**Sprint Planning**

**Sprint 0: Elaboration and Modeling**

**Tasks:**

* **Define the data model.**
* **Plan the .NET classes with initial functions and attributes.**
* **Delegate responsibilities to specific classes, following best practices.**
* **Document decisions in the backlog.**

**Sprint 1: Environment Setup**

**Tasks:**

* **Configure the development environment in .NET Core.**
* **Create a basic server and map an initial endpoint.**
* **Test server accessibility using Postman with a simple response (e.g., "Hello World").**

**Sprint 2: Database Setup**

**Tasks:**

* **Adapt and execute the provided SQL scripts in PostgreSQL to create and populate the database.**
* **Validate tables and relationships using PGAdmin.**
* **Develop basic CRUD commands in raw SQL and test operations on the database.**

**Sprint 3: Entity Framework Integration**

**Tasks:**

* **Configure Entity Framework in the project.**
* **Map database tables to .NET classes.**
* **Create simple endpoints (GET and POST) and test them using Postman.**

**Sprint 4: Cache System Integration**

**Tasks:**

* **Implement IMemoryCache to temporarily store data.**
* **Set TTL (Time to Live) for cached elements.**
* **Test data storage and retrieval from the cache using Postman.**

**Sprint 5: External API Integration (IP2C)**

**Tasks:**

* **Configure calls to the IP2C API and test responses in CSV format.**
* **Develop logic to convert API responses into usable objects.**
* **Integrate returned data into the main function’s flow (including insertion into the cache and database, if necessary).**

**Sprint 6: Error Handling in the Main Function**

**Tasks:**

* **Add HTTP error handling (404 and 500).**
* **Return clear error messages for invalid requests or external API failures.**
* **Test error scenarios with missing or malformed data.**

**Sprint 7: Automation (Scheduled Task)**

**Tasks:**

* **Configure HostedService to create the automatic update system.**
* **Develop logic to verify data consistency between the database and the external API.**
* **Implement updates for database records and cache invalidation when necessary.**

**Sprint 8: Error Handling in Automation**

**Tasks:**

* **Implement exception handling in the automation system.**
* **Ensure proper logging to monitor failures and reprocessing.**
* **Test scenarios where the external API fails or database data is inconsistent.**

**Sprint 9: Testing Integration**

**Tasks:**

* **Execute request testing: random IP requests every 2 minutes.**
* **Test endpoint access: include valid and invalid inputs for all endpoints.**
* **Simulate database inconsistencies and validate automatic corrections during scheduled updates.**
* **Verify cache updates and persistence.**

**Sprint 10: Report System Development**

**Tasks:**

* **Plan the data structure required for the report (e.g., attributes and table joins).**
* **Create and validate SQL queries (e.g., inner joins) using PGAdmin.**
* **Develop classes to structure reports in .NET.**

**Sprint 11: Report System Integration and Testing**

**Tasks:**

* **Implement the report endpoint in .NET.**
* **Test requests with valid and null parameters using Postman.**
* **Ensure the output is formatted and efficient.**

**Sprint 12: Code Review and Refactoring**

**Tasks:**

* **Review code to identify redundancies and improvements.**
* **Refactor classes and methods to adhere to clean code principles.**
* **Review and enhance exception handling across the system.**

**Sprint 13: Testing**

**Tasks:**

* **Execute request testing: random IP requests every 2 minutes.**
* **Test endpoint access: include valid and invalid inputs for all endpoints.**
* **Simulate database inconsistencies and validate automatic corrections during scheduled updates.**
* **Verify cache updates and persistence.**
* **Test the integration and functionality of all implemented systems.**

**Sprint 14: Documentation Translation**

**Tasks:**

* **Translate project documentation into English, ensuring clarity and professionalism.**
* **Update the README file with clear instructions for project setup and usage.**

**Sprint 15: Deployment (Optional)**

**Tasks:**

* **Set up the production environment, including database and server.**
* **Perform integration testing in the production environment.**
* **Publish the project in an accessible environment.**

**Sprint 16: Official Delivery**

**Tasks:**

* **Submit the project to the required platforms.**
* **Include necessary links or files for evaluation.**

**Note: For more details, refer to the linked Trello board used for task organization and planning.**