

IBM Cúram Social Program Management  
8.0.2

*Cúram Batch Performance Mechanisms*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 16](#)

**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

- Figures..... iv**
- Tables..... v**
- Chapter 1. Tuning batch streaming performance.....1**
  - Overview.....1
  - Intended Audience..... 1
  - What Batch Performance Mechanisms does the application Provide?..... 1
  - Cúram Batch Processes using Batch Streaming.....1
  - Operation of Streamed Batch Processes..... 2
  - Batch Streaming Architecture..... 2
    - Overview..... 2
    - Architectural Details.....3
  - Data Caching..... 5
    - Core Cúram Entity Caches.....6
  - Cúram Batch Processes using Streaming.....7
    - DetermineProductDeliveryEligibility.....7
    - GenerateInstructionLineItems..... 8
    - GenerateInstruments.....8
    - CREOLEBulkCaseChunkReassessmentByProduct..... 8
    - ApplyProductReassessmentStrategy..... 9
    - Perform Batch Recalculations From Precedent Change Set batch process..... 9
    - RedetermineTranslator.....9
  - Operation of Streamed Batch Processes..... 10
    - Running Batch Executables..... 10
    - Environment variables.....11
    - Error handling..... 14
- Notices.....16**
  - Privacy Policy considerations..... 17
  - Trademarks..... 17

---

# Figures

- 1. Streaming Architecture Overview..... 3
- 2. Streaming Architecture Details..... 5

---

# Tables

1. Method Names for batch executables.....	10
--	----



---

# Chapter 1. Tuning batch streaming performance

Use this information to learn how to improve performance and scalability of batch streaming and the caching of batch process data. Batch streaming allows for concurrent execution of multiple instances of batch processes. Cúram batch processes use transaction level data caching. This can greatly reduce the volume of database transactions that are required for batch process execution.

## Overview

---

This guide gives an overview of the application functionality which allows both caching of batch data and execution of multiple instances of a single batch process. These enhancements were designed to improve the efficiency and scalability of Cúram batch processing.

Note that this guide should be read in conjunction with the Cúram Batch Processing Guide, which provides a description of all other aspects of Cúram Batch Processing.

## Intended Audience

This guide is intended for people interested in batch process performance mechanisms in the application.

## What Batch Performance Mechanisms does the application Provide?

Over and above good design and development paradigms, the application provides two primary mechanisms for improving the performance and scalability of Batch Processes:

- Batch Streaming
- Caching of Batch Process Data

### Batch Streaming

Batch Streaming refers to the application support for the concurrent execution of multiple instances of batch processes. Each logical batch process in the application (for example, `GenerateInstructionLineItems`) is represented by two physical batch executables. The first, the 'Chunker', divides the record set to be processed into a number of subsets or 'chunks', based on a 'chunk size' parameter set via system properties. The second, the 'Stream', processes these chunks. The Stream processes each record in a chunk, commits the result, and then looks for another chunk to process. Multiple instances of the Stream can execute in parallel.

By utilizing this Batch Streaming mechanism, Cúram batch processes can employ all of the available processing power of their host machine(s). Ultimately, this allows for the processing of more records in a given time period than a single instance of a batch process would allow.

### Caching of Batch Process Data

Cúram batch processes can also avail of transaction level data caching. Utilization of this mechanism can greatly reduce the volume of database I/O required for batch process execution. A good example of the performance savings that this provides is when an error is encountered when processing a record, requiring it to be skipped or excluded. Caching of data in such situations (where processing effectively needs to restart without including a particular record) greatly improves operational efficiency.

## Cúram Batch Processes using Batch Streaming

The above streaming and caching mechanisms are used in the processing of the following batch programs:

- Determine Product Delivery Eligibility
- Generate Instruction Line Items

- Generate Instruments
- CREOLE Bulk Case Chunk Reassessment By Product
- Apply Product Reassessment Strategy
- Perform Batch Recalculations From Precedent Change Set

## Operation of Streamed Batch Processes

Batch Streaming introduces a number of operational considerations, including:

- Command-line execution of streamed batch processes
- Properties that are introduced by Batch Streaming
- Exception processing in streamed batch processes

## Batch Streaming Architecture

---

This section describes the architecture underlying batch streaming in the application.

### Overview

A simple overview of the architecture is included in the figure here. The mechanism is based on the concept of segmenting data to be processed into subsets or 'chunks'. Once segmented, an arbitrary number of batch processes then can operate in parallel on these chunks, performing identical processing on each constituent record in each chunk. In this way, with the appropriate configuration of the number and distribution of the batch processes, the use of resources used can be maximized in the most efficient manner for each process.

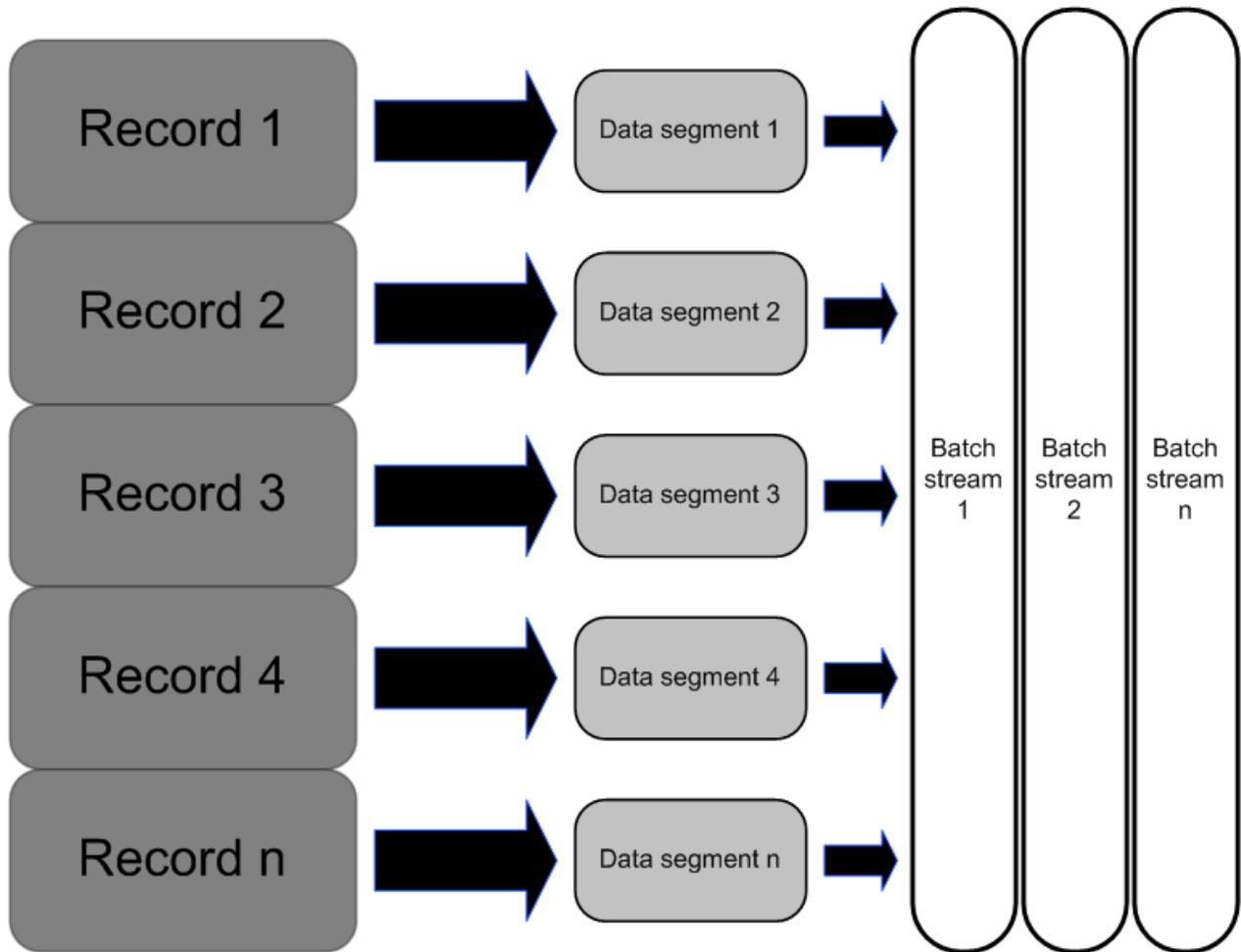


Figure 1. Streaming Architecture Overview

## Architectural Details

As mentioned in the introduction, each logical Batch Process is composed of two physical batch executables: the 'Chunker' and the 'Stream'.

### The Chunker

The 'Chunker' is the batch process executable which identifies the records to be processed. This process constructs 'chunks' of these records and writes them to the database, in effect assembling them in a queuing table called BatchProcessChunk. This table is populated at the beginning of batch processing, and each set of records to be processed is identified on this table by a chunk ID. Note that this assembly is transactional, and must succeed before any Streams can start their processing.

In addition to creating the chunks, the Chunker waits for all chunks to be processed by the Stream(s) and produces a summary report when they are all complete. In most cases only one instance of the Chunker is required for each batch process. Note that if the chunker fails after chunk assembly, it is possible to just restart it even if streaming has already commenced.

### The Stream

The Stream is the batch process executable which performs the appropriate business functionality on each chunk. Each instance of a Stream operates on one chunk at a time, executing business processing on each record in the chunk in turn, and updating the chunk record with summary information once processing is complete. When complete, the records are marked as processed. If further chunks are available, processing starts again and the streams pick up another chunk.

Two important elements of this processing are as follows:

1. Each chunk is processed in a separate database transaction providing commit-point processing. This ensures that once a chunk is successfully processed, there will be no need to reprocess its constituent records if other chunks do not succeed for any reason.
2. Because processing of chunks is transactional, problem records can be excluded from the chunk during processing. For instance, if there is a lock contention during the processing of a chunk, one of the records may not be able to be processed at that point in time. In this instance, the work done by the chunk will be rolled back and the problem record removed. Processing of the chunk can then start again. Note that use of transaction level caching can greatly reduce the database I/O in this type of situation (see [“Data Caching” on page 5](#) for more details).

When all the chunks have been processed, a final search is done for any remaining unprocessed records. One final attempt is made to process these. These unprocessed chunks are processed serially. Streaming is not supported here to mitigate as far as possible against database contention and concurrency problems. This final search is optional, and is controlled by the 'chunkMainParameters' parameter of the runChunkMain method on the BatchStreamHelper in question.

When this process is completed, a notification containing the details of those records processed and those not processed is sent. The recipient of this notification is defined by appropriate coding of the sendBatchReport method of the chunker batch process.

**Note:** No differentiation is made by the Batch Streaming environment between records remaining unprocessed because of technical issues, and those which were skipped for business reasons by the batch process. It will be left up to the batch administrator or user to examine all outputs to determine any cause of failures.

## Additional Information

A more detailed diagram of the batch streaming architecture is included below. Two additional elements are of note here:

1. Chunk Key

This table (called BatchChunkKey) is essentially used as a key server, allowing chunks to be "served" up to individual streams without creating contention on the chunk table itself. It is also worth noting that the value of the next key available can be examined to determine the progress of the batch program.

2. Batch params

The details of the parameters passed into the Chunker batch process are stored to make them available to each stream without being re-entered. This table, called BatchProcess, also contains the total number of chunks written, along with some other information about the Batch Process.

**Note:** The batch streaming architecture also supports the dynamic addition of streams while the batch process is being run, subject to the appropriate hardware being available to execute them.

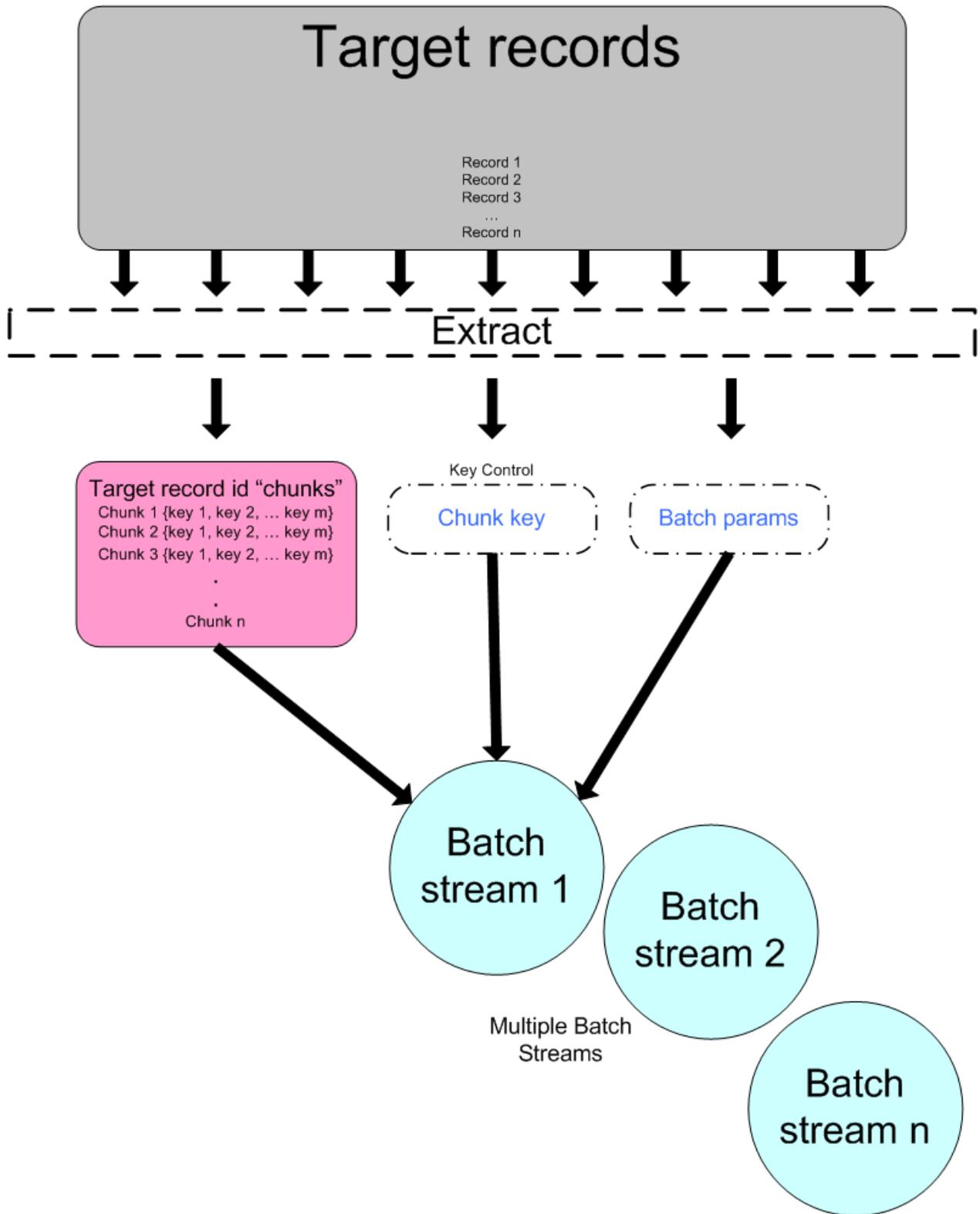


Figure 2. Streaming Architecture Details

## Data Caching

The second batch performance mechanism provided by the application addresses the issue of database I/O contention. Improvements to database I/O in batch processing are always worth making, especially as batch windows reduce and the case and client loads increase. To this end a number of in-memory

caches have been introduced for core Cúram entities which are available for re-use by Cúram batch processes.

Note that data which is accessed repeatedly during the eligibility processing is not limited to that stored in core Cúram entities. As a result, consideration should be given by customers to the caching of custom entities (for example, evidence) which are accessed as part of this process.

It is also worth noting that these caches have been constructed so that they cannot be used in on-line mode. When on-line, because the application server is in control of the thread scheduling, the consistency between the cached data and that on the database cannot be guaranteed.

## Core Cúram Entity Caches

Caches are implemented for the following core Cúram Entities:

- CaseEvidenceTree

This entity is one of the constituents of the Case Evidence Tree evidence maintenance solution. The caching of this entity is incorporated into the CaseEvidenceAPI class and does not need to be accessed directly.

- CaseEvidenceGroupLink

This entity is one of the constituents of the Case Evidence Tree evidence maintenance solution. The caching of this entity is incorporated into the CaseEvidenceAPI class and does not need to be accessed directly.

- AttributedEvidence

This entity is part of the Evidence maintenance solution. The caching of this entity is incorporated into the Evidence Controller class and does not need to be accessed directly.

- CaseHeader

This stand-alone cache is implemented in the CachedCaseHeader class. Referencing this class rather than the CaseHeader entity directly allows your processing take advantage of this cache.

- ConcernRole

This stand-alone cache is implemented in the CachedConcernRole class. Referencing this class rather than the ConcernRole entity directly allows your processing take advantage of this cache.

- CaseNomineeProdDelPattern

This stand-alone cache is implemented in the CachedCaseNomineeProdDelPattern class. Referencing this class rather than the CaseNomineeProdDelPattern entity directly allows your processing take advantage of this cache.

- CaseParticipantRole

This stand-alone cache is implemented in the CachedCaseParticipantRole class. Referencing this class rather than the CaseParticipantRole entity directly allows your processing take advantage of this cache.

- CaseRelationship

This stand-alone cache is implemented in the CachedCaseRelationship class. Referencing this class rather than the CaseRelationship entity directly allows your processing take advantage of this cache.

- CaseStatus

This stand-alone cache is implemented in the CachedCaseStatus class. Referencing this class rather than the CaseStatus entity directly allows your processing take advantage of this cache.

- ConcernRoleRelationship

This stand-alone cache is implemented in the CachedConcernRoleRelationship class. Referencing this class rather than the ConcernRoleRelationship entity directly allows your processing take advantage of this cache.

- FinancialCalendar

This stand-alone cache is implemented in the `CachedFinancialCalendar` class. Referencing this class rather than the `FinancialCalendar` entity directly allows your processing take advantage of this cache.

- Person

This stand-alone cache is implemented in the `CachedPerson` class. Referencing this class rather than the `Person` entity directly allows your processing take advantage of this cache.

- Product

This stand-alone cache is implemented in the `CachedProduct` class. Referencing this class rather than the `Product` entity directly allows your processing take advantage of this cache.

- ProductDelivery

This stand-alone cache is implemented in the `CachedProductDelivery` class. Referencing this class rather than the `ProductDelivery` entity directly allows your processing take advantage of this cache.

- ProductDeliveryCertDiary

This stand-alone cache is implemented in the `CachedProductDeliveryCertDiary` class. Referencing this class rather than the `ProductDeliveryCertDiary` entity directly allows your processing take advantage of this cache.

- ProductDeliveryPattern

This stand-alone cache is implemented in the `CachedProductDeliveryPattern` class. Referencing this class rather than the `ProductDeliveryPattern` entity directly allows your processing take advantage of this cache.

- ProductDeliveryPatternInfo

This stand-alone cache is implemented in the `CachedProductDeliveryPatternInfo` class. Referencing this class rather than the `ProductDeliveryPatternInfo` entity directly allows your processing take advantage of this cache.

- ProductRulesLink

This stand-alone cache is implemented in the `CachedProductRulesLink` class. Referencing this class rather than the `ProductRulesLink` entity directly allows your processing take advantage of this cache.

- ProviderLocation

This stand-alone cache is implemented in the `CachedProviderLocation` class. Referencing this class rather than the `ProviderLocation` entity directly allows your processing take advantage of this cache.

- RateTable

This cache is incorporated into the `RateTable` service layer class and does not need to be accessed directly.

- SupplierReturnHeader

This stand-alone cache is implemented in the `CachedSupplierReturnHeader` class. Referencing this class rather than the `SupplierReturnHeader` entity directly allows your processing take advantage of this cache.

## Cúram Batch Processes using Streaming

---

This section describes the Core Cúram batch processes which implement streaming and caching, together with their operational characteristics. Each process has been provided as two executables.

### DetermineProductDeliveryEligibility

This batch process takes "Approved" cases and runs the determine eligibility process.

Two batch executables are provided for this batch process:

- DetermineProductDeliveryEligibility

This executable is the Chunker for this process. It identifies all cases which are "Approved" and writes their caseIDs to the chunks. This process also accepts a product identifier as an optional input parameter, which is used to limit the cases selected to those which are instances of a particular product.

- DetermineProductDeliveryEligibilityStream

This program is the Stream for this process. It runs the determine eligibility process for each case and stores the results on the database.

## GenerateInstructionLineItems

This batch program takes Financial Components due to be processed, reassesses the case for the period to be paid and generates the appropriate Instruction Line Item records.

Two batch executables are provided for this program:

- GenerateInstructionLineItems

This executable is the Chunker for this process. It identifies all cases with Financial Components due to be processed and writes their caseIDs to the chunks. This process also accepts a set of optional input parameters, a 'from' date, a 'to' date and a delivery method, which are used to limit the cases selected to be processed.

- GenerateInstructionLineItemsStream

This program is the Stream for this process. It runs the determine eligibility process for the period to be paid for each case and generates all relevant Instruction Line Items.

## GenerateInstruments

This batch program takes Instruction Line Items due to be processed and generates Payment Instrument records.

Two batch executables are provided for this program:

- GenerateInstruments

This executable is the Chunker for this process. It identifies all nominees with Instruction Line Items due to be processed and writes their nomineeIDs to the chunks.

- GenerateInstrumentsStream

This program is the Stream for this process. It generates Payment Instruments for each nominee.

## CREOLEBulkCaseChunkReassessmentByProduct

This batch process takes "Active" CER cases and runs the case reassessment process on them.

Two batch executables are provided for this batch process:

**Important:** As this process will cause reassessment of all cases of the specified type, it may cause a lot of unnecessary reassessments. Where appropriate, a new batch process should be written in order to more precisely identify the cases that require reassessment, especially when the cases are spread across a range of products. For a full explanation of how to write an appropriate batch process see the Inside Cúram Eligibility and Entitlement Using Cúram Express Rules guide.

- CREOLEBulkCaseChunkReassessmentByProduct

This executable is the Chunker for the bulk case reassessment process. It identifies all cases which are "Active" and writes their caseIDs to the chunks. The bulk case reassessment also accepts a product identifier as an optional input parameter, which is used to limit the cases selected to those which are instances of a particular product.

- CREOLEBulkCaseChunkReassessmentStream

This program is the Stream for the bulk case reassessment process. It runs the case reassessment process for each case and, if the determination has changed, it stores the new determination and supersedes the previous one.

## ApplyProductReassessmentStrategy

This batch process checks all the cases for a CER-based product whose reassessment strategy has changed.

- ApplyProductReassessmentStrategy

This executable is the Chunker for the Apply Product Reassessment Strategy process. It takes a product ID as input, and for that product identifies all product delivery cases and writes their caseIDs to the chunks.

- ApplyProductReassessmentStrategyStream

This program is the Stream for the Apply Product Reassessment Strategy process. For each product delivery case, the program checks to see if the case's support for reassessment has changed due to the change in the product's reassessment strategy.

For each product delivery case for the product:

- if the case was not reassessable under the old strategy but becomes reassessable under the new strategy, then an assessment is performed on the case to build up the dependency records for the case's determination result;
- if the case was reassessable under the old strategy but is no longer reassessable under the new strategy, then the dependency records for the determination result are removed;
- otherwise no action is performed on the case.

See the [Inside Cúram Eligibility and Entitlement Using Cúram Express Rules guide](#) for more detail.

## Perform Batch Recalculations From Precedent Change Set batch process

The PerformBatchRecalculationsFromPrecedentChangeSet batch process analyzes a set of changes to precedent data and recalculates all dependents that are potentially affected by any of those precedent changes.

- PerformBatchRecalculationsFromPrecedentChangeSet

This executable is the Chunker for the Perform Batch Recalculations From Precedent Change Set process. It takes a dependent type as input, examines the most-recent precedent change set submitted for batch processing, identifies the unique set of dependents (for the type input) potentially affected by any of the precedent change items in the submitted precedent change set, and writes their dependent IDs to the chunks.

- PerformBatchRecalculationsFromPrecedentChangeSetStream

This program is the Stream for the Perform Batch Recalculations From Precedent Change Set. For each dependent identified, the dependent is recalculated in a manner appropriate to its type, for example, if the dependent identifies a CER-based case, the case is reassessed.

For full details on this batch process, see "The Dependency Manager" in the [Cúram Express Rules Reference Guide](#).

## RedetermineTranslator

This batch process checks all open cases for which a particular user is assigned as the case owner and compares the preferred language of each case participant in the case against the language skill of the user, and then updates the translator required indicator for the case participant if necessary. It is used to perform automatic redetermine translator processing when a change to the language skill of a user is made and the change will affect large volumes of cases.

The application property, `curam.cases.maxnocases.onlineautotranslatorredetermination`, is used to control whether automatic redetermination of translator requirements occurs in batch mode or in online mode. If the number of open cases that require processing exceeds this value, redetermination will not occur in online mode and this batch process must instead be executed. Two batch executables are provided for this program:

- `RedetermineTranslator`

This executable is the Chunker for the redetermine translator process. It takes a user name as input, and for that user name identifies all the non closed cases and writes their caseIDs to the chunks.

- `RedetermineTranslatorStream`

This program is the stream for the redetermine translator process. For each case, the program compares the preferred language of each case participant in the case against the language skill of the user, and then updates the translator required indicator for the case participant if necessary.

## Operation of Streamed Batch Processes

This section details various operational considerations which apply when deploying the streamed batch processes in the application. Note that similar considerations should also apply to customer-written streamed batch processes.

## Running Batch Executables

To launch the batch executables on a machine the following command can be used:

```
ant -f app_batchlauncher.xml -Dbatch.username=superuser -Dbatch.program=<method name>
```

Where the method name is the appropriate one from the list here:

Executable	Method Name
DetermineProductDeliveryEligibility	<code>curam.core.intf.DetermineProductDeliveryEligibility.process</code>
DetermineProductDeliveryEligibilityStream	<code>curam.core.intf.DetermineProductDeliveryEligibilityStream.process</code>
GenerateInstructionLineItems	<code>curam.core.intf.GenerateInstructionLineItems.processAllFinancialComponentsDue</code>
GenerateInstructionLineItemsStream	<code>curam.core.intf.GenerateInstructionLineItemsStream.process</code>
GenerateInstruments	<code>curam.core.intf.GenerateInstruments.processInstructionLineItemsDue</code>
GenerateInstrumentsStream	<code>curam.core.intf.GenerateInstrumentsStream.process</code>
CREOLEBulkCaseChunkReassessmentByProduct	<code>curam.core.sl.infrastructure.assessment.intf.CREOLEBulkCaseChunkReassessmentByProduct.process</code>

Table 1. Method Names for batch executables (continued)	
Executable	Method Name
CREOLEBulkCaseChunkReassessmentStream	curam.core.sl.infrastructure.assessment.intf .CREOLEBulkCaseChunkReassessmentStream.process
ApplyProductReassessmentStrategy	curam.core.sl.infrastructure.assessment.intf .ApplyProductReassessmentStrategy.process
ApplyProductReassessmentStrategyStream	curam.core.sl.infrastructure.assessment.intf .ApplyProductReassessmentStrategyStream.process
PerformBatchRecalculationsFromPrecedentChangeSet	curam.dependency.intf .PerformBatchRecalculationsFromPrecedentChangeSet .process
PerformBatchRecalculationsFromPrecedentChangeSetStream	curam.dependency.intf .PerformBatchRecalculationsFromPrecedentChangeSetS tream .process

So for example to run the DetermineProductDeliveryEligibilityStream process the command would be:

```
ant -f app_batchlauncher.xml -Dbatch.username=superuser -Dbatch.program=curam.core
.intf.DetermineProductDeliveryEligibilityStream.process
```

Note that it is possible to use the BatchLauncher to run the batch executables; however, the queued processes is run sequentially.

## Environment variables

The environment variables listed here control the operation of the various batch performance mechanisms described in the previous sections. It is important to note that while the tuning of these parameters is key to achieving the best performance when running batch processes, it is also possible to compromise their performance by incorrect tuning of these parameters. It is therefore advised that the impact of changes to each parameter be assessed individually to ensure that it has the expected affect on performance.

### General Batch streaming

The following environment variables control the generic batch streaming infrastructure behavior:

- curam.batch.streams.batchprocessreadwaitinterval

The interval (in milliseconds) for which a batch stream will wait before retrying when reading the batch process table.

- curam.batch.streams.chunkkeyreadwaitinterval

The interval (in milliseconds) for which a batch stream will wait before retrying when reading the chunk key table.

- curam.batch.streams.scanforunprocessedchunksawaitinterval

The interval (in milliseconds) for which the main batch process (chunker) will wait before trying to scan for unprocessed chunks, once the value in the chunk key table has exceeded the number of chunks.

### General Caching

The following environment variables control generic caching behavior:

- `curam.batch.caching.buffersize`

Batch process caches using circular buffers will use this value to set the initial buffer size.

## Determine Product Delivery Eligibility

The following environment variables control the behavior of the Determine Product Delivery Eligibility program:

- `curam.batch.determineproductdeliveryeligibility.chunksize`

The number of cases in each chunk that will be processed by the Determine Product Delivery Eligibility batch program.

- `curam.batch.determineproductdeliveryeligibility.dontrunstream`

Indicates whether the Determine Product Delivery Eligibility batch program should sleep while waiting for processing to be completed.

- `curam.batch.determineproductdeliveryeligibility.chunkkeywaitinterval`

The interval (in milliseconds) for which the Determine Product Delivery Eligibility batch program will wait before retrying when reading the chunk key table.

- `curam.batch.determineproductdeliveryeligibility.unprocessedchunkwaitinterval`

The interval (in milliseconds) for which the Determine Product Delivery Eligibility batch program will wait before retrying when reading the chunk table.

- `curam.batch.determineproductdeliveryeligibility.processunprocessedchunk`

Indicates whether the Determine Product Delivery Eligibility program should attempt to process any unprocessed chunks found after all the streams have completed.

## Generate Instruction Line Items

The following environment variables control the behavior of the Generate Instruction Line Items process:

- `curam.batch.generateinstructionlineitems.chunksize`

The number of cases in each chunk that will be processed by the Generate Instruction Line Items batch process.

- `curam.batch.generateinstructionlineitems.dontrunstream`

Indicates whether the Generate Instruction Line Items batch program should sleep while waiting for the processing to be completed.

- `curam.batch.generateinstructionlineitems.chunkkeywaitinterval`

The interval (in milliseconds) for which the Generate Instruction Line Items batch process will wait before retrying when reading the chunk key table.

- `curam.batch.generateinstructionlineitems.unprocessedchunkwaitinterval`

The interval (in milliseconds) for which the Generate Instruction Line Items batch process will wait before retrying when reading the chunk table.

- `curam.batch.generateinstructionlineitems.processunprocessedchunk`

Indicates whether the Generate Instruction Line Items program should attempt to process any unprocessed chunks found after all the streams have completed.

- `curam.batch.generateinstructionlineitems.dontreassesscase`

Indicates whether the Generate Instruction Line Items program should skip reassessment of the case prior to payment.

## Generate Instruments

The following environment variables control the behavior of the Generate Instruments process:

- `curam.batch.generateinstruments.chunksize`  
The number of cases in each chunk that will be processed by the Generate Instruments batch process.
- `curam.batch.generateinstruments.dontrunstream`  
Indicates whether the Generate Instruments batch process should sleep while waiting for the processing to be completed.
- `curam.batch.generateinstruments.chunkkeywaitinterval`  
The interval (in milliseconds) for which the Generate Instruments batch process will wait before retrying when reading the chunk key table.
- `curam.batch.generateinstruments.unprocessedchunkwaitinterval`  
The interval (in milliseconds) for which the Generate Instruments batch process will wait before retrying when reading the chunk table.
- `curam.batch.generateinstruments.processunprocessedchunk`  
Indicates whether the Generate Instruments program should attempt to process any unprocessed chunks found after all the streams have completed.

## CREOLE Bulk Case Chunk Reassessment By Product

The following environment variables control the behavior of the CREOLE Bulk Case Chunk Reassessment By Product program, and its associated Stream process (CREOLE Bulk Case Chunk Reassessment Stream):

- `curam.batch.creolebulkcasechunkreassessment.chunksize`  
The number of cases in each chunk that will be processed by the CREOLE Bulk Case Chunk Reassessment Stream program.
- `curam.batch.creolebulkcasechunkreassessment.dontrunstream`  
Indicates whether the CREOLE Bulk Case Chunk Reassessment By Product batch program should sleep while waiting for processing to be completed.
- `curam.batch.creolebulkcasechunkreassessment.chunkkeywaitinterval`  
The interval (in milliseconds) for which the CREOLE Bulk Case Chunk Reassessment By Product batch program will wait before retrying when reading the chunk key table.
- `curam.batch.creolebulkcasechunkreassessment.unprocessedchunkwaitinterval`  
The interval (in milliseconds) for which the CREOLE Bulk Case Chunk Reassessment By Product batch program will wait before retrying when reading the chunk table for unprocessed chunks.
- `curam.batch.creolebulkcasechunkreassessment.processunprocessedchunk`  
Indicates whether the CREOLE Bulk Case Chunk Reassessment By Product program should attempt to process any unprocessed chunks found after all the streams have completed.

## Apply Product Reassessment Strategy

The following environment variables control the behavior of the Apply Product Reassessment Strategy program, and its associated Stream process (Apply Product Reassessment Strategy Stream):

- `curam.batch.applyproductreassessmentstrategy.chunksize`  
The number of cases in each chunk that will be processed by the Apply Product Reassessment Strategy batch program.
- `curam.batch.applyproductreassessmentstrategy.dontrunstream`

Indicates whether the Apply Product Reassessment Strategy batch program should sleep while waiting for the processing to be completed (rather than run a stream in its context)

- `curam.batch.applyproductreassessmentstrategy.chunkkeywaitinterval`

The interval (in milliseconds) for which the Apply Product Reassessment Strategy batch program will wait before retrying when reading the chunk key table.

- `curam.batch.applyproductreassessmentstrategy.unprocessedchunkwaitinterval`

The interval (in milliseconds) for which the Apply Product Reassessment Strategy batch program will wait before retrying when reading the chunk table for unprocessed chunks.

- `curam.batch.applyproductreassessmentstrategy.processunprocessedchunk`

Indicates whether the Apply Product Reassessment Strategy program should process any unprocessed chunks found after all the streams have completed.

## Perform Batch Recalculations From Precedent Change Set

The following environment variables control the behavior of the Perform Batch Recalculations From Precedent Change Set program, and its associated Stream process (Perform Batch Recalculations From Precedent Change Set Stream):

- `curam.batch.performbatchrecalculationsfromprecedentchangeset.chunksize`

The number of dependents in each chunk that will be processed by the Perform Batch Recalculations From Precedent Change Set batch program.

- `curam.batch.performbatchrecalculationsfromprecedentchangeset.dontrunstream`

Indicates whether the Perform Batch Recalculations From Precedent Change Set batch program should sleep while waiting for the processing to be completed (rather than run a stream in its context)

- `curam.batch.performbatchrecalculationsfromprecedentchangeset.chunkkeywaitinterval`

The interval (in milliseconds) for which the Perform Batch Recalculations From Precedent Change Set batch program will wait before retrying when reading the chunk key table.

- `curam.batch.performbatchrecalculationsfromprecedentchangeset.unprocessedchunkwaitinterval`

The interval (in milliseconds) for which the Perform Batch Recalculations From Precedent Change Set batch program will wait before retrying when reading the chunk table for unprocessed chunks.

- `curam.batch.performbatchrecalculationsfromprecedentchangeset.processunprocessedchunk`

Indicates whether the Perform Batch Recalculations From Precedent Change Set program should process any unprocessed chunks found after all the streams have completed.

## Determine Product Delivery Eligibility

The following environment variables control the behavior of the RedetermineTranslator Program:

- `curam.cases.maxnocases.onlineautotranslator determination`

Used to control whether automatic redetermination of translator requirements will occur in batch mode versus online mode.

## Error handling

Two key types of errors can occur when running the streamed batch programs:

- Skipped chunks

These are reported when the batch process completes, together with an estimate of the total number of records which might have been affected. Re-running the batch process processes these chunks correctly, unless some unrecoverable error is occurring during the batch processing. Note that skipped chunks are a relatively rare phenomenon; skipped records are far more likely.

- Skipped records

These are also reported when the batch program completes, and entries are added to the log files for the stream(s), which encountered the errors, detailing the error that occurred and the stack trace. There are two possible scenarios for this:

1. Some business error was encountered processing the record

The status of the record is changed to remove it from the set of records to be processed and a task is created for the business owner. This takes the form of suspending the case and sending a task to the case owner.

2. Some technical error was encountered processing the record

The status of the record is not changed by this event. The log file(s) can be examined to determine the problem, and the batch process rerun to process these records, after the issue is resolved.

## 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: