported by the ProductCenter branching rules parser. The evaluation of workflow process branch rules considers the attribute's data types.

- The comparisons based on attribute type,
 - Integer attributes will be compared as (signed) integers.
 - Floating point attributes will be compared as (signed) floating point numbers, to the full precision allowed by their internal representation.
 - Date attributes will be compared as strings, using the configured date format.
 - All other types of attributes will be compared as strings.
- Constants enclosed in double-quotes will have the comparison type of strings.
- Constants not enclosed in double-quotes must consist of decimal digits, an optional preceding minus-sign, and an optional decimal point. If they include a decimal point, then they will have the comparison type of

floating point numbers. Otherwise they will have the comparison type of integers.

- All other text words in branch rules will be interpreted as attribute names. Invalid or undefined names will be processed as the empty string.
- Comparisons between integers and floating point numbers will be performed by converting the integer value into a floating point number. All other comparisons between different types of values will always evaluate to FALSE.
- The result of all the operators is of type Boolean. The operators "and", "or", "=" and "!=" can be applied to pairs of Boolean arguments.
- The result of a branch rule expression must be of type Boolean.

The information described above allows for testing for a FALSE condition. For example, if you need to take a branch only if the Description attribute does not contain the string XYZ then the rule could be written as,

`(item.description contains "XYZ") != (0=0)`

Text type attributes will always be evaluated as text type and the types of both the compared values will be observed, which could result in different behavior.

Note that "attribute_name" and "tt_name" listed in Table 2-4 are both the names, not the prompts, of custom attributes. The names used here are not case-sensitive. The names may be specified in upper-case in the Form Editor and lower-case here, or vice versa.

Table 2-4: *Attributes you can use with branch rules*

Attribute	Description
process.name	<p>string</p> <p>This attribute gives the name of the process instance, not the name of the process definition.</p> <p>If the process instance was created by the <code>pcProcessDef::CreateInstance()</code> then the instance name was set by the <code>instance_name</code> parameter.</p> <p>If the process instance was created by the Windows or Web Client Issue Form command, then the instance name is the same as the name of the form item that was created. This name defaults to the name of the process definition followed by a space, number sign, and a sequentially generated number, but the user who issued the form could enter a different name.</p> <p>If the process instance was created by the Windows or Web Client Route Selected Item command, then the instance name is formed from the name of the file or other item that was routed, followed by a space, number sign, and a sequentially generated number to distinguish the process instance from all other process instances that were active when it was created.</p>
process.coordinator	string
process.state	one of the following strings: "Initiated", "Activated", "Completed"
process.workitem	string in the following format: "Class:RelativePath:FileProjectName:CmsId"
activity.name	string
activity.worknotes	string
activity.donethreshold	integer
activity.workitem	string in the following format: "Class:RelativePath:FileProjectName:CmsId"
activity.state	one of the following strings: "Initiated", "Unclaimed", "Claimed", "Suspended", "Completed", "Cancelled"

Table 2-4: Attributes you can use with branch rules (continued)

Attribute	Description
item.name	string
item.revision	string This attribute gives the revision of the attached item. This consists of the revision level code (typically a letter), followed by a colon and the revision number within the level.
item.version	integer This attribute gives the version number of the attached item.
item.status	string
item.title	string
item.classname	string
item.preparer	string
item.reviewer	string
item.issuer	string
item.lastuser	string
item.comments	string
item.description	string
item.location	string
item.relpah	string
item.filetype	string
item.filesize	integer
item.vaultspace	string
item.custom.attribute_name	string or integer, depending on value
item.custom.tt_name[row_count]	Integer type: the number of rows in the table type attribute.

Table 2-4: *Attributes you can use with branch rules (continued)*

Attribute	Description
<code>item.custom.tt_name[row_num].col_name</code>	Where <code>row_num</code> is a positive integer: the contents of the table column named <code>col_name</code> in table row <code>row_num</code> . If the table does not have a column with that name, then the value is the empty string. If the table does not have that many rows, then the value is the empty string (even if the column would not normally be of string type). The first row of a table is number 1. The type of the value is determined by the type of the column.
<code>item.custom.tt_name[last].col_name</code>	The contents of the table column named <code>col_name</code> in the last row of the table. If the table does not have a column with that name, then the value is the empty string. If the table does not have any rows, then the value is the empty string (even if the column would not normally be of string type). The type of the value is determined by the type of the column.

Table 2-4: Attributes you can use with branch rules (continued)

Attribute	Description
<code>item.custom.tt_name[any].col_name</code>	The contents of the table column named <code>col_name</code> in any row of the table. If the table does not have a column with that name, then the value is the empty string. If the table does not have any rows, then the value is the empty string (even if the column would not normally be of string type). The type of the value is determined by the type of the column. If the table contains more than one row, then the value in the named column from each row is tested. If any of these values causes the comparison to return TRUE, then the whole expression will return TRUE.
<code>item.custom.tt_name[all].col_name</code>	The contents of the table column named <code>col_name</code> in all the rows of the table. If the table does not have a column with that name, then the value is the empty string. If the table does not have any rows, then the value is the empty string (even if the column would not normally be of string type). The type of the value is determined by the type of the column. If the table contains more than one row, then the value in the named column from each row is tested. If any of these values causes the comparison to return FALSE, then the whole expression will return FALSE. In other words, the expression will only return TRUE if the comparison returns TRUE for the values from all of the rows.

NOTE: The square brackets that follow "*tt_name*" listed in the last several rows of this table are part of the literal syntax that the user must enter in the branch rule.

Examples

The examples in Table 2-5 assume that:

- Process Name = “ECO Part Replacement”
- Activity Name = “Review Changes”
- Item Cost = 2500

Table 2-5: Branching rules examples

This expression:	Evaluates to:
(process.name = "ECO Part Replacement") and (activity.name = "Review Changes") and (item.custom.cost < 3000)	TRUE
((process.name = "ECO Part Replacement") or (activity.name contains "Changes")) and (item.custom.cost < 3000)	TRUE
((process.name = "ECO Part Replacement") or (activity.name contains "Changes")) and (item.custom.cost > 2500)	FALSE
(process.name = "ECO Part Replacement") and (activity.name != "Update Instructions") and (item.custom.cost = 2500)	TRUE

Notes If an item.custom.*attribute_name* does not exist at the time the expression is evaluated, the value will be the empty string.

The Process Editor parses an expression to validate syntax prior to closing the **Branching Rules** tab. Keywords such as item.name are not part of the validation check.

To create a branch rule

You can define a branch rule for an activity or for the Start object of the process. The procedures are similar, but differ in a couple of details.

1. Select the activity for which you want to define a branch rule. The activity must have at least two connectors exiting from it.

If you are defining a branch rule for the Start object, you do not need to select the Start object, nor do you need to deselect any selected activities. Ensure that the Start object has at least two exit connectors.

2. For an activity, select **Notebook** from the context menu. For the Start object, select **Properties** from the **Process** menu.
3. Select the **Branch Rules** tab.
4. Select the first **Expression** field and enter an expression as described in “Branch rule syntax” on page 80.

To modify a branch rule

1. Select the activity for which you want to modify a branch rule. The activity must have at least two connectors exiting from it.

If you are modifying a branch rule for the Start object, you do not need to select the Start object, nor do you need to deselect any selected activities. Ensure that the Start object has at least two exit connectors.

2. For an activity, select **Notebook** from the context menu. For the Start object, select **Properties** from the **Process** menu.
3. Select the **Branch Rules** tab.
4. Select the desired **Expression** field and enter an expression as described in “Branch rule syntax” on page 80.

Evaluation of Branch Rules and Server Logging

In an effort to support the development and testing of workflow branch rules, the ProductCenter Server Log file

includes additional information when evaluating specific branch rules. If the **cms.server.msg.level** is set to **1** then the following messages will be generated:

WFE - Branch Rule Error: Attribute *Attr_Name* is not defined in *Class_Name*
 WFE - Branch Rule Error: Attribute *Attr_Name* is not a table type attribute in *Class_Name*
 WFE - Branch Rule Error: Attribute *Attr_Name* is a table type attribute in *Class_Name*
 WFE - Branch Rule Error: *Left_Arg_Type* to *Right_Arg_Type* comparison is not supported:
 Exp_Text
 WFE - Branch Rule Error: *Arg_Type* comparison is not supported by operator "*Op_Name*" :
 Exp_Text
 WFE - Branch Rule Error: expression is of type *Arg_Type*, not of type Boolean

For detailed investigation to understand how ProductCenter is evaluating the workflow branch rules then the **cms.server.msg.level** resource can be set to a value of 3 for tracing workflow operations and then following will also be generated:

WFE - Branch Rule Evaluation For *Process_Name* - *Activity_Name* - *Item_Name*
 WFE - *Activity_Name* : *Exp_Text*
 WFE - *Exp_Values* SUCCESS - Branch
 WFE - *Exp_Values* FAILED

Where:

Class_Name = the Class for the attached item

Item_Name = the Name for the attached item

Attr_Name = the attribute name being evaluated

Activity_Name = the name of the current activity

Left_Arg_Type, *Right_Arg_Type*, *Arg_Type* = the name of the attribute data type of an attribute reference, sub-expression, or expression, such as "Numeric" (which includes both integer and floating point), "Text", or "Boolean"

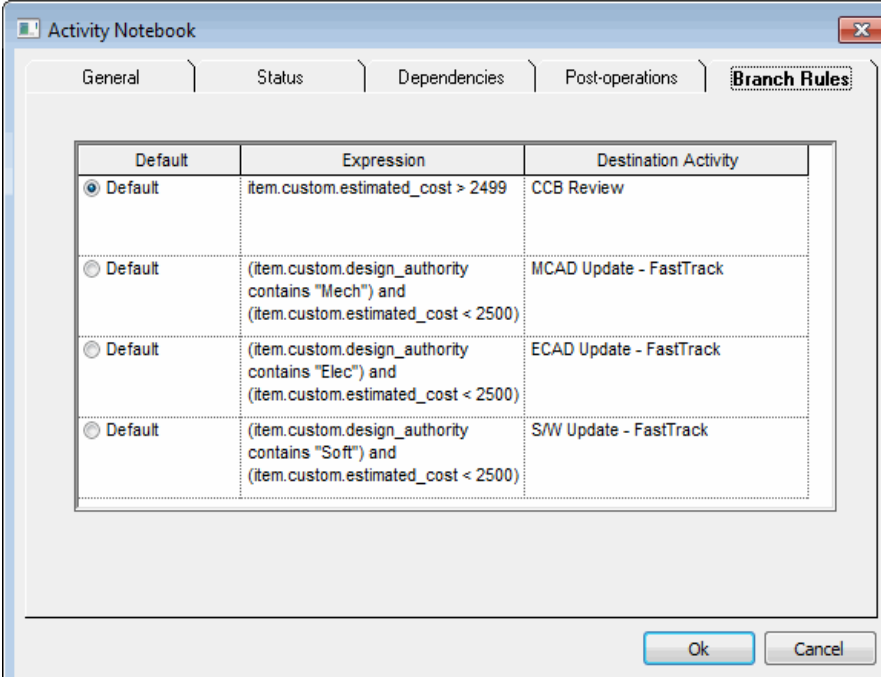
Exp_Text = the sub-expression that has the error

Exp_Values = the entire expression with all attribute references replaced by their values

Op_Name = the specific operator involved, such as "=" or "and"

Process_Name = the process instance name

For example, consider the following set of branch rules for a specific workflow activity.



Default	Expression	Destination Activity
<input checked="" type="radio"/> Default	item.custom.estimated_cost > 2499	CCB Review
<input type="radio"/> Default	(item.custom.design_authority contains "Mech") and (item.custom.estimated_cost < 2500)	MCAD Update - FastTrack
<input type="radio"/> Default	(item.custom.design_authority contains "Elec") and (item.custom.estimated_cost < 2500)	ECAD Update - FastTrack
<input type="radio"/> Default	(item.custom.design_authority contains "Soft") and (item.custom.estimated_cost < 2500)	S/W Update - FastTrack

Ok Cancel

Figure 2-24: Workflow Branch Rules

First, assume that custom attribute `estimated_cost` is of type Integer and `cms.server.msg.level` is set to 3. Then using some hypothetical values for the attributes, the log messages

produced by evaluating these rules would be as follows.
(Long lines are shown as wrapped onto two lines.)

WFE - Branch Rule Evaluation for ECO - CCM Review - ECO#17
WFE - CCB Review : item.custom.estimated_cost > 2499
WFE - 2000 > 2499 FAILED
WFE - MCAD Update - FastTrack : (item.custom.design_authority contains "Mech") and
(item.custom.estimated_cost < 2500)
WFE - ("Electrical/Software" contains "Mech") and (2000 < 2500) FAILED
WFE - ECAD Update - FastTrack : (item.custom.design_authority contains "Elec") and
(item.custom.estimated_cost < 2500)
WFE - ("Electrical/Software" contains "Elec") and (2000 < 2500) SUCCESS - Branch
WFE - S/W Update - FastTrack : (item.custom.design_authority contains "Soft") and
(item.custom.estimated_cost < 2500)
WFE - ("Electrical/Software" contains "Soft") and (2000 < 2500) SUCCESS - Branch

Now, assume that custom attribute estimated_cost is of type Text and **cms.server.msg.level** is set to 3 then using some hypothetical values for the attributes, the log messages produced by evaluating these rules would be as shown on the following page. (Long lines are shown as wrapped onto two lines.)

2

WFE - Branch Rule Evaluation for ECO - CCM Review - ECO#17
WFE - CCB Review : (item.custom.estimated_cost > 2499)
WFE - Branch Rule Error: Text to Numeric comparison is not supported:
 item.custom.estimated_cost > 2499
WFE - (2000 > 2499) FAILED
WFE - MCAD Update - FastTrack : (item.custom.design_authority contains "Mech") and
 (item.custom.estimated_cost < 2500)
WFE - Branch Rule Error: Text to Numeric comparison is not supported:
 item.custom.estimated_cost < 2500
WFE - ("Electrical/Software" contains "Mech") and (2000 < 2500) FAILED
WFE - ECAD Update - FastTrack : (item.custom.design_authority contains "Elec") and
 (item.custom.estimated_cost < 2500)
WFE - Branch Rule Error: Text to Numeric comparison is not supported:
 item.custom.estimated_cost < 2500
WFE - ("Electrical/Software" contains "Elec") and (2000 < 2500) FAILED
WFE - S/W Update - FastTrack : (item.custom.design_authority contains "Soft") and
 (item.custom.estimated_cost < 2500)
WFE - Branch Rule Error: Text to Numeric comparison is not supported:
 item.custom.estimated_cost < 2500
WFE - ("Electrical/Software" contains "Soft") and (2000 < 2500) FAILED

Working with operations

ProductCenter enables you to invoke a script upon the start of a process (*pre-operation*) or at the completion of an activity or a process (*post-operation*). These operations can take the form of any chore that might be useful at a particular point in a workflow process, such as generating an email message.

NOTE: You must remember that operations execute on the application server, not your local machine. If you specify that a script resides in C:\scripts, for example, you must ensure that this directory and script exist on the server. If you place it on your local machine (client), ProductCenter will not find it when it tries to execute the operation.

2

Workflow variables

ProductCenter Workflow provides some variables to make script and Toolkit application writing easier. These variables would be included in the Argument Data field of a post-operation definition and include:

- **\$PROCESSID** — returns the database ID value for the current process (replaces obsolete \$WRKFLWID, which returned same value)
- **\$ACTIVITYID** — returns the database ID value for the current activity (replaces obsolete \$TASKID, which returned same value)
- **\$ACTIVITYID_BACK** — this variable is only defined for post-operations that are triggered by a Send Back command. The variable returns the database ID value for the activity that the process was sent back to. (By contrast, after a Send Forward \$ACTIVITYID would return the ID for the activity that was sent forward.) If a toolkit API is used to do a Send Back to all the immediate predecessor activities, then this variable will return a comma-separated list of IDs for all of those activities.
- **\$WRKITMID** — returns the class and database ID of the item attached to the Workflow process, in the format CMS:*subclass::...::filename::id*

\$WRKITMID is a shortcut for Toolkit users who would otherwise need to use the Get Item function in conjunction with the \$PROCESSID value.

See Table B-3 on page 218 for additional variables available for writing e-mail notification routines.

To create a pre- or post-operation for a process

1. Create the script and test it, ensuring that it works the way you expect it to prior to hooking it into your workflow process.
2. Open the process in the Process Editor.
3. Open the Properties window by selecting **Properties** from the context menu while the cursor is over an empty area of the editor or by double clicking on the Start object.
4. Select the **Operations** tab as shown in Figure 2-25.

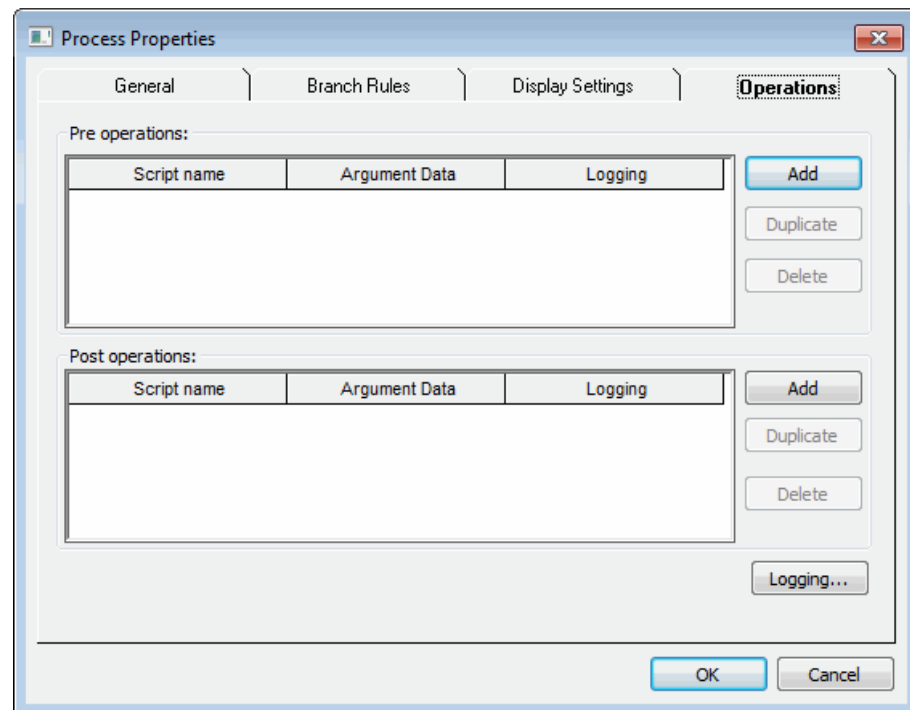


Figure 2-25: Process Properties, Operations tab

5. Click **Add** next to the pre- or post-operation pane.
6. Click in the **Script Name** field, and enter the pathname of the script you want to be the post-operation for this activity.
7. If this script requires arguments, click in the **Argument Data** field and type the arguments.
8. To make a copy of the selected **Script** and **Argument** fields to use as a starting point for a second operation, click **Duplicate**. To remove the selected operation, click **Delete**.

See “Example” on page 97 for an example of a script specified as a post-operation for an activity. (Activity post-operations are implemented in a similar manner to process operations.)

To create a post-operation for an activity

1. Create the script and test it, ensuring that it works the way you expect it to prior to hooking it into your workflow process.
2. Select the activity whose completion you want to invoke this script, and select **Notebook** from the context menu.

3. Select the **Post-operations** tab as shown in Figure 2-26.

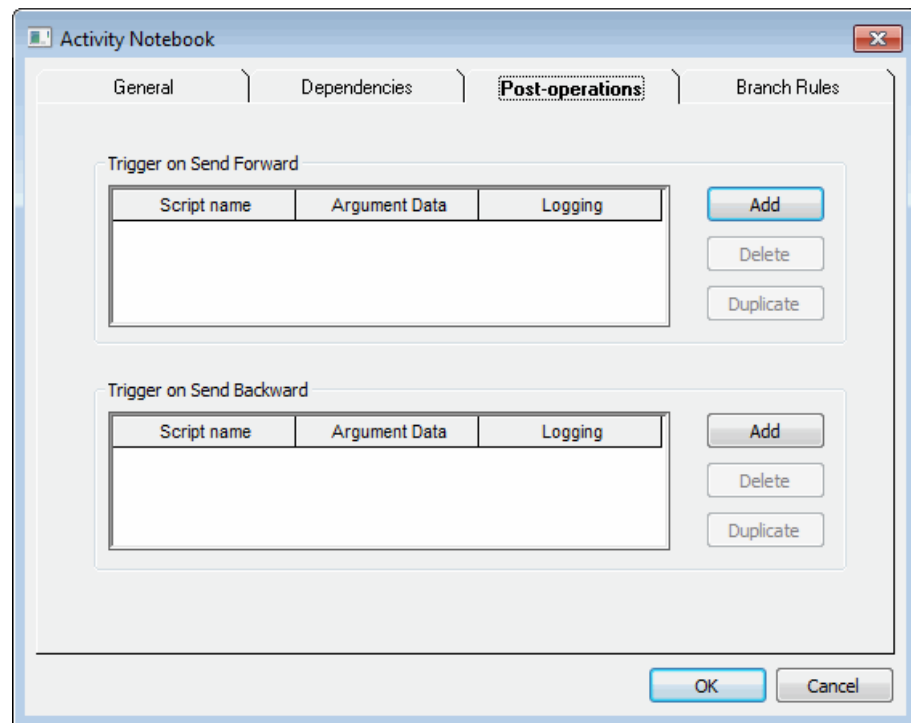


Figure 2-26: Activity Notebook, Post-operations tab

4. Click **Add**.

Note there are two Add buttons (as there are in the Process Properties window), one for triggering on Send Forward, and one for triggering on Send Backward.

5. Click in the **Script Name** field, and enter the pathname of the script you want to be the post-operation for this activity.
6. If this script requires arguments, click in the **Argument Data** field and type the arguments.
7. To make a copy of the selected **Script** and **Argument** fields to use as a starting point for a second operation, click **Duplicate**. To remove the selected operation, click **Delete**.

Example Here is an example of implementing a post-operation for an activity.

1. On the server machine, create a batch file in C:\temp called wfctest.bat, with the following contents:

```
echo off
echo Hello World > C:\temp\wfctest.log
time /t >> C:\temp\wfctest.log
exit
```

2. Test it in an MS-DOS window on the server machine to make sure it works:

```
C:\windows\system32\cmd.exe /q /c start
C:\temp\wfctest.bat
```

After running it, check for the existence of C:\temp\wfctest.log, and check that its contents resemble:

```
Hello World
5:22p
```

NOTE: The script and the log file *must* reside on the server machine, not the client machine where you typically use Workflow.

3. Delete wfctest.log to prepare for the next test.
4. Back on your client machine, open the Process Editor and open the Activity Notebook for the activity with which you want to test this post-operation. Go to the **Post-operations** tab. Click the **Trigger on Send Forward Add** button
5. In the **Script name** column, enter the path to cmd.exe as it exists on the server:

```
c:\windows\system32\cmd.exe
```

In the **Argument Data** column, enter the arguments, including the path to the batch file as it exists on the server:

```
/q /c start C:\temp\wftest.bat
```

The **Post-operations** tab should resemble Figure 2-27.

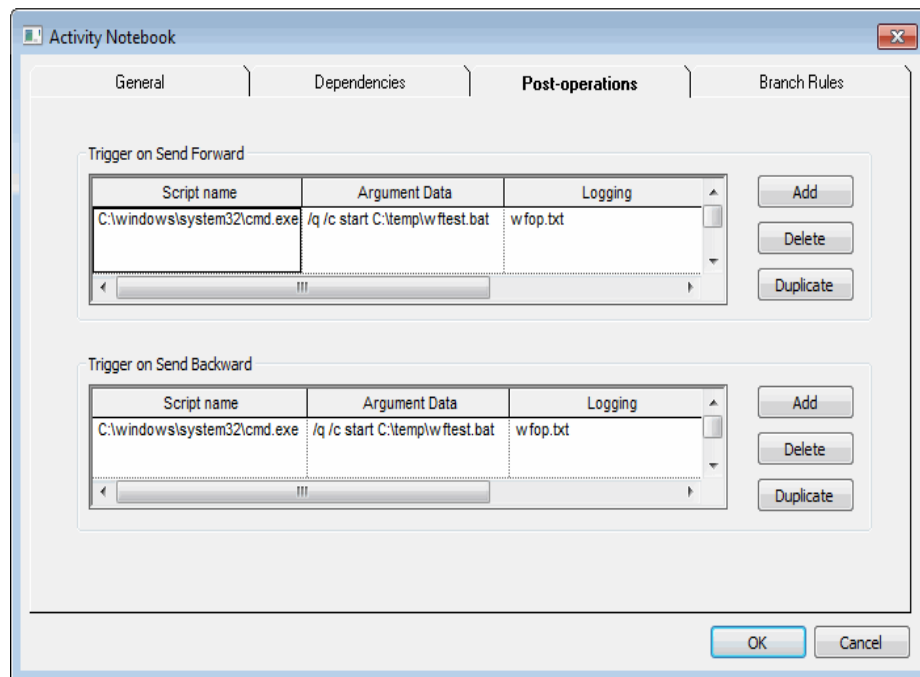


Figure 2-27: Post-operation example

6. Click **OK** to close the Activity Notebook, and click **Save** on the **Process** menu.
7. Start an instance of this process and send forward the activity which contains this sample post-operation. Check the C:\temp directory on the server machine to ensure that the wftest.log file was created.

Workflow Pre/Post-Operation Server Log

Information can be recorded in log files on the server when pre- or post-operation scripts are launched. The amount of information recorded can be configured by the administrator. These log entries can be particularly useful for debugging problems with the operation scripts and the way that the workflow process launches them. The log entries may also be useful for understanding how a workflow process is executed.

Two separate sets of log messages are available for pre-/post-operation scripts. The first set records the fact that a particular operation script is to be launched, the argument data that was passed to the script, and any problems that workflow had with actually launching the operation script.

The second set of log messages records any error messages and exit codes from the operation script. This can be particularly useful for debugging problems with the installation or configuration of complex programs that are used as operation scripts. See Appendix C for information about this second level of logging.

The amount of logging from the first set, which is related to launching pre-/post-operation scripts, is controlled by the ProductCenter application server's log level. This is set by the `cms.server.msg.level` resource variable. (See the section on Server and Broker Log Files in the *ProductCenter Administrator Guide* for more information about this resource variable.) When workflow is to launch an operation script, it may generate Error, Trace, and/or Debug messages as follows. These messages are written to the application server's log file. They all begin with the standard time stamp, process ID, and level information used for all messages in this log file. This standard prefix is omitted in the following description.

The first message generated records the fact that a particular operation script is to be launched. This is a Trace level message. The format is:

```
PROCESSID process_id ACTIVITYID activity_id  
WRKITMID workitem_id operation number op_num as  
defined: script_name arguments
```

In this message, *arguments* represents the argument data exactly as it was entered in the table in the Activity Notebook or Process Properties, without substituting the values for any variables.

The second message generated also records the fact that a particular operation script is to be launched. This is a Debug level message. The format is:

```
PROCESSID process_id ACTIVITYID activity_id  
WRKITMID workitem_id operation number op_num  
called: script_name arguments
```

This is nearly the same format as the first message (replacing "as defined" with "called"), but this time *arguments* represents the argument data after substituting the values for any variables - i.e. the command line arguments as they will be passed to the operation script. If the second set of logging (described in Appendix C) is also to be recorded for the operation script, then the format of this second message is altered slightly. The workflow operation logging program and its arguments will be enclosed in braces and included in the message, giving the following format:

```
PROCESSID process_id ACTIVITYID activity_id  
WRKITMID workitem_id operation number op_num  
called: { wfoplog_and_args } script_name arguments
```

The third message generated will indicate the outcome of the actual attempt to launch the operation script, and the format and level of the message depend on that outcome.

If the operation script was successfully launched, then this is a Debug level message and the format is:

```
PROCESSID process_id ACTIVITYID activity_id
WRKITMID workitem_id operation number op_num
launched: script_name arguments
```

If the server detected a problem before it actually tried to launch the operation script, then this is an Error level message and the format is:

```
PROCESSID process_id ACTIVITYID activity_id
WRKITMID workitem_id operation number op_num
failed: script_name arguments: message
```

The most common such problem would be that the script file path does not point to a file on the server computer.

If the server tried to launch the operation script but failed, then this is an Error level message and the format is:

```
PROCESSID process_id ACTIVITYID activity_id
WRKITMID workitem_id operation number op_num OS
error: script_name: message
```

One such problem could occur if the script file path points to a file that is not executable

In all of these message formats we have used the following variable text elements:

process_id = the database ID value for the current process

activity_id = the database ID value for the current activity, or

-1 for process pre-operations

0 for process post-operations

workitem_id = the class and database ID of the item attached to the Workflow process, in the format

CMS:subclass:::filename::id

op_num = index of the operation in the table of operations for this activity, where the first row in the table is number zero

script_name = path name of the operation script file

arguments = argument list as defined in the operations table but with any variables replaced by their values (except as noted above)

message = textual explanation of the cause of the failure, such as "No such file or directory"

Also, if the post-operation is being triggered by a Send Back on an activity then the word "back" will be inserted before the words "operation number" in the message format.

This set of log messages for the launching of a pre- or post-operation script will consist of zero, one, two, or three messages, depending on the setting of `cms.server.msg.level` and the outcome of the attempt to launch the script.

Chapter 3

Coordinating and Administering Workflow

3

Just Ahead:

Responsibilities of Administrators and Coordinators	104
Setting ProductCenter Workflow resource variables	111
Group and user roles	112
Specifying a bypass user	113
Dealing with activities that are On Hold	115
Suspending and activating activities	120
Cancelling vs. deleting a process	125

Responsibilities of Administrators and Coordinators

A ProductCenter administrator installs the Workflow product and configures it. You must have administrator privileges or the appropriate screen permission to use the Workflow Process Editor.

A ProductCenter coordinator is responsible for managing a process instance. This typically includes dealing with activities that are placed On Hold, canceling or deleting workflow processes, and reassigning activities. The coordinator may also start a workflow process, just as any ProductCenter Workflow user may do so.

The job of coordinator can be assigned to any ProductCenter user; a coordinator does not require administrator permissions. However, any DBA-enabled user can perform coordinator functions if necessary. Suspended activities and On Hold assignments will appear in the Work List window for the Process Coordinator but not for other DBA users.

Table 3-1 provides a summary of Workflow operations and who has permission to perform them. Additional information for Activity and Assignment Operations follow.

Table 3-1: Workflow operations and permissions

Category	Operation	Can be performed by	Comments
Process Operations	Cancel Process	Coordinator User with Cancel Process Instance Screen Permission	Process must be either "Initiated" or "Active"
	Delete Process	Coordinator User with Delete Process Instance Screen Permission	Process must be either "Canceled" or "Completed"



Table 3-1: Workflow operations and permissions

Category	Operation	Can be performed by	Comments
Activity Operations	Suspend	Coordinator	Activity must be "Claimed" or "Unclaimed"
	Resume	Coordinator	Activity must have been "Suspended" by the Suspend command, not by becoming deadlocked
	Restart	Coordinator	Activity must have become "Suspended" due to a "Deadlocked" situation
	Administrative Send Forward / Send Back	Coordinator User with Send Forward Admin or Send Back Admin Screen Permission	Activity must be "Claimed" or "Unclaimed"
Assignment Operations	Send Forward / Send Back	Assigned User	Assignment must be "Claimed"
	Place On Hold	Assigned User Coordinator	Assignment must be "Claimed"
	Take Off Hold	Assigned User Coordinator	Assignment must be "On Hold"
	Reassign	Coordinator User with Reassign Screen Permission	If the operation is to be performed in a Work List window, then the assignment must be On Hold. But if the operation is to be performed in the Activities Search Results, then the assignment may be either Claimed or On Hold. If the administrator has enabled the feature, then the assignment may be Unclaimed instead.


Activity Operations

For workflow activities the following operations are available:


Suspend an Activity

The Suspend  operation will place the selected activity into the Suspended state .

This operation is available to the Process Coordinator in his/her Work List and in Activities Search Results. This operation is available to a DBA user in the Activities Search Results.


Activities can become suspended by becoming deadlocked. When this occurs, the  icon is displayed instead, to distinguish from activities that were suspended by the Suspend operation.

Resume an Activity

The Resume  operation takes an activity that was suspended by the Suspend operation out of the Suspended state.

This operation is available to the Process Coordinator in his/her Work List and in Activities Search Results. This operation is available to a DBA user in the Activities Search Results.

Restart an Activity

The Restart  operation will restart an activity that was suspended due to a deadlocked situation. This operation will take the selected activity and reset all activity assignments (whether Approved, Disapproved, Claimed, or On Hold) to their initial state of Claimed or Unclaimed. If any of the assignments were from claimable group assignments then the assignment status will be changed to Unclaimed for all members of the group.

This operation is available to the Process Coordinator in his/her Work List and in Activities Search Results. This operation is available to a DBA user in the Activities Search Results.

Administrative Send Forward, Send Back

With the Administrative Send Forward / Send Back operation voting weights, thresholds and un-voted assignees are ignored. The activity is immediately sent back or forward. This operation is available to the Process Coordinator, a DBA user or any user with the Send Forward Admin and Send Back Admin screen permissions in the Activities Search Results.



Assignment Operations

When an assignee is allowed to perform an operation that can function in either an administrative mode or an assignee mode, ProductCenter will select the mode as follows. This situation can arise when a user is the Process Coordinator, DBA user, or the user has various screen permissions granting levels of authority. The affected commands are listed below.

- Operations issued on assignments selected in the Work List or Claimable Work windows will be performed in assignee mode.
- Operations issued on Suspended activities selected in the Process Coordinator's Work List window will be performed in administrative mode.
- Operations issued on activities selected in the Search Results window will be performed in administrative mode.


For workflow assignments, the following operations apply:

Send Forward, Send Back

With the Send Forward  / Send Back  operation voting weights are totaled and compared to the relevant threshold. Only if the total equals or exceeds the threshold is the activity actually sent back or forward. If no thresholds are specified, then all assignments must do a Send Forward before the activity is sent forward, but the activity would be

sent back when the first Send Back is done (even if some other assignees had already done a Send Forward).

Place On Hold

The Place On Hold  operation will change an activity assignment from the Claimed status to On Hold.

Assignee: Only set the status of the selected assignment.

Administrative: Set the status of all the Claimed assignments. The user may choose to leave the status of some assignments unchanged.


The Place On Hold operation is available to the assigned user in his/her Work List and Activities Search Results. This operation is available to the Process Coordinator and DBA user in the Activities Search Results.

When using the operation in Activities Search Results, if the selected activities have multiple assignments and if the user is the Process Coordinator or DBA then the user will be prompted to select the specific assignments that should be placed on hold.

In addition to the Place On Hold operation there are additional process events that can change an assignment status to On Hold.

- When a user initiates a new Process Instance or when using the Send Forward operation and if the activity assignment is defined as User or Group Roles and the roles are not defined in the Item Form and the user cancels the Assignment Dialog then the assignment is undefined and will be set to On Hold.
- When all assignments for a specific activity are assigned to the Bypass User, all but one of the assignments are deleted and the one remaining assignment is undefined and set to On Hold.

Take Off Hold

The Take Off Hold  operation moves an assignment from the On Hold status to Claimed.

Assignee: Only set the status of the selected assignment.

Administrative: Set the status of all the On Hold assignments. The user may choose to leave the status of some assignments unchanged.


The Take Off Hold operation is available to the Process Coordinator and assigned user in his/her Work List or Activities Search Results. This operation is available to the Process Coordinator or DBA user in the Activities Search Results.

When using the operation in Activities Search Results, if the selected activities have multiple assignments and if the user is the Process Coordinator or DBA then the user will be prompted to select the specific assignments that should be taken off hold.

Note that you cannot use Take Off Hold on an undefined assignment - you can only Reassign it.

The Reassign operation always takes the assignment Off Hold as it changes the assigned user.

Reassign

The Reassign  operation changes the user(s) who are assigned to a specific activity.

Assignee: Only reassign the selected assignment, which must be On Hold. The user may choose to leave the assignment unchanged.

Administrative: Reassign all assignments that are either Claimed or On Hold (or, if your administrator has the feature, Unclaimed). The user may choose to leave some assignments unchanged while changing others.

The Reassign operation always takes the assignment Off Hold as it changes the assigned user.

The Reassign operation applies to On Hold assignments and is available to the Process Coordinator or an assigned user with the Reassign screen permission when working in their

Work List. If more than one assignment for a single activity is selected (by the Process Coordinator) then the operation will be applied to all the selected assignments. An assigned user may only reassign the selected assignment, which must be On Hold.

The Reassign operation is available to the Process Coordinator when working in his/her Work List if a Suspended activity has been selected, and will apply to any On Hold or Claimed assignments. This operation is also available to the Process Coordinator, a DBA user or any user that has the Reassign screen permission when working in Activities Search Results, and will apply to any On Hold or Claimed assignments. In the above situations (i.e. when an activity has been selected), Workflow will cycle through the list of all the On Hold and Claimed assignments for the activity, presenting the Reassign dialog for each of them in turn. If the administrator has enabled the feature, then it will also cycle through the Unclaimed assignments.

A Reassign operation that picks the bypass user can change the effective thresholds of the assigned activity, so that the previous Send Forward/Back operations could belatedly result in the activity being sent forward/back or becoming deadlocked.

Setting ProductCenter Workflow resource variables

ProductCenter Workflow provides three resource variables that you can set in one of the following two places:

- Site-wide:

ProductCenter_home\resource\cms_site

- Individual user:

ProductCenter_home\resource\cms_user_userid

cms.workflow.enabled

Set this resource variable to TRUE to make ProductCenter Workflow features available when running ProductCenter.

cms.workflow.update_interval

Set this resource variable to the number of seconds you want between Work List refreshes. You may want to try an initial setting of 1800 (30 minutes). Values less than 300 (5 minutes) may cause too-frequent refreshes that can be distracting.

cms.workflow.bypass_assignment_user

This resource variable permits a ProductCenter user to be designated as a *bypass* user. This allows a workflow designer to create a list of possible assignees on a form and disable them by assigning the user specified in the resource variable. (See “Specifying a bypass user” on page 113.) For example, in some cases you might want to have all five users specified in the form to send an activity forward, but in a different situation, you might need only three to do so. This variable allows you to disable the two that you do not need in this particular instance.

Group and user roles

You can assign roles to activities. Roles are simply text labels that are given values when ProductCenter Workflow starts the activity. ProductCenter has two types of roles: system-defined and custom-defined roles. ProductCenter fills system-defined roles automatically, however custom-defined roles can be populated based on two options: either by prompting for a value at run-time or populating the value from the attached file or project consisting of the corresponding role-based custom attribute.

If the custom attribute has a blank value, then Workflow prompts for a user/group to fill the role for the assignment, however the value is not retained. If the next activity is also assigned to the same role, Workflow will prompt to have it filled again, and the new value may be different from the previous one.

System-defined roles

ProductCenter provides two predefined roles:

Last User — the role is automatically filled by the same user that last modified the form attached to the activity.

Preparer — the role is automatically filled by the preparer of the project or file attached to the process.

Custom roles DBA-enabled users define custom roles with the **Form Editor** option found on the ProductCenter **Administration** menu. See “Adding roles” on page 202 for more details.

ProductCenter provides the following two custom attribute types that you can use to develop you own custom roles:

- User role — (for example, Engineer) allows some single user to be assigned to activities dynamically when the process is in progress.
- Group role — (for example, Quality Control Team) allows several people to be assigned to an activity dynamically when the process is in progress.

When ProductCenter Workflow comes to an activity assigned to a custom role, it first examines the attached project or file to see if the role is an attribute in its class. If the role is in the class and the value of the attribute in this project or file is not blank, then the activity is automatically assigned to that user or group without prompting.

3

Specifying a bypass user

On occasion, you might want a specific instance of a process to require only a subset of the usual approvals. To allow this, Workflow provides for a *bypass user* that you use in conjunction with ProductCenter roles. Use the following procedures to set up and use the bypass feature.

NOTE: If you use Done Thresholds (see “To specify Voting Weight and Thresholds” on page 78), you may need to adjust this threshold downward if you introduce a bypass user, as bypass users do not qualify as a yes vote.

Setting up a bypass user

1. Decide upon a user to be the bypass user. This can either be an existing user account or a new one created expressly for this purpose. (See “Adding a non-O.S. user account” on page 200 for information about creating a special bypass user account.) This user does not need to be DBA-enabled, but can be.
2. Make this user the bypass user by specifying a resource value in the `cms_site` file:

```
cms.workflow.bypass_assignment_user =  
    user_name
```

Make sure that you use the user name, not the log in. This setting is case-sensitive and quotes are not necessary.

3. Define a number of user roles in ProductCenter. (See “Adding roles” on page 202 for information about creating roles.)
4. In the Process Editor, assign the user roles defined in step 1 to an activity.

Using the bypass user feature

1. Issue the form or route an existing file or project as appropriate to start the process instance.
2. When you send forward an activity and are prompted to assign users to the roles for the following activity, assign the bypass user to those roles that do not need to approve the activity for this particular process instance.

NOTE: If you make all the assignments of an activity be to the bypass user (either by filling roles or by reassigning), then all but one of the assignments will be deleted and the remaining one will be made undefined and placed On Hold.

Dealing with activities that are On Hold

Any activity assignment that is On Hold in a process you coordinate is listed in your Work List window with a special icon:



Figure 3-1: On Hold icon

If more than one person puts the same activity On Hold for a process that you coordinate, each On Hold assignment of the activity appears in your Work List window. Activities may be put On Hold for two reasons:

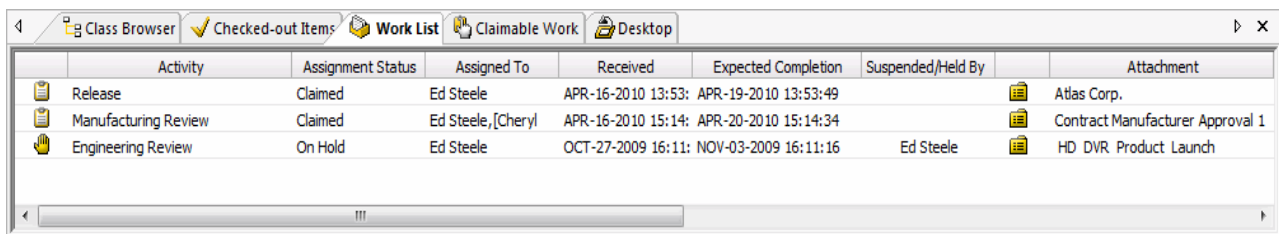
- The person assigned to the activity has explicitly placed the activity On Hold to delay it. The activity is listed in your Work List window along with the specific individual currently assigned to the activity.
- Someone who was prompted to assign the next activity or activities in a process cancelled the Assign Activity window, requesting that you (the coordinator) make the assignment instead. The activity is listed in your Work List window along with the role of the individual or group who should perform the activity.

If an activity is put On Hold by the person assigned to the activity, contact that person to identify the problem. Perhaps this person is just awaiting more information. However, if

necessary you can reassign the activity or cancel the process instance in question.

Suspended/Held By column in Work List

Coordinators have a special **Suspended/Held By** column in their Work List (see Figure 3-2) that shows the name of the user who placed an assignment On Hold or suspended an activity, causing it to appear in the coordinator's Work List.



Activity	Assignment Status	Assigned To	Received	Expected Completion	Suspended/Held By	Attachment
Release	Claimed	Ed Steele	APR-16-2010 13:53:	APR-19-2010 13:53:49		Atlas Corp.
Manufacturing Review	Claimed	Ed Steele,[Cheryl	APR-16-2010 15:14:	APR-20-2010 15:14:34		Contract Manufacturer Approval 1
Engineering Review	On Hold	Ed Steele	OCT-27-2009 16:11:	NOV-03-2009 16:11:16	Ed Steele	HD DVR Product Launch

Figure 3-2: Coordinator's "Suspended/Held by" column

This column will be blank if the activity is not On Hold, but is assigned directly to the coordinator. (See "Reassigning an activity assignment On Hold (coordinator procedure)" on page 116.)

Reassigning an activity assignment On Hold (coordinator procedure)

If you are a coordinator and receive an On Hold activity assignment in your Work List window, you may decide that the appropriate action is to use the **Reassign** feature to pass the activity to a different person. Only the coordinator can reassign an activity unless the user has the Reassign screen permission enabled. If a user wants to reassign an activity, that user places the activity assignment On Hold, which makes the assignment appear in the coordinator's Work List. See "Reassigning an activity (user procedure)" on page 137.)

“Undefined assignment” in the Assigned To column indicates an activity assigned to a role that is not yet filled. Once you make a role assignment, the assigned resource appears in the Assigned To column, followed by the role name in parentheses, such as jsmith(QA Reviewers).

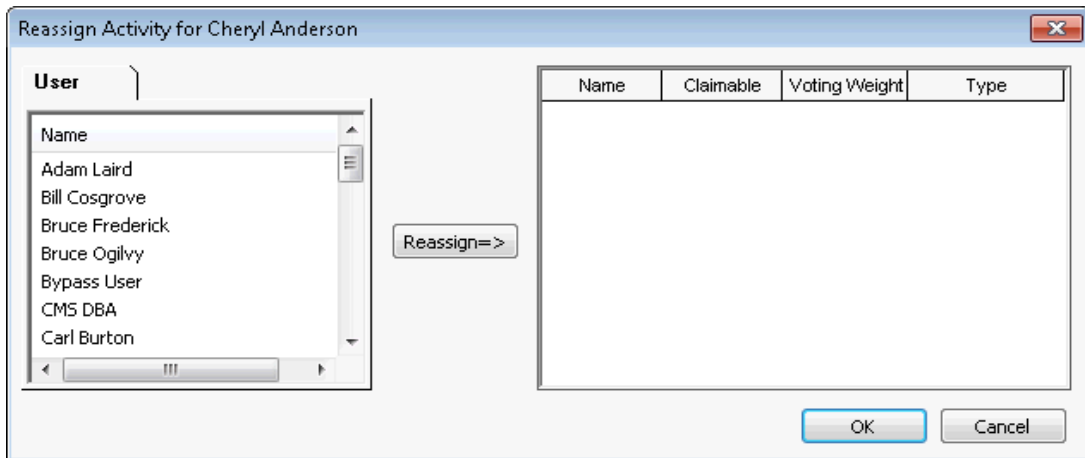


Figure 3-3: Reassign activity window

To reassign an activity assignment On Hold

1. In the Work List window, select the assignment you want to reassign.
2. Click **Reassign** on the toolbar or by using the right mouse context menu.
3. In the **Reassign Activity** window, select the **User** tab, and then select the individual user you want to assign to this activity.
4. Click **Reassign** in the middle of the window.
5. Click **OK** when done.

NOTE: Once an activity that is assigned to a group role is On Hold, you can reassign the activity to one user. You cannot reassign the activity to another group.

Claimed assignments to members of an assigned group can be placed On Hold and reassigned to other users.

To reassign any other activity (that is, activities that have not been placed On Hold by a user), see “Having a coordinator or DBA-enabled user reassign any activity” on page 122.

Reassigning a Suspended activity (coordinator procedure)

If you are a coordinator and receive a Suspended activity in your Work List window, you may decide that the appropriate action is to use the Reassign feature to assign the activity to some different persons before allowing processing to resume.

To reassign a Suspended activity

1. In the Work List window, select the activity you want to reassign.
2. Click **Reassign** on the toolbar or by using the right mouse button context menu.

3. The **Reassign Activity** window will be displayed for each currently Claimed or On Hold assignment of the activity. (Your ProductCenter administrator may configure workflow so that this window will also be displayed for each group member for an unclaimed group assignment.) In the **Reassign Activity** window, select the User tab, and then select the individual user you want to assign to this activity instead of the user named in the title bar of the window. If you do want to leave the activity assigned to a currently assigned user, click **Cancel**.
4. Click **Reassign** in the middle of the window, then click **OK**.
5. Continue until you have assigned all the users you want to assign to this activity.
6. Take any additional necessary steps, then resume the activity. (See “Resume an Activity” on page 106).

To cancel an activity that is On Hold

An activity cannot actually be cancelled, although a process can be. You can, however, achieve the same result by marking the activity as complete and supplying an appropriate comment. The process then continues normally.

If you want to cancel the entire process, see “Cancelling vs. deleting a process” on page 125.

To cancel an activity that is On Hold:

1. Reassign the activity to yourself (see “To reassign an activity assignment On Hold” on page 117).
2. Select the activity, and then click **Send Forward** to bring up the Electronic Signature window.

NOTE: If your administrator has modified signature requirements with the `cms.admin.EsigOps` resource variable, it is possible that some operations may not prompt for your signature.

3. Type your password and any appropriate comments, such as “Cancelled activity”.
4. If prompted to do so, select the process path and assign the next activity.

NOTE: If other resources are also assigned to the activity, it may be simpler to use the search window to locate the activity and then use the Administrative Send Forward command.

Suspending and activating activities

ProductCenter Workflow includes features that enable a coordinator (or any DBA-enabled user) to suspend any activity or to restart a deadlocked activity. This allows the coordinator to reassign an activity even if a user has not already placed the activity On Hold.

These features are accessible from the Administration menu on the Process Viewer (refer to Figure 3-4).

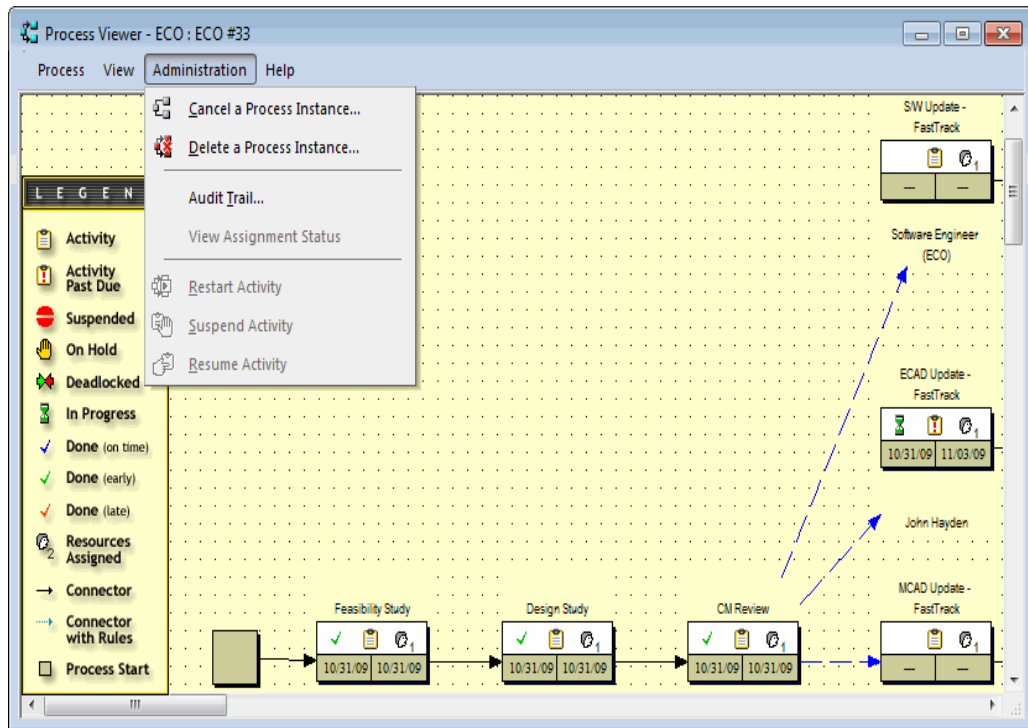


Figure 3-4: Administration menu on Process Viewer

This menu contains the following options:

- **Cancel a process** — removes a process instance but preserves history
- **Delete a process** — removes all information related process instance
- **Audit Trail** — displays history about a process instance
- **View Assignment Status** — displays assignment status given that an activity can be assigned to multiple users
- **Restart Activity** — restarts an activity that was suspended due to a deadlocked situation. This operation will take the selected activity and reset all activity assignments to their initial state of Claimed. All Approved, Disapproved and On Hold assignments will be updated to Claimed. If any of the assignments were from claimable group

assignments then the assignment status will be changed to Unclaimed for all members of the group.

- **Suspend Activity** — puts selected activity into the Suspended state; activity must be Claimed or Unclaimed.
- **Resume Activity** — takes an activity out of the Suspended state for all assignments.

Having a coordinator or DBA-enabled user reassign any activity

After an activity is assigned, only a coordinator or DBA-enabled user can reassign it, using one of two methods.

The coordinator or DBA can use the Process Viewer to suspend an activity and have it appear in the coordinator's Work List where it can be reassigned.

The coordinator or any DBA-enabled user may search for the activity and reassign it from the Search Results window.

NOTE: Once an activity that is assigned to a group is On Hold, you can reassign the activity to one or more individuals. You cannot reassign the activity to another group.

To reassign an activity from Process Viewer (coordinator procedure)

This is the original procedure for reassigning activities that are not already Suspended or On Hold. You may prefer to use the newer procedure described in “To reassign an activity from Search Results (coordinator or DBA procedure)” on page 123.

1. Make sure that you are the coordinator for the process of interest, or a DBA-enabled user.
2. Display the Process Viewer for that process.

3. In the Process Viewer, select the activity you want to reassign.
4. On the **Administration** menu, click **Suspend Activity**.
5. Go to the Work List, select the newly-suspended activity, and click **Reassign** on the toolbar. See “To reassign a Suspended activity” on page 118.

The activity appears On Hold in the Work List of all assigned users.

To reassign an activity from Search Results (coordinator or DBA procedure)


1. Make sure that you are the coordinator for the process of interest, or a DBA-enabled user.
2. Use the **Activities** tab on the Search window to identify the activity you wish to reassign. See “To find a Workflow process instance or activity” on page 175 for details about using the Workflow options on the Search window.
3. In the Search Results window, select the activity you wish to reassign, and click **Reassign** on the **Workflow** menu or by using the right mouse button context menu.
4. The **Reassign Activity** window will be displayed for each currently Claimed or On Hold assignment of the activity. (Your ProductCenter administrator may configure workflow so that this window will also be displayed for each group member for an unclaimed group assignment.) In the **Reassign Activity** window, select the User tab, and then select the individual user you want to assign to this activity instead of the user named in the title bar of the window. If you do want to leave the activity assigned to a currently assigned user, click **Cancel**.
5. Click **Reassign** in the middle of the window, then click **OK**.

6. Continue until you have assigned all the users you want to assign to this activity.

NOTE: In addition to coordinators and DBA-enabled users, users with the reassign screen permission are able to reassign activities from the Activity Search Results window by using the Reassign operation from the toolbar or context menu.

Restarting an Activity

The Restart operation will restart an activity that was suspended due to a deadlocked situation and will reset all activity assignments to the initial state of Claimed or Unclaimed.

The Process Coordinator, in his/her Work List, may Restart an activity by using the Workflow menu, right-click context menu or the Restart  icon. The Process Coordinator or a DBA user may use the right-click context menu to restart an activity in the Activities Search Results window. For additional information see “Restart an Activity” on page 106.

Cancelling vs. deleting a process

Coordinators, DBA-enabled users, and other users with the Cancel Process Instance or the Delete Process Instance screen permissions, respectively, can cancel and delete process instances from the Process Viewer and from the Process Search Results window. Cancelling a process instance stops the process but keeps the workflow information in the ProductCenter database. Deleting a process instance removes the Workflow information about a cancelled or completed process instance from the database. The **Cancel** and **Delete** options for process instances are on the **Process** menu of the Process Viewer. These options are active for only Coordinators, DBA-enabled users, and other users who have the Cancel Process Instance and Delete Process Instance screen permissions. See “Cancelling and deleting process instances” on page 126.

DBA-enabled users and other users who have the Process Editor screen permission can also delete a process definition from the Process Editor, which permanently removes all information about the process. The **Delete** option for process definitions is a button in the Administer Process Definitions window, which is opened by that command in the Process menu of the Process Editor. See “To delete a process definition” on page 48.

Use **Cancel process** (instance) when you want to preserve the workflow information as history. Use **Delete process** (instance) when you no longer have any need to refer to the workflow information. Use **Delete process definition** when you will never again need to issue a form or route an item with that particular process.

NOTE: You cannot get the process information back once it has been deleted, and you cannot restart a cancelled process.

3

Permissions

Coordinators, DBA-enabled users, and other users with the Cancel Process Instance or Delete Process Instance screen permissions can cancel or delete a process instance, respectively. DBA-enabled users and other users with the Process Editor screen permission can delete a process definition.

Restrictions

You can cancel only processes that are Activated or Initiated. You can delete only processes that are Cancelled or Completed. Therefore, to delete an active process instance, you must first cancel it.

You can delete only a process definition that has no instances. As noted on the previous page, **Delete Process Definition** is one button in the Administer Process Definitions window, and that window displays all the definitions. One column in that window shows how many instances there are, so you can avoid trying to delete definitions that have instances. An error message will be presented when attempting to delete definitions that have instances.

Cancelling and deleting process instances

To cancel a process instance

1. In the Process Viewer, select **Cancel a Process Instance** from the **Administration** menu. This command is also available in the Process Search Results window from either the Workflow menu or right-click context menu. This option is inactive if you are neither a DBA user, nor a user with the Cancel Process Instance screen permission, nor the Coordinator of the process that is displayed in the Process Viewer.

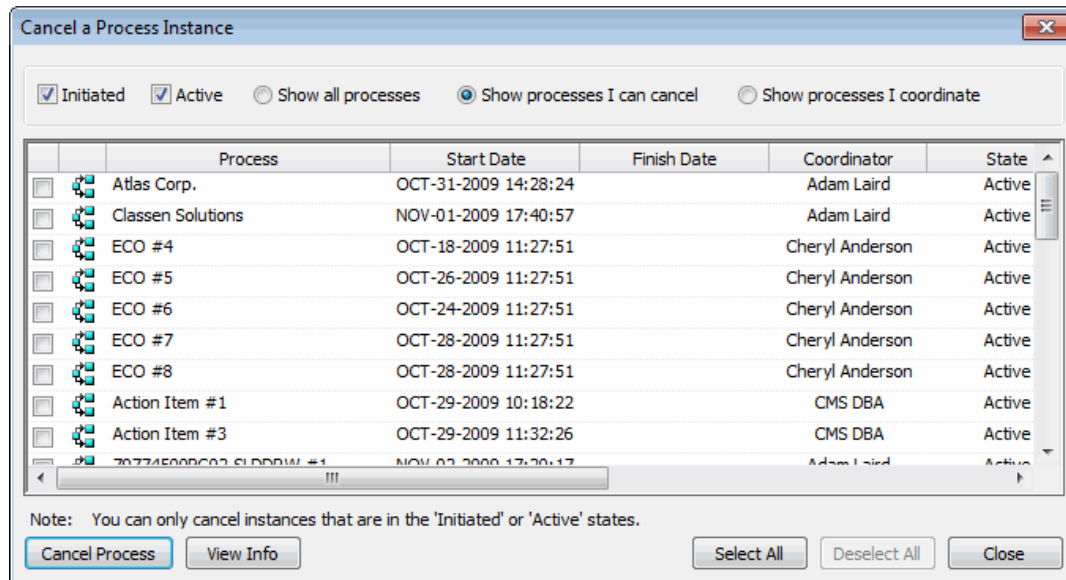


Figure 3-5: Cancel window

2. Filter the contents of this window by selecting or deselecting the checkboxes labeled **Initiated** and **Active**. The user may also wish to use the radio buttons for "Show all processes", "Show processes I can cancel", and "Show processes I coordinate" to filter the contents.
3. Check the boxes of the process or processes you want to cancel.
4. Click **Cancel Process**.

See "Cancelling vs. deleting a process" on page 125 for more information.

To delete a process instance

1. In the Process Viewer, select **Delete a Process Instance** from the **Administration** menu. This command is also available in the Process Search Results window from either the Workflow menu or right-click context menu

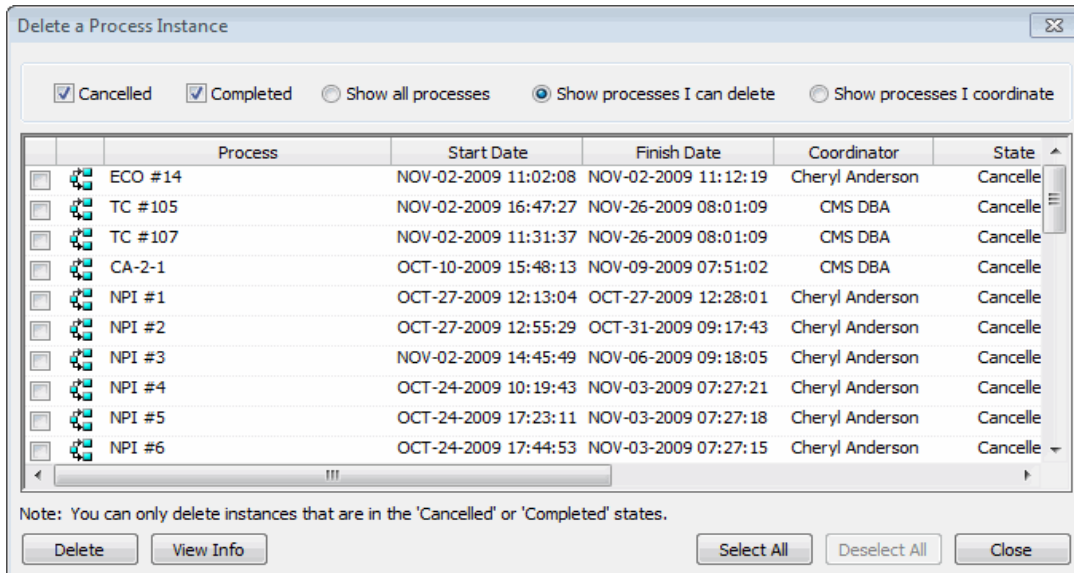


Figure 3-6: Delete window

2. Filter the contents of this window by selecting and deselecting the checkboxes labeled **Cancelled** and **Completed**. The user may also wish to use the radio buttons for "Show all processes", "Show processes I can delete", and "Show processes I coordinate" to filter the contents.
3. Check the boxes of the process or processes you want to delete.
4. Click **Delete**.

See “Cancelling vs. deleting a process” on page 125 for more information.

Chapter 4

Using ProductCenter Workflow

4

Just Ahead:

Using ProductCenter Workflow.	130
Claimable activities	131
Responding to an assigned activity	132
Viewing a process	138
Process Viewer Diagram view	139
The Process Viewer Properties window.	140
The Process Viewer Activity Notebook	146
Process Viewer List view	154
Work instructions	157
The audit trail	158
Starting a workflow process	161
Workflow queries	167
Workflow Reports	176
Reassigning an activity	186
Other Work List window operations	188

Using ProductCenter Workflow

Whether you access Workflow from ProductCenter for Windows or from the Web Client, the procedures you follow are similar.

This chapter focuses on the Windows interface, but most discussions also apply to using the Web Client. See the Web Client User Guide for details specific to that interface.

Claimable and Work List windows

When using Workflow, you use two windows:

- Work List
- Claimable Work

You receive in these windows various activity assignments that require your attention.

Activities assigned to you appear in your Work List window and remain there as long as they are either Claimed or On Hold. Activities that are On Hold also appear in the process coordinator's Work List window.

If an activity is assigned to a group to which you belong but needs to be assigned to a single person, this activity appears in your Claimable Work window until you or somebody else in the group *claims* or takes responsibility for it. It then appears in the Work List window of the assignee.

When you complete an activity, you *send it forward*. If you feel an activity is not ready for you to work on it, you can reject or *send it back* for rework. When you send forward or send back, the activity disappears from your Work List window.

In most cases, you perform one or more of the following procedures in response to these activities:

- Work on the activity, which may include reviewing or creating files and projects associated with the activity.
- Indicate that the activity is complete by *sending it forward*. You may also need to specify who should work on the activity next.
- Indicate that the activity should be rejected by *sending it back* to a previous activity.
- Place an activity *On Hold*. Depending on the circumstances, the responsibility for taking the activity Off Hold may be yours or the coordinator's.

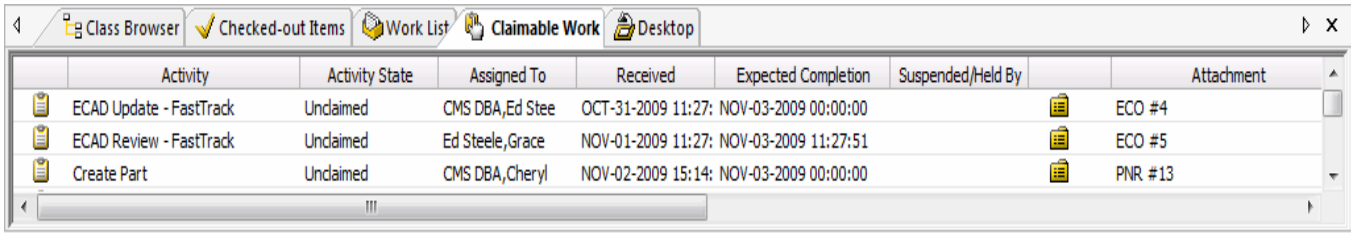
In addition to these procedures, which tend to be responses to activities that appear in your Work List window, you can also *initiate a process* (see “Starting a workflow process” on page 161).

4

Claimable activities

If a process designer assigns an activity to a group, the designer has the option of making that activity **claimable**. When claimable, the activity becomes the exclusive responsibility of the first person to “grab” it.

Unlike unambiguously assigned activities that appear in the Work List windows of the responsible individuals, claimable activities first appear in the Claimable Work window of every user who belongs to the group assigned to the activity.



Activity	Activity State	Assigned To	Received	Expected Completion	Suspended/Held By	Attachment
ECAD Update - FastTrack	Unclaimed	CMS DBA,Ed Stee	OCT-31-2009 11:27:	NOV-03-2009 00:00:00		ECO #4
ECAD Review - FastTrack	Unclaimed	Ed Steele,Grace	NOV-01-2009 11:27:	NOV-03-2009 11:27:51		ECO #5
Create Part	Unclaimed	CMS DBA,Cheryl	NOV-02-2009 15:14:	NOV-03-2009 00:00:00		PNR #13

Figure 4-1: Claimable Work window showing unclaimed activity

When somebody claims the activity, it disappears from everybody's claimable window and appears in the Work List window of the person who claimed it.

If you would like to review the form or file that is attached to an activity that appears in your Claimable Work window before deciding to claim it, you can select the activity and then use the View Info toolbar button, the entries in the Action menu, or the entries in the Attachment sub-menu of the right-click context menu.

To claim an activity

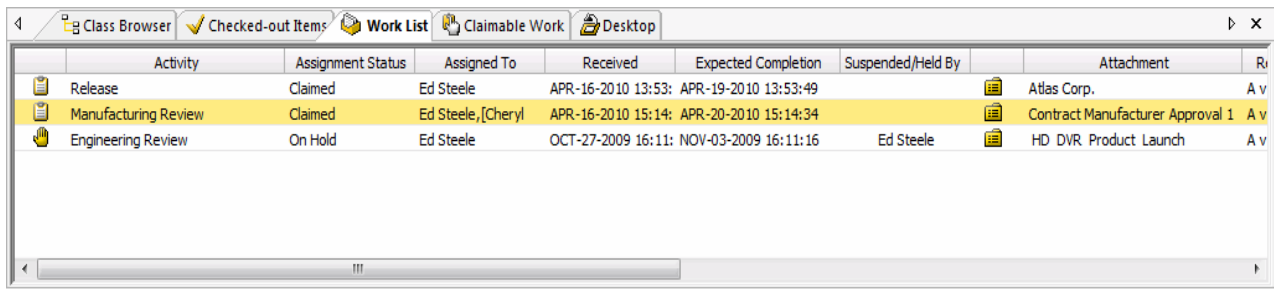
1. In the Claimable Work window, select the activity you want to claim.
2. On the Workflow menu click **Claim**. You may also click the **Claim** button on the toolbar or use the right mouse button context menu.
3. The activity disappears from your Claimable Work window and appears in your Work List window.

Responding to an assigned activity

The Work List window is your primary tool for working with assigned activities. You also can use the Process Viewer for graphical and text representations of the process to which your assigned activity belongs.

Using the Work List window

Any activities assigned to you appear in your Work List window.



The screenshot shows a software window titled 'Work List' with a tabbed interface. The 'Work List' tab is active, displaying a table of assigned activities. The table has columns for Activity, Assignment Status, Assigned To, Received, Expected Completion, Suspended/Held By, Attachment, and a small icon column. Three activities are listed: 'Release' (Claimed, Ed Steele), 'Manufacturing Review' (Claimed, Ed Steele, [Cheryl]), and 'Engineering Review' (On Hold, Ed Steele). Each row has an icon in the Attachment column and a small 'A v' icon in the final column.

Activity	Assignment Status	Assigned To	Received	Expected Completion	Suspended/Held By	Attachment	
Release	Claimed	Ed Steele	APR-16-2010 13:53:	APR-19-2010 13:53:49		Atlas Corp.	A v
Manufacturing Review	Claimed	Ed Steele, [Cheryl]	APR-16-2010 15:14:	APR-20-2010 15:14:34		Contract Manufacturer Approval 1	A v
Engineering Review	On Hold	Ed Steele	OCT-27-2009 16:11:	NOV-03-2009 16:11:16	Ed Steele	HD DVR Product Launch	A v

Figure 4-2: Work List window showing assigned activity

Of particular interest in the Work List window are the **Attachment** and **Assigned To** columns. The **Attachment** column shows the file or form attached to this activity. You can move this attachment to your Desktop where you can view or modify it as required by the assigned activity. You can also use the Action menu, toolbar buttons or right mouse button Attachment menu in this window to view or modify it.

The **Assigned to** column provides a feature for displaying the names of multiple assignees. Click in the **Assigned to** field, and if more than one resource is assigned to the activity, ProductCenter Workflow displays a menu showing the resource names as shown in Figure 4-3. To also see the status of the assignment to each resource, use the Assigned status entry in the Workflow or right mouse context menu.

“Undefined assignment” indicates an activity assigned to a role that is not yet filled. This appears in the Assigned To column and could also arise from assignment of an activity to the bypass user. See “Reassigning an activity assignment On Hold (coordinator procedure)” on page 116.

4

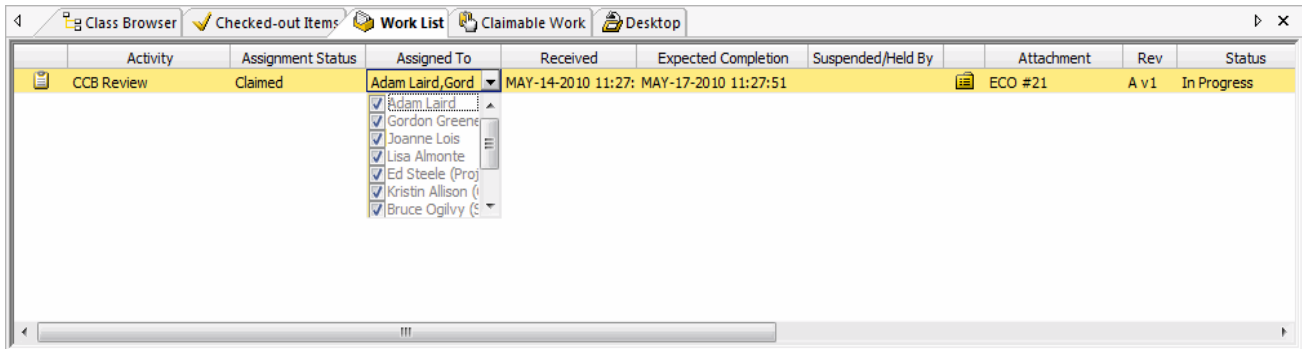


Figure 4-3: Multiple assignment feature of Assigned to column

There is a Suspended/Held By column, which shows the name of the user who suspended the activity or placed an activity assignment On Hold, causing it to appear in the coordinator's Work List. (See “Dealing with activities that are On Hold” on page 115.) This column will be blank when the activity is not suspended and the current user's assignment is not On Hold.

When you are in the Work List window, ProductCenter provides several icons in the toolbar. For a complete listing see “Work List toolbar” on page 22.

Sending an activity forward

When you complete an activity, you need to let ProductCenter Workflow know that you are done so it can remove the activity from your Work List window and move it to the next stage of its lifecycle.

To send an activity forward

1. Select the activity in your Work List window.
2. Click **Send Forward** in the toolbar or right click Send Forward. **Send Forward** may also be selected from the Workflow menu.

3. When ProductCenter displays the Electronic Signature window, type your ProductCenter User ID and Password as your electronic signature. The password appears only as stars.

The E-Sig dialog will display the operation, item name and any additional information to clarify which item will be processed. In addition, if you had selected multiple items, activities, processes or users then the E-Sig dialog will clearly indicate that you are processing more than one item, activity, process or user.

NOTE: If your administrator has modified signature requirements with the **cms.admin.EsigOps** resource variable, it is possible that some operations may not prompt for your signature.

If the **cms.ESigComments** resource is set to a value of none then the Comments text box will not be displayed.

4

Electronic Signature

Please provide your authorization for this operation:

Operation: Send Forward
Activity: CCB Review
Attachment: ECO #23

Signature

User ID: esteele
Password: *****
Comment: (optional)

OK Cancel

Figure 4-4: Electronic signature window

4. Optionally, type any activity-related comments you want to add to the information stored about the process. We recommend that you always provide an informative comment, as such information becomes valuable later should the process require the coordinator's attention. These comments appear in the audit trail.
5. Click **OK**.

You may be requested to fill a role assignment for the next activity. If so, a resource assignment window appears. Specify the resource, or follow the prompts to have the process coordinator assign the resource.

Sending back an activity

You may occasionally need to send a process back to an activity that was performed earlier. For example, you may decide that a document needs additional work before you can approve it. Although you specify to which point you think the activity should be sent back, Workflow may send the activity back to a different point, or may not send it back at all if Voting Weights are enabled. Note that Workflow will only allow you to specify where to send it back if it is in fact going to send it back there now. See on for more information.

To send back an activity

1. Select the activity in the process you want to reject.
2. Click **Send Back** on the toolbar or right click Send Back. Send Back may also be selected from the Workflow menu.
An Electronic Signature window appears.
3. Type your ProductCenter password and any appropriate comments, such as the reason why you are rejecting the activity. Click **OK**.

NOTE: If your administrator has modified signature requirements with the `cms.admin.EsigOps` resource variable, it is possible that some operations may not prompt for your signature.

4. To find how far back to send the activity, ProductCenter Workflow presents a list of previously completed activities. You must choose one of these activities to be restarted.

NOTE: If you have passed through this activity before in a loop, it is possible that you see future activities in the list of activities to which you can send back. Also, if you have parallel paths and send back to a point prior to the branch node, you could have multiple activities active during your second pass.

4

Reassigning an activity (user procedure)

When you receive an activity in your Work List window, you may decide that the appropriate action is to pass it on to a different person. If the Reassign screen permission has been enabled, then you may select Reassign using either the toolbar, Workflow menu or right mouse button context menu. If the Reassign permission has not been enabled then only the coordinator can reassign an activity. The activity should be put On Hold and a request added in the comment field for the coordinator. See “Placing an activity assignment On Hold” on page 188. The coordinator uses a special version of the Assignment window to reassign the activity. See “Reassigning an activity assignment On Hold (coordinator procedure)” on page 116.


Viewing a process

ProductCenter provides a graphical tool called the Process Viewer for examining the process to which your assigned activity belongs. This viewer resembles the Process Editor (see “Understanding the Process Editor” on page 28) that workflow designers use to create processes, but provides different features and does not permit changes to be made to the process or activities.

NOTE: The **Administration** menu on the Process Viewer provides access to some special functions that are available only to the Coordinator for the process. While the Audit Trail (View Comments) and View Assignment Status options on this menu are available to all users (see “The audit trail” on page 158), the other functions on this menu remain inactive unless you are the Coordinator. See “Suspending and activating activities” on page 120 and “Cancelling vs. deleting a process” on page 125 for more information.

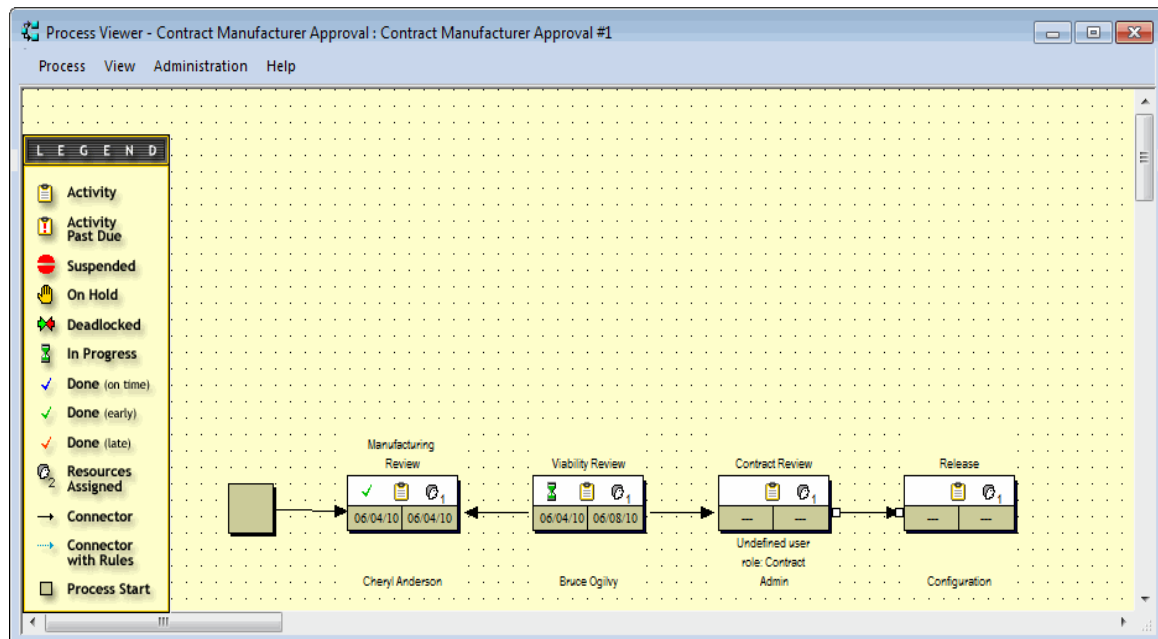
Like the Process Editor, the Process Viewer provides a Diagram view and a List view for displaying information.

To display the Process Viewer

1. In your Work List window, select the activity whose process you want to view.
2. Click **View Process** by using either the toolbar (), Workflow menu or right mouse button context menu.
3. Select **Diagram** or **List** from the **View** menu to toggle between the two views.

Process Viewer Diagram view

The Diagram view provides a graphical representation of the process to which your assigned activity belongs. This view is not editable although you can temporarily rearrange the position of objects by dragging and dropping them. Refer to Figure 4-5.



4

Figure 4-5: The Process Viewer Diagram view

The plain box to the left is called the *Start object* and represents the starting point of the process. The other boxes represent activities. Each activity box contains a great deal of information about the activity, including start and completion dates, assigned resource, and state of the activity.

The Legend in the lower left corner of the Diagram view explains most conventions, but completed activities (those displaying a checkmark) show actual dates, while In Progress activities (those displaying an hourglass) show actual start

dates but estimated completion dates (estimated from the Duration value provided by the designer who defined the process).

You can display a read-only version of the Process Properties window by double-clicking the Start object (see “Understanding the Properties window” on page 59 for more information about the Process Editor version of the Properties window). Although this version of the Properties Window is read-only, you can set grid display options with the Display Settings tab (see “Process Viewer Properties window: Display Settings tab” on page 142).

You can display a read-only version of the Activity Notebook by double-clicking any activity (see “Understanding the Activity Notebook” on page 68 for information about the Process Editor version of this notebook).

The Process Viewer Properties window

The Properties window displays information about the overall process, and allows you to specify or modify certain attributes. (Contrast this to the Notebook which displays information about an individual activity. See “Understanding the Activity Notebook” on page 68 and “The Process Viewer Activity Notebook” on page 146 for more information.)

This Process Viewer version is read-only except for display settings. Administrators have access to an editable version in the Process Editor.

The Properties window consists of the following tabs:

- General
- Branch Rules
- Display Settings
- Operations
- Permissions

Process Viewer Properties window: General tab

The **General** tab displays basic information such as process name and who is assigned as coordinator.

The screenshot shows the 'Process Properties' dialog box with the 'General' tab selected. The fields are as follows:

Field	Value
Process name:	ECO
Description:	Engineering Change Process
Coordinator:	Cheryl Anderson
Modified By:	CMS DBA
Default class:	CMS:Change Items:ECO

At the bottom right are 'OK' and 'Cancel' buttons.

Figure 4-6: Properties General tab

The **General** fields are not editable. If a value appears in the **Default class** field, this is a form-based process. If this field is blank, this is a route-based process. See “Route-based and form-based processes” on page 5 for more information. As a note, the "Process name" shown in Figure 4-6, is the name

of the process definition, not the name of the process instance that you are viewing.

Process Viewer Properties window: Branch Rules tab

The **Branch Rules** tab looks identical to the tab of the same name in the Activity Notebook.

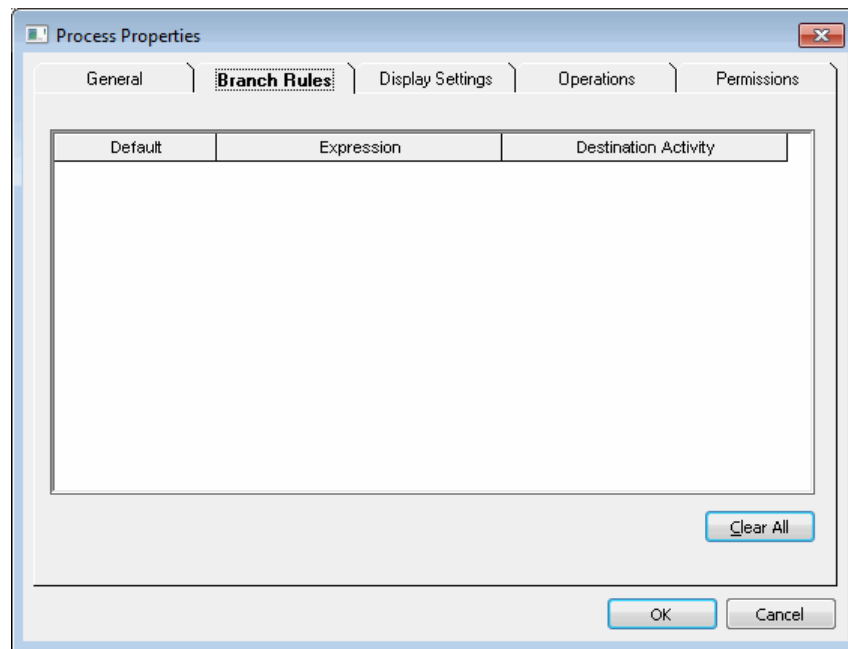


Figure 4-7: Properties Branch Rules tab

However, this tab applies specifically to the **Start object**. That is, it determines which activity or activities the process starts with, if it starts with more than one activity in parallel. If only one starting activity exists, this tab remains blank. You cannot edit the Process Viewer version of this tab.

Process Viewer Properties window: Display Settings tab

The **Display Settings** tab provides control over the size and appearance of the work area.

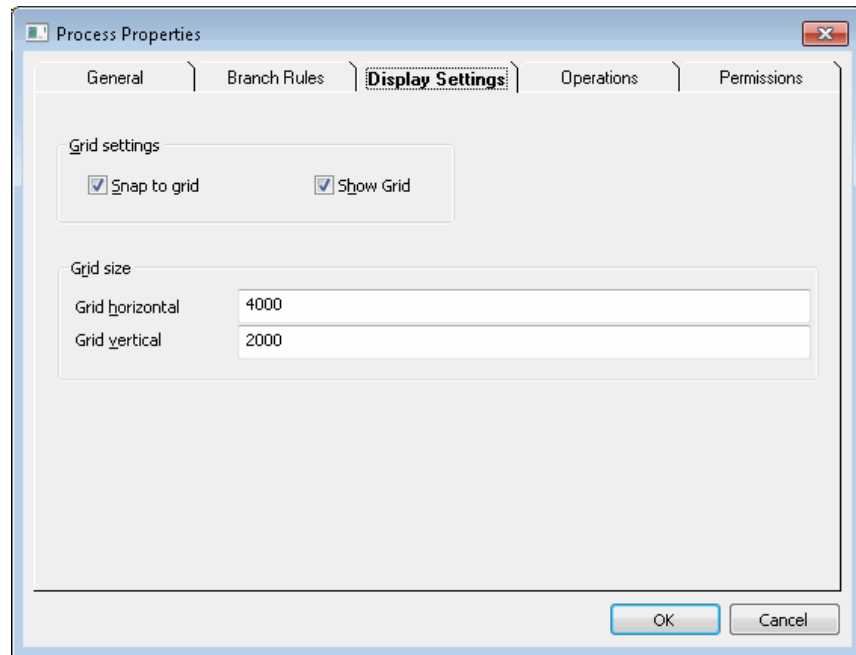


Figure 4-8: Properties Display Settings tab

The **Display Settings** tab is the only tab that you can edit from the Process Viewer. You can control the appearance and behavior of the grid.

To use the Display Settings tab in the Viewer

1. Double-click on the Start object.
2. Select the **Display Settings** tab.
3. To enable the display of grid points in the work area, click the **Show grid** checkbox.
4. To cause activities and connectors to be positioned exactly over grid points when adding and moving, click the **Snap to grid** checkbox.

NOTE: You do not need to display the grid to snap to it. And although you may temporarily reposition activities in the Process Viewer, you cannot change the actual flow of the process.

- To change the size of the work area, enter values in pixels in the fields labeled **Grid horizontal size** and **Grid vertical size**. Workflow displays a fixed-size grid within the area specified.

Process Viewer Properties window: Operations tab

The **Operations** tab allows you to examine the scripts and arguments that execute at the beginning (pre-operation) or completion (post-operation) of a process.

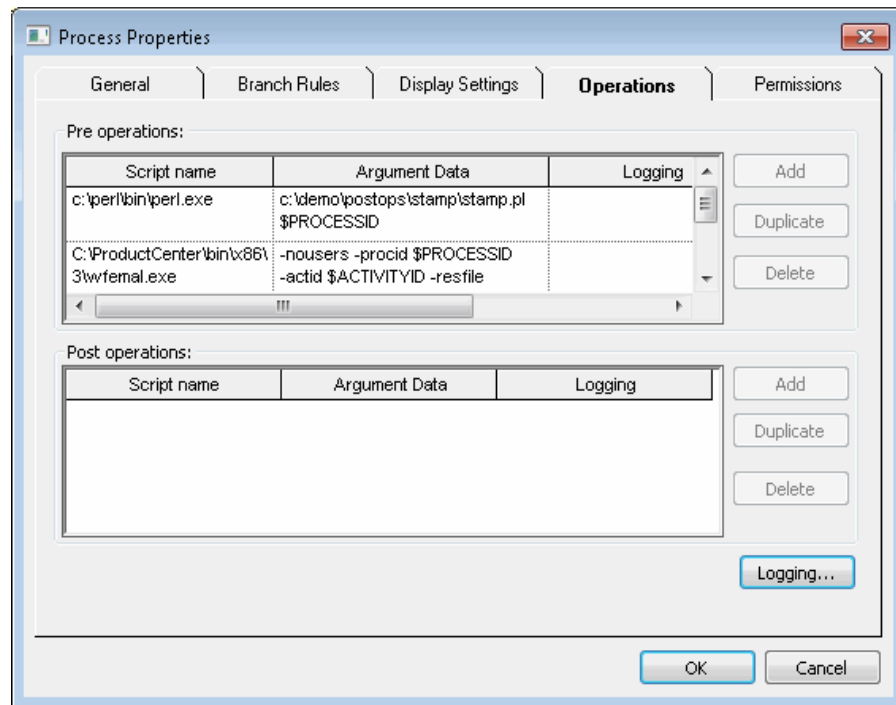
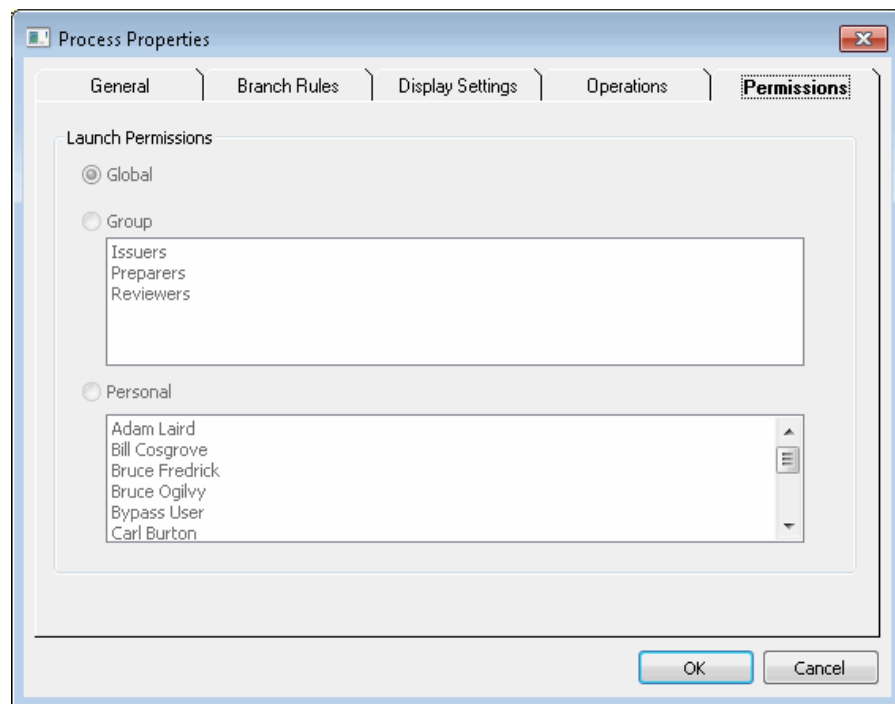


Figure 4-9: Process Viewer Properties Operations tab

The Process Viewer version of the **Operations** tab does not allow you to edit operations. See “To use the Operations tab” on page 64 for information about editing operations. You can also edit and view post-operations for activities. See “To use the Post-operations tab” on page 71 for editing, and “To use the Post-operations tab” on page 152 for viewing activity post-operations.

Process Viewer Properties window: Permissions tab

The **Permissions** tab allows you to review the list of users or groups that have launch permission for the definition of the current process.



4

Figure 4-10: Process Viewer Properties Permission tab

The Process Viewer Activity Notebook

The Activity Notebook displays all information about the activity. In the Process Viewer you cannot enter any information into the Activity Notebook; it appears in a read-only state and simply provides a way to examine all information about an activity. Process designers have access to an editable version of this same notebook and use it in the Process Editor to design process activities (see “Understanding the Activity Notebook” on page 68).

The Activity Notebook in the Process Viewer consists of the following tabs:

- **General**
- **Status**
- **Dependencies**
- **Post-operations**
- **Branch Rules**

Like the Properties window (see previous section), the Activity Notebook is resizable by clicking and dragging the corners or edges of the window.

To use the Notebook's General tab


1. Place the cursor over an activity and double-click to display a read-only version of the Activity Notebook.
2. Ensure that the **General** tab is displayed.

The screenshot shows the 'Activity Notebook' dialog box with the 'General' tab selected. The fields are as follows:

- Activity name:** CM Review
- Work instructions:** Perform Configuration Review. Ensure proper data package exists.
- Assignee(s):** Configuration Mgr (ECO) (with a people icon)
- Estimated duration:** 1 days
- Done threshold:** 0
- Back threshold:** 0

At the bottom right are 'Ok' and 'Cancel' buttons.

Figure 4-11: Activity Notebook General tab

3. The **Activity name** field displays the name of the activity.
4. The **Work instructions** field displays any directions that the process designer decided you might need to perform this activity. You can also view this text by right-clicking over the activity in Work List. See “Work instructions” on page 157 for more information.
5. **Done threshold** and **Back threshold** determine when to promote or reject this activity. They are explained in “Voting weights and thresholds” on page 34 and “To specify Voting Weight and Thresholds” on page 78.
6. The **Assignee(s)** field shows the resource or resources who have responsibility for this activity. To view all available resources, click the people icon () next to the **Assignee(s)** field. This displays a read-only version of the Assignment window (see “Assigning a resource to an activity” on page 75.)

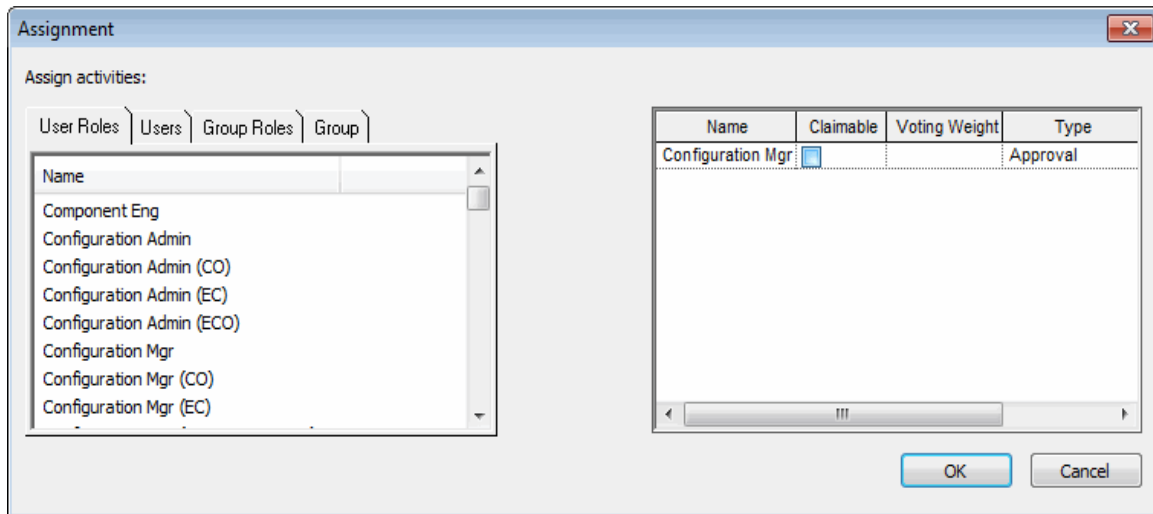


Figure 4-12: Viewer version of Assignment window

This version of the Assignment window does not provide buttons in the middle of the window for assigning and removing resources to the activity. Click the **User Roles**, **Users**, **Group Roles**, and **Group** tabs to view all potential candidates that could be assigned to this activity. To make such assignments, you need to have administrator rights that give you access to the Process Editor Activity Notebook (see “Assigning a resource to an activity” on page 75).

7. The **Estimated duration** field on the **General** tab shows the number of days that the process designer specified that it would take to complete this activity. ProductCenter uses this value to calculate estimated completion dates.
8. Click **OK** when done.

To use the Status tab

1. Place the cursor over an activity and double-click to display a read-only version of the Activity Notebook.
2. Select the **Status** tab.

The screenshot shows the 'Activity Notebook' window with the 'Status' tab selected. The fields are as follows:

Field	Value
State:	Completed
Started on:	MAY-12-2010 11:27:51
Completed on:	MAY-14-2010 11:27:51
Estimated:	MAY-14-2010 11:27:51
Estimated duration:	1 days

Buttons: Ok, Cancel

Figure 4-13: The Process Viewer Activity Notebook, Status tab

3. The **State** field shows the current state of the activity. See “States” on page 8 for more information.

NOTE: If this field and most others on this tab are blank, the activity has not yet been activated. That is, other activities must be completed before work begins on this one.

4. The **Started on** field shows the date that this activity first appeared in a Claimable or Work List window. This field shows the same value as the **Initiated** field in the Process Viewer List view and the **Received** field in the Work List.

5. The **Completed on** field shows the actual completion date. That is, the date that the activity was sent forward or backward.
6. The **Estimated Duration** time shows the number of working days that this task takes to complete as specified by the process designer.
7. The **Estimated** field shows the estimated completion date, based on the **Started on** value plus the **Estimated Duration** value. This calculation assumes a normal Monday through Friday work week.

To use the Dependencies tab

1. Place the cursor over an activity and double-click to display a read-only version of the Activity Notebook.
2. Select the **Dependencies** tab.

The screenshot shows the 'Activity Notebook' window with the 'Dependencies' tab selected. The window has a title bar with a close button. Below the title bar are five tabs: 'General', 'Status', 'Dependencies' (selected), 'Post-operations', and 'Branch Rules'. The main content area is divided into two sections: 'Predecessors' and 'Successors'. The 'Predecessors' section has two radio buttons, 'Merge all' and 'Merge one', with 'Merge all' selected. Below these is a table with two columns: 'Activity name' and 'Resource'. The table contains one row: 'Design Study' and 'Project Engineer'. The 'Successors' section has a table with two columns: 'Activity name' and 'Resource'. The table contains four rows: 'ECAD Update - FastTrack' with 'ECAD', 'CCB Review' with 'Configuration Mgr, Software Engineer (E', 'MCAD Update - FastTrack' with 'MCAD', and 'S/W Update - FastTrack' with 'Software Engineer (ECO)'. At the bottom right of the window are 'Ok' and 'Cancel' buttons.

Activity name	Resource
Design Study	Project Engineer

Activity name	Resource
ECAD Update - FastTrack	ECAD
CCB Review	Configuration Mgr, Software Engineer (E
MCAD Update - FastTrack	MCAD
S/W Update - FastTrack	Software Engineer (ECO)

Figure 4-14: Activity Notebook Dependencies tab

3. In the **Predecessors** pane, you can view the activity or activities that occur immediately before this activity, and see who is assigned to those activities. This pane is blank if this is the first activity in the process.
4. If more than one activity feeds into the current activity, either the **Merge All** or **Merge One** button is set. **Merge All** indicates that all of the active, previous activities must be sent forward before this activity can start. **Merge One** indicates that only one of the previous activities must be sent forward before this activity can start.

For more information about **Merge All** considerations, see “Activities and connectors” on page 32 and “Validating a process” on page 55.

5. In the **Successors** pane you can view the activity or activities (and the resources assigned to complete them) that follow the current activity. This pane is blank if this is the last activity in the process.

To use the Post-operations tab

1. Place the cursor over an activity and double-click to display a read-only version of the Activity Notebook.
2. Select the **Post-operations** tab.

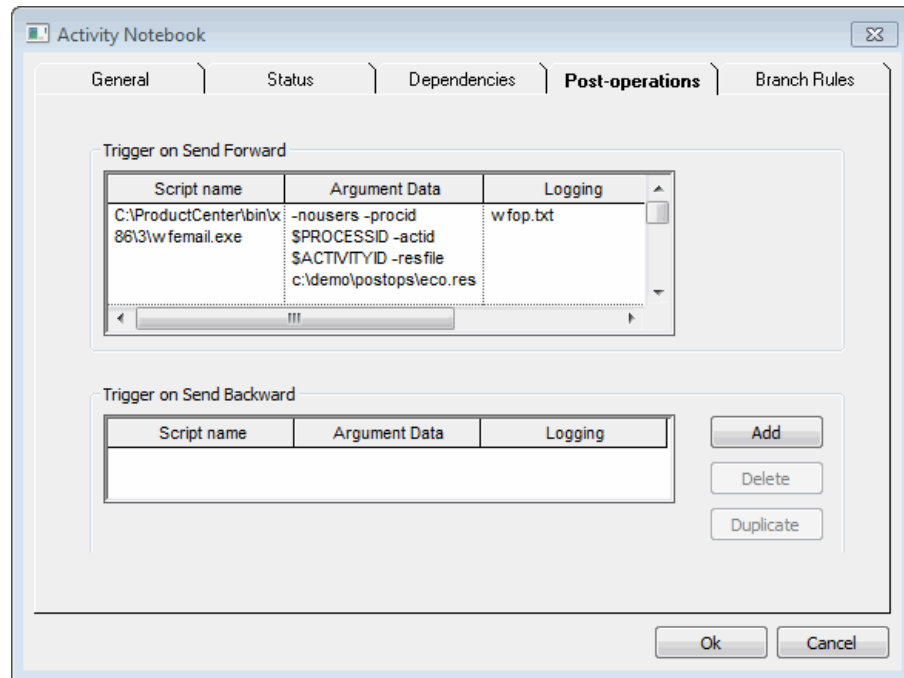
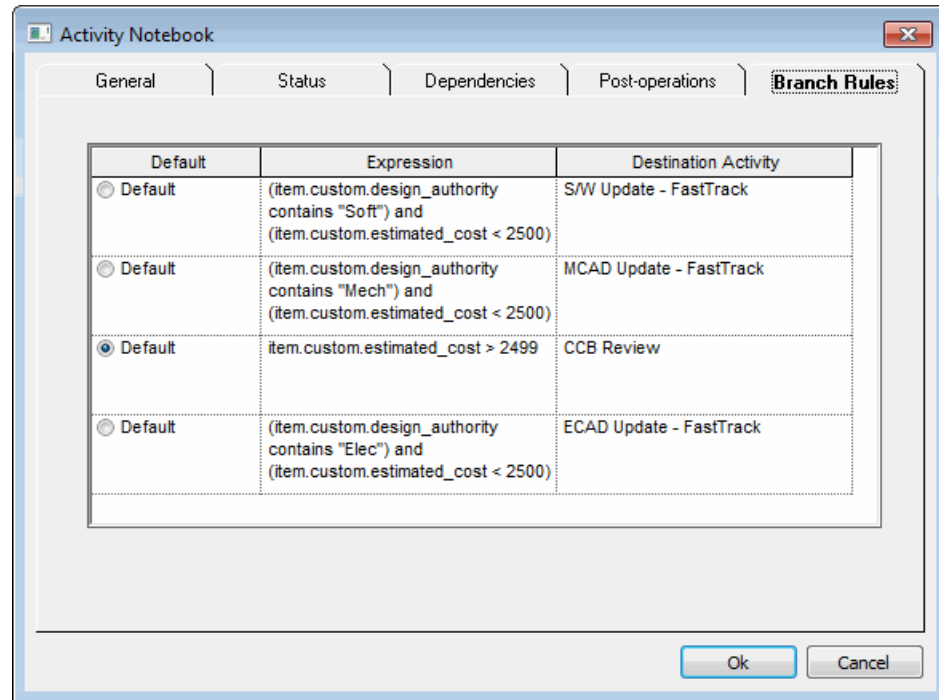


Figure 4-15: Activity Notebook Post-operations tab

3. If any post-operation scripts are defined for this activity, they and their arguments appear in the **Script name** and **Argument data** columns. If the tab is blank, no post-operations are associated with this activity.
- For more information about Post-operations, see “Working with operations” on page 92.

To use the Notebook's Branch Rules tab

1. Place the cursor over an activity and double-click to display a read-only version of the Activity Notebook.
2. Select the **Branch Rules** tab.



4

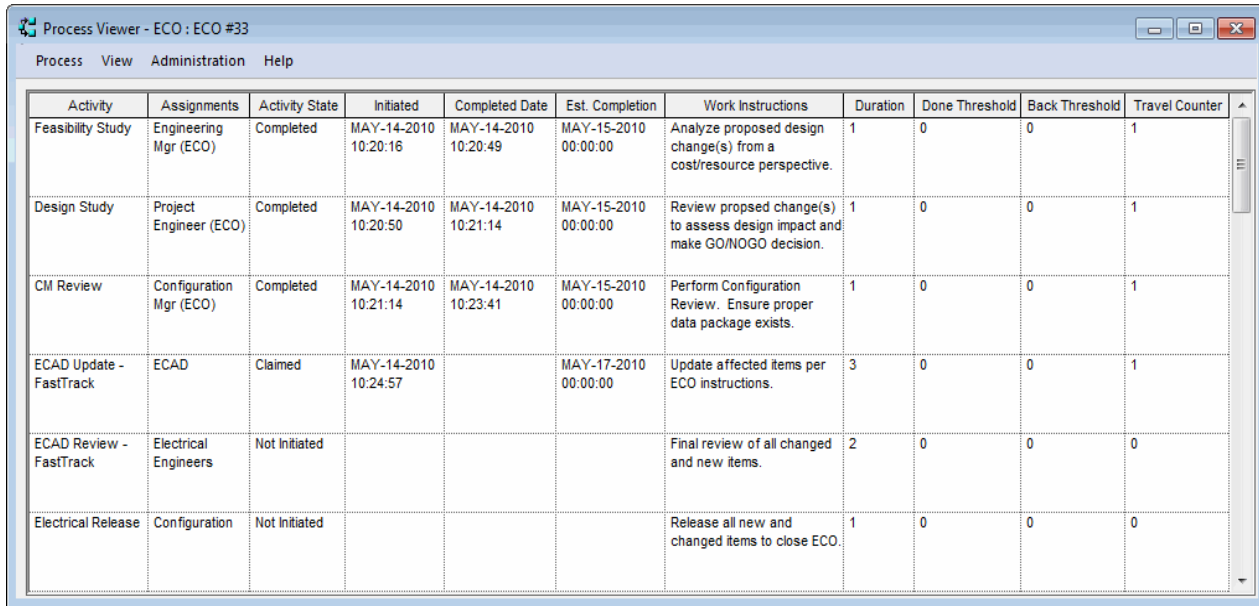
Figure 4-16: Activity Notebook Branch Rules tab

3. If any branch rules exist for this activity, they appear in the Default, Expression, and Destination Activity columns. If these columns are blank, no branch rule was defined for this activity.

For more information about branch rules, see “Working with branch rules” on page 80.

Process Viewer List view

The List view provides a textual representation of the process. This view is not editable.



Activity	Assignments	Activity State	Initiated	Completed Date	Est. Completion	Work Instructions	Duration	Done Threshold	Back Threshold	Travel Counter
Feasibility Study	Engineering Mgr (ECO)	Completed	MAY-14-2010 10:20:16	MAY-14-2010 10:20:49	MAY-15-2010 00:00:00	Analyze proposed design change(s) from a cost/resource perspective.	1	0	0	1
Design Study	Project Engineer (ECO)	Completed	MAY-14-2010 10:20:50	MAY-14-2010 10:21:14	MAY-15-2010 00:00:00	Review proposed change(s) to assess design impact and make GO/NOGO decision.	1	0	0	1
CM Review	Configuration Mgr (ECO)	Completed	MAY-14-2010 10:21:14	MAY-14-2010 10:23:41	MAY-15-2010 00:00:00	Perform Configuration Review. Ensure proper data package exists.	1	0	0	1
ECAD Update - FastTrack	ECAD	Claimed	MAY-14-2010 10:24:57		MAY-17-2010 00:00:00	Update affected items per ECO instructions.	3	0	0	1
ECAD Review - FastTrack	Electrical Engineers	Not Initiated				Final review of all changed and new items.	2	0	0	0
Electrical Release	Configuration	Not Initiated				Release all new and changed items to close ECO.	1	0	0	0

Figure 4-17: The Process Viewer List view

You can use the mouse to adjust the width of any column and the height of any row in this table. That may be especially helpful for reading long work instructions or lists of assigned resources.

The fields in this view include:

- **Activity** — Displays all activities that make up this process instance.
- **Assignments** — Shows all resources (users, groups, or roles) that are assigned to this activity. If the list is too large to fit in the column, click in this field and then

click the resulting drop-down menu to show the complete list of assignments.

- **Activity State** — See “States” on page 8 for a complete list of activity states.
- **Initiated** — Shows the date that the activity appeared in somebody’s Work List.
- **Completed Date** — Shows the date that the activity was sent forward.
- **Est. Completion** — Provides a rough estimate of when various activities should be completed based on the Estimated Duration values specified by the process definition designer. (See “To use the Notebook’s General tab” on page 69 for information about setting this value.)
- **Work Instructions** — Provides a description of what you should do when assigned to this activity. See “Work instructions” below for more information.
- **Duration** — Shows the Estimated Duration for this activity as provided by the process designer when creating the process definition. (See “To use the Notebook’s General tab” on page 69 for information about setting this value.)
- **Done Threshold** — When Vote Weighting is in effect (see “Voting weights and thresholds” on page 34 and “To specify Voting Weight and Thresholds” on page 78), this value represents the point at which the activity can be sent forward. For example, if the Done Threshold = 2 and three assigned resources each have a voting weight of 1, the activity is considered complete when two out of the three assigned resources send it forward.
- **Back Threshold** — Similar to Done Threshold, but applies to sending an activity back. If two or more resources try to send back an activity by the time the Back Threshold is reached, the activity goes back to the

point specified by the last person to perform the send back operation.

- **Travel Counter** — The number of times the process has looped through this activity (see “Loops” on page 42).

Work instructions

The process designer might include directions or *Work Instructions* when defining an activity, to help you understand how to complete the assigned task (see Step 4, “To use the Notebook’s General tab”, on page 70).

You can view these Work Instructions either from the Process Viewer or Work List.

To view Work Instructions

To view Work Instructions from the Process Viewer **Diagram** view:

1. Double-click on the activity of interest to display the Activity Notebook.
2. On the **General** tab, read the text in the Work Instructions field.

Note that you may also view Work Instructions from the Process Viewer **List** view. To do so, click the **List** button at the top of the Process Viewer screen and view the Work Instructions column.

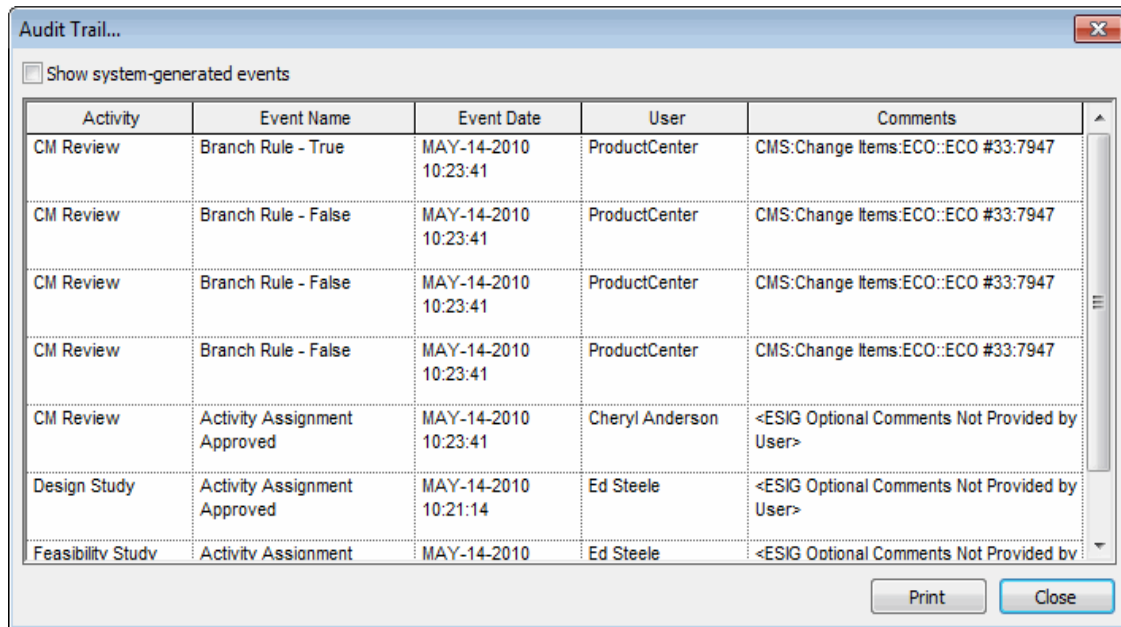
To view Work Instructions from Work List:

1. Select the activity of interest. Ensure that the line is highlighted.
2. Right-click and select **Work Instructions** from the resulting context menu. You may also select Work Instructions from the toolbar or Workflow menu.

4

The audit trail

The Process Viewer provides access to an *audit trail* feature that shows a summary of process history.



The screenshot shows a window titled "Audit Trail...". At the top left, there is a checkbox labeled "Show system-generated events" which is currently unchecked. Below this is a table with five columns: Activity, Event Name, Event Date, User, and Comments. The table contains seven rows of data. The first four rows are for "CM Review" activities, all with "Branch Rule - False" event names, dated "MAY-14-2010 10:23:41", and assigned to "ProductCenter". The comments for these are "CMS:Change Items:ECO::ECO #33:7947". The fifth row is for a "CM Review" activity with an "Activity Assignment Approved" event name, dated "MAY-14-2010 10:23:41", assigned to "Cheryl Anderson", with a comment "<ESIG Optional Comments Not Provided by User>". The sixth row is for a "Design Study" activity with an "Activity Assignment Approved" event name, dated "MAY-14-2010 10:21:14", assigned to "Ed Steele", with the same comment. The seventh row is for a "Feasibility Study" activity with an "Activity Assignment" event name, dated "MAY-14-2010", assigned to "Ed Steele", with the same comment. At the bottom right of the window are "Print" and "Close" buttons.

Activity	Event Name	Event Date	User	Comments
CM Review	Branch Rule - True	MAY-14-2010 10:23:41	ProductCenter	CMS:Change Items:ECO::ECO #33:7947
CM Review	Branch Rule - False	MAY-14-2010 10:23:41	ProductCenter	CMS:Change Items:ECO::ECO #33:7947
CM Review	Branch Rule - False	MAY-14-2010 10:23:41	ProductCenter	CMS:Change Items:ECO::ECO #33:7947
CM Review	Branch Rule - False	MAY-14-2010 10:23:41	ProductCenter	CMS:Change Items:ECO::ECO #33:7947
CM Review	Activity Assignment Approved	MAY-14-2010 10:23:41	Cheryl Anderson	<ESIG Optional Comments Not Provided by User>
Design Study	Activity Assignment Approved	MAY-14-2010 10:21:14	Ed Steele	<ESIG Optional Comments Not Provided by User>
Feasibility Study	Activity Assignment	MAY-14-2010	Ed Steele	<ESIG Optional Comments Not Provided by User>

Figure 4-18: Audit Trail window

The **Activity** column shows the name of the activity. The **Event Name** column shows what occurred within the process and the **Event Date** column shows when it occurred. The **User** column shows the assigned resource for the activity. The **Comments** column shows any notes entered in the electronic signature window when the event occurred, or displays the message “System generated event” if the event happened automatically with no human intervention. You can resize this column to view longer comments.

The Audit Trail records the user ID during the following Workflow events:

- Send Forward
- Send Back
- Put on Hold / Take off Hold
- Claiming an Activity (only when Claimable)
- Reassigning an Activity
- Initiating a Process
- Suspend / Resume Activity
- Cancelling a Process
- Reassigning an Activity

To view the audit trail

You can view the audit trail from the Process Viewer and Work List.

To view the audit trail from the Process viewer:

1. Select **View Comments** from the **Administration** menu on the Process Viewer.
2. Examine the contents of the resulting Audit Trail window. Click and drag the column borders to resize columns as necessary.
3. Optionally, click **Print** to generate a hard copy of this information.
4. Click **Close** when done.

To view the audit trail from Work List:

1. In the Work List, select the activity of interest.
2. Right-click and select **View Comments** from the resulting context menu. You may also select **View Comments** from the Workflow menu or the toolbar.
3. Examine the contents of the resulting Audit Trail window. Click and drag the column borders to resize columns as necessary.
4. Optionally, click **Print** to generate a hard copy of this information.
5. Click **Close** when done.

Starting a workflow process

ProductCenter Workflow provides two kinds of processes:

- **Form-based** — those defined with a specific form, such as an Engineering Change Order or Expense Report. You can think of this as an electronic version of a paper form, and the process by which that form is handled. Form-based processes must be defined with a default project class, not file class.
- **Route-based** — those associated with an existing file or project that needs to be routed for review or other work, such as a CAD drawing that needs to go through a review. These processes are not attached to a predetermined form. Many of the shorter processes, especially those that are applied somewhat generically, are not attached to a new form or project, but rather, apply to an existing one. You can think of this type of process as an electronic routing slip.

The type of processes available at your site depends on how the database administrator has designed them. (Form-based processes are associated with a particular class on the **General** tab of the Properties window in the Process Editor.)

Issue Form displays a list of form-based workflow processes whose definitions have a default project class assigned. The class represents the form associated with this process, and must be a project class, not a file class.

Route selected item displays a list of route-based processes. These process definitions have no default class assigned; you specify at run time what item you want to associate with the process instance.

In both cases the list of processes will be limited based on the permissions assigned to each process definition. Only

those processes that grant launch permission to the current user will be included in the list displayed.

The menu option is disabled if no process definitions of that type exist.

To start a form-based process

1. From the Desktop, Claimable Work, Checked-out Items, Search or Work List window select **Issue Form** from the **Workflow** menu or the toolbar. The Issue Form window appears.

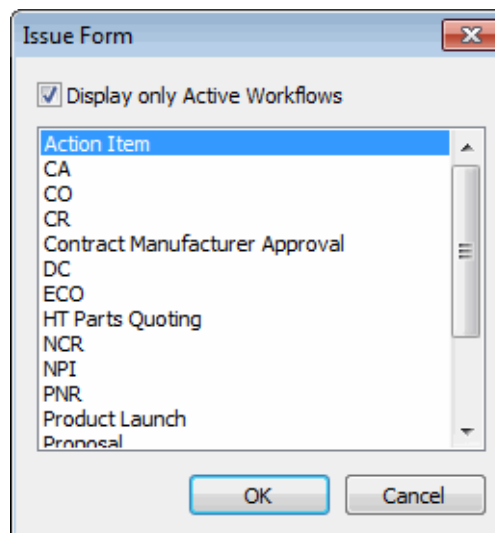


Figure 4-19: Issue Form window

2. If you are the author or editor of inactive processes (that is, processes that are not released for general use) that you wish to view, make sure to clear the check box to add them to the display. Inactive processes always have the text “[TestVnn]” appended to their names.
3. Click on the appropriate workflow process and click **OK**.
4. An Add Project window appears to allow you to enter attribute information in the new form that will be directly attached to the process.

Add Project

Class: CMS:Change Items:NCR

Name: NCR #3 Version: 1

Title: Non-Compliance Report

Preparer: Cheryl Anderson Prepared On: Jun -04-2010 14:34:14

ECO Required: Status: In Progress

Description:

Found During: Incoming Inspection Product Line: CA202

Corrective Action:

Approvals:

Project Engineer: Grace Smith Configuration Mgr: Dave Williams

Last User: Cheryl Anderson Modified On: JUN-04-2010 14:34:14

Change Class... OK Cancel

4

Figure 4-20: Describing a project for a new process

5. Add appropriate information to the form, including the title. The class and name are determined automatically. You may not change the class, but you may change the project name. Enter suitable common attribute, custom attribute, and named links data.

**How ProductCenter
assigns an activity**

The workflow process definition may assign a specific ProductCenter user or group to an activity.

The following information of two alternatives (assign or leave blank) only apply if the role is a custom attribute of the form that is being filled in. Otherwise, there is no choice to make. (The system-defined roles are special cases of this "otherwise" option.) If the process definition assigns a role to an activity, you can:

- Assign a specific group or user to the role when you issue the form, through the form's Attributes window. If the process author made use of the system-defined Preparer or Last User roles, ProductCenter automatically fills these roles at run time
- Leave the assignment blank, and have a user fill in the assignment when sending the previous activity forward. See "To assign an activity when sending forward" on page 191 for more information.

To assign roles when issuing a form

You can assign individual ProductCenter users or groups to specific process roles from the form's Attributes window. If you choose not to do this, users assigned to the activity will be prompted to fill in the role assignment when they send the activity forward. If the role attribute is left blank and users are prompted to fill it, the user/group they pick will not be stored in the attribute. As a result, users will be prompted to fill the role for each activity that is assigned to it - and they are free to fill the same role with different users or groups each time it is used.

1. When you issue the form, the Attributes window for Add Project appears. Click the pull-down menu to the right of **Project Engineer** to bring up a list of users or groups. Note that in this example, "Project Engineer" is the prompt of the role-type attribute that is being filled. Click the pull-down menu to the right of Project Engineer to bring up a list of users or groups. Real

classes are apt to have prompts that better describe the role but do not as clearly guide the user.

4

Figure 4-21: Complete role assignments

2. Select a user or group from this list.
3. Click **OK**.

To start a route-based process

To start a process associated with an existing file or project:

1. From the Desktop, select the item you want to route.
2. Click **Route selected item** from the **Workflow** menu or from the toolbar.

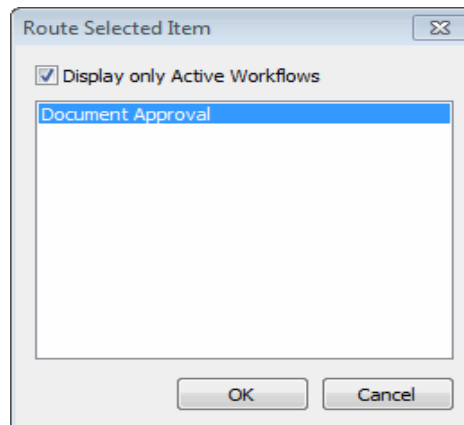


Figure 4-22: *Route Selected Item* window

3. If you are the author or editor of an inactive process (that is, processes that are not released for general use) that you want to view, make sure to clear the check box to display them. Inactive processes always have the text “[TestVnn]” appended to their names.
4. Select the process you want to use to route the item.

NOTE: Route-based processes are separate from form-based processes, which have default classes (forms) assigned to them. The latter do not appear in this list.

5. Click **OK**.

The first activity appears in the Work List of all users assigned to it. If a group is assigned to the activity and the process designer specified that the activity is claimable, the activity appears in the Claimable Work window of all users in that group.

Workflow queries

The standard Search window (see Chapter 3 of the *ProductCenter Windows User Guide*) provides two tabs for performing Workflow-related queries:

- Process Instances
- Activities

In the following discussion, the term “processes” implies process instances rather than process definitions.

NOTE: Queries about activities will not return results unless the activity has been initiated.

Both tabs provide Workflow-specific query criteria. The main difference between the **Process Instances** and **Activities** tabs and the **Items** tab is the lack of a **Form** column (see Figure 4-23).

4

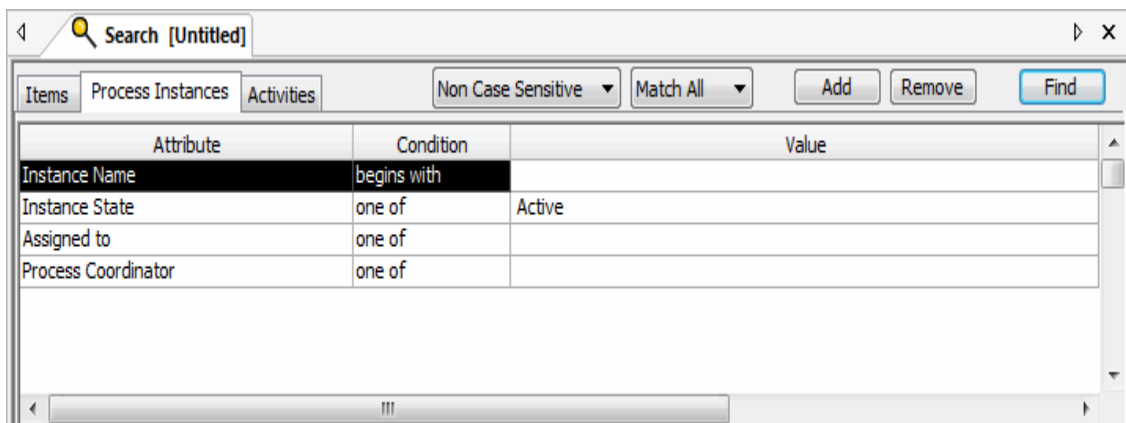


Figure 4-23: Search window showing Process Instances tab

The table below lists the search criteria available for Workflow-related queries, with pointers to information about those criteria.

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Instance Name	begins with ends with contains does not contain exactly is empty is not empty	<p>The implementation of a process definition is defined as the process instance. Enter a search string in the Value column.</p> <p>If the process instance was created by the Windows or Web Client Issue Form command, then the instance name is the same as the name of the form item that was created. This name defaults to the name of the process definition followed by a space, number sign, and a sequentially generated number, but the user who issued the form could enter a different name.</p> <p>If the process instance was created by the Windows or Web Client Route Selected Item command, then the instance name is formed from the name of the file or other item that was routed, followed by a space, number sign, and a sequentially generated number to distinguish the process instance from all other process instances that were active when it was created.</p>
Instance State	one of not one of begins with ends with contains does not contain exactly is empty is not empty	<p>The current status of the process instance. In the Value column, choose from:</p> <p>Initiated Active Cancelled Completed</p> <p>See "States" on page 8</p>

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Assigned to	one of not one of begins with ends with contains does not contain exactly is empty is not empty	<p>A user assigned to the activity, either when the administrator defined the process, or at run time when a user claimed the activity, or when a role was filled. You cannot specify groups or roles.</p> <p>This will match a given user if he/she is a member of a group that was assigned or that filled an assigned group role, or if he/she filled an assigned user role. For claimable group or group role assignments, this is only true if the assignment is currently unclaimed or if the user claimed it.</p> <p>Select one or more users in the Value column</p>
Process Coordinator	one of not one of begins with ends with contains does not contain exactly is empty is not empty	<p>The user specified to be the process coordinator when the process was defined. In the Value column, check the user name(s) to search for.</p> <p>See “Responsibilities of Administrators and Coordinators” on page 104 and “To use the Properties window’s General tab” on page 60</p>

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Process Start Date	before after between on past 24 hours past 7 days past 30 days past year is empty is not empty	<p>The date the process was started by Issue Form or Route Selected item. In the Value column, enter a date in the format specified by cms.date.format (default is MON-DD-YYYY).</p> <p>To enter a value for the Process Start Date you may also use the calendar option by selecting the arrow to the right of the Value row.</p> <p>To enter two dates for the "between" condition the two dates must be separated by the word "and" (not case sensitive). If it is next to a letter (e.g. followed by MON), then there must be a space between them. The space is not required if it is next to a number (e.g. 09/11/01and11/04/08 would be OK if cms.date.format = MM/DD/YY).</p> <p>See the <i>ProductCenter Administrator Guide</i> for more information about cms.date.format. See Chapter 5 of the <i>ProductCenter Windows User Guide</i> For a list of other date formats.</p>
Process Finish Date	before after between on past 24 hours past 7 days past 30 days past year is empty is not empty	<p>The date the process was completed (i.e., the last activity of the process was sent forward).</p> <p>For more info, see "Process Start Date" above.</p>
Activity Name	begins with ends with contains does not contain exactly is empty is not empty	<p>The name assigned to the activity when the process was designed. Enter a search string in the Value column.</p>

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Activity Work Notes	begins with ends with contains does not contain exactly is empty is not empty	The written instructions explaining how to complete the activity. Enter a search string in the Value column. See “Work instructions” on page 157.
Activity State	one of not one of begins with ends with contains does not contain exactly is empty is not empty	The current state of the activity. In the Value column, choose from: Initiated Unclaimed Claimed Cancelled Suspended Completed See “States” on page 8
Activity Start Date	before after between on past 24 hours past 7 days past 30 days past year is empty is not empty	The date the activity was initiated. For more info, see “Process Start Date” above.

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Activity Finish Date	before after between on past 24 hours past 7 days past 30 days past year is empty is not empty	The date the activity was completed (sent forward by the last assignee). For more info, see “Process Start Date” above.
Duration	= < > > = < = not equal between is empty is not empty	An integer specifying the time estimated by the process designer that the assignee(s) would take to complete the activity. See “To use the Notebook’s General tab” starting on page 69.
Assignment Type	one of not one of begins with ends with contains does not contain exactly is empty is not empty	Approval Informational

Table 4-1: Workflow search criteria

Attribute:	Conditions	Description
Assignment Status	one of not one of begins with ends with contains does not contain exactly is empty is not empty	Unclaimed Claimed Approved Disapproved On Hold Cancelled
Assignee Comment	begins with ends with contains does not contain exactly is empty is not empty	Text entered by assigned user when sending an activity forward or back.

Process instances and activities returned by your query are presented in a Search Results window (see Figure 4-24).

4

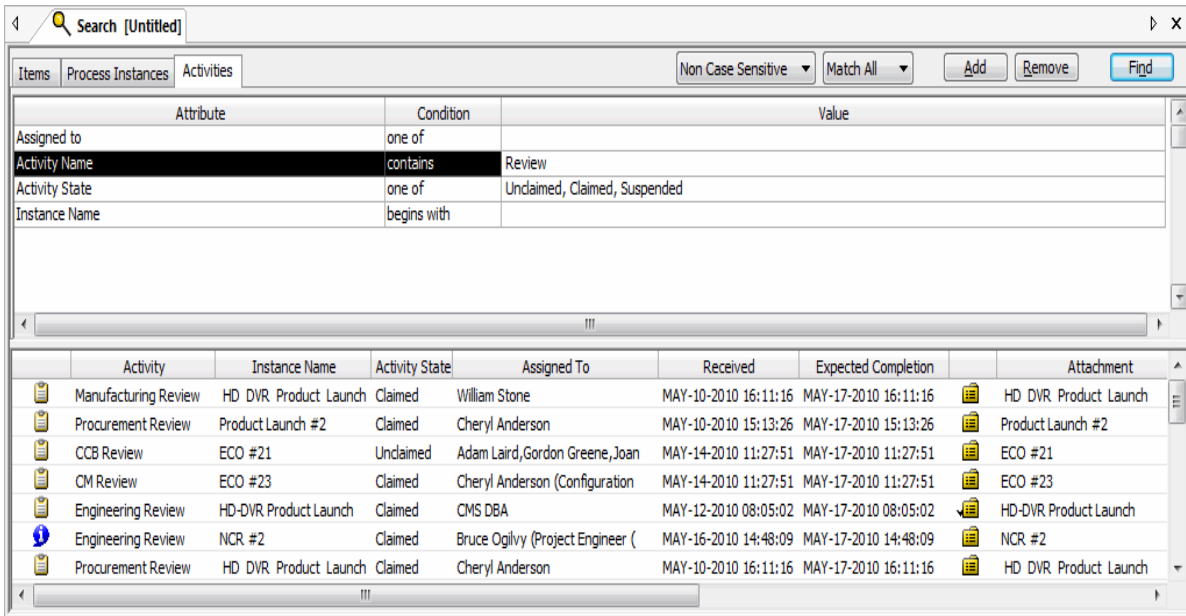


Figure 4-24: Workflow search results

This is similar to the item Search Results window described in Chapter 3 of the *ProductCenter Windows User Guide*, but the columns correspond to the process or activity attributes. Toolbar buttons and context menu items for individual processes in the result set are also specific to process searches.

The available functions include all the functions available from the combination of the Work List and Claimable Work windows. This includes all the attachment functions.

Administrative commands, which are available in Search Results windows but not available in either the Work List or Claimable Work windows are as follows.

For process instances:

- Cancel Process
- Delete Process

For activities:

- Administrative Send Forward
- Administrative Send Back

NOTE: If you are the Coordinator or a DBA-enabled user, you may place any or all assignments On Hold that appear in the Search Results window. This causes that activity to be suspended for *all* users assigned to that activity. Users that are not Coordinators or DBA-enabled can place their own assignment On Hold but cannot affect other users' assignments to the same activity from the Search results window. The same applies for taking an assignment Off Hold.

4

To find a Workflow process instance or activity

Note that you cannot search on activities that have not yet been initiated. For example, if you search for the fifth activity of a process instance, and the process has only gotten to the third activity, your search will not return any results.

1. Open the Search window.
2. Select the **Process Instances** or **Activities** tab.
3. In the **Attribute** column, display the Workflow attributes that you wish to use for the search.

(For general Search window procedures, such as adding or removing search criteria, or creating and accessing saved queries, see Chapter 3 of the *ProductCenter Windows User Guide*.)

4. Select an option in the **Condition** column.
5. Select or enter a value in the **Value** column.
6. Click **Find** to run the search.

7. Any returned items are presented in a Search Results windows (see Chapter 3 of the *ProductCenter Windows User Guide*).

Workflow Reports

ProductCenter provides two report utilities for summarizing information about the database:

- SQL reports
- XML reports

Likewise, the reports specifically provided for Workflow data come in both SQL and XML.

For general information about ProductCenter reports, see Appendix B of the *ProductCenter for Windows User Guide*

Generating a Workflow SQL report

ProductCenter provides a predefined SQL report on all currently active processes. In addition, your ProductCenter administrator can install custom database queries to generate process-related reports.

To generate a Workflow SQL report

1. To generate an SQL report select **SQL Report** from the **File** menu while the Desktop is active. The Reports window appears.

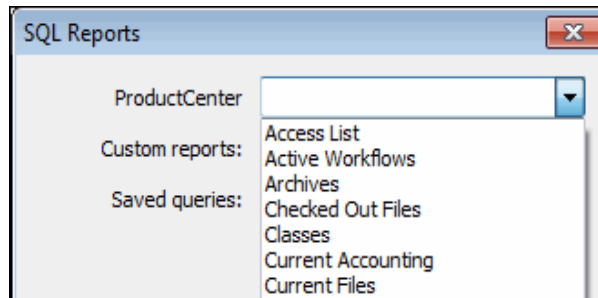


Figure 4-25: *SQL Reports window*

2. To generate the standard Process report, select **Active Workflows** from the **ProductCenter Reports** choice menu.
3. To generate a custom report, make a selection from the **Custom Reports** choice list of custom reports. (Custom reports will only be available if your Administrator has defined them.)
4. Click **OK**.

4

Generating Workflow XML reports

ProductCenter provides XML-based reports that you can access from:

- the **Report** option on the **File** menu
- context sensitive menus wherever items or Workflow process functions are accessible.
- the Workflow Process Viewer

If you cannot see report buttons or menus, check with your administrator to ensure that screen permissions have been set correctly for your account.

The reports are generated in XML and then are formatted by XSL stylesheets. ProductCenter comes installed with several predefined reports and stylesheets, and your system administrator can customize these and also create new ones for custom reports specific to your location. See the

ProductCenter Administrator Guide for information about custom reports.

Reports specific to Workflow are divided into two basic types:

- process specific — All information about a Workflow process is generated in an XML report which is then filtered by an XSL stylesheet. Invoked only in the context of an process, such as from the Process Viewer, Worklist, or Search Results when returning Workflow processes. Process specific reports include activity reports. ProductCenter comes with some predefined activity and audit trail-related process specific reports (see below). Reports about process details must be defined by the administrator using the Report Editor (the *ProductCenter Administrator Guide*).
- process query — Information returned by a saved query for processes is generated in an XML report which is then filtered by an XSL stylesheet. Invoked from the **Reports** option on the **File** menu (or the **Process** menu in the Process Viewer).

The predefined Workflow reports provided with ProductCenter include:

- Activity Detail
- Audit Trail
- Activity Status (state) by User
- Active Workflow Status (state)
- Workflow XML (no stylesheet manipulation)

NOTE: You must use the Report Editor to associate these predefined reports with the Workflow processes developed at your site. Otherwise, your end users will not have access to them. (The only exception is Workflow processes that are in-progress at the time you update your database as part of a ProductCenter upgrade installation. After updating your database, your existing, in-progress Workflow processes are automatically associated with Activity Detail, Audit Trail, and Workflow XML reports.)

To generate a Workflow XML report

You can generate Workflow XML reports in a variety of ways, depending on where you are in the interface.

1. To generate a report about a specific Workflow process, select that process or related item in the Desktop, Search Results window or in the Process Viewer.

To generate a report about Workflow processes in general (“process, query” reports), you do not need to select or open a specific item or process, although it does not matter if you do.

2. Click **Reports**. Depending on where you are, this might be:
 - on the **File** menu when the Work List or Claimable Work window is active
 - context menu (right mouse button click over a Workflow item)
 - on the **Process** menu (in the Process Viewer)
 - the **Reports** button from the Attachment context menu

4

3. In the resulting Reports window (see Figure 4-26), select the radio button to display the available specific or query reports, then select the report you want.

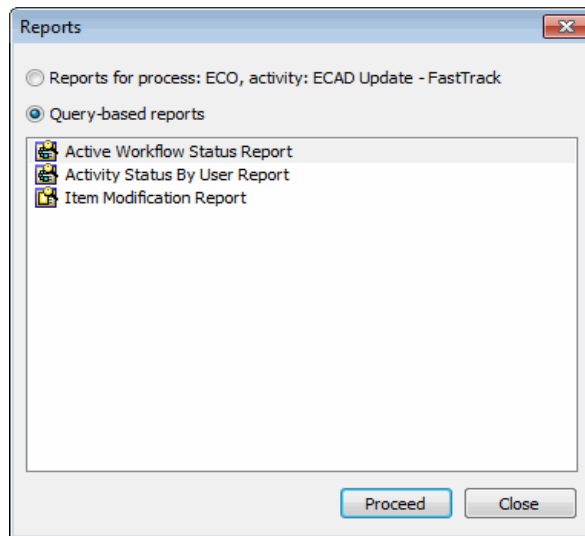



Figure 4-26: Reports window

Note that you will not see any process specific reports if your Administrator has not set them up.

4. Click **Proceed**.
5. The requested report appears in a new window. The appearance of this report can vary greatly depending on how your Administrator has customized the XSL stylesheets. The report in shows the appearance with the a generic stylesheet as delivered with ProductCenter.

Active Workflow Status Report

 SofTech

Report Date: Monday, September 19, 2011

ECO #36- Digital Video Recorder High-Definition Video Upgrade

Activity	Assignee	Status	Assigned Date	Comments	Type
Feasibility Study	Ron James	Approved	09/19/11 15:23:06	<ESIG Optional Comments Not Provided by User>	Approval
Design Study	Adam Laird	Approved	09/19/11 15:24:54	<ESIG Optional Comments Not Provided by User>	Approval
CM Review	Cheryl Anderson	Approved	09/19/11 15:26:03	<ESIG Optional Comments Not Provided by User>	Approval
CCB Review	Scott Holmes	Claimed	09/19/11 15:27:16		Approval
>>>	Adam Laird	Unclaimed	09/19/11 15:27:16		Approval
>>>	Gordon Greene	Unclaimed	09/19/11 15:27:16		Approval
>>>	Joanne Lois	Unclaimed	09/19/11 15:27:16		Approval
>>>	Lisa Almonte	Unclaimed	09/19/11 15:27:16		Approval
>>>	Ed Steele	Claimed	09/19/11 15:27:16		Approval

Figure 4-27: Active Workflow Status Report

NOTE: Workflow XML includes the Activity Start Date in the Julian format to facilitate sorting workflow activities. This can be seen in the stylesheet of the Workflow Activity Status Report.

Administrator notes: Workflow attributes

If you are an administrator setting up custom XML/XSL reports for Workflow users, reference Table 4-2 for a list of Workflow attributes that can be returned by XML reports.

Table 4-2: Workflow attributes available in XML reports

Database table	Attribute	Appears in report?
CMS_WF_DEF (Process Definitions)	ID	Yes
	VERSION	Yes
	ISVALID	No
	NAME	Yes
	AUTHOR	Yes
	COORDINATOR	Yes
	DESCRIPTION	Yes
	CREATION_DATE	Yes
	LASTEDIT_DATE	Yes
	LASTEDIT_PERSON	Yes
	CLASS_NAME	Yes
	SEQUENCE_FORMAT	No
	ISWORKITEM_FIXED	No
	SEQUENCE_SEED	No
	RELEASE_STATUS	Yes
CMS_WF_DEF_TASK_POP		None
CMS_WF_DEF_TASK_TRULE		None
CMS_WF_DEF_TASK (Activity Definitions)	ID	Yes
	WF_DEF_ID	Yes
	NAME	Yes

Table 4-2: Workflow attributes available in XML reports

Database table	Attribute	Appears in report?
	WORK_NOTES	No
	MERGE_TYPE	Yes
	DURATION	Yes
	DONE_THRESHOLD	Yes
	BACK_THRESHOLD	Yes
CMS_WF_DEF_TASK_ASSIGN (Definition Assignees)	WF_DEF_ID	N/A
	WF_DEF_TASK_ID	N/A
	NAME	Yes
	ROLE_NAME	Yes
	GROUP_NAME	Yes
	TYPE	Yes
	CLAIMABLE	Yes
	DONE_WEIGHT	Yes
CMS_WF_DEF_TASK_LINKS	WF_DEF_ID	N/A
	PREV_TASK_ID	Yes
	NEXT_TASK_ID	Yes
CMS_WF_IALL (Process Instances)	ID	Yes
	WF_DEF_ID	Yes
	WORKITEM_ID	Yes
	NAME	Yes

Table 4-2: Workflow attributes available in XML reports

Database table	Attribute	Appears in report?
	COORDINATOR	Yes
	STATE	Yes
	ISWORKITEM_FIXED	No
	THREAD_COUNT	No
	START_DATE	Yes
	FINISH_DATE	Yes
CMS_WF_IALL_TASK (Activity Instances)	ID	Yes
	TASK_DEF_ID	Yes
	WF_INS_ID	Yes
	WORKITEM_ID	N/A
	WORK_NOTES	duplicated
	NAME	Yes
	DONE_THRESHOLD	Yes
	BACK_THRESHOLD	Yes
	STATE	Yes
	ESTIMATED_DURATION	duplicated
	EXPECTED_COMPLETION	Yes
	START_DATE	Yes
	FINISH_DATE	Yes
	MERGE_TYPE	duplicated
	ISWORKITEM_FIXED	duplicated
	THREAD_ID	No

Table 4-2: Workflow attributes available in XML reports

Database table	Attribute	Appears in report?
CMS_WF_IALL_TASK_LINKS	WF_INS_ID	N/A
	PREV_TASK_ID	Yes
	NEXT_TASK_ID	Yes
CMS_WF_IALL_TASK_ASSIGN (Assignments)	ID	No
	WF_INS_ID	N/A
	WF_INS_TASK_ID	N/A
	NAME	Yes
	GROUP_NAME	Yes
	TYPE	Yes
	CLAIMABLE	duplicated
	DONE_WEIGHT	Yes
	STATUS	Yes
	COMMENTS	Yes
	ROLE_NAME	Yes
CMS_WF_AUDIT_LOG	ID	Yes
	EVENT_NAME	Yes
	WF_INS_ID	N/A
	WF_INS_TASK_ID	Yes
	WORKITEM_ID	N/A
	EVENT_DATE_TIME	Yes

Table 4-2: Workflow attributes available in XML reports

Database table	Attribute	Appears in report?
	COMMENTS	Yes
	USER_NAME	Yes

Reassigning an activity

ProductCenter Workflow provides several different methods for reassigning an activity, depending upon the privileges of the user and the state of the activity. The various procedures are discussed in different sections of this documentation, and are summarized in the table below.

Table 4-3: Procedures for reassigning activities

Who can reassign:	What kind of activity:	Where:	Description:
End user	Current activity	Work List	End users with no special privileges have one option: to place their current activity on hold and have the Coordinator reassign the activity. This procedure is described in “Reassigning an activity (user procedure)” on page 137.
Coordinator	On-hold activity	Coordinator’s Work List	When an end user places an activity on hold, the activity appears in the Work List of the Coordinator, who can then reassign the activity. See “Reassigning an activity assignment On Hold (coordinator procedure)” on page 116.

Table 4-3: Procedures for reassigning activities

Who can reassign:	What kind of activity:	Where:	Description:
Coordinator	Any activity	Process Viewer	If the coordinator needs to reassign an activity (say, for example, because of an unexpected medical absence of the assigned user) then the coordinator or a DBA-Enabled user can find it in the Process Viewer and Suspend the activity which places it in the coordinator's Work List for reassignment. See "To reassign an activity from Process Viewer (coordinator procedure)" on page 122.
Coordinator or DBA-enabled user	Any Activity	Search Results	An alternative to the above procedure allows the coordinator or any DBA-enabled user to find an activity with a query, and reassign it directly from the Search Results window. See "To reassign an activity from Search Results (coordinator or DBA procedure)" on page 123.
End user	Any Activity	Search Results	An end user with the Reassign screen permission cannot suspend an activity, but he/she can reassign any activity in Search Results. The user can reassign his/her own assignment without waiting for the coordinator to do it.

Other Work List window operations

Placing an activity assignment On Hold

You might choose to put an activity assignment On Hold if you:

- Need more information before proceeding
- Want to request help from the coordinator
- Decide that the activity should be assigned to somebody else
- Decide that the activity should be proceeding down a different path in the process rather than the current one

Placing an activity assignment On Hold causes it to appear in the coordinator's Work List window. The comments tell the coordinator why you did so. If you have placed the activity assignment On Hold simply to gather more information or to resolve an issue, you may be responsible for taking the activity assignment Off Hold when the issue has been resolved.

Other situations, such as reassigning or cancelling the process, must be resolved by the coordinator.

To place an activity On Hold

1. From the Work List window, select the item you want to place On Hold.
2. Select Place **On Hold** from the **Workflow** menu. Place On Hold is also available in the right-click menu and the toolbar. ProductCenter displays the Electronic Signature window:

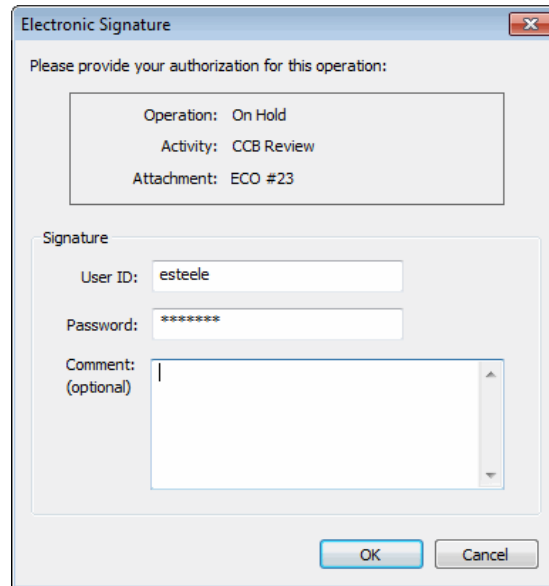
The image shows a Windows-style dialog box titled "Electronic Signature". It has a close button (X) in the top right corner. The main text says "Please provide your authorization for this operation:". Below this is a box containing three lines of text: "Operation: On Hold", "Activity: CCB Review", and "Attachment: ECO #23". Underneath is a section labeled "Signature" which contains three input fields: "User ID:" with the text "esteele", "Password:" with "*****", and "Comment: (optional)" with a large empty text area. At the bottom right are "OK" and "Cancel" buttons.

Figure 4-28: Enter comments explaining the hold

3. Enter your password, and then in the **Comment** field enter any information that explains why the activity is On Hold and what you need from others to proceed.

NOTE: If your administrator has modified signature requirements with the cms.admin.EsigOps resource variable, it is possible that some operations may not prompt for your signature.

4. Click **OK** to place the activity On Hold with your comments.

To take an activity Off Hold

1. From the Work List window, select the activity that is On Hold.

2. From the **Workflow** menu, select **Take Off Hold**. Take Off Hold is also available in the right-click context menu and the toolbar.
3. Type any comments into the Comments window. These replace any comments you entered when you originally put the activity On Hold.

The activity returns to Claimed status and is removed from the process coordinator's Work List window.

Assigning an activity

When you complete an activity and send it forward, ProductCenter normally assigns the next activity to users or groups based on the process definition. However, if the next activity is assigned to a role, and that role was not filled by the person issuing the form (see “To assign roles when issuing a form” on page 164), ProductCenter asks you to assign the next activity. In this situation an Assign Activity window appears.

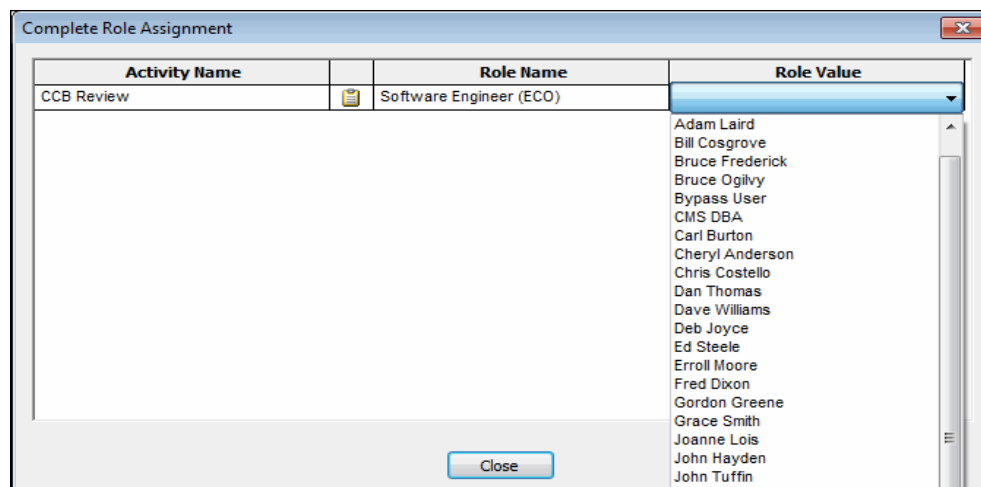


Figure 4-29: Assign activity window

The **Role Value** column expands to display a list of all users who can be assigned to the activity.

You can have the coordinator make the assignment by just clicking **Close** without making the assignment. The activity appears in the coordinator's Work List window. ProductCenter prompts you through this procedure with a detailed message.

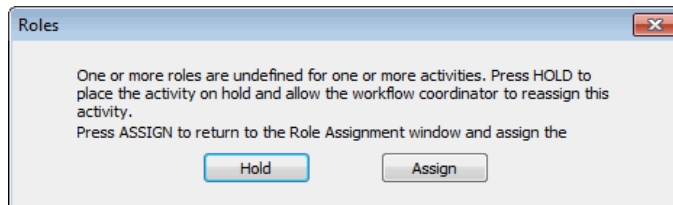


Figure 4-30: Assignment prompting window

To assign an activity when sending forward

If the Assign Activity window appears:

1. Click in the **Role Value** column to display the list of possible resources.
2. Select a resource from the **Role Value** column.
3. Click **Close**.

To request that the coordinator assign an activity

If you are uncertain to whom the next activity should be assigned, you can have the coordinator make the assignment. This places the activity On Hold and places it in the coordinator's Work List window.

1. Click **Close** without selecting a resource.
2. After ProductCenter displays a confirmation window, click **Hold**.

Closing the assignment dialog will place activity On Hold

Following a Send Forward operation in the Web Client, if the user closes the assignment window before assigning the next activity to a group or user role then the activity

assignment will be placed On Hold, which will then place the activity assignment in the workflow coordinator's Work List.

Working with files and projects attached to a process

Each process has one particular project or file that is directly associated with it. This item is called the *attached item* for the process. Often, this is a specific project (form) that is automatically attached to the process when it starts. The attached project or file is listed in the **Attachment** column of the Work List window.

You can put the attached items from activities in your Work List window onto your Desktop, where you can then view, check out, and check in the items. Or you can use the toolbar or right-mouse button Attachment sub-menu to do that directly in the Work List window.

NOTE: Administrators using the Process editor also have access to a **List items using** feature. See “To list items using a process definition” on page 48 for more information.

Operations on attachments in Work List

The Windows and Web Clients offer the following operations in the Work List window for the selected activity's attachment:

- View Info
- View File
- Expand -> One Level
- Expand -> All Levels
- Expand -> Non-hierarchical
- Expand -> Using Filter
- Expand -> Collapse
- Expand -> Expand Filter
- Get Copy
- Check Out
- Check In
- Save As...
- Return Unmodified
- Store Hierarchy
- Retrieve Hierarchy
- Release -> Submit
- Release -> Approve
- Release -> Disapprove
- Release -> Re-release
- Release -> Mark as Obsolete
- Release -> Reinstate
- Control -> Alter
- Control -> Purge
- Control -> Delete
- Control -> Move
- Control -> Rollback
- Edit -> Copy
- Edit -> Select All
- Edit -> Deselect All
- Workspace Explorer
- Collaboration
- Reports...
- Print Info...
- Put on Desktop

In the Windows Client the commands also appear on the Action and Expand menus. In both Windows and the Web Client, you must select activities or items one at a time. ProductCenter refreshes the window after the successful completion of each operation except GetCopy. The user's screen permissions control access to the operations.

Floating and fixed release states

The version of a project or file under Release Management can behave in one of three ways during the course of a workflow process:

- Float — The item version changes any number of times during the lifetime of the process
- Fixed — The item version remains the same throughout the lifetime of the process
- Float then fixed — The item version changes until approval or release

To clarify between float and fixed, suppose an item is checked in, so that a new version is created, while a process instance that it was attached to it is still active. Which version of the item is now attached to the process instance? If the new version replaces the old one as the item attached to the process, then we say that it "floated". If we keep the old version attached to the process and ignore the existence of the new version, then we say that it was "fixed".

This versioning feature is tied to the release state of the item being routed. If the item starts with an In Progress state, its version floats until it is In Approval or Released. If the item is Released and then checked in (so that a new revision is started) at any time while the attached process instance is active, then the item will not float to the new revision.

However, an item can be submitted (and so become In Approval) and then be disapproved (and so go back to In

Progress) any number of times while the process is active, and the item will still float. This is true even if it was In Approval when the process instance was launched.

See the *ProductCenter User Guide* and *Administrator Guide* for more information about Release Management.

Reviewing other processes

You can display other available processes to review their status.

To review other processes

1. On the **Workflow** menu, select **List processes**. You may also use the toolbar icon. The List all process instances window appears (refer to Figure 4-31).

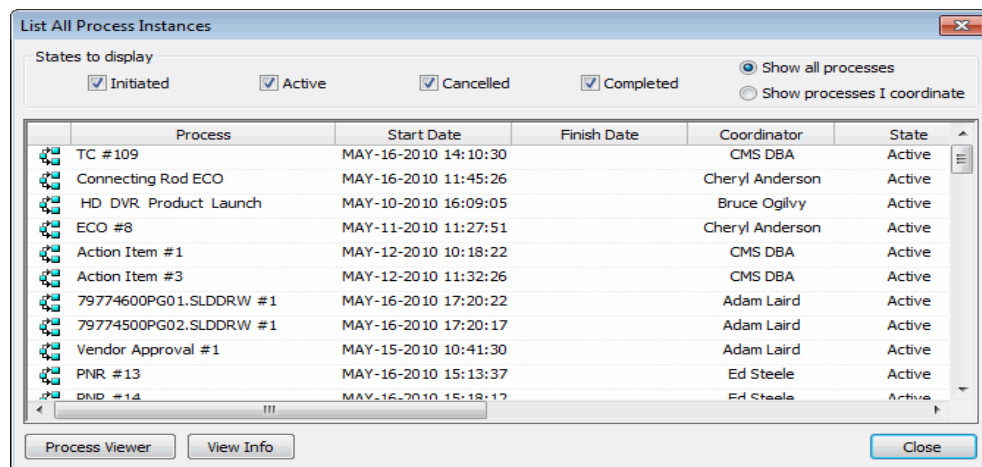


Figure 4-31: List of all processes

2. Use the **States to display** checkboxes and the radio buttons to filter the display. For example, uncheck **Initiated** and **Active** but leave checked **Cancelled** and **Completed** to show only processes that are no longer active.

3. If you wish to you can now start the Process Viewer. To do so select a process instance in the table, then click on the Process Viewer button.
4. Click **Close** when done.

To view attached processes

To find out what processes are associated with a particular project or file:

1. Select the file or project from the Desktop, Class Browser, Checked-out Items or Search Items tab. Using either the toolbar, Action menu or right-click context menu select View Info. Next, select the Process tab to view what processes are associated to the file.

From the Work List, Claimable Work, and Search Process Instances or Search Activities tab select an activity and use either the toolbar, Action menu or the right-click Attachment menu. Select View Info and then select the Process tab to view what processes are associated to the file.

The Attached Process Instances List appears (Figure 4-32).

NOTE: Only Active and Cancelled process instances will be listed. Completed instances will not be listed.

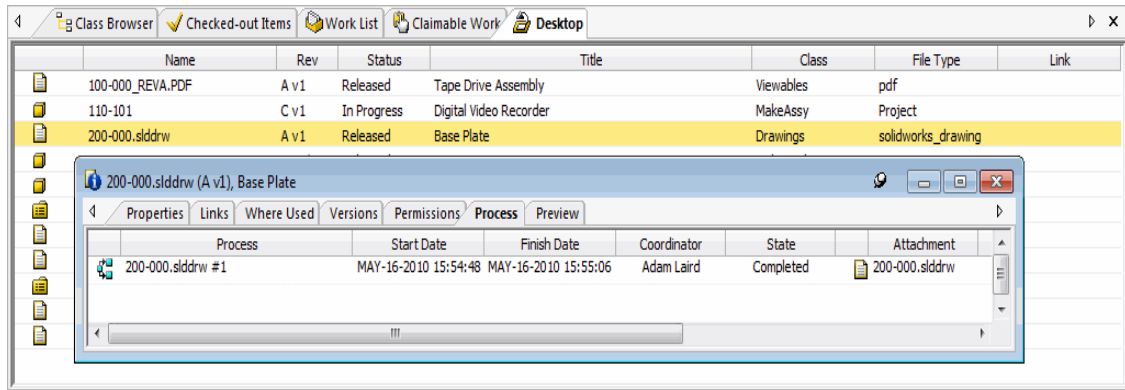


Figure 4-32: The attached processes of the selected activity

Processes associated with the selected project or file are listed alphabetically by the name of the process. You can start the Process Viewer from this window by selecting **Process Viewer** from the right-click context menu (see “Viewing a process” on page 138). The **State** column indicates the state of the process instance (see “States” on page 8).



Appendix A

Administration Procedures

Just Ahead:

Adding a non-O.S. user account 200
Adding roles 202

This appendix contains summaries of the following general ProductCenter administrative procedures for Workflow administrators or coordinators who need to set up a bypass user account (see “Specifying a bypass user” on page 113):

- Adding a ProductCenter user who does not have a Windows operating system (O.S.) account
- Creating roles

Adding a non-O.S. user account

When a ProductCenter administrator adds a new user to ProductCenter, that user typically must have an existing operating system account. However, ProductCenter for Windows allows you to circumvent this restriction in either of two ways. Workflow administrators do this when creating a bypass user.

- You can set a resource variable that allows you to type entries in the Login Name and Host fields (instead of selecting values from a drop-down list) at the User Administration window.
- You can create a text file that contains the necessary information for each ProductCenter account that you want to create, and then import the file.

Procedures for each method follow.

To enable direct entry at the User Administration window

To enable this option, edit the *ProductCenter_home\resource\cms_site* file and add the following resource variable:

```
cms.admin.user.enforce_existence = FALSE
```

If this variable is not present (the default condition), or if you set its value to TRUE, you need to select from a list of Windows account names when you add users.



To add a list of user accounts from an import file

1. Use Notepad to create a text file called newuser.lis in *ProductCenter_home\install\oracle* directory.
This file is similar in format to the cmsexp.lis file that is created when you add new users from the operating system.

2. Insert the following text all on one line in newuser.lis:

```
bypass:bypass:Bypass_User:host:
disabled:c:\user_directory
```

where:

user_directory is a path such as C:\users\bypass

3. Save the file.
4. Start an MS-DOS window and run the following command all on one line:

```
ProductCenter_home\bin\X86\3\cmsusadm.exe
add -db PCTR -login cms
-pass cms -import
ProductCenter_home\install\oracle\newu
ser.lis -verbose
```

If no error messages occur, you receive the “Successfully added users from file...” message.

Note that in this example *PCTR* is the default database name (SID) however you may utilize a different SID if you choose.

5. Restart ProductCenter as a DBA-enabled user and go to the User Administration window to ensure that the user was added to the database.

Adding roles

You can create roles for users and groups via the Form Editor. Workflow administrators can make use of this feature to assign an activity to a role that gets filled with a specific user or group at run time (see “To assign roles when issuing a form” on page 164). A role can also be filled by a bypass user when only a subset of the approvals is needed for a specific instance of a process (see “Specifying a bypass user” on page 113). You can define a user role so that only members from a specific group are valid choices to fill that role. (ProductCenter also provides two system-defined roles, Last User and Preparer, that the process author can specify when defining the process.)

To define roles in ProductCenter

1. Log in to ProductCenter as a DBA-enabled user or as a user with form editing privileges.
2. Click **Form Editor** on the **Administration** menu.
3. Create a new form by clicking the **New** button and filling out the New Form window (see Figure A-1). Make sure **Master** is selected, clear the check box for including common attributes, and call the form and its associated database table something that reflects its purpose, such as “Role Definitions” and “role_defs”. Click **OK** when done to return to the Form Editor.

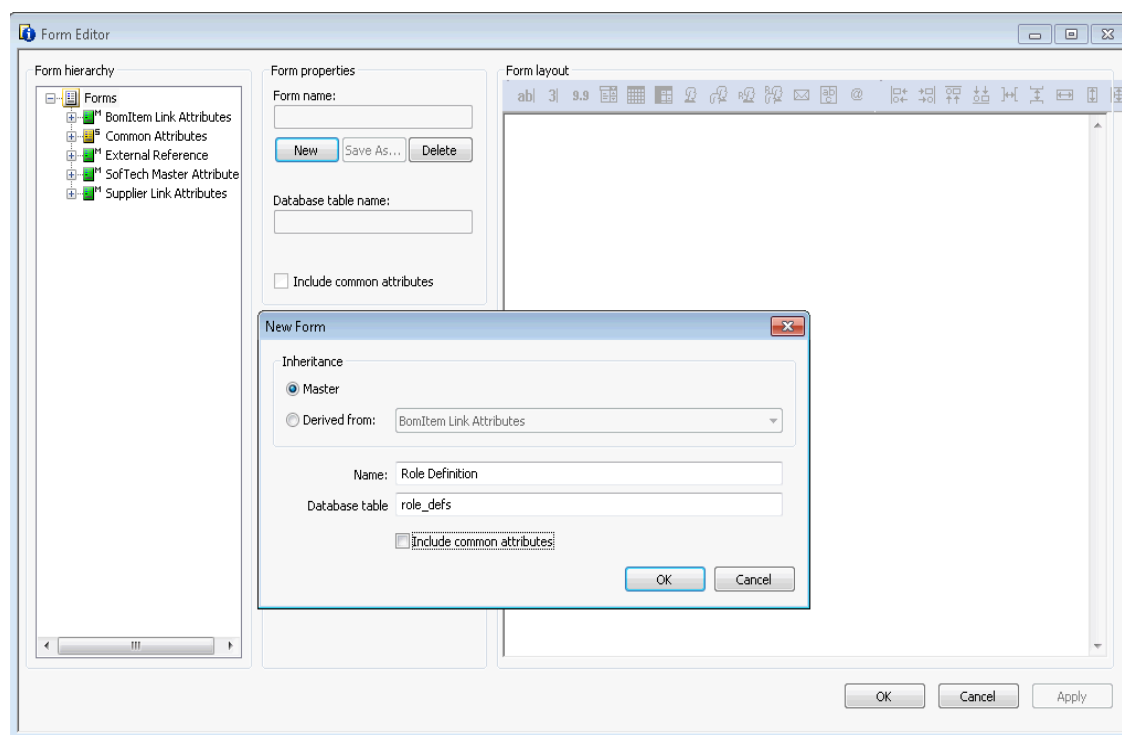


Figure A-1: Defining a form for roles.

Adding roles

4. Click the User Role or Group Role button, and add a role to the Form Layout (Figure A-2).

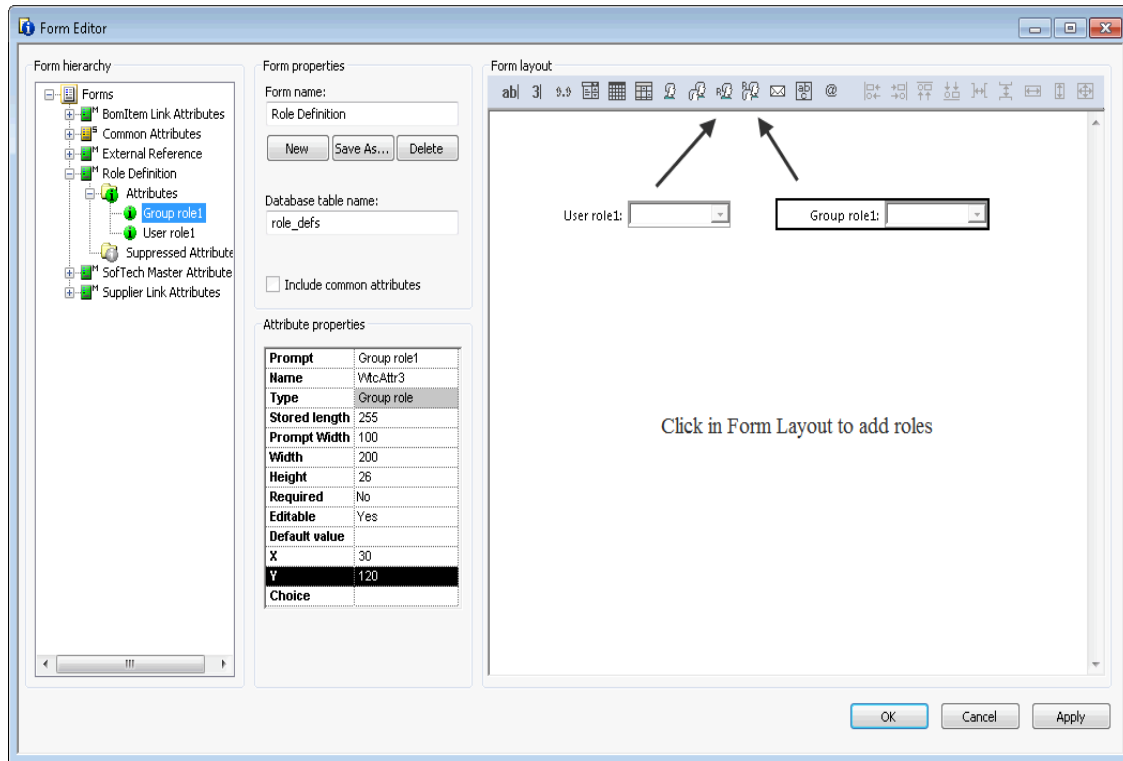


Figure A-2: Adding roles to Form Layout

5. Select a role that you have just added and go to the Property Attributes to edit the **Prompt** and **Name** to reflect the role's purpose (for example, "QA Rep"). Note that for user roles, the **Choice** drop-down menu allows you to specify a group limiting the users who may fill the role at run time. If you do not specify a group, all users will be eligible to fill the role.

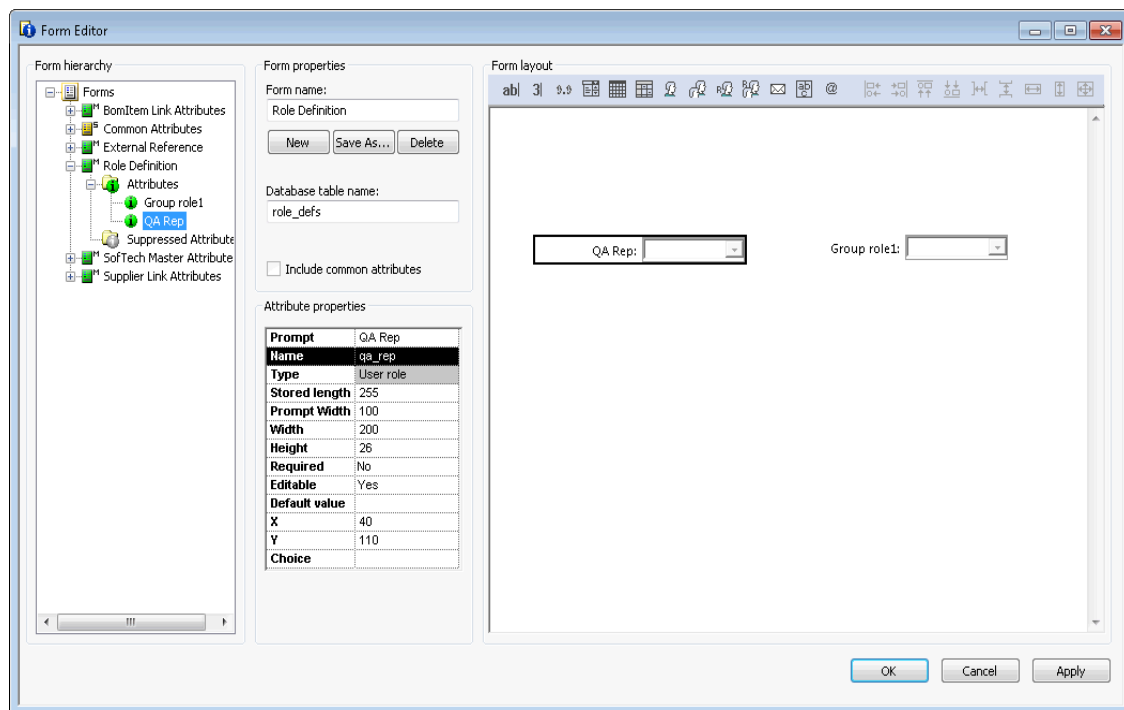


Figure A-3: Editing Attribute Properties

6. Continue steps 4 and 5 for as many roles as you need to create.
7. When done, click **OK** to exit the Form Editor.

Next, you must now create a derived form from this master form, and ensure that the role attributes are available for use with Workflow. Only role-type attributes in derived forms can be used as resources to be assigned to activities. Then

the role will be available to you from the Activity Notebook in the Process Editor (see “Assigning a resource to an activity” on page 75). For additional information on created a derived for see the *ProductCenter Administration Guide*.

Localization of the User and Group Role Assignments

As the preceding section explains, custom user roles and group roles are defined by role-type custom attributes in forms. (The system-defined user roles Last User and Preparer are associated with the corresponding user-type common attributes.) When users need to see the names of roles, they naturally see the prompts of those attributes.

But ProductCenter supports client software that is localized to other "locales" or languages (such as French, German, and Italian), and a single installation of ProductCenter can support clients using different languages (such as English and Italian, or French and German). In this type of configuration, the ProductCenter administrator can use the Form Editor to create localized prompts for each attribute in each language. ProductCenter provides standard localized prompts for all the common attributes, including Last User and Preparer, although the administrator is able to replace them with alternative versions.

When user or group roles are used in this kind of multi-locale configuration, ProductCenter automatically presents the localized prompts for each role attribute to users. It does this by storing the form and name (not the prompt) of each attribute in the process definition in the database, and then using the prompts from the form definitions to supply the appropriate localized prompt for each user.

Ambiguous Role Names

This support for localized role names is largely transparent, but it does give rise to some features that users may need to



become aware of - and this can happen even if the ProductCenter installation only supports English. There are two similar situations to consider. First, suppose a form has two different user role attributes (or two different group role attributes) that have the same prompt. Second, suppose two or more derived forms have user role attributes (or group role attributes) that have the same prompt.

Resolving Ambiguity

In both of these situations, the process definition is perfectly clear about which role-type attribute is used for an assignment, but just displaying the prompt to the users will not make it clear to them. To avoid that confusion, Workflow will add something to the end of the prompt. In the first situation (two attributes with the same prompt in the same form), it will add the localized name of the derived form and the name (not the prompt) of the attribute, with a pair of parentheses around them. In the second situation, it will just add the localized name of the derived form in parentheses.

As an example of the first situation, you might have two group roles that appear as:

Review Committee (Bids)
Review Committee (ECO)

Or you might have used the name Preparer for several different user roles (in addition to the system-defined user role), so that they would variously appear as:

Preparer (Common Attributes)
Preparer (Shipping Document)
Preparer (Truck PREP_BODY)
Preparer (Truck PREP_WHEELS)

Taking Advantage of Ambiguity

In some cases it may be very useful to have role attributes in several forms have the same prompt. For example, you

might have different forms and classes for CAD files produced using different CAD systems, but have a user role named Checker for all of them (because all of your CAD files have to be checked by a senior designer). You could then define a single route-based Workflow process that would be used to track the checking and approval process of all classes of CAD files.

In this example, you would want to assign a particular activity to the Checker role, regardless of which CAD system the attached file came from. Workflow supports this by what is called a multi-form role name, which is just the prompt that all of the role attributes have in common. The Process Editor Assignment dialog presents this name in the list in the User Role or Group Role tab, as appropriate, and an assignment to a multi-form role is stored in the database in a different way from assignments to particular role-type attributes. When a file is routed to the activity that is assigned to this multi-form role, Workflow will locate the appropriate attribute in the form of the file and use that attribute for the assignment. As a result, the assignments of active processes will always be to particular role attributes, not to multi-form roles. The multi-form role assignment only exists in the process definition.

If you decide to make use of multi-form role assignments, you may want to be sure that your process designers do not accidentally use one of the role attributes instead.

If you define the resource variable:

```
site.workflow.admin.assignment.role.show_  
each_form_attribute = FALSE
```

then the Process Editor Assignment dialog will only display the multi-form role name, such as:

Review Committee



Otherwise, the dialog will list both the multi-form role name and the role attribute names, such as:

- Review Committee
- Review Committee (Bids)
- Review Committee (ECO)

Locales and Ambiguity

These cases of ambiguity are related to the prompts of different role-type attributes. What if your installation supports more than one locale? In this case, the ambiguity only arises if the prompts are the same in a given locale.

When there are multi-form role names for a locale different from the one that a process designer uses, the names are identified by putting the name of their locale in front of the name. For example, a French process designer might see the following in his Process Editor Assignment dialog:

- Anglais: Review Committee
- Le Comité De Revue
- Le Comité De Revue (Offres)
- Le Comité De Revue (Ordre de Modification)

For more information about working with forms and attributes, please see Chapter 7 of the *ProductCenter Administrator Guide*.



Appendix B

The Workflow Email Utility

Just Ahead:

Introduction	212
Setup and Configuration	213
Arguments summary	228
Troubleshooting	231
Implementing overdue warnings	234

This appendix describes how to configure and use the ProductCenter Workflow email notification utility.

Introduction

This utility is a ProductCenter Toolkit program which you use as a post-operation (see “Working with operations” on page 92) to notify users that new activities have been assigned to them. The Workflow utility is available on the UNIX and Windows platforms. The Workflow email notification utility is unrelated to the ProductCenter email notification feature described in the *ProductCenter Administrator Guide*.

The Workflow email utility supports fully customizable mail messages. These mail messages can be shared by the entire site or focused on specific process and activity instances. The same mail message can be sent when an activity is either sent forward or backward, or different mail messages can be sent depending on the direction the workflow was sent. The mail messages can reference attributes associated with the current process instance, activity instance, or work item. In addition, these customized mail messages can also have embedded WebLink URL tags which enable you to hyperlink to the activity or item object within ProductCenter.

The Workflow email utility supports the following scenarios as shown in Figure B-1:

1. Invoked as a Workflow process pre-operation with at least one activity started. You typically use this to generate notification about the start of the first activity in the process.

2. Invoked as a Workflow activity post-operation with at least one successor activity. You typically use this to generate notification about the start of the next activity in the process.
3. Invoked as a Workflow process post-operation with a distribution list specified (see “-dlfile name” on page 229). You typically use this to generate notification about *completion* of the last activity in the process.

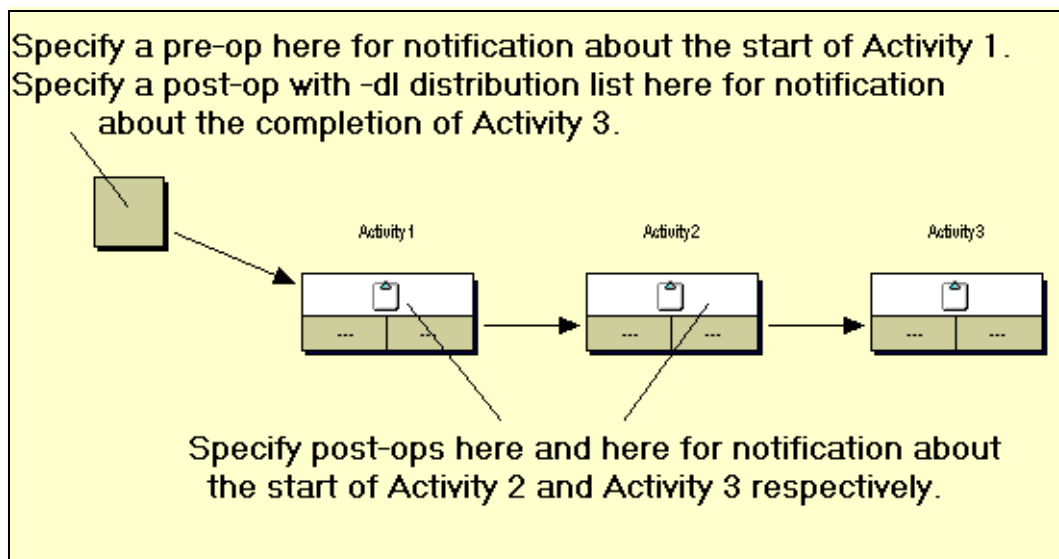
B

Figure B-1: Using pre- and post-operations for Workflow email

Setup and Configuration

The regular ProductCenter server installation includes installation of the files needed by the Workflow email utility.

You must perform some configuration tasks before you can use the email utility:

- Edit the cms_site file.
- Edit a resource file.
- Edit one or more mail template files.
- Ensure that the host system is capable of sending email.
- Add post-operations to your Workflow processes to enable email notification.

What gets installed?

When you install ProductCenter server, the installation process copies the following email-related files to your disk:

Table B-1: Workflow Email Files

File	Location	Purpose
wfemail (UNIX)	<code>\$CMS_HOME/bin/\$ARCH/\$OS</code>	executable
wfemail.exe (Windows)	<code>ProductCenter_home\bin\x86\3</code> (typical)	
wfemail_site	<code>\$CMS_HOME/resource</code> (UNIX) <code>ProductCenter_home\resource</code> (Windows)	preference settings
MailMessage1.mtf MailMessage2.mtf	<code>\$CMS_HOME/resource</code> (UNIX) <code>ProductCenter_home\resource</code> (Windows)	email template files

Editing the cms_site file

The following settings must be set in the cms_site file before you can utilize the Workflow email utility.

The default location for this file is:

`ProductCenter_home\resource\cms_site`

For Windows users, *ProductCenter_home* is typically C:\ProductCenter.

- cms.SMTP.mail.host = mail.softech.com
- cms.mail.address_format = %s@%s
- site.email.default_domain_name = softech.com

NOTE: The acceptable syntax has been extended for the cms.SMTP.mail.host setting to allow an optional trailing colon and port number. If omitted, then the standard SMTP server port number 25 will be used.

B

Editing the resource file

You must set a number of preferences in the wfemail_site resource file before you can use the Workflow email utility.

The default location for this file is:

ProductCenter_home\resource\wfemail_site

For Windows users, *ProductCenter_home* is typically C:\ProductCenter.

You can specify a different location by using the -resfile argument to the Workflow email utility executable (wfemail on UNIX, wfemail.exe on Windows). Likewise, you can override most of the settings in this resource file by specifying other arguments to the Workflow email utility executable. See “Arguments summary” on page 228 for more information.

NOTE: wfemail_site comes installed with most preference fields commented out. Make sure that you activate settings you want by removing the “#” from the beginning of their lines.

Table B-2: *wfemail_site* preference settings

Preference	Description
pcwfmail.startup.delay_count = 300	Specifies how long in seconds the notification program should delay prior to executing. This ensures that all operations have time to complete before attempting to find the next activities associated with the current post-operation. In general, you should specify a delay of at least three to five minutes (180 to 300 seconds). When first setting up and testing the email utility, set this value to 5 or 10 seconds so you can see immediate results. Set it back to a higher value prior to placing the system in production.
pcwfmail.broker.host_name = <i>hostname</i>	Specifies the host name where the ProductCenter Broker is running.
pcwfmail.broker.port_number = 5400	Specifies the port number on which the ProductCenter Broker is listening.
pcwfmail.server.database_name = PCTR	Specifies the ProductCenter database name.
pcwfmail.server.login_name = cms	Specifies the ProductCenter login name.
pcwfmail.server.login_password = cms	Specifies the ProductCenter login password.
pcwfmail.log.file_name = \$CMS_HOME\log\wfemail.log	Specifies where the Workflow email log file should be created. This log file can be extremely helpful in troubleshooting problems when installing or maintaining the Workflow email utility. By default, the utility creates a log file named 'wfemail.log' in the directory from which the executable is invoked.
pcwfmail.log.message_level = 1	Specifies the amount of detail recorded in the log file. The three levels are: 1 - error messages only. 2 - error and verbose messages. 3 - error, verbose, and debug messages. Set this value to 3 when first setting up the Workflow email utility.

Table B-2: *wfemail_site preference settings*

Preference	Description
pcwfmail.message.file_name = \$CMS_HOME\resource\MailMessage1.mtf	Specifies a mail template file. ProductCenter installs two sample files in the resource directory, MailMessage1.mtf and MailMessage2.mtf. Template files can contain the text of a site-specific message you want sent to all ProductCenter workflow users.
pcwfmail.message.subject = A new activity has arrived in ProductCenter.	Specifies a default subject for all Workflow email messages.
pcwfmail.message.line_nn = This is a test message line number nn.	Specifies default message lines for all Workflow email messages. 'nn' may range from 01 to 99. You typically use either these resource entries or the 'pcwfmail.message.file_name' resource entry, but not both.
pcwfmail.nag.time_threshold	Default value for the -nagtime argument (see "Implementing overdue warnings" on page 234).
pcwfmail.nag.file	Default value for the -nagfile argument (see "Implementing overdue warnings" on page 234). If not specified, the default is \$CMS_HOME/resource/wfemail_nagfile)
pcwfmail.message.notify_user	This setting is used to set the name of the user who is identified as sending the email messages that wfemail generates. The default value is "cmsmail". You can set this to an actual user's name, or to the keyword COORDINATOR, in which case the name of the process coordinator will be used. Example: test_user@softech.com

Editing the email template files

At some point you must determine the contents of the email notifications that ProductCenter will send to your Workflow users.

You do not need to do this immediately. During installation and testing of the Workflow email utility, you can simply use the template files as installed. However, before you go into production, you will want to return to this section and customize the messages to reflect your specific environment.

First, decide whether you wish to use a template file or the message lines specified in the resource file described in the previous section. If you wish to use the template file, leave the message lines in the resource file commented out. If you are going to use a template file then make sure to uncomment the `pcwfmil.message.file_name` line and point it to a template file such as `C:\productcenter\resource\mailmessage1.mtf`.

Mail Message Substitution Keywords

You can customize Workflow email messages by mixing text with keywords that substitute values for process, activity, and item attributes at run time (see Table B-3 on page 218). You can use these keywords in a template message file or as part of the message line resource entries defined in `wfemail_site`.

Also see “Workflow variables” on page 93 for general purpose Workflow substitution variables that can be used on the command line for any post-operation or pre-operation application.

Table B-3: Mail Message Substitution Keywords

Keyword	Description
<code>\$PROCESSNAME</code>	Process instance name
<code>\$PROCESSOWNER</code>	Process instance coordinator name
<code>\$ACTIVITYNAME</code>	Activity instance name
<code>\$ACTIVITYDUEDATE</code>	Estimated completion date for activity

Table B-3: Mail Message Substitution Keywords

Keyword	Description
\$ITEMID	Item ID number.
\$ITEMNAME	Item name
\$ITEMTITLE	Item title
\$ITEMCLASS	Item class name
\$ITEMTYPE	Item type (for example, file type)
\$ITEMSTATUS	Item release state
\$ITEMVERSION	Item version number
\$ITEMREVISION	Item revision level
\$ITEMCOMMENT	Item comment
\$ITEMDESCRIPTION	Item description
\$ITEMLASTUSER	Last person to edit the item
\$ITEMPREPARER	Person who prepared the item
\$ACTIVITYDUETIME	Expected completion time of the activity
\$CURRENTDATETIME	Date/time current when email is generated
\$ACTIVITYCOMMENTS	Comment from Send Forward/Send Back

Note the keyword is of the form \$CUSTOM{attr_name}, where attr_name is either the name or prompt of a custom attribute. The search for a match to attr_name is not case-sensitive.

Mail Message Template File Samples

Here are two mail message template files, showing the original file, followed by sample output showing the effect of the keyword substitutions.

Template File 1 Here is how MailMessage1.mtf might look:

You have been asked to work on the activity "\$ACTIVITYNAME" for the "\$PROCESSNAME" process. You can locate the item associated with this activity by performing a "Search by attributes..." operation in ProductCenter using some or all of the following attribute information in your criteria:

Item Id:	\$ITEMID
Item Name:	\$ITEMNAME
Item Title:	\$ITEMTITLE
Item Class:	\$ITEMCLASS
Item Revision:	\$ITEMREVISION
Item Version:	\$ITEMVERSION
Item Status:	\$ITEMSTATUS
Item Type:	\$ITEMTYPE
Item Last User:	\$ITEMLASTUSER
Item Comment:	\$ITEMCOMMENT
Item Description:	\$ITEMDESCRIPTION

This activity has an expected completion date of \$ACTIVITYDUEDATE. All questions regarding it should be directed to the process coordinator \$PROCESSOWNER.

This email was auto generated by the ProductCenter Workflow Email Utility.

Template File 1 Example

Here is how the output from MailMessage1.mtf might appear:

```
From jsmith Fri May 7 08:43:45 2010
Date: Fri, 7 May 2010 08:43:45 -0500 (EST)
From: Joan Smith <jsmith>
To: jsmith
```

Subject: A new activity has arrived in ProductCenter.

You have been asked to work on the activity "Update Drawing" for the "ECO Process #1" process. You can locate the item associated with this activity by performing a "Search by attributes..." operation in ProductCenter using some or all of the following attribute information in your criteria:

- Item Id: 1132
- Item Name: ECO Process #1
- Item Title: Test process.
- Item Class: CMS:Projects
- Item Revision: A:1
- Item Version: 1
- Item Status: In Progress
- Item Type: Project
- Item Last User: Joan Smith
- Item Comment: This line is a comment about the item.
- Item Description: This line describes the item.

This activity has an expected completion date of MAY-12-2010. All questions regarding it should be directed to the process coordinator.

This email was auto generated by the ProductCenter Workflow Email Utility.

Template File 2 Here is how MailMessage2.mtf might look. Note that you must substitute a valid value for *webserver* in the template URL.

You have been asked to work on the activity "\$ACTIVITYNAME" for the "\$PROCESSNAME" process. You can automatically locate the item associated with this activity in ProductCenter by selecting the URL below.

```
http://webserver/cgi-bin/pcweblink.cgi/  
pcenterweb/signin.wml?id=$ITEMID
```

```
This activity has an expected completion  
date of $ACTIVITYDUEDATE. All questions  
regarding it should be directed to the  
process coordinator $PROCESSOWNER.  
This email was auto generated by the  
ProductCenter Workflow Email Utility.
```

Template file 2 Example

Here is how the output from MailMessage2.mtf might appear:

```
From jsmith Fri May 7 08:32:35 2010  
Date: Fri, 7 May 2010 08:32:35 -0500 (EST)  
From: Joan Smith <jsmith>  
To: jsmith  
Subject: A new activity has arrived in  
ProductCenter.
```

```
You have been asked to work on the activity  
"Update Drawing" for the "ECO Process #1"  
process. You can automatically locate the  
item associated with this activity in  
ProductCenter by selecting the URL below.
```

```
http://webserver/cgi-bin/pcweblink.cgi/  
pcenterweb/signin.wml?id=1132
```

```
This activity has an expected completion  
date of MAY-12-2010. All questions  
regarding it should be directed to the  
process coordinator.  
This email was auto generated by the  
ProductCenter Workflow Email Utility.
```

Define the post-operations

The final step in implementing Workflow email notifications is to add a command as a Workflow activity post-operation using the ProductCenter Workflow Process Editor.

In general, you should do this for every activity which has successor activities.

You can also invoke the email utility as a Workflow process pre-operation, or as a process post-operation with a distribution list specified with the `-dlfile` argument, but most often you will implement it as an activity post-operation as described below.

NOTE: The platform and location of the ProductCenter server determines the path and syntax you use when assigning post-operations in the Process editor.

On UNIX, the path would resemble:

```
ProductCenter_home/bin/arch/os/wfemail
```

On Windows, the path would resemble:

```
ProductCenter_home\bin\x86\3\wfemail.exe
```

To enter this path and its arguments as a post-operation:

1. Start the Process Editor and open the process to which you wish to add the email post-operation.
2. Open the notebook for the activity and go to the **Post-operations** tab.

B

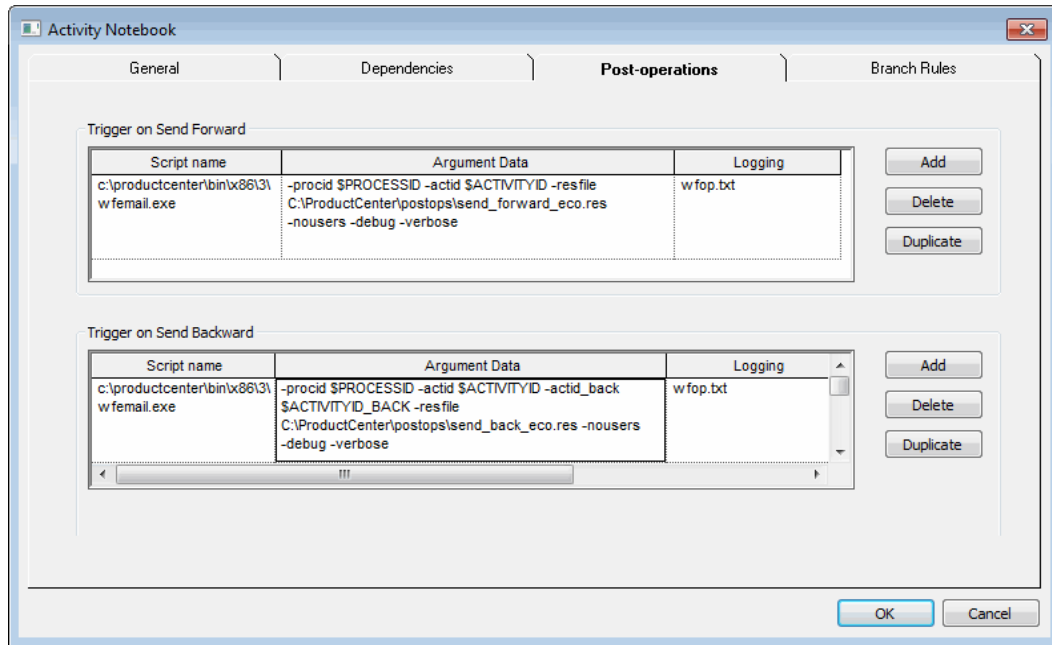


Figure B-2: Specifying an email post-operation

3. Click **Add**.
4. Click inside the **Script Name** field and type the absolute pathname to the executable. For example:

```
c:\productcenter\bin\x86\3\wfemail.exe
```

Remember, the actual path will vary depending on your platform and where you have installed ProductCenter. For example, a UNIX path might more closely resemble:

```
/apps/productcenter/bin/sun4/5/wfemail
```

The post-operation processor does not translate **ProductCenter_home** to an actual path, so you must specify the path explicitly.

- Click inside the **Argument Data** field and enter the arguments for this post-operation. The following are two examples:

```
-procid $PROCESSID -actid $ACTIVITYID
-resfile
C:\ProductCenter\postops\send_forward_eco.res
-nousers -debug -verbose
```

Or:

```
-procid $PROCESSID -actid $ACTIVITYID -
actid_back $ACTIVITYID_BACK -resfile
C:\ProductCenter\postops\send_back_eco.r
es -nousers -debug -verbose
```

Again, the exact syntax will vary depending on your specific installation. If you do not specify the **-resfile** argument, the Workflow email executable looks for the resource file in the ProductCenter resource directory. **\$PROCESSID**, **\$ACTIVITYID** (send forward) **\$ACTIVITYID_BACK** (send back) identify the current process and activity ID in the process instance. Note that Windows users must specify the **-nousers** argument if the account sending the email is a nonprivileged OS account that cannot access Windows user account information (see “-nousers” on page 229 for more information). Also, you may wish to specify the **-debug** and **-verbose** arguments when first configuring the email utility, but then remove them once everything is running smoothly.

Activity Post-Operation Trigger on Send Back

ProductCenter has the ability to invoke post operation triggers for the Send Back operation. This can be useful for sending email notifications when a user has decided that additional information or additional work must be completed by a prior activity so the current activity is sent



back to a specific activity and all users can then be notified of this event.

Activity Notebook

The Post Operations tab of the Process Editor Activity Notebook allows the workflow coordinator to define Send Forward and Send Back Post Operations.

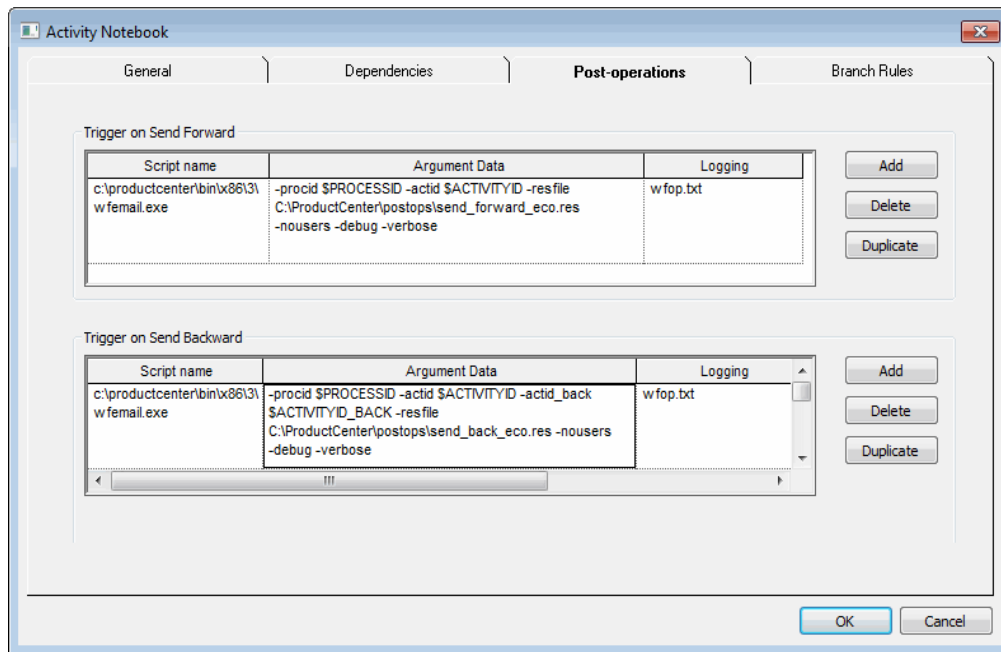


Figure B-3: Post Operation for an activity

Command Line Variables

When invoking a post operation, ProductCenter provides system defined variables that can be used by the post operation and those variables for a Send Forward operation include \$PROCESSID, \$ACTIVITYID, and \$WRKITMID. When the post-operation is executed, these variable names are replaced by the relevant values for the activity and the attached file or project.

For the Send Back operations, the variables will be \$PROCESSID, \$ACTIVITY_BACK, and \$WRKITMID where \$ACTIVITYID_BACK is a comma-separated list of

the Activity IDs of all activities that will be re-activated based on the Send Back operation.

wfemail The wfemail program is provided as a ready to use post-operation program that sends email to users to notify them when a workflow activity has been activated and assigned to them. For the Send Forward operation then wfemail utilizes the command line argument `-actid number` so that email is sent to all assignees of the activated activities.

The wfemail program also recognizes the command line argument, `-actid_back number`. This argument would be used instead of `-actid number` but together with `-procid number` and will specify the specific activities whose assignees should be notified. The number provided with the new argument would either be a single numeric activity instance ID or a list of such ID values separated by commas without any blanks.

In normal usage, a Send Forward post-operation to notify users would use command arguments such as:

```
-procid $PROCESSID -actid $ACTIVITYID -resfile C:\ProductCenter\resource\wfemail_site
```

The corresponding Send Backward post-operation to notify users would use command arguments such as the following. Note that a different resource file is specified, so that a different mail template can be used for notifications generated by send backward actions. Users could of course use the same resource file for both post-operations if they want to send the same email message in both situations.

```
-procid $PROCESSID -actid $ACTIVITYID -actid_back $ACTIVITYID_BACK -resfile  
C:\ProductCenter\resource\wfemail_site_back
```



Arguments summary

Table B-4 describes the arguments recognized by the Workflow email executable.

Table B-4: Workflow email executable arguments

Argument	Description
-cmsdb <i>name</i>	CMS database name.
-cmslog <i>name</i>	CMS login name (default - 'cms').
-cmspass <i>name</i>	CMS password.
-bhost <i>name</i>	Broker host name (default - current host name).
-bport <i>number</i>	Broker port number (default - 5400).
-logfile <i>name</i>	Log file name (default - 'wfemail.log').
-mhost <i>name</i>	Mail host name (default - current host name).
-msgfile <i>name</i>	Message template file name.
-resfile <i>name</i>	Resource file name.
-delay <i>number</i>	Delay count (in seconds) prior to start of program.
-procid <i>number</i>	Process instance ID number. You can use \$PROCESSID in a post-operation.
-actid <i>number</i>	Activity instance ID number. You can use \$ACTIVITYID in a Send Forward post operation. You can use \$ACTIVITYID_BACK to have the comments displayed for a Send Back post operation.
-actid_back <i>number</i>	Activity instance ID number. You can use \$ACTIVITYID_BACK in a Send Back post operation.

Table B-4: Workflow email executable arguments

Argument	Description
-dlfile <i>name</i>	Distribution list of ProductCenter users using the full name (not email address or ProductCenter log in name). This overrides the list of users in the next activity, and is useful when invoking the email utility as a process post-operation rather than as an activity post-operation.
-verbose	Generate verbose output messages.
-debug	Generate debug output messages.
-nouters	Used on Windows platforms to work around the problem of having email accounts that are not privileged OS accounts. When the Workflow email utility looks at resources to determine where to send email, it first looks at the list of ProductCenter log in accounts and tries to compare it to the list of Windows operating system accounts. The Workflow email utility assumes that the OS information provides more reliable email addressing information. The -nouters switch tells the email utility that OS information is not available and to use ProductCenter user information only.
-nagmode	Invokes the overdue notification feature. See “Implementing overdue warnings” on page 234 for more information.
-nagtime <i>minutes</i>	Specifies the time threshold in minutes to determine which activities should generate a warning message. Positive values = time after deadline, 0 = any activity that is late, negative values = time until deadline (in other words, advance notice of impending deadline)

B

Table B-4: Workflow email executable arguments

Argument	Description
-nagfile <i>filename</i>	The name of the file specifying the Workflow activities and their corresponding notification recipients, that should be used in generating e-mail notices.
-notify_type <i>type</i>	The wfemail program will accept the command line argument: -notify_type <i>type</i> where <i>type</i> is either Approval or Informational. When this argument is specified, the email notification will only be sent to assigned users of the specified type. By configuring two post operations for an activity that both run wfemail but with different type arguments, the customer can send different email messages to Approval and Informational users.

Troubleshooting

You can invoke the Workflow email program from the command line for troubleshooting purposes. In general, this is the best way to resolve email problems.

To do this, you need to identify the process instance ID and activity ID prior to invoking the program. You can do this through a SQL session, or by means of the logging facility described in “Workflow Pre/Post-Operation Server Log” on page 99.

The examples below assume that you are troubleshooting a Windows installation.

Using SQL to determine ids

Use the following procedure to determine the procid and actid of an existing Workflow activity (cannot be the Start object) to test the Workflow email utility.

1. Start SQL Plus, logging into your ProductCenter database as the administrative user. In a typical installation, this might be:

User Name: **cms**

Password: **cms**

Host String: **PCTR**

2. Enter the following lines to list Workflow items:

```
column workitem_id format a50;
select id, wf_def_id, workitem_id, name from
cms_wf_inso;
```



3. Find the CMS ID for the process for which you wish to generate a test message, and then enter the following line to find the activity IDs for this process:

```
select id, wf_ins_id, workitem_id, name from  
cms_wf_inso_task where  
wf_ins_id=cms_id
```

4. From the resulting output, note the value of WF_INS_ID, which you will use as the value of *procid* in the next step. Likewise, choose the CMS ID value of an activity with successor activities to become the value of *actid*.
5. Exit SQL Plus.

Executing from the command line

1. Open a command line window. Make sure that the MSG_DB_HOME variable is set, then change to the ProductCenter bin directory where the Workflow email executable resides.
2. Execute a command line to generate a test email to the user of the next activity:

```
wfemail.exe -procid procid  
-actid actid -resfile  
ProductCenter_home\resource\wfemail_site  
-debug -verbose -nusers
```

Remember, this syntax assumes a Windows platform. UNIX users would specify “wfemail” as the executable, would use / instead of \, and would not use the **-nusers** switch.

3. Open the log file in a text editor and review the debug statements. If you have been having problems, the cause should be found in the output.

Time stamps

You may see inaccurate “Sent:” time stamps on the messages generated by the Workflow email utility. This appears to be caused by a setting on your mail host or software, and is not caused by the Workflow email utility.

Error messages

This list of error messages shown in Table B-5 is not comprehensive, but lists some of the more common messages that you might see when implementing Workflow email.

B

Table B-5: Error Messages

Error Message:	May indicate:
MSG DB: Error (51540) occurred - database not opened. - wfcTask_LoadInsMaskById	incorrect actid used
MSG DB: Error (51540) occurred - database not opened. - wfcWorkflow_LoadInsAttributesById	incorrect procid value used
CMS_error - Unable to resolve SMTP server address.	Incorrect setting for pcwfmil.mail.host_name
MSG DB: Error (12518) occurred - database not opened. - sessionConnect	incorrect setting for pcwfmil.server.login_name or pcwfmil.server.login_password
MSG DB: Error (12011) occurred - database not opened. - brokerQueryLaunchInfo	incorrect setting for pcwfmil.server.database_name

Table B-5: Error Messages

Error Message:	May indicate:
MSG DB: Error (7006) occurred - database not opened. - brokerVersionCheck	Incorrect setting for: pcwfmmail.broker.host_name = pcwfmmail.broker.port_number or broker not running
MSG DB: Error (2006) occurred - database not opened. - adm_user_load_info_recs	The user is unable to retrieve operating system data on users. Try adding the "-nusers" flag to the arguments

Implementing overdue warnings

The wfemail utility includes an escalation (or "nag") feature that causes an email to be generated for designated workflow activities which have not been completed within a specified time.

The email can go to the assignee of the activity, the coordinator of the activity, or to any other specified recipient.

The feature generates an email for any activity which has exceeded a specified time threshold and for which an entry is found in the escalation file. All other activities are ignored.

This feature is implemented as arguments to the wfemail command line utility, and you should create a script (UNIX) or .bat file (Windows) which will invoke the program at specified times. This can be started through the cms_launcher script on UNIX and as a service on Windows. You can also run it interactively from the command line.

NOTE: This feature does not keep track of e-mails that have already been sent, so whenever it runs, it sends fresh notifications to recipients of all activities that meet the threshold. Therefore, if it is run frequently, it will generate the same e-mails to the same users each time it is invoked. You should be not run the utility so often that it constitutes “spamming”.

B

Command line arguments

This feature is implemented in the form of three arguments to the wfemail command line utility:

- -nagmode — invokes the reminder feature
- -nagtime *minutes* — specifies a time threshold to determine which Workflow activities will generate an e-mail notification
- -nagfile *filename* — file specifying which Workflow activities to check and who to notify (default: \$CMS_HOME/resource/wfemail_nagfile)

Batch File Example:

The following is an example of a program that can be run as a scheduled task.

```
echo off

set CMS_HOME=C:\ProductCenter

%CMS_HOME%\bin\x86\3\wfemail.exe -resfile %CMS_HOME%\resource\wfemail_site -
msgfile %CMS_HOME%\resource\MailMessage1.mtf -nagmode -nagtime 0 -nagfile %
%CMS_HOME%\resource\wfemail_nagFile wfemail_site preferences
```

You may add the following preferences to the wfemail_site file:

- pcwfmfile.nag.time_threshold — default value for the nagtime argument (see above).
- pcwfmfile.nag.file — default value for the nagfile argument (see above). If not specified, default is \$CMS_HOME/resource/wfemail_nagfile)

Escalation file

The escalation file (or “nagfile”) is similar in format to a ProductCenter resource file: the lines within the file consist of a preference name, followed by an equal sign (=), and a value.

The preference name is of the format

workflow_name.activity_name

which must be constructed using the exact names of the workflow process and activity as defined in the Process Editor for this Workflow process.

This variable is set to a comma-separated list of e-mail recipients. An e-mail recipient can be specified with an e-mail address or a special keyword. The two keywords available for this feature are:

- ASSIGNEE — send mail to the assignee of the activity.
- COORDINATOR — send mail to the coordinator of the workflow process

All other recipients must be specified with a complete email address (such as address@domain).

Examples:

```
ECO_workflow.activity2 = user1@domain1.com,user2@domain2.com
ECO_workflow.activity4 = ASSIGNEE,COORDINATOR,user3@domain2.com
ECO_workflow.activity6 = COORDINATOR
```

Time threshold value

The time threshold value is the number of minutes beyond which, if the activity is not complete, that an e-mail will be generated. This value can be:

- positive — specifies the number of minutes beyond the estimated completion time of the activity which will generate an email.
- zero (0) — specifies that an email should be sent for any activity which is past its estimated completion time.
- negative — specifies the number of minutes BEFORE the estimated completion time that an email will be sent. Used as a reminder that an activity is almost due.

Message substitution keywords

The wfemail utility supports keywords for automating the generation of notification e-mails (see “Mail Message Substitution Keywords” on page 218). Two keywords are provided specifically for the escalation feature:

- \$ACTIVITYDUETIME — expected completion time of the activity
- \$CURRENTDATETIME — date/time current when email is generated

B



Appendix C

Workflow Pre/Post- Operation Script Logging

Just Ahead:

Introduction	240
Manual Configuration	241
Configuration Resources	243
User Interface Configuration	245

This appendix describes how to test, debug and validate that the post-operation script is working as desired.

Introduction

On both Windows and UNIX platforms, at the completion of a Send Back or Send Forward operation then the ProductCenter Server will asynchronously launch the specified workflow post-operation script as a server-side, background program. Once the script is launched then the ProductCenter Server continues with its next event and does not track the success or failure of the workflow post-operation script. Also, given this implementation then the ProductCenter Server is unable to redirect the stderr or stdout streams from the script to a log file.

During the development of a workflow post-operation script there is a need for the ability to test, debug and validate that the script is working as desired. To facilitate this process, then ProductCenter includes a workflow operation log program named **wfoplog.exe** to capture and record all stdout and stderr output as well as the exit code from the workflow post-operation script.

There are three ways you can configure this program to capture the information you want: You can manually alter the pre-/post-operation command in the process definition. Or you can add resource variables to the cms_site file to specify which operations you want to study. Or you can use the Activity Notebook to generate the appropriate resource variables, and then simply copy them into the cms_site file.

Manual Configuration

To manually configure the wfoplog program, the Activity Notebook post-operation entry can be updated with the following command line,

```
wfoplog [-options] log_file_name script_file_name
        script_file_argument(s)
```

The wfoplog program will create the named log file (if it does not already exist), and then will append lines to it as they are ready to be recorded. Lines will be time-stamped and labeled as to their content. The following content lines will be logged,

- Arguments used to invoke the script
- Stdout lines written by the script
- Stderr lines written by the script
- Exit code from the script (or error code from trying to launch the script)
- Errors related to the arguments used to invoke wfoplog

The wfoplog program will write error messages to its own stderr if it is unable to record them in the log file. This would be expected to happen if the specified log file name is invalid or wfoplog does not have permission to create and append to the file. (If you suspect this is happening, you could look in the \$CMS_HOME/log/broker/start_2_log.txt file for these messages.)

wfoplog options

The wfoplog program is used as a debugging tool, so that the logged data is as complete as possible. However, it is possible to invoke it with an options argument that specifies what information to include or exclude from the log file. For example, you can specify that the log file will contain the stdout from the script and nothing else (no labeling, time stamps, stderr, exit codes, etc.). When this is done, the information which is excluded from the log file is lost: there



is no way to put some of the information into one log file and other parts of it into other files.

When specified, the `--options` argument is made up of a dash followed by one or more of the following letters. The order of the letters in the argument does not matter, and they may be either upper case or lower case. If the argument is not specified, the program uses the default value `--AOEXLTP`.

Table C-1: Options Argument

Letter	Meaning
A	Log the command line arguments.
O	Log the stdout output from the program.
E	Log the stderr output from the program.
X	Log the exit code when the program exits.
L	Label each line in the log as to the type of information it contains: command line arguments, stdout, stderr, or exit code.
T	Include a time stamp on each line in the log.
P	Include the OS process id of the script in the label on each line in the log.
B	Write all the log lines for the program to the log file in a single block, rather than allowing them to be interleaved with lines logged for another program that may be executing concurrently. Writing the log lines in a single block is more efficient if many separate stdout and/or stderr lines will be logged. If another copy of wfoplog is running concurrently and logging a different program, then the other copy will be blocked from executing until this copy exits. If both copies specify the A option and this copy starts first, then the other copy will be blocked before it launches the program it is to log. Thus, use of this option may alter the behavior of logged processes that would execute concurrently.
V	Write the version information of the wfoplog program to its stderr. All other options are ignored and no program is launched or logged.

Configuration Resources

As an alternative to modifying the Activity Notebook Post - operation table entries, wfoplog can be configured by creating specific resource entries in the `cms_site` file. The following table lists the resources.

Table C-2: Configuration Resources

Resource Name	Resource Value	Meaning
<code>site.workflow.oplog.enabled</code>	TRUE	Use wfoplog to run and log all pre-/post-operation script programs for all activities of all processes and for the processes themselves. If not set to TRUE , then only do so for those that are individually specified by numbered family resources.
<code>site.workflow.oplog.options</code>	-options argument	Default -options argument value for logging all pre-/post-operation scripts. Specification of options for individual scripts will override this default.
<code>site.workflow.oplog.file</code>	filename	Default log_file_name argument value for logging all pre-/post-operation scripts. Specification of a file name for individual scripts will override this default. If <i>file-name</i> is not syntactically a complete file path, then it will be interpreted relative to the ProductCenter log directory on the server (e.g. <code>C:\Product-Center\log</code>). If not specified, the default is wfop.txt .
<code>site.workflow.oplog.number.process</code>	process_name	Name of a process whose operation script programs are to be logged. Unless a corresponding activity resource is specified, the process pre- and post-operation script programs and all activity post-operation script programs will be logged.



site.workflow.oplog.number.activity	activity_name	Name of an activity within a process whose operations are to be logged. This restricts the scope of the corresponding process resource. Two activity names are reserved with special meaning: -1 represents the process pre-operations, and 0 represents the process post-operations. If not specified, then all activity names for the specified process will be logged.
site.workflow.oplog.number.trigger	Direction	Direction of workflow movement from an activity for the operations that are to be logged. Legal values are F and B (abbreviation for Forward and Backward; only the first letter will be inspected and case will be ignored). If not specified and opnum is not specified, then operations triggered for both directions from the specified activity name and process will be logged. If not specified and opnum is specified, then operations triggered for Forward from the specified activity name and process will be logged.
site.workflow.oplog.number.opnum	index	Index into the specified operations table(s) for the entry that is to be logged. Index 0 is the first entry in the table. If not specified, then all entries in the specified operations tables will be logged.
site.workflow.oplog.number.options	-options argument	The -options argument value for logging the specified scripts. If not specified, then the default will be used.
site.workflow.oplog.number.file	Filename	The log_file_name argument value for logging the specified scripts. If not specified, then the default will be used.

The family of resource names that begin with site.workflow.oplog.1 are representative. You may specify many such families by changing the number. Any number from 1 to 999 is accepted. Gaps in numbering are allowed (i.e. it is OK to specify families 1 and 3 without specifying

family 2). If the process member of a numbered family is not specified, then all the other members of that family will be ignored.

Using these resources to enable and configure logging with wfoplog makes it much more convenient to disable it when you finish debugging the scripts: simply delete all of these lines from the cms_site file.



User Interface Configuration

In order to further simplify the process of enabling and configuring use of wfoplog, the Process Editor in the Windows client includes this information. The Process Properties Operations tab includes a **Logging** button that brings up a dialog box for setting the three default resources and for disabling all logging in the process from a single button. The operations tables in the Activity Notebook Post-operations tab and the Process Properties Operations tab includes a third column labeled “Logging”. In each row of the tables this column shows the options and file resources that apply to that row. (If no options value has been set by any resources, then none is shown. If logging has not been enabled for the row, then the entire column is blank.) Clicking on or attempting to change the text in this

third column brings up a dialog box for choosing options with check boxes and a box for typing in the log file name.

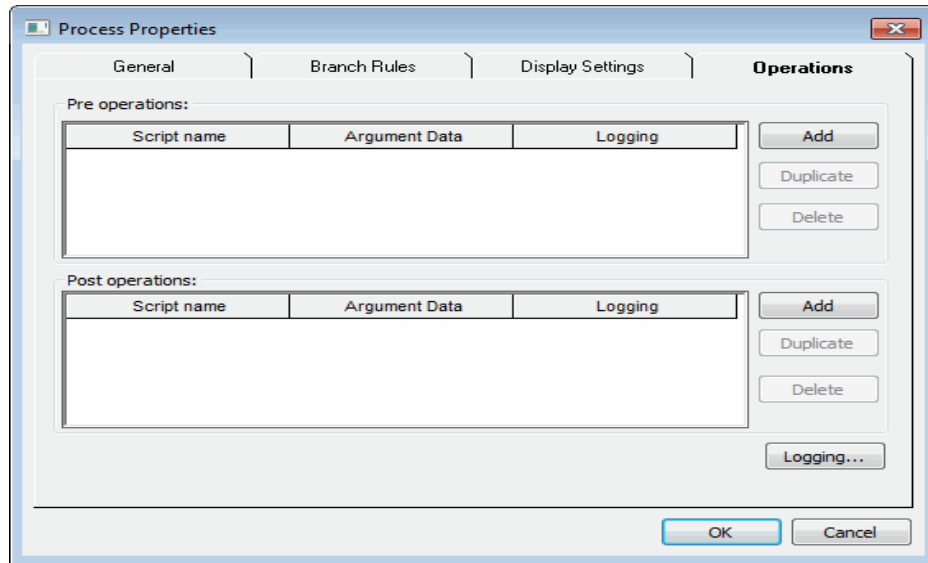


Figure C-1: Process Properties Operations dialog

Using the Process Editor in the Windows client to edit resources in the `cms_site` file is subject to one limitation: the Windows client may not be running on the server computer where the file is stored (or the program may not have write access to the file for some other reason). Because that may be the case, the Process Editor will always write out a local disk file containing the complete set of `site.workflow.oplog` resources that should be placed into the `cms_site` file and instruct the user to put them there using a text editor. Whenever the Process Editor is started, it will use the `site.workflow.oplog` resources from the server.

Using the Process Editor rather than manually editing the resource entries eliminates the possibility of incorrectly typing process or activity names and may make it easier to visualize what will be done. On the other hand, because the

Process Editor focuses on a single process it tends to hide the status of logging for all the other workflow processes.

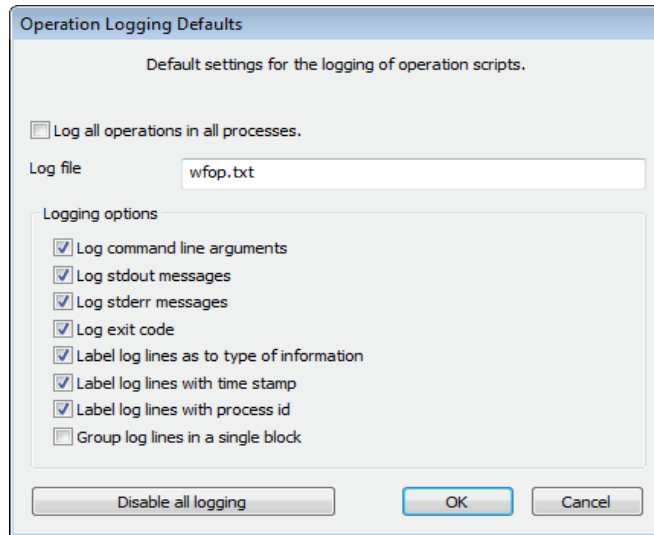


Figure C-2: Options for logging operation

See “Workflow Pre/Post-Operation Server Log” on page 99 for additional information.

Tools for debugging wfemail issues connecting to the mail host

In an effort to make it easier to debug wfemail issues on Windows when connecting to the mail host, a debug-enabled mode has been implemented to capture and log all the details of the SMTP dialog, so that mail experts could see exactly what was failing.

For example:

Use ssltap as a proxy server to do packet sniffing.

Pick an unused port on the app server, e.g. 2525, and launch it in a command window:

```
ssltap -l -p 2525 realmailserver:25
```

Temporarily edit `cms_site` so that `cms.SMTP.mail.host` points to this proxy:

```
cms.SMTP.mail.host = localhost:2525
```

Do something that generates email, and watch the command window.

For `wfemail`, remember to wait 5 minutes before it actually generates the email.

Index

Symbols

\$ACTIVITYCOMMENTS 219
\$ACTIVITYDUEDATE 218
\$ACTIVITYDUETIME 219
\$ACTIVITYID 93, 225, 228
\$ACTIVITYNAME 218
\$CURRENTDATETIME 219
\$ITEMCLASS 219
\$ITEMCOMMENT 219
\$ITEMDESCRIPTION 219
\$ITEMID 219
\$ITEMLASTUSER 219
\$ITEMNAME 219
\$ITEMREVISION 219
\$ITEMSTATUS 219
\$ITEMTITLE 219
\$ITEMTYPE 219
\$ITEMVERSION 219
\$PROCESSID 93, 225, 228
\$PROCESSNAME 218
\$PROCESSOWNER 218
\$WRKITMID 93

A

activate process 47
activating an activity 120
activities 3, 6, 20, 32, 130, 154
 activating 120
 adding to process 56
 assigning 190
 claimable 17, 78, 131, 132

 connecting 58
 creating sequential or parallel 56
 On Hold 115, 188
 placing On Hold 188
 reassigning 116, 137
 removing from process 57
 responding to assigned 132
 sending back 136
 sending forward 134
 specifying Thresholds 78
 state (status) 8
 suspending 120
 viewing state (status) 149
 working with 56
actual date 140
Add Project window 162
adding a non-O.S. user account 200
adding roles 202
Administer Process Definition window 47, 48
Administration menu 121, 138
administrative procedures 200
administrators 2, 104, 125, 200
Align commands 74
approve
 See send forward.
Argument Data 98
Argument data column 152
Assign Activity window 190, 191
assign an activity 191
Assignees 79
Assignees field 147
assigning an activity 190
assigning roles 164
Assignments 5, 31, 155

Assignments window (Viewer version) 148
associated information 192
Attached Process Instances List 196
attached processes 196
Attachment column 192
Audit Trail 121
 comments 136
audit trail 7, 158
 printing 160
 viewing 160

B

Back Threshold 31, 34, 156
 setting 70, 147
 specifying 78
branch 33
Branch Rules
 tab 72, 153
branch rules 41, 80
 creating 87
 definition of 68
 examples 87
 modifying 41
 syntax 80
Branch Rules tab
 Notebook window 72, 153
 Properties window 59, 62, 142
bypass user 111, 113, 200, 202

C

Cancel 121
cancelling
 an On Hold activity 119
 process definitions 125
 process instances 125
cancelling a process 126
 permissions 126

 restrictions 126
claimability 17, 77, 130
Claimable window 3, 7, 16, 130, 166
class
 file vs. project 161
cms.admin.user.enforce_existence 200
cms.workflow.bypass_assignment_user 111
cms.workflow.enabled 14, 111
cms.workflow.update_interval 111
cmsexp.lis 201
cms_site file 14, 200
cms_site, email utility 214
cmsusadm.exe 201
comments
 entering 136, 189, 190
 viewing 158, 160
 See also Audit Trail
Comments window 190
Completed 155
Completed on 150
Condition field 175
connectors 32
 adding 58
 adding corners 58
 multiple 33
 removing from process 57
context menus 17, 21
coordinator
 assigning an activity 191
coordinators 2, 104, 200
 and On Hold activities 188
 Suspended By column 116
creating a workflow process
 See Process Editor 42
cross-dependencies (Merge All) 51

D

dates 140
 estimated completion 31, 140, 150

- deadlocked activity 36
- Default class 61
- defining a workflow process
 - See* Process Editor 42
- Delete a process 121
- deleting
 - process definitions 125
 - process instances 125
- deleting a process 127
 - permissions 126
 - restrictions 126
- Dependencies tab
 - Notebook window 70, 150
- designer 2, 32
- Diagram view 28
 - Process Editor 28
 - Process Viewer 139
- Display Settings tab
 - Properties window 63
 - Properties window in the Viewer 143
- Done Threshold 31, 34, 155
 - setting 70, 147
 - specifying 78
- duration 31, 150, 155

E

- electronic signature 120, 135, 137, 188, 189
- Electronic signatures and Issue Form 5
- email utility 212
 - cms_site 214
 - installed files 214
 - keywords, substitution 218
 - resource file 214, 215
 - setup and configuration 213
 - supported scenarios 212
 - template files 214, 217, 219, 221
 - using from command line 231
- email utility arguments
 - actid 228

- bhost 228
- bport 228
- cmsdb 228
- cmslog 228
- cmsspass 228
- debug 229
- delay 228
- dlfile 229
- logfile 228
- mhost 228
- msgfile 228
- nagfile 230
- nagmode 229
- nagtime 229
- nusers 229
- procid 228
- resfile 215, 228
- verbose 229
- email utility keywords
 - \$ACTIVITY COMMENTS 219
 - \$ACTIVITYDUE DATE 218
 - \$ACTIVITYDUETIME 219
 - \$ACTIVITYNAME 218
 - \$CURRENTDATE TIME 219
 - \$ITEMCLASS 219
 - \$ITEMCOMMENT 219
 - \$ITEMDESCRIPTION 219
 - \$ITEMID 219
 - \$ITEMLASTUSER 219
 - \$ITEMNAME 219
 - \$ITEMREVISION 219
 - \$ITEMSTATUS 219
 - \$ITEMTITLE 219
 - \$ITEMTYPE 219
 - \$ITEMVERSION 219
 - \$PROCESSNAME 218
 - \$PROCESSOWNER 218
- email utility preference setting
 - pcwfmmail.broker.host_name 216
 - pcwfmmail.broker.port_number 216
 - pcwfmmail.log.file_name 216

pcwfmmail.log.message_level 216
pcwfmmail.message.file_name 217
pcwfmmail.message.line_nn 217
pcwfmmail.message.notify_user 217
pcwfmmail.message.subject 217
pcwfmmail.nag.file 217
pcwfmmail.nag.time_threshold 217
pcwfmmail.server.database_name 216
pcwfmmail.server.login_name 216
pcwfmmail.server.login_password 216
pcwfmmail.startup.delay_count 216
Error messages, wfemail 233
escalation file 236
Estimated Completion Date 31, 140, 150, 155
Estimated Duration 31, 150, 155
 setting 70, 148
Estimated field 150

F

file class 161
Find 175
fixed state 194
float state 194
floating state 194
Form editor 202
form-based process 5, 61, 166
 starting 162

G

General tab 161
 Notebook 68
 Notebook window in the Viewer 146
 Properties window 59, 141
generating reports 176
grid
 adjusting 63, 144
group roles 33, 113

I

icons
 Active and On Hold 20
icons, workflow toolbar 25
inactivate process 47
inactive process 162, 166
Informational Activity Assignments 36
Initiated 155
Issue Form 5, 161, 162
 and electronic signatures 5
Issue form 161

L

List Attached Process 196
List items using feature 48, 192
List Processes 195
List view 28, 29
 Process Editor 29
 Process Viewer 154
loops 42, 156
loops (Merge All) 51

M

MailMessage.mtf files 214
Merge 151
Merge All 33, 51, 71, 151
 design considerations 49
Merge One 33, 71, 151
messages, email utility 218
My Work List 6, 16
 as Preferred Window 23
My Work List window 3, 20, 130
 automated refresh 111
 using 133

N

nag file 236
newuser.lis 201
Notebook 68
notification 236
notification utility 212

O

Off Hold 189
Oh Hold
 from Search Results 175
On Hold 115, 131, 188, 191
 handling activities 116
 placing an activity 188
On/Off Hold 190
operations
 creating 94
 post-operation 92
 pre and post 41
 pre-operation 92
 working with 92
Operations tab
 Properties window 59, 64
 Properties window in the Viewer 144
overview 3

P

Permissions tab
 Properties window 67
permissions, screen access 13
placing an activity On Hold 188
pop-up menus. *See* context menus.
post-operations 41, 42
 creating 41, 94, 95
 definition of 68
 example 97

Post-operations tab 152
 Notebook window 71
Predecessors pane 151
preferences, email utility 215
pre-operations 41, 42
 creating 94
Pre/Post Operation Server Log 99
Print button 160
process definition 4
process designer 4
Process Editor 4, 7, 16
 adding activities 56
 creating a process definition 42
 designing a process 32
 Diagram view 28
 displaying 28
 List view 29
 overview 28
 permissions needed 28
 View commands 73
 views 28
process instance 4
process management 2
process query reports 178
process specific reports 178
Process Viewer 7, 16, 138, 196
 Administration menu 138
 Diagram view 139
 displaying 138
 List view 154
Process Viewer button 197
processes 4
 cancelling 48, 125, 126
 creating 44
 creating, modifying, and saving 55
 definitions instances 4
 deleting 48, 125, 127
 designing 32
 form-based 5, 161, 162
 instances 4
 list attached 196

-
- make active or inactive 47
 - opening 45
 - operations 94
 - removing activities or connectors from 57
 - reviewing 194
 - route- and form-based 166
 - route-based 5, 161
 - Save As 46
 - saving 42, 45
 - starting 161
 - status 8
 - validating 55
 - viewing 195
 - viewing attached 196
 - project class 161
 - Properties window 59, 161
 - Branch Rules tab 59
 - Branch Rules tab in the Viewer 142
 - Display Settings tab 59
 - Display Settings tab in the Viewer 143
 - General tab 59
 - General tab in the Viewer 141
 - Operations tab 59
 - Operations tab in the Viewer 144
 - Permissions tab 59
 - Permissions tab in the Viewer 145
 - Process Viewer version 140
- Q**
- queries 167
- R**
- reassign
 - current activity (user procedure) 137
 - from Process Viewer (coordinator procedure) 122
 - from search results (coordinator and DBA procedure) 123
 - on hold activities (coordinator procedure) 117
 - summary of procedures 186
 - reassign, on-hold (coordinator procedure) 116
 - refresh 111
 - reject
 - See* send back 6
 - reports 176
 - reports, generating an XMLreport 179
 - reports, process query 178
 - reports, process specific 178
 - requesting that a coordinator assign an activity 191
 - resource file, email utility 214, 215
 - resource variables 111
 - resources 33, 154
 - assigning 70, 75, 147
 - assigning to multiple activities 76
 - bypass user 111
 - viewing multiple assignments 133
 - responsibilities of administrators and coordinators 104
 - Restart Activity 121
 - Resume Activity 122
 - Role Value column 190, 191
 - roles 34, 112, 190, 200
 - adding 202
 - administrator 2
 - assigning 164
 - coordinator 2
 - defining 34, 113
 - designer 2
 - group 112
 - Last User 112
 - Preparer 112
 - system-defined 112
 - user 3, 112
 - Route selected 5
 - Route Selected Item 161
-

Route selected item 165
Route Selected Item window 166
route-based process 5
 starting 165

S

Screen Access 13
Script name column 152
Search window 175
send back 6, 130, 136
send forward 6, 130, 134
setting resource variables 111
Show States checkboxes 195
SQL, using to troubleshoot email utility 231
Start object 33
Start on 150
Started on 149
starting
 a route-based process 165
 form-based processes 162
 the Process Editor 28
 the Process Viewer 138
state 8, 197
state (status) 149
State (status) tab
 Notebook window in the Viewer 149
states 155
 activity 8
 floating and fixed 194
 process 8
status 8, 155
 viewing activity 149
Status (state) column 197
stylesheets, XSL 177
Successors pane 151
Suspend Activity 122
suspending an activity 120

T

taking an activity Off Hold
 See Off Hold 189
tasks *See* activities.
template files, email utility 214, 219, 221
 editing 217
 substitution keywords 218
termination (Merge All) 51
threshold 34
 deadlocked activity 36
 setting 70, 147
Travel Counter 156
troubleshooting email utility issues 231

U

UNIX
 support 12
user 3
user roles 33, 113
users bypass 113

V

Validate Process 55
variables, Workflow 93, 218, 219, 225, 228
versions 12, 45
View Assignment Status 121
View commands 73
 align 74
 zoom 73
viewing processes 195
Vote Weighting 155
voting
 specifying weight 78
 thresholds 78
 weight 34

W

Web Client interface 14

wfemail 214, 232

error messages 233

wfemail.exe 214, 232

wfemail_site 214, 215

wfoplog 241

windows

Add Project 162

Assign Activity 190, 191

Claimable 7, 16, 130

Claimable Work 3

Electronic Signature 188

My Work List 3, 6, 20, 130

My Work List, using 133

Process Editor 7

Process Viewer 7

Process Viewer Properties 140

Properties 59

work area 29

adjusting size 63, 143

work instructions 31, 155, 157

defining 70, 147

viewing 157

Workflow

introduction 2

menu 14, 23

using 130

Workflow Activity State (status) 8

Workflow Assignment State (status) 8

Workflow overview 3

Workflow queries 167

X

XSL stylesheets 177

Z

zoom 73





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