**1. Introduction and Model Purpose**

This document provides the necessary context and details for an Artificial Intelligence (AI) generative model and a Retrieval-Augmented Generation (RAG) system to understand, create, and modify restaurant business rules in natural language, and to translate them into a format suitable for Business Rule Management Systems (BRMS) like Drools. The objective is to develop an AI assistant that automatically adapts to the incorporation of new business rules into the BRMS platform, without requiring extensive reprogramming.

**2. Key Concepts of the Decision Architecture**

The solution is based on an "AI Gen + BRMS" approach, which describes an AI-powered conversational assistant for business rules management2. Decide4AI is a technology boutique specializing in the development and productivization of digital innovation initiatives based on Automation, Artificial Intelligence, and Hybrid Architectures, with over 16 years of experience. Their approach is "decision-centric" and integrates various disciplines and technologies:

• **Business Process & Process Mining:** To understand and optimize workflows4.

• **Machine Learning & Math Optimization:** For predictive analysis and decision optimization4.

•n**Business Rules:** Form the core of decision logic, with a strong emphasis on dynamic management4.

• **Generative AI (GEN AI) & Cloud Architecture:** Key elements for intelligent automation and scalability4.

The objectives of this approach include increasing profitability and productivity, enhancing customer satisfaction, and reducing operational costs and risks4. Decide4AI has over 140 consultants in the field and more than 40 customers in over 10 countries3.

**3. Business Rule Management System (BRMS) and Drools**

The BRMS is fundamental for managing and applying rules. The assistant's logic integrates with the business rule infrastructure using tools like **Drools Workbench**. Supporting documentation includes "additional decision services developed in Drools" intended for testing the assistant, and "detailed documentation for the Drools platform, including an installation and configuration manual"6. Furthermore, "documentation regarding DMN notation" is available6.

**4. The AI Assistant and its Capabilities**

The proposed AI assistant is conceived as an essential tool for rule management. Its key features include adaptability, scalability, agent orchestration, and dynamic context management1.

The project contemplates several key steps to approach this challenge:

• **Multi-Agent Systems:** These systems include an orchestrator that distributes tasks and agents that handle specific requests, such as rule analysis, semantic validation, and modification of DMN structures5. An n8n orchestrator is suggested6.

• **Embeddings and Semantic Search:** Embedding models are used to map queries, and a vector knowledge base is implemented to facilitate the discovery of relevant rules5.

• **Retrieval-Augmented Generation (RAG):** This enables enriching the assistant's responses with information extracted in real-time from BRMS documentation and change history. This facilitates the generation of precise modifications without requiring extensive model training5.

• **Continuous Learning and Adaptability Mechanisms:** These allow for improved rule interpretation based on previous interactions and adaptation to new rules and services without requiring complete model retraining5.

The system integrates a language model and an intelligent agent system to empower users to interact more effectively with the BRMS platform, particularly for demand forecasting, optimization, and real-time demand and positioning calculation rules7. The modification historical data provided by Decide4AI since 2023 will be anonymized to protect client data confidentiality6.

**5. Types of Business Rules for Employee Recommendation in Restaurants (Based on JIRA History)**

The sources detail an extensive history of business rules, predominantly focused on employee recommendations for restaurants. The following taxonomy outlines these rules, their conditions, and associated data, which will be valuable for the model to understand the business logic and dependencies. Each rule type is often linked to an Excel tab for its values8.

**5.1. Base Employee Rules:**

• **Based on Restaurant Size (size):** Recommends a base number of employees.

◦ Initial version.

◦ Increased base employees for large restaurants from 10 to 129.

◦ General revisions to the number of recommended employees have occurred

◦ All "natural employee recommendation rules" including this one must now include a condition to check that the calculation date falls between the opening and closing dates.

• **Based on Day's Total Sales Forecast (total-sales):** Recommends a base number of employees.

◦ Initial version.

◦ For sales between 300 and 500, base employees increased from 6 to 814.

◦ New rows and updates to recommended employees have been added.

◦ A new range of 800-1000 sales was added, initially recommending 8 employees, later changed to 9 employees.

◦ Sales ranges were updated: 300-500 became 300-600, and 500-800 became 600-80017.

◦ Must include calculation date condition (as above).

• **Based on Expected Sales Per Time Slot (partial-sales):** Recommends extra employees for specific time slots.

◦ Initial version.

◦ A new row with the range 20-25 was added, recommending 3 employees14.

◦ Sales forecasts have been updated15.

◦ Two new ranges (12-17 and 17-20) were added, and the 12-20 range was removed. The 20-25 range increased from 3 to 5 employees.

◦ Must include calculation date condition (as above).

**5.2. Additional / Specialized Employee Rules:**

• **Autoking Rule (autoking):** Recommends additional base employees if the restaurant has autoking.

◦ Initially recommended 2 additional employees.

◦ Later reduced to 1 employee.

◦ Must include calculation date condition (as above).

• **Home Delivery (HD) Employees (employees-HD, short-HD, medium-HD, large-HD):**

◦ Initially recommended HD employees based on restaurant size.

◦ Modified to include time of day as a condition.

◦ Further modified to add a condition for company identifiers, applying only for companies 18001 and 25002.

◦ A new input field "distanceHD" with values 'C' (short), 'M' (medium), 'L' (long) was introduced as a condition, splitting the rule into three separate rules: short-HD, medium-HD, and large-HD19.

◦ The cshort-HD rule had its recommended number of employees updated.

◦ Existing HD employee rules have been modified by adding new rows and changing existing ones.

• **Extra Employees for Specific Restaurants (extra-restaurantes):** Recommends 1 extra base employee for specific restaurants.

◦ Counts and new restaurants have been added/updated.

◦ The number of extra employees for specific locations has been changed.

**5.3. Employee Breakdown and Positional Rules:**

• **Breakdown by Position (employees):** Recommends a breakdown of employees by position based on the base employee count, outputting a new object called locationBreakdown.

◦ Adjustments to positions for certain employee counts have been made.

• **Breakdown by Position (Autoking Dependent) (employees-without-autoking, employees-with-autoking):** The employee breakdown rule was split into two based on whether the restaurant has autoking or not.

◦ Positions for employees 16 and 17 were updated in the "no autoking" rule.

◦ Positions for employees 3, 4, and 12 were updated in the "with autoking" rule.

◦ Positions for employees 8 and 19 were updated in the "with autoking" rule.

◦ The regular breakdown rule should now only apply when it's neither opening nor closing time.

• **Opening Breakdown (opening-breakdown):** New rule for employee breakdown during opening.

• **Closing Breakdown (closing-breakdown):** New rule for employee breakdown during closing.

**5.4. Time-Sensitive Operational Rules:**

• **Opening Rule (opening):** Recommends a certain number of employees based on a new input field "previousDaySales" and the hours left until opening.

◦ The recommended number of employees has been updated multiple times

• **Closure Rule (closure):** Recommends a number of employees when the calculation date is a certain number of hours after the closing date.