Developing an AOMM-Based Maturity Assessment Tool Using FastAPI

Saniya Khan
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Supervisor: Mr. Prashant Srivastava

Abstract

This project aimed to create a maturity assessment tool aligned with the Autonomous Operations Maturity Model (AOMM), leveraging a Python-based FASTAPI framework. The tool collects data from multiple stakeholders through targeted questions, computes maturity scores, and proposes a roadmap for operational transformation. By mapping user responses onto AOMM dimensions: Party, Technology, Culture, Strategy, Operations, and Data, the tool supports organisations in identifying their current maturity level and planning for next steps.

1 Introduction and Background

1.1 AOMM and TM Forum Context

The Autonomous Operations Maturity Model (AOMM) is an evolution of TM Forum's Digital Maturity Model (DMM), focusing on how enterprises progress from manual processes to high-level automation. This includes assessing strategic, cultural, technological, and operational capabilities. The framework is rooted in helping customers improve network operations, leverage emerging technologies, and adopt best practices for digital transformation.

1.2 Project Objectives

1. **Develop a Web-Based Tool:** Provide a quick way to gather data on an organization's operational maturity.
2. **Implement a Scoring Mechanism:** Translate stakeholder responses into quantifiable maturity levels across the six AOMM dimensions.
3. **Generate a Roadmap:** Suggest specific improvement paths for organizations, helping them move from lower automation to a self-governing, predictive environment.

2 Work Produced

2.1 Tool Architecture and FASTAPI Framework

2.1.1 Choice of Framework

FASTAPI was selected for its efficiency, ease of creating RESTful APIs, and built-in support for data validation via pydantic models. This allowed front-end routes and back-end logic to coexist in a single, streamlined Python application.

2.1.2 Data Models

- **Enums (Service, Operation, Dimension):** Define the available categories within the AOMM.
- **BaseModel Classes (Capability, SubCapability, Question, Attribute):** Represent the entities required for storing and managing assessment criteria.

2.1.3 Endpoints

- **Root Endpoint ("/"):** Returns a list of capabilities for quick retrieval.
- **Parameterized Endpoint ("/capabilities/{capability_id}"):** Provides detailed information on a specific capability, raising an HTTP 404 if not found.

2.2 Assessment and Scoring Mechanism

- **Closed-Loop Questions:** Each question has multiple-choice answers that correspond to maturity levels (e.g., 1 to 5). This ensures each response clearly maps to a specific score.
- **Dimensions and Sub-Dimensions:** The tool references the six main AOMM dimensions (Party, Technology, Culture, Strategy, Operations, Data) and may break these down into sub-dimensions or scenarios, each with a unique set of questions and weighted criteria.
- **Roadmap Generation:** Once scores are calculated, the system proposes areas of focus for elevating maturity such as adopting advanced automation or upskilling teams.

2.3 Implementation Details

- **Authentication and Authorization:** FASTAPI's compatibility with JWT tokens was used to manage access rights, ensuring that only authorized users or administrators could view, update, or export results.
- **Data Collection & Storage:**
  - The user's answers are captured through the web interface, stored in a structured format, and aggregated for analysis.
  - Scoring calculations are performed in near real-time, enabling rapid feedback to participants.
- **Collaboration and Iterations:**
  - Weekly sync meetings with a supervisor and a fellow team member ensured alignment.
  - Two interns worked in parallel on different parts of the code, sharing findings to enhance each other's coding practice and problem-solving approaches.

2.4 Usage Scenario

In practice, an organization's key stakeholders might complete the questionnaire in under half a day. The tool then consolidates and analyzes their responses, generating a maturity profile and recommended next steps. This approach can be repeated at intervals to measure progress over time or compare different departments within the same company.

3 Conclusion

The resulting maturity assessment tool offers a powerful means of evaluating an organization's stage of autonomous operations. By automating data collection and mapping answers to the AOMM, it provides clear, actionable insights. The use of FASTAPI simplified the development process—enabling quick setup, reliable endpoints, and an intuitive interface for stakeholders. Ultimately, the project demonstrates how a structured, model-driven tool can guide enterprises towards more advanced, data-centric operational models.

4 Further Steps

4.1 Expanded Customization

Allow organizations to adjust or create custom questions, weighting factors, and scoring models to reflect unique business processes.

4.2 Real-Time Dashboards

Develop a front-end interface or integrate with a business intelligence platform to provide interactive, real-time visualizations of maturity levels.

4.3 AI/ML Integration

Incorporate machine learning models to analyze historical data and predict which interventions or investments will most effectively increase maturity.

4.4 Modular Deployment

Package the tool into a containerized environment (e.g., Docker) for easy on-premises or cloud deployment, enabling seamless scaling as more participants or organizations use it.

By focusing on clear data structures, robust scoring logic, and flexible design, this project sets the stage for helping organisations not just measure their current level of automation, but also plot a clear course toward greater autonomy and operational excellence.