IBM Cúram Social Program Management

Designing Cúram Temporal Evidence Solutions

Version 6.0.4

Note

Before using this information and the product it supports, read the information in
Notices at the back of this guide.

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Chapter 1

Introduction

1.1 Background

Evidence is the data collected by an organization to facilitate the delivery of benefits and services to the organization's customers. Evidence is captured as part of case processing and is normally used by rules to return a decision regarding a customer's eligibility and entitlement.

1.2 Purpose

The purpose of this guide is to provide the necessary information to successfully design an evidence solution using the Cúram temporal evidence framework. It is assumed the temporal evidence framework has already been selected as the preferred evidence solution.

1.3 Audience

Evidence design is a shared project between technical architects who design the system and business analysts who map the evidence requirements. This guide is primarily aimed at technical architects; it may also be useful to business analysts.

1.4 Chapters in this Guide

The following chapters are in this guide:

The Temporal Evidence Pattern

This chapter describes the architecture of the Cúram temporal evidence framework. At a high level, the Cúram temporal evidence framework is an evidence pattern consisting of evidence entities for storing data, screens for capturing data, and business processes for maintaining evid-

ence.

Designing an Evidence Solution

This chapter provides guidelines for designing an evidence solution using the temporal evidence pattern. Certain aspects of evidence design are required to maintain evidence using this pattern; other aspects are recommended to ensure effective and efficient evidence maintenance.

Chapter 2

The Temporal Evidence Pattern

2.1 Introduction

This chapter provides an architectural overview of the temporal evidence pattern. It describes the parts of the temporal evidence pattern which are reusable in the design of an evidence solution. To read this chapter, some familiarity with data modelling, patternization, and user interfaces is assumed, as the temporal evidence pattern consists of the following features:

Temporal Evidence Entities

The temporal evidence framework includes entities in the core reference model for storing evidence information. The majority of these entities are part of the case manager since evidence is maintained at the case level. There are additional entities in the administration manager which link evidence to products, as well as one entity for setting up evidence approval checks.

Temporal Evidence Controller

The temporal evidence controller is used to maintain evidence. It does this by managing the steps in evidence processes each time they occur.

Temporal Evidence User Interface

Evidence screens and evidence views are provided with the temporal evidence framework. These screens and views introduce consistency for capturing, viewing, updating, validating, and activating evidence; they are reusable and customizable.

2.2 Temporal Evidence Entities

The following table describes the entities in the Case Manager for temporal evidence

Entity	Description
Evidence Descriptor	This entity centralizes the maintenance of all evidence records. It links the custom evidence entities to the case header.
Attributed Evidence	Stores information regarding the time period during which an active evidence record is used to determine case eligibility.
Evidence Relationship	Maintains relationship information between custom evidence entities.
Evidence Descriptor Approval Request	Indicates whether or not an evidence record is awaiting approval from a supervisor before that evidence is activated or cancelled.

Table 2.1 Entities in Case Manager for temporal evidence

The following table describes the entities in the Administration Manager for temporal evidence.

Entity	Description
EvidenceMetadata	Stores configuration data about evidence types.
ProductEvidenceLink	Link evidence types to products .
AdminICEvidenceLink	Links evidence types to Integrated Cases.
TemporalEvidenceApprovalLink	Stores configuration of evidence approvals for evidence types.

Table 2.2 Entities in Administration Manager for temporal evidence

2.2.1 Evidence Descriptor

The role of the evidence descriptor entity is similar to that of the case header. Where the case header entity contains the information standard to maintaining a case in the system, the evidence descriptor entity contains the information necessary to maintain a piece of evidence in the system, e.g., the evidence record status and the received date.

The evidence descriptor entity stores a summary of common evidence information in a single database table. This simplifies the process of retrieving evidence information since the system can read a summary of all evidence using this table, rather than having to read the individual evidence type database tables.

Including common evidence information in the evidence descriptor entity also reduces repetition as there no longer the need to model this information in each of the evidence entities. For example, information regarding the status of an evidence record is stored as part of the evidence descriptor entity. This eliminates the need for including a status code in every custom evidence entity.

The following table describes each of the attributes in the evidence descriptor entity:

Attribute	Description
Evidence Descriptor ID	Unique identifier of the evidence descriptor record. This is the primary key used to identify the evidence descriptor record in the system.
Case ID	Identifier of the case associated with the evidence. Evidence can be associated with either an integrated case or a product delivery case. When associated with an integrated case, it can be shared across all product delivery cases within the integrated case.
Participant ID	Identifier of the participant to whom the evidence relates; this could be the primary client of the case or a member of the integrated case. By recording a participant ID for each evidence record, evidence can be maintained from the participant perspective. For example, a person's evidence can be identified and canceled or transferred to an alternative case.
Status Code	Status of the evidence descriptor record. When an evidence record is inserted, its status is in edit. In edit evidence becomes active when a user selects to activate it by applying evidence changes. If a user modifies an active evidence record, an additional evidence record with an in edit status is created. This ensures that active evidence remains in tact until the evidence changes are fully ready for activation. When pending evidence updates are activated, the status of the active evidence becomes superseded and its in edit evidence be-

Attribute	Description
	comes active.
Received Date	Date the organization received the evidence; this is a user entered field.
Correction Set ID	Identifier used to track all corrections to a piece of evidence. When evidence is captured, it is assigned a correction set ID. That same piece of evidence can be corrected resulting in any number of new evidence records; however, the correction set ID for each of these records is carried through thereby grouping evidence in a correction set.
Effective From	Date from which a piece of evidence is effective. This date is stored to support a change of circumstance to a piece of evidence over time.
Succession ID	Identifier of the set of evidence records that collectively represent a real world item of evidence and the changes made to it over time.
Related ID	Identifier of the evidence record related to the evidence descriptor record. Each time evidence is captured, an evidence descriptor record and an evidence record are created. The evidence descriptor record contains all the information described in this table; the evidence record contains all the business information modeled for the evidence entity. The related ID and the evidence type link these two records.
Evidence Type	Type of evidence that the evidence descriptor record relates to, e.g. "income evidence", "income usage evidence". This is a code table value. The evidence type and the related ID link the evidence descriptor record to its evidence record.
Pending Removal Indicator	Indicator used to flag an active evidence record for logical deletion. This indicator is set when active evidence record is selected for deletion by the user.

Attribute	Description
Pending Update Indicator	Indicator used to flag pending updates for an active evidence record. This indicator is set when an active evidence record is updated resulting in a new evidence record. This new evidence record shares the same correction set ID as the active evidence record, but has a status of in edit. If this indicator is flagged, the system will supersede the active evidence record when the in edit version is activated.
New Indicator	Indicator used to flag a new instance of evidence. When new evidence is created, this indicator is automatically flagged. The indicator is unset when the evidence is activated. Once unset, it cannot be set again, as the evidence is no longer considered new.
Approval Requested Indicator	Indicator used to flag evidence which requires approval from a supervisor. When a user activates evidence, the system checks if approval is required. If approval is required, this indicator is flagged until the supervisor approves or rejects the evidence.
Shared Instance ID	Unique identifier that will be common to all evidence records which have been shared from the same initial piece of evidence.
Shared Indicator	Indicates that this evidence record has been shared from another case.
Change Received Date	Date on which evidence changes have been received. When a user modifies an evidence record, this date defaults to the current date on the system, i.e., the date on which the modifications are saved.
Evidence Activation Date	Date on which evidence has been activated. The system sets this date when evidence changes are applied.
Shared Unchanged Indicator	Indicates that the shared evidence record has not been changed since be-

Attribute	Description
	ing accepted onto the case and before being applied. This indicator is used by the evidence broker when deciding whether the evidence should be rebroadcast back to the original source case.
Source Case ID	The unique identifier of the case from which this evidence has been shared.
External Source Case Indicator	Indicates if the source case is from an external system.
Change Reason	This attribute indicates the reason for record correction.

Table 2.3 Attributes in the Evidence Descriptor Entity

2.2.2 Attributed Evidence

Attribution periods refer to the timelines over which evidence is used in case eligibility and entitlement determination. The attributed evidence entity is used to store information regarding the effective time period for an active evidence record.

Most evidence has business dates associated with it; however, often these dates are not directly used for case eligibility and entitlement determination. For example, an employment will have a start and end date; however, the business requirement can be that this piece of evidence should be considered for case eligibility and entitlement on month-aligned or quarter-aligned dates. While business start and end dates such as an employment start and end date influence the attribution dates, they are not explicitly used by the case eligibility and entitlement determination process.

By storing the attributed evidence information in an entity separate from the custom evidence which may contain business dates, users are free to maintain business dates without having to understand how or if those dates will impact case eligibility and entitlement. It is the system, rather than the user, that performs the calculations to determine when active evidence is effective.

It is important to note that attributed evidence records are not created for integrated cases. Each attributed evidence record pertains to a particular product delivery case. When evidence is activated at the integrated case level, the system creates an attributed evidence record for each product delivery case that shares the evidence record. For example, an integrated case may have three product delivery cases within it that share the income evidence for a household. Any income evidence record activated will result in three separate attributed evidence records for each of the product delivery

cases.

The system checks for product delivery cases within an integrated case before it creates any attributed evidence records. If there are no product delivery cases within the integrated case at the time an evidence record is activated, then the system will not create attributed evidence records for the active evidence. Later, when product delivery cases are added to the integrated case, the system will create the necessary attributed evidence records.

The following table describes each of the attributes in the attributed evidence entity:

Attribute	Description
Attributed Evidence ID	Unique identifier of the attributed evidence record. This is the primary key used to identify the attributed evidence record in the system.
Evidence Descriptor ID	Identifier of the related evidence descriptor record. During case eligibility and entitlement determination process, the system uses this ID to retrieve the evidence information to be used in the eligibility and entitlement determination.
Case ID	Identifier of the related product delivery case. This ID links the attribution period for an active evidence record to the product delivery case that uses this evidence for eligibility and entitlement determination processing.
Attributed From Date	Start date of the period over which evidence is used in case eligibility and entitlement determination. When checking eligibility and entitlement for a product delivery case, the system will retrieve evidence whose attribution periods are in-line with the eligibility and entitlement period.
Attributed To Date	End date of the period over which evidence is used in case eligibility and entitlement determination.

Table 2.4 Attributes in the Attributed Evidence Entity

2.2.3 Evidence Change History

The evidence change history entity is used to store information regarding all

maintenance operations performed on a piece of evidence. When evidence is captured for the first time, it is assigned a correction set ID. The system uses the correction set ID to track the changes made to the same evidence.

By using the correction set ID, the system can track evidence changes across multiple evidence records. When changes are made to an active evidence record, the system creates a new in edit evidence record. This protects the evidence information used in eligibility and entitlement determination. Both the active and its in edit evidence record share the same correction set ID; therefore, the evidence change history will include information about the active evidence and about changes made to it post-activation.

The following is the complete list of evidence changes that get recorded in the evidence change history:

- An insert entry is added when evidence is created initially. This occurs when evidence is captured for the first time or when changes are made to active evidence.

- An updated entry is added when evidence is modified while in edit.

- A submitted for approval entry is added when evidence changes are awaiting approval from a supervisor.

- An approved entry is added when the supervisor approves the submitted evidence.

- A rejected entry is added when the supervisor rejects the submitted evidence.

- A canceled entry is added when active evidence is canceled.

- A superseded entry is added when active evidence is superseded by evidence changes. This occurs when changes are made to an active evidence record, and its in edit evidence record is activated, thus superseding the existing active evidence record.

- An activated entry is added when in edit evidence is activated.

- A pending update set entry is added when active evidence is updated.

- A pending update discarded entry is added when pending updates on active evidence are discarded.

- A pending removal set entry is added when active evidence is flagged for removal.

- A pending removal discarded entry is added when the pending removal set on active evidence is discarded.

The following table describes each of the attributes in the evidence change history entity:

Attribute	Description
Evidence Change History ID	Unique identifier of the evidence

Attribute	Description
	change history record. This is the primary key used to identify the evidence change history record in the system.
Evidence Descriptor ID	Identifier of the related evidence descriptor record. The correction set ID is retrieved from this evidence descriptor record.
Change Type	Type of change that has occurred. This is a code table value. The change types include "input" , "modified" , "removed" , "modification activated" , "removal activated" , etc.
Change Date Time	Date on which the evidence change is captured. This is the current date and time on the system when the change occurs. For example, when the evidence is first captured, the current date and time on the system is recorded.
Change User	User who performed the change on the evidence, e.g., the user who first captured the evidence on the system.

Table 2.5 Attributes in the Evidence Change History Entity

2.2.4 Evidence Metadata, Product Evidence Link and Admin IC Evidence Link

Evidence metadata is maintained as part of the application's administration functionality. The evidence metadata entity provides configuration data about an evidence type. The configuration data includes the names of the application pages to be used for displaying and editing evidence. The following table describes each of the attributes in the evidence metadata entity:

Attribute	Description
Evidence Metadata ID	Unique identifier of the evidence metadata record. This is the primary key used to identify the evidence metadata record in the system.
Evidence Type	Type of evidence that the evidence metadata record relates to. This is a code table value and is used to

Attribute	Description
	identify the evidence to which the configuration data refers.
Effective From	Date from which the configuration data applies to the evidence type. The system determines the correct evidence pages to use for an evidence type based on the effective from date of the evidence metadata record.
View Page Name	Application page name to be used for displaying evidence of this type.
View Snapshot Page Name	Application page name to be used for displaying evidence snapshot of this type. Evidence snapshot is available for participant evidence only.
Create Page Name	Application page name to be used for creating evidence of this type.
Modify Page Name	Application page name to be used for editing evidence of this type.
Business Object Page Name	Application page name to be used for viewing evidence of this type from business object perspective.
Business Object Issues Page Name	Application page name to be used for viewing business object issues for evidence of this type.
Business Object Verifications Page Name	Application page name to be used for viewing business object verifications for evidence of this type.
History Record Page Name	Application page name to be used for the history record for evidence of this type.
Workspace Page Name	Application page name to be used to list evidence of this type.
Localized Description ID	Unique identifier of the localized description record. This record contains localized description for evidence of this type.
Participant Data Indicator	Indicator for participant data. This indicator is set if this evidence type pertains to participant data.
Participant Data Applies To All Indicator	This indicator is relevant to participant evidence types only and it indicates whether this data is relevant for all case members or just the

Attribute	Description
	primary client.
Record Status	Status of the evidence metadata record. This status is active unless the evidence metadata record has been deleted, in which case the status is canceled.

Table 2.6 Attributes in the Evidence Metadata Entity

The product evidence link entity is used to link evidence metadata to products. By having a link entity between the evidence metadata and the product entities, the relationships between evidence types and products can be reciprocal; the product evidence link entity specifies the list of evidence types used by a product or conversely the list of products which use a particular evidence type. The following table describes each of the attributes in this entity:

Attribute	Description
Product Evidence Link ID	Unique identifier of the product evidence link record. This is the primary key used to identify the product evidence link record in the system.
Product ID	Identifier of the product record linked to the evidence metadata record.
Evidence Metadata ID	Identifier of the evidence metadata record linked to the product record. This sets up a relationship between the evidence type recorded for the evidence metadata and the product.
Data Linked To Product Indicator	Indicates if data is captured at the product level as opposed to the integrated case level.
Shareable Indicator	Indicates if the evidence type can be shared by the product. If it is set to true, then this evidence type can be used in the Evidence Broker to configure sharing between case types.
Category	The category code for the evidence in the context of this product.
Quick Link Indicator	An indicator used to show if this evidence type will appear in the quick link list for adding evidence.
Sort Order	The sort order for this evidence type.

Attribute	Description
	The sort order is an integer value used when ordering evidence types. If multiple types have the same sort order the alphabetic ordering of the type code will be used.

Table 2.7 Attributes in the Product Evidence Link Entity

The admin ic evidence link entity is used to link evidence metadata to integrated cases. By having a link entity between the evidence metadata and an integrated case, it's possible to find out what evidence is stored on the integrated case. The following table describes each of the attributes in this entity:

Attribute	Description
Admin IC Evidence Link ID	Unique identifier of the admin ic evidence link record. This is the primary key used to identify the admin ic evidence link record in the system.
Evidence Metadata ID	Identifier of the evidence metadata record linked to the admin integrated case record. This sets up a relationship between the evidence type recorded for the evidence metadata and the integrated case.
Admin Integrated Case ID	Identifier of the admin integrated case record linked to the evidence metadata record.
Shareable Indicator	Indicates if the evidence type can be shared by the integrated case. If it is set to true, then this evidence type can be used in the Evidence Broker to configure sharing between case types.
Category	The category code for the evidence in the context of this integrated case.
Quick Link Indicator	An indicator used to show if this evidence type will appear in the quick link list for adding evidence.
Sort Order	The sort order for this evidence type. The sort order is an integer value used when ordering evidence types. If multiple types have the same sort order the alphabetic ordering of the type code will be used.

Table 2.8 Attributes in the Admin IC Evidence Link

2.2.5 Approval Request and Temporal Evidence Approval Check

Evidence approval checks are set up on evidence. They provide an extra step in the evidence change process to ensure that the changes are correct. When an evidence approval check applies to an evidence change, the case supervisor must approve or reject the change.

The evidence descriptor approval request entity and the temporal evidence approval check entity are used to store information relating to evidence approval checks. The evidence descriptor approval request entity is linked to the evidence descriptor entity. It is used to indicate whether or not an evidence descriptor record is pending approval. The temporal evidence approval check entity is part of the administration manager. It is used to maintain configuration details for approval check functionality.

The following table describes each of the attributes in the temporal evidence approval check entity:

Attribute	Description
Temporal Evidence Approval Check ID	Unique identifier of the temporal evidence approval check record. This is the primary key used to identify the temporal evidence approval check record in the system.
Organization Unit ID	Identifier of the organization unit to which the evidence approval check percentage applies. This is only relevant for evidence approval checks set up for an organization unit.
Username	Username of the user to whom the evidence approval check percentage applies. This is only relevant for evidence approval checks set up for a user.
Position ID	Identifier of the position to which the evidence approval check percentage applies. This is only relevant for evidence approval checks set up for a position.
Evidence Type	Type of evidence to which the evidence approval check percentage applies.
Approval Type	Type of evidence approval check, i.e., organization, position, user, and/

Attribute	Description
	or evidence type.
Percentage	The percentage of evidence changes that the case supervisor must approve or reject. This percentage is applied according to the evidence approval type. For example, if the approval type is an evidence type, such as income evidence, then 60 percent of all income evidence must be approved by a case supervisor before it is activated.
Comments	User comments on the temporal evidence approval check record.
Record Status	Status of the temporal evidence approval check record. This status is active unless the evidence metadata record has been deleted, in which case the status is canceled.

Table 2.9 Attributes in the Temporal Evidence Approval Check Entity

2.2.6 Custom Evidence Entities

The main task in designing an evidence solution is to model the custom evidence entities. Evidence entities are used to store information for a specific evidence type. It is also common for evidence entities to be related to each other. Examples of custom evidence entities are income and income usage. In this example these evidence types are related and the income evidence is the parent of income evidence usage.

Evidence Types

Evidence types represent the events and circumstances that determine client eligibility and entitlement for benefits. Not all evidence types directly impact eligibility; some evidence information is captured for informational purposes.

Each evidence type is added as a code value to the evidence type code table. Once added, an evidence type is used to link the information stored on the evidence descriptor table with the information stored on an evidence entity table. When checking case eligibility, the system reads the evidence type and related ID for an evidence descriptor record to locate its related evidence record.

The evidence metadata entity also includes the evidence type attribute. This

links the evidence entity with one or more products. For example, evidence metadata can be created for the income evidence type and linked to the income support product. When a user enters evidence for an income support case, that user will be able to enter income evidence.

When two evidence records are related to each other, their evidence types are stored in the evidence relationship record. Evidence relationships are covered in the next section.

Evidence Relationships

Evidence entities can naturally relate to each other. The common types of logical relationships can be categorized as follows:

- The evidence exists in isolation; it has no relationship (or dependency) on any other evidence. It is a standalone evidence and therefore has no child evidence records.

- An evidence entity has a specific parent evidence entity and this is a mandatory relationship. The child evidence cannot exist without having a parent evidence record of this type.

- An evidence entity has a single parent evidence entity. The parent evidence could be one of many parent entities, but it must have one and only one parent evidence. In other words, a child evidence record of this type cannot exist without having a parent evidence record, but the type of the parent evidence may vary.

- An evidence entity has a single parent evidence entity. The parent evidence could be one of many parent entities but it does not always have a parent evidence. It can exist in isolation and hence, the parent/child relationship can be considered optional between the two evidence entities.

- An evidence entity has more than one type of child evidence.

An evidence entity may fulfill more than one relationship role. For example, an evidence entity can be the parent of another evidence entity and the grandparent of an additional evidence entity. In a grandparent-grandchild relationship, the 'middle' evidence entity is both a parent (of the grandchild), and a child (of the grandparent).

The temporal evidence framework includes the evidence relationship entity. This entity is used to store the relationship information between evidence records. The following table describes each of the attributes in the evidence relationship entity:

Attribute	Description
Evidence Relationship ID	Unique identifier of the evidence relationship record. This is the primary key used to identify the evidence relationship record in the system.

Attribute	Description
Parent ID	Identifier of the parent evidence descriptor record. The system reads the parent evidence descriptor record to retrieve the parent evidence record.
Parent Type	Evidence type of the parent evidence record, e.g., income evidence. Both the parent ID and parent type are used to identify the parent evidence record in the evidence relationship.
Child ID	Identifier of the child evidence descriptor record. The system reads the child evidence descriptor record to retrieve the child evidence record.
Child Type	Evidence type of the child evidence record, e.g., income usage evidence. Both the child ID and the child type are used to identify the child evidence record in the evidence relationship.

Table 2.10 Attributes in the Evidence Relationship Entity

The system uses relationship information to filter the evidence displayed in the evidence sub-tabs that are within the evidence object tab. When accessing a child evidence object sub-tab, the system searches for the child evidence records that are related to the parent evidence record. While there may be any number of evidence records for the child evidence type, only those evidence records that are in relationships with the parent evidence record will be displayed in the sub-tab. For example, a user can access the Asset Ownership evidence sub-tab for a parent Current Asset record evidence object tab. The system will read the evidence relationship table to retrieve only the Asset Ownership evidence records that are related to the parent Current Asset evidence record. The evidence object tab is described in Section 2.4.4, *Evidence Object Tab* .

2.3 The Evidence Controller

The evidence controller is responsible for the majority of business processing required to maintain evidence. It provides a balance between the common infrastructure applied across all evidence types for maintaining evidence and any parts of evidence maintenance which have been customized to meet business requirements.

Common logic is provided in the evidence controller for enacting the steps in the processes which form part of the overall evidence pattern. This pre-

vents this logic from having to be repeated across all evidence types in a custom evidence solution.

To provide a balance, the evidence controller also orchestrates the logic specific to an evidence type. It contains methods which call evidence interface methods for the evidence types. Each custom evidence entity, therefore, must implement this interface to take part in the evidence pattern.

2.3.1 Evidence Hooks and Registrar

Evidence hooks provide extension points where customized business logic can be added to an evidence processing. For example when removing evidence, the evidence controller calls an evidence hook where extended functionality can been added.

The registrar process works in conjunction with evidence hooks. Its purpose is to provide the ability to customize business logic on a per product basis. Each product can register with an evidence sub-pattern its own hook. Once a product is registered, the evidence controller will enact the extended processing for the process specific to that product.

2.3.2 List Evidence

The list evidence process presents the user with relevant information about an evidence in the evidence list. There are a few different list methods. One list method provides a view of all the evidence objects of a given type. There are separate methods to provide lists of active objects of all types, and in edit objects of all types.

2.3.3 Insert Evidence

The insert evidence process is used to capture evidence information for an evidence type. The result is a new evidence record with an in edit status. The first step to inserting a new evidence record is to specify the evidence type and pass control to the evidence controller. Any user wishing to insert new evidence is presented with an insert screen unique to the evidence type.

When the user selects to save the evidence information, the evidence controller validates the information. These validations can be warnings or errors. For example, the income evidence type requires an income amount greater than zero for all new records. If an amount of zero is entered, then the system will not insert the new income evidence record. If all validations succeed, the evidence information is stored for the new evidence record.

The second step to inserting a new evidence record occurs when the evidence controller creates an evidence descriptor record. The evidence descriptor record includes the correction set ID and succession ID for the piece of evidence, its status (in edit), the case ID, and the participant ID for the participant to whom the evidence applies. The evidence descriptor entity is described in Section 2.2.1, *Evidence Descriptor* .

The third step only occurs if the new evidence record is a child of a parent evidence record. The evidence controller creates an evidence relationship record to acknowledge the relationship between the parent evidence record and its new child.

The next step is the insertion of an entry into the evidence change history table. This is the first entry in the evidence change history as it captures the actual creation of the evidence.

The final step to inserting a new evidence record is to call out to an evidence hook. This hook enacts any additional steps additional steps required to insert a new evidence record based on business requirements for an evidence type.

2.3.4 Modify Evidence

The modify evidence process allows a user to update evidence information for an active or in edit evidence record.

As with the insert evidence process, the modify evidence process specifies the evidence type and passes control to the evidence controller. The evidence controller retrieves evidence information for the evidence record from both the custom evidence entity table and the evidence descriptor table. This information is displayed to the user wishing to modify it. While most of the information retrieved from the custom evidence entity table is modifiable, the information retrieved from the evidence descriptor table cannot be modified with the exception of the evidence received date, change received date, and effective date.

Once the user saves the evidence changes, the evidence controller validates the evidence which can result in warnings and/or errors. The temporal evidence solution provides two validations to support the approval check process which are called during an enactment of the modify evidence process. One validation is used to warn users that their modifications are being made to a piece of evidence which is currently awaiting approval. The second validation is used to stop a user from changing evidence that has been approved and is ready for activation.

The modify evidence process continues in one of two directions. If the changes apply to active evidence, the evidence controller inserts a new evidence record which contains the modified evidence. The evidence controller labels the modified evidence as either an evidence correction or an evidence succession (see Section 2.3.4.1, *Evidence Correction and Succession*). Alternatively, if the changes apply to in edit evidence, the existing evidence record is updated and no new evidence record is created.

The evidence controller then adds an entry to the evidence changes history table. This entry captures information regarding the modifications made to the evidence record. The evidence controller completes the process of modifying evidence by calling out to an evidence hook. This hook enacts any additional steps required to modify the evidence based on business requirements.

Evidence Correction and Succession

The temporal evidence pattern provides support for two types of evidence change: evidence correction and evidence succession.

An evidence correction is the replacement of an existing evidence record with a new evidence record in order to correct an incorrect piece of data. For example, an active bank account evidence record which contains an incorrect bank account number can be updated such that the new bank account number supersedes the incorrect one.

An evidence succession is the set of evidence records that collectively represent a piece of evidence as it changes over time. For example, a bank account evidence record may include a bank account balance. This bank account balance is likely to change over time and the succession of bank account balances collectively represent the changes to the bank account.

The evidence controller uses the correction ID, succession ID, and effective date attributes to manage evidence changes.

A correction set ID and succession ID are assigned to all new evidence records. The correction set ID is used to track corrections made to evidence; the succession ID is used to track changes in circumstance.

When updating an active evidence record, a user has the option to modify the effective date of change or else leave it the same. The effective date of change is the field which determine whether a modification to an active evidence record is a succession or a correction.

When modifying evidence, if no change is made to the effective date of change field, the modification is a correction. For all evidence corrections, the system assigns the in edit evidence record the same correction ID as the active evidence record. This ensures that the evidence corrections supersede the existing active evidence. Also, it allows for all evidence corrections to be tracked in a single evidence change history.

If the effective date of change is changed as part of modifying evidence, the modification is a change during the lifetime of the evidence and as such is a succession. To monitor a succession of updates made to an active evidence record, the system assigns each in edit evidence record the same succession ID, but a different correction set ID. When activated, the succession of updates will not supersede any existing active evidence.

> **Important**
>
> The effective date of change can only be updated for active evidence records. The temporal evidence pattern provides validation which prevents a user from modifying the effective date of change for in edit evidence. If the user enters an incorrect effective date of change when updating active evidence, he or she must discard the incorrect in edit record and restart the update process.

2.3.5 View Evidence

The view evidence process displays evidence information for an evidence record. This is initiated when a user selects to view an evidence record in the evidence list.

The evidence controller retrieves evidence information for the evidence record from both the custom evidence entity table and the evidence descriptor table. It also retrieves the name of the user who made the last modification from the evidence change history table. The evidence information is presented to the user on the view evidence screen unique to the evidence type.

2.3.6 Remove Evidence

The remove evidence process is used to mark an active evidence record as pending removal. It is important to note that an enactment of this process does not actually remove an active evidence record. The evidence record remains active after it has been flagged as pending removal. To action the pending removal, the apply evidence changes process must be run.

The first step in the remove evidence process is to specify the evidence ID and evidence type to the evidence controller. The evidence controller retrieves the evidence record and sets the active evidence to pending removal. While the evidence record status remains active, its pending removal indicator is flagged. An entry is also added to the evidence changes history table.

During the last step in the remove evidence process, the evidence controller calls out to an evidence hook. This hook enacts any additional steps required to mark the evidence as pending removal based on business requirements.

2.3.7 Apply Evidence Changes

The apply evidence changes process serves two purposes: one is to activate new and updated evidence, the other is to remove active evidence which has been flagged as pending removal. A user can select to enact this process in three different ways: by applying all outstanding changes, by applying only his or her own changes, or by selecting the specific changes to apply from the complete list of pending changes.

Both the calculate attribution period and the submit for approval process are called as part of applying evidence changes. The purpose of the calculate attribution period process is to calculate and store the period of time during which the newly activated evidence will be used in eligibility and entitlement determination. The purpose of the submit for approval process is to determine whether or not an evidence change requires approval from the case supervisor and to initiate the processing which gets this approval.

At a high level, the process of applying evidence changes can be divided into stages. In the first stage, the evidence controller validates the pending evidence changes. In the second stage, the evidence controller determines whether or not the evidence changes require approval from the case supervisor. In the third stage, the evidence controller activates the in edit evidence and calculates the attribution periods for the newly activated evidence.

In the fourth stage, it cancels any active evidence which is pending removal. In the final stage, the eligibility and entitlement engine is called.

Description of Steps to Validate Evidence Changes

During the first stage of applying evidence changes, the evidence controller validates the pending evidence changes by following these steps:

- The evidence controller calls out to a hook which checks for evidence requirements at the case level such as the minimum set of evidence records that must exist for a case. This hook provides the ability to call custom validations that apply at the case level rather than at the evidence type level.

- The evidence controller then calls all validations associated with applying evidence changes for the specific evidence type.

- If any of the validations fail, an exception will be thrown and the user will be forced to make the appropriate updates before trying to apply the changes again.

Description of Steps to Check if Evidence Requires Approval

During the second stage of applying evidence changes, the evidence controller checks if any of the pending evidence changes require approval from the case supervisor. To make this determination, the evidence controller performs the following steps:

- The evidence controller checks if manual approvals are already outstanding for the evidence by checking if the approval status is submitted. The evidence controller will not add this evidence to the list of pending updates since it still requires approval; however, the evidence will not be sent for manual approval a second time since the case supervisor has already been informed.

- The evidence controller checks if the evidence was previously rejected. If so, the evidence controller submits the evidence for approval.

- The evidence controller checks if the evidence was previously approved. If so, the evidence does not require approval and is thus added to the list of pending updates (ready for the next steps required to apply evidence changes).

- The evidence controller checks if the evidence was previously automatically approved. If so, the evidence will not require manual approval again, so the evidence controller adds it to the list of pending updates.

- For all other evidence, the evidence controller calls the Check for Evidence Approval API which reads the temporal evidence approval checks table and determines if the evidence should be manually approved. Evidence that requires approval is submitted for approval; evidence not re-

quiring approval is added to the list of pending updates.

To set an evidence's approval status to submitted, the evidence controller does the following:

- The evidence controller creates an approval request record and an evidence descriptor approval request record with the current approval request indicator set to true.

- The evidence controller updates any previous evidence descriptor approval request records for the same evidence descriptor record by setting the current approval request indicator to false.

- The evidence controller updates the evidence descriptor record by setting the approval request indicator to true and the approval status to submitted.

- The evidence controller adds an entry to the evidence change history to acknowledge that the evidence has been submitted for approval.

- The evidence controller enacts the evidence approval workflow (see Section 2.3.9, *Submit Evidence for Approval Workflow*).

Description of Steps to Activate Evidence and Calculate Attribution Periods

During the third stage of applying evidence changes, the evidence controller activates in edit evidence and calculates the attribution periods for the newly activated evidence. To do this:

- The evidence controller changes the status of the new and updated evidence records from in edit to active and populates the evidence activation date with the current date on the system. It also searches for existing active evidence records with the same correction set ID as the newly active evidence records. If found, the evidence controller changes the status of the existing active evidence records to superseded.

- To create attribution periods for the newly active evidence, the evidence controller initiates the calculate attribution period process by calling out to a hook. This hook retrieves the list of case IDs which will require an attribution period for the active evidence. If the evidence is maintained for a stand alone product delivery, only one case ID is returned. If evidence is maintained at the integrated case level, each product delivery case that shares the evidence must have its own attribution period, and thus the case IDs for each of these product deliveries are returned.

- The evidence controller creates a new attribution period for each of the case IDs.

- The evidence controller searches for existing active evidence records which have the same succession ID as the newly activated evidence records. If found, the evidence controller re-attributes all evidence records

in the succession.

- The evidence controller continues applying evidence changes to in edit evidence by calling out to another hook. This hook enacts any additional steps required to activate the in edit evidence.

- The evidence controller adds a new entry to the evidence change history table for each evidence record which has been activated.

Description of Steps to Remove Active Evidence

The fourth stage of applying evidence changes consists of the following steps to apply pending removal changes to active evidence:

- The evidence controller applies the evidence changes to active evidence pending removal by changing the status of this evidence to canceled.

- The evidence controller searches for existing active evidence records which have the same succession ID as the newly canceled evidence records. If found, the evidence controller re-attributes all evidence records in the succession.

- The evidence controller calls out to a hook which enacts any additional steps required to cancel the active evidence.

- The evidence controller adds a new entry to the evidence change history table for each evidence record which has been canceled.

Step to Assess Evidence Changes

The last step in applying changes is to assess affected product delivery cases. The evidence controller calls the eligibility and entitlement engine using an eligibility and entitlement determination period consisting of the earliest attributed from and latest attributed to dates for all applied evidence.

2.3.8 Additional Functionality for Calculating Attribution Periods

The temporal evidence framework provides additional functionality for calculating attribution periods. This includes support for simulating the activation of in edit evidence; it also includes the automatic calculation of attribution periods for new product delivery cases.

Simulating the Activation of In Edit Evidence

As part of the manual check eligibility process, users can check eligibility using in edit evidence. The system simulates the activation of the in edit evidence records by calculating virtual attribution periods for the in edit evidence records. The system also virtually supersedes the existing active evidence records. The end result is that the user is able to see the eligibility

results that could be achieved by applying evidence changes to all in edit evidence.

Automatic Calculation of Attribution Periods

When evidence is activated, the evidence controller creates an attribution period for each product delivery case within an integrated case that shares the evidence. Note, however, additional product delivery cases may get added to the integrated case after the evidence was activated and these new product deliveries will require attribution periods for their active evidence.

The temporal evidence framework includes functionality which automatically re-enacts the calculate attribution period process for existing active evidence in order to create attribution periods for the new product delivery cases. This occurs when these product delivery cases are submitted.

2.3.9 Submit Evidence for Approval Workflow

The first activity in this workflow is a manual activity. The purpose of this activity is to send a task to the case supervisor with instructions to approve or reject a piece of evidence on a case. The task includes links to the approve and reject evidence pages. The manual activity is completed when the case supervisor approves or rejects the activity.

The workflow splits and continues in one of two directions based on the outcome of the manual activity. If the evidence is approved, the next activity is the evidence approval activity; if rejected, the next activity is the evidence rejection activity. Both of these activities are route activities whose purpose is to send a notification to the user who selected to activate the evidence. The notification informs the user of the evidence approval outcome and includes a link to the relevant evidence list screen.

2.3.10 Participant Evidence Integration

Participant data is also regarded as evidence, a concern's date of birth for example, and even though such data is maintained from the Participant Manager, it needs to be accessible to all cases that are required to use it as evidence. The out-of-the-box application has integrated the following entities to the temporal evidence solution.

- Address
- Alternate ID
- Alternate Name
- Bank Account
- Citizenship
- Concern Role

- Concern Role Relationship

- Education

- Employer

- Employment

- Employment Working Hour

- Foreign Residency

- Person

- Prospect Employer

- Prospect Person

Modifications to these entities will automatically apply to all cases using this data as well as triggering eligibility and entitlement re-determination of all cases using the data. To find out more about Participant Evidence Integration see the Curam Temporal Evidence Developers Guide.

2.3.11 Evidence Generation

The application has found from its considerable experience in building large evidence based solutions that evidence entities, and the relationships between them, fall into a relatively small number of high level patterns. As the maintenance overhead on evidence code can be quite considerable, especially if the modules being maintained are large, the idea of generating evidence artefacts was initiated. The evidence generator takes input data about the entity, its relationships to other entities as well as meta-data about how it will be maintained on the client. Using these it generates the server-side code and client-side UIM and VIM files and associated properties and help. For more on the evidence generator see the Curam Temporal Evidence Generator Cookbook, Curam Evidence Generator Specification and Curam Evidence Generator Modeling Guide.

2.4 The Temporal Evidence User Interface

Screens and views are provided with the temporal evidence framework to allow users to capture and maintain evidence in a consistent manner. The main screens and views are:

Dashboard

   The dashboard view provides a summary display of evidence for a case.

EvidenceFlow

   The evidenceFlow view provides an alternate summary display and navigation through evidence on a case where each evidence type is represented by a tile.

Evidence Type Tab

This is used to maintain evidence records for a specific evidence type.

Evidence Object Tab

A view is provided for each evidence object which displays the latest details for the evidence and lists the successive changes to the object over time. This view is displayed within a tab.

View Evidence

This is used to view evidence information retrieved from the evidence descriptor table.

Insert Evidence

This is used to allow users to input specific evidence details.

Modify Evidence

This is used to allow users to view and modify evidence details.

Apply Evidence Changes

This allows users to select the evidence records to activate or remove.

Validate Evidence Changes

This allows users to validate evidence changes for an evidence type before applying these evidence changes.

Evidence Approval

There are a number of screens provided to support evidence approval checks.

Evidence Correction History

This displays the history of changes made to a piece of evidence without specifying the effective date for the change.

Evidence Change History

This displays the history of changes made to an evidence object.

2.4.1 Dashboard

The dashboard view provides a summary display of evidence for a case. The dashboard groups evidence by category to help a caseworker locate individual evidence types. Further information is available including whether there is any evidence in edit, any verifications outstanding or any issues for each evidence type. Each category offers additional flexibility for a caseworker with three different views of evidence

- all the evidence types that have been configured for that category on a case

- all evidence that has been recorded for the category

- all evidence for the category that has not been recorded

2.4.2 EvidenceFlow

The evidenceFlow view provides an alternate summary display and navigation through evidence on a case where each evidence type is represented by a tile. When a tile, or evidence type, is in focus then the list of evidence objects (and the successive changes to the object over time) for that evidence type are available.

2.4.3 Evidence Type Tab

The evidence type tab displays the evidence records for a particular type of evidence. Its purpose is to allow users to maintain evidence for the evidence type.

Evidence type tab is similar to active and in-edit list views, except that it is specific to one evidence type and it shows evidence records of all status'. It provides links to view and edit individual evidence records as well as link to the standard evidence object tab view.

An evidence type tab can be opened in a few different ways. One is by selecting an evidence type on evidence list (active evidence list, in-edit evidence list) the other two are by navigating to a child evidence type from a parent evidence record, and by selecting the evidence name on the Dashboard.

2.4.4 Evidence Object Tab

A tab view is provided for each evidence object which displays the latest details for the evidence and lists the successive changes to the object over time. Any additional data pertaining to the evidence object is available; if the evidence is a parent then a list of related child evidence is displayed, one list for each child evidence type. For example, income evidence is a parent of income usage evidence. A caseworker viewing income evidence will have the ability to view a list of income usage evidences relating to the income evidence.

If an evidence type is a child, the parent evidence will be listed. If an evidence type is a grandchild, only the child evidence will be displayed and not the parent evidence - the related evidences are available to one level of relationship (parent to child is one level, child to grandchild another level)

An evidence object tab can be opened by selecting an evidence description on evidence list (active evidence list, in-edit evidence list, and other evidence lists).

2.4.5 Active And In Edit List Views

Two high level list views exist within the application which give users another entry point for adding and maintaining evidence. These list views are intended to give an overall picture of the evidence on a case, regardless of type. One lists the active records, including those active records that are pending removal. The other lists in edit records. These should give the user

more options for browsing and creating evidence.

The high level list views provide links to view and edit individual evidence records as well as links to the standard evidence type and object tab views. There are also links for applying, approving and rejecting evidence. These links are accessible from any case-level view of evidence.

A new way of creating evidence has been developed for the high level list views. There is an "New Evidence" link which takes the user throught the number of screens where they select the evidence type they want to create, and then they can choose from a list of possible parent and/or related evidence, and finally they are brought to the create evidence screen itself. On saving (creating) the record, the user is returned back to the high level list view. The actual screens the user is presented with the selection in a wizard depends upon the patterns used by the evidence type being created.

2.4.6 Apply Evidence Changes

The information displayed on the apply evidence changes screen is retrieved from both the evidence descriptor table and the custom evidence table for the evidence type.

The purpose of the apply evidence changes screen is to list all evidence records for a case which are in edit or pending removal. From this list, a user can select which evidence changes to activate; the user can also select to remove evidence which is pending removal.

This screen is accessible from any case-level view of evidence. For example, it could be accessible via a link on an evidence dashboard.

2.4.7 Validate Evidence Changes

The validate evidence changes screen allows a user to validate evidence changes for an evidence type. It is a pre-test of the apply evidence changes maintenance function for a specific evidence type. As evidence changes can be applied across any number of evidence types at once, it can be difficult for a user to find and correct all errors that have occurred. Pre-testing allows a user to test the evidence changes for just one evidence type and correct these changes before actually apply them. This screen is accessible from all main evidence screens (from in-edit evidence, active evidence, dashbord, evidenceFlow).

2.4.8 Evidence Approval

The temporal evidence framework provides a number of screens for maintaining evidence approvals. Evidence approval check set-up screen is one of many screens provided as part of system administration for setting up evidence approval checks and is used to set up an evidence approval check for an organization unit. There are similar screens for creating evidence approval checks for users, positions, and for evidence types.

The user creating the evidence approval check must enter a percentage. This is the percentage of evidence changes submitted by users in the organization that will require manual approval by the case supervisor. The user must also select whether the approval check percentage applies to all evidence types or to a selected evidence type.

2.4.9 Evidence Correction History

The purpose of the evidence correction history screen is to list all corrections made to a specific record which was modified without an 'effective from date' specified. The evidence correction history screen is accessed by selecting the View History option on the evidence view page.

2.4.10 Evidence Change History

The purpose of the evidence change history screen is to list all changes performed on evidence object during its lifetime. The evidence change history page is accessed from evidence object tab.

> **Important**
>
> The evidence change history is not limited to changes made to a single evidence record. This is because it is designed to recognize changes made to the same piece of evidence. For example, when corrections are made to active evidence, the system creates a new evidence record with these corrections. Both the existing active evidence record and the evidence record with the evidence corrections are considered the same piece of evidence, they share the same correction set ID, and thus both evidence records are monitored in the one evidence change history.

Chapter 3

Designing an Evidence Solution

3.1 Introduction

The temporal evidence solution simplifies the task of designing an evidence solution by providing a balance between re-usability and support for customization. It reuses components of an evidence solution as much as possible, especially those aspects of evidence maintenance common across all evidence types.

At the same time, the temporal evidence solution supports customization. It enforces certain design standards which need to be addressed at the start of a project. These design considerations are described in this chapter.

3.2 Modelling the Evidence Solutions

The most difficult task in designing an evidence solution is to define the required evidence and model the evidence solution. This includes the modelling of all the real world events and circumstances which must be captured in order to determine eligibility for benefits and services.

The task of modelling an evidence solution works best as a shared project. Business analysts understand the business requirements, and thus the evidence that must be captured to determine case eligibility. The architect bridges between these business requirements and the technical components of the evidence solution.

There is no one way to go about modelling evidence solutions; however, there are certain high level considerations that must be addressed as part of designing an evidence solution. They are as follows:

Gather Rules from Legislation

The purpose of this task is to gather the rules required to determine case eligibility using as many primary resources as possible, e.g., government forms. This is a time consuming process which requires business

analysts with knowledge and experience working with legislation.

Design Rule Set

The initial design of a rule set tends to be based on legislation research. It can be advantageous to have a rules architect involved in the designing of rule sets from as early on in the project as possible. The rules architect bridges between the rules legislation and the development of a rules set in the application.

Determine What Needs to be Captured to Return Rule Results

During this stage of a project, the focus starts to shift from rules to evidence. Each rule in the rule set will require some piece or even several pieces of evidence to return a rules result. Using a simple example, assume that an income support benefit has established income limits such that any person whose income exceeds this limit will not be eligible for income support. Based on this simple example, it makes sense then that the income amount over time must be captured for all claimants.

Perform Gap Analysis

The purpose of the gap analysis is to determine what information is already captured in the application and what information still needs to be captured.

Create LDM and Page Specifications

A logical data model based on the business requirements is constructed. It includes the evidence entities for capturing evidence as well as the categories for these entities and any relationships between them. From this LDM, pages can be designed to capture and maintain the information. The page specifications can also include navigation to related evidence.

Check Soundness of Model

Before the evidence requirements are implemented in the application, a technical architect can review the business requirements and check the soundness of the logical data model. This includes reviewing the rule set and checking whether or not the page specifications and navigation can be used to build a user interface.

In summary, the above tasks include three milestones in designing an evidence solution: the completion of a rule set, a logical data model, and a document with page specifications.

There are two additional tasks that are recommended as part of modelling the evidence solution: mapping evidence to products and identifying evidence relationships, both of which are described in this section.

3.2.1 Map Evidence to Products

An important task in designing an evidence solution is to map each evidence type to its product(s). At a high level, this establishes the different types of evidence that must be maintained for a product in order to determine eligibility. It also determines whether or not an evidence type is shared between

multiple products. If shared, then the evidence is best maintained at the integrated case level. If evidence is specific to one product, then that product will need its own sitemap for maintaining its unique evidence.

The task of mapping evidence to products is particularly important to the temporal evidence framework because of the way in which active evidence is attributed. Evidence is attributed for each evidence type and for each product delivery. This means that when evidence is activated, the system automatically calculates an attribution period for each of the product delivery cases that share the evidence. If evidence isn't shared, then the evidence will only be attributed to the specific product delivery case that the evidence record applies to. Each evidence type has its own algorithm for calculating attribution periods (see Section 3.4, *Defining Algorithms for Calculating Attribution Periods*). By mapping evidence types to products, this determines which products need to be considered in an evidence type's algorithm.

Table 3.1, *Sample Mapping of Evidence to Products* provides a sample to illustrate the mapping of evidence to products. For each evidence type, the table indicates whether or not the evidence is maintained at the integrated case level. The table also indicates the products which use that evidence to determine eligibility.

Evidence Type	Maintained at IC Level (Yes/No)	Product(s)
Income	Yes	Foodstamps, Cash Assistance, Medical Assistance
Income Usage	Yes	Foodstamps, Cash Assistance, Medical Assistance
Sporting Activity	No	Cash Assistance Only
Sporting Activity Expense	No	Cash Assistance Only

Table 3.1 Sample Mapping of Evidence to Products

In the above table, there are two evidence types, income and income usage, which are maintained at the integrated level and shared between the three products, Foodstamps, Cash Assistance, and Medical Assistance. These evidence types can be accessed from a sitemap maintained at the integrated case level; however, three separate attribution periods will be created for each active evidence record. The algorithm used to calculate attribution periods for income and income usage evidence should therefore consider any specific attribution requirements for the three products.

Also in the above table are the two evidence types, sporting activity and sporting activity expense, which are not maintained at the integrated case level. These evidence types will need to be accessible from an evidence sitemap specific to Cash Assistance. The algorithm used to calculate attribu-

tion periods for these two evidence types will only need to take into consideration specific requirements for the Cash Assistance product.

> ℹ **Note**
>
> The actual mapping of evidence to products is implemented using evidence types and the evidence metadata and product evidence link entities. Each evidence entity in the logical data model has its own unique evidence type defined in the evidence types code table. The evidence type is associated with one or more evidence metadata records. Evidence metadata records are linked with product evidence link records. Once this is set up as part of evidence administration, all evidence associated with a product will be maintainable for that product.

3.2.2 Identify Evidence Relationships

Evidence relationships can significantly impact development requirements for an evidence solution as they impact the design of evidence object tab and custom code that will be required to insert an evidence relationship record.

Evidence object tab must contain the sub-tabs for the related parent or child evidence.

Custom code must be added to an evidence entity's insert method to cater for evidence relationships. This custom code adds a record to the evidence relationship table for each evidence relationship.

To ease the implementation of evidence relationships, it makes sense to identify the relationships between evidence types in the early stages of designing an evidence solution. Table 3.2, *Relationships between Evidence Types* provides a sample list of evidence types and their relationships.

Evidence Type	Related Evidence Type	Relationship Type
Income Evidence	Income Usage Evidence	Parent/Child
Property Evidence	Loan Evidence	Parent/Child
Loan Evidence	Loan Insurance Policy Evidence	Parent/Child
Property Evidence	Loan Insurance Policy Evidence	Grandparent/Grandchild
Carer Evidence	Benefit Evidence	Parent/Child (optional)

Table 3.2 Relationships between Evidence Types

Each row in this table represents an evidence relationship, with the parent evidence type in the first column and the related child (or grand-child) evidence type in the second column. The second column can be used to determine which evidence types will require custom code to cater for the evidence

relationships. For each related evidence type, custom code is added to that evidence type's insert method.

This table can be used as a starting point for defining navigation.

3.3 Designing the User Interface

There are three main tasks to designing the user interface: defining the layout of evidence pages, defining navigation requirements, and determining the details displayed for each evidence type on the screens provided with the temporal evidence framework.

The lengthiest task is to define the layout of the custom evidence pages. The temporal evidence framework significantly eases the burden of screen design by providing infrastructure support for functionality common across all evidence screens; however, each evidence type must still have custom evidence screens for capturing and maintaining evidence.

3.3.1 Define the Layout of Evidence Pages

After the creation of the logical data model, the next task is to define the layout of evidence pages. Each evidence entity in the logical data model will require its own view, create, and modify screens as well as the evidence type, and evidence object tabs. These screens should include a visualization (both content and layout) of the eventual evidence screens to be implemented by developers.

The temporal evidence framework provides evidence views for all view, create, and modify screens, as well as for evidence object, and evidence type tabs. The evidence views include the common evidence information maintained across all evidence types. Thus, each evidence screen must include an evidence view in order to access the common information. For example, when designing a create evidence screen, the create view should be included in the create evidence screen design.

Table 3.3, *Standard Information Provided in Views* describes the common information provided in the view, create, and modify evidence views and the name of the temporal evidence entity from which the common information is retrieved. By including an evidence view in an evidence screen, the common information described in this table will automatically appear in the evidence screen.

Evidence View	Common Information Provided	Retrieved from Temporal Evidence Entity
View Evidence	Participant ID, Received Date, Effective Date (effective date of change), Status	Evidence Descriptor

Evidence View	Common Information Provided	Retrieved from Temporal Evidence Entity
	Updated By (username), Updated On	Evidence Change History
	Approval Requested Indicator, Approval Status	Approval Request
Create Evidence	Participant ID, Received Date	Evidence Descriptor
Modify Evidence	Participant ID, Received Date, Effective Date, Status	Evidence Descriptor
	Updated By (username), Updated On	Evidence Change History
	Approval Requested Indicator, Approval Status	Approval Request

Table 3.3 Standard Information Provided in Views

3.3.2 Determine Details Displayed on Temporal Evidence Screens

The "get details for list display" method is required for all evidence types and is used to populate the details field on the evidence list screens, apply evidence changes, and validate evidence changes screens. The details field also appears on a number of evidence approval screens including both the approve and reject evidence screens.

The purpose of the details field is to provide information significant to an evidence type across standard evidence screens. For example, the details field for income evidence screens might display the income amount and income frequency.

3.4 Defining Algorithms for Calculating Attribution Periods

One of the main features of the temporal evidence framework is the way in which evidence is attributed. The temporal evidence architecture provides infrastructure support for attributing active evidence, thus removing the burden of this complexity from the user.

As part of designing an evidence solution, an algorithm for calculating attribution periods must be provided for each evidence type. For example, the calculation of attribution periods for the income evidence type could be based on the income frequency recorded for an income evidence record.

When evidence is shared across multiple product deliveries within an integrated case, attribution periods are calculated for each product delivery separately. Thus, the algorithm for an evidence type should take into account business requirements specific to the evidence type, as well as business requirements specific to each product linked to the evidence type. Expanding on the previous example, the algorithm for the income evidence type could also take into account the delivery patterns for each product linked to the income evidence type.

There are additional considerations to take into account when defining these algorithms. One such consideration is that attribution rules could change over time, e.g., rules-based legislation. To support changing attribution rules, Cúram rule sets or rate tables could be used to implement the attribution logic.

3.5 Validating Evidence

The temporal evidence framework provides support for adding validations to the insert evidence, modify evidence, and apply evidence changes sub-patterns for each evidence type. These sub-patterns access the informational manager which allows for standard warning and error validations. Warnings should be used to inform users of important information that must be updated or fixed at some point in the future before the evidence is applied. Errors are used when a process should not be completed until the validations are executed successfully.

The use of warnings should be considered when adding validations for the insert and modify evidence sub-patterns, in particular, for evidence relationship validations. This will allow the user to focus on the capture of evidence requirements without being forced to follow certain restricted paths in maintaining related evidence. All validations for the apply evidence changes sub-pattern must throw errors rather than warnings since the activation and removal of evidence can impact case eligibility and determination.

One obvious benefit to validating evidence is the reduction in errors. Validations can also be used to check for gaps in the evidence and to look for duplications. For example, there may be certain evidence types which require one active evidence record at all times such as an active primary address. Validation can be used to make sure there is no gap, i.e., that there is always an active address record. To look for duplications, an additional validation can be implemented which does not allow more than one evidence record, e.g., the primary address evidence record, to be active at the same time.

As part of designing an evidence solution, it is important to recognize the strong relationship between validations and how the rules loaders should be designed to load the evidence data. For example, consider a validation which states that a person cannot collect income more than once from the same employer for the same time period. Given this validation, the loader only needs to search for one piece of income data at a point in time. On the other hand, if the validation stated that a person could collect multiple salar-

ies from the same employer over the same period of time, the rules loader needs to look for a list of items to load.

3.5.1 Additional Validation to Support Apply Evidence Changes

There is an additional validation feature built into the apply evidence changes process. When evidence changes are applied, the system calls a hook that applies validations at the case level rather than at the evidence level. This extra validation ensures that a specified minimum amount of evidence exists for the case. For example, before activating a loan evidence record, validation could be called as part of the hook which checks for an associated (active) property evidence record.

3.5.2 Validation Considerations for Calculating Attribution Periods

There are a number of validation considerations for calculating attribution periods. One consideration is whether or not evidence can have a null attribution end date. If all records for an evidence type should be attributed to finite periods, then a validation should be added to prevent a null attribution end date.

Another consideration is whether or not gaps are allowed between attribution periods. If there should be no gaps, then validation should be added to ensure these gaps do not occur. Also, validations can be used to ensure that attribution periods do not overlap.

3.6 Extending Evidence Processing

The purpose of an evidence hook is to support the extension of an evidence sub-pattern with custom functionality. Hooks are provided for inserting, modifying, and removing evidence. A hook is also provided for applying evidence changes.

Evidence hooks can be used to raise workflow events and trigger workflows. For example, the remove evidence process could include an evidence hook which raises a workflow event. This event could trigger a workflow process instance which sends a notification to a caseworker when an active evidence record has been flagged for removal by another user. Each time an active evidence record is flagged for removal, the workflow event would trigger a new instance of the workflow in order to notify the relevant caseworker.

Chapter 4

Conclusion

4.1 Summary of Temporal Evidence Benefits

The Cúram temporal evidence framework is beneficial to the users responsible for maintaining the evidence of the organization's clients. It is also beneficial to the architects and developers faced with the challenging task of designing and implementing custom evidence solutions.

4.1.1 Benefits for Maintaining Evidence

The following summarizes the Cúram temporal evidence features which make it easier for users to maintain evidence:

- Evidence can be maintained in small, manageable units called evidence types. A separate evidence tab is provided for each evidence type.

- Evidence can have start and end business dates based on real world events and circumstances. Examples of business dates include the date the household members move into a new house, the date they move out of a house, and the date on which a person starts a new employment.

- Evidence can also have an effective date of change which represents the date on which the evidence information is valid and this date does not have to be the same as the business start date.

- Complex processing for calculating attribution periods for active evidence is handled by the system rather than the user. This allows users to capture and activate evidence successfully without having to define the time period during which the evidence is used to determine eligibility.

- The system recognizes two types of evidence changes: evidence corrections and a succession of changes in circumstance to the same piece of evidence.

- There is functionality for applying evidence changes (this includes activ-

ating evidence changes or removing active evidence). A user can select which evidence changes to apply from the complete list of pending updates. It is important to note that evidence changes can be applied universally, i.e., across all evidence types.

- Evidence approval checks can be set up to ensure that evidence is approved by a supervisor before it is activated or removed.

- A history of evidence changes is provided for each piece of evidence captured.

- The validation feature is available on each high level case evidence screeen; it allows all pending updates for an evidence type to be validated before they are applied. This makes is possible for users to identify whether or not pending updates are valid for each evidence type; however, these validations are always re-run when evidence is applied.

- Evidence can be shared between cases. When shared evidence is activated, an attribution period is calculated for each case. This ensures that the evidence is attributed according to specific case and evidence type requirements.

4.1.2 Benefits for Designing and Implementing Evidence Solutions

The benefits of using the Cúram temporal evidence framework to design and implement an evidence solution include reusable features which bring consistency and customizable features which provide flexibility. The following summarizes some of these features:

- The evidence infrastructure provides standard pages for maintaining evidence, .e.g., insert and modify evidence pages; this brings consistency to evidence functionality across evidence types.

- Information displayed on standard pages can be customized for each evidence type based on business requirements.

- The evidence infrastructure also provides evidence sub-patterns that make up the one evidence pattern, e.g., insert evidence. These sub-patterns standardize processing across all evidence types and provide a central maintenance point.

- Common logic in the evidence infrastructure reduces repeated code and, in turn, the probability of defects.

- Hooks are provided which allow processes to be extended based on unique evidence maintenance requirements.

- Validations can be set up for inserting, modifying, removing, and activating evidence.

- Support is provided to maintain evidence relationships, i.e., parent,

child, and grand-child relationships.

4.2 Further Reading

For information on how to implement an evidence solution using the Cúram temporal evidence framework, see the `Cúram Evidence Developers Guide`.

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