CREATING UNIQUE CUSTOMER ENGAGEMENTS

WITH ADOBE EXPERIENCE PLATFORM (AEP)

Digital transformation helps our clients become more efficient and fast-moving and creates differentiation and growth.

For many, better customer engagement is a linchpin of their transformation as customer experience supplants product and price as their key differentiator. The ability to deliver unique and personalized customer experiences across an increasing array of channels and touchpoints is foundational to their success.

Unified data is at the heart of creating engaging customer experiences, and as a result a new breed of tools classified as Customer Data Platforms (CDPs) are gaining prominence.

A CDP enables the creation of comprehensive, data-driven customer experiences. In this paper we will discuss the concept of CDP, how it differs from other data platforms, and how Adobe Experience Platform (AEP) provides an open, flexible and powerful solution to delivering enterprise-grade, scalable personalized experiences.
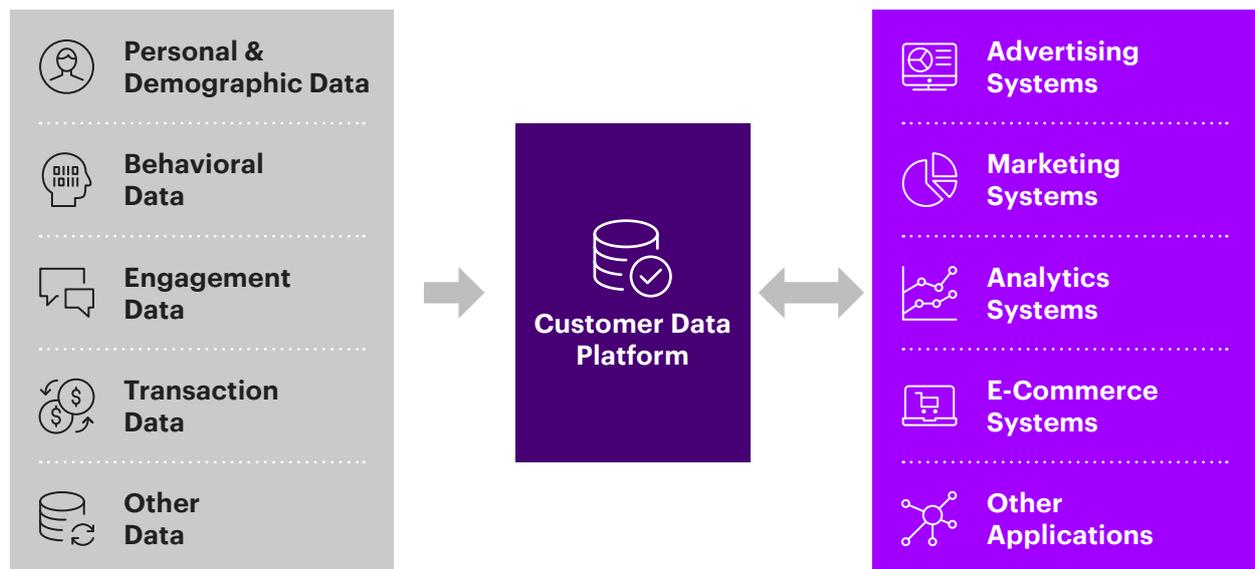
CUSTOMER DATA PLATFORMS EXPLAINED

The Customer Data Platform Institute provides the following definition of CDP: "A Customer Data Platform is a marketer-managed system that creates a persistent, unified customer database that is accessible to other systems."

The objective of a CDP is to bring all customer information (personal, demographic, behavioral, engagement, transactional and operational) together and stitch it into a unified customer profile. Other systems, such as advertising, marketing, sales, service, analytics and ecommerce, use the unified customer profile to deliver unique experiences across multiple channels (email, web, messaging, call center, social, direct mail, retail).

A CDP primarily performs three functions:

1. Ingest and integrate customer data from multiple sources

2. Stitch together the customer's unified profile in real time

3. Decide on and activate the profile across various points of engagement

A Customer Data Platform should not be viewed merely as a database or a data store. It is a platform to ingest data from a variety of sources, integrate data into a common model, create unified customer profiles in real time, segment customers, produce actionable insights powered by artificial intelligence and machine learning (AI/ML), and provide edge services to integrate with systems of engagement, all with trusted governance and privacy controls.

Data Sources		Customer Data Platform		Connected Systems
Personal & Demographic Data				Advertising Systems
Behavioral Data				Marketing Systems
Engagement Data	→	**Customer Data Platform**	↔	Analytics Systems
Transaction Data				E-Commerce Systems
Other Data				Other Applications

CDP VERSUS OTHER DATA PLATFORMS

There are a number of tools and concepts in the industry under the umbrella of "Customer 360" that offer the promise of a unified customer record. Here's how they are similar to and different from CDPs:

Customer Relationship Management (CRM) platforms were primarily designed for sales teams to track their interactions with customers, although they are often used by the entire organization. A CRM platform stores data about prospects, customers, suppliers, service providers and others. It is used to track transactions, analyze the sales pipeline, and keep track of customer communications, notes and feedback for future use. A CRM platform doesn't store and integrate information from all other channel systems or transactions that the customer may have. But since CRM systems have customer information, they clearly have some overlap with CDPs.

Master Data Management (MDM) platforms can be loosely defined as maintaining and distributing consistent information about core business entities such as people, products and locations. Since the customer is one of the core entities being held in MDM, there is some overlap with CDP. MDM platforms perform identity resolution to create a "golden record" containing the business's best view of customer attributes, such as name and address. MDM platforms manage and master a small subset of core attributes, and rarely manage information like behavior and transaction information, which is table stakes in a CDP.
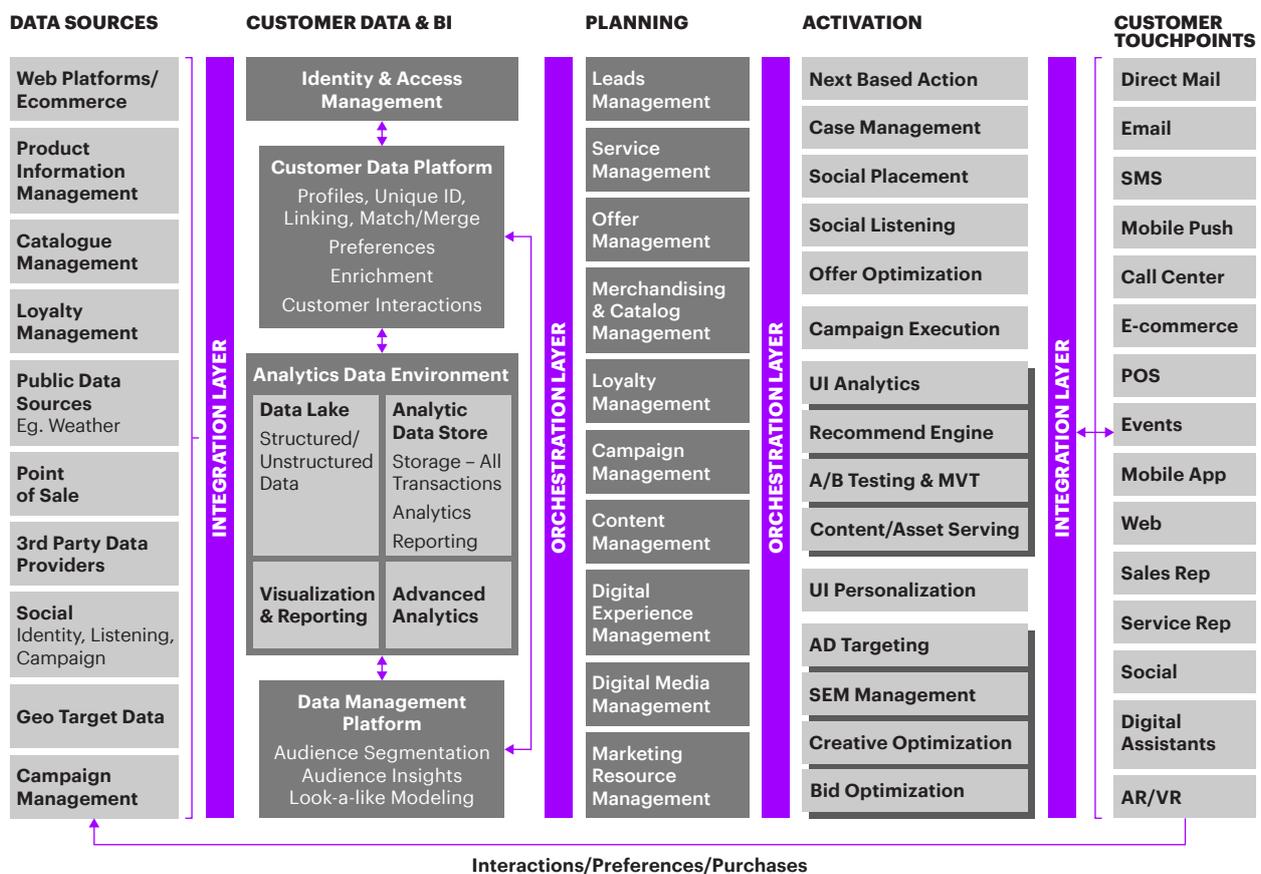
Most MDM systems operate in a batch mode, although new implementations are beginning to include real-time data mastering. In contrast, CDPs almost always act on real-time customer information.

Data Lakes/Data Warehouses are IT-built enterprise data platforms. They bring a variety of structured and unstructured data from various internal, external and third-party sources and integrate them for consumption. These platforms are highly governed, and new data pipelines through the data lake take a long time from inception to execution. As opposed to CDPs, data lakes support all enterprise data domains, not just those that are marketing focused. CDPs may be built on top of data lake technology, but they add additional software layers to facilitate making customer information quickly accessible and actionable. Most CDPs offer a user interface to enable marketers to act on the data. In fact, we see data lakes feeding CDPs with insights into customer behavior (models and advanced segmentations) or important information that may impact the customer experience. Data lakes will generally have a superior set of data (breadth and history) to focus on analysis, while CDPs leverage a subset for driving customer experience.

Data Management Platforms (DMPs) work on the capture and exchange of cookies into an anonymous view of the customer that integrates into personalization tools, demand side platforms (DSPs) and ad-servers. The value is created by enriching an anonymous profile with third-party data, integrating known customer data into a cookie on-boarder (e.g., LiveRamp), and leveraging these profiles to find similar (look-a-like) profiles on third-party advertising sites.

This allows a web or mobile experience to be personalized to the individual, for the individual to be targeted with media after leaving the web/mobile experience, and for the company to find more people like that individual to drive customer acquisition. Generally, the data in the DMP cannot be taken out of the DMP, and the data should be seen as indicative more than absolute (due to variance in how the third-party data is obtained). For identifiable customers in the DMP, the segments they are assigned to can be exported. DMPs can help support compliance with regulations such as GDPR, but the value of the cookie data is being diminished as third-party cookie data collection is facing increasing restrictions from Google and Apple. CDPs can replicate some of the DMP functionality, but generally lack the third-party data marketplace capabilities and have fewer DSP/ad network integrations.

In our view, CDP is a specialized category that is purpose-built to support marketing functions and cross-channel engagement. In a mature enterprise, we expect to see a number of these platforms coexist, since they each have a different, purpose-built focus. Can you use any of the other platforms to create CDP-like functionality? The answer is YES. But CDP platforms provide many pre-built components to satisfy the specific marketing needs around a customer, and this capability will be time-consuming and costly to build on other platforms.

DATA SOURCES		CUSTOMER DATA & BI		PLANNING		ACTIVATION		CUSTOMER TOUCHPOINTS
Web Platforms/ Ecommerce	I N T E G R A T I O N L A Y E R	**Identity & Access Management**	O R C H E S T R A T I O N L A Y E R	Leads Management	O R C H E S T R A T I O N L A Y E R	Next Based Action	I N T E G R A T I O N L A Y E R	Direct Mail
Product Information Management		**Customer Data Platform** Profiles, Unique ID, Linking, Match/Merge		Service Management		Case Management		Email
Catalogue Management		Preferences		Offer Management		Social Placement		SMS
Loyalty Management		Enrichment Customer Interactions		Merchandising & Catalog Management		Social Listening		Mobile Push
Public Data Sources Eg. Weather		**Analytics Data Environment**		Loyalty Management		Offer Optimization		Call Center
		Data Lake Structured/ Unstructured Data	**Analytic Data Store** Storage – All Transactions			Campaign Execution		E-commerce
Point of Sale				Campaign Management		UI Analytics		POS
3rd Party Data Providers			Analytics Reporting			Recommend Engine		Events
Social Identity, Listening, Campaign		**Visualization & Reporting**	**Advanced Analytics**	Content Management		A/B Testing & MVT		Mobile App
				Digital Experience Management		Content/Asset Serving		Web
Geo Target Data		**Data Management Platform** Audience Segmentation Audience Insights Look-a-like Modeling		Digital Media Management		UI Personalization		Sales Rep
						AD Targeting		Service Rep
Campaign Management				Marketing Resource Management		SEM Management		Social
						Creative Optimization		Digital Assistants
						Bid Optimization		AR/VR

Interactions/Preferences/Purchases

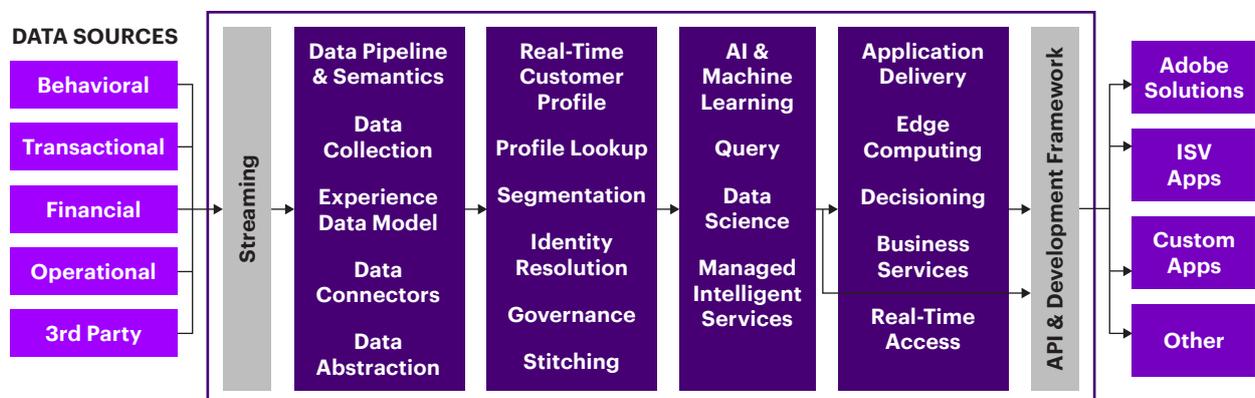# ADOBE EXPERIENCE PLATFORM (AEP): MORE THAN A CDP

Adobe Experience Platform is a powerful, flexible, open system for building and managing complete solutions that drive customer experience. Experience Platform enables organizations to centralize and standardize customer data and content from any system and apply data science and machine learning to dramatically improve the design and delivery of rich, personalized experiences.

AEP can be seen as comprising three major functional components:

1. Data Foundation gives developers the power to ingest/import data from a variety of sources and map it to a standard Experience Data Model (XDM).

XDM provides an ability to create schemas (a set of rules that describe the blueprint of the data, including validations) against which data sets can be imported and organized. Using XDM, developers create a Customer Data Model that represents all of their customer data no matter which data sources are used. One key value of AEP is that it provides "out of the box" XDM schemas that can be modified. Data can be imported into AEP from a variety of sources such as Analytics, Target, or Audience Manager, via third-party connectors such as Microsoft Dynamics, Salesforce, S3 and others, or be ingested through available APIs. A number of pre-built connectors are provided by AEP. An important thing to note is that data needs to be cleansed and standardized (conformed to the XDM model) outside of the AEP platform (e.g., in an ETL tool or in a data lake prior to ingesting into AEP).

An open, intelligent, and real-time platform for customer experience

DATA SOURCES	Streaming	Data Pipeline & Semantics	Real-Time Customer Profile	AI & Machine Learning	Application Delivery	API & Development Framework	
Behavioral		Data Collection	Profile Lookup	Query	Edge Computing		Adobe Solutions
Transactional		Experience Data Model	Segmentation	Data Science	Decisioning		ISV Apps
Financial		Data Connectors	Identity Resolution	Managed Intelligent Services	Business Services		Custom Apps
Operational		Data Abstraction	Governance		Real-Time Access		Other
3rd Party			Stitching				

2. Machine Learning (ML) offers predefined models that the user can leverage in their own solutions, as well as the capability to develop custom machine learning models for specific needs. AEP provides a Data Science workspace that allows data scientists to author, build, train and publish AI/ML models. Through AEP's AI/ML, users can get insights and make predictions from the data. AEP has an ML framework to import already built models, author models from scratch or use an existing prebuilt model with templates. Data scientists of all skill levels will find this an easy-to-use tool that supports development, training and tuning of machine learning models. It has one-stop data access and is fully integrated with AEP, data lake, unified profile and unified edge. It delivers real-time experiences through an open and extensible platform and it has multiple capabilities: data preparation and wrangling, data exploration, data analysis, authoring, experimentation, predictive model building, operationalization, continuous improvement and next best actions. Once the best trained model is selected, it can be securely deployed and operationalized using intelligent services.

3. Audience Activation includes Real-Time Customer Profile, Identity Services and Edge Services. These services work together to enable clients to build and activate audiences based on customer profiles containing individual attributes and behaviors. Real-Time Customer Profile serves as the store for all customer attributes and interactions that create a complete picture of the customer. A profile in AEP consists of known customer data/personal attributes (name, gender, address, loyalty status) as well as unknown behavioral data (costs per click/acquisition, clickstream, search, navigational, funnel, conversion). The profile can also contain time-series data, such as account creation, log-in on a new device, mobile app download or in-store purchase. Identity Service stitches together the identity of the consumer by merging the various profile segments. It examines unauthenticated and authenticated interactions to build an identity graph that connects with the 360-degree customer profile to represent behaviors and interests. A key functionality provided within AEP is an ability to segment customers. Segmentation rules can be built based on customer attributes (state, age range, etc.), events (page view, product view, add cart) or both. Segments can be combined to create new segments. Segmentation functionality within AEP allows for "customized" behaviors and treatments to be associated with each unique segment. Edge Services enable access to customer data to instantaneously perform computations and decisioning to deliver enhanced, individualized experiences to customers in real time as they interact with systems of engagement.

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The AEP Architecture

This diagram shows the basic architecture of AEP, which is further documented below.

Data Ingestion allows for different types of data (batch and streaming) to be brought into the Experience Platform. Multiple pre-built connectors to Adobe products and other third-party products exist.

Once different profile "fragments" have been ingested into AEP, the Unified Profile Service dynamically stiches the individual fragments together into a unified customer profile. Segments are created based on attribute and event information contained in the profile.

Data Science Workspace allows data scientists to build, train and deploy models that can be used to derive additional signals from the data and make recommendations on the next best offer or action. It allows clients to build models right where data is collected and activated, shortening data science time to value.

API End-Point and **Query Service** allow users and applications to access profile and segmentation data from AEP. API endpoints are exposed as REST services. Query Service can be used for integration with BI and visualization tools such as Tableau and PowerBI.

Data Governance includes services for managing the catalog (metadata tied to the data assets), data usage labeling and enforcement, XDM registry, and schema management and privacy.

AEP runs on Azure infrastructure and uses numerous Azure services, such as Azure Data Factory, ADLS, Cosmos DB, Azure Container Services, Azure Monitor, etc. Other third-party components used in the platform are Kafka, Mesos, Spark, MongoDB, Airflow and Splunk.
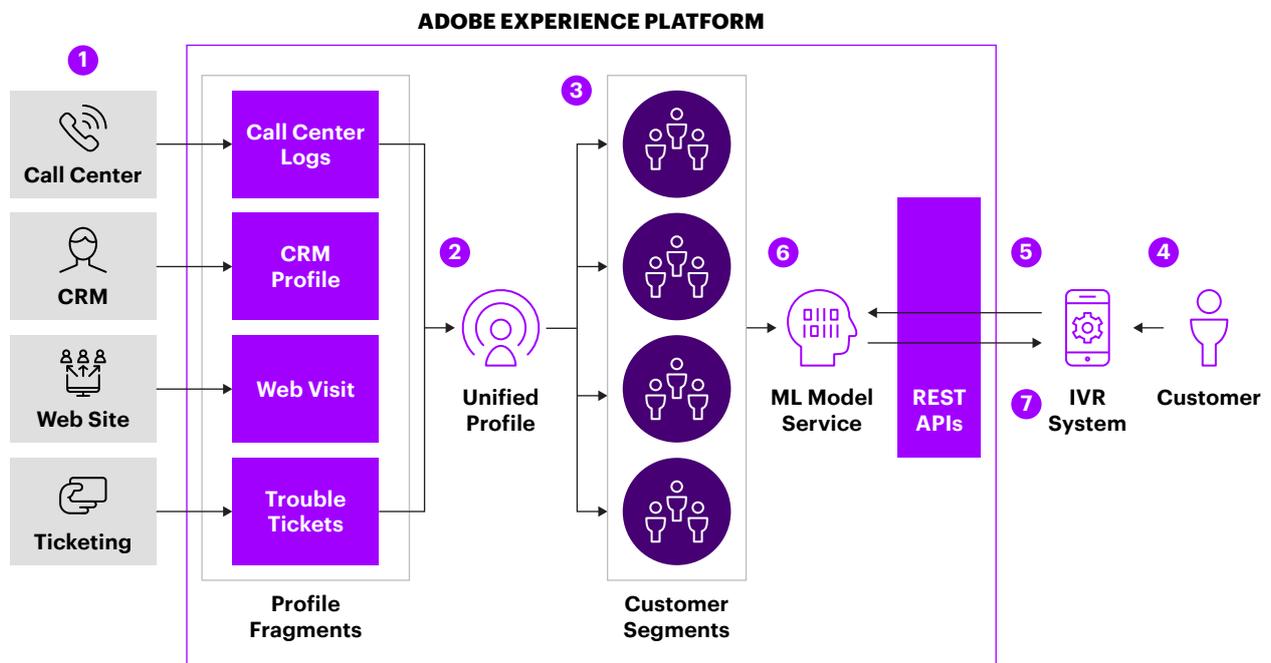
DATA SOURCES

- Sales/Commerce
- CRM
- 3rd Party
- ERP
- Call Center
- Data Lake

ADOBE EXPERIENCE PLATFORM

Data Governance

Data Ingest

- Unified Profile Service
- API End-Point
- Data Science Workspace
- Query Service

Azure Infrastructure

CONSUMERS

- Advertising
- Marketing
- E-Commerce
- Analytics
- Applications
- 3rd Party
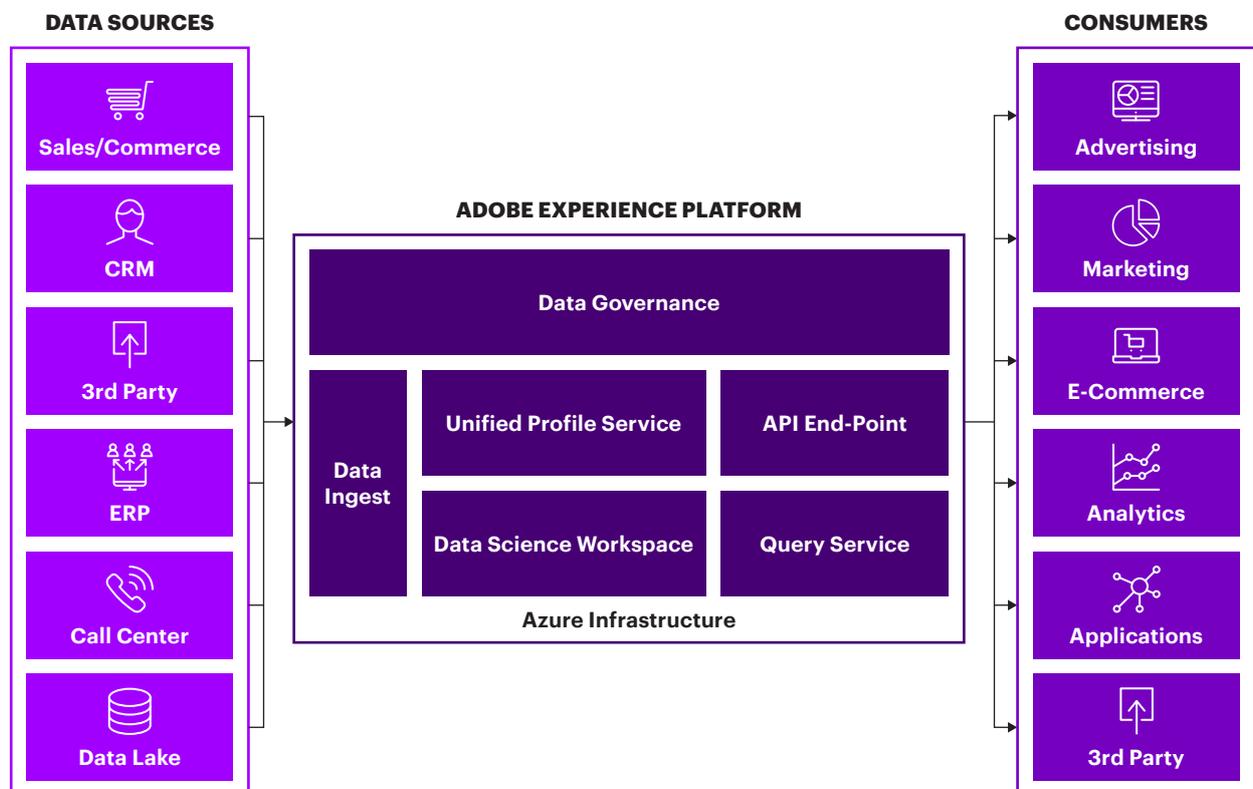
AN EXAMPLE USE CASE

The power and capability of the AEP platform can be readily seen by stepping through a use case, such as this example of an IVR (Integrated Voice Response) system.

1 Customer data from multiple sources is ingested into AEP in real time. This data can include call center logs (when and how many times a customer called, for what purpose), CRM profile (name, phone number, age, gender, location, state), website visits (when visited, what page views, anything added to cart), and trouble tickets (case logs of problems, issues, resolutions). This data is initially maintained in AEP as separate, disconnected profile fragments.

2 AEP then stitches these various profile segments into a unified customer profile in real time. An identity graph is created for the customer with all profile and experience event data linked together. AEP may use identifiers like a customer phone number to stitch segments together.

3 AEP is then used to create customer segments. Multiple customer segments may be created based on one or more attributes (such as gender, age range or location state) and/or events (such as page views, product views or items added to cart). For example, a segment could be: 30+ years old, male, yoga enthusiasts, premium loyalty status, living in California, frequented the yoga apparel product page on the website more than five times in the past week.

4 A customer calls the 1-800 number of the apparel company from his registered phone number, which is answered by an IVR system.

5 The IVR system captures the customer caller ID (phone number). The IVR system needs to determine where to route the customer call and makes an API call to the AEP service.

6 A machine learning model has been trained on historical data related to customer information, purchase history and other relevant data. The trained ML model has been deployed as a "service" that is accessible via an API. When the IVR calls this service, the service identifies the segment the customer belongs to (based on the caller ID, which is the same phone number that was used to stitch profiles together). Based on this segment, the ML model recommends a specific product purchase option for the customer and perhaps a 10% discount.

7 Based on the information returned by the AEP service, the IVR makes a product and discount offer to the customer and routes the call accordingly.

ADOBE EXPERIENCE PLATFORM

Call Center	Call Center Logs			
CRM	CRM Profile			
Web Site	Web Visit	Unified Profile	Customer Segments	ML Model Service · REST APIs · IVR System · Customer
Ticketing	Trouble Tickets			

Profile Fragments

CONCLUSION

Adobe AEP offers a compelling solution for organizations looking to enable a true omni-channel vision of their customer's interactions.

For enterprises that have already made investments in the Adobe Experience Cloud, AEP will offer unparalleled data integrations across the suite while providing, through an Open API architecture, the ability to seamlessly integrate within a broader heterogenous ecosystem.

As the leader in Customer Experience Management software, Adobe has made a strong entry into the data-driven experience space with its purpose-built AEP solution, and it should be considered as a foundational capability in any enterprise experience architecture stack.
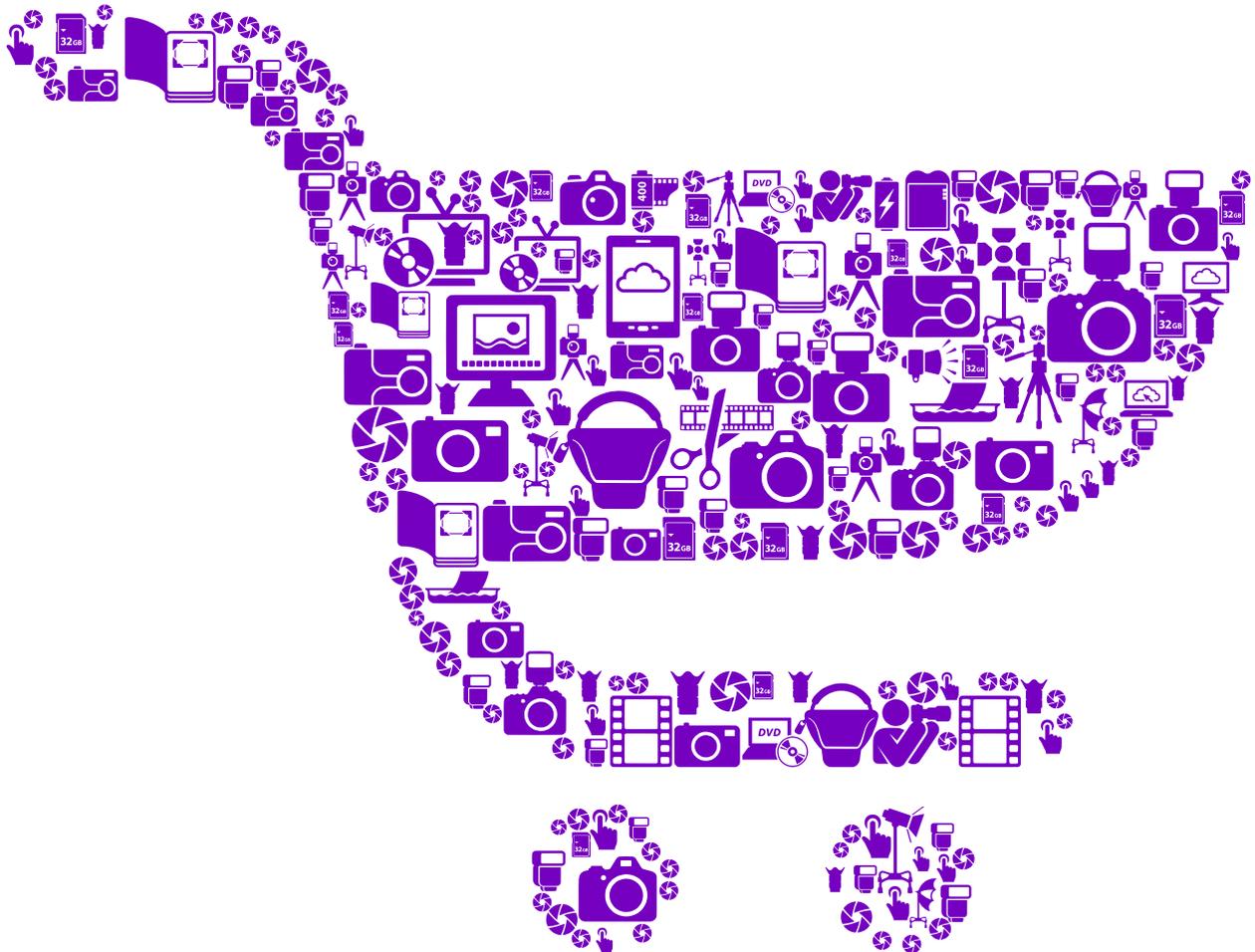
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