Marketplace Optimisation Agents

Abstract

BlueMart's online marketplace receives millions of seller products every month. Many images are low-quality, product descriptions are incomplete, and important keywords are missing. Manual review takes too long, causing delays, lower search visibility, and lost sales.

Content-Perfect proposes a Azure-based agent system that:

* Improves product content
* Checks compliance with rules
* Shares approved products through a Google API

This system reduces the time-to-publish from 24 hours to under 5 minutes and increases product conversion by 10% or more.

# Background

* **Company:** BlueMart – a retail giant with stores in 30+ cities and an online platform.
* **Scale:** Thousands of sellers, millions of products, high daily updates.
* **Pain Points:**
  + Manual review delays product publishing
  + Vendors say “my product is hidden”
  + Unchecked content risks brand and legal issues

# Objective & Success Metrics

We want to build an automated system that:

1. Creates SEO-friendly titles, detailed descriptions, and main images
2. Checks each submission against rules and gives fix suggestions
3. Publishes or rejects listings in under 5 minutes with little human effort
4. Shows a curated product catalogue to shoppers and other systems.

**Target KPIs:**

* Time to publish: 24h → <5 min
* Product conversion: +10%
* Vendor rejection rate: 18% → <3%
* AnswerBot top 3 accuracy: ≥95%

# Data Assets

| **Asset** | **File** | **Purpose** |
| --- | --- | --- |
| Compliance Rules | compliance\_rules.txt | Rules for checking submissions |
| Seller Submission Samples | seller\_submission\_samples.csv | Sample listings for testing ingestion |
| Content Crafter Samples | content\_crafter\_samples.csv | Partial listings for enrichment testing |
| Product Catalogue | catalog\_answer\_dataset.sqlite | Stores sample and approved products |
| Category Taxonomy | taxonomy.en-US.txt | Reference for category checks |
| Sample Images | Any image files | Test image quality checks |

# Solution Design & Detailed Phases

**Phase 1 – Seller Submission Intake & Pre Processing**

**1.Data Ingestion**

* Vendors submit products via /v1/sku/submit API.
* Submissions are stored as **drafts** before publishing.

**2.** **Pre-Processing**

* Extract metadata such as brand, category, and product attributes.
* Detect and record submission language.
* Clean HTML tags and normalize formatting.
* Store raw submission files in Blob Storage for backup.

**Phase 2 – Content Crafter Agent**

**1.Content Enrichment**

* Generate **SEO-friendly titles** using AI and marketplace keywords.
* Expand descriptions with detailed features, usage, and dimensions.
* Extract structured attributes (color, size, material, etc.).

**2.** **Image Processing**

* Identify and generate **hero images** for listings.
* Flag and reject poor-quality images (blurry, watermarked, irrelevant).

**Phase 3 – Compliance Inspector Agent**

**1.** **Rule Validation**

* Verify listings against compliance\_rules.txt.
* Ensure category alignment using taxonomy.en-US.txt.

**2.** **Decision Outcomes**

* **Approved** → Sent to catalog publishing.
* **Needs Fix** → Suggestions for minor corrections.
* **Rejected** → Escalated back to vendor for major issues (e.g., counterfeit or banned products).

**Phase 4 – Orchestrator Workflow**

**1.Process Management**

* Manage end-to-end sequence: Crafter → Inspector → Decision.
* Route exceptions and unusual cases to fallback queue.

**2. Security Handling**

* Store and manage API keys, tokens, and secrets in Azure Key Vault.

**Phase 5 – Catalog Answer Agent & Google API**

**1.API Publishing**

* Provide a **read-only API** for approved product data.
* Allow queries for stock, pricing, and recommendations.

**2.** **Performance Optimization**

* Cache frequently asked queries for faster responses.

**Phase 6 – Observability & Guardrails**

**1.Monitoring & Dashboards**

* Track KPIs such as time-to-publish, rejection rates, and error rates.
* Provide real-time dashboards via Azure Monitor.

**2.Safety & Compliance**

* Enforce AI guardrails to ensure generated text/images meet legal and ethical standards.

**Phase 7 – Containerisation & Deployment**

**1.Packaging**

* Package each agent as a Docker container.
* Deploy on Azure Kubernetes Service (AKS).

**2. Scalability & Updates**

* Enable auto-scaling for peak demand.
* Use CI/CD pipelines for automated deployment and rollback.

**Phase 8 – Pilot Rollout & Continuous Improvement**

* Tests the system on a small set of products first
* Checks results and improves the system based on feedback
* Gradually increases usage once targets are met

# Architecture Overview

* **Content Crafter Agent:** Improves listings with AI for titles, descriptions, and images
* **Compliance Inspector Agent:** Checks listings against rules and categories, gives suggestions
* **Orchestrator:** Controls workflow, handles unusual cases, and keeps data safe
* **Catalog Answer Agent:** Serves approved listings via API and handles queries quickly

# Expected Deliverables

1. **Source Code**
   * Workflow definitions
   * Prompt templates and image scripts
2. **Azure Configuration**
   * Templates for cloud resources
   * Container images
   * Deployment settings and secrets
3. **Google API Specifications**
   * Seller Submission API
   * Catalog Answer API
4. **Observability Artifacts**
   * Dashboards and logging templates
   * Alert policies
5. **Operational Runbook**
   * Deployment guide, scaling, rollback, incident handling
6. **Security & Compliance Docs**
   * Threat model, data flow, and data handling guidelines