

# Technical Back-End Development Brief for Saudi Streams of Creativity

## Overview:

Saudi Streams of Creativity is a digital platform designed to empower visual artists in Saudi Arabia. The platform will serve as a directory for artists, a marketplace to sell physical artwork, digital artwork and NFTs and an open call section for projects. The system must include user management, secure data handling, smart contracts, and IP registration functionalities.

## Key Components and Requirements:

### 1. User Profiles & Role Management

The platform will support multiple user types, each with a specific set of fields and functionalities. Role-Based Access Control (RBAC) is required to ensure users have access only to the areas of the platform relevant to their role.

#### 1.1 General User Profile (Visitor/Non-Artist User)

##### Profile Fields:

- **Full Name (Arabic & English):** First and last name fields with support for both languages.
- **Username:** Unique identifier for login and public display. Must be validated for uniqueness.
- **Email Address:** Required for communications and notifications. Verified via OTP or email link.
- **Mobile Number:** Verified via OTP or SMS. This is mandatory for all users for additional security.
- **Profile Picture:** Optional profile image upload. Must support different image formats (JPEG, PNG).
- **Location:** City and country fields. These should be used for localized content recommendations.
- **Interests:** Multi-select categories (e.g., Painting, Sculpture, Digital Art, Photography) for recommendations and personalized content.
- **Wishlist/Favourites:** Allows users to save artworks, projects, or artists they wish to revisit or purchase later.
- **Notifications Settings:** User-configurable preferences for email or in-app notifications. This should be stored and applied to all platform communications.
- **Purchase History:** A list of previous purchases including artworks and services. Must be securely stored and displayed for user reference.

##### Functionalities:

- **Art-Connect Directory Access:** Browse and search for artists based on categories, popularity, and location.
- **Art-Bid Interaction:** View open calls, submit proposals, and track project deadlines.
- **Art-Market Access:** Browse, purchase, and review artwork. Filters such as price, category, and location need to be implemented.
- **Project Participation:** Register for workshops and engage with the creative community through open calls.

## Back-End Requirements:

- **User registration & authentication:** OAuth2 and JWT (JSON Web Token) for secure login. Two-factor authentication (2FA) via OTP/SMS for additional security.
- **Database storage for interests and purchase history:** Data should be linked to user profiles and stored in a relational database.
- **Notification management system:** Enable both in-app and email notifications based on user preferences.

### 1.2 Artist Profile

##### Profile Fields:

**Full Name/Artist Name (Arabic & English):** Display name for public-facing interactions.

**Username:** Unique identifier for platform usage. Validate for uniqueness.

**Email Address:** Primary email for notifications and communications. Must be verified.

**Mobile Number:** Verified via OTP/SMS for identity verification.

**Profile Picture/Avatar:** High-resolution image for display. Stored securely in the database.

**Biography/About Me (Arabic & English):** A detailed bio, including exhibitions, career highlights, and notable works.

**Location:** City and country fields. Used for search and recommendation algorithms.

**Social Media Links:** External links (Instagram, Behance, Twitter) to promote the artist's online presence.

**National ID Number:** Required for identity verification, stored securely, and encrypted.

### Portfolio Management:

- **Gallery of Work:** Upload and manage portfolio items categorised by type (Painting, Sculpture, Digital Art, etc.).
- **Artwork Descriptions:** Include fields for medium, size, price, availability and year of creation.
- **Artwork Display Options:** Artists must select where they want their artwork to be displayed:
  - Primary Market: For original and unique artworks.
  - Secondary Market: For resale of previously sold works.
  - NFTs: For listing digital art as NFTs.
  - Prints & Souvenirs: For selling prints or artwork-related merchandise like posters, mugs, or t-shirts.
- **Certificate of Authenticity:** Upload certificates for original works to verify authenticity.
- **Timestamp or SAIP Registration:** Artists must choose whether the work is timestamped or registered with SAIP. They must upload certificates of registration for intellectual property protection.

### Service Offerings:

- **Custom Commissions:** Artists should be able to offer commission-based services with options for customization (size, material, price).
- **Workshops:** Artists can create listings for workshops (online or in-person) in collaboration with the Ministry of Culture's Cultural Learning Hub (CLH).
- **Consultation Services:** Allow artists to offer consulting for collectors or businesses.

### Functionalities:

- **Artwork Listings:** Manage artworks available for sale, including tracking sales history, editing availability, and pricing.
- **Bid Management:** Artists can view and manage project bids, track approvals, and rejections.
- **Wallet Integration:** Artists should have a wallet for transactions

### Back-End Requirements:

- **User authentication & authorization:** Secure logins using OAuth2 with role-based access for artists.
- **File uploads:** Image uploads for artwork, certificates, and portfolio items need to be handled via AWS S3 or similar cloud storage, with validation for size and format.
- **Payment gateway integration:** For purchases, sales, and commission services.
- **API for social media linking:** Enable profile linking to external platforms like Instagram and Behance.

## 1.3 Patron Profile

### Profile Fields:

- **Organisation Name (Arabic & English):** First and last name fields with support for both languages.
- **Email Address:** Verified via OTP/email link for communications.
- **Mobile Number:** Verified mobile number for security and identity verification.
- **Authorized Representative Information:** Full details for the authorized representative managing transactions.  
Includes:
  - Full Name
  - ID Number
  - Mobile Number
  - Email Address
  - National Address
  - Authorization Document upload
- **Commercial Registration Details:** Required for patrons, must upload a copy of their commercial registration.
- **Licenses (if applicable):** Patrons must upload any relevant licenses for validation.
- **About Us (Arabic & English):** A brief description of the patron's art interests, collections, and budget.
- **Preferred Art Categories:** Multi-select categories (e.g., Painting, Sculpture, Photography).

- **Budget Preferences:** Allow patrons to set a budget range in Saudi Riyals (SAR) for supporting artists or purchasing artwork.
- **Location:** City and country fields. Used for search and recommendation algorithms.
- **Social Media Links:** External links to Instagram, Facebook, and other platforms for public promotion.

#### Functionalities:

- **Transaction History:** Log and display all purchases and project contributions.
- **Wallet Integration:** Patrons should have wallets for managing funds and payments within the platform.

#### Back-End Requirements:

- **User registration & verification:** OAuth2 with 2FA for secure registration. Documents such as commercial registration and authorization must be securely stored and encrypted.
- **Database storage for transaction history:** Transaction logs must be linked to patron profiles and securely.
- **Payment gateway integration:** Include a system for handling payments and transactions.

### 1.4 Intermediary Profile (Gallery/Agency)

#### Profile Fields:

- **Organisation Name (Arabic & English):** Gallery or agency name in both languages.
- **Email Address:** Verified for communications.
- **Mobile Number:** Verified via OTP/SMS.
- **Authorized Representative Information:** Full details including:
  - Full Name
  - ID Number
  - Mobile Number
  - Email Address
  - National Address
  - Authorization Document upload
- **Commercial Registration:** Required for intermediaries, must upload a copy of their commercial registration.
- **Licenses (if applicable):** Must upload relevant licenses.
- **Profile Picture/Logo:** Gallery or agency logo for public-facing interactions.
- **About Us (Arabic & English):** A description of the gallery or agency's services, artist representation, and exhibitions.
- **Preferred Art Categories:** Multi-select categories (e.g., Painting, Sculpture, Photography).
- **Budget Preferences:** Allow patrons to set a budget range in Saudi Riyals (SAR) for supporting artists or purchasing artwork.
- **Location:** City and country fields. Used for search and recommendation algorithms.
- **Social Media Links:** External links to Instagram, Facebook, and other platforms for public promotion.

#### Functionalities:

- **Gallery Management:** Intermediaries can manage the artists they represent and update information on exhibitions.
- **Transaction History:** Full record of gallery sales, artist sponsorships, and project interactions.
- **Wallet Integration:** Galleries/agencies should have wallets to handle payments, artist transactions, and commissions.

#### Back-End Requirements:

- **Document handling:** Secure storage and encryption of commercial registration and authorization documents.
- **Transaction history management:** A robust database system for logging and retrieving transaction histories.
- **Wallet system:** Implement wallets for managing payments between galleries/agencies and the artists they represent.

## 2. Core Platform Functionalities

### 2.2 Wallets & Payments:

- **Wallet Creation:** Every user (Artist, Patron, Intermediary) must have a wallet for handling transactions. These wallets will be used for purchasing artwork, submitting bids, managing commissions, and paying for services.
- **Currency Support:** Wallets should support fiat currency (Saudi Riyals, SAR).

- **Payment Gateway Integration:** Secure payment gateways (such as **Stripe**, **PayPal**, **Mada**, or **Apple Pay**) must be integrated to handle fiat currency transactions.
- **Transaction Logging:** Each wallet transaction must be logged, with detailed records stored in the database. This includes transactions such as purchases, sponsorships, commissions, and bid payments.
- **Fee Structure:** Implement a backend system to handle commission fees charged by the platform for each transaction. Ensure fees are automatically deducted and transferred to the platform's wallet.

## 2.3 IP Registration & Artwork Management:

- **SAIP (Saudi Authority for Intellectual Authority) Registration:** Alternatively, artists can register their work with SIAP. This requires uploading a registration certificate as proof of intellectual property protection.
- **Certificate Validation:** All uploaded certificates (timestamp or SAIP) must be verified by the backend system to ensure authenticity and link them to the respective artwork.
- **Artwork Data Storage:** All artwork details, including title, description, price, availability, certificates, and images, should be stored securely in a **NoSQL** database (such as **MongoDB**) or a **relational database** (such as **PostgreSQL**), depending on scalability requirements.
- **File Uploads & Storage:** Images and certificates should be securely uploaded and stored using **AWS S3**, **Google Cloud Storage**, or similar. Ensure file size limitations and format validation are applied.

## 3. Core Functionalities & APIs:

### 3.1 Search & Filter:

**Comprehensive Search System:** The backend should support advanced search features across creatives, artwork and projects.

#### a. Primary and Secondary Market:

##### Categories:

- Calligraphy
- Drawing & Illustration
- Graphics
- Mixed Media
- Painting
- Photography
- Printmaking
- Sculpture

##### Format:

- Digital Print on Archival Paper
- Ink on Paper
- Mixed Media on Canvas
- Engraving on Wood or Metal
- Oil on Canvas
- Acrylic on Canvas
- Watercolour on Paper
- Freestanding Sculptures
- Metal Work Sculptures

- 3D Printed
- Mixed Media Assemblage
- C-Prints
- Aluminium Mounted Prints
- Framed Photographs
- Collage on Canvas or Board
- Assemblage on Panel
- Textile Art (Fabric & Embroidery)
- Screen Print on Paper
- Lithograph on Paper
- Etching on Metal
- Monotype Prints
- Giclée Prints on Canvas or Paper
- Charcoal on Paper
- Pen and Ink on Paper
- Graphite on Board
- Coloured Pencil on Bristol Paper
- PDF
- AI
- PSD
- SVG
- EPS
- JPG
- PNG

**Size:**

- Small (under 50 cm)
- Medium (50 - 100 cm)
- Large (100-150 cm)
- Extra Large (Above 150 cm)

**Certifications:**

- Certificate of Authenticity
- Gallery Provenance
- Signed By Artist

- Copyrighted

**Location:**

- Riyadh
- Jeddah
- Makkah
- Madina
- Khobar
- Dammam
- Tabuk
- Taif
- Abha
- Khamis Mushait
- Buraidah
- Hail

**Price Range:**

- Under SAR 5,000
- SAR 5,000 - SAR 20,000
- SAR 20,000 - SAR 50,000
- SAR 50,000 - SAR 100,000
- Above SAR 100,000

**Style:**

- Abstract
- Realism
- Impressionism
- Minimalism
- Surrealism
- Contemporary
- Traditional

**Themes:**

- Cultural Heritage
- Nature
- Urban Life
- Portraits

- Conceptual

**Year of Creation:**

- Recent Works (Last 1-2 Years)
- Within the Last 5 Years
- Older Works (5+ Years)

**Intermediaries:**

- Athr Gallery
- Hafez Gallery
- Hayy Jameel
- Naila Art Gallery
- Ithra (King Abdulaziz Center for World Culture)
- Kingdom Heritage
- Madina Arts Center

**Availability:**

- Instant Download
- Available Now
- Commission Available
- Sold but Similar Works Available

**Framing Options:**

- Framed
- Unframed
- Custom Framing Available

**Shipping:**

- Local Pickup
- Domestic Shipping
- International Shipping

**b. NFTs**

**Format:**

- Digital Art
- 3D Models
- GIFs
- Animation
- Video

- Augmented Reality (AR)

- Virtual Reality (VR)

- JPEG

- PNG

- MP4

- SVG

**Edition:**

- 1 of 1 (Unique)

- Limited Edition

- Open Edition

**Rarity:**

- Common

- Rare

- Epic

- Legendary

**Licensing:**

- Commercial Use Allowed

- Personal Use Only

- Resale Rights Included

**Size:**

- Small (Under 1000 x 1000 pixels)

- Medium (Up to 3000 x 3000 pixels)

- Large (Above 3000 x 3000 pixels)

- Custom Sizes

**Price Range:**

- Under SAR 500

- SAR 500 - SAR 2,000

- SAR 2,000 - SAR 10,000

- Above SAR 10,000

- Auction / Bid-Based

**Style:**

- Abstract

- Realism



- Impressionism
- Minimalism
- Surrealism
- Contemporary
- Traditional

**Themes:**

- Cultural Heritage
- Nature
- Urban Life
- Portraits
- Conceptual

**Year of Creation:**

- New Releases (Last 7 Days)
- Last 30 Days
- Older

**Availability:**

- Instant Download
- Commission Available

**c. Prints & Souvenirs:**

**Format:**

- Giclée Prints
- Screen Prints
- Lithographs
- Digital Prints
- Photographic Prints
- Posters
- Mugs
- Canvas Bags
- Notebooks
- Phone Cases
- T-Shirts
- Calendars
- Magnets

- Keychains

**Size:**

- Small (under 8 x 10 inches)
- Medium (under 11 x 14 inches)
- Large (under 16 x 20 inches)
- Custom Sizes Available

**Location:**

- Riyadh
- Jeddah
- Makkah
- Madina
- Khobar
- Dammam
- Tabuk
- Taif
- Abha
- Khamis Mushait
- Buraidah
- Hail

**Price Range:**

- Under SAR 50
- SAR 50 - SAR 100
- SAR 100 - SAR 200
- SAR 200 - SAR 500
- Above 500 SAR

**Style:**

- Abstract
- Realism
- Impressionism
- Minimalism
- Surrealism
- Contemporary
- Traditional

**Themes:**

- Cultural Heritage
- Nature
- Urban Life
- Portraits
- Conceptual

**Year of Creation:**

- Recent Works (Last 1-2 Years)
- Within the Last 5 Years
- Older Works (5+ Years)

**Availability:**

- Instant Download
- In Stock
- Limited Edition
- Exclusive Collections

**Framing Options:**

- Framed
- Unframed
- Custom Framing Available

**Shipping:**

- Local Pickup
- Domestic Shipping
- International Shipping

**d. Creatives**

**Skills:**

- Calligraphy:
  - Arabic Calligraphy Styles: Naskh, Thuluth, Diwani, Kufi, Ruq`ah, Farisi (Persian), Maghrebi
  - Western Calligraphy Styles: Italic, Gothic, Copperplate, Uncial, Roman Capitals
- Drawing & Illustration:
  - Realistic Drawing, Portrait Drawing, Character Design, Environmental Drawing, Still Life Drawing, Gesture Drawing, Perspective Drawing, Line Drawing
- Illustration:
  - Digital Illustration, Vector Illustration, Editorial Illustration, Fashion Illustration, Scientific Illustration, Manga/Anime Illustration

**Experience:**

- Beginner (0-2 years)
- Intermediate (3-5 years)
- Advanced (6-10 years)
- Professional (11+ years)

**Location:**

- Riyadh
- Jeddah
- Makkah
- Madina
- Khobar
- Dammam
- Tabuk
- Taif
- Abha
- Khamis Mushait
- Buraidah
- Hail

**Budget:**

- Free
- Under 1,000 SAR
- 1,000 SAR - 5,000 SAR
- 5,000 SAR - 10,000 SAR
- Above 10,000 SAR
- Custom Budget

**Availability:**

- Immediately Available
- Available within 1-2 weeks
- Available within 1 month
- Part-Time
- Full-Time

**e. Projects**

**Status:**

- On-going
- Completed

**Project Type**

- Art Installation
- Competition
- Exhibition
- Exploration
- Initiative
- Program
- Residency

**Eligibility:**

- Open to All,
- Saudi Nationals only
- International Artists
- Emerging Artists
- Established Artists
- Students, Age-Specific (over 18)

**Location:**

- Riyadh
- Jeddah
- Makkah
- Madina
- Khobar
- Dammam
- Tabuk
- Taif
- Abha
- Khamis Mushait
- Buraidah
- Hail

**Prize:**

- Under SAR 10,000
- SAR 10,000 - SAR 50,000

- SAR 50,000 - SAR 100,000

- Above SAR 100,000

- Non-Monetary (Exposure)

- Non-Monetary (Collaboration)

**Deadline:**

- Within 1 Week

- This Month

- Next 3 Months

- Later This Year

- No Deadline

**Host Organisation:**

- Government

- Private Sector

- Non-Profit Organisations

- Art Intermediaries

- Educational Institutions

- Cultural Centers

**Search API:** The platform must have a robust **RESTful API** to handle search requests, ensuring fast and efficient data retrieval. Elasticsearch or similar tools can be integrated for optimizing search performance.

**3.2 Notifications System:**

- **Notification Types:**
- New project open calls
- New artwork
- Art purchases or bids
- Project approvals or rejections
- Workshop and event

**Notification Delivery:** Notifications should be sent both in-app and via email based on user preferences. These notifications need to be managed and stored in a notification database.

**Push Notifications:** Implement push notifications for mobile users via Firebase Cloud Messaging (FCM) or Apple Push Notification Service (APNS).

**3.3 Project & Bidding Management (Art-Bid):**

- **Project Listings:** The platform should allow patrons and intermediaries to create and manage open calls for project submissions. These listings must have fields for:
  - Project name and description
  - Submission guidelines
  - Budget range
  - Timeline and deadlines
- **Bid Submissions:** Artists must be able to submit their bids for projects, including artwork proposals, timelines, and pricing.
- **Project Approval Workflow:** The backend should manage the approval or rejection of project bids by patrons. Notification emails or messages will be sent based on the project status.

- **Project & Bidding API:** Build an API for submitting and managing bids, updating project status, and retrieving project details.

## 4. Security & Compliance:

### 4.1 User Data Encryption:

- **Sensitive Data Storage:** All sensitive data (e.g., ID numbers, authorization documents, payment details) must be encrypted both in transit (using **SSL/TLS**) and at rest (using **AES-256** encryption).
- **Password Security:** User passwords must be hashed using a secure algorithm (e.g., **bcrypt**) and stored securely in the database.

### 4.2 Document Handling:

- **Encryption of Uploaded Files:** All uploaded documents (e.g., authorization certificates, commercial registrations, and SAIP registration documents) should be encrypted and stored securely using cloud storage (AWS S3 or similar).

### 4.3 Two-Factor Authentication (2FA):

- **Mandatory 2FA:** For all sensitive actions (e.g., signing contracts, confirming purchases), 2FA must be enforced via OTP sent through SMS or email.
- **Authentication Framework:** Use **OAuth2** with **JWT** (JSON Web Tokens) for secure authentication and session management.

### 4.4 GDPR & Data Compliance:

- **Data Privacy:** Ensure that the platform complies with **GDPR** (for international users) and **Saudi Arabian data protection laws**. Implement mechanisms for data export and deletion requests from users.

## 5. Performance & Scalability:

### 5.1 Horizontal Scaling:

Use **Kubernetes** or **Docker Swarm** for container orchestration to ensure the platform can scale horizontally during high-traffic periods (e.g., during major project submissions or marketplace sales).

### 5.2 Load Balancing:

Implement load balancers using **NGINX** or **HAProxy** to distribute traffic evenly across backend servers, ensuring high availability.

### 5.3 Caching:

Use **Redis** or **Memcached** to cache frequently accessed data (e.g., popular artwork, user profiles) to improve response times and reduce database load.

### 5.4 Monitoring & Alerts:

Implement monitoring tools like **Prometheus** and **Grafana** to track system performance, uptime, and error rates. Set up alert systems for any anomalies or downtime.

## 6. APIs & Integrations:

### 6.1 Third-Party Integrations:

- **Payment Gateway Integration:** Integrate payment processors like Stripe, PayPal, Mada, or Apple Pay for fiat currency transactions.
- **Social Media API Integration:** Enable artists, patrons, and intermediaries to link and promote their profiles on external platforms like Instagram, Behance, and Twitter.
- **SAIP (Saudi Authority for Intellectual Property) API:** Integration with the Saudi Intellectual Authority for real-time verification of intellectual property registration certificates.

### 6.2 Internal APIs:

- **User Management API:**
  - Create User: API to create user profiles for all user types (General User, Artist, Patron, Intermediary) with necessary fields (name, email, mobile, etc.).
  - Update User: Endpoint to update user profile details, including personal information, preferences, and interests.
  - Delete User: Allow users to delete their profiles with the option for account recovery within a specified period.
  - Authentication & Authorization: OAuth2 and JWT-based secure login and authorization handling, including role-based access control for each user type.
  - Two-Factor Authentication (2FA): API for enabling 2FA, using OTP via SMS or email for additional security during login and sensitive transactions.
- **Wallet API:**
  - Create Wallet: Automatically create wallets for all users (Artists, Patrons, and Intermediaries) upon registration.
  - View Wallet Balance: Retrieve wallet balances, including pending transactions and available funds for purchasing artworks, bidding on projects, or making commissions.
  - Deposit Funds: API for depositing fiat currency (SAR) into the wallet using integrated payment gateways like Mada, PayPal, and Apple Pay.
  - Withdraw Funds: Handle wallet withdrawals to a user's bank account or other external wallet systems, with appropriate transaction fees.
  - Transfer Funds: Facilitate the transfer of funds between wallets, whether for artwork purchases, project sponsorships, or custom commissions.
  - Transaction History: Retrieve detailed logs of all wallet transactions, including deposits, withdrawals, commissions, and purchases, linked to relevant artworks or projects.
- **Notification API:**
  - Manage Notification Settings: Allow users to configure notification preferences (email or in-app) for specific events like new projects, bids, or artwork sales.
  - Send Notifications: Send real-time notifications to users when key events occur, such as project approvals, bid rejections, artwork sales, or smart contract execution.
  - Push Notification Integration: Integrate with Firebase Cloud Messaging (FCM) or Apple Push Notification Service (APNS) to send push notifications to mobile users.
  - Retrieve Notifications: Fetch a user's notification history, displaying unread or read notifications in the user's account dashboard.
- **Project & Bidding API:**
  - Create Project: Allow patrons or intermediaries to create open calls for projects, with fields for project name, description, budget range, timeline, and submission guidelines.
  - View Projects: Retrieve a list of active, completed, or upcoming projects, including project details, deadlines, and artist participation status.
  - Submit Bid: Allow artists to submit proposals for projects, including timelines, artwork descriptions, and pricing.
  - Manage Bids: Patrons and intermediaries can view, approve, or reject bids and notify artists of bid status changes.
  - Project Approval Workflow: Automate notifications and smart contract creation upon project approval. If a bid is approved, automatically generate and execute smart contracts between artists, patrons, or intermediaries.
  - Project History: Log and retrieve the full history of each project, including submissions, bids, approvals, and final transactions.
- **Artwork API:**
  - Create Artwork: Allow artists to upload new artworks, including title, description, medium, size, price, availability, and year of creation.
  - Update Artwork: Enable artists to update details of their existing artworks, such as pricing, availability, or medium changes.
  - Delete Artwork: Allow artists to delete artworks from their portfolio, with the option to retain sales history and transaction logs.
  - Manage Display Options: API to manage where the artwork will be displayed (Primary Market, Secondary Market, NFTs, or Prints & Souvenirs).
  - Upload Certificates: Handle file uploads for certificates of authenticity, timestamp certificates, and SAIP registrations. The backend should verify the authenticity and store these securely.
  - Search Artworks: Allow users (artists, patrons, intermediaries) to search artworks by categories, location, themes, price, availability, and more.
  - Artwork Transactions: Log sales transactions, including tracking when an artwork is sold, the buyer, and payment information.



- **Manage Prints & Souvenirs:** For prints or related merchandise, enable artists to specify print formats, sizes, pricing, and availability for purchase.