IBM Cúram Social Program Management

Cúram Solution Architecture

Version 6.0.4

This edition applies to version 6.0.4 of IBM Cúram Social Program Management and all subsequent releases and modifications unless otherwise indicated in new editions.

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Chapter 1

Introduction

1.1 Introduction

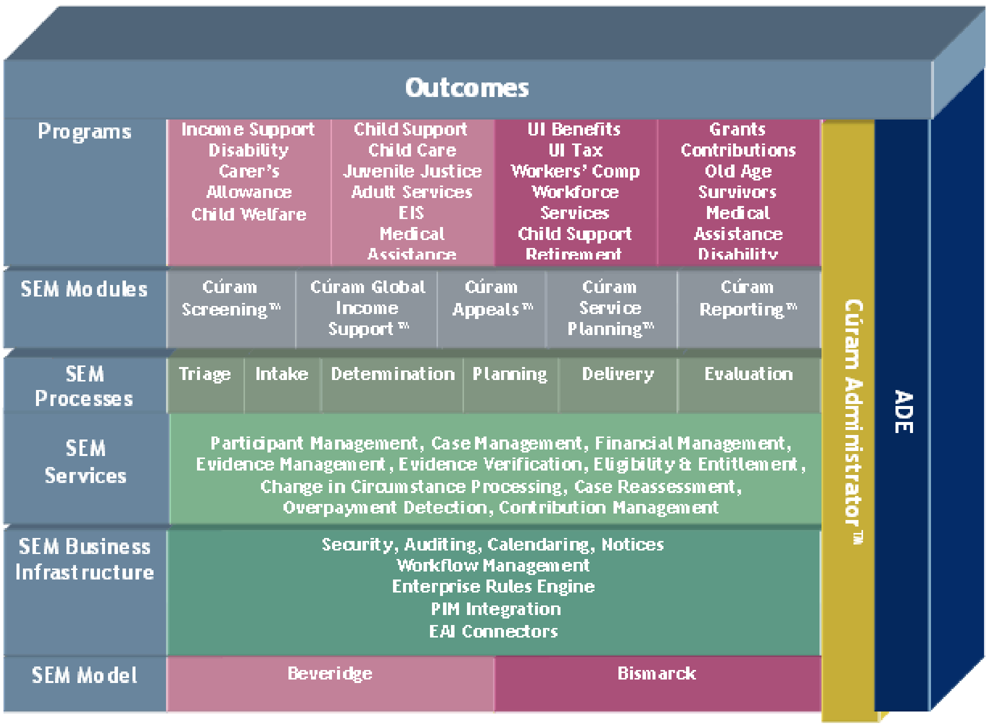
This document provides an overview of the solution architecture of *IBM® Cúram Social Program Management* from a business, development and deployment perspective. Cúram is a comprehensive commercial-off-the-shelf (COTS) solution for Social Enterprises. *IBM Cúram Social Program Management* also includes a environment for organizations wishing to develop their own Social Enterprise Management applications, or to augment those provided by IBM. An architectural description of *IBM Cúram Social Program Management* must thus describe the components of existing "out-of-the-box" business applications, and the technical architecture of the framework which underpins those applications and is reusable by developers building additional ones.

Chapter 2

Business Architecture

2.1 Business Architecture

IBM Cúram Social Program Management is designed specifically for human services, health, labor, social security, and military and veterans' organizations - collectively referred to as social enterprises. The *IBM Cúram Social Program Management* solution is comprised of multiple layers, each designed to address specific and unique business and technical requirements of social enterprises.



Outcomes
Programs
Income Support Disability Carer's Allowance Child Welfare
Child Support Child Care Juvenile Justice Adult Services EIS Medical Assistance
UI Benefits UI Tax Workers' Comp Workforce Services Child Support Retirement
Grants Contributions Old Age Survivors Medical Assistance Disability
SEM Modules
Cúram Screening™
Cúram Global Income Support™
Cúram Appeals™
Cúram Service Planning™
Cúram Reporting™
SEM Processes
Triage
Intake
Determination
Planning
Delivery
Evaluation
SEM Services
Participant Management, Case Management, Financial Management, Evidence Management, Evidence Verification, Eligibility & Entitlement, Change in Circumstance Processing, Case Reassessment, Overpayment Detection, Contribution Management
SEM Business Infrastructure
Security, Auditing, Calendaring, Notices Workflow Management Enterprise Rules Engine PIM Integration EAI Connectors
SEM Model
Beveridge
Bismarck
Cúram Administrator™
ADE

Figure 2.1 Cúram Business Model

By supporting both the Beveridge and Bismarck program delivery models, *IBM Cúram Social Program Management* provides the foundation required to administer benefits and services to support both needs-based and contribution-based programs. The Business Infrastructure is designed to provide support for many of the common processes found throughout the enterprise including security, workflow, and integration tools.

A Services layer includes the common services that support the service and benefit delivery processes for social enterprises. These services include industry-leading integrated case management and integrated eligibility and entitlement, as well as participant management, financial management, contribution management, and evidence management.

Common across social enterprises, the SEM processes define the mission-critical activities performed in the delivery of services and benefits. These common processes include: Triage, Intake, Determination, Planning, Delivery, and Evaluation. Each of the processes is supported by through supplied business processes based on global best practices.

A series of application modules are designed to support common business functionality and global rules and evidence required to address program delivery. For example, *Cúram for Global Income Support* supports the collection, management, application, and processing of business rules and evidence associated with income support programs world-wide.

Chapter 3

The Cúram Application Development Environment

3.1 Introduction

IBM Cúram Social Program Management provides an environment for producing *Java® EE*-compliant applications for the Human Services and Social Security industry. This environment includes:

- development aids that make it easier to produce n-tier *Java EE*-compliant applications;
- a higher-level business infrastructure needed by most enterprise-class systems, and especially targeting the Human Services and Social Security industries. In particular, infrastructure is provided to allow the capture of eligibility and entitlement rules for Social Security “products” (or programs), and to execute these rules within Cúram applications;
- an application model (in UML, the Unified Modeling Language) for these industries;
- off-the-shelf software components based on the application model;
- a pre-built reference application constructed using these components.

3.2 Development Environment Objectives

Focus on the business problem:

IBM Cúram Social Program Management minimizes the amount of non-business-specific functionality that needs to be developed. Because developers are freed up from some of the more tedious and error-prone aspects of client/server development, they can spend more time on activities directly concerned with the business solution.

Model-based development:

The starting point for all *IBM Cúram Social Program Management* software development is a platform-independent application model, developed using the Unified Modeling Language (UML).

Code generation:

Many parts of an application are formulaic in nature, and can be expressed concisely through stereotypes and patterns in the application design. By adhering to a model-driven approach, the tools provided with the environment maximize the amount of code that can be generated.

Avoidance of platform dependencies:

The *IBM Cúram Social Program Management* architecture packages specific platform dependencies in generated code and infrastructure components, minimizing the effects of changing them at a later stage, and thus maximizing the architecture's portability.

Use of recognized architectural patterns:

The *IBM Cúram Social Program Management* architecture makes extensive use of patterns, such as factory and proxy mechanisms, to enhance application maintainability, performance and portability.

Simplified user interface development:

Considerable effort can be expended producing quality user interfaces. *IBM Cúram Social Program Management* generates user interfaces based on simple platform-independent definitions, resulting in a dramatic increase in developer productivity.

Industry-standard applications:

IBM Cúram Social Program Management facilitates easier application development, producing robust client/server applications based on industry-standard technologies. Runtime performance, cross-platform deployment, and user interface elegance are key goals of *IBM Cúram Social Program Management* application development.

3.3 Using the Environment

IBM Cúram Social Program Management development generally utilizes the following broad approach to development, represented by the following linked cycles:

- Modeling
- Implementation
- Building
- Deployment

These cycles are described in more detail in the following sections.

3.3.1 Modeling with Cúram

The starting point for all development is the Platform-Independent Application Model. *IBM Cúram Social Program Management* applications follow a service-oriented architecture, and services to be provided by the application are defined as UML interfaces in the model. Lower-level services are also defined here, resulting in an application that uses a layered approach. All interfaces in the model are referred to as “business objects”. When we need to distinguish between services that are only consumed internally by the application and services which are visible to external applications and user interfaces, we refer to the latter as “facades”. These define the outside world's view of a *IBM Cúram Social Program Management* application. Internal services are provided by a combination of “business process objects” and “business entity objects”. Entity objects define the "things" modeled by the application. Entity objects support data access operations to persist and retrieve instances of entities.

It is important to remember that the application model is platform-independent. No particular middleware or component technology (such as EJB) is referenced in the model. The model simply defines service interfaces and which subset of those interfaces will be made externally visible. The *IBM Cúram Social Program Management* environment looks after middleware dependencies by automatically generating any required “plumbing” code. Developers generally do not need to be concerned with the intricacies of middleware interfaces.

3.3.2 Implementation

After modeling the required business objects, the developer provides an implementation of the interfaces that have been modeled. All of the source code interface definitions and some of the implementation is provided by the *IBM Cúram Social Program Management* environment. For instance, data access operations on entities are generated for free. The developer focuses on coding just business logic. Business object implementations are coded by developers as plain *Java* objects (POJOs). The use of code-generated business interfaces and abstract classes ensures that the developer must provide the necessary implementations with the correct model-enforced interfaces.

3.3.3 Building

The *IBM Cúram Social Program Management* environment provides facilities for building developed applications. Scripts are provided to invoke code generators which analyze the application model and generate the skeleton of the target application. This code generated output is compiled, along with handcrafted developer implementations of business objects. Any necessary middleware tools required to build the final application are also automatically invoked.

Developers do not have to be concerned about dependencies between various source code and compiled application artifacts, as this is looked after by the supplied scripts.

3.3.4 Deployment

IBM Cúram Social Program Management online applications are enterprise-scale client/server applications. Production deployment of such applications can be a complex task, involving many configuration options for deployment across multiple network nodes, database tuning, security set up, and so on. Developers generally require a much simpler deployment configuration in which business objects can be tested as part of an iterative development cycle.

Several deployment alternatives are provided for business objects under test. A single-node EJB deployment allows the application to be deployed in the organization's chosen application server environment. However, an even simpler online setup involves the use of RMI-IIOP middleware for *IBM Cúram Social Program Management* client/server communications. Since RMI is built into all *Java Standard Edition* implementations, no application server software is required in this configuration. This simplifies the deployment of applications for testing purposes, as well as reducing the need for application server licenses.

IBM Cúram Social Program Management business objects can also be invoked asynchronously through the use of messaging middleware. This style of invocation underpins the *IBM Cúram Social Program Management* workflow facility which allows “process definitions” to be composed of multiple steps including business object execution and interactions with online users.

Finally, business objects can be deployed “standalone”, which allows for easy batch mode operation or batched unit testing. In this configuration, the target program can simply be executed from the command line, or from a script.

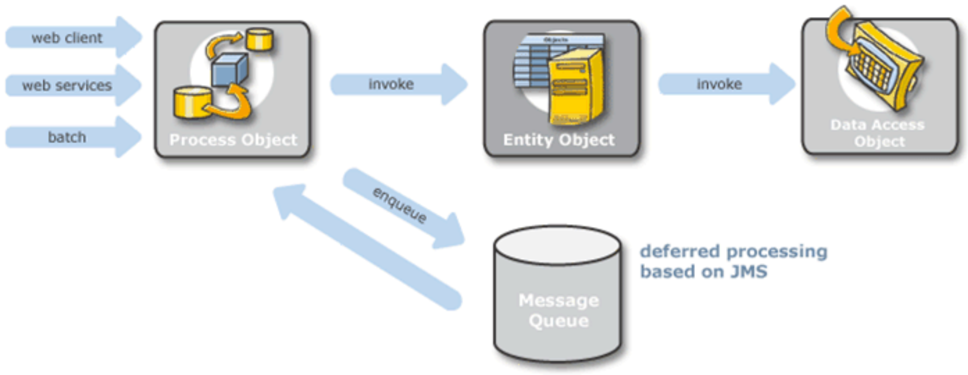


Figure 3.1 Invocation Options

Chapter 4

Runtime Architecture

4.1 Introduction

At a logical design level, *IBM Cúram Social Program Management* is platform independent. The concrete realization of a *IBM Cúram Social Program Management* application must, of course, be deployed in some "real world" environment. As already mentioned, business objects can be deployed in a variety of ways. One of the more important (and complex) environments is the online client/server environment. Online applications follow the *Java EE* architecture. This is a modern n-tier architecture with separate *Presentation*, *Application* and *Persistence* tiers. This logical three-tier architecture has become the standard for developing client/server applications. The separation of presentation, application logic, and persistent storage allows the very different concerns of these tiers to be considered in relative isolation and promotes easier design. *IBM Cúram Social Program Management* simplifies this concept even further by hiding much of the complexity of n-tier application development. This chapter looks at what's "under the hood" in the runtime architecture of *IBM Cúram Social Program Management* online applications.

4.2 The Relationship to Java EE Architecture

Consider the *Java Enterprise Edition* (J2EE) architectural layers (see the Oracle J2EE 1.4 tutorial [http://docs.oracle.com/javaee/1.4/tutorial/doc/Overview2.html] for more detail):

- Client-side presentation:
  - Browser (HTML, *Java Applet*)
  - Desktop (*Java* application)

  - Other devices (*J2EE* client)
- Server-side presentation:
  - Web Server (JSP, *Java Servlet, J2EE*)
- Server-side business logic:
  - EJB Container (EJBs, *J2EE*)
- Enterprise Information System (EIS):
  - Various databases

The *IBM Cúram Social Program Management* client-side presentation tier consists of HTML user interfaces rendered by a standard browser program on the user's desktop. Only pure HTML user interfaces are directly supported using client generation tools. Other types of clients could also be developed using generated Server Access Beans to connect to the server.

At runtime, the HTML user interface is generated by a server-side presentation layer consisting of *Java* Server Pages. Browser clients communicate with this layer over http, typically encrypted using SSL for security reasons.

The server-side presentation layer communicates with the server-side business logic using the RMI-IIOP protocol. *IBM Cúram Social Program Management* typically presents business objects in the business logic tier as Session EJBs although, as mentioned previously, they can also be simple *Java* RMI objects for the simpler deployment option often used during application development. In any event, business objects are ultimately plain *Java* objects (POJOs) with the middleware plumbing filled in transparently during the application build.

The back end of the *IBM Cúram Social Program Management* architecture is a relational database as well as other enterprise and legacy applications. Again, the middleware “plumbing” required to communicate with the EIS is generated.

4.3 Summary of Java Technologies Used

EJB – Enterprise *Java* Beans

IBM Cúram Social Program Management uses Enterprise *Java* Beans for its server component model.

***Java* Servlets**

Java Servlets are used by the presentation tier.

JSP – *Java* Server Pages

Java Server Pages are used to generate the user interface.

JTA – *Java* Transaction API

Java Transaction API is used for starting and committing transactions.

JDBC – *Java* Database Connectivity

Java Database Connectivity is used for the middleware to communicate with the application database.

JMS – *Java* Message Service

Java Message Service is used for deferred processing and workflow within *IBM Cúram Social Program Management*.

JNDI – *Java* Naming and Directory Interface

Java Naming and Directory Interface is used in *IBM Cúram Social Program Management* both for application initialization-time lookup of Data Sources and Queues as well as to locate Enterprise *Java* Beans from the Presentation Tier.

RMI-IIOP – Remote Method Invocation

Remote Method Invocation over IIOP is used as the communications protocol between the presentation and application tiers.

4.4 *Java EE* Design Patterns

Many of the Oracle *Java EE* Design Patterns are used by *IBM Cúram Social Program Management*.

The *Struts* framework used in the *IBM Cúram Social Program Management* presentation tier utilizes the Front Controller pattern. Generated Server Access Beans in the presentation tier implement the Service Locator pattern to hide the complexities of locating server-side objects.

The *IBM Cúram Social Program Management* application server uses the Session Façade pattern to provide coarse-grained access to business logic. Value Objects are used to communicate between different business objects on the server, and between the server and the web tier. The Data Access Object pattern is used for all database accesses in the application server.

4.5 Presentation Tier Runtime Architecture

At runtime, the client user interface is generated by *Java* Server Pages (JSPs) compiled as servlets. These servlets run in a web container that sits between the browser client and the back-end *IBM Cúram Social Program Management* application server.

The Browser Client, which is a standard internet browser (e.g. *Microsoft® Internet Explorer*), displays the HTML pages to the user. Events generated by user interaction result in a HTTP request being sent to the web server. This is a standard web server such as *IBM® HTTP Server* or *Apache Web Server*. Here, a JSP generated by the Cúram environment is converted into a *Java* Servlet which accepts the relevant parameters from the web server and calls the application server.

The *IBM Cúram Social Program Management* application server uses generated Server Access Beans to call appropriate server business logic, in addition to providing data conversion logic. It passes back the result and the servlet that handles this result generates the new HTML page and passes it back to the web browser via the web server.

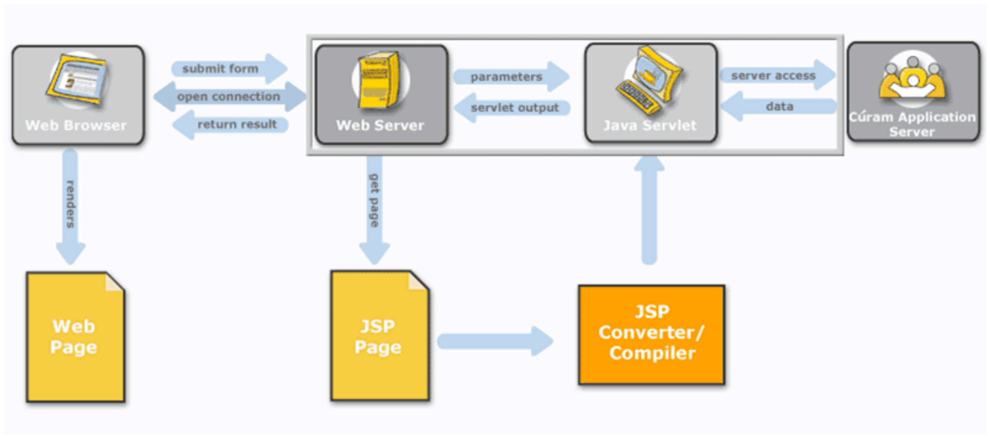


Figure 4.1 Client Runtime Architecture

The following more detailed view of the Web tier shows that client requests are intercepted by a controller servlet, which dispatches to the appropriate JSP servlet. Server Access Beans perform the job of converting data from HTML forms to an appropriate representation for transmission to the back-end application server. This stage of processing also includes data validations which have been previously defined in the application model. Results from the application server are formatted for display, and "list data" may optionally be sorted in a user-defined order.

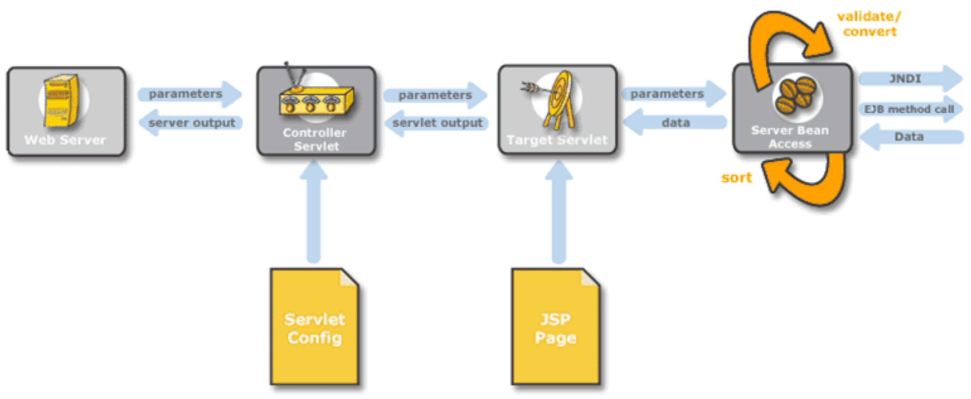


Figure 4.2 Client Runtime Architecture (Level 2)

4.5.1 The Struts Framework

The *Apache Struts Framework* is an open source framework for building web applications based on standard technologies such as *Java* Servlets, *Java* Beans, ResourceBundles and XML. It encourages application architectures based on the Model 2 approach (a variant of the Model View Controller (MVC) design pattern). *Struts* provides its own Controller component and integrates with other technologies to provide the Model and the View. For the Model, *Struts* can interact with any standard data access technology, including Enterprise *Java* Beans, JDBC, and Object Relational Bridge. For the View, *Struts* work well with *Java* Server Pages, Velocity Templates, XSLT, and other presentation systems.

IBM Cúram Social Program Management uses *Struts*, but generates most of the required components. Some custom JSP tags are provided with *IBM Cúram Social Program Management* and uses its own Server Access Beans, rather than *Struts* form beans.

Struts provides the front controller component and mandates the `struts-config` file format.

4.6 Business Logic Tier Runtime Architecture

The *IBM Cúram Social Program Management* application server can be logically split into three layers. A Remote Interface Layer handles the details of interacting with middleware. The Business Object Layer contains application business logic, implemented as plain *Java* classes. The Data Access Layer performs all interaction with the application database, or with other Enterprise Information Systems.

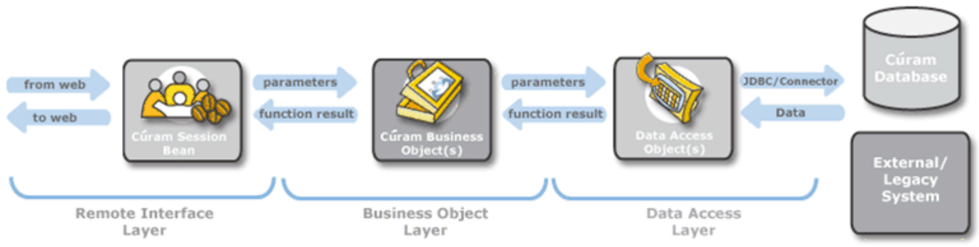


Figure 4.3 Server Runtime Architecture

4.6.1 Remote Interface Layer

The Remote Interface Layer controls various aspects of client/server interaction. It deals with middleware concerns that are outside the focus of the application's business logic and effectively shields the business logic code from the knowledge that it is participating in a client/server environment. The functions of the Remote Interface Layer are:

Business Object Life-cycle Management

Creating/locating appropriate Business Objects to service client requests;

Authorization

Checking that a client is entitled to execute a particular server function;

Transaction Control

Starting, committing, and rolling back atomic transactions;

Argument marshaling

Translating between different data formats involved in client/server transmission;

Last-chance exception handling

Handling exceptions that are not properly handled by application code, and logging them to a central location, as well as performing uniform reporting to client applications.

4.6.2 Business Object Layer

The Business Object Layer contains all of the application business logic including "Process" objects which implement the business-specific functionality and "Entity" objects which indirectly perform data accesses.

This is the only layer of the *IBM Cúram Social Program Management* architecture containing logic directly coded by application developers. Certain patterns are used by convention in "out-of-the-box" applications. The Business Object layer is further subdivided into Façade and Service Layers. The various types of objects in the following diagram are collectively known as "business objects":

The interaction between the Facade Layer and the Service Layer is shown in the following diagram

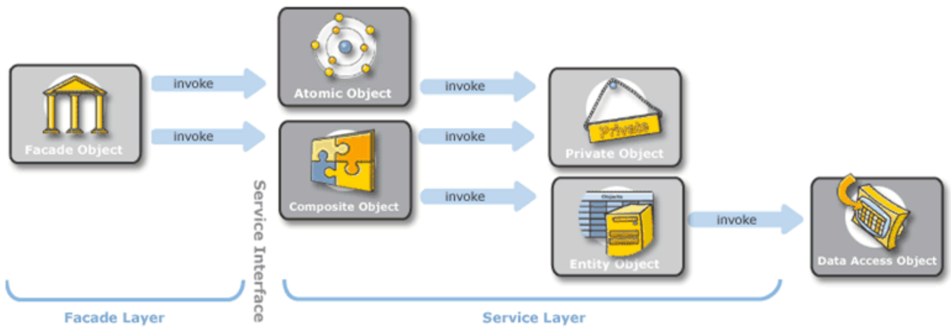


Figure 4.4 Business Object Layer

Facade Layer

A `Facade` layer is a higher-level business component that contains and centralizes complex interactions between lower-level business components:

- The `Facade` layer represents the public (remote) interface to the server;
- `Facade` objects may perform interface-specific processing;
- `Facade` objects sequence calls to a `Service Layer`

- Façade objects are “process” objects.

Service Layer

The service layer contains core *IBM Cúram Social Program Management* business processes. It uses the following process types within the Service Layer:

- “Atomic” processes are the lowest level units of processing that leave the server in a consistent state.
- “Composite” processes are convenience processes that sequence multiple atomic operations.

Factory Methods

IBM Cúram Social Program Management uses Factory Methods to provide an interface for creating business objects without specifying their concrete classes. All business objects (process and entity) are created by calling factory methods.

- Factories optionally support a very fine-grained trace facility using *Java* dynamic proxies.
- Factories are useful for debugging and understanding flow of control.

4.7 Connectors

IBM Cúram Social Program Management Connectors are a set of tools which facilitate Application Integration. They allow application developers to develop with objects representing data obtained from, or persisted on, legacy and other application platforms in exactly the same way that they use other *IBM Cúram Social Program Management* Business or Entity Objects.

Connectors also remove the necessity of writing “low level” code in order to access legacy systems. The mechanism of communication with the legacy platform is hidden from the developer.

Connectors are provided for:

- *IBM® MQSeries®*;
- Web services; and
- SQL.

Chapter 5

Development Architecture

5.1 Introduction

The *IBM Cúram Social Program Management* Development Environment is composed of a Server Development Environment and a Client Development Environment.

The *IBM Cúram Social Program Management* development approach has the following key features:

- Metamodel-based development approach;
- Application model based on UML;
- Code generators that produce significant portions of client/server applications;
- Simplified coding of handcrafted business logic;
- Simplified development of user interfaces;
- High-level business infrastructure.

5.2 Server Development Environment

The Server Development Environment uses a model-based approach to development. An application model is defined in a business-centric and platform-independent manner using a UML modeling tool. The model is the key building block for the code generators as it defines all the required entity objects and process objects.

The generators will create the necessary classes and files for the application structure. This structure will also have all the Remote Interface Layer code, the Data Access Layer code and the Business Object Layer code as well as handcrafted code.

5.2.1 Application Model

The Application Model is the basis for all server development and consists of the following elements:

Domains:
: Application-specific datatypes;

Entities:
: The objects modeled and persistently stored by the application;

Processes:
: Related sets of activities to achieve some business goal;

Value objects:
: Passed as messages throughout the application.

Application Model—Domains

Application model domains are defined in terms of a “fundamental” datatype (string, integer etc.), or another domain. They have application-specific type names such as “SOCIAL_SECURITY_NUMBER” or “PAYMENT_AMOUNT”, and collectively form a tree called the “domain hierarchy”.

Domains can have associated validations like UPPERCASE, range checks, code tables, pattern matches or custom validations. Attributes of entities and value objects are specified as domains.

The following illustrates the inheritance hierarchy of domain classes starting at a point called "root", with each lower-level, indented bullet inheriting from the preceding higher level:

- root
  - `STRING`
    - `FIRSTNAME`
    - `SURNAME`
    - `ADDRESSLINE`
  - `INT_64`
    - `UNIQUE_ID`
      - `PERSON_ID`
  - `DATE`
    - `DATE_OF_BIRTH`

Application Model—Entities

Entities have attributes which are defined as domain types, and can have primary and alternate keys, and foreign key relationships.

No implementation is required for “Create, Read, Update, Delete” (CRUD) style operations specified as stereotyped methods in UML. Other business methods can also be used whose signatures are defined in UML. Complex database operations can be specified in SQL.

The persistent store has pre and post access Exit Points.

Application Model—Processes

Arbitrary business functions are represented within the *IBM Cúram Social Program Management* model as methods of process classes. Method arguments are modeled as Value Objects.

The model defines the interface, but not implementation, of process objects.

5.2.2 Server Code Generation

A platform-specific model is automatically generated from the platform-independent metamodel and then code is automatically generated for an EJB server application. The main generated artifacts of the server code generation process are shown below.

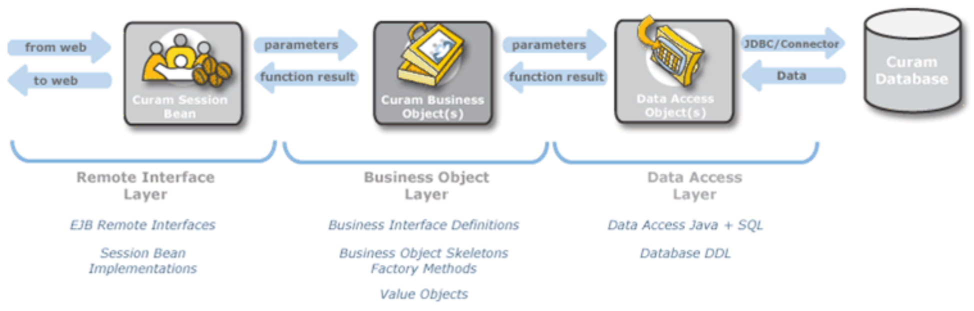


Figure 5.1 Server Code Generation

5.3 Client Development Environment

5.3.1 Overview

The *IBM Cúram Social Program Management* client consists of HTML Pages generated by JSPs which are in turn generated from XML screen definitions, with Style Sheets to provide formatting of screen pages. The XML screen definitions are presentation layer independent, and the *IBM Cúram Social Program Management* specific format is known as UIM (or

User Interface Metadata).

Automatic data validation/conversion is based on application model definitions with support for custom widgets and JavaScript Exit points.

5.3.2 User Interface Development

A major goal of the *IBM Cúram Social Program Management* development environment is to simplify user interface creation. Client “pages” are associated with particular back-end server interfaces, and since metadata about these interfaces has already been captured in the application model this can be leveraged to provide much of the information required for user interface generation. Much of the remaining task for client developers is to list the fields that should appear on a given client page. Default “widget” types are provided for fields and controls on the screen, based on its knowledge of the datatypes associated with fields.

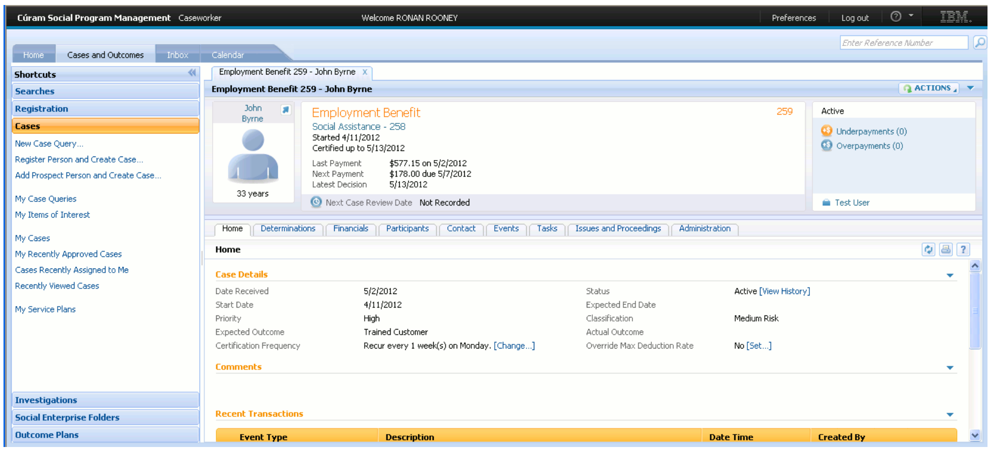
Fields follow a grid layout in “clusters” and “lists” specified in XML along with the overall “page hierarchy”. Widget types are determined automatically by connections.

An example of the User Interface Metadata (UIM) code for the “firstname” field is as follows:

```
<FIELD LABEL="Field.Label.FirstName">
<CONNECT>
<SOURCE NAME="Interface1" PROPERTY="firstForename"/>
</CONNECT>a
</FIELD>
```

The LABEL attribute of the FIELD element describes the label text that will be associated with this field when a client page is displayed. The value “Field.Label.FirstName” is a reference to the actual label value in a separate property file. The use of strings externalized in property files allows for easy localization of client applications. The SOURCE element describes where this field's contents comes from when the page is displayed. The NAME attribute of the SOURCE element specifies a specific back-end interface defined in the application model. The PROPERTY attribute specifies a particular datum returned by the back-end interface.

Note that there is no specification of exactly where on the screen the field should be displayed, nor is their any information about the field's datatype or the HTML control that will be used to display it. All of this information is filled in automatically at application build time. The simplicity of UIM pages makes them very easy to copy and paste from templates, making for a high level of developer productivity.



Employment Benefit 259 - John Byrne

John Byrne
33 years

Employment Benefit 259
Social Assistance - 258
Started 4/11/2012
Certified up to 5/13/2012

Last Payment	$577.15 on 5/2/2012
Next Payment	$178.00 due 5/7/2012
Latest Decision	5/13/2012

Next Case Review Date Not Recorded

Active
Underpayments (0)
Overpayments (0)
Test User

Home

Case Details

Date Received	5/2/2012	Status	Active [View History]
Start Date	4/11/2012	Expected End Date	
Priority	High	Classification	Medium Risk
Expected Outcome	Trained Customer	Actual Outcome	
Certification Frequency	Recur every 1 week(s) on Monday. [Change...]	Override Max Deduction Rate	No [Set...]

Comments

Recent Transactions

Event Type	Description	Date Time	Created By

Figure 5.2 Sample Cúram User Interface

5.3.3 Client Code Generation

The following diagram shows the main generated artifacts of the client code generation process.

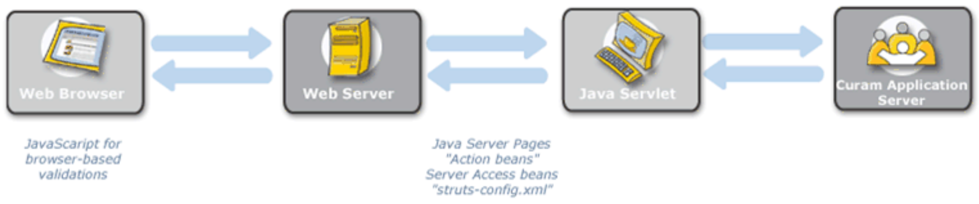


Figure 5.3 Client Code Generation

Chapter 6

Business Infrastructure

6.1 Introduction

IBM Cúram Social Program Management consists of a comprehensive business infrastructure functionality, which includes the following elements:

- The Rules Development Environment;
- XML & Printing; and
- Workflow.

In addition to these services, a complete façade-based authorization infrastructure is also provided.

6.2 Rules Development Environment

Cúram Express Rules, or CER for short, is a language for defining questions that can be asked, and the rules for determining the answers to those questions. Each question specifies:

- its name;
- the type of data which provides the answer to the question; and
- the rules for providing the answer (if the question is asked).

The answer to a question can be as simple as yes or no, e.g. the question "Is this person eligible to receive benefits?"; however, CER lets you define answer types to be as complex as you need, e.g. the question "Which groups of people in the household have an urgent need?" would be answered by providing a list of household groups, with each household group containing a list of people.

The environment for developing CER rules is the CER Rules Editor. This editor provides a user-friendly environment and interface for both technical and business users to create, edit and validate a rule set and its rule classes. For more information on the CER Rules Editor, please see the *CER Reference Manual* and the *Working With CER Guide*.

6.2.1 Eligibility and Entitlement Processing

The CER Rules Engine provides a mechanism for determining eligibility and entitlement on a case. The engine acts on the rules defined in the CER Rules Editor and the data, or evidence, captured on a case.

The flexibility of CER rules means they can used to define display rules, which is a way of conveying to a business user what has happened on the case. These rules can be as terse or as verbose as they need to be.

More on the CER Rules Engine, and the determination of eligibility and entitlement, can be found in the *Inside Cúram Eligibility* and *Entitlement Using Cúram Express Rules* guides.

6.3 XML and Printing

IBM Cúram Social Program Management print processing is based on merging data with document templates to produce the final document output. Document templates are developed in XSL (Extensible Stylesheet Language), and stored on the application database. Business processes that produce printed output produce data in the form of an XML document, and then send the data to a print server along with the id of the appropriate stylesheet used to format that data.

Producing XML data in *IBM Cúram Social Program Management* processes is easy as any “value object” can be converted into XML data. Since all communication between business processes and data access objects is in the form of value objects, effectively any data can be produced in XML form as easily as accessing the application database.

The *IBM Cúram Social Program Management* XML server can produce *PDF*, RTF, HTML or text from the XML/XSL definitions.

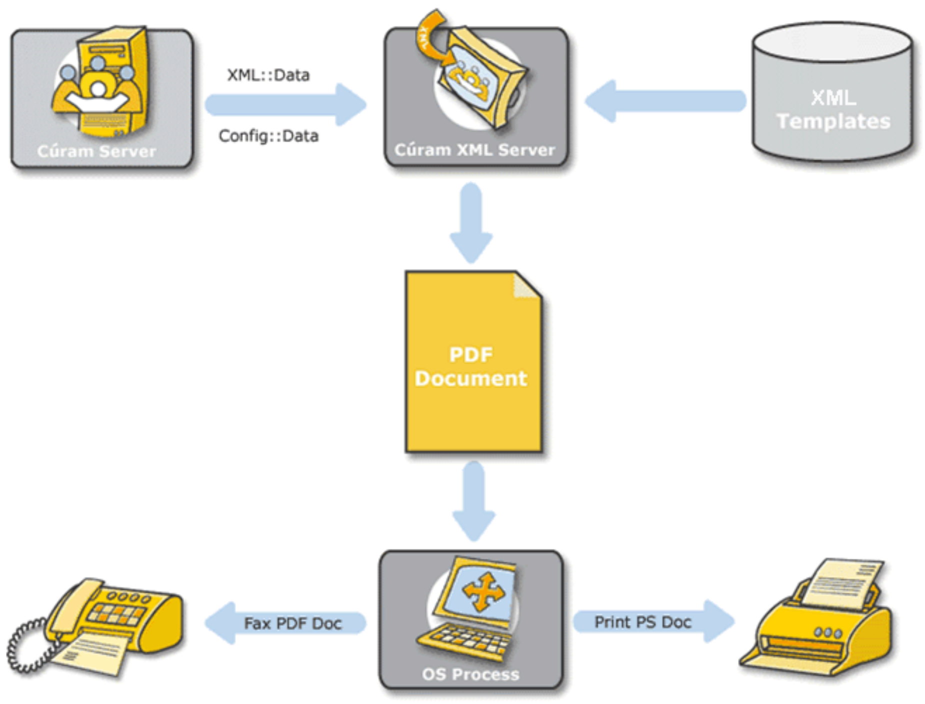


Figure 6.1 XML and PDF Printing

6.4 Workflow

The *IBM Cúram Social Program Management* workflow management system, which is based on the Workflow Management Coalition's standards, allows organizations to break down business processes into their constituent activities and to then build flexible relationships between them. Procedural automation of a business process is done by managing the sequence of work activities and the allocation of appropriate human and/or system resources associated with the various activity steps.

The *IBM Cúram Social Program Management* Workflow Management System comprises an interactive Process Definition Tool used to define the workflow activities and transitions, and a Workflow Engine which manages the workflow in the production environment. It also includes an administration component for maintaining instances of workflow process definitions.

This approach ensures that organizations can implement and manage their processes in a flexible manner and maximizes their ability to respond to change.

Workflow activities may involve an automated step (invoking a Cúram Business Process), or a manual step (creating a task for a user to perform manually).

Notices

Programming Interface Information

This publication documents intended programming interfaces that allow the customer to write programs to obtain the services of IBM Cúram Social Pogram Management.

Trademarks