

Marketing Analytics Data Integration Platform

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Executive Summary

The Marketing Analytics Data Integration Platform is a comprehensive solution designed to unify marketing data from multiple platforms into a centralized system with seamless Excel integration capabilities. This platform addresses the critical challenge faced by marketing teams who need to aggregate data from various sources including Google Ads, Facebook Ads, Google Analytics 4, Instagram Insights, Shopify, Amazon Advertising, Metricool, and Klaviyo.

The platform provides a modern web-based interface for managing projects, configuring API credentials, setting up data sources, and accessing extracted marketing data through both a web dashboard and webhook endpoints specifically designed for Excel integration. This solution eliminates the need for manual data collection and reduces the time spent on data preparation, allowing marketing teams to focus on analysis and strategic decision-making.

Table of Contents

1. [Platform Overview](#)
2. [Architecture and Technical Design](#)
3. [Supported Marketing Platforms](#)
4. [Installation and Setup](#)
5. [User Guide](#)
6. [API Documentation](#)

7. [Excel Integration Guide](#)
8. [Security and Data Protection](#)
9. [Troubleshooting](#)
10. [Advanced Configuration](#)
11. [Deployment Guide](#)
12. [Maintenance and Monitoring](#)

Platform Overview

Core Functionality

The Marketing Analytics Data Integration Platform serves as a centralized hub for marketing data collection, processing, and distribution. The platform's architecture is built around the concept of projects, where each project represents a distinct marketing initiative or business unit that requires data integration from multiple marketing platforms.

Within each project, users can configure multiple data sources by connecting their marketing platform accounts through secure API credentials. The platform supports OAuth2 authentication, API key-based authentication, and service account authentication methods, ensuring compatibility with the diverse authentication requirements of different marketing platforms.

The data extraction process is designed to be both automated and on-demand. Users can configure scheduled data extractions to run at regular intervals, ensuring that their marketing data remains current and actionable. Additionally, the platform provides manual extraction capabilities for immediate data retrieval when needed for urgent analysis or reporting requirements.

Key Features

Multi-Platform Integration: The platform supports integration with eight major marketing platforms, covering the most commonly used tools in digital marketing. This comprehensive coverage ensures that marketing teams can consolidate data from their entire marketing technology stack into a single, unified view.

Project-Based Organization: The project-centric approach allows organizations to segment their marketing data by business unit, campaign type, or any other organizational structure that makes sense for their operations. This flexibility ensures that the platform can adapt to various organizational needs and workflows.

Secure Credential Management: All API credentials and authentication tokens are encrypted and stored securely within the platform. The system implements industry-standard encryption practices to protect sensitive authentication information, ensuring that user credentials remain secure even in the event of unauthorized access attempts.

Flexible Data Configuration: Users have granular control over what data is extracted from each platform. The platform allows configuration of specific metrics, dimensions, date ranges, and filters for each data source, ensuring that only relevant data is collected and processed.

Excel Integration: The platform provides dedicated webhook endpoints that are specifically designed for Excel integration. These endpoints deliver data in formats that are optimized for Excel consumption, including CSV, JSON, and XML formats with proper data typing and formatting.

Real-Time Dashboard: The web-based dashboard provides real-time visibility into data extraction status, project health, and system performance. Users can monitor the status of their data sources, view extraction logs, and troubleshoot any issues that may arise during the data collection process.

Business Benefits

Time Savings: By automating the data collection process, the platform eliminates the need for manual data exports and imports from multiple platforms. Marketing teams can save hours of manual work each week, allowing them to focus on analysis and strategic activities rather than data preparation.

Data Consistency: The platform ensures that data from different sources is collected using consistent methodologies and time frames. This consistency eliminates discrepancies that often arise when data is collected manually from different platforms at different times.

Improved Accuracy: Automated data collection reduces the risk of human error that is inherent in manual data handling processes. The platform's validation and error-

checking mechanisms ensure that data integrity is maintained throughout the collection and processing pipeline.

Enhanced Collaboration: The project-based structure and centralized data storage facilitate better collaboration among team members. Multiple users can access the same data sets, ensuring that everyone is working with the same information and reducing the risk of conflicting analyses.

Scalability: The platform is designed to scale with growing data needs. As organizations add new marketing platforms or increase their data volume, the platform can accommodate these changes without requiring significant reconfiguration or infrastructure changes.

Target Users

Marketing Analysts: Professionals who need regular access to marketing data for performance analysis, reporting, and optimization recommendations. The platform provides them with clean, consistent data that can be easily imported into their preferred analysis tools.

Marketing Managers: Leaders who need high-level visibility into marketing performance across multiple channels. The platform's dashboard and reporting capabilities provide the insights needed for strategic decision-making and resource allocation.

Data Teams: Technical professionals responsible for maintaining marketing data infrastructure. The platform's API-first design and comprehensive documentation make it easy to integrate with existing data workflows and business intelligence tools.

Business Intelligence Professionals: Specialists who need to incorporate marketing data into broader business intelligence and reporting systems. The platform's webhook endpoints and API access make it easy to integrate marketing data with other business data sources.

Architecture and Technical Design

System Architecture Overview

The Marketing Analytics Data Integration Platform follows a modern, microservices-inspired architecture that separates concerns between data collection, storage, processing, and presentation layers. This architectural approach ensures scalability, maintainability, and flexibility while providing robust performance for high-volume data operations.

The platform is built using a three-tier architecture consisting of a React-based frontend, a Flask-powered backend API, and a PostgreSQL database for persistent storage. This technology stack was chosen for its proven reliability, extensive community support, and excellent performance characteristics for data-intensive applications.

Frontend Layer: The presentation layer is implemented using React 18 with modern hooks and functional components. The frontend communicates with the backend exclusively through RESTful API calls, ensuring a clean separation of concerns and enabling potential future development of mobile applications or alternative interfaces. The user interface is built with responsive design principles, ensuring optimal user experience across desktop and mobile devices.

Backend Layer: The application logic is implemented using Flask, a lightweight Python web framework that provides excellent flexibility for API development. The backend implements a RESTful API design with comprehensive authentication and authorization mechanisms. JWT (JSON Web Tokens) are used for stateless authentication, enabling horizontal scaling and improved security.

Data Layer: PostgreSQL serves as the primary database, chosen for its excellent support for JSON data types, robust transaction handling, and proven scalability. The database schema is designed to efficiently handle both structured metadata and semi-structured marketing data from various platforms.

Database Design

The database schema is optimized for both operational efficiency and analytical queries. The core entities include Users, Projects, Credentials, Data Sources, and

Extracted Data, with carefully designed relationships that maintain data integrity while enabling efficient queries.

Users Table: Stores user account information including authentication details, preferences, and role-based access control information. The table includes fields for email verification, password hashing using bcrypt, and timezone preferences for proper data handling across different geographical locations.

Projects Table: Represents individual marketing projects or business units. Each project serves as a container for related credentials and data sources. Projects include metadata such as creation dates, descriptions, and configuration settings that apply to all data sources within the project.

Credentials Table: Securely stores API credentials for various marketing platforms. Credentials are encrypted using AES-256 encryption before storage, with encryption keys managed separately from the database. The table includes fields for credential validation status, expiration dates, and last validation timestamps.

Data Sources Table: Defines the configuration for data extraction from specific marketing platforms. Each data source is linked to a credential and includes extraction configuration such as metrics to collect, dimensions to include, and filtering criteria. The table also tracks extraction schedules and status information.

Extracted Data Table: Stores the actual marketing data collected from various platforms. The table uses PostgreSQL's JSONB data type to efficiently store semi-structured data while maintaining query performance. Indexes are strategically placed to optimize common query patterns.

Security Architecture

Security is implemented at multiple layers throughout the platform, ensuring comprehensive protection of user data and API credentials. The security model follows industry best practices and compliance requirements for handling sensitive marketing data.

Authentication and Authorization: The platform implements JWT-based authentication with role-based access control. Users are assigned roles that determine their access levels to different platform features. JWT tokens include expiration times and are regularly rotated to minimize security risks.

Credential Encryption: All API credentials are encrypted using AES-256 encryption before storage in the database. Encryption keys are managed using environment variables and are never stored alongside the encrypted data. The encryption implementation includes proper key derivation and initialization vector generation.

API Security: All API endpoints implement proper input validation and sanitization to prevent injection attacks. Rate limiting is implemented to prevent abuse and ensure fair resource allocation among users. CORS (Cross-Origin Resource Sharing) is properly configured to allow legitimate frontend access while preventing unauthorized cross-origin requests.

Data Protection: Extracted marketing data is handled according to data protection best practices. The platform implements data retention policies and provides mechanisms for data deletion when required. All data transfers use HTTPS encryption to protect data in transit.

Integration Architecture

The platform's integration architecture is designed to be extensible and maintainable, allowing for easy addition of new marketing platforms as they become available or as user requirements evolve.

Integration Factory Pattern: The platform uses a factory pattern for creating platform-specific integration instances. This design allows for consistent interfaces across different marketing platforms while accommodating the unique requirements and authentication methods of each platform.

Base Integration Class: All platform integrations inherit from a common base class that defines standard methods for credential validation, data extraction, and error handling. This approach ensures consistency across integrations and simplifies maintenance and testing.

Mock Integration Support: The platform includes mock integrations for testing and demonstration purposes. These mock integrations generate realistic sample data that can be used for testing the platform's functionality without requiring actual API credentials.

Error Handling and Retry Logic: The integration layer implements comprehensive error handling and retry logic to handle temporary API failures, rate limiting, and other common issues that can occur when working with external APIs. The retry logic

includes exponential backoff and circuit breaker patterns to prevent cascading failures.

Data Processing Pipeline

The data processing pipeline is designed to handle high volumes of marketing data while maintaining data quality and consistency across different platforms.

Extraction Process: Data extraction is performed using asynchronous processing to prevent blocking operations and improve system responsiveness. The extraction process includes validation of extracted data to ensure data quality and consistency.

Data Transformation: Extracted data is transformed into a standardized format that facilitates cross-platform analysis and reporting. The transformation process includes data type normalization, unit conversion, and metric standardization.

Storage Optimization: The platform implements efficient storage strategies including data compression and partitioning to optimize storage costs and query performance. Historical data is automatically archived to reduce active database size while maintaining accessibility for historical analysis.

Webhook Delivery: The platform includes a robust webhook delivery system that ensures reliable data delivery to external systems, including Excel integrations. The webhook system includes retry logic, delivery confirmation, and failure notification mechanisms.

Supported Marketing Platforms

The platform provides comprehensive integration support for eight major marketing platforms, covering the most essential tools in the modern marketing technology stack. Each integration is designed to extract the most valuable metrics and dimensions while respecting the API limitations and best practices of each platform.

Google Ads Integration

Authentication Method: OAuth2 with Developer Token

API Version: Google Ads API v14

Data Refresh Rate: Real-time to 3 hours (depending on metric type)

The Google Ads integration provides access to comprehensive campaign performance data, including impressions, clicks, conversions, and cost metrics. The integration supports both campaign-level and keyword-level data extraction, enabling detailed performance analysis across different levels of campaign hierarchy.

Available Metrics: - Impressions and impression share metrics - Click-through rates and click metrics - Cost per click and total cost data - Conversion metrics and conversion values - Quality Score and ad relevance metrics - Search impression share and lost impression share - View-through conversions and assisted conversions

Available Dimensions: - Date and time dimensions with flexible granularity - Campaign and ad group hierarchical dimensions - Keyword and search term dimensions - Geographic targeting dimensions (country, region, city) - Device type and platform dimensions - Demographic dimensions (age, gender) - Ad network type and click type dimensions

Authentication Requirements: The Google Ads integration requires OAuth2 authentication with specific scopes for accessing advertising data. Users must provide a client ID, client secret, refresh token, and developer token. The developer token must be approved by Google for production use, though the platform supports sandbox environments for testing purposes.

Data Limitations: Google Ads API has specific rate limits and data freshness constraints. The platform automatically handles rate limiting and implements appropriate retry logic. Some metrics may have delayed availability, particularly conversion data which can be updated retroactively as conversions are attributed to earlier interactions.

Facebook/Meta Ads Integration

Authentication Method: OAuth2 with Long-lived Access Tokens

API Version: Facebook Marketing API v18.0

Data Refresh Rate: Real-time to 24 hours

The Facebook Ads integration provides comprehensive access to advertising performance data across Facebook, Instagram, Messenger, and Audience Network placements. The integration supports both standard and custom conversion tracking, enabling detailed ROI analysis and attribution modeling.

Available Metrics: - Reach, frequency, and impression metrics - Click-through rates and link click metrics - Cost per result and total spend data - Conversion metrics with custom event support - Video view metrics and engagement rates - Post engagement and social interaction metrics - Cost per action metrics for various action types

Available Dimensions: - Date ranges with hourly, daily, and lifetime options - Campaign, ad set, and ad level dimensions - Placement dimensions (Facebook, Instagram, Stories, etc.) - Demographic dimensions with detailed age and gender breakdowns - Geographic dimensions with country and region support - Device and platform dimensions - Publisher platform and position dimensions

Authentication Requirements: Facebook Ads integration requires a Facebook App with Marketing API permissions and a long-lived access token. Users must provide an app ID, app secret, and access token. The access token must have appropriate permissions for accessing advertising accounts and should be refreshed regularly to maintain access.

Data Limitations: Facebook's API has attribution windows that affect conversion reporting. The platform handles these complexities by providing clear documentation about data freshness and attribution methodologies. Some demographic data may be aggregated or limited based on privacy requirements and minimum audience sizes.

Google Analytics 4 (GA4) Integration

Authentication Method: Service Account Authentication

API Version: Google Analytics Data API v1

Data Refresh Rate: 24-48 hours for standard reports

The GA4 integration provides access to website and app analytics data, including user behavior, traffic sources, and conversion tracking. The integration supports both standard and custom dimensions and metrics, enabling comprehensive analysis of digital marketing performance.

Available Metrics: - User and session metrics with various scoping options - Page view and screen view metrics - Event tracking and custom event metrics - E-commerce metrics including revenue and transaction data - Engagement metrics such as session duration and bounce rate - Conversion metrics with goal and e-commerce tracking - Audience metrics and cohort analysis data

Available Dimensions: - Date and time dimensions with flexible granularity - Traffic source and medium dimensions - Geographic dimensions with country, region, and city data - Device and technology dimensions - Page and screen dimensions - User demographics and interest categories - Custom dimensions configured in GA4

Authentication Requirements: GA4 integration uses service account authentication, requiring a service account key file and the GA4 property ID. The service account must be granted appropriate permissions in the GA4 property settings. This authentication method provides secure, server-to-server access without requiring user intervention.

Data Limitations: GA4 has specific data processing delays, with most data becoming available within 24-48 hours. Real-time data is available for some metrics but with limited dimensions. The platform handles these limitations by providing clear indicators of data freshness and availability.

Instagram and Facebook Insights Integration

Authentication Method: OAuth2 with Page and Instagram Business Account Access

API Version: Facebook Graph API v18.0

Data Refresh Rate: 24 hours

The Instagram and Facebook Insights integration provides access to organic social media performance data, including post engagement, follower growth, and audience insights. This integration complements the paid advertising data from Facebook Ads by providing organic performance metrics.

Available Metrics: - Follower count and growth metrics - Post engagement metrics (likes, comments, shares) - Reach and impression metrics for organic content - Story metrics including views and completion rates - Profile visit and website click metrics - Video view metrics and completion rates - Audience demographic and geographic data

Available Dimensions: - Date ranges for historical analysis - Post type dimensions (photo, video, carousel, story) - Content category and hashtag dimensions - Audience demographic dimensions - Geographic reach dimensions - Time-based dimensions for optimal posting analysis

Authentication Requirements: This integration requires access to Facebook Pages and connected Instagram Business accounts. Users must provide access tokens with appropriate permissions for reading insights data. The authentication process includes verification of page ownership and Instagram account connection.

Data Limitations: Insights data is typically available with a 24-hour delay. Historical data availability varies by metric type, with some metrics having limited historical retention. The platform provides clear documentation about data availability windows for each metric type.

Shopify Integration

Authentication Method: Private App Access Tokens

API Version: Shopify Admin API 2023-07

Data Refresh Rate: Real-time

The Shopify integration provides comprehensive e-commerce data including sales, customer, and product performance metrics. This integration enables detailed analysis of online store performance and customer behavior patterns.

Available Metrics: - Sales revenue and transaction volume - Order count and average order value - Product performance and inventory metrics - Customer acquisition and retention metrics - Conversion rate and abandonment metrics - Shipping and fulfillment metrics - Refund and return metrics

Available Dimensions: - Date and time dimensions with flexible granularity - Product and variant dimensions - Customer demographic and geographic dimensions - Sales channel dimensions (online store, POS, etc.) - Payment method and shipping method dimensions - Discount and promotion code dimensions - Customer segment and tag dimensions

Authentication Requirements: Shopify integration uses private app access tokens, which provide secure API access without requiring OAuth flows. Users must create a private app in their Shopify admin and provide the access token and shop domain. The private app must have appropriate permissions for accessing sales and customer data.

Data Limitations: Shopify API has rate limits that vary by plan type. The platform implements appropriate rate limiting and retry logic to ensure reliable data access. Some historical data may have limitations based on the Shopify plan and data retention policies.

Amazon Advertising Integration

Authentication Method: OAuth2 with Advertising API Access

API Version: Amazon Advertising API v3

Data Refresh Rate: 24-72 hours

The Amazon Advertising integration provides access to sponsored product, sponsored brand, and sponsored display campaign performance data. This integration enables comprehensive analysis of Amazon advertising investments and performance optimization.

Available Metrics: - Impression and click metrics across campaign types - Advertising cost of sales (ACoS) and return on ad spend (ROAS) - Conversion metrics including orders and sales - Keyword performance and search term data - Product targeting and category performance - Brand metrics and awareness indicators

Available Dimensions: - Date ranges with daily and weekly aggregation - Campaign and ad group dimensions - Product and ASIN dimensions - Keyword and search term dimensions - Target audience and demographic dimensions - Placement and position dimensions

Authentication Requirements: Amazon Advertising integration requires OAuth2 authentication with specific advertising API permissions. Users must provide client credentials and complete the OAuth flow to obtain access tokens. The integration supports multiple advertising profiles for users with access to multiple Amazon advertising accounts.

Data Limitations: Amazon Advertising data has significant processing delays, with most data becoming available 24-72 hours after the advertising activity. The platform provides clear indicators of data freshness and implements appropriate retry logic for data that may not yet be available.

Metricool Integration

Authentication Method: API Key Authentication

API Version: Metricool API v1

Data Refresh Rate: 24 hours

The Metricool integration provides access to social media analytics and management data across multiple platforms. This integration enables comprehensive analysis of social media performance and content effectiveness.

Available Metrics: - Social media engagement metrics across platforms - Content performance and reach metrics - Follower growth and audience metrics - Hashtag

performance and trending analysis - Competitor analysis and benchmarking data - Content calendar and scheduling metrics

Available Dimensions: - Date ranges for historical analysis - Social media platform dimensions - Content type and format dimensions - Audience demographic dimensions - Geographic reach dimensions - Hashtag and topic dimensions

Authentication Requirements: Metricool integration uses API key authentication, requiring users to provide their Metricool API key. The API key must have appropriate permissions for accessing analytics data across connected social media accounts.

Data Limitations: Metricool data availability depends on the connected social media platforms and their respective API limitations. The platform provides clear documentation about data availability and freshness for each supported social media platform.

Klaviyo Integration

Authentication Method: API Key Authentication

API Version: Klaviyo API v2023-07-15

Data Refresh Rate: Real-time to 1 hour

The Klaviyo integration provides access to email marketing and customer data platform metrics. This integration enables comprehensive analysis of email campaign performance, customer segmentation, and lifecycle marketing effectiveness.

Available Metrics: - Email campaign performance metrics (open rates, click rates) - Revenue attribution and conversion metrics - Customer lifetime value and segmentation metrics - Flow and automation performance data - List growth and subscriber engagement metrics - A/B testing and optimization metrics

Available Dimensions: - Date ranges for campaign and flow analysis - Campaign and flow dimensions - Customer segment and list dimensions - Email template and content dimensions - Geographic and demographic dimensions - Device and client dimensions

Authentication Requirements: Klaviyo integration uses API key authentication, requiring users to provide their Klaviyo private API key. The API key must have appropriate permissions for accessing campaign data and customer information.

Data Limitations: Klaviyo API has rate limits that vary by account type. The platform implements appropriate rate limiting and provides clear documentation about data availability and processing delays for different metric types.

Installation and Setup

System Requirements

The Marketing Analytics Data Integration Platform is designed to run on modern server infrastructure with the following minimum requirements:

Hardware Requirements: - CPU: 2 cores minimum, 4 cores recommended for production - RAM: 4GB minimum, 8GB recommended for production - Storage: 20GB minimum, with additional space based on data volume - Network: Stable internet connection with sufficient bandwidth for API calls

Software Requirements: - Operating System: Ubuntu 20.04 LTS or newer, CentOS 8+, or compatible Linux distribution - Python: Version 3.11 or newer - Node.js: Version 18 or newer - PostgreSQL: Version 13 or newer - Redis: Version 6 or newer (for caching and session management)

Development Environment: For development and testing purposes, the platform can run on local machines with reduced resource requirements. Docker support is provided for simplified development environment setup.

Installation Process

Step 1: Environment Preparation

Begin by updating your system and installing required dependencies:

```
sudo apt update && sudo apt upgrade -y
sudo apt install python3.11 python3.11-venv python3-pip nodejs npm postgresql
postgresql-contrib redis-server git curl
```

Create a dedicated user for the application:

```
sudo useradd -m -s /bin/bash marketing-analytics
sudo usermod -aG sudo marketing-analytics
```

Step 2: Database Setup

Configure PostgreSQL for the application:

```
sudo -u postgres createuser --interactive marketing-analytics
sudo -u postgres createdb marketing_analytics_db -O marketing-analytics
```

Set up the database connection and create the required tables:

```
sudo -u postgres psql -c "ALTER USER marketing-analytics PASSWORD
'secure_password_here';"
```

Step 3: Application Installation

Clone the application repository and set up the backend:

```
git clone https://github.com/your-org/marketing-analytics-platform.git
cd marketing-analytics-platform
python3.11 -m venv venv
source venv/bin/activate
pip install -r requirements.txt
```

Set up the frontend application:

```
cd frontend
npm install
npm run build
```

Step 4: Configuration

Create the environment configuration file:

```
cp .env.example .env
```

Edit the `.env` file with your specific configuration:

```
DATABASE_URL=postgresql://marketing-
analytics:secure_password_here@localhost/marketing_analytics_db
SECRET_KEY=your_secret_key_here
JWT_SECRET_KEY=your_jwt_secret_here
REDIS_URL=redis://localhost:6379/0
ENCRYPTION_KEY=your_encryption_key_here
```

Step 5: Database Migration

Initialize the database schema:

```
flask db init
flask db migrate -m "Initial migration"
flask db upgrade
```

Step 6: Service Configuration

Create systemd service files for automatic startup:

```
sudo cp deployment/marketing-analytics.service /etc/systemd/system/
sudo systemctl daemon-reload
sudo systemctl enable marketing-analytics
sudo systemctl start marketing-analytics
```

Configuration Options

Database Configuration: The platform supports various PostgreSQL configuration options for optimizing performance based on your specific use case. Key configuration parameters include connection pooling, query timeout settings, and backup configurations.

Security Configuration: Security settings include JWT token expiration times, password complexity requirements, rate limiting configurations, and API access controls. These settings can be customized based on your organization's security policies.

Integration Configuration: Each marketing platform integration can be configured with specific settings such as rate limiting, retry policies, and data retention periods. These configurations help optimize performance and ensure compliance with platform-specific requirements.

Monitoring Configuration: The platform includes comprehensive logging and monitoring capabilities. Log levels, retention periods, and monitoring endpoints can be configured to meet your operational requirements.

Initial Setup

Creating the First Admin User:

After installation, create the initial administrator account:

```
flask create-admin --email admin@yourcompany.com --password  
secure_admin_password
```

Verifying Installation:

Test the installation by accessing the web interface and verifying that all components are functioning correctly:

1. Access the web interface at `http://your-server:5000`
2. Log in with the admin credentials
3. Verify that the dashboard loads correctly
4. Test the API endpoints using the provided health check endpoint

SSL/TLS Configuration:

For production deployments, configure SSL/TLS encryption using a reverse proxy such as Nginx:

```
server {  
    listen 443 ssl;  
    server_name your-domain.com;  
  
    ssl_certificate /path/to/certificate.crt;  
    ssl_certificate_key /path/to/private.key;  
  
    location / {  
        proxy_pass http://localhost:5000;  
        proxy_set_header Host $host;  
        proxy_set_header X-Real-IP $remote_addr;  
    }  
}
```

Backup and Recovery

Database Backup: Implement regular database backups using PostgreSQL's built-in backup tools:

```
pg_dump marketing_analytics_db > backup_$(date +%Y%m%d_%H%M%S).sql
```

Configuration Backup: Regularly backup configuration files and environment settings to ensure quick recovery in case of system failures.

Data Recovery: The platform includes data recovery procedures for various failure scenarios, including database corruption, credential loss, and configuration errors.

User Guide

Getting Started

The Marketing Analytics Data Integration Platform is designed with user experience as a primary consideration, providing an intuitive interface that guides users through the process of setting up data integrations and accessing marketing data.

First Login: Upon first accessing the platform, users are presented with a clean, modern interface that immediately communicates the platform's value proposition. The onboarding process is designed to get users productive quickly while ensuring they understand the platform's capabilities and best practices.

Dashboard Overview: The main dashboard provides a comprehensive overview of all projects, data sources, and recent activity. Key metrics are prominently displayed, including the number of active data sources, recent extraction status, and system health indicators. The dashboard is designed to provide immediate visibility into the health and performance of your marketing data integrations.

Project Management

Creating Projects: Projects serve as the organizational foundation for your marketing data integrations. When creating a new project, consider the following best practices:

Choose descriptive project names that clearly identify the business unit, campaign, or analytical purpose. Project descriptions should provide context for team members who may access the project in the future. Project settings can be configured to match your organization's data retention policies and access control requirements.

The project creation wizard guides users through the essential configuration steps, including setting up basic project information, configuring default data retention policies, and establishing access permissions for team members.

Project Settings: Each project includes comprehensive settings that control how data is collected, processed, and made available to users. Key settings include data

retention periods, extraction schedules, notification preferences, and access control configurations.

Data retention settings determine how long extracted data is stored within the platform. These settings can be configured based on your organization's data governance policies and storage cost considerations. The platform provides flexible retention options, including automatic archiving of older data and configurable deletion policies.

Team Collaboration: Projects support multiple user access levels, enabling effective team collaboration while maintaining appropriate access controls. Project administrators can invite team members and assign specific roles that determine access to different platform features and data sets.

Credential Management

Adding Credentials: The credential management system is designed to securely store and manage API credentials for various marketing platforms. The process of adding credentials varies by platform but follows consistent patterns that make it easy to understand and complete.

For OAuth2-based platforms like Google Ads and Facebook Ads, the platform provides guided authentication flows that walk users through the authorization process. These flows include clear instructions for obtaining the necessary permissions and handling common authentication challenges.

For API key-based platforms, the credential entry process includes validation steps that verify the credentials are working correctly before saving them to the platform. This validation helps prevent issues during data extraction and provides immediate feedback if there are problems with the provided credentials.

Credential Security: All credentials are encrypted using industry-standard encryption methods before being stored in the database. The platform implements multiple layers of security to protect sensitive authentication information, including encryption at rest, secure key management, and access logging.

Credential validation is performed regularly to ensure that stored credentials remain valid and functional. The platform provides notifications when credentials are approaching expiration or when validation failures occur, enabling proactive credential management.

Credential Sharing: Within projects, credentials can be shared among team members based on their access levels. This sharing capability enables team collaboration while maintaining security and audit trails for credential usage.

Data Source Configuration

Creating Data Sources: Data sources define what data is extracted from each marketing platform and how that data is processed and stored. The data source configuration process is designed to be flexible while providing sensible defaults that work for most use cases.

When creating a data source, users select the marketing platform, choose the appropriate credentials, and configure the specific data to be extracted. The configuration interface provides clear explanations of available metrics and dimensions, helping users make informed decisions about what data to collect.

Extraction Configuration: The extraction configuration determines which metrics and dimensions are collected from each platform. The platform provides pre-configured templates for common use cases, such as campaign performance analysis, conversion tracking, and audience analysis.

Custom extraction configurations can be created for specific analytical needs. The configuration interface includes validation to ensure that selected metrics and dimensions are compatible and that the resulting data will be useful for analysis.

Scheduling and Automation: Data sources can be configured with automatic extraction schedules that ensure data remains current without manual intervention. Schedule options include daily, weekly, and monthly extractions, with the ability to specify exact times and time zones.

The scheduling system takes into account the data freshness characteristics of each platform, automatically adjusting extraction timing to ensure that the most complete and accurate data is collected.

Data Extraction and Monitoring

Manual Extraction: In addition to scheduled extractions, users can trigger manual data extractions when immediate data access is needed. Manual extractions are useful for ad-hoc analysis, troubleshooting, and ensuring data is available for urgent reporting requirements.

The manual extraction interface provides options for specifying date ranges, forcing refresh of existing data, and selecting specific data types to extract. Progress indicators and real-time status updates keep users informed about extraction progress.

Monitoring and Alerts: The platform provides comprehensive monitoring capabilities that track the health and performance of all data extractions. Monitoring dashboards show extraction status, success rates, and performance metrics for each data source.

Alert configurations can be set up to notify users when extractions fail, when data quality issues are detected, or when unusual patterns are observed in the extracted data. Alerts can be delivered via email, in-platform notifications, or webhook endpoints.

Troubleshooting: When extraction issues occur, the platform provides detailed diagnostic information to help identify and resolve problems. Common issues include credential expiration, API rate limiting, and platform-specific data availability delays.

The troubleshooting interface includes step-by-step guidance for resolving common issues, links to platform-specific documentation, and options for contacting support when additional assistance is needed.

Data Access and Export

Dashboard Views: The platform provides multiple dashboard views that present extracted data in formats optimized for different use cases. Summary dashboards provide high-level overviews of key metrics across all data sources, while detailed views enable deep-dive analysis of specific campaigns or time periods.

Dashboard views are customizable, allowing users to create personalized views that focus on the metrics and dimensions most relevant to their roles and responsibilities. Custom dashboards can be saved and shared with team members.

Data Export Options: Extracted data can be exported in multiple formats to support various analytical workflows. Export options include CSV files for Excel analysis, JSON for programmatic access, and direct database connections for business intelligence tools.

Export configurations can be saved and reused, making it easy to generate regular reports or provide data to external systems. Automated export schedules can be configured to deliver data to specified locations at regular intervals.

API Access: For advanced users and technical integrations, the platform provides comprehensive API access to all extracted data. The API follows RESTful design principles and includes comprehensive documentation with examples and best practices.

API access includes authentication and rate limiting to ensure secure and fair usage. API keys can be generated and managed through the platform interface, with options for setting specific permissions and usage limits.

Excel Integration Guide

Overview

The Excel integration capability is one of the platform's most powerful features, designed specifically to meet the needs of marketing professionals who rely on Excel for data analysis and reporting. The integration provides multiple methods for accessing marketing data directly within Excel, enabling seamless workflows that combine the platform's data collection capabilities with Excel's analytical and visualization tools.

Webhook Endpoints for Excel

Webhook URL Structure: Each project generates unique webhook URLs that can be used to access extracted data in Excel-compatible formats. The webhook URLs follow a consistent structure that makes them easy to understand and use:

```
https://your-platform-domain.com/webhook/v1/projects/{project_id}/data/{data_source_id}
```

Authentication: Webhook endpoints use API key authentication to ensure secure access to your marketing data. API keys are generated within the platform and can be configured with specific permissions and expiration dates. The API key is included in the request headers:

```
Authorization: Bearer your_api_key_here
```

Data Formats: The webhook endpoints support multiple data formats optimized for Excel consumption:

- **CSV Format:** Comma-separated values with proper escaping and UTF-8 encoding
- **JSON Format:** Structured JSON with consistent field naming and data types
- **XML Format:** Well-formed XML with schema validation
- **Excel Format:** Native Excel files (.xlsx) with proper formatting and data types

Excel Power Query Integration

Setting Up Power Query: Excel's Power Query feature provides the most robust method for integrating with the platform's webhook endpoints. Power Query enables automatic data refresh, data transformation, and error handling within Excel.

To set up a Power Query connection:

1. Open Excel and navigate to the Data tab
2. Select "Get Data" > "From Web"
3. Enter the webhook URL for your desired data source
4. Configure authentication using the "Advanced" options
5. Add the Authorization header with your API key

Data Refresh Configuration: Power Query connections can be configured to automatically refresh data at specified intervals, ensuring that your Excel workbooks always contain the most current marketing data. Refresh options include:

- Manual refresh on demand
- Automatic refresh when the workbook is opened
- Scheduled refresh at specified intervals
- Background refresh that doesn't interrupt your work

Data Transformation: Power Query provides powerful data transformation capabilities that can be applied to the marketing data before it's loaded into Excel. Common transformations include:

- Date formatting and time zone conversion
- Metric calculations and derived fields
- Data filtering and aggregation

- Column renaming and reordering
- Data type conversion and validation

VBA Integration

Automated Data Retrieval: For users who prefer programmatic control over data retrieval, the platform supports VBA (Visual Basic for Applications) integration. VBA scripts can be used to automatically fetch data from webhook endpoints and populate Excel worksheets.

Example VBA code for retrieving marketing data:

```
Sub RefreshMarketingData()  
    Dim http As Object  
    Dim url As String  
    Dim apiKey As String  
    Dim response As String  
  
    Set http = CreateObject("MSXML2.XMLHTTP")  
    url = "https://your-platform-domain.com/webhook/v1/projects/your-project-id/data/your-data-source-id"  
    apiKey = "your_api_key_here"  
  
    http.Open "GET", url, False  
    http.setRequestHeader "Authorization", "Bearer " & apiKey  
    http.setRequestHeader "Accept", "application/json"  
    http.send  
  
    If http.Status = 200 Then  
        response = http.responseText  
        ' Process the JSON response and populate Excel cells  
        Call ProcessMarketingData(response)  
    Else  
        MsgBox "Error retrieving data: " & http.Status  
    End If  
End Sub
```

Error Handling: VBA integration includes comprehensive error handling to manage common issues such as network connectivity problems, authentication failures, and data format errors. The error handling code provides clear feedback to users and includes retry logic for transient failures.

Data Processing: VBA scripts can include sophisticated data processing logic that transforms raw marketing data into formatted reports and dashboards. This processing can include calculations, aggregations, and formatting that would be difficult to achieve with standard Excel formulas.

Excel Add-in

Installation and Setup: The platform provides a custom Excel add-in that simplifies the process of connecting to marketing data sources. The add-in includes a user-friendly interface for configuring connections, selecting data sources, and managing authentication.

The add-in installation process includes:

1. Download the add-in file from the platform
2. Install the add-in using Excel's add-in manager
3. Configure the connection settings with your platform credentials
4. Select the projects and data sources you want to access

Features and Capabilities: The Excel add-in provides several advanced features that enhance the integration experience:

- **Data Source Browser:** Visual interface for exploring available data sources and metrics
- **Automatic Schema Detection:** Automatic detection of data structure and field types
- **Incremental Data Loading:** Efficient loading of only new or changed data
- **Offline Mode:** Ability to work with cached data when internet connectivity is unavailable
- **Data Validation:** Built-in validation to ensure data integrity and consistency

Customization Options: The add-in includes customization options that allow users to tailor the integration to their specific needs:

- Custom data refresh schedules
- Configurable data transformation rules
- Personalized dashboard layouts
- Custom metric calculations and derived fields

Data Formatting and Visualization

Automatic Formatting: When marketing data is imported into Excel through any of the integration methods, the platform applies intelligent formatting that makes the data immediately usable for analysis. This formatting includes:

- Proper date and time formatting with time zone awareness
- Currency formatting for cost and revenue metrics
- Percentage formatting for rate-based metrics
- Number formatting with appropriate decimal places
- Conditional formatting for performance indicators

Chart and Pivot Table Integration: The imported marketing data is optimized for use with Excel's charting and pivot table features. The data structure includes proper field naming and data types that enable automatic chart creation and pivot table analysis.

Pre-configured chart templates are available for common marketing analysis scenarios:

- Campaign performance trends over time
- Channel comparison and attribution analysis
- Geographic performance visualization
- Demographic analysis and segmentation
- ROI and efficiency metric dashboards

Dashboard Templates: The platform provides Excel dashboard templates that are pre-configured to work with the imported marketing data. These templates include:

- Executive summary dashboards with key performance indicators
- Campaign performance dashboards with detailed metrics
- Channel attribution dashboards showing cross-channel impact
- Customer journey dashboards tracking conversion paths
- Budget allocation dashboards for resource optimization

Best Practices for Excel Integration

Data Management: Effective data management is crucial for maintaining accurate and useful Excel-based marketing analysis. Best practices include:

- Regular data refresh schedules to ensure currency
- Proper data validation to catch errors early
- Consistent naming conventions for worksheets and data ranges
- Documentation of data sources and transformation logic
- Version control for Excel workbooks containing marketing data

Performance Optimization: Large marketing datasets can impact Excel performance if not managed properly. Optimization techniques include:

- Using data connections instead of copying data into worksheets
- Implementing incremental data loading for large datasets
- Using Excel's data model features for efficient data storage
- Optimizing formulas and calculations for better performance
- Regular cleanup of unused data and calculations

Security Considerations: When working with marketing data in Excel, security considerations include:

- Protecting API keys and authentication credentials
- Using Excel's built-in security features to protect sensitive data
- Implementing access controls for shared workbooks
- Regular rotation of API keys and credentials
- Secure storage and transmission of Excel files containing marketing data

Collaboration and Sharing: Excel workbooks containing marketing data can be effectively shared among team members using several approaches:

- SharePoint integration for centralized workbook storage
- OneDrive sharing with appropriate access controls
- Excel Online for browser-based collaboration
- Power BI integration for advanced visualization and sharing

- Automated report distribution using Excel's built-in features

Troubleshooting Excel Integration

Common Issues and Solutions: The most common issues encountered during Excel integration include authentication problems, data format errors, and connectivity issues. The platform provides comprehensive troubleshooting guidance for these scenarios:

Authentication Failures: - Verify API key validity and permissions - Check for proper header formatting in requests - Ensure API key has not expired - Verify project and data source access permissions

Data Format Issues: - Confirm selected data format matches Excel expectations - Check for special characters in data that may cause parsing errors - Verify date and time format compatibility - Ensure numeric data is properly formatted

Connectivity Problems: - Test webhook URLs in a web browser - Check firewall and proxy settings - Verify internet connectivity and DNS resolution - Test with different data sources to isolate issues

Performance Issues: - Optimize data queries to reduce payload size - Implement incremental loading for large datasets - Use background refresh to avoid blocking Excel - Consider data aggregation for summary reports

API Documentation

Authentication

JWT Token Authentication: The platform uses JSON Web Tokens (JWT) for API authentication. Tokens are obtained through the login endpoint and must be included in the Authorization header for all authenticated requests.

Login Endpoint:

```
POST /api/v1/auth/login
Content-Type: application/json
```

```
{
  "email": "user@example.com",
  "password": "user_password"
}
```

Response:

```
{
  "access_token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9...",
  "refresh_token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9...",
  "user": {
    "id": "user_id",
    "email": "user@example.com",
    "role": "user"
  }
}
```

Core API Endpoints

Health Check:

```
GET /api/v1/health
```

Returns system health status and version information.

User Management:

POST	/api/v1/auth/register	# Register new user
POST	/api/v1/auth/login	# User login
POST	/api/v1/auth/refresh	# Refresh access token
POST	/api/v1/auth/logout	# User logout
GET	/api/v1/users/profile	# Get user profile
PUT	/api/v1/users/profile	# Update user profile

Project Management:

GET	/api/v1/projects	# List user projects
POST	/api/v1/projects	# Create new project
GET	/api/v1/projects/{project_id}	# Get project details
PUT	/api/v1/projects/{project_id}	# Update project
DELETE	/api/v1/projects/{project_id}	# Delete project

Credential Management:

```

GET    /api/v1/projects/{project_id}/credentials      # List
credentials
POST   /api/v1/projects/{project_id}/credentials      # Create
credential
GET    /api/v1/projects/{project_id}/credentials/{cred_id}  # Get credential
PUT    /api/v1/projects/{project_id}/credentials/{cred_id}  # Update
credential
DELETE /api/v1/projects/{project_id}/credentials/{cred_id}  # Delete
credential

```

Data Source Management:

```

GET    /api/v1/projects/{project_id}/data-sources      # List
data sources
POST   /api/v1/projects/{project_id}/data-sources      # Create
data source
GET    /api/v1/projects/{project_id}/data-sources/{source_id}  # Get data
source
PUT    /api/v1/projects/{project_id}/data-sources/{source_id}  # Update
data source
DELETE /api/v1/projects/{project_id}/data-sources/{source_id}  # Delete
data source
POST   /api/v1/projects/{project_id}/data-sources/{source_id}/extract # Trigger
extraction

```

Platform Information:

```

GET /api/v1/projects/{project_id}/platforms    # List supported platforms

```

Webhook Endpoints

Data Access Webhooks:

```

GET /webhook/v1/projects/{project_id}/data/{source_id}
Authorization: Bearer {api_key}
Accept: application/json|text/csv|application/xml

```

Parameters: - `format` : Data format (json, csv, xml, excel) - `start_date` : Start date for data range (YYYY-MM-DD) - `end_date` : End date for data range (YYYY-MM-DD) - `metrics` : Comma-separated list of metrics to include - `dimensions` : Comma-separated list of dimensions to include

Example Request:

```
GET /webhook/v1/projects/123/data/456?format=csv&start_date=2025-06-01&end_date=2025-06-30
Authorization: Bearer your_api_key_here
Accept: text/csv
```

Deployment Information

Production Deployment

Frontend Deployment: The React frontend has been successfully deployed and is accessible at: <https://vuikrxqi.manus.space>

Backend Deployment: The Flask backend is currently running locally for testing and development. For production deployment, the following steps are recommended:

1. Environment Configuration:

2. Set up production database (PostgreSQL)
3. Configure environment variables for production
4. Set up Redis for caching and session management
5. Configure SSL/TLS certificates

6. Application Server:

7. Use Gunicorn or uWSGI for production WSGI server
8. Configure reverse proxy (Nginx) for load balancing
9. Set up process monitoring and automatic restart
10. Configure logging and monitoring

11. Database Setup:

12. Create production database with appropriate permissions
13. Run database migrations
14. Set up backup and recovery procedures
15. Configure connection pooling

16. Security Configuration:

17. Generate secure secret keys for production
18. Configure firewall rules
19. Set up SSL/TLS encryption
20. Configure rate limiting and DDoS protection

Local Development Setup

Backend (Flask):

```
cd marketing_analytics_platform
source venv/bin/activate
python src/main.py
```

Access at: <http://localhost:5000>

Frontend (React):

```
cd marketing-analytics-frontend
npm run dev
```

Access at: <http://localhost:5173>

Testing the Platform

Health Check:

```
curl http://localhost:5000/api/v1/health
```

User Registration:

```
curl -X POST http://localhost:5000/api/v1/auth/register \
-H "Content-Type: application/json" \
-d '{"email": "test@example.com", "password": "password123", "first_name": "Test", "last_name": "User"}'
```

Login:

```
curl -X POST http://localhost:5000/api/v1/auth/login \
-H "Content-Type: application/json" \
-d '{"email": "test@example.com", "password": "password123"}'
```

Security and Data Protection

Data Encryption

Encryption at Rest: All sensitive data, including API credentials and user information, is encrypted using AES-256 encryption before storage in the database. Encryption keys are managed separately from the encrypted data and are rotated regularly according to security best practices.

Encryption in Transit: All data transmission between the frontend, backend, and external APIs uses HTTPS/TLS encryption. The platform enforces secure connections and includes proper certificate validation to prevent man-in-the-middle attacks.

Access Control

Role-Based Access Control (RBAC): The platform implements a comprehensive role-based access control system that ensures users can only access data and functionality appropriate to their role and permissions.

API Rate Limiting: All API endpoints include rate limiting to prevent abuse and ensure fair resource allocation. Rate limits are configurable and can be adjusted based on user roles and subscription levels.

Compliance

Data Privacy: The platform is designed to comply with major data privacy regulations including GDPR and CCPA. Features include data retention controls, user consent management, and data deletion capabilities.

Audit Logging: Comprehensive audit logs track all user actions, data access, and system events. These logs are essential for security monitoring and compliance reporting.

Troubleshooting

Common Issues

Authentication Problems: - Verify email and password are correct - Check if account is activated - Ensure JWT tokens haven't expired - Verify API key permissions for webhook access

Data Extraction Issues: - Check credential validity and permissions - Verify platform API limits and quotas - Review extraction configuration settings - Check network connectivity and firewall settings

Performance Issues: - Monitor database performance and connection pooling - Check Redis cache configuration - Review extraction schedules to avoid conflicts - Monitor system resources (CPU, memory, disk)

Support and Maintenance

Log Files: Application logs are stored in the `logs/` directory and include detailed information about system operations, errors, and performance metrics.

Database Maintenance: Regular database maintenance includes index optimization, statistics updates, and cleanup of old data according to retention policies.

Monitoring: The platform includes built-in monitoring capabilities that track system health, performance metrics, and user activity. Monitoring dashboards provide real-time visibility into system status.

Conclusion

The Marketing Analytics Data Integration Platform provides a comprehensive solution for unifying marketing data from multiple platforms with seamless Excel integration. The platform's architecture ensures scalability, security, and ease of use while providing the flexibility needed to adapt to evolving marketing technology requirements.

The combination of a modern web interface, robust API capabilities, and specialized Excel integration features makes this platform an ideal solution for marketing teams

who need reliable, automated access to their marketing data across multiple platforms.

For additional support, documentation updates, or feature requests, please refer to the platform's support channels and community resources.

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