The Marketing BI Stack
Architecture Guide

Step-by-step blueprint for building a marketing analytics stack that scales — from data sources to BI layer

> The real question isn't Looker vs Looker Studio — it's what sits underneath. Without clean, unified data, even the best BI tool shows the wrong numbers.

Every high-performing marketing analytics stack follows a four-layer architecture. Data flows left to right — from raw sources through integration and warehousing to the BI layer where your team consumes insights.

LAYER 1		LAYER 2		LAYER 3		LAYER 4
Data Sources	→	**Integration**	→	**Warehouse**	→	**BI Layer**
Ad platforms, CRM, web analytics, social, email, commerce		Extraction, transformation, normalization		Storage, modeling, governance, access control		Visualization, dashboarding, self-serve analytics

Key Principle: Each layer must be independently scalable. Swapping your BI tool shouldn't require rebuilding your data pipeline. Adding a new data source shouldn't break your dashboards.

1 Data Sources

- Ad platforms (Google Ads, Meta Ads, TikTok, LinkedIn, programmatic DSPs)
- CRM systems (Salesforce, HubSpot) for revenue attribution
- Web analytics (GA4, Adobe Analytics) for on-site behavior
- Social media (organic metrics from Instagram, Facebook, LinkedIn, X/Twitter)
- Email marketing (Marketo, Klaviyo, Mailchimp) for lifecycle data

2 Integration (ETL / ELT)

- Data extraction from APIs with rate-limit handling and schema detection
- Transformation: currency normalization, naming convention mapping, deduplication
- Cross-channel metric harmonization (impressions, clicks, conversions unified)

3 Data Warehouse

- Centralized storage optimized for analytical queries (columnar format)
- Data modeling: star/snowflake schemas, semantic layers, metric definitions
- Governance: access control, data lineage, freshness monitoring

4 BI Layer

- Visualization: dashboards, reports, and ad-hoc exploration
- Self-serve analytics for marketing teams (no SQL required)
- Scheduled reporting, alerts, and embedded analytics for stakeholders

Data Source Categories

Category	Examples	Key Metrics	Update Frequency
Ad Platforms	Google Ads, Meta, TikTok, LinkedIn	Spend, impressions, clicks, CPA, ROAS	Daily / hourly
CRM	Salesforce, HubSpot, Dynamics	Pipeline, revenue, deal stage, LTV	Real-time / daily
Web Analytics	GA4, Adobe Analytics, Mixpanel	Sessions, bounce rate, conversions	Daily
Social	Instagram, Facebook, LinkedIn, X	Engagement, reach, followers, shares	Daily
Email	Marketo, Klaviyo, Mailchimp	Open rate, CTR, unsubscribes, revenue	Daily
Commerce	Shopify, Amazon, WooCommerce	Orders, AOV, cart abandonment	Real-time / daily

ETL vs ELT Decision Framework

Factor	ETL (Transform First)	ELT (Load First)
Data volume	Low-to-medium	**High volume (preferred)**
Warehouse compute	Limited / expensive	**Scalable (BQ, Snowflake)**
Transformation complexity	**Complex, multi-step**	SQL-based, dbt-friendly
Data freshness	Batch (hourly+)	**Near real-time possible**
Team SQL proficiency	Low (GUI tools)	**High (dbt, SQL-first)**

Build vs Buy: Integration Layer

Build In-House

- Full control over schema and logic
- Engineering team maintains connectors
- Costly: API changes break pipelines
- Avg. 40+ hrs/connector/year maintenance

Buy / Partner

- Pre-built connectors, auto-maintained
- Schema-change detection and alerts
- Faster time-to-value (days vs months)
- Marketing-specific transformations built in

Improvado sits at Layers 1-2 — providing 500+ pre-built connectors with automated extraction, transformation, and cross-channel metric normalization. Your engineering team focuses on Layers 3-4 while Improvado handles the data plumbing.

PRO TIP

The hidden cost of building your own integration layer isn't the initial build — it's the ongoing connector maintenance. Every API deprecation, rate-limit change, or schema update requires engineering time. At 50+ data sources, this becomes a full-time job for 2-3 engineers.

Warehouse Comparison

Dimension	BigQuery	Snowflake	Redshift
Pricing model	Pay-per-query	Credit-based compute	Instance-based
Best for	Google ecosystem	Multi-cloud flexibility	AWS-heavy stack
Auto-scaling	Serverless	Multi-cluster	RA3 nodes
dbt support	Native	Native	Native
Semi-structured data	Excellent	VARIANT type	SUPER type
Looker integration	Seamless	Full support	Full support

BI Decision Matrix: Looker vs Looker Studio

Dimension	Looker	Looker Studio
Team size	50+ analysts / large org	Small-to-mid teams
Budget	$$$$ (enterprise licensing)	Free / low cost
Governance needs	Strong (LookML, ACL)	Limited
Data complexity	Complex models, joins	Simple, flat data
SQL proficiency required	Yes (LookML)	No (drag-and-drop)
Version control	Git-integrated	None
Embedding	White-label	iFrame only

When to Use Looker

- Enterprise governance and version-controlled metrics via LookML
- Multiple teams need consistent, single-source-of-truth definitions
- Complex data modeling with multi-table joins and derived tables
- Embedded analytics for client-facing products

When to Use Looker Studio

- Fast visualization for marketing teams in the Google ecosystem
- Budget-conscious teams needing quick, shareable dashboards
- Non-technical stakeholders who need drag-and-drop access
- Lightweight reporting on top of Google Sheets or BigQuery

When to Use Both (Common at Enterprise Scale)

- Looker as the governed semantic layer and source of truth
- Looker Studio for ad-hoc marketing team dashboards and quick views
- Separate teams with different skill levels and use cases
- Looker for executive reporting, Looker Studio for campaign-level ops

Implementation Checklist

Use this phased checklist to build your marketing BI stack. Phases overlap intentionally — start warehouse setup while data integration is underway, and begin BI configuration while the warehouse matures.

Phase 1 **Data Foundation** Weeks 1-4

- ☐ Audit all marketing data sources and document API access credentials
- ☐ Map key metrics per channel (spend, impressions, clicks, conversions, revenue)
- ☐ Define naming conventions for campaigns, ad groups, and UTM parameters
- ☐ Select and configure integration platform (ETL/ELT) — connect first 5 sources
- ☐ Validate data completeness: compare platform UI numbers vs extracted data

Phase 2 **Warehouse Setup** Weeks 3-6

- ☐ Provision data warehouse (BigQuery, Snowflake, or Redshift) and configure access
- ☐ Design schema: staging, intermediate, and mart layers (star schema recommended)
- ☐ Implement dbt project with source definitions and base models
- ☐ Set up data quality tests (freshness, uniqueness, not-null, accepted values)
- ☐ Build cross-channel unified marketing model with common metric definitions

Phase 3 **BI Layer** Weeks 5-8

- ☐ Connect BI tool to warehouse and configure service account access
- ☐ Build executive dashboard: spend, ROAS, CPA, pipeline contribution by channel
- ☐ Build campaign-level operational dashboards for each marketing team
- ☐ Set up scheduled email reports and Slack/Teams alerts for anomalies
- ☐ Train marketing team on self-serve exploration and dashboard creation

Phase 4 **Optimization** Ongoing

- ☐ Implement data freshness monitoring and alerting (SLA: data <4hrs old)
- ☐ Add attribution modeling layer (first-touch, last-touch, multi-touch)
- ☐ Optimize warehouse costs: partitioning, clustering, query caching policies
- ☐ Document data dictionary and maintain metric governance runbook

> **Timeline Note:** Phases are designed to overlap. Start Phase 2 in Week 3 while Phase 1 connectors are still being added. Begin Phase 3 BI work in Week 5 using early warehouse models. Target: **working MVP dashboard by Week 8**, with optimization as an ongoing practice.

Your BI Layer Is Only as Good as Your **Data Layer**

The best dashboard in the world can't fix broken data upstream. Improvado handles Layers 1 and 2 — data extraction, transformation, and normalization — so your BI investment actually pays off.

Improvado = Layer 1-2 (Data Sources + Integration)

We connect to your entire marketing ecosystem, normalize metrics across channels, and deliver warehouse-ready data — so your team can focus on insights, not data plumbing.

500+
Data connectors

75%
Faster reporting

Enterprise
Grade governance

Get a Personalized Demo

See the AI Agent in Action

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