**I. User-Facing Application Modules (Web/Mobile Client)**

* **1. User Authentication & Profile Module**
  + 1.1. User Registration (V1)
  + 1.2. User Login & Session Management (V1)
  + 1.3. Password Reset/Recovery Functionality (V1)
  + 1.4. User Logout (V1)
  + 1.5. User Profile Viewing & Editing (Display Name, Avatar) (V1)
  + 1.6. Account Settings Management (Notification Preferences) (V2)
* **2. Character Discovery & Interaction Module**
  + 2.1. Public Character Browser
    - Display List of Public AI Characters (V1)
    - Search Functionality (by name, tags) (V1)
    - Filtering Options (by category, creator type) (V1)
    - View Detailed Character Profile Page (V1)
    - *New:* Sorting by Popularity/Rating/Date (V2)
  + 2.2. Text Chat Interaction
    - Chat Interface (V1)
    - Initiate/Manage Chat Sessions (V1)
    - Real-time Message Sending & Receiving (V1)
    - Display Chat History within a Session (V1)
    - Render Character Visuals (V1)
  + 2.3. Voice Call Interaction
    - Voice Call Interface (V2)
    - Initiate/Manage Voice Call Sessions (V2)
    - Real-time Audio Input/Output Streaming (V2)
    - Microphone Controls (V2)
    - Visual Feedback for Voice Activity (V2)
  + 2.4. Interaction History
    - View List of Past Conversations/Calls (V2)
    - Access Detailed Logs for Past Interactions (V2)
  + *New:* **2.5. User Ratings & Reviews Module** (V2)
    - Interface to submit star rating (V2)
    - Interface to submit text review (V2)
    - Display average rating/reviews on Character Profile (V2)
  + *New:* **2.6. Group Chat Module** (V4)
    - Interface to create/manage group chat rooms (V4)
    - Mechanism to add multiple AI characters to a room (V4)
    - Display interactions between user and multiple AIs (V4)
* **3. User Character Creation & Management Module**
  + 3.1. Character Submission Form
    - Input Basic Fields: name, description, image\_url (V1)
    - Input Initial Detail Fields: greeting\_message/greeting, scenario, category, language, tags, voice\_id (V1)
    - *New:* Input Detailed Personality Fields (Traits, Style, Background, Knowledge Scope, Quirks, Emotional Range) (V3)
    - Submission for Admin Validation (V1)
  + 3.2. "My Characters" Dashboard
    - List Characters Submitted by User (V1)
    - Display Status (Pending, Approved, Rejected, Draft) (V1)
    - View Admin Feedback/Rejection Reasons (V1)
    - Option to Edit Characters (Draft/Rejected) (V1)
    - Option to Delete Characters (V1)
  + *New:* **3.3. Community Sharing Options** (V3)
    - Button/Option to make approved character shareable/discoverable (V3)
    - Generate unique sharing link (V3)
    - Option to allow "Remixing" by others (V3)

**II. Admin Portal Modules (Web Interface)**

* **4. Admin Authentication Module** (V1)
* **5. Admin Dashboard Module** (V1)
* **6. User Management Module (Admin)** (V2)
* **7. Character Validation Module (Admin)** (V1)
* **8. Platform Character Management Module (Admin)**
  + Create/Edit/Delete Admin Characters (V1)
  + Manage Public Visibility Status (V1)
  + Manage is\_featured Flag (V1)
  + Manage Categories/Tags (V1)
* **9. System Configuration Module (Admin)**
  + Manage API Keys for AI Services (V2)
  + Configure Content Moderation Settings (V2)
  + Set Platform-Wide Parameters (V2)
  + *New:* Manage Voice Service Options (TTS Providers, Cloning settings) (V4)
* **10. Reporting & Monitoring Module (Admin)**
  + Basic Usage Analytics (popularity\_score calculation logic, interaction counts) (V2)
  + System Health Monitoring Interface (V2)
  + View System Logs (V2)
  + *New:* Review Moderation Flags/Reports (V2)
  + *New:* View User Ratings/Reviews Data (V2)

**III. Core Backend Services Modules (APIs & Logic)**

* **11. API Gateway Service** (V1, expanded V2, V3, V4)
* **12. User Service** (V1, expanded V2)
* **13. Character Service**
  + Manage basic character data & status (V1)
  + Store/retrieve detailed personality fields (V3)
  + Store/retrieve ratings & reviews (V2)
  + Manage community sharing status & remix links (V3)
  + Calculate/update popularity\_score (V2)
* **14. Interaction Service**
  + Manage text chat sessions & history logging (V1)
  + Manage voice call sessions & history logging (V2)
  + Orchestrate group chat sessions (V4)
  + Implement enhanced character memory logic (V3)
* **15. AI Integration Service**
  + Abstract basic LLM/TTS/STT communication (V1)
  + Handle voice call audio processing (V2)
  + Incorporate detailed personality fields into prompts/behavior (V3)
  + Support multi-character prompt orchestration for group chat (V4)
  + Integrate advanced voice options/cloning service (V4)
* **16. Notification Service** (V1, expanded V2 for reviews/sharing)
* **17. Validation Workflow Service** (V1)

**IV. Infrastructure & Cross-Cutting Concerns**

* **18. Database Module** (Schema V1, expanded V2, V3)
* **19. Real-time Communication Layer** (WebSockets V1, WebRTC V2)
* **20. AI Model Connectors** (Basic V1, Advanced V3/V4)
* **21. Logging, Monitoring & Alerting Framework** (Basic V1, Expanded V2/V4)
* **22. Security Module** (Baseline V1, Hardening V4)
* **23. Content Moderation Module** (V2)
* **24. Deployment & Infrastructure Management** (Basic V1, CI/CD V2, Scalability V4)

**Version Summary:**

* **Version 1 (Core MVP):** Focus on essential user auth, character submission (with initial detailed fields like scenario, category, voice\_id), admin validation, public browsing, and text chat. Establish core backend services and infrastructure.
* **Version 2 (Voice & Community Feedback):** Introduce voice calls, interaction history, user ratings/reviews, basic admin reporting, user management, and content moderation.
* **Version 3 (Advanced Characters & Sharing):** Implement deep character personality definition, enhanced memory, and community sharing/remixing features. Refine AI integration for personality.
* **Version 4 (Advanced Interactions & Polish):** Add group chats, explore advanced voice features (like cloning), potentially add monetization, and focus on scalability, security, and overall polish.