**1. Software & Program Process Overview**

**A. Product Name: Visa Application Validator**

**B. Purpose:**

Automate, standardize, and enhance the accuracy and auditability visa application assessments, mapping every applicant data field to Migration Regulations 1994 requirements.

**C. High-Level Architecture**

**A diagram of a software system

AI-generated content may be incorrect.**

* **User Interface**
  + Web portal for uploading applicant files (Word, PDF, images)
  + Dashboard for compliance status and report downloads
* **Data Extraction Layer**
  + OCR for scanned documents
  + NLP for parsing forms (English/Mandarin support possible)
  + Structuring data into database fields
* **Regulation Engine**
  + Rules database mapping application fields to Migration Regulations (kept current)
  + NLP-based “GTE evaluator” (assesses free-text intent and motivation)
* **Compliance Engine**
  + Rule-based logic for binary checks
  + ML-based logic for text analysis, anomaly detection, and flagging
  + Document verification (checks for missing, expired, or inconsistent documents)
* **Reporting Module**
  + Generates per-applicant compliance matrix, clause mapping, and summary reports (Word, PDF, dashboard view)
  + Officer/caseworker override interface
* **Feedback & Learning**
  + Officer feedback for false positives/negatives
  + Regulation updates pushed monthly
* **Audit & Security**
  + Full logging, change tracking, role-based access, data privacy compliance

**D. Program Process**

**Step 1: Upload & Ingestion**

* User uploads application (docx/pdf/image)
* System parses, extracts, and normalizes data

**Step 2: Mapping & Validation**

* Each field is mapped to corresponding regulation
* Automated checks and NLP evaluation are run
* Compliance, risk, and missing info are flagged

**Step 3: Report Generation**

* Section-by-section Pass/Fail/Review matrix produced
* Downloadable Word/PDF report generated

**Step 4: Officer Review (if needed)**

* Human can override AI output or add notes

**Step 5: Continuous Feedback**

* Officer actions/decisions are captured for retraining and improvement

**2. Software Life Cycle**

**A. Analysis**

* **Stakeholder Interviews:** Understand pain points (migration agents, case officers)
* **Regulation Review:** Deep dive into Schedule 2 Subclass 500, Directions, and all referenced sections
* **Functional Requirements:**
  + High accuracy in mapping fields to legal clauses
  + Transparency and traceability
  + Multilingual support

**B. Design**

* **System Architecture:** Modular, API-first, secure web application
* **UI/UX:** Intuitive dashboards, easy file upload, clear compliance visualization
* **Database Design:** Flexible schema for applicant data, document management, and regulatory mapping
* **AI/NLP Models:** Custom-trained for GTE, intent, and anomaly detection
* **Audit & Logging:** Granular user and system action logging

**C. Development**

* **Frontend:** React.js or Angular for web portal
* **Backend:** Python (Django/FastAPI), or Node.js for business logic and API
* **NLP/AI:**
* **Database:** PostgreSQL or MongoDB
* **OCR:** Tesseract, Google Vision API, or AWS Textract
* **Compliance Engine:** Custom module, updated quarterly with regulatory changes
* **Testing:**
  + Automated unit/integration tests
  + “Golden set” of real/redacted applicant files for regression testing

**D. Deployment**

* **Cloud Platform:** AWS, Azure, or GCP (preferably in Australia for data residency)
* **CI/CD:** Automated builds, security scans, test pipeline
* **Security:**
  + Encryption in transit and at rest
  + SSO and RBAC
  + Regular penetration testing
* **Release Management:**
  + Phased rollout (PoC → pilot → production)
  + Sandbox mode for agent testing

**E. Maintenance & Continuous Improvement**

* **Regulation Sync:**
  + Automated monitoring of [AustLII](https://www.austlii.edu.au/) for new/updated clauses
  + Quarterly legal review with compliance team
* **Model Retraining:**
  + Use caseworker feedback to improve NLP models
  + Add new scenarios as detected in production
* **Helpdesk & Support:**
  + 24/7 ticketing system
  + FAQ, documentation, and user training
* **Scalability:**
  + Auto-scaling based on load
  + Globalization support (other visa subclasses, countries)
* **Audit & Governance:**
  + Full activity traceability for compliance and dispute resolution

**4. Continuous Maintenance Life Cycle**

1. **Quarterly Regulatory Update:**
   * Automatic or manual review of [AustLII](https://www.austlii.edu.au/) for changes.
   * Regulations module updated with new clauses, sunsetted clauses removed.
2. **Monthly Model Review:**
   * Analyze officer/caseworker overrides.
   * Retrain NLP models for better GTE intent or fraud detection.
3. **Annual Security Review:**
   * Penetration testing.
   * Full audit and compliance check (GDPR, Australian privacy law).
4. **User Feedback Integration:**
   * Feedback button in dashboard.
   * Direct line to product team for critical issues.