SOFTWARE ARCHITECTURE & DESIGN PRACTICES

Technical Architecture Document

Yukti Kosh: National Skills Database

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1. Entity Types and Attributes

1.1 Individual Skills Management Module

1.1.1. UserProfile

- *Role*: Serves as the primary container for individual user identity and professional information, enabling personalized skill management and privacy control.
- *Attributes*:
    - Basic Info: UUID, name, contact details, location
    - Educational background
    - Work experience
    - Privacy settings
    - Profile visibility preferences
    - DigiLocker integration ID
    - ABC ID (Academic Bank of Credits)
    - Authentication Credentials

1.1.2. SkillProfile

- *Role*: Maintains a structured repository of an individual's skills and competencies, mapped to standardized frameworks for consistent assessment and matching.
- *Attributes*:
    - Skill ID
    - NSQF level
    - Certification details
    - Validation status
    - Last updated timestamp
    - Issuing authority

1.1.3. Certification

- *Role*: Manages verification and validation of user credentials, ensuring trust in the skill claims through integration with authorized certification bodies.
- *Attributes*:
    - Certificate ID
    - Issuing organization
    - Date of issuance
    - Validity period
    - Digital signature
    - Verification status

1.2 Enterprise Talent Module

1.2.1. Organization

- *Role*: Maintains verified enterprise profiles and access control, enabling trusted participation in the talent ecosystem.
- *Attributes*:
  - Organization ID
  - GSTN number
  - Industry sector
  - Location details
  - Verification status
  - HR team access roles

1.2.2. JobRequirement

- *Role*: Facilitates structured capture of skill needs and job requirements, enabling precise matching with candidate profiles.
- *Attributes*:
  - Job ID
  - Required skills mapping
  - NSQF level requirements
  - Experience criteria
  - Assessment criteria
  - Geographic preferences

1.2.3. TalentAnalytics

- *Role*: Processes and presents talent demand-supply insights, helping organizations make data-driven hiring decisions.
- *Attributes*:
  - Analytics ID
  - Skill demand metrics
  - Geographical distribution
  - Industry-wise requirements
  - Trend analysis data

1.3 Government & Policy Module

1.3.1. PolicyMetrics

- *Role*: Aggregates and analyzes national-level skill data to support evidence-based policy making and program planning.
- *Attributes*:

- Metric ID
- Skill distribution data
- Geographic mapping
- Industry sector analysis
- Timeline markers
- Impact indicators

1.3.2. SkillGapAnalysis

- *Role*: Identifies and quantifies skill gaps across sectors and regions, helping direct training and development initiatives.
- *Attributes*:
  - Analysis ID
  - Sector-wise gaps
  - Geographic distribution
  - Temporal trends
  - NSQF level distribution

1.4. Education & Training Module

1.4.1. Course

- *Role*: Manages standardized course information and tracks alignment with industry needs and national qualification frameworks.
- *Attributes*:
  - Course ID
  - NSQF alignment
  - Learning outcomes
  - Industry relevance metrics
  - SSC approval status
  - Content version

1.4.2. TrainingProvider

- *Role*: Maintains authorized training provider profiles and monitors their performance in delivering skill development programs.
- *Attributes*:
  - Provider ID
  - Accreditation details
  - Course offerings
  - Performance metrics
  - Quality indicators

1.5. National Common Assessment Module

1.5.1. Assessment

- ○ *Role*: Defines and manages standardized assessment frameworks, reducing redundant testing across organizations.
- ○ *Attributes*:
    - ■ Assessment ID
    - ■ Type (aptitude, technical, domain)
    - ■ Validity period
    - ■ Provider details
    - ■ Security level

1.5.2. Score

- ○ *Role*: Securely stores and manages assessment results, enabling verified sharing of standardized test scores across the platform.
- ○ *Attributes*:
    - ■ Score ID
    - ■ Candidate reference
    - ■ Assessment reference
    - ■ Timestamp
    - ■ Validity status
    - ■ Verification hash

2. Inter-Module Relationships

2.1 Relationship Graph
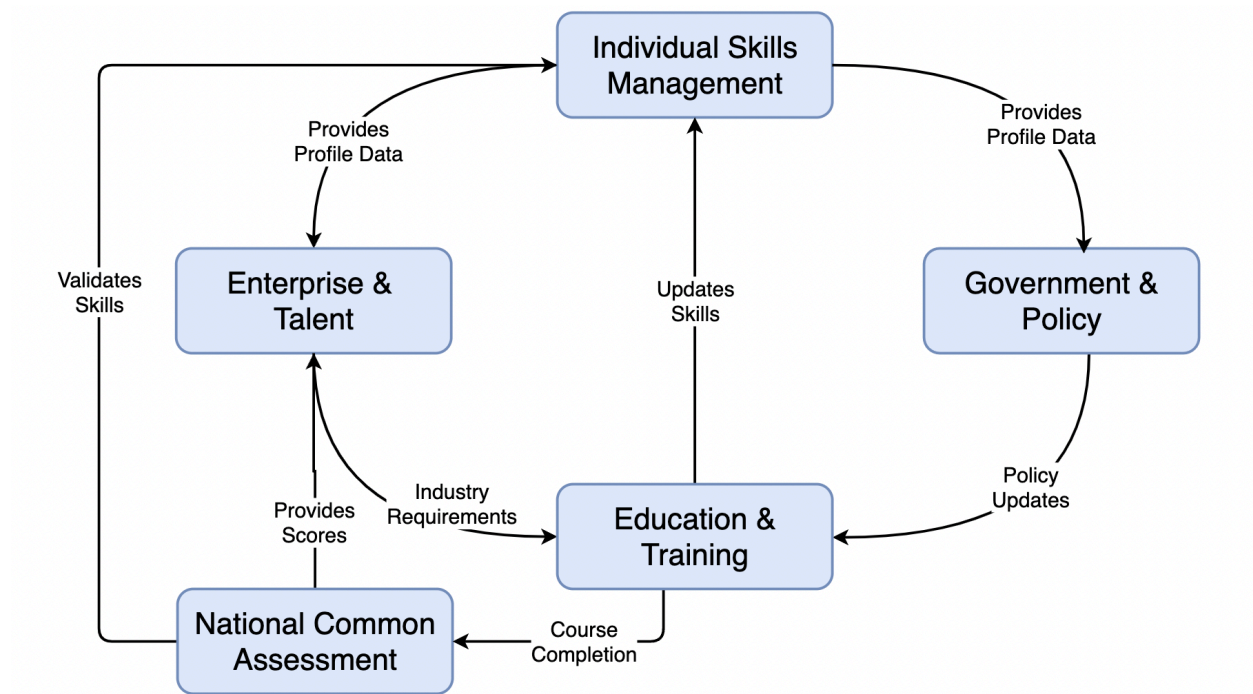
2.2 Data Flow Roles

Source Node	Target Node	Source Role	Target Role	Data/Process Flow
Individual Skills	Enterprise Talent	Provider (a)	Processor (b)	Profile & Skill Data
Individual Skills	Government & Policy	Provider (a)	Processor (b)	Aggregated Skill Data
Education & Training	Individual Skills	Provider (a)	Processor (b)	Skill Updates
National Assessment	Individual Skills	Provider (a)	Processor (b)	Skill Validation
National Assessment	Enterprise Talent	Provider (a)	Processor (b)	Assessment Scores
Government & Policy	Education & Training	Processor (b)	Both (c)	Policy Updates
Enterprise Talent	Education & Training	Provider (a)	Both (c)	Industry Requirements
Education & Training	National Assessment	Provider (a)	Provider (a)	Course Completion

2.2.1. Individual Skills Management Module

Role Type: Combination (c)

- As Source Node:
    - Provides profile and skill data to Enterprise Talent
    - Provides aggregated skill data to Government & Policy
- As Target Node:
    - Processes skill updates from Education & Training
    - Processes validation data from National Common Assessment

2.2.2. Enterprise Talent Module

Role Type: Combination (c)

- As Source Node:
    - Provides industry requirements to Education & Training
- As Target Node:
    - Processes profile data from Individual Skills Management
    - Processes assessment scores from National Common Assessment
    - Processes and analyzes candidate profiles

2.2.3. Government & Policy Module

Role Type: Process-oriented (b)

- As Source Node:
    - Processes skill data to generate policy updates for Education & Training
- As Target Node:
    - Processes aggregated skill data from Individual Skills Management
    - Analyzes trends and generates insights

2.2.4. Education & Training Module

Role Type: Combination (c)

- As Source Node:
    - Provides skill updates to Individual Skills Management
    - Provides completion data to National Common Assessment
- As Target Node:
    - Processes industry requirements from Enterprise Talent
    - Processes policy updates from Government & Policy
    - Adapts curriculum based on inputs

2.2.5. National Common Assessment Module

Role Type: Data Provider (a)

- As Source Node:
    - Provides validation data to Individual Skills Management
    - Provides assessment scores to Enterprise Talent
- As Target Node:
    - Processes course completion data from Education & Training

3. Stakeholder Interactions

3.1. Individual Users

- **Location**: Remote/Distributed
- **Devices**: Mobile devices, web browsers
- **Interaction Points**:
    - Profile management
    - Skill updates
    - Certificate uploads
    - Assessment scheduling

3.2. Enterprise Users

- **Location**: Corporate offices
- **Devices**: Desktop workstations, web browsers
- **Interaction Points**:
    - Talent search
    - Analytics dashboard
    - Requirement posting
    - Candidate evaluation

3.3. Government Officials

- **Location**: Government offices
- **Devices**: Secure workstations
- **Interaction Points**:
    - Policy dashboard
    - Analytics interface

- ○ Report generation
- ○ Program planning

3.4. Education Providers

- **Location**: Educational institutions
- **Devices**: Desktop/laptop computers
- **Interaction Points**:
  - ○ Course management
  - ○ Student progress tracking
  - ○ Certification issuance
  - ○ Industry alignment checks

4. Technical Constraints

4.1. Security Constraints

- **Constraint**: Multi-factor authentication for all user types
- **Justification**: Critical for protecting sensitive personal and organizational data
- **Constraint**: End-to-end encryption for all data transmission
- **Justification**: Required for compliance with data protection regulations

4.2. Performance Constraints

- **Constraint**: Maximum response time of 3 seconds for search operations
- **Justification**: Essential for user experience and system usability
- **Constraint**: Support for 1 million concurrent users
- **Justification**: Required to handle peak loads during major recruitment cycles

4.3. Integration Constraints

- **Constraint**: Standardized API protocols for all external integrations
- **Justification**: Ensures consistent and maintainable integration patterns
- **Constraint**: Real-time synchronization with DigiLocker and ABC
- **Justification**: Critical for maintaining data accuracy and reducing fraud

4.4. Scalability Constraints

- **Constraint**: Cloud-native architecture with auto-scaling

- **Justification**: Required to handle varying loads and ensure system reliability
- **Constraint**: Distributed database architecture
- **Justification**: Necessary for managing large-scale data across geographic regions
- **Constraint**: Support for 100 million user profiles
- **Justification**: Accommodate projected user base including students and professionals
- **Expansion**: As per the suggestion from the stakeholders, the target user group for the National Skills Database (Yukti Kosh) should primarily be individuals in the 18-26 years age range, who are seeking entry-level jobs. This aligns with the focus on supporting fresh graduates and young professionals in their skill development and job search.