

Data Cloud DevOps

what does it mean?

what's available

what's coming



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Agenda



 What is Data Cloud?

 Architecture / Data Cloud Components

 Configuring Data Cloud

 Data Cloud DevOps Pipelines

 Resources

Forward Looking Statements

This presentation contains forward-looking statements about, among other things, trend analyses and future events, future financial performance, anticipated growth, industry prospects, environmental, social and governance goals, and the anticipated benefits of acquired companies. The achievement or success of the matters covered by such forward-looking statements involves risks, uncertainties and assumptions. If any such risks or uncertainties materialize or if any of the assumptions prove incorrect, Salesforce's results could differ materially from the results expressed or implied by these forward-looking statements. The risks and uncertainties referred to above include those factors discussed in Salesforce's reports filed from time to time with the Securities and Exchange Commission, including, but not limited to: impact of, and actions we may take in response to, the COVID-19 pandemic, related public health measures and resulting economic downturn and market volatility; our ability to maintain security levels and service performance meeting the expectations of our customers, and the resources and costs required to avoid unanticipated downtime and prevent, detect and remediate performance degradation and security breaches; the expenses associated with our data centers and third-party infrastructure providers; our ability to secure additional data center capacity; our reliance on third-party hardware, software and platform providers; the effect of evolving domestic and foreign government regulations, including those related to the provision of services on the Internet, those related to accessing the Internet, and those addressing data privacy, cross-border data transfers and import and export controls; current and potential litigation involving us or our industry, including litigation involving acquired entities such as Tableau Software, Inc. and Slack Technologies, Inc., and the resolution or settlement thereof; regulatory developments and regulatory investigations involving us or affecting our industry; our ability to successfully introduce new services and product features, including any efforts to expand our services; the success of our strategy of acquiring or making investments in complementary businesses, joint ventures, services, technologies and intellectual property rights; our ability to complete, on a timely basis or at all, announced transactions; our ability to realize the benefits from acquisitions, strategic partnerships, joint ventures and investments, including our July 2021 acquisition of Slack Technologies, Inc., and successfully integrate acquired businesses and technologies; our ability to compete in the markets in which we participate; the success of our business strategy and our plan to build our business, including our strategy to be a leading provider of enterprise cloud computing applications and platforms; our ability to execute our business plans; our ability to continue to grow unearned revenue and remaining performance obligation; the pace of change and innovation in enterprise cloud computing services; the seasonal nature of our sales cycles; our ability to limit customer attrition and costs related to those efforts; the success of our international expansion strategy; the demands on our personnel and infrastructure resulting from significant growth in our customer base and operations, including as a result of acquisitions; our ability to preserve our workplace culture, including as a result of our decisions regarding our current and future office environments or work-from-home policies; our dependency on the development and maintenance of the infrastructure of the Internet; our real estate and office facilities strategy and related costs and uncertainties; fluctuations in, and our ability to predict, our operating results and cash flows; the variability in our results arising from the accounting for term license revenue products; the performance and fair value of our investments in complementary businesses through our strategic investment portfolio; the impact of future gains or losses from our strategic investment portfolio, including gains or losses from overall market conditions that may affect the publicly traded companies within our strategic investment portfolio; our ability to protect our intellectual property rights; our ability to develop our brands; the impact of foreign currency exchange rate and interest rate fluctuations on our results; the valuation of our deferred tax assets and the release of related valuation allowances; the potential availability of additional tax assets in the future; the impact of new accounting pronouncements and tax laws; uncertainties affecting our ability to estimate our tax rate; uncertainties regarding our tax obligations in connection with potential jurisdictional transfers of intellectual property, including the tax rate, the timing of the transfer and the value of such transferred intellectual property; uncertainties regarding the effect of general economic and market conditions; the impact of geopolitical events; uncertainties regarding the impact of expensing stock options and other equity awards; the sufficiency of our capital resources; the ability to execute our Share Repurchase Program; our ability to comply with our debt covenants and lease obligations; the impact of climate change, natural disasters and actual or threatened public health emergencies; and our ability to achieve our aspirations, goals and projections related to our environmental, social and governance initiatives.

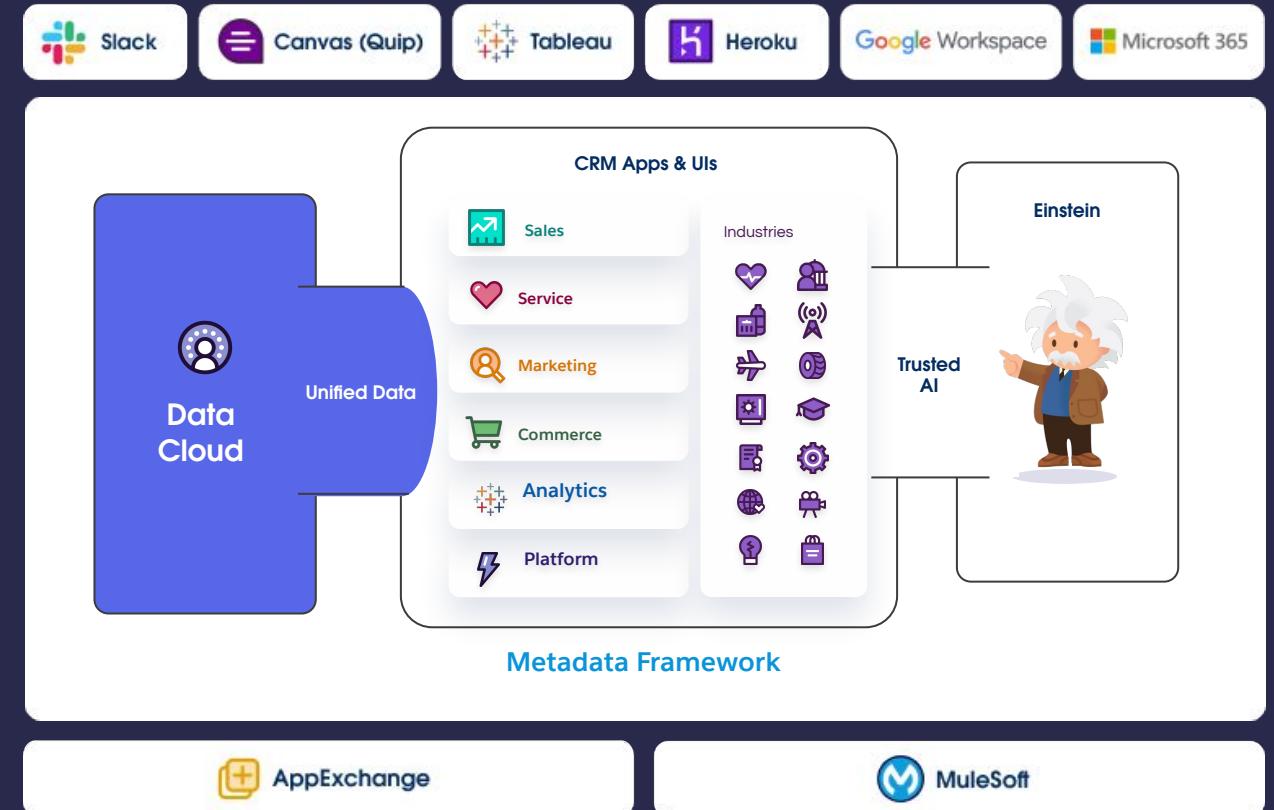
What is Data Cloud?



Einstein 1

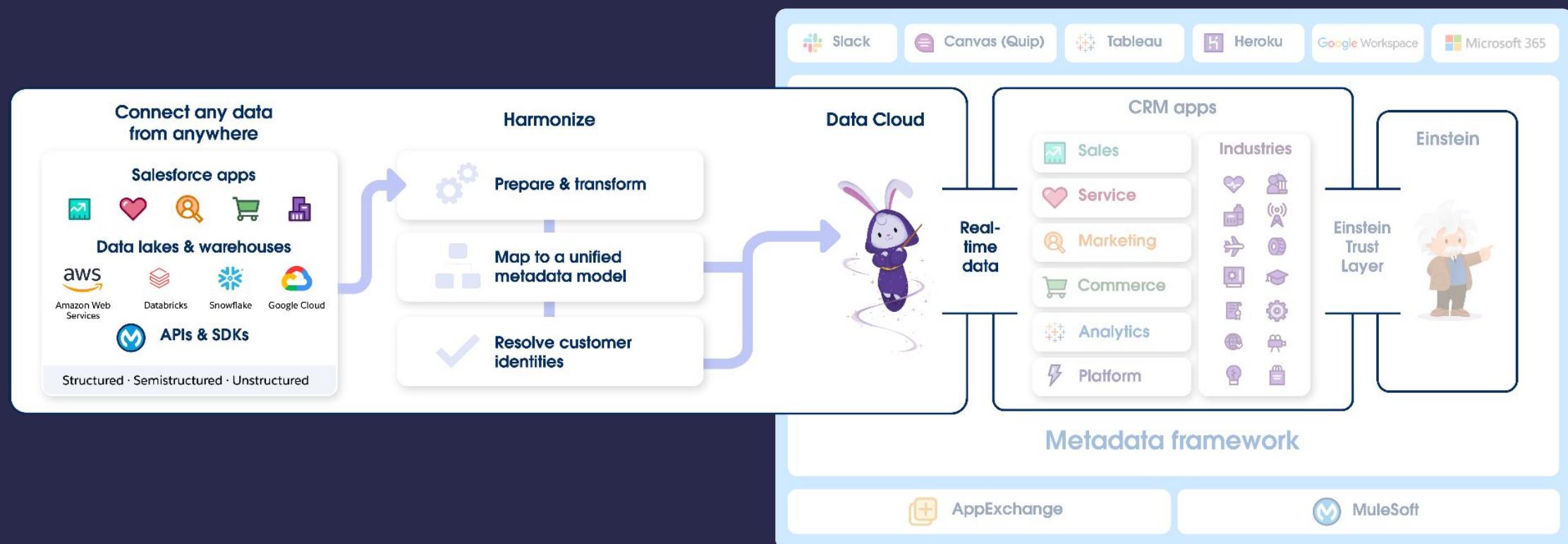
Now AI works for business
and everyone can be an
Einstein

- ✓ Integrated
- ✓ Intelligent
- ✓ Automated
- ✓ Low-code & no code
- ✓ Open data + AI ecosystem

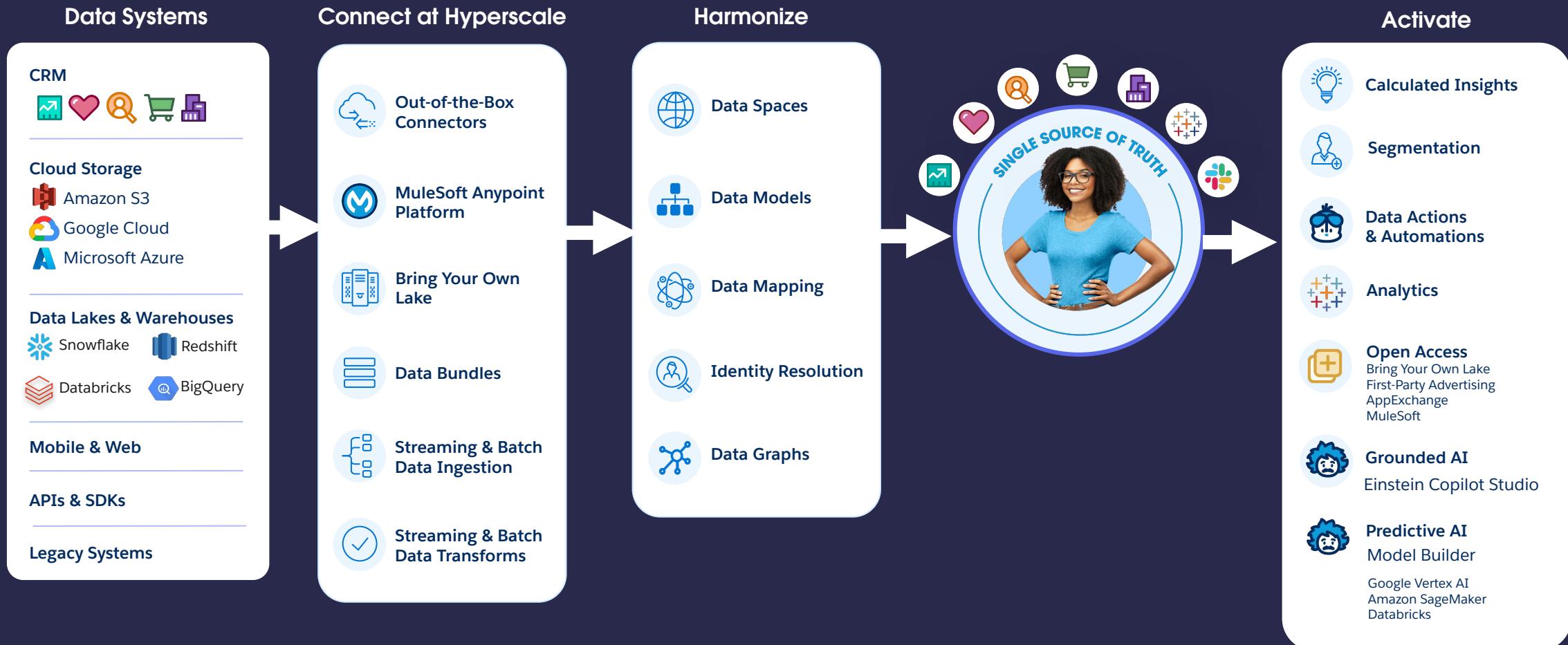


Unlock Your Trapped Data

Connect and harmonize all your enterprise data



How Data Cloud Works



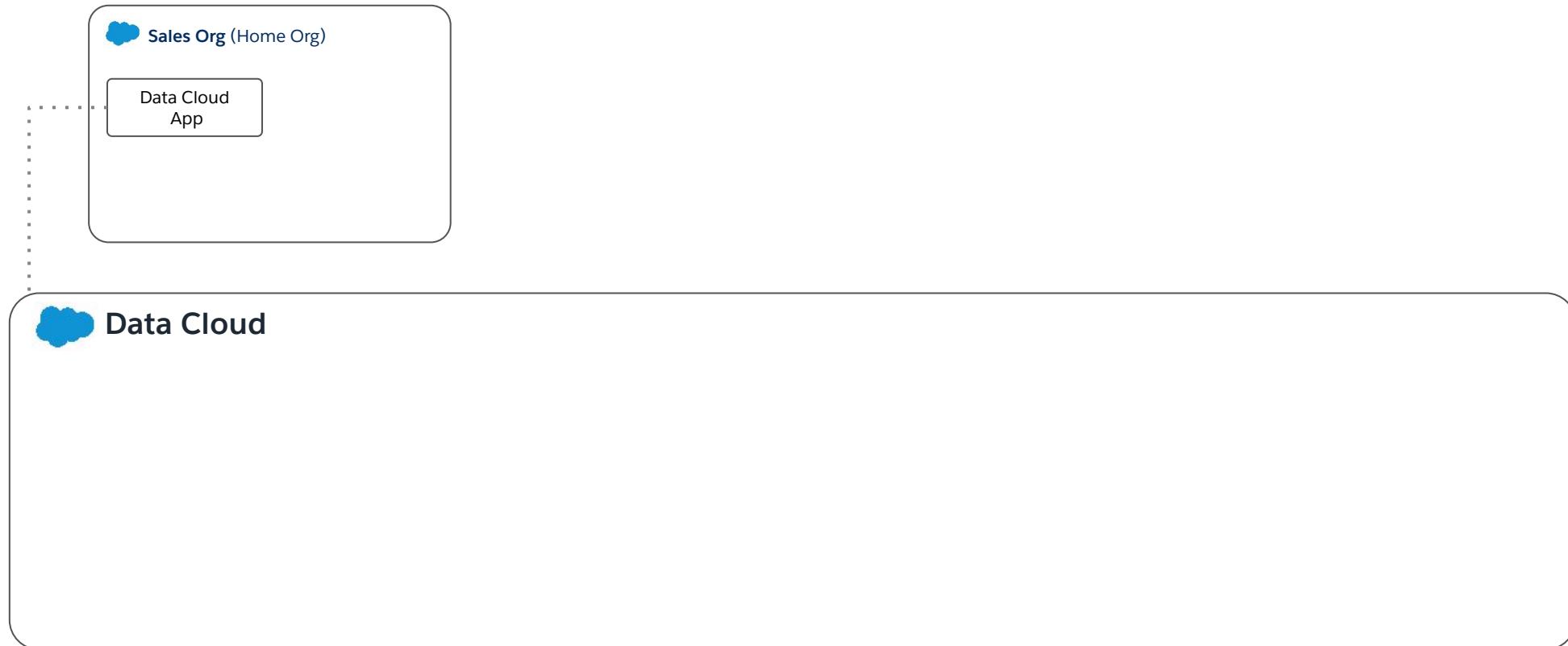
Data Cloud within your Enterprise Architecture (Data Cloud Components)



Data Cloud



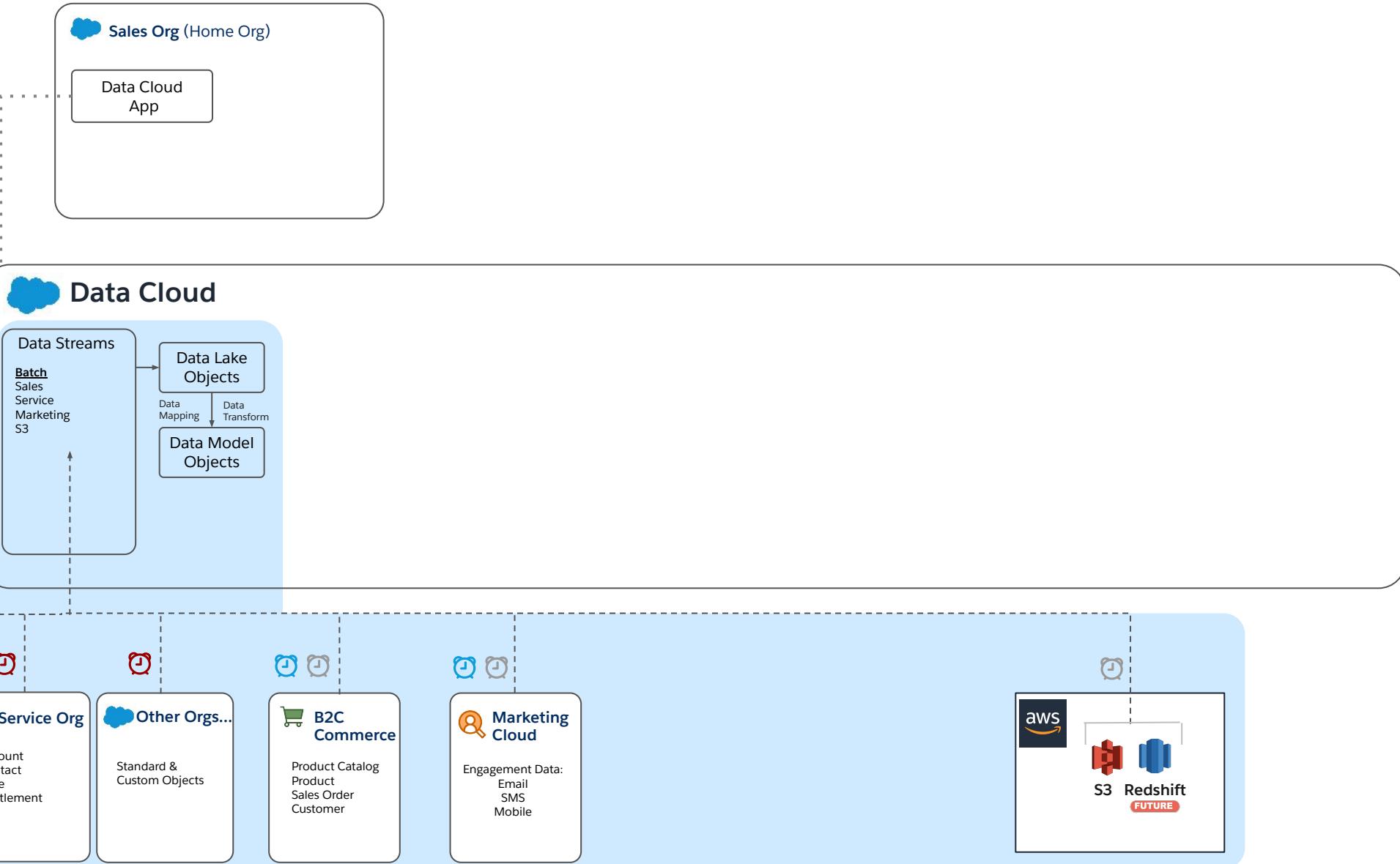
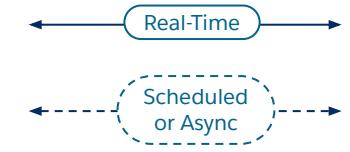
Data Cloud Instance



Data Cloud

Batch Data Ingestion and Harmonization

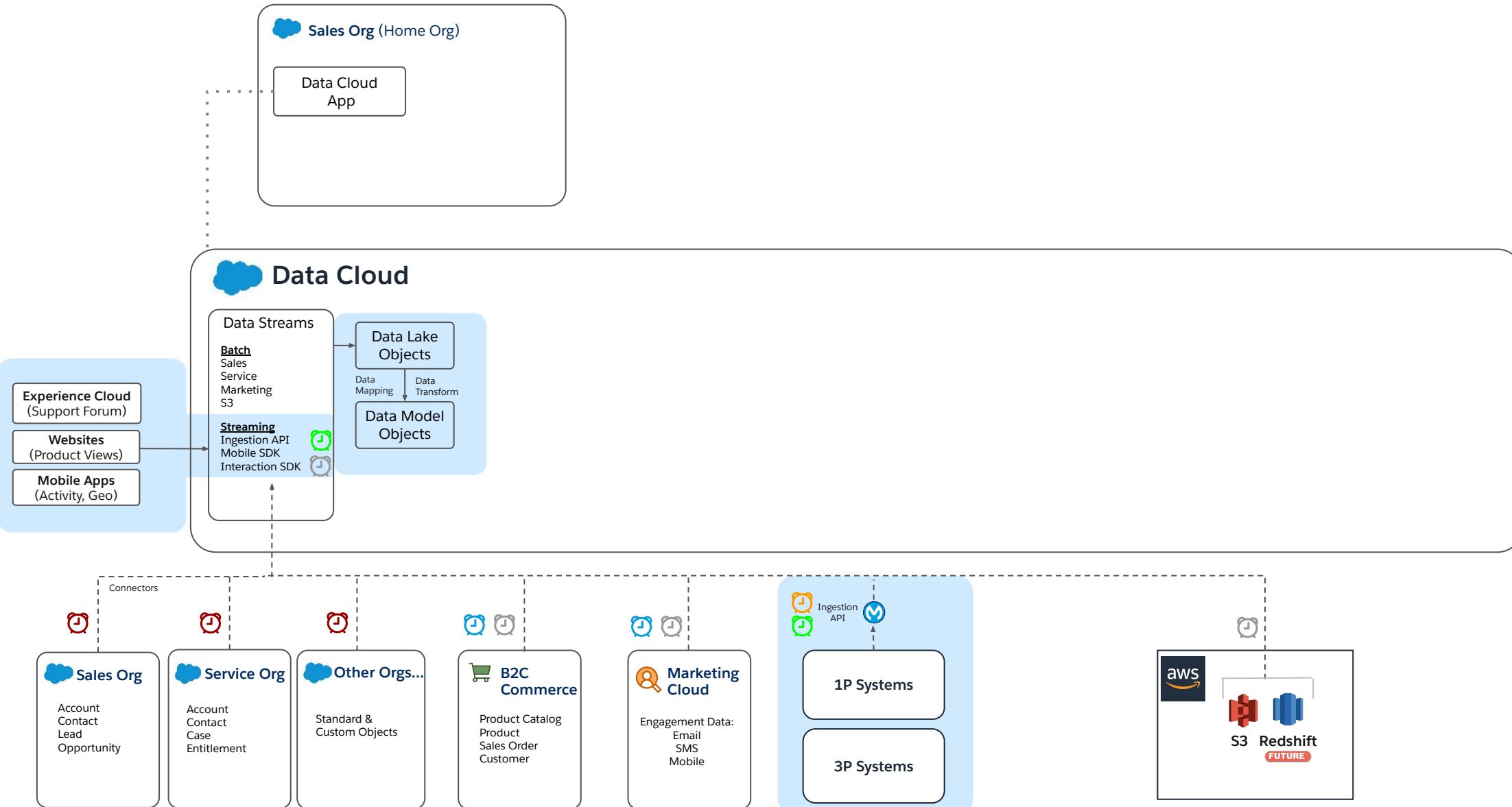
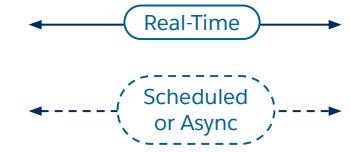
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⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Streaming Data Ingestion and Ingestion API

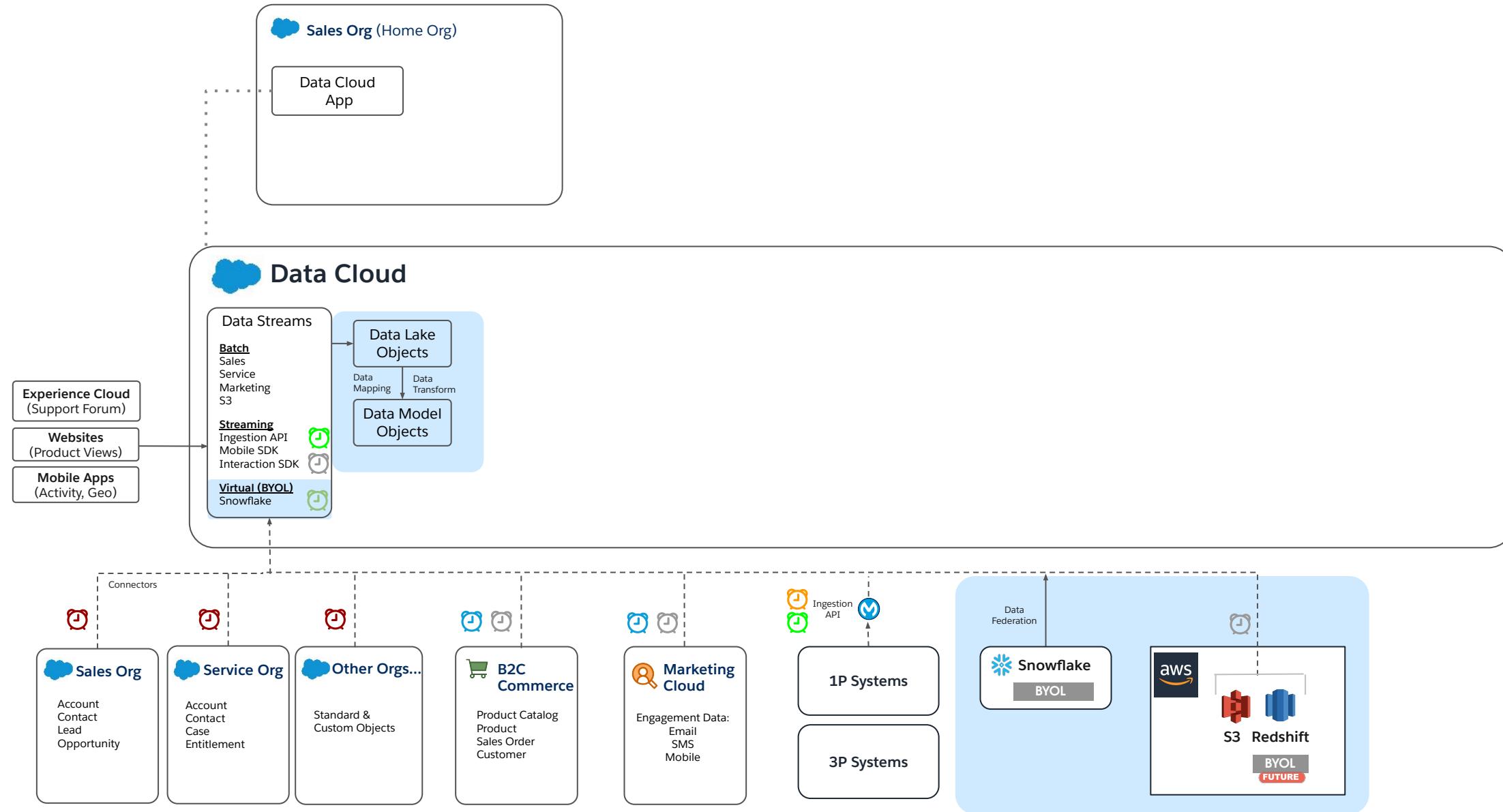
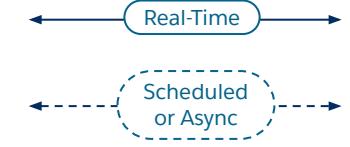
Frequency	⌚ 5 mins	⌚ Hourly	⌚ 12 hrs
⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Bring Your Own Lake (BYOL)

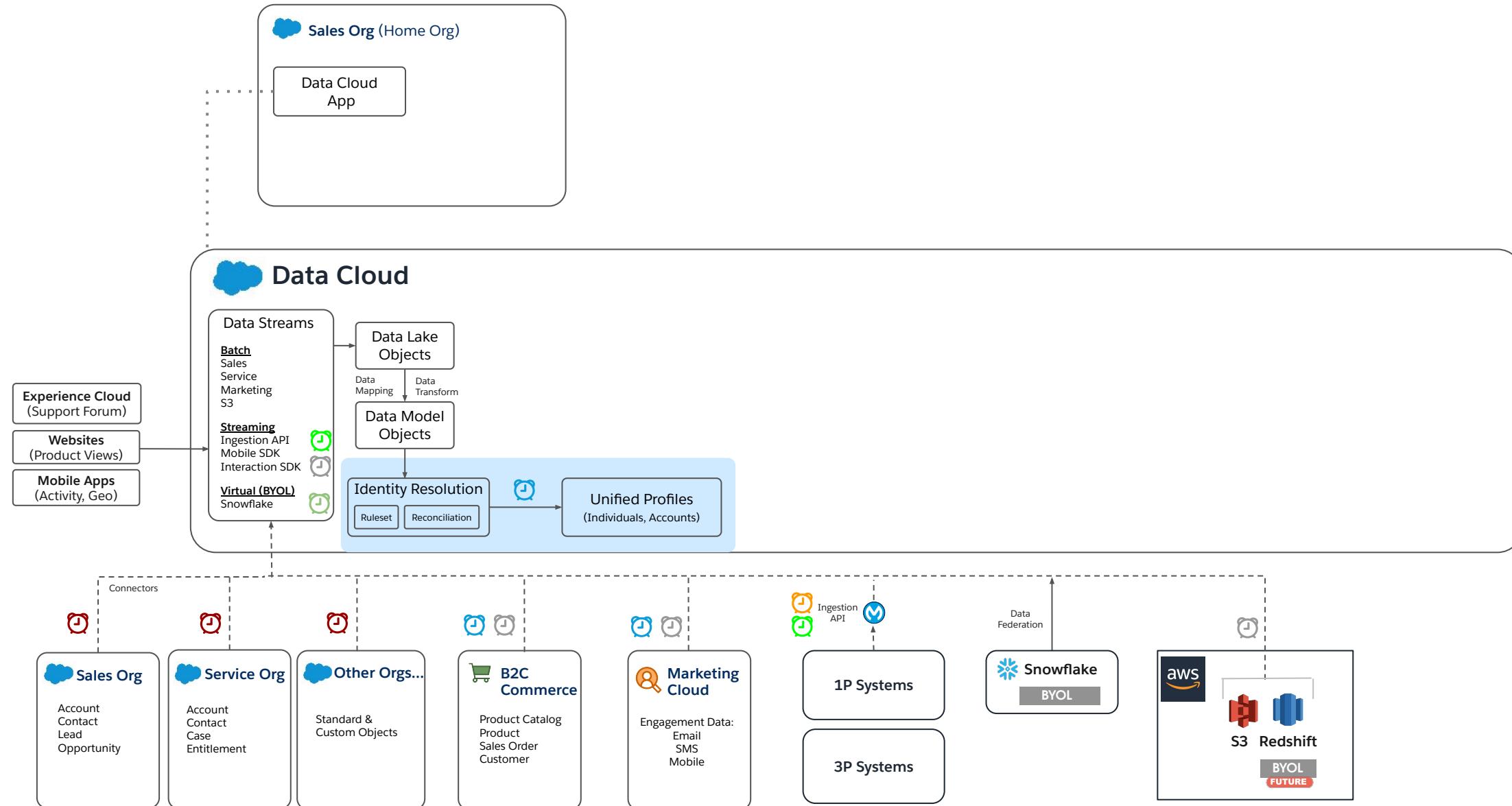
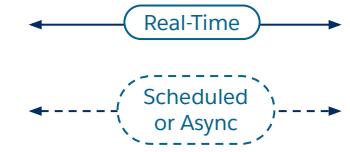
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Real-time	Real-time	10 mins	6 hrs
2 mins	2 mins	Daily	Up to 15 mins



Data Cloud

Profile Unification

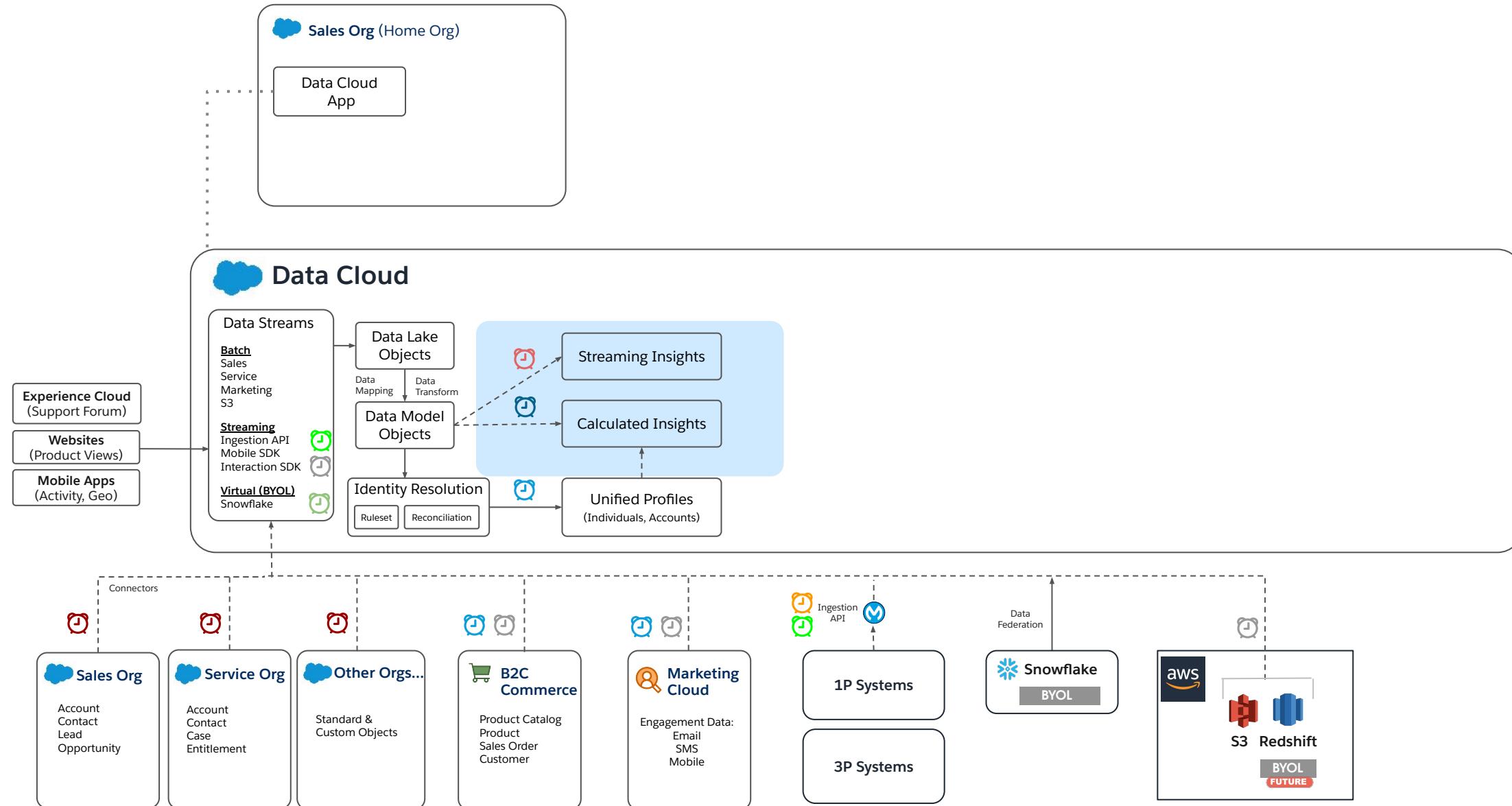
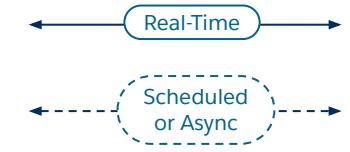
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⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Calculated Insights

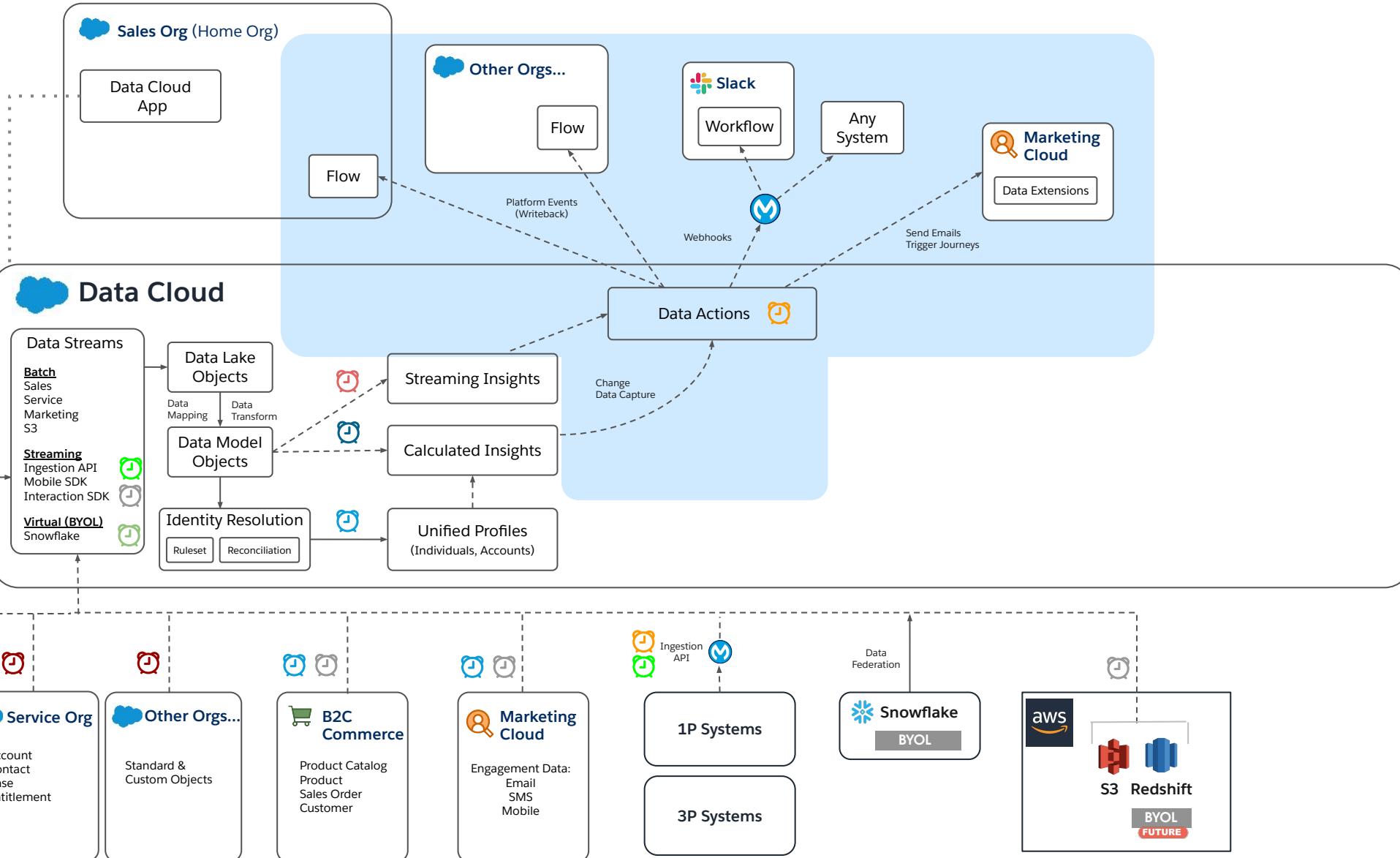
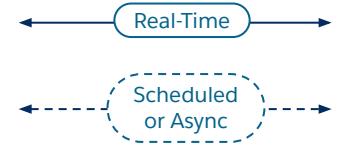
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⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Data Actions

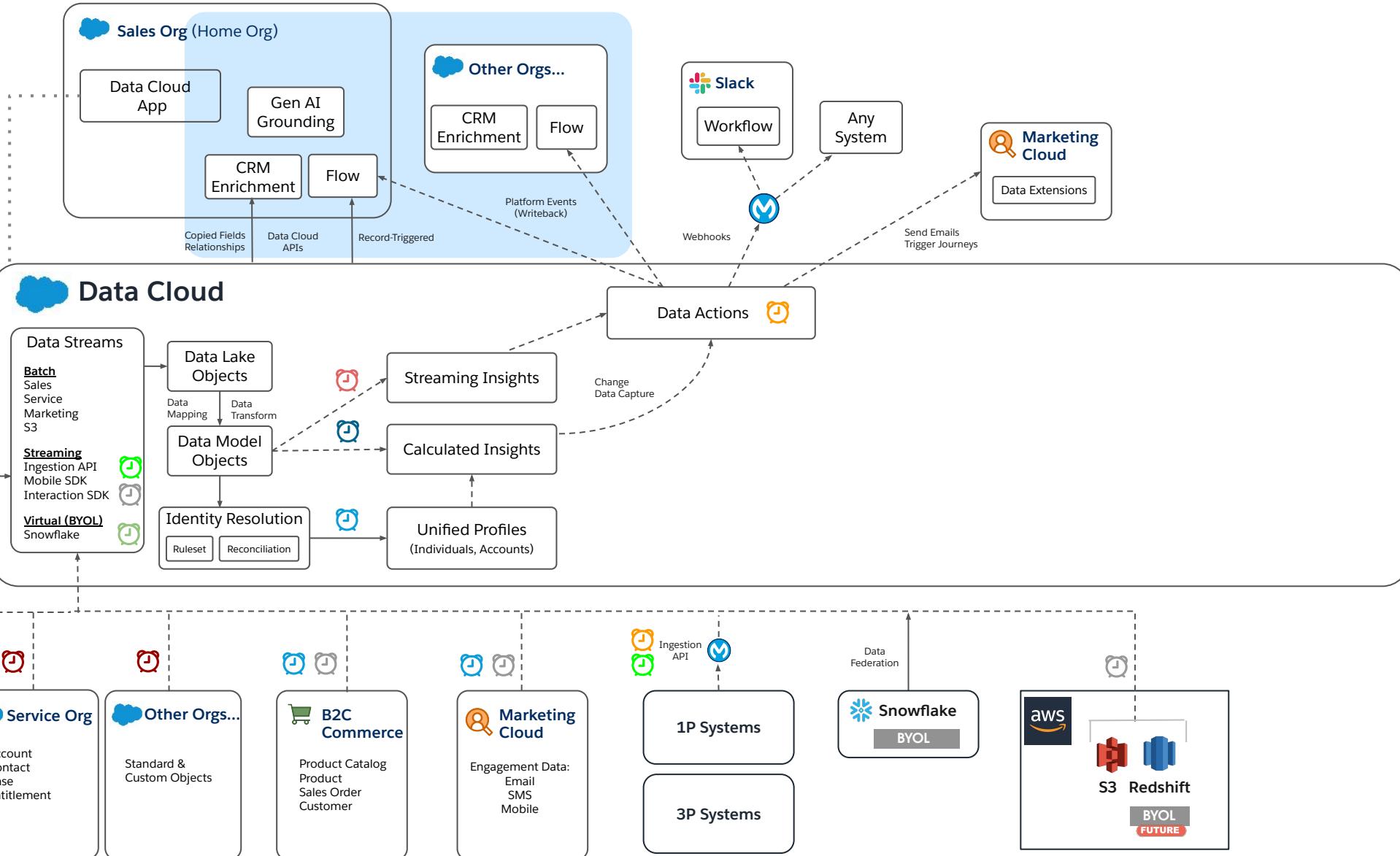
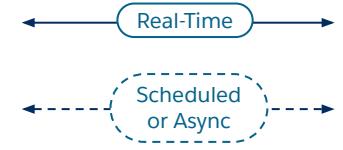
Frequency	5 mins	Hourly	12 hrs
Real-time	Real-time	10 mins	6 hrs
2 mins	2 mins	Up to 15 mins	Daily



Data Cloud

CRM Enrichment

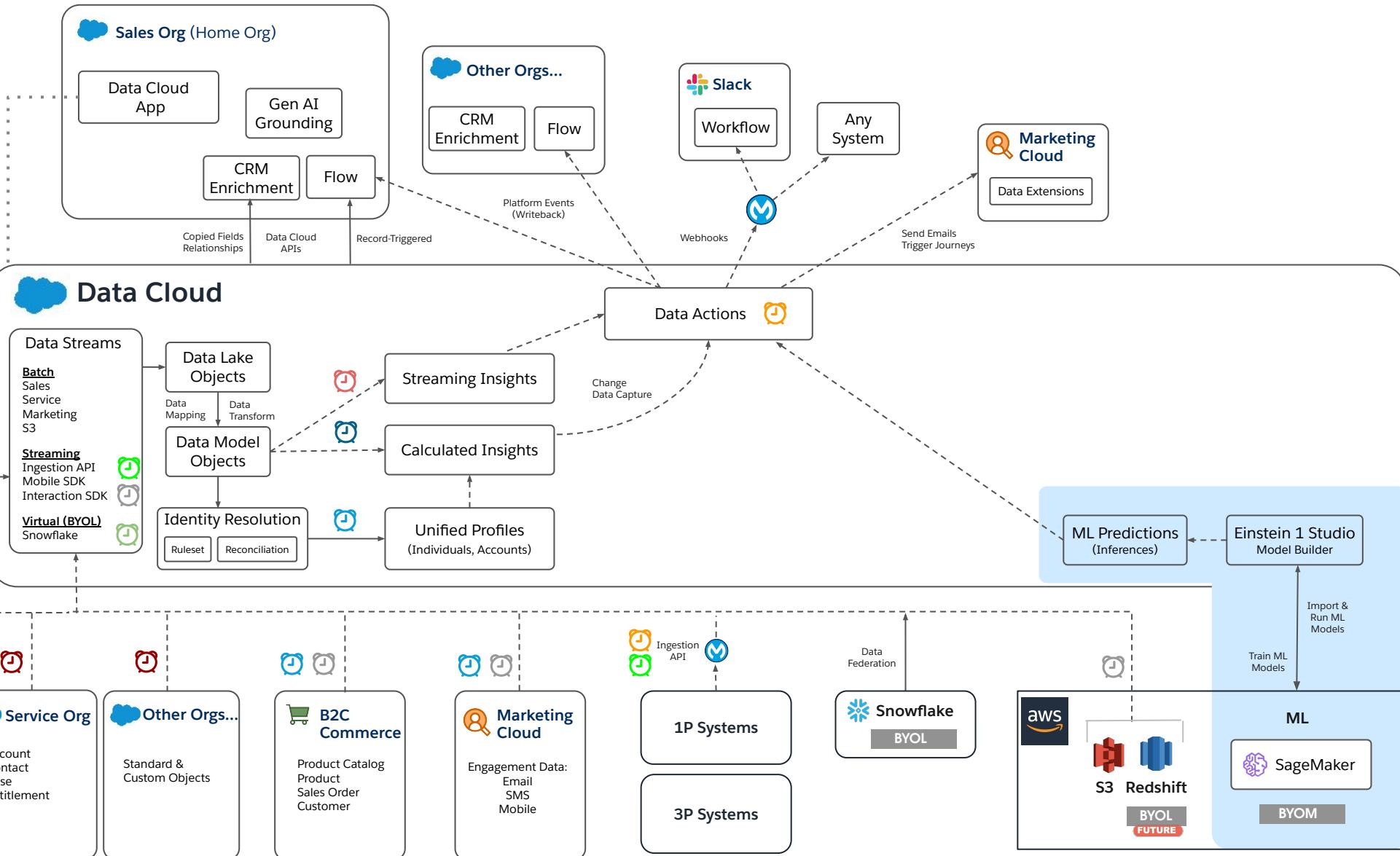
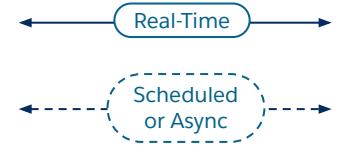
Frequency	⌚ 5 mins	⌚ Hourly	⌚ 12 hrs
⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Train and Run ML Models

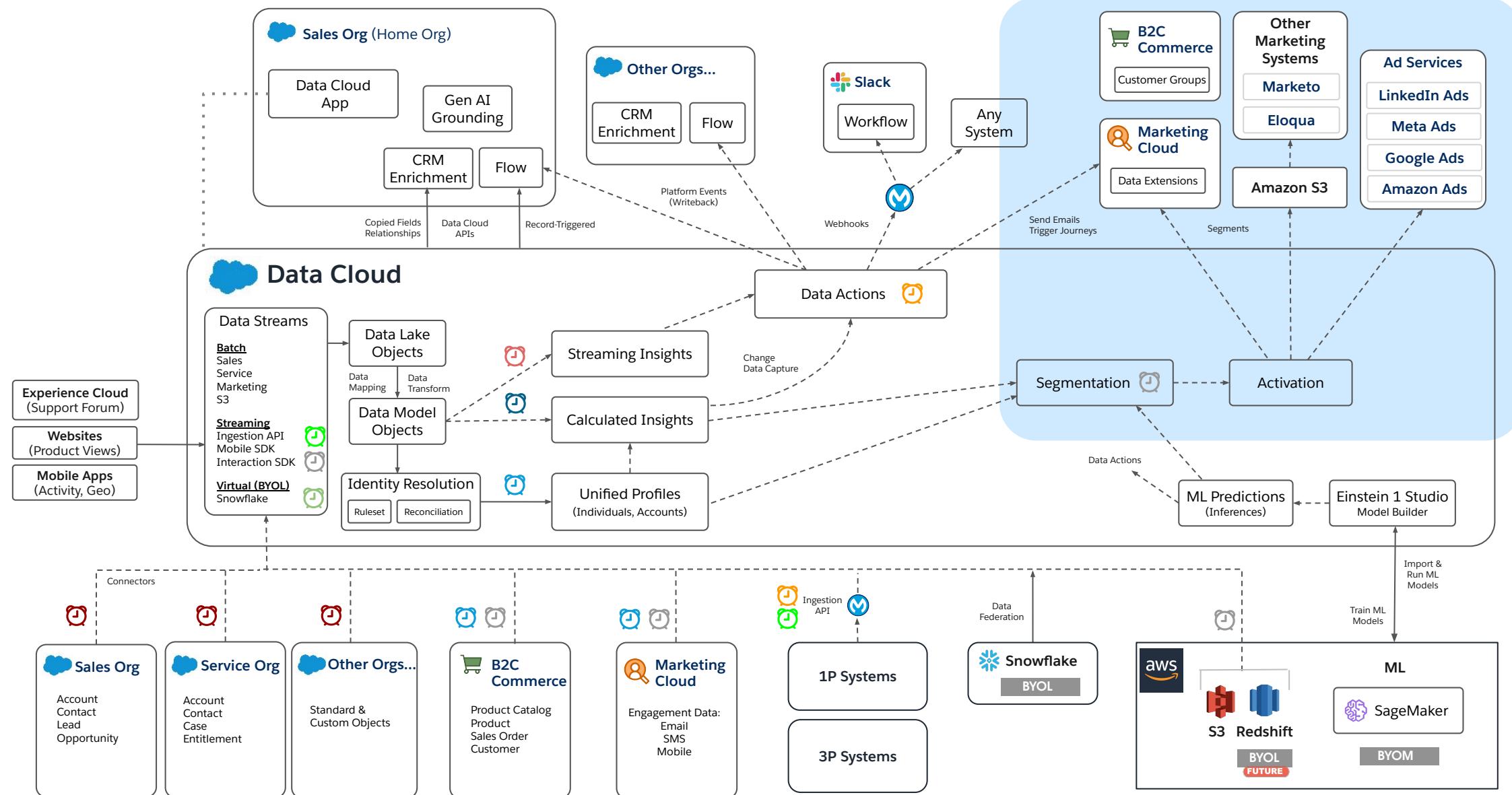
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⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		



Data Cloud

Marketing Segmentation and Activation

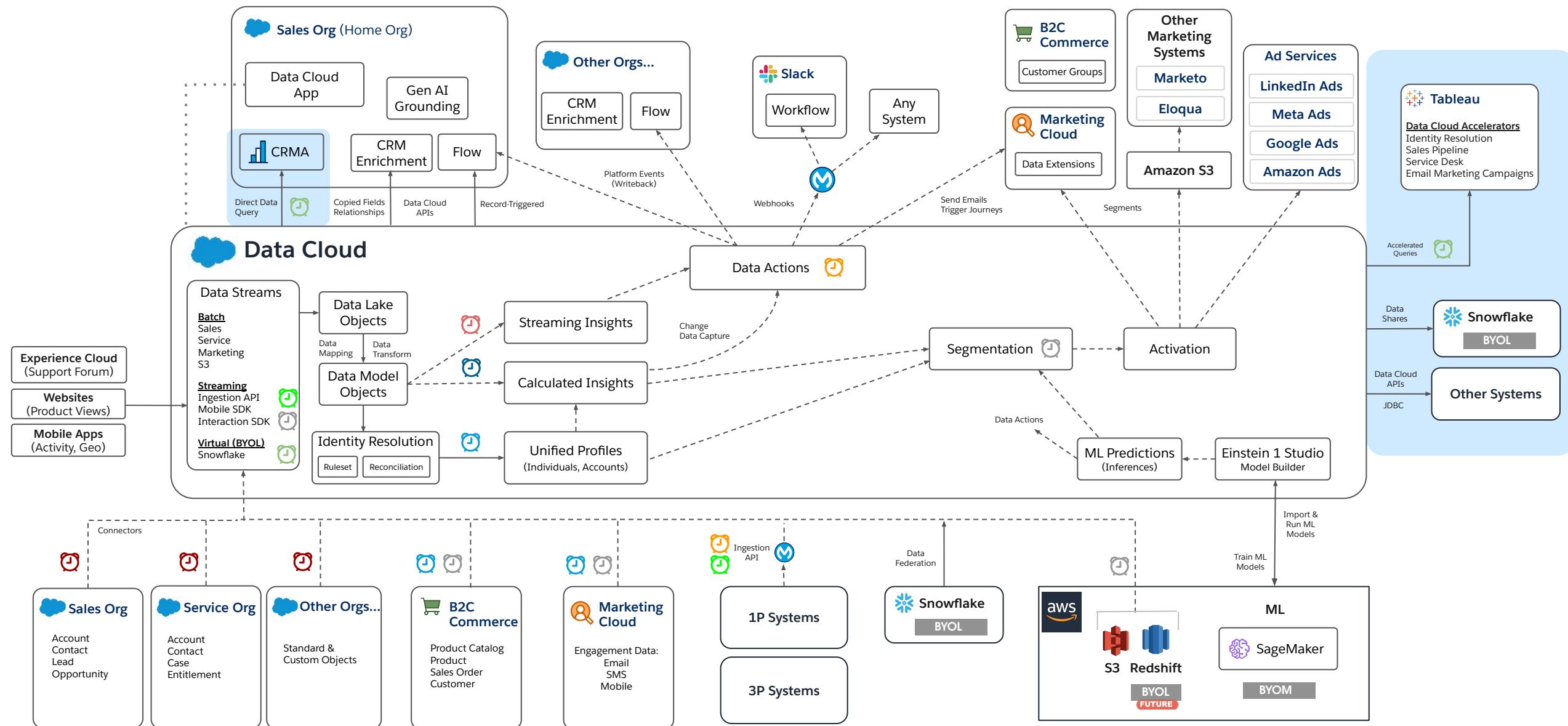
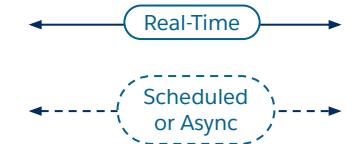
Frequency	⌚ 5 mins	⌚ Hourly	⌚ 12 hrs
⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		
			⌚ Real-Time



Data Cloud

Analytics and Data Sharing

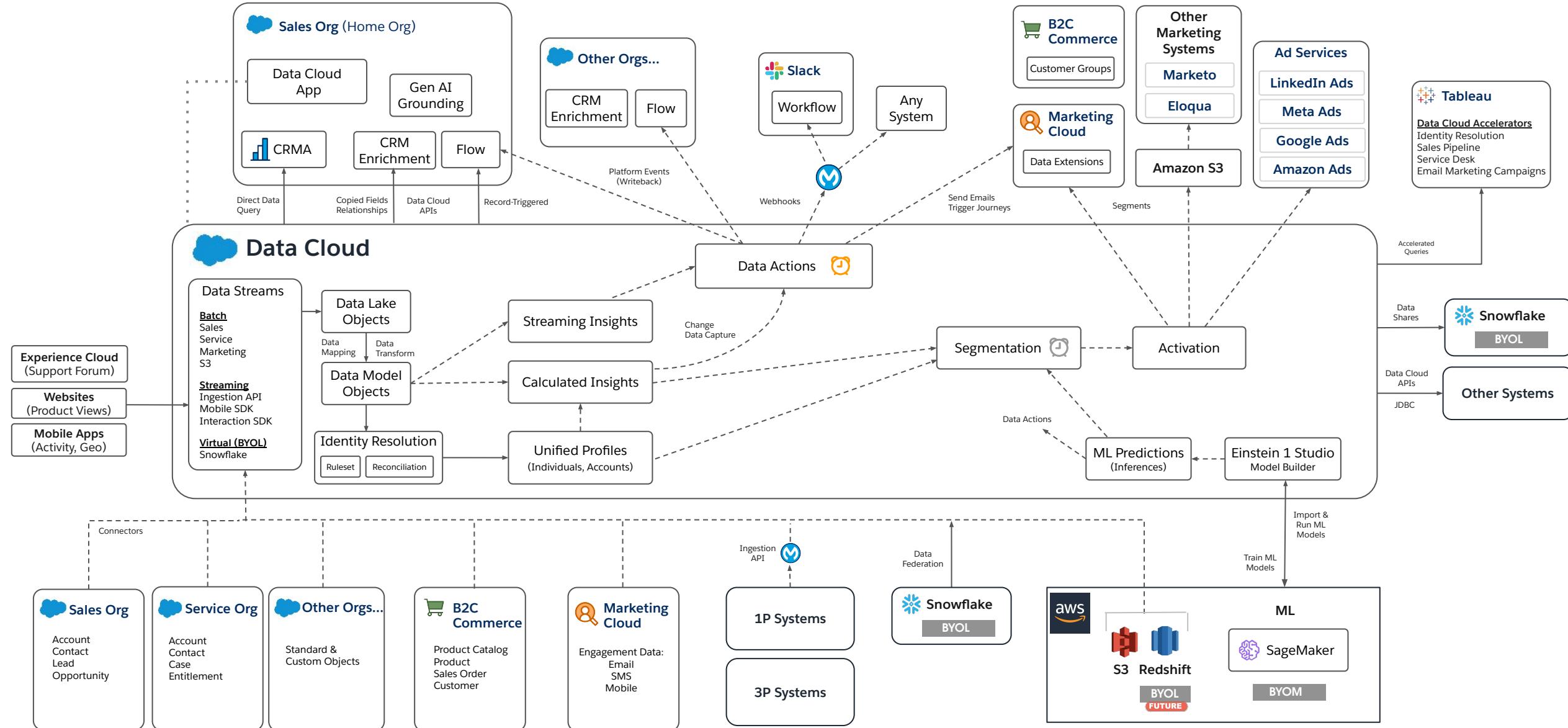
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⌚ Real-time	⌚ 10 mins	⌚ 6 hrs	⌚ Daily
⌚ 2 mins	⌚ Up to 15 mins		
			⌚ Scheduled or Async



Data Cloud

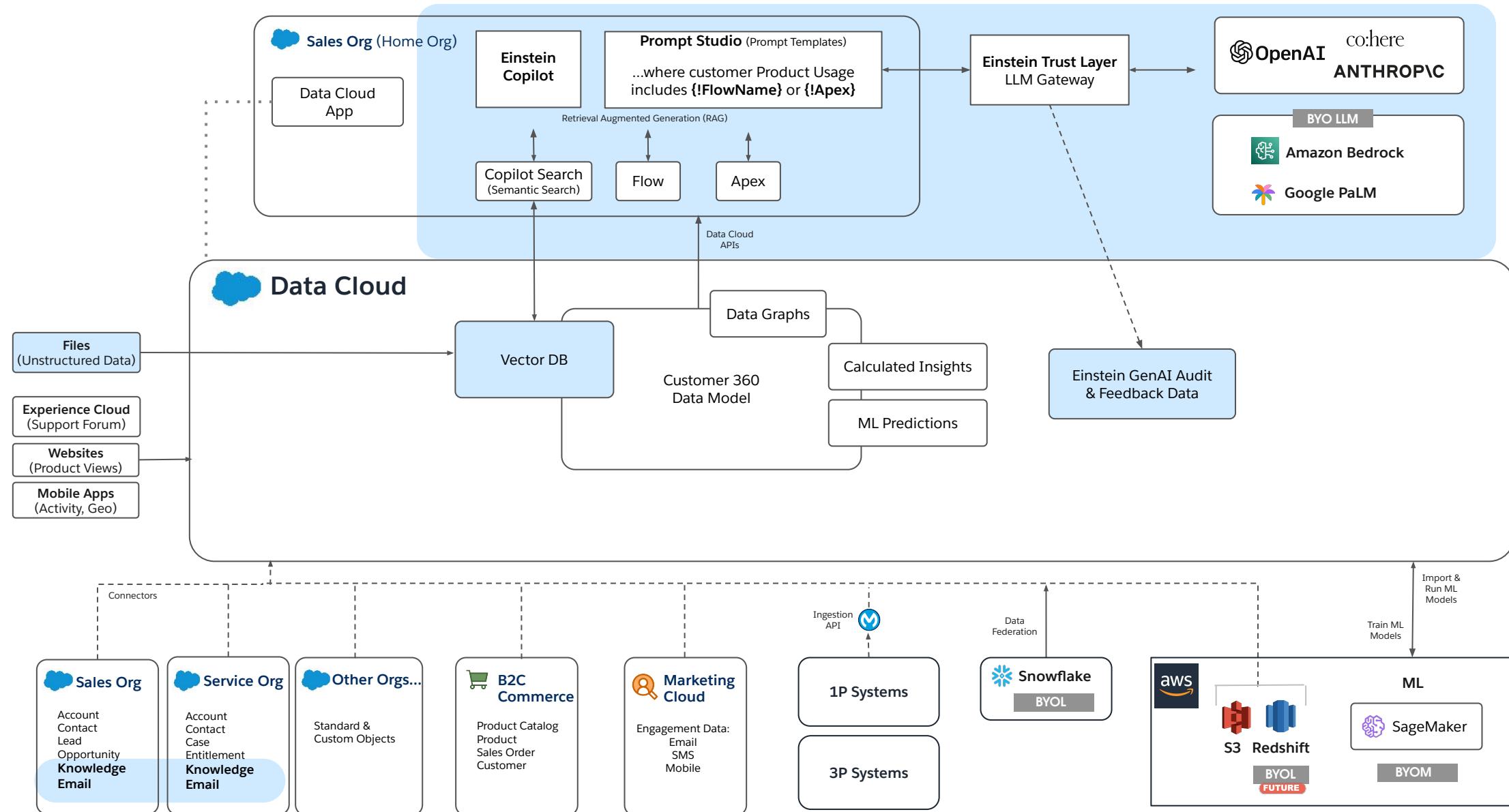


Vision for an enterprise architecture using Data Cloud + AWS + Snowflake



Data Cloud

Grounding GenAI with Data Cloud data



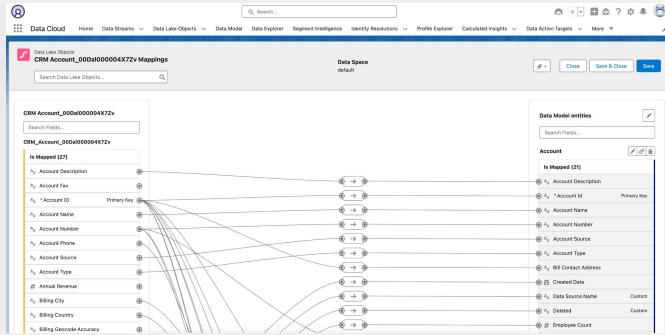
Configuring Data Cloud



Methods for configuring Data Cloud



Salesforce Admin UI



Salesforce admins use declarative and low-code tools to configure Data Cloud through the Salesforce UI.

Deploy with Metadata API

Supported Data Cloud Feature Metadata
can be retrieved and deployed
using the Salesforce Metadata API.

Deploy with Packaging

Packages			
Search by package name or id			
Count	Metadata Package ID	Versions	Subscribers
294	BofPerMan-2G	BofPerMan-2G Versions	BofPerMan-2G Subscribers
7	2GPM	2GPM Versions	2GPM Subscribers
1	Old 2GPM	Old 2GPM Versions	Old 2GPM Subscribers

Org Type			
Select an Option			
Count	Metadata Package ID	Subscriber Org Status (Active or Inactive)	Subscriber Org Type (Production or Sandbox)
212	BofPerMan-2G	Demo	Sandbox
48	BofPerMan-2G	Active	Production
33	BofPerMan-2G	Free	Production
5	2GPM	Free	Production
1	2GPM	Trial	Production
1	BofPerMan-2G	Trial	Production
1	Old 2GPM	Free	Production
1	2GPM	Trial	Sandbox

Supported Data Cloud Features
can be deployed using
Salesforce Packaging.

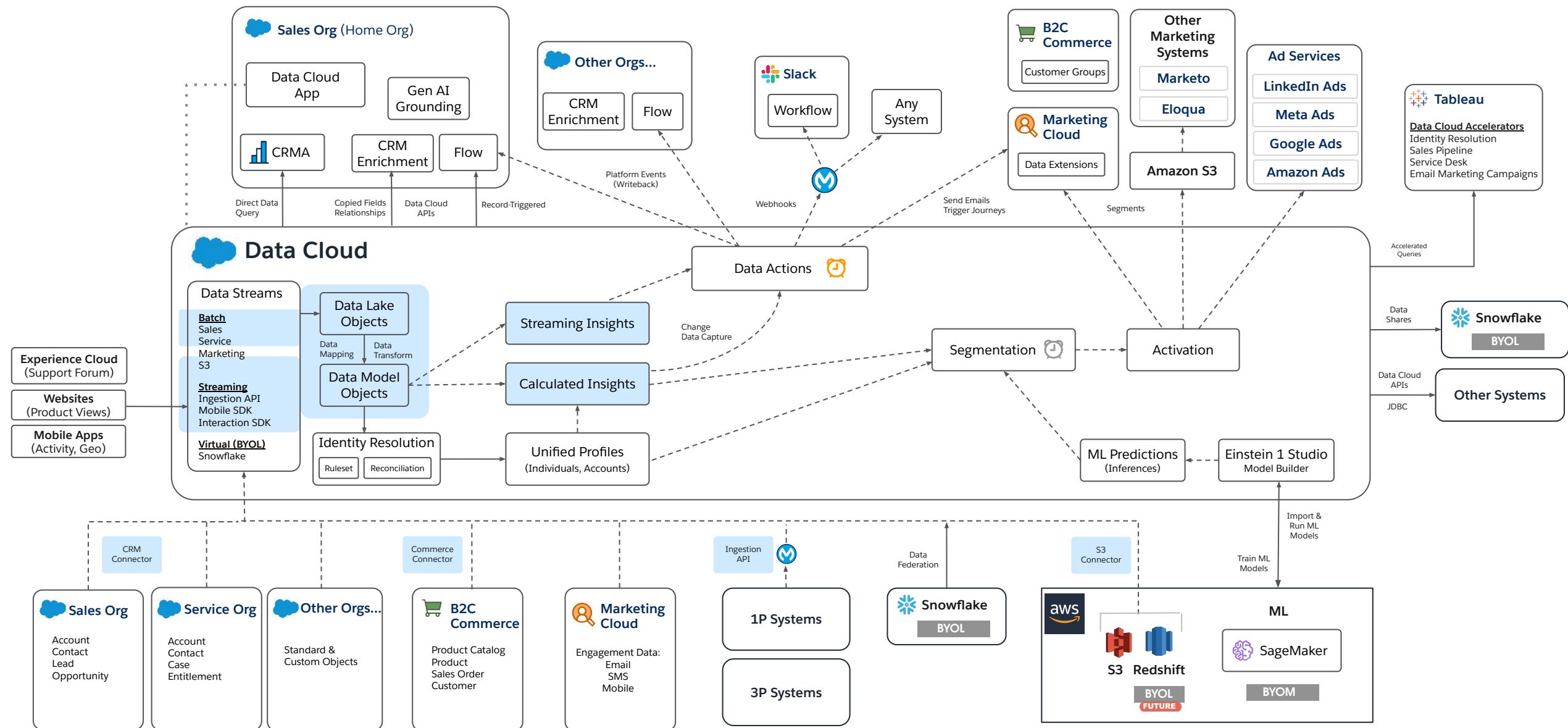
Data Cloud - Data Kits

Data Cloud components that can be packaged into Data Kits

Resources

Data Cloud Developer Guide: [Packages and Data Kits](#)

Data Cloud Reference Guide: [Data Cloud Extensibility Readiness Matrix](#)



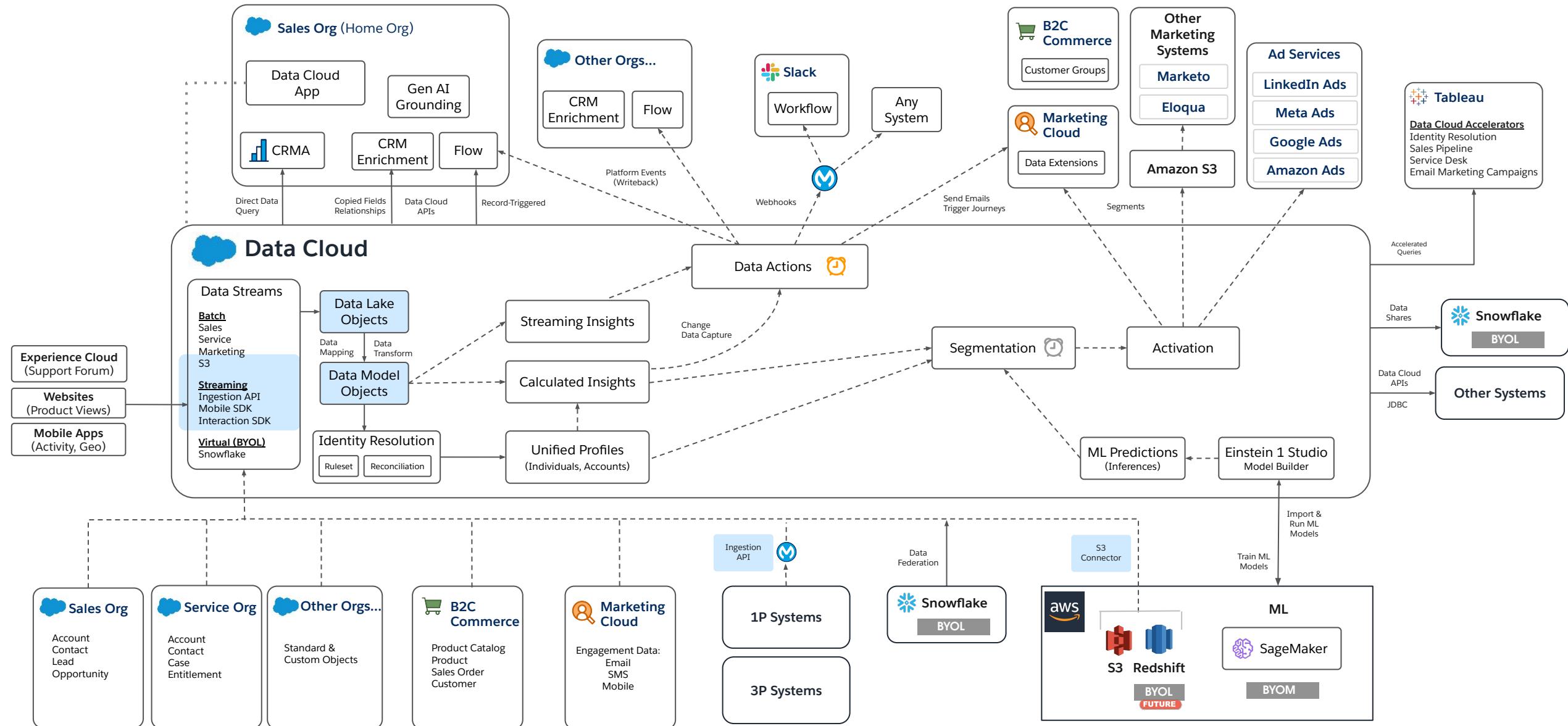
Data Cloud - Metadata API

Data Cloud components that can be deployed using the Metadata API

Resources

Data Cloud Developer Guide: [Metadata API](#)

Salesforce Help: [Using the Metadata API in Data Cloud](#)

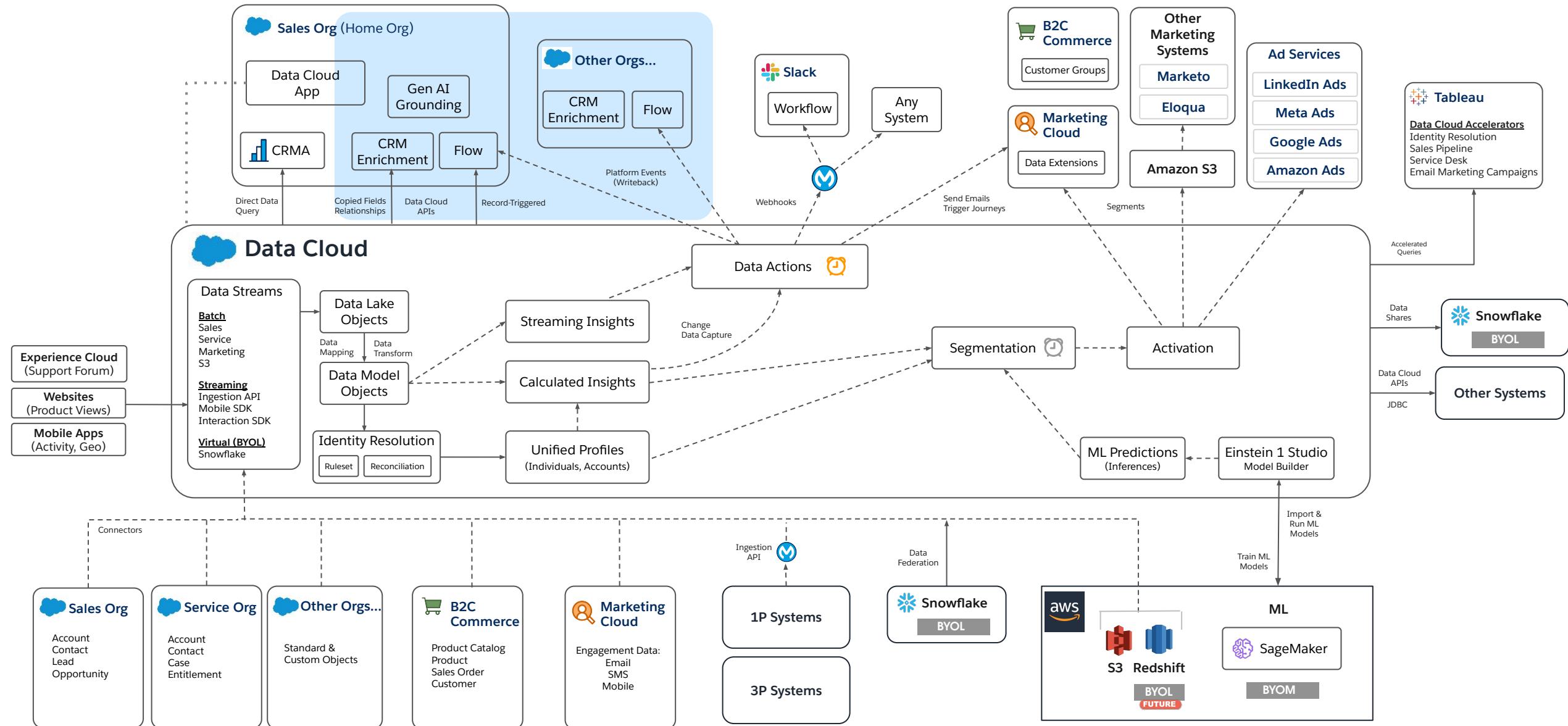


Data Cloud - CRM Enrichment Components

Data Cloud CRM Enrichment components can be packaged the same as any other Salesforce metadata

Resources

- [Data Cloud Enrichments \(video\)](#)
- [Enrich Your Org with 360 Data and Insights](#)



Data Cloud DevOps Pipeline



Options for Data Cloud development environments



Today

Purchase another Production Org

This will be a new independent production Salesforce Org and Data Cloud tenant that is designated as a development environment.

This is not a Salesforce Sandbox.

Implementations are not transferred or connected.

Beta
Summer '24

Data Cloud in Sandbox

Full featured Data Cloud provisioned in the same Salesforce Sandbox Org with all Data Cloud config & metadata, but no data.

System connections must be reconfigured/re-authenticated to ingest data.

Supports ALM & Change Deployment with DevOps Center



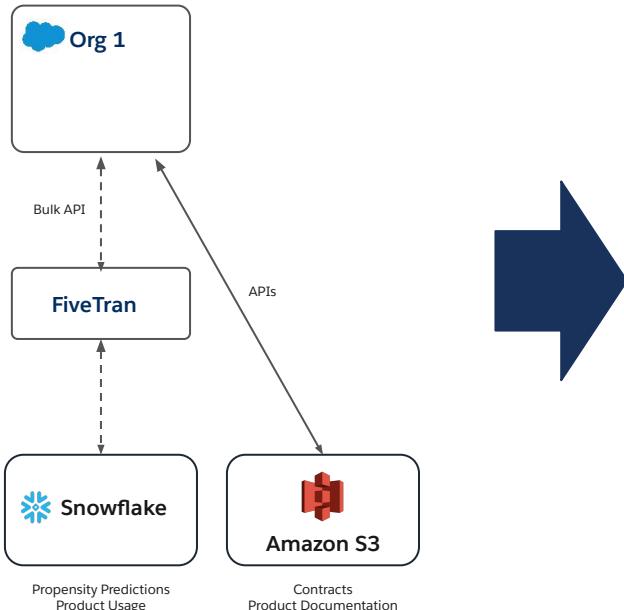
Data Cloud - Example

Example Transformation to Data Cloud

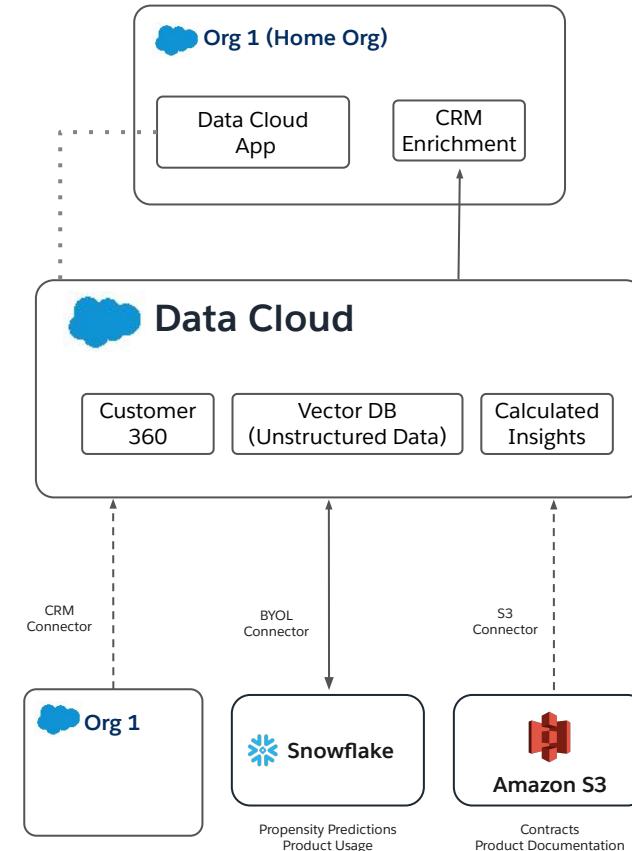


One Salesforce Org

Current



Future (with Data Cloud)



Challenges / Considerations

- API Limits
- Storage Limits
- Governor Limits
- No intelligence on unstructured data
- Dev across multiple tech stacks
- Limited identity resolution (dedupe is hard)
- Limited eventing from external sources
- Stale data (based on ETL jobs)
- Point-to-Point integrations between each system
- Overhead of managing data replication jobs
- Separate security, governance and policies management on each system outside of Salesforce Trust boundary

Benefits

- Hyper Scale Data Platform
- High volume data ingestion and processing
- No Storage Limit (consumption-pricing)
- Few API Limits (consumption-pricing)
- Salesforce low-code configuration tools
- Identity Resolution (B2B and B2C profiles)
- Action on data events
- More accurate, fresh data
- Index unstructured content for Semantic Search
- Bring Your Own Lake (zero-copy)
- Future proof architecture for incorporating new data sources and data actions in Salesforce orgs and other target systems
- Salesforce Trust boundary simplifies data security, governance and policy management

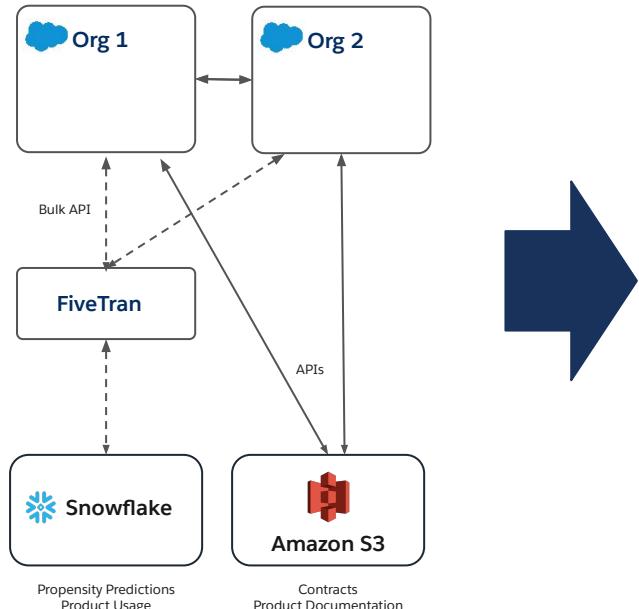
Data Cloud - Example

Example Transformation to Data Cloud

Multiple Salesforce Orgs



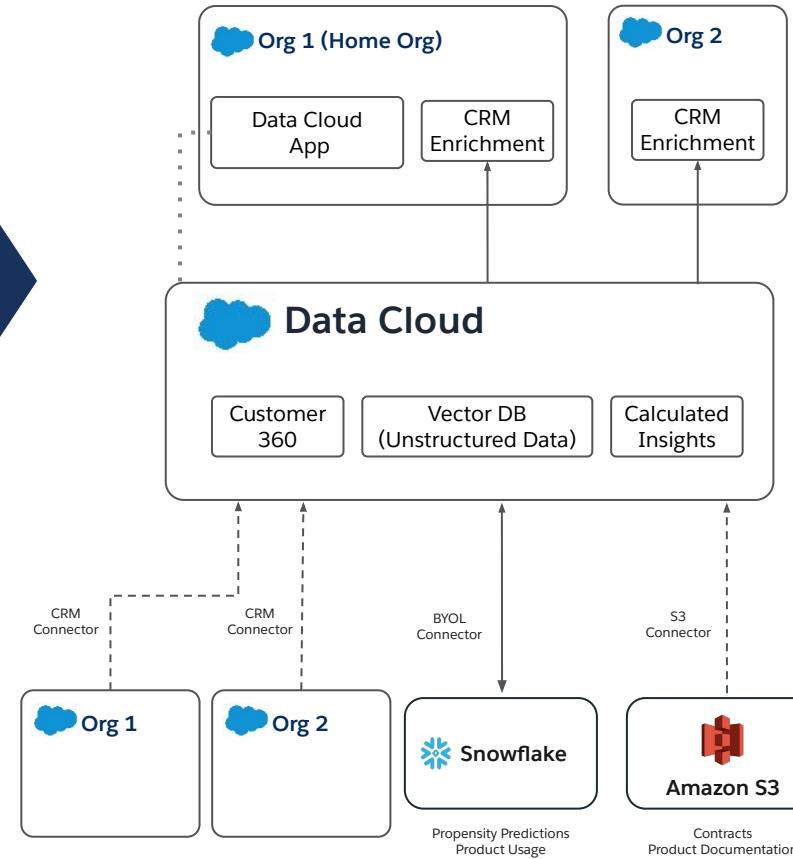
Current



Challenges / Considerations

- API Limits
- Storage Limits
- Governor Limits
- No intelligence on unstructured data
- Dev across multiple tech stacks
- Limited identity resolution (dedupe is hard)
- Limited eventing from external sources
- Stale data (based on ETL jobs)
- Point-to-Point integrations between each system and orchestration between Salesforce Orgs
- Duplicate integration effort for each Salesforce Org
- Overhead of managing data replication jobs
- Separate security, governance and policies management on each system outside of Salesforce Trust boundary
- Licensing requirements on each connected Org if users need to see/share data

Future (with Data Cloud)



Benefits

- Hyper Scale Data Platform
- High volume data ingestion and processing
- No Storage Limit (consumption-pricing)
- Few API Limits (consumption-pricing)
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- Future proof architecture for incorporating new data sources and Salesforce orgs
- Future proof architecture for incorporating new data sources and data actions in Salesforce orgs and other target systems
- Salesforce Trust boundary simplifies data security, governance and policy management
- Less dependency on replicating licenses across all Orgs
- Structured and unstructured data can be combined to feed AI directly with less code to manage

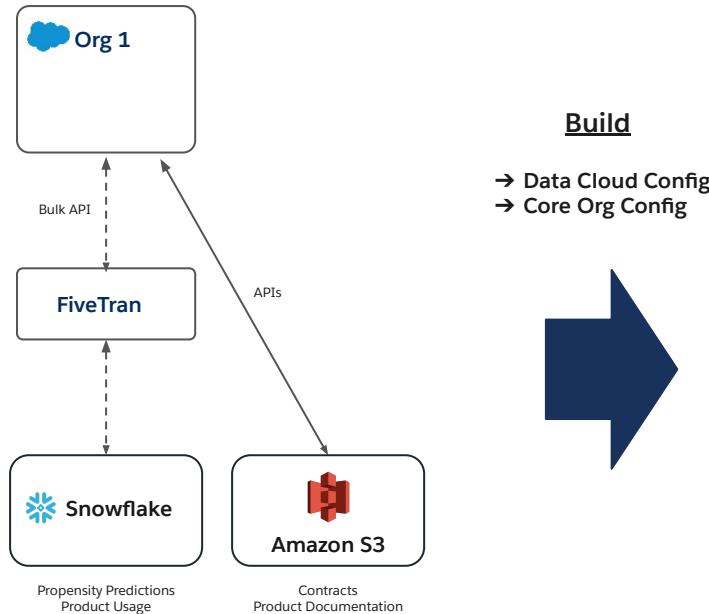
Data Cloud - Dev Pipeline

Data Cloud DevOps Pipeline (Spring '24)

One Salesforce Org



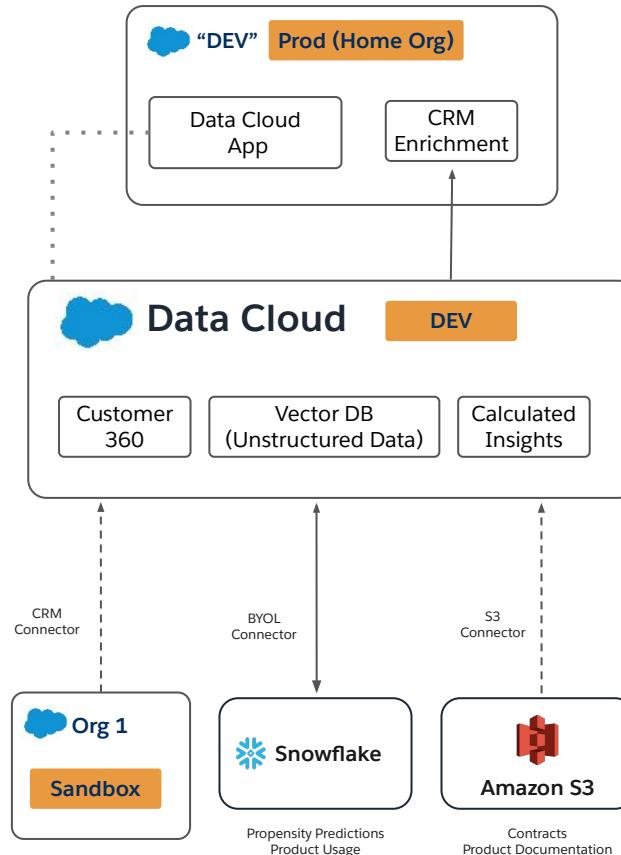
Current



Build

- Data Cloud Config
- Core Org Config

Data Cloud “DEV”



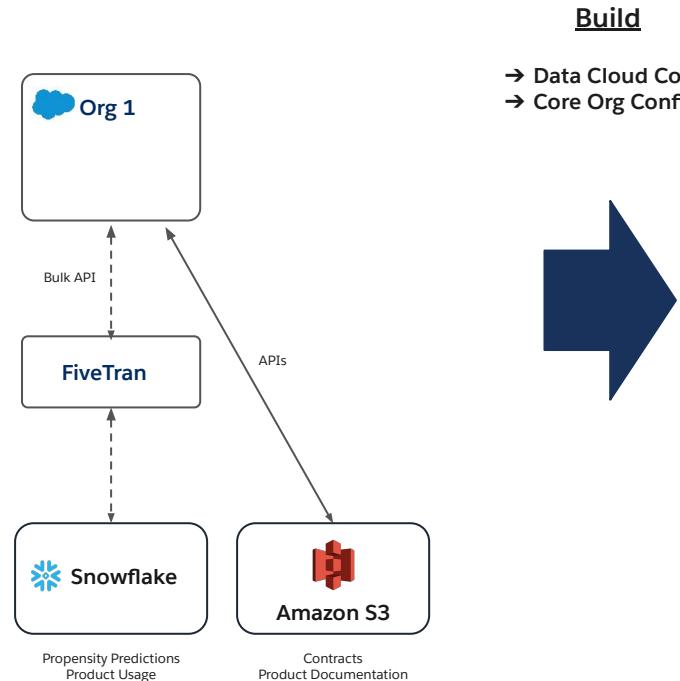
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Data Cloud DevOps Pipeline (Spring '24)

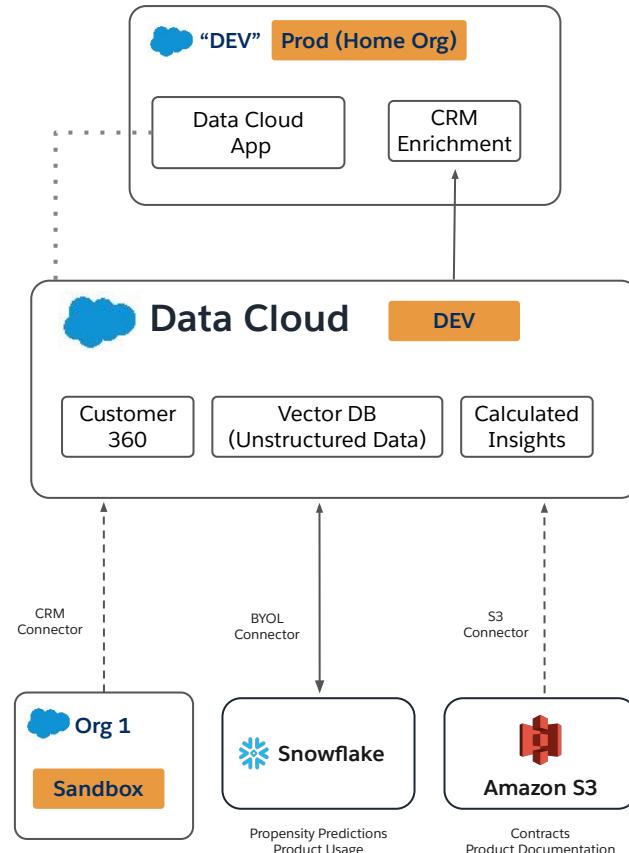
One Salesforce Org



Current



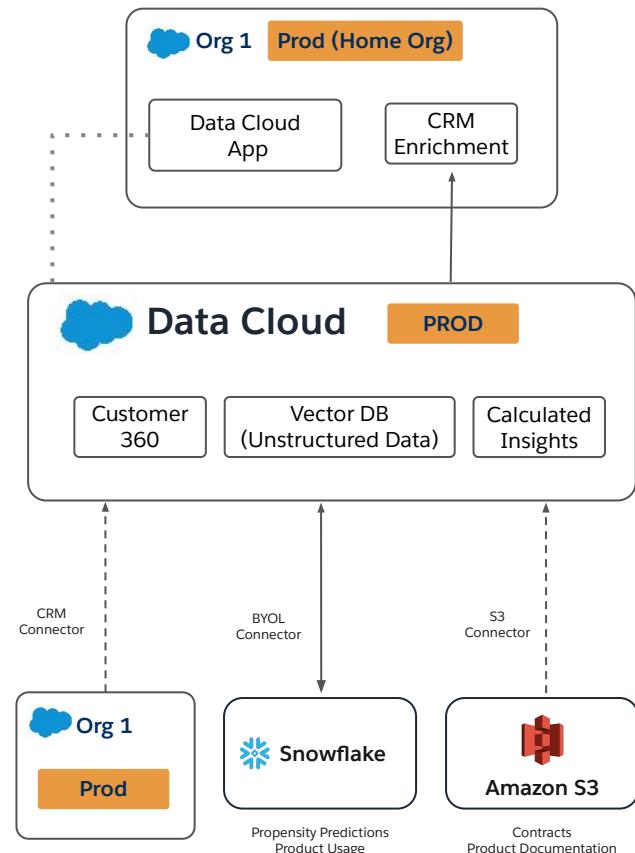
Data Cloud “DEV”



Deploy

- Core Org Config**
- CRM Enrichment (Flows, Lightning Pages, → Copy Fields, Related Lists)
 - Gen AI grounding (Einstein CoPilot Actions, Prompt Templates)
 - Data Cloud permissions
- Depends On
- Data Cloud Config**
- Packages (Data Kits)
 - Metadata API
 - Manual Configuration

Data Cloud “PROD”



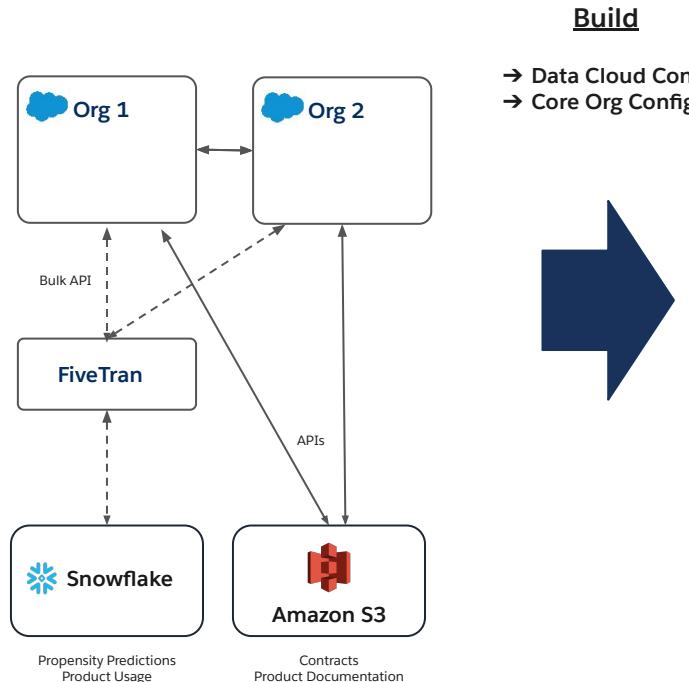
Data Cloud - Dev Pipeline

Data Cloud DevOps Pipeline (Spring '24)

Multiple Salesforce Orgs



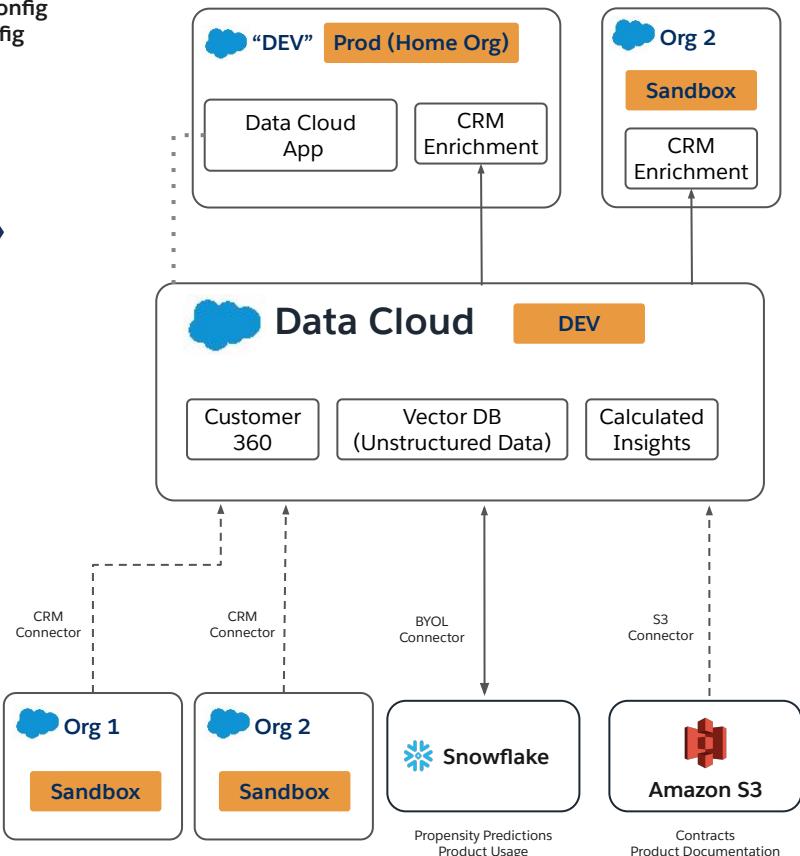
Current



Build

- Data Cloud Config
- Core Org Config

Data Cloud “DEV”



Deploy

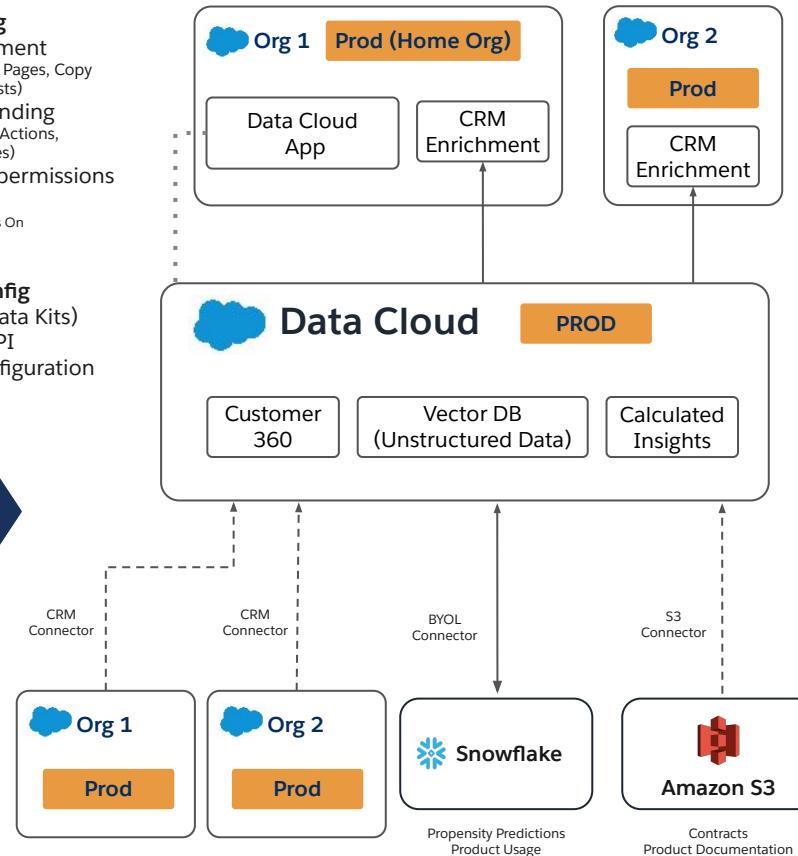
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- Data Cloud permissions

Data Cloud Config

- Packages (Data Kits)
- Metadata API
- Manual Configuration

Data Cloud “PROD”



Data Cloud - Sandboxes

Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

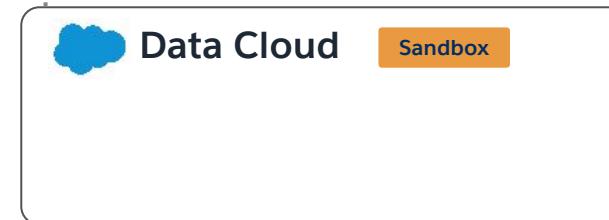
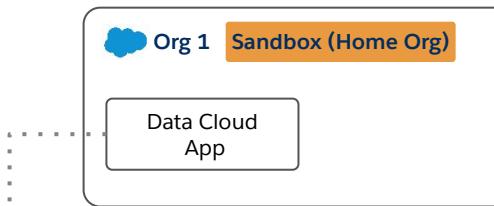
beta

Single Org, First Data Cloud Implementation

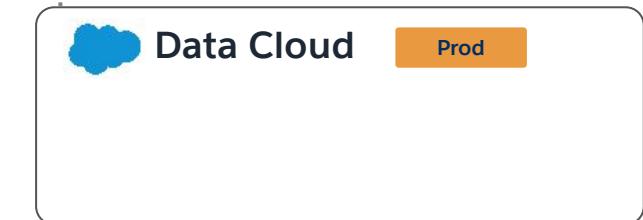


1 [Create Sandbox](#)

Data Cloud “DEV”



Data Cloud “PROD”



Data Cloud - Sandboxes

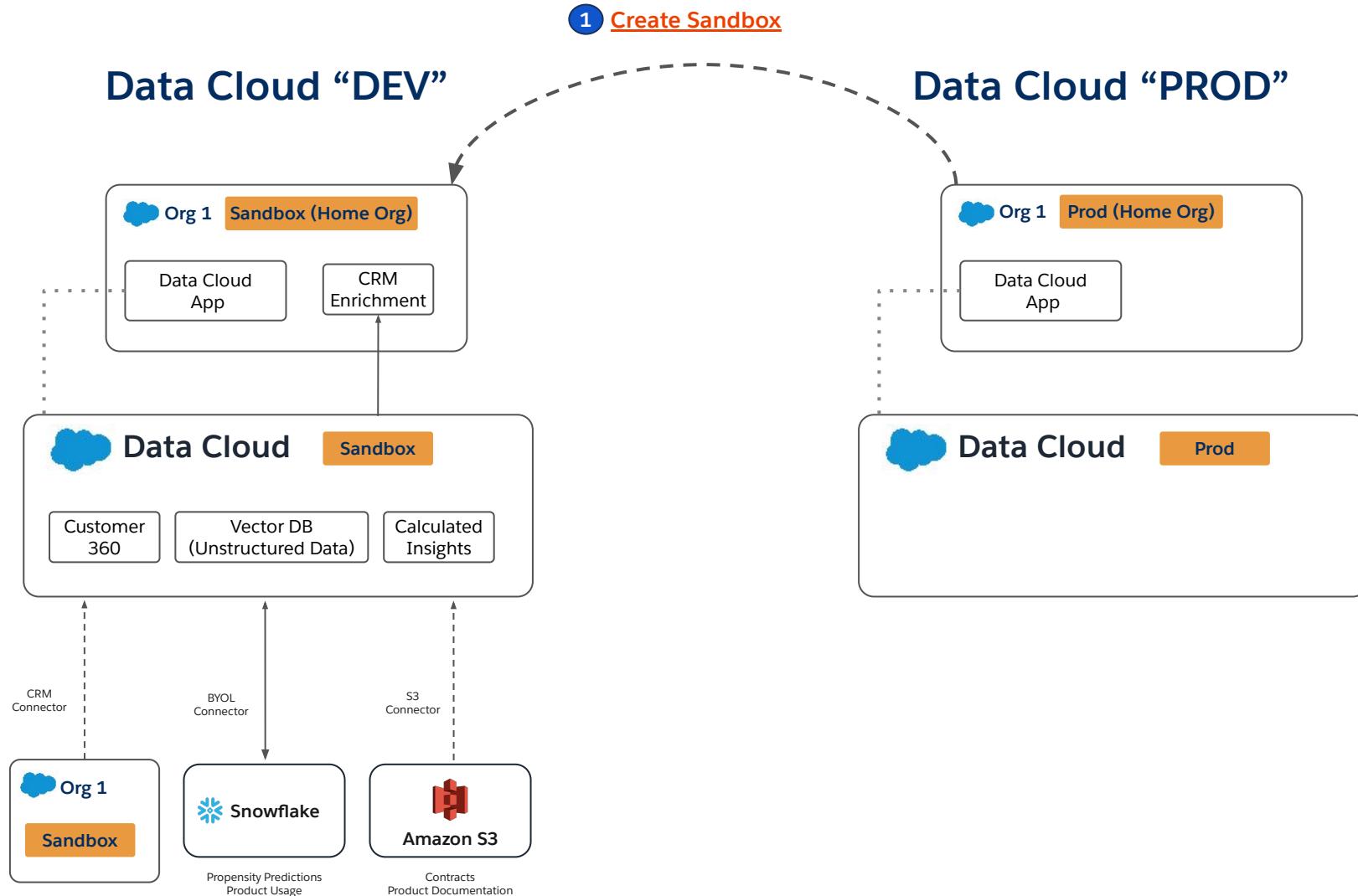
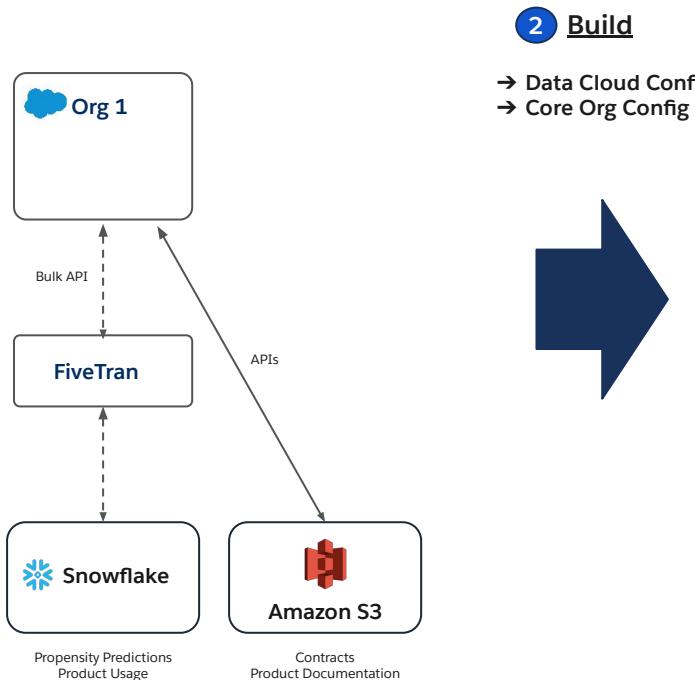
Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

beta

Single Org, First Data Cloud Implementation



Current



Data Cloud - Sandboxes

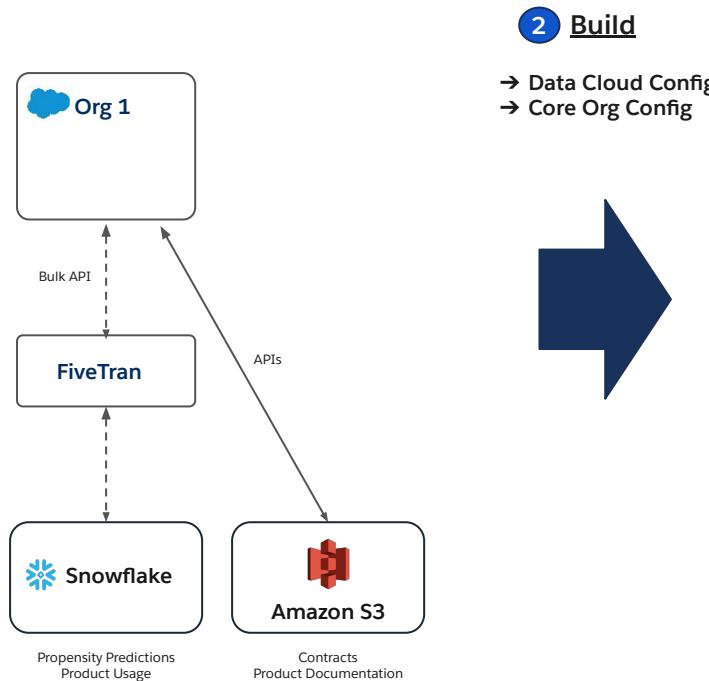
Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

beta

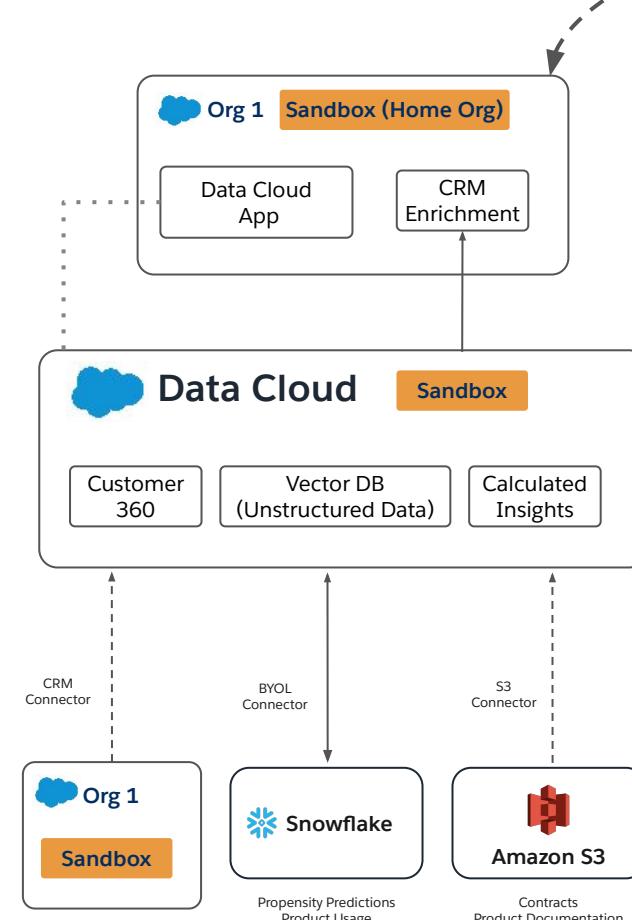
Single Org, First Data Cloud Implementation



Current



Data Cloud “DEV”

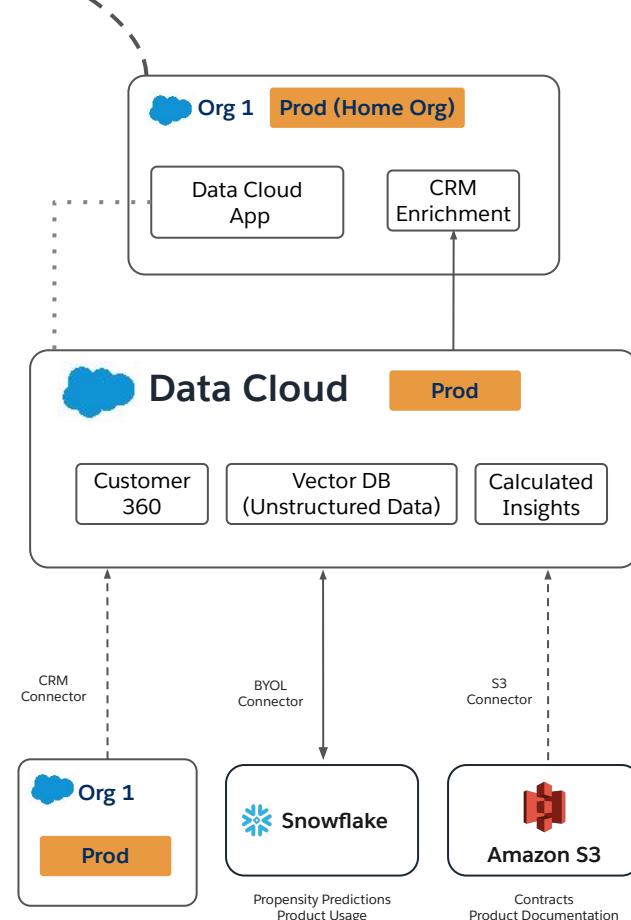


1 Create Sandbox

3 Deploy

- Core Org Config**
- CRM Enrichment (Apex, Flows, Lightning Pages, Copy Fields, Related Lists)
 - Gen AI grounding (Einstein CoPilot Actions, Prompt Templates)
 - Data Cloud permissions
- Depends On
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Data Cloud “PROD”



Data Cloud - Sandboxes

Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

beta

Single Org, Existing Data Cloud Implementation

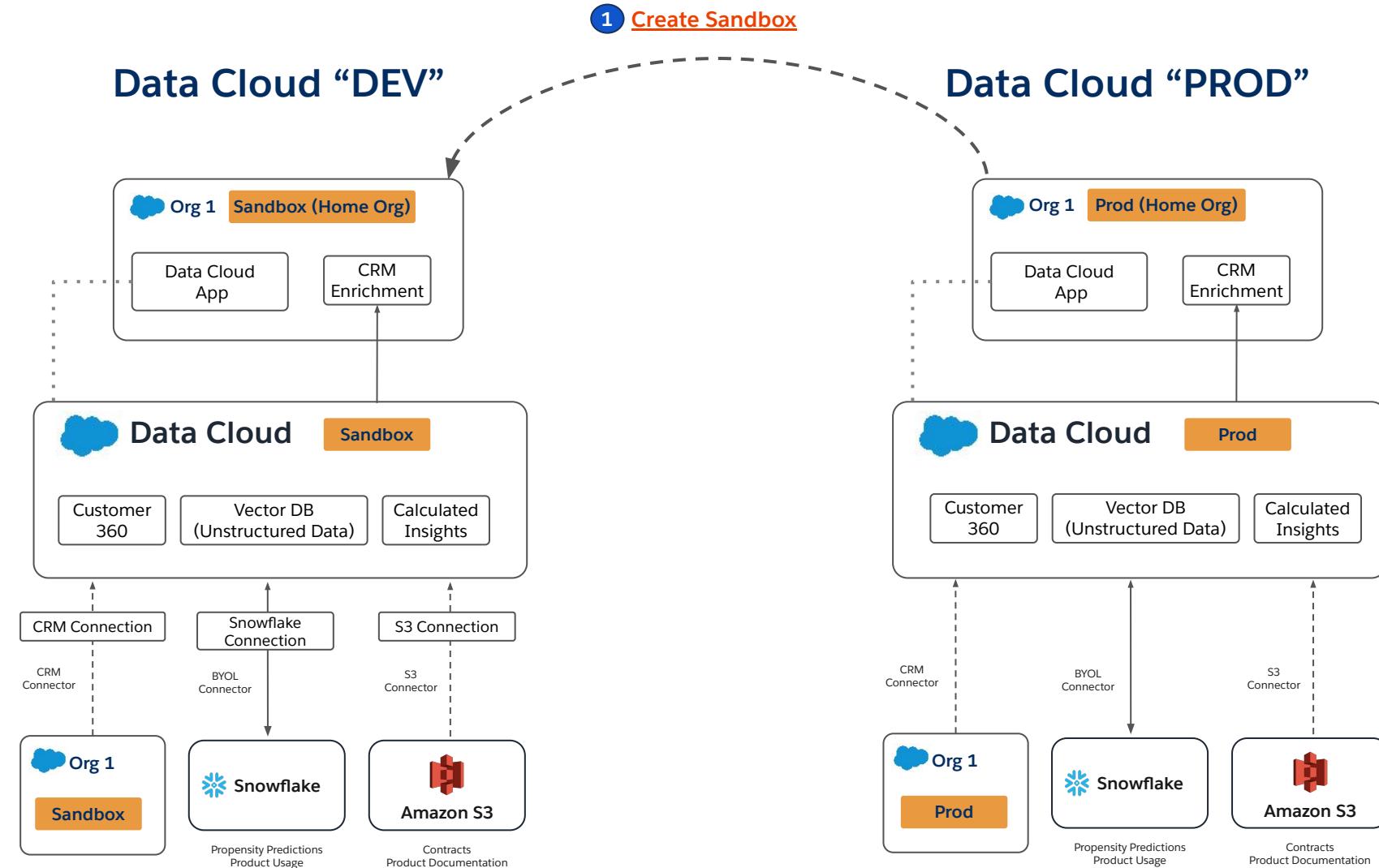


2 Salesforce Sandbox Org created

- all sandbox types supported
(Dev, Dev Pro, Partial Copy, Full Copy)

3 Data Cloud Sandbox instance created

- all sandbox types supported
(Dev, Dev Pro, Partial Copy, Full Copy)
- all configurations (metadata) replicated,
except system connections (authentications)
- no Data Cloud data is replicated from Prod



Data Cloud - Sandboxes

Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

beta

Single Org, Existing Data Cloud Implementation



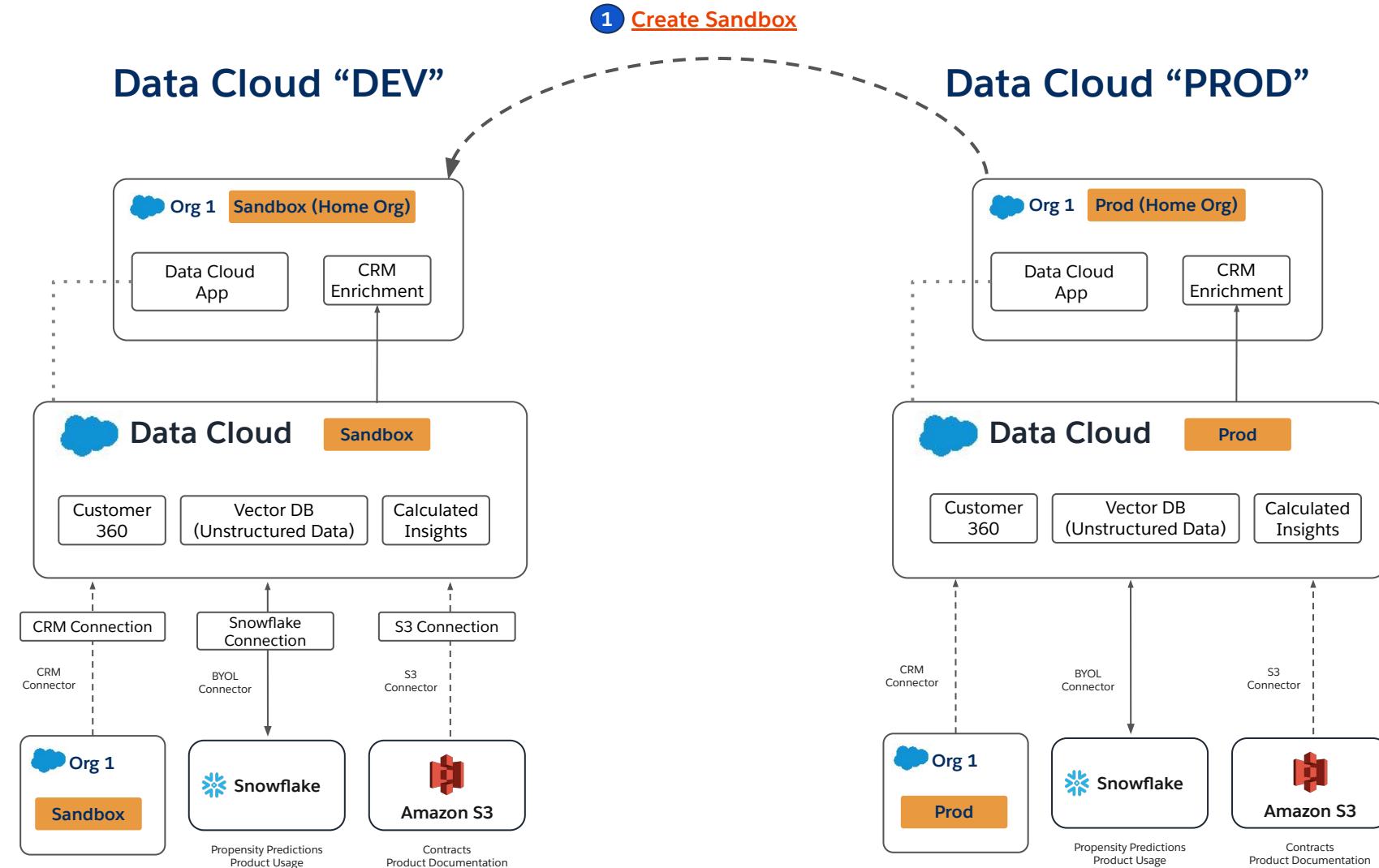
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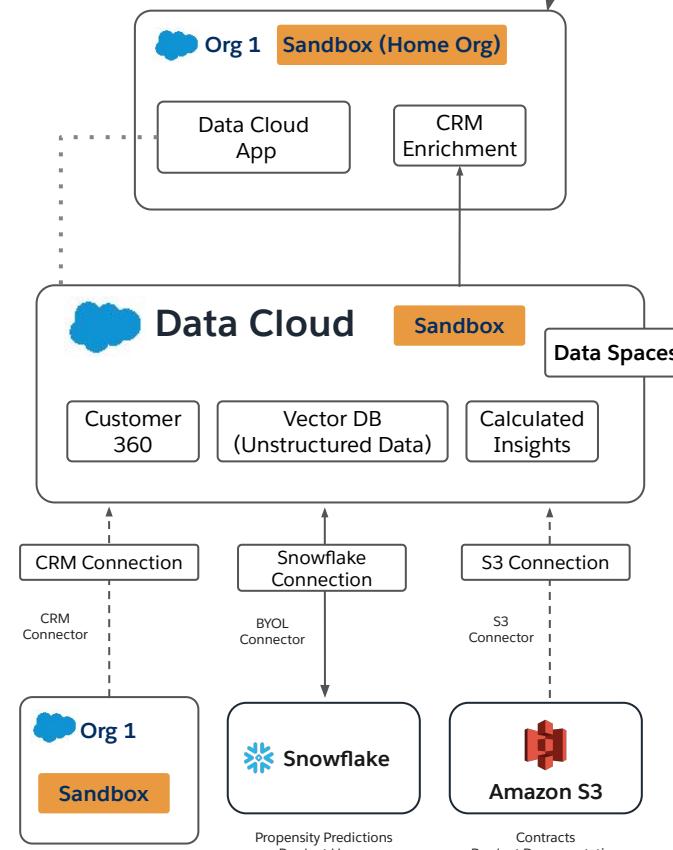
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5 Build

- Data Cloud Config
- Core Org Config

1 Create Sandbox

Data Cloud "DEV"

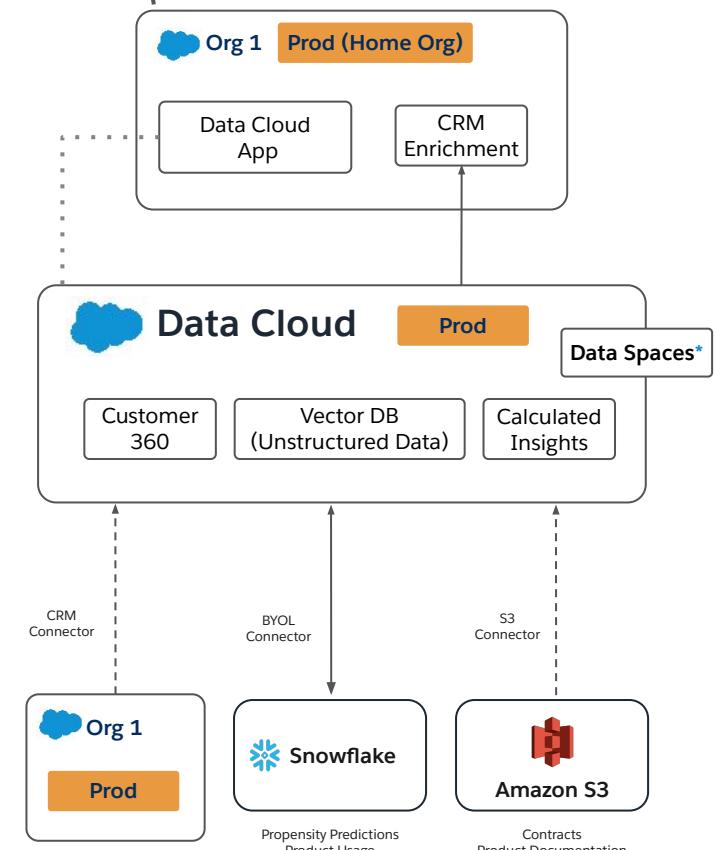


6 Deploy

- Core Org Config
 - CRM Enrichment
(Apex, Flows, Lightning Pages, Copy Fields, Related Lists)
 - Gen AI grounding
(Einstein CoPilot Actions, Prompt Templates)
 - Data Cloud permissions

- Depends On
- Data Cloud Config
 - **DevOps Center support**
 - Packages (Data Kits)
 - Metadata API
 - Manual Configuration

Data Cloud "PROD"



*Data Spaces have to be configured in Prod before deploying the data model that relies on them into Prod

Data Cloud - Sandboxes

Data Cloud DevOps Pipeline (Summer '24) w/ Data Cloud Sandboxes

beta

Multiple Orgs, Existing Data Cloud Implementation



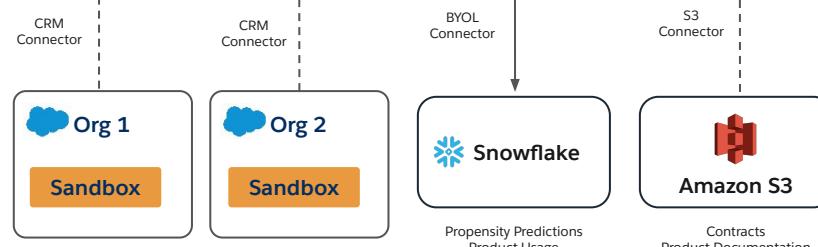
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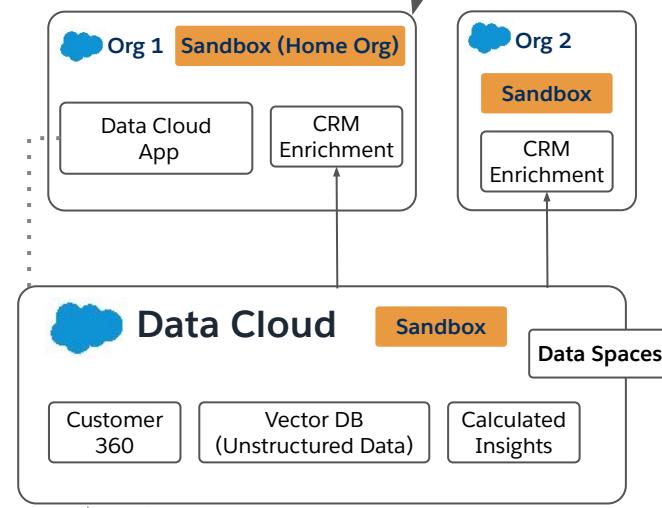


5 Build

- Data Cloud Config
- Core Org Config

1 Create Sandbox

Data Cloud "DEV"

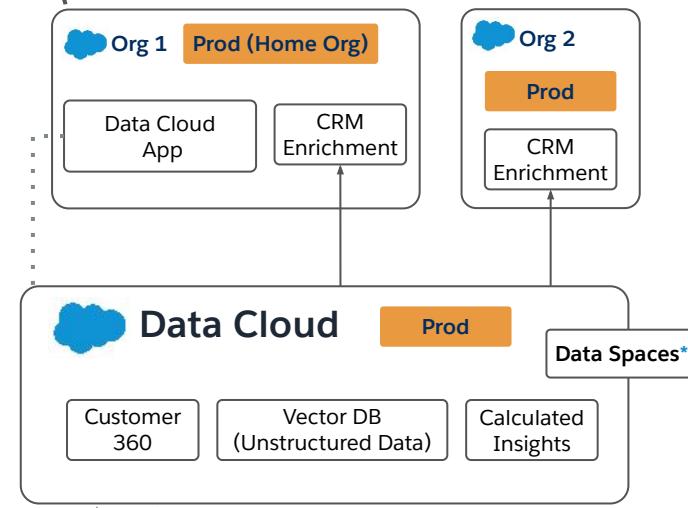


Deploy

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Data Cloud "PROD"



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Data Cloud Resources



Data Cloud Resources



Data Cloud

- [Discover Data Cloud Demo \(1 min\)](#)
- [Demo by Data Cloud product lead \(MK\)](#)
- [Einstein 1 Platform Demo video \(MK\)](#)
- [Data Cloud \(product page\)](#)
- [Data Cloud documentation](#)
- [Data Cloud Video Library & Trailhead Modules](#)
- [Data Cloud Technical Capabilities Explained](#)
- [Bring All Your Customer Data Together in Data Cloud](#)
- [How Data Cloud Works](#)

Data Cloud Development

- [Data Cloud Developer Guide
 - \[Get Started with Data Cloud Development\]\(#\)
 - \[Packages and Data Kits\]\(#\)
 - \[Metadata API\]\(#\)](#)
- [Data Cloud Reference Guide
 - \[Data Cloud Extensibility Readiness Matrix\]\(#\)](#)
- [Salesforce Help
 - \[Using the Metadata API in Data Cloud\]\(#\)](#)
- [Data Cloud Enrichments \(video\)
Enrich Your Org with 360 Data and Insights](#)
- [Mastering Second Generation Packaging in Data Cloud:
A Comprehensive Guide \(Jitin Mehndiratta, 3/6/2024\)](#)



Thank you!

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Options for Data Cloud development environments



Today

Purchase another Production Org

This will be a new independent production Salesforce Org and Data Cloud tenant that is designated as a development environment.

This is not a Salesforce Sandbox.

Implementations are not transferred or connected.

Available Only To
AppExchange
Partners

Data Cloud Scratch Org

Scratch Orgs, ephemeral dev orgs with a max lifespan of 30 days, can be created from a Production Data Cloud org using Dev Hub and Org Shapes.

Using scratch orgs, you can package Data Cloud metadata into Data Kits using Second Generation Packaging (2GP) to be deployed into other Data Cloud orgs.

Beta
Summer '24

Data Cloud in Sandbox

Full featured Data Cloud provisioned in the same Salesforce Sandbox Org with all Data Cloud config & metadata, but no data.

System connections must be reconfigured/re-authenticated to ingest data.

Supports ALM & Change Deployment with DevOps Center

