

IBM Cúram Social Program Management  
8.0.2

*Cúram Milestone Developer Guide*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 14](#)

**Edition**

This edition applies to IBM® Cúram Social Program Management 8.0.0, 8.0.1, and 8.0.2.

Licensed Materials - Property of IBM.

© **Copyright International Business Machines Corporation 2012, 2022.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

© .

---

# Contents

<b>Tables.....</b>	<b>iv</b>
<b>Chapter 1. Developing with milestones.....</b>	<b>1</b>
Configuring milestones.....	1
Milestone configuration settings.....	1
Associating milestones with cases.....	3
Configuring milestone waiver request approvals.....	3
Milestone entities.....	4
Milestone configuration.....	4
Milestone link.....	6
Milestone waiver approval check.....	6
Milestone delivery.....	7
Milestone waiver approval request.....	8
Milestone business processing.....	8
Milestone configuration.....	8
Maintain milestone waiver approval.....	10
Maintain waiver approval request.....	10
Milestone delivery.....	11
Implementing a generic milestone event handler.....	12
Create a milestone delivery when a milestone creation event is raised.....	12
Complete a milestone delivery when a milestone completion event is raised.....	12
<b>Notices.....</b>	<b>14</b>
Privacy Policy considerations.....	15
Trademarks.....	15

---

# Tables

1. Milestone configuration settings.....	1
2. Summary of MILESTONECONFIGURATION Entity Fields.....	4
3. Summary of MILESTONELINK Entity Fields.....	6
4. Summary of MILESTONEWAIVERAPPROVALCHECK Entity Fields.....	6
5. Summary of MILESTONEDELIVERY Entity Fields.....	7
6. Summary of MILESTONEWAIVERAPPROVALREQUEST Entity Fields.....	8
7. Summary of MilestoneConfiguration methods.....	8
8. Summary of MaintainMilestoneWaiverApproval methods.....	10
9. Summary of MaintainWaiverApprovalRequest Methods.....	10
10. Summary of MilestoneDelivery methods.....	11

# Chapter 1. Developing with milestones

Use this information to design milestone functionality, a key component of Cúram integrated cases. Case milestones are used to track the completion of significant events or tasks during the life cycle of a case, for example, to track the submission, approval, and activation of a case. Milestone processing can be customized to suit agency needs.

Milestones functionality satisfies the following business requirements:

- Track the completion of significant events or tasks during the life cycle of a case.
- Provide configuration to associate milestones with a case.
- Provide administration to support the association of milestone configuration with case components and events.
- Support ability to create and complete milestones automatically.
- Capability to configure and use milestone waiver approval requests at user, organization unit, and milestone levels.
- Generic infrastructure support to create or complete milestone deliveries automatically based on raised events.

## Configuring milestones

Administrators can configure milestones and associate the milestone configurations with cases. Case milestones are used to track the completion of significant events or tasks during the lifecycle of a case, for example, to track the submission, approval, and activation of a case. Each milestone has an expected start and end date during which the important event is scheduled to start and complete and an actual start and end date.

Capabilities to configure and use milestone waiver approval requests at user, organization unit, and milestone level are also provided. For example, a child care solution configures milestones to track the completion of important events that occur on a child care case.

**Note:** Case milestones can be configured for integrated case, product, and screening case types; however, there is currently no functionality available within these case types to create milestone deliveries. Development effort is required to create milestone deliveries at the case level.

## Milestone configuration settings

All case milestones are based on an associated milestone configuration. Use the table to understand the available milestone configuration settings and how to use them.

Table 1. Milestone configuration settings		
Configuration settings	How to use	Optional or mandatory
Name and Type	Use the name and type to distinguish the milestone configuration. When creating a manual milestone, a user must select the milestone configuration to apply by using the milestone configuration name.	Mandatory

*Table 1. Milestone configuration settings (continued)*

<b>Configuration settings</b>	<b>How to use</b>	<b>Optional or mandatory</b>
Earliest Start Day (days)	<p>Use to determine the expected start date for automatically created milestones. The expected start date is set to the current date on which the milestone is created plus the number of days that are defined here.</p> <p>You can also use this setting to validate the expected start date that is entered by a user when manually creating a milestone. A milestone cannot have an expected start date earlier than this number of days after the start date of the case. For example, if the milestone is created on April 1 and this setting is 3, then the expected start date of the milestone cannot be earlier than April 4.</p>	Mandatory
Duration (days)	<p>Use to determine the expected end date for all milestones. For manually created milestones, the expected end date is set to the user-entered expected start date plus this duration minus one. For example, if the expected start date is April 1 and the duration is 7 days, the expected end date is set to April 6. For automatically created milestones, the same calculation is applied to the expected start date defined by the date on which the milestone was created and the Earliest Start Day (days).</p>	Mandatory
Start Date	Use the start date to determine the active, and thus availability, period of the milestone configuration.	Mandatory
End Date	User the end date to determine when the milestone configuration is no longer active. This date is not mandatory as milestone configurations can remain active for an indefinite time period.	Optional
Expected Date Extension Allowed	This indicates whether the expected start and end dates for an automatically created milestone can be modified by a User. If this indicator is not set, then the expected start and expected end date that is calculated upon creation of a milestone are unchangeable.	Optional
Waiver Required	This indicates whether a waiver is required to change the expected start and expected end date for an automatically created milestone. This can only be set for milestone configurations, which allow the expected dates to be extended (as described in the setting above).	Optional
Milestone Added	Any existing workflow event can be associated with the creation of a milestone. This event can be used to extend the OOTB milestone creation processing. For example, when a milestone is added, a workflow can be enacted to notify the case owner.	Optional

*Table 1. Milestone configuration settings (continued)*

Configuration settings	How to use	Optional or mandatory
Milestone Complete	Any existing workflow event can be associated with the completion of a milestone. Use this event to extend the default milestone completion processing. For example, when a milestone is completed, a workflow can be enacted to notify the case owner.	Optional
Expected Start Date Not Achieved	Any existing workflow event can be associated with the expected start date to track the timeliness of the milestone. For example, if no actual start date is entered for the milestone and the expected start date passes, a workflow can be enacted to notify the supervisor that the milestone is not yet started.	Optional
Expected End Date Not Achieved	Any existing workflow event can be associated with the expected end date to track the timeliness of the milestone. For example, if no actual end date is entered for the milestone and the expected end date passes, a workflow can be enacted to notify the supervisor that the milestone is not completed in a timely fashion.	Optional

## Associating milestones with cases

To support the manual and automatic creation of milestones within a case, it is necessary to set up an association between a milestone configuration and the case type (product delivery, integrated case, or screening type). There are two options for setting up these associations: either a new milestone configuration can be recorded at the same time it is associated with the case type or an existing milestone configuration can be selected.

When recording a new milestone configuration as part of the association process, the milestone configuration information must be defined. Additional association information can also be defined whether the milestone is to be created automatically. The two main configuration settings for automatically created milestones are the creation event and the completion event. These events are used by the application to automatically create and complete an instance of the milestone.

For example, a milestone can be set up to track the approval of a product delivery case. To set up the automatic creation of this milestone, the Submit Case event can be selected as the creation event and the Approve Case event can be selected as the completion event. When a case is submitted for approval, the Submit Case event triggers an instance of the milestone. Later when the case is approved, the Approve Case event closes the milestone instance.

The matching process for creating milestones within a case can be further specified by using the component type and component category settings. A clear distinction can be made between creation and completion events at the case level and at the case component level. For example, the case component, Contract, can be set, with a creation event of Create Contract and a completion event of Close Contract.

When a contract is created, the Create Contract event triggers an instance of the milestone and the application associates both the contract ID and the case ID with it. Later when the contract is closed, the Close Contract event uses both of these IDs to find and close the correct milestone instance.

## Configuring milestone waiver request approvals

A milestone waiver request may be required in order for the milestone expected start and end dates to be changed for an automatically created milestone. Milestone waiver request approval checks can be set up at the organization and user level. Expected start and end dates for manually created milestones can be

changed without a waiver request. The milestone waiver request approval process is used to confirm that the changes in dates to the milestone are valid.

Once a submitted request is approved, the new expected start or end dates or both, take effect.

Milestone waiver requests can only be submitted (that is, the expected dates for a milestone can only be changed) if the Expected Date Extension Allowed setting is configured. The approval process (that is, the need to submit a waiver request for approval) for these requests is only necessary if the Waiver Required setting is also configured. If the Waiver Required setting is not configured, a user is able to change the expected start or end dates or both directly.

Milestone waiver request approval check settings for a milestone include a setting that is used to determine the percentage of submitted waiver requests for a milestone of a particular type that need to be reviewed by a case supervisor, for example, 40%. Alternatively, an administrator can indicate that all waiver requests for a milestone that need to be reviewed by a case supervisor.

User configuration settings take precedence over organization unit settings. When a waiver request is submitted for approval, the system first checks the user's milestone waiver request approval check settings, then checks the milestone waiver request approval check settings for the organization unit that the user belongs to. After checking these settings, the system checks the approval settings at the milestone level. The system may determine at any point in this process that the milestone waiver request requires approval.

## Milestone entities

Milestone entities and the fields that they contain are described.

It should be noted that tables are used to represent each of the following milestone requirements:

- the milestone configuration details available in the system
- the relationship between milestone configuration and a case type
- the milestone waiver approvals percentage for a user, organization unit, or a milestone.
- the milestone deliveries that are created by the user or by the system
- the milestone waiver approvals or requests for a milestone. A milestone can have multiple approval requests.

The following entities form the actual design of milestone functionality:

- MILESTONECONFIGURATION
- MILESTONELINK
- MILESTONEWAIVERAPPROVALCHECK
- MILESTONEDELIVERY
- MILESTONEWAIVERAPPROVALREQUEST

## Milestone configuration

The MILESTONECONFIGURATION entity is focused on the administration of milestones within the Administration component. A milestone can be associated with one or more types of cases or service plans. This entity contains the following fields:

Table 2. Summary of MILESTONECONFIGURATION Entity Fields	
Entity Field	Description
milestoneConfigurationID	Unique reference number that is assigned by the system to the milestone configuration record.
name	Name of the milestone. This field is mandatory.
type	Type of the milestone. This field is mandatory.



*Table 2. Summary of MILESTONECONFIGURATION Entity Fields (continued)*

<b>Entity Field</b>	<b>Description</b>
earliestStartDay	The earliest number of days after the service plan or case start date that this milestone can start. This field is mandatory.
duration	Indicates how long this milestone takes to complete(this is used to calculate the expected end date of a milestone unless the milestone is added as part of a service plan template in which case the duration on the template supersedes this value). This field is mandatory.
startDate	The date on which this milestone configuration becomes effective. This field is mandatory.
endDate	The date on which this milestone configuration expires.
addedEvent	Indicates the event to be raised when a milestone of this type is added to a case or service plan
expctdStDateEvent	Indicates the event to be raised when the expected start date of the milestone is reached and its status is Not Started.
expctdEndDateEvent	Indicates the event to be raised when the expected end date of the milestone is reached and its status is Not Started or In Progress.
completeEvent	Indicates the event to be raised when the status of the milestone is Completed, that is, The actual end date is entered and the status is Complete.
creationDate	The date on which this milestone was created.
comments	General remarks that are entered by a user.
waiverRequired	Indicates if an approved waiver is required to modify the automatically created milestone delivery by system.
waiverAllowed	Indicates if a user can modify the Expected Start Date or Expected End Date of an milestone delivery that is automatically created by the system.
commentsTextID	Unique Identifier corresponding to localized TextID of milestone comments.
nameTextID	Unique Identifier corresponding to localized TextID of name.
recordStatus	The status of the milestone, that is, Active or Cancelled. Logical deletion supported.
typeTextID	Unique Identifier corresponding to localized TextID of Milestone type.

## Milestone link

The MILESTONELINK entity allows for the administration of the links between cases or service plan and milestones. This entity contains the following fields:

Table 3. Summary of MILESTONELINK Entity Fields	
Entity Field	Description
milestoneLinkID	Unique reference number that is assigned by the system to the milestone link record.
caseTypeID	Unique reference number of the case or service plan, which is associated with the milestone record.
caseType	Type of case, which is linked to the milestone configuration, for example, service plan, product, issue.
componentCategory	The category of a component that is associated to a case, which is linked to the milestone configuration.
componentType	Type of a component that is associated to a component category, which is linked to the milestone configuration.
creationEvent	Identifies the event based on which a milestone delivery is created.
completionEvent	Identifies the event based on which a milestone delivery is completed.
milestoneConfigurationID	Unique reference number of the milestone record, which is associated with the case or service plan record.

## Milestone waiver approval check

The MILESTONEWAIVERAPPROVALCHECK entity is focused on the administration of milestone waiver approval. A milestone waiver can be associated with user or milestone or organization unit.

Table 4. Summary of MILESTONEWAIVERAPPROVALCHECK Entity Fields	
Entity Field	Description
milestoneWaiverApprovalCheckID	Unique reference number that is assigned by the system to the milestone waiver approval check record. This field is mandatory.
percentage	Percentage of waiver requests for the milestone that requires approval. This field is mandatory.
type	Type of milestone waiver approval check. This field is mandatory.
status	The status of the milestone waiver approval check, that is, Active or Canceled. Logical deletion supported. This field is mandatory.
milestoneConfigurationID	Unique identifier of the milestone configuration on which this milestone waiver approval check is based.

<i>Table 4. Summary of MILESTONEWAIVERAPPROVALCHECK Entity Fields (continued)</i>	
<b>Entity Field</b>	<b>Description</b>
userName	The user name of the milestone waiver approval check.
organisationUnitID	Unique organization unit reference number of the milestone waiver approval check.
comments	General remarks that are entered by a user.
versionNo	Version number of the milestone waiver approval check.

## Milestone delivery

MILESTONEDELIVERY entity is focused on the addition of a milestone to any type of case, for example, service plan, product delivery.

<i>Table 5. Summary of MILESTONEDELIVERY Entity Fields</i>	
<b>Entity Field</b>	<b>Description</b>
milestoneDeliveryID	Unique identifier that is assigned by the system to this milestone record. This field is mandatory.
milestoneConfigurationID	Unique identifier of the milestone configuration on which this milestone is based. This field is mandatory.
caseID	Unique identifier of the case to which this milestone is added. This field is mandatory.
ownerUserName	Unique identifier of the user who is the milestone owner. This field is mandatory.
expectedStartDate	Date on which the milestone is expected to start. This field is mandatory.
expectedEndDate	Date on which the milestone is expected to end. This field is mandatory.
actualStartDate	Date on which the milestone started.
actualEndDate	Date on which the milestone ended.
comments	General remarks that are entered by a user.
status	Status of this milestone, that is, Not Started, In Progress or Completed. This field is mandatory.
createdBySystem	Indicates whether this milestone delivery is system generated record. This field is mandatory.
relatedID	Identifier, which relates the instance of a milestone to a component category or a component type of a case instance.

## Milestone waiver approval request

The MILESTONEWAIVERAPPROVALREQUEST entity is focused on the milestone waiver approval request that is raised by the user and is only applicable for system generated milestone deliveries.

Table 6. Summary of MILESTONEWAIVERAPPROVALREQUEST Entity Fields	
Entity Field	Description
waiverApprovalRequestID	Unique reference number that is assigned by the system to the milestone waiver approval request record. This field is mandatory.
approvalRequestID	Unique reference number of approval request record.
milestoneDeliveryID	Unique reference number of a milestone delivery to which milestone waiver approval request is related. This field is mandatory.
originalExpStartDate	Date on which the milestone was originally expected to start. This field is mandatory
requestedExpStartDate	Date on which the milestone is being requested to start. This field is mandatory
approvedExpStartDate	Date on which the milestone is approved to start.
originalExpEndDate	Date on which the milestone was originally expected to end.
requestedExpEndDate	Date on which the milestone is being requested to end.
approvedExpEndDate	Date on which the milestone is approved to end.
requestComments	Comments that are entered by a user on submission of a milestone waiver request for approval.
approvalComments	Comments that are entered by a user on approval of a milestone waiver request.
requestedDate	Date on which this milestone waiver approval request created. This field is mandatory.

## Milestone business processing

Milestone process classes and their associated methods support milestone business processing.

## Milestone configuration

The process class, which supports the business process MilestoneConfiguration is Product.

Table 7. Summary of MilestoneConfiguration methods	
Method	Description
cancelMilestoneConfiguration	This method sets the status of a milestone configuration to canceled.
createMilestoneConfiguration	This method creates a milestone configuration record. The milestone type of a milestone configuration must be unique.

*Table 7. Summary of MilestoneConfiguration methods (continued)*

<b>Method</b>	<b>Description</b>
listMilestoneConfigurationsForCaseType	This method lists all active and canceled milestone configuration records.
modifyMilestoneConfiguration	Modifies the details of a milestone configuration record.
readMilestoneConfiguration	Reads the details for a milestone configuration record.
addInvestigationCaseExistingMilestone	This method adds a set of existing milestones to the investigation case.
createInvestigationCaseMilestone	This method creates a new milestone configuration and then creates the link between the milestone and the investigation case.
listMilestone	This method lists all the milestones, which are currently associated with a particular product.
listUnassociatedMilestone	Lists all the active milestones that are not already associated with a particular product.
removeMilestone	This method removes the link between a milestone and a product.
cancelApprovalCheckForInvestigation	This method allows an administrator to cancel an Investigation Approval Check for a particular investigation.
getComponentList	This method returns a list of components based on the component base type. This method works on a hook mechanism and is based on the component base type, which is being passed to it.
getSubComponentList	This method returns a list of sub components based on the component base type. The list of sub components that are retrieved is also handled by a hook mechanism ,which is driven by the component base type.
addInvestigationCaseExistingMilestoneWithConfig	This method adds a set of existing milestones to the investigation case along with configuration details such as component category, component type, creation event, and completion event.
modifyMilestoneLinkAssociation	This method modifies associated configuration details such as creation event, completion event, component type, and sub component type for the milestone link.

## Maintain milestone waiver approval

Table 8. Summary of MaintainMilestoneWaiverApproval methods	
Method	Description
viewOrgUnitMWApproval	This method returns milestone waiver approval check details based on the milestone waiver approval check id for an organizational unit. A similar method exists for users.
listMilestoneApprovals	This method lists the milestone approval checks for a particular milestone configuration. It also determines whether a new milestone approval can be created or not.
listUserMWApprovals	Returns a list of milestone waiver approval check records based on the organizational unit id.
viewUserMWApproval	Returns milestone waiver approval check details based on the milestone waiver approval check id.

## Maintain waiver approval request

The ProductDelivery process class supports the milestone configuration business process.

Table 9. Summary of MaintainWaiverApprovalRequest Methods	
Method	Description
readMilestoneDeliveryDetails	This method reads milestone details such as expected start date and end date that is administratively configured for the milestone.
createWaiverApprovalRequest	This method allows users to create a waiver request for a milestone and submit it for the approval. It also checks whether the manual approval is required or not based on case supervisor or milestone approval checks. If not required it approves the waiver request automatically.
listMilestoneWaiverRequests	This method lists all the waivers that are requested for a milestone along with the status whether it is in submit status or approved or rejected.
readMilestoneWaiverRequests	This method reads the details of waiver request.
approveWaiver	This method approves the waiver request. It also checks the date validations and whether the approver has the supervisor privilege to approve the waiver or checks the approval check for a user or for user belonging to an organization and which has approval check.
modifyAndApprove	This method allows system to modify the waiver request details and approve the waiver request. It also checks the date validations and whether the approver has the supervisor privilege to approve the waiver or checks the approval check for a user or for user belonging to an organization and which has approval check.

<i>Table 9. Summary of MaintainWaiverApprovalRequest Methods (continued)</i>	
<b>Method</b>	<b>Description</b>
rejectWaiver	This method rejects the waiver request. It also checks the date validations and whether the logged in user has the supervisor privilege to reject the waiver.
readExpStartAndEndDate	This method reads the expected start date and end date of a waiver request.
readWaiverIndicatorDetails	This method sets a boolean parameter to true only when the Expected Time Frame indicator is set to true and if Waiver Required indicator is set to false in the Administration application for a milestone. Based on this boolean value the user is allowed to change the Expected Start and End Date at the client side.
modifyMilestoneForWaiver	This method is used to modify the milestone delivery details

## Milestone delivery

The methods that are listed here are part of the APIs, which support automatic creation of milestone deliveries by using the milestone configuration.

Administration configuration allows the user to associate work flow events with a milestone type for the creation and completion of milestone deliveries. When such events are raised, the appropriate event handlers use create or complete milestone delivery APIs.

<i>Table 10. Summary of MilestoneDelivery methods</i>	
<b>Method</b>	<b>Description</b>
createMilestoneDelivery	This method Creates milestone delivery based on event details. All milestone deliveries that are created by this method have 'Created By System' indicator set to true. The earliest start day is added to the current date to calculate the expected start date of this milestone delivery.
completeMilestoneDelivery	This method completes milestone delivery based on event details. If related ID has been passed as a parameter, then a search for milestone deliveries is based on the 'Related Id'. Once retrieved these milestone deliveries are completed. If the related id is not passed, then a search based on case type, component and the completion event is made. The list of milestone deliveries retrieved are then completed.

## Implementing a generic milestone event handler

---

You can implement generic milestone event handlers to create deliveries when milestones are created and also when they are completed.

### Create a milestone delivery when a milestone creation event is raised

You can automatically create milestone deliveries when a milestone creation event is raised.

- For milestones that are configured at the case level:
  1. Configure the Creation Event for a milestone.
  2. Define an entry in handler\_config.xml to map the configured Creation Event class to 'MilestoneCreationEventHandler'.
  3. Customers raise the creation event with 'caseID' as primary data.
- For milestones that are configured on case component level:
  1. Configure the Creation Event for a milestone.
  2. Define an entry in handler\_config.xml to map the configured Creation Event class to 'MilestoneCreationEventHandler'.
  3. Implement the sample interface 'MilestoneComponentDelivery' and provide an implementation for the 'populateMilestoneCreationDetails' method. This method populates the milestone creation start date according to the business requirements.
  4. Create a module class that extends the AbstractModule (com.google.inject.AbstractModule).
  5. Define a Map Binder to bind implemented class to 'MilestoneComponentDelivery' interface.  

```
Ex: MapBinder<String, MilestoneComponentDelivery> mapbinder
    = MapBinder.newMapBinder(binder(), String.class,
        MilestoneComponentDelivery.class);
mapbinder.addBinding().toInstance
    (new 'customimplmentationclass'());
```
  6. Customers raise the creation event with 'caseID' as primary data and ID of the component as the secondary data.

### Complete a milestone delivery when a milestone completion event is raised

You can complete a milestone delivery when a milestone completion event is raised.

- For milestones configured at the case level:
  1. Configure the Completion Event for a milestone.
  2. Define an entry in handler\_config.xml to map the configured Completion Event class to 'MilestoneCompletionEventHandler'.
  3. Customers raise the completion event with 'CaseID' as primary data.
- For milestones configured at the case component level:
  1. Configure the Completion Event for a milestone.
  2. Define an entry in handler\_config.xml to map the configured Completion Event class to 'MilestoneCompletionEventHandler'.
  3. Implement the sample interface 'MilestoneComponentDelivery' and provide an implementation for the method 'populateMilestoneCompletionDetails'. This method populates the milestone actual end date according to the business requirements.
  4. Create a module class that extends the AbstractModule (com.google.inject.AbstractModule).
  5. Define a Map Binder to bind the implemented class to the 'MilestoneComponentDelivery' interface.  

```
Ex: MapBinder<String, MilestoneComponentDelivery> mapbinder
    = MapBinder.newMapBinder(binder(), String.class,
        MilestoneComponentDelivery.class);
mapbinder.addBinding().toInstance
    (new 'customimplmentationclass'());
```



**Note:** There is no need to repeat Step 4 and 5 if the entry exists in the module class.

6. Customers raise the completion event with 'caseID' as the primary data and the ID of the component as the secondary data.

## Notices

---

This information was developed for products and services offered in the United States.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US*

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

*Intellectual Property Licensing Legal and Intellectual Property Law IBM Japan Ltd. 19-21, Nihonbashi-Hakozakicho, Chuo-ku Tokyo 103-8510, Japan*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

*IBM Director of Licensing IBM Corporation North Castle Drive, MD-NC119 Armonk, NY 10504-1785 US*

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

#### COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

## Privacy Policy considerations

---

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

Depending upon the configurations deployed, this Software Offering may use session cookies or other similar technologies that collect each user's name, user name, password, and/or other personally identifiable information for purposes of session management, authentication, enhanced user usability, single sign-on configuration and/or other usage tracking and/or functional purposes. These cookies or other similar technologies cannot be disabled.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at <http://www.ibm.com/privacy> and IBM's Online Privacy Statement at <http://www.ibm.com/privacy/details> the section entitled "Cookies, Web Beacons and Other Technologies" and the "IBM Software Products and Software-as-a-Service Privacy Statement" at <http://www.ibm.com/software/info/product-privacy>.

## Trademarks

---

IBM, the IBM logo, and [ibm.com](http://www.ibm.com) are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at <http://www.ibm.com/legal/copytrade.shtml>.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Java™ and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

The registered trademark Linux is used pursuant to a sublicense from the Linux Foundation, the exclusive licensee of Linus Torvalds, owner of the mark on a worldwide basis.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other names may be trademarks of their respective owners. Other company, product, and service names may be trademarks or service marks of others.





Part Number:

(1P) P/N: