

Demand-Side Platform (DSP) - Component Requirements

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1. Advertiser Interface (Frontend UI)

- Campaign creation/editing
- Creative upload (banner, video, native)
- Budget & schedule configuration
- Targeting UI (geo, device, time, interest, retargeting)
- Real-time reporting dashboard
- User roles and access control

2. Campaign Management System

- Validating campaign setup
- Storing campaign structure (ad groups, creatives, targeting rules)
- Scheduling and budget pacing
- Frequency and impression caps

3. Real-Time Bidding Engine (RTB Core)

- Evaluate bid requests
- Match to eligible campaigns
- Calculate optimal bid price
- Return bid response and creative ID

4. Targeting & Audience Matching

- Geo/IP, Device/browser, Behavioral (via DMP), Contextual, Retargeting
- Fast access via Redis, Aerospike
- Integration with DMP/CDP

5. Creative Management System

- Stores and delivers ad creatives
- Creative approval, format validation, rendering
- CDN integration (Cloudflare, Akamai)

6. Budgeting & Pacing Engine

- Manages budget constraints and pacing

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- Bid throttling, even/performance pacing
- Real-time counters and rules engine

7. DMP Integration

- Lookalike modeling, audience segmentation, cookie/device mapping
- Precomputed audience tables

8. Analytics & Reporting

- Tracks performance metrics (CTR, CPA, eCPM)
- BI dashboard integration

9. Data Pipeline & Logging

- Captures all bid/impression/conversion events
- Kafka + schema registry, S3, ETL tools

10. Optimization & ML

- CTR prediction, Bid price optimization, Fraud detection
- Online model serving, Offline training

11. Fraud Detection & Viewability

- IP blacklisting, bot detection, JavaScript viewability tracking
- 3rd-party integrations (IAS, MOAT)

12. Security & Compliance

- GDPR / CCPA, encrypted data, audit logging, RBAC