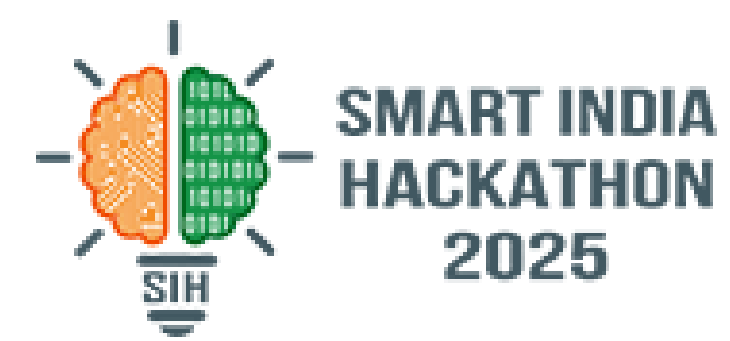# SMART INDIA HACKATHON 2025

- Problem Statement ID – **25202**

- Problem Statement Title - **Micro-Credential Aggregator Platform**

- Theme - **Miscellaneous**

- PS Category - **Software**

- Team ID - **118191**

- Team Name - **Hexadecimal**

Idea/Approach Details

HEXADECIMAL

CORE FEATURES

- Aggregates micro-credentials from multiple learning platforms such as **Coursera, SWAYAM, NPTEL, and LinkedIn Learning** through APIs and bulk uploads.
- Converts diverse credential formats into a **standardized structure**, ensuring uniformity across all providers.
- Offers a **Skill Analytics Dashboard** that visualizes real-time national and institutional skill trends for employers and policymakers.
- Ensures **alignment with NSQF levels** to support **stackable and credit-linked qualifications**.
- Delivers a multilingual, accessible, and inclusive user interface to **accommodate diverse learner backgrounds.**

Aggregation → Normalization → Verification → Recommendation → Analytics

BUSINESS PROSPECTS

- **India's EdTech and skilling market** is valued at over USD 10.2 Billion (₹84,000+ crore), with rising demand for verified micro-credentials and interoperable learning systems.
- Operates on a freemium structure—free portfolio creation for learners, with **premium verification, analytics, and recommendation features**, alongside a 2–5% platform fee from institutions and API partners.
- Partners with **universities, EdTech platforms, and NCVET-recognized bodies** through public–private partnerships, enabling large-scale adoption and shared revenue generation.

USER WORKFLOW

Technical Approach
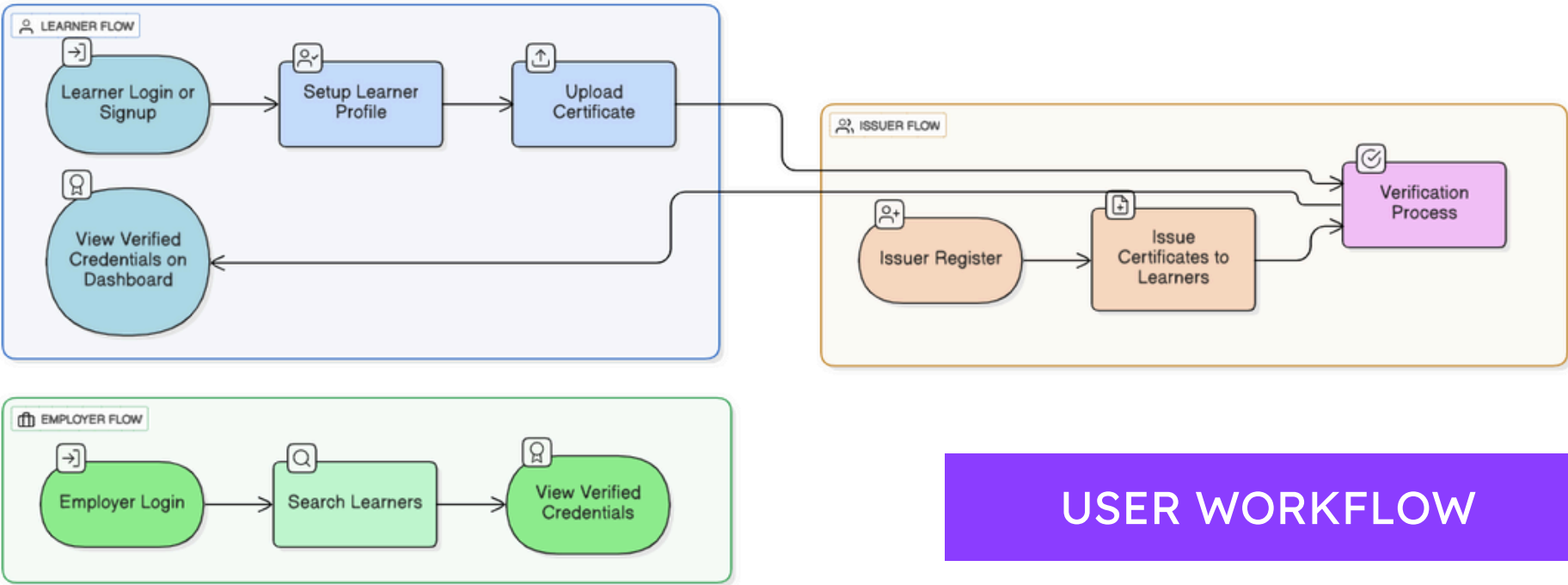
- **Frontend**: Next.js / React.js
- **Backend**: FastAPI (Python) or Express.js (Node.js)
- **Database**: PostgreSQL + FAISS / Pinecone
- **AI / NLP**: Sentence Transformers (BERT-based) for similarity detection
- **Authentication**: JWT / OAuth2
- **Hosting**: AWS / GCP
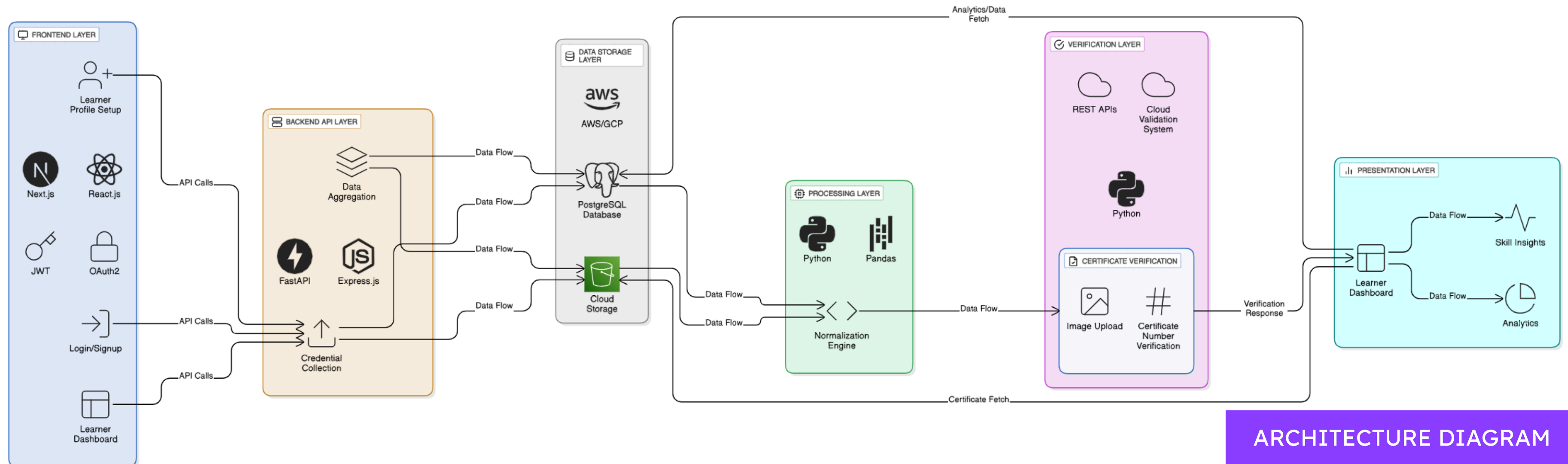
ARCHITECTURE DIAGRAM

Feasibility & Viability

HEXADECIMAL

FEASIBILITY

- Directly aligns with **MSDE's Skill India** and **NEP 2020 objectives**.
- Uses APIs and open data from trusted and verified providers.
- Lightweight AI models (Sentence Transformers) ensure **fast and scalable** processing.
- **Proven technical stack**: React + FastAPI + PostgreSQL.
- Modular architecture allows easy feature expansion.
- Low operational and infrastructure costs due to **efficient design.**
- **Integrates smoothly** with existing digital education and skill portals.
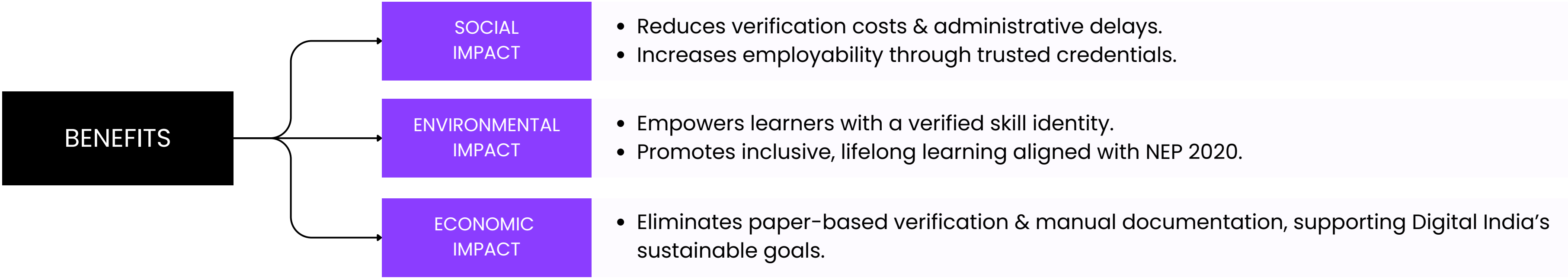
VIABILITY

- Enables **large-scale skill mapping** for India's workforce.
- Centralized trusted skill repository **accessible to learners, employers, and policymakers.**
- Can be extended to **international credential systems.**
- Supports data-driven policy decisions and workforce planning.
- **Reduces manual verification costs** for employers.
- Encourages employer-learner engagement through **instant verification.**
- **Revenue potential** via premium services, analytics reports, and API subscriptions.
- Can **adapt to future digital initiatives** (Digital India, global skill standards).

CHALLENGES & RISKS

- Integrating APIs from multiple skill providers can be **technically complex.**
- Ensuring credentials are authentic and protecting sensitive personal data is **critical**.
- Duplicate accounts or overlapping credentials may affect **analytics accuracy.**
- Handling **large-scale concurrent requests** may strain system performance.
- Reliance on **third-party APIs** may cause service interruptions or inconsistencies.
- **Compliance with national and international regulations** must be maintained.
- Learners and employers may hesitate to adopt a **new centralized platform.**
- **Frequent updates** from multiple providers can lead to data mismatches or inconsistencies.
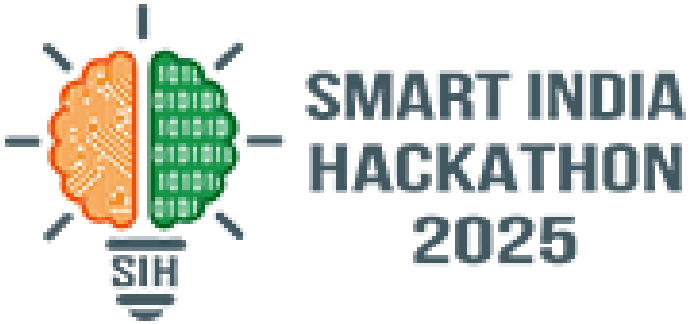
Impacts & Benefits

ASPECT	TRADITIONAL CREDENTIAL SYSTEM	MSDE – OUR UNIFIED PLATFORM	IMPACT/BENEFITS
Data Collection	Credentials scattered across Coursera, SWAYAM, NPTEL, LinkedIn, etc.	Automated aggregation and standardization from multiple learning platforms via APIs.	Efficiency
Analysis	No unified analytics; difficult to track national skill trends.	Real-time dashboards with skill mapping, trend analysis, and insights for policymakers.	Transparency
Learner Experience	Difficult to showcase multiple certificates; lacks credibility.	Single verified digital portfolio showcasing all achievements securely.	Credibility

BENEFITS

SOCIAL IMPACT
- Reduces verification costs & administrative delays.
- Increases employability through trusted credentials.

ENVIRONMENTAL IMPACT
- Empowers learners with a verified skill identity.
- Promotes inclusive, lifelong learning aligned with NEP 2020.

ECONOMIC IMPACT
- Eliminates paper-based verification & manual documentation, supporting Digital India's sustainable goals.

- **Skill Landscape & Policy**
  - India Skills Report 2024 – Only 51.25% of youth employable, highlighting the need for verified credentials. Wheebox
  - NEP 2020 – Promotes modular, micro-credential-based learning aligned with Skill India. MoE
- **Credential Standards**
  - W3C Verifiable Credentials 2.0 – Global framework for secure digital credential verification. W3C
  - NASSCOM Digital Skills Gap Report 2023 – 78% of employers face credential verification challenges.
- **AI & Data Processing**
  - Sentence-BERT (2019) – Foundation for AI-based course deduplication. arXiv
  - Coursera & SWAYAM – Over 30M Indian learners, showcasing fragmented credential data.