

AAE (Automated Ad Engine)

Product Design Document

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1. Executive Summary

1.1 Product Vision

AAE (Automated Ad Engine) is an AI-powered advertising management platform designed to help businesses efficiently manage their digital advertising campaigns across multiple platforms. The platform provides a unified interface where users can create ad creatives, analyze performance, and optimize campaigns through an intelligent AI assistant.

1.2 Business Objective

Our mission is to democratize digital advertising by making professional-grade advertising tools accessible to businesses of all sizes. By leveraging AI technology, we automate complex advertising tasks that traditionally require specialized expertise, enabling small and medium businesses to compete effectively in digital marketing.

1.3 Key Value Propositions

- **Unified Management:** Single platform to manage ads across Meta, TikTok, and Google Ads
- **AI-Powered Automation:** Intelligent creative generation and campaign optimization
- **Conversational Interface:** Natural language interaction for ease of use
- **Data-Driven Insights:** Real-time analytics and actionable recommendations

2. Product Overview

2.1 What is AAE?

AAE is a Software-as-a-Service (SaaS) platform that combines advertising management with artificial intelligence. Users interact with the platform through a conversational AI assistant that can:

- Generate advertising creatives (images and videos)
- Analyze campaign performance across platforms
- Provide optimization recommendations
- Automate routine advertising tasks
- Create landing pages for campaigns

2.2 Platform Components

Component	Description
Web Dashboard	Central hub for viewing campaigns, creatives, and analytics
AI Assistant	Conversational interface for natural language commands
Creative Studio	AI-powered tool for generating ad images and videos
Analytics Center	Performance tracking and reporting across all platforms

Component	Description
Campaign Manager	Tools for creating and managing advertising campaigns

2.3 Supported Advertising Platforms

- **Meta Ads** (Facebook & Instagram) - Full integration
- **TikTok Ads** - Full integration
- **Google Ads** - Planned integration (pending API access)

3. Target Users & Use Cases

3.1 Target User Segments

Segment	Description	Primary Needs
E-commerce Businesses	Online retailers selling products	Product advertising, ROAS optimization
Digital Marketing Agencies	Agencies managing client campaigns	Multi-account management, reporting
Small Business Owners	Local businesses with limited marketing expertise	Easy-to-use tools, automated optimization
Performance Marketers	Professionals focused on conversion optimization	Advanced analytics, A/B testing

3.2 Primary Use Cases

Use Case 1: Creative Generation

A user needs to create 10 ad images for a new product launch. They provide the product URL, and the AI generates multiple creative variations optimized for different platforms.

Use Case 2: Performance Analysis

A marketing manager wants to understand why campaign performance dropped. The AI analyzes metrics, identifies anomalies, and provides actionable recommendations.

Use Case 3: Campaign Creation

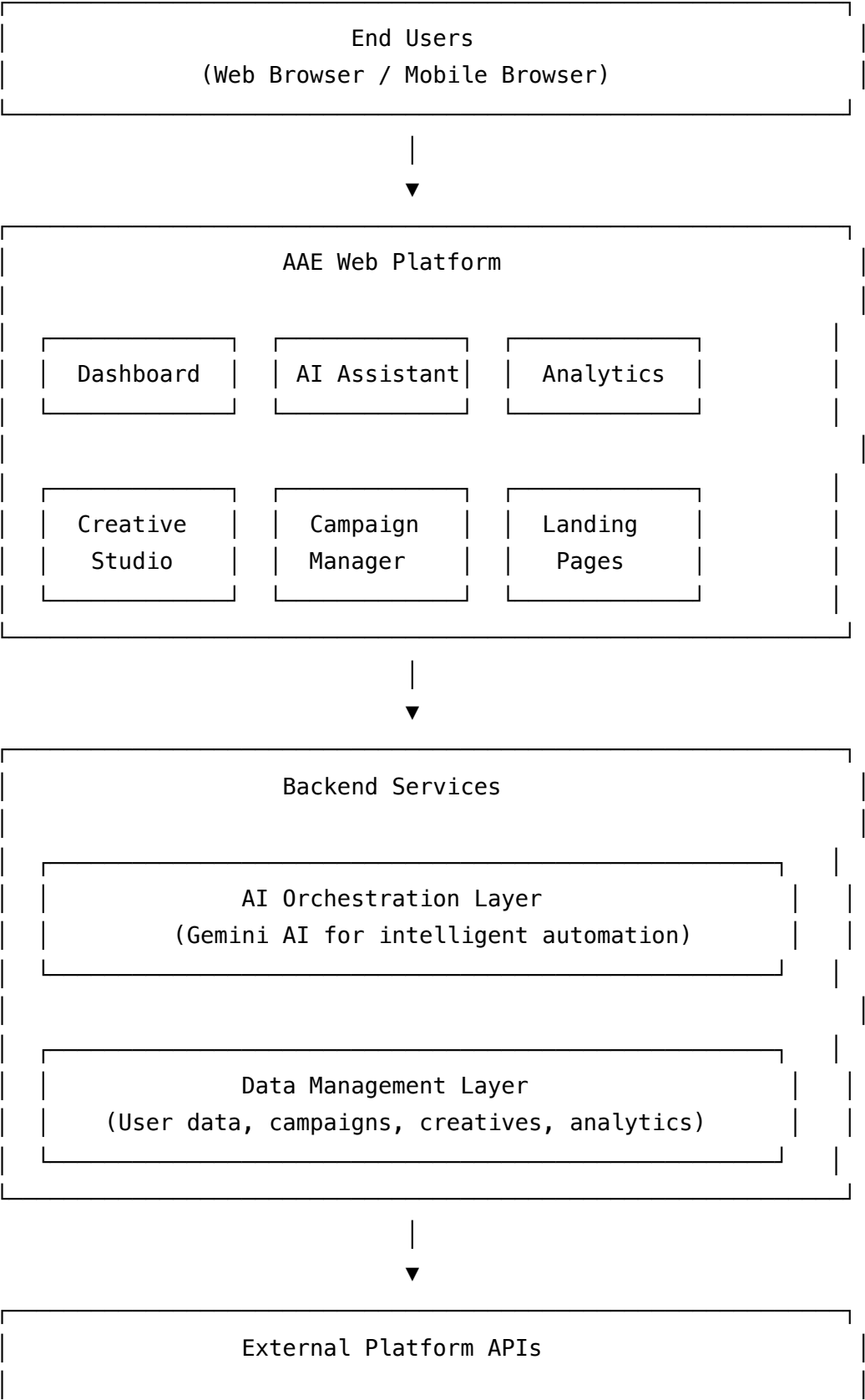
A business owner wants to launch a new advertising campaign. Through conversation with the AI, they set up targeting, budget, and creatives without needing technical expertise.

Use Case 4: Cross-Platform Reporting

An agency needs consolidated reports across all client ad accounts. The platform aggregates data from multiple platforms into unified dashboards.

4. System Architecture

4.1 High-Level Architecture





4.2 Technology Stack

Layer	Technology	Purpose
Frontend	Next.js, React	User interface
Backend	Python, FastAPI	API services
AI Engine	Google Gemini	Intelligent automation
Database	MySQL	Data persistence
Cache	Redis	Performance optimization
Storage	Cloud Storage	Media file storage
Hosting	AWS	Cloud infrastructure

4.3 Data Flow

- User Authentication:** Users sign in via Google OAuth
- Ad Account Connection:** Users authorize access to their ad platform accounts
- Data Synchronization:** Platform fetches campaign data from connected accounts
- AI Processing:** AI analyzes data and generates insights/creatives
- Action Execution:** User-approved actions are executed via platform APIs

5. Core Features

5.1 AI-Powered Creative Generation

Description: Generate high-quality advertising images and videos using AI.

Capabilities:

- Product image generation from URL or description
- Video ad creation with AI-generated content
- Multi-format output (square, vertical, horizontal)
- Platform-specific optimization (Meta, TikTok, Google)
- A/B variant generation for testing

User Benefit: Reduce creative production time from days to minutes.

5.2 Intelligent Performance Analytics

Description: AI-driven analysis of advertising performance with actionable insights.

Capabilities:

- Real-time metrics dashboard
- Anomaly detection and alerts
- Cross-platform performance comparison
- AI-generated optimization recommendations
- Automated reporting

User Benefit: Make data-driven decisions without analytics expertise.

5.3 Campaign Automation

Description: Streamlined campaign creation and management through AI assistance.

Capabilities:

- Guided campaign setup via conversation
- AI-suggested targeting and budgets
- Automated bid optimization
- Rule-based automation triggers
- Bulk campaign management

User Benefit: Launch effective campaigns faster with less manual effort.

5.4 Landing Page Builder

Description: AI-generated landing pages optimized for conversions.

Capabilities:

- Template-based page generation
- AI-written copy and content
- Mobile-responsive design
- Conversion tracking integration
- A/B testing support

User Benefit: Create professional landing pages without design skills.

5.5 Market Intelligence

Description: Competitive analysis and market trend insights.

Capabilities:

- Competitor ad monitoring
- Industry trend analysis
- Audience insights
- Strategic recommendations

User Benefit: Stay ahead of competition with market intelligence.

6. Google API Integration

6.1 Google OAuth 2.0

Purpose: User authentication and authorization

Scopes Requested:

- `openid` - User identification
- `email` - User email address
- `profile` - User profile information

Implementation:

- Users click "Sign in with Google" on our platform
- OAuth consent screen displays requested permissions
- Upon approval, we receive authorization code
- Code is exchanged for access/refresh tokens

- User profile is created/updated in our system

Data Usage:

- Email: Account identification and communication
- Profile: Display name and avatar in the application
- No data is shared with third parties

6.2 Google Ads API (Planned)

Purpose: Campaign management and performance data retrieval

Intended Scopes:

- <https://www.googleapis.com/auth/adwords> - Google Ads management

Planned Capabilities:

- Read campaign performance metrics
- Create and manage campaigns
- Manage ad creatives
- Retrieve audience insights

User Authorization Flow:

1. User initiates Google Ads connection from AAE dashboard
2. OAuth consent screen shows Google Ads permissions
3. User approves access to their Google Ads account
4. AAE receives tokens to access user's Google Ads data
5. User can revoke access at any time from AAE or Google settings

6.3 Data Handling for Google APIs

Data Type	Collection Purpose	Retention	Sharing
User Profile	Account creation	Account lifetime	Never shared
Email	Authentication, notifications	Account lifetime	Never shared
Ads Metrics	Performance analysis	2 years	Never shared
Campaign Data	Management features	Account lifetime	Never shared

7. Data Handling & Privacy

7.1 Data Collection

What We Collect:

- User account information (email, name, profile picture)
- Connected ad account data (campaigns, metrics, creatives)
- User-generated content (creatives, landing pages)
- Usage analytics (feature usage, session data)

What We Don't Collect:

- Payment information from ad platforms
- Personal data of ad audiences
- Sensitive personal information

7.2 Data Storage

Data Category	Storage Location	Encryption
User Accounts	AWS RDS (MySQL)	AES-256 at rest
Ad Metrics	AWS RDS (MySQL)	AES-256 at rest
Media Files	AWS S3	AES-256 at rest
Session Data	AWS ElastiCache	In-transit TLS

7.3 Data Retention

Data Type	Retention Period	Deletion Process
Account Data	Until account deletion	Immediate upon request
Campaign Metrics	2 years	Automatic purge
Generated Creatives	Until user deletion	User-controlled
Usage Logs	90 days	Automatic purge

7.4 User Data Rights

Users have the right to:

- **Access:** View all data we hold about them
- **Export:** Download their data in standard formats
- **Delete:** Request complete account and data deletion
- **Revoke:** Disconnect ad platform integrations at any time

8. Security Measures

8.1 Authentication & Authorization

Measure	Implementation
User Authentication	Google OAuth 2.0
Session Management	JWT tokens with expiration
API Authentication	Bearer token authentication
Role-Based Access	User roles and permissions

8.2 Data Protection

Measure	Implementation
Encryption in Transit	TLS 1.3 for all connections
Encryption at Rest	AES-256 for stored data
Token Storage	Encrypted credential storage
API Keys	Environment-based secrets management

8.3 Infrastructure Security

Measure	Implementation
Network Security	VPC with private subnets

Measure	Implementation
Access Control	IAM policies and security groups
Monitoring	Real-time security monitoring
Backup	Automated daily backups

8.4 Compliance

- GDPR compliant data handling
- SOC 2 security practices
- Regular security audits
- Incident response procedures

9. User Journey

9.1 Onboarding Flow

Step 1: Sign Up

- └─ User visits AAE website
- └─ Clicks "Sign in with Google"
- └─ Authorizes basic profile access
- └─ Account created

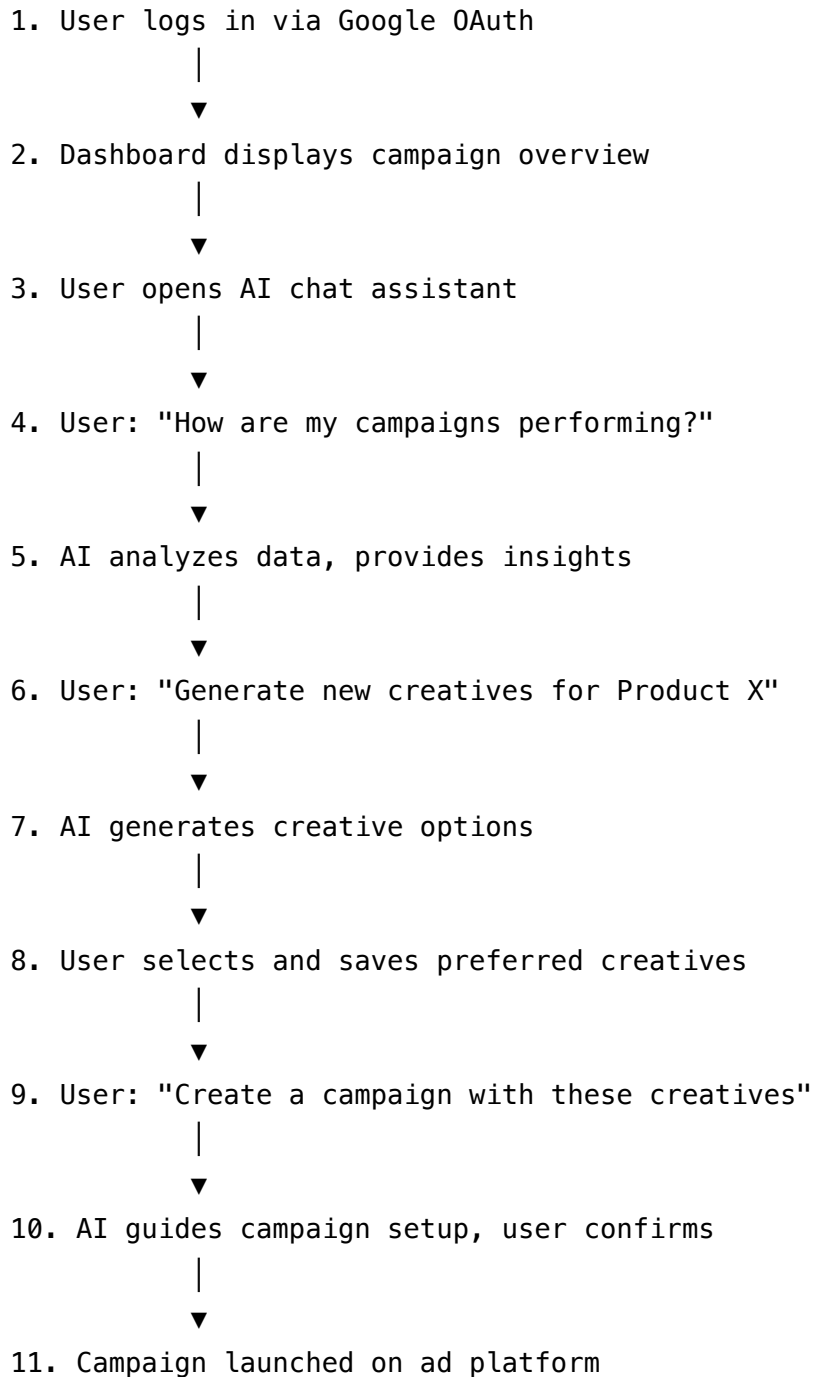
Step 2: Connect Ad Accounts

- └─ User navigates to Settings
- └─ Clicks "Connect Meta Ads" / "Connect TikTok Ads"
- └─ Authorizes ad account access
- └─ Data synchronization begins

Step 3: Start Using Features

- └─ View dashboard with connected account data
- └─ Chat with AI assistant for tasks
- └─ Generate creatives, analyze performance
- └─ Create and manage campaigns

9.2 Typical User Session



9.3 Account Disconnection

Users can disconnect their ad platform accounts at any time:

1. Navigate to Settings > Connected Accounts
2. Click "Disconnect" next to the platform
3. Confirm disconnection
4. Access tokens are immediately revoked

5. Cached data is deleted within 24 hours

10. Compliance & Policies

10.1 Terms of Service

Our Terms of Service clearly outline:

- User responsibilities and acceptable use
- Service limitations and disclaimers
- Intellectual property rights
- Account termination conditions

10.2 Privacy Policy

Our Privacy Policy details:

- What data we collect and why
- How we use and protect data
- User rights and controls
- Third-party data sharing (none)
- Cookie usage and tracking

10.3 Platform Compliance

Platform	Compliance
Google	Google API Services User Data Policy
Meta	Meta Platform Terms and Policies
TikTok	TikTok Marketing API Terms

10.4 Data Processing Agreement

We provide Data Processing Agreements (DPA) for enterprise customers that include:

- Data processing scope and purpose
- Security measures

- Sub-processor list
- Data breach notification procedures

Appendix A: Glossary

Term	Definition
Campaign	A set of ads with shared budget and targeting
Creative	An image or video used in advertisements
ROAS	Return on Ad Spend - revenue generated per dollar spent
CTR	Click-Through Rate - percentage of impressions that result in clicks
CPA	Cost Per Acquisition - cost to acquire one customer
OAuth	Open Authorization - secure authorization protocol

Appendix B: Document History

Version	Date	Changes
1.0	December 16, 2024	Initial document

This document is confidential and intended for Google API access review purposes.