Road to Chiplets: Data & Test
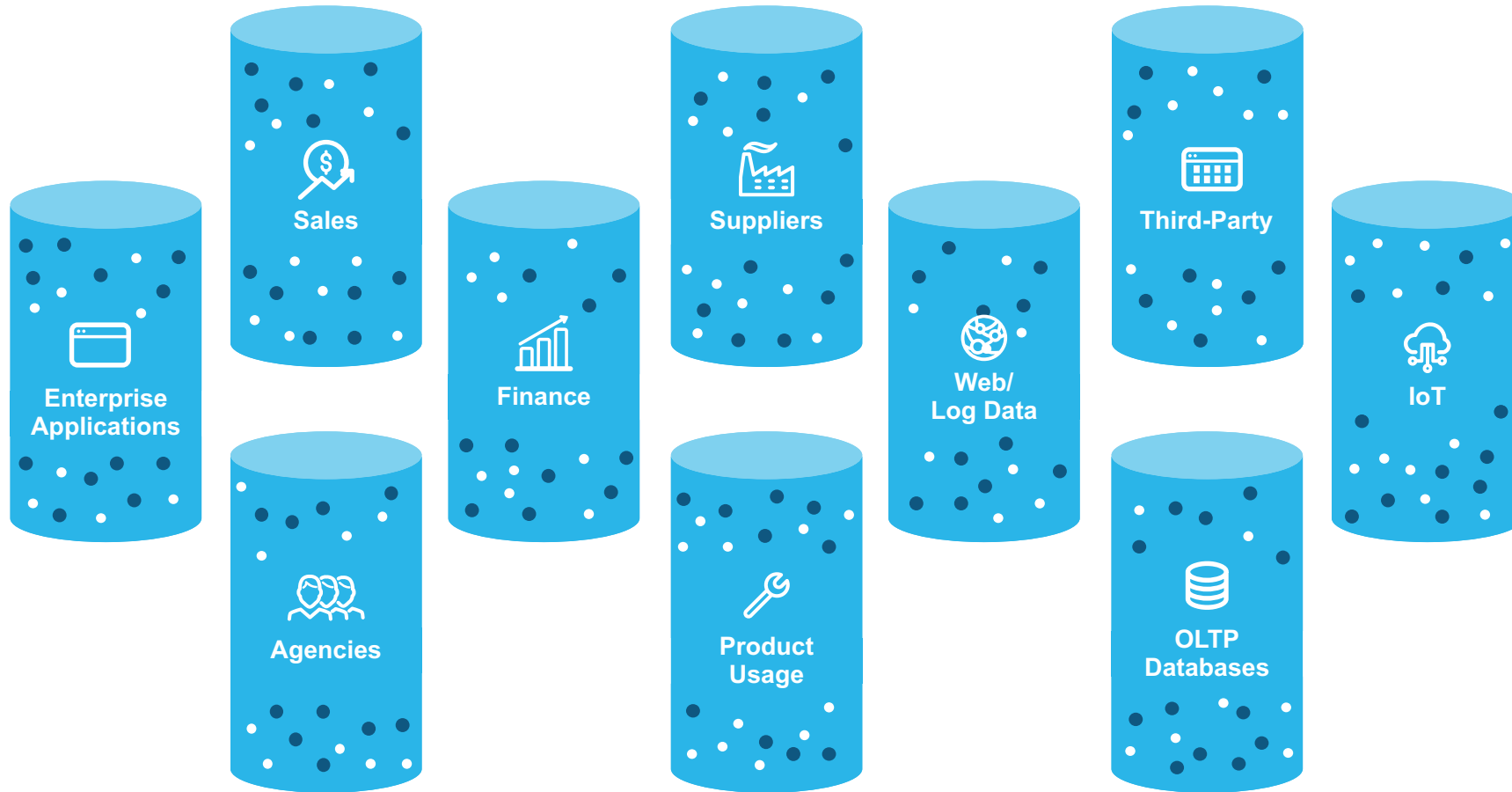## November 9 - 11, 2021

www.meptec.org

Cross-Domain Sharing in the Snowflake Data Cloud

Nov 11, 2021

VINAY H SRIHARI
Field CTO, Snowflake

DATA SILOS PREVENT VALUE REALIZATION

Enterprise
Applications

Sales

Agencies

Finance

Suppliers

Product
Usage

Web/
Log Data

Third-Party

OLTP
Databases

IoT

87%

of firms are expanding
their ability to source
external data[1]

[1] "The Insights Professional's Guide To External Data Sourcing" Forrester, 2020

TECHNICAL CHALLENGES

Make it difficult to answer the questions of supply chain
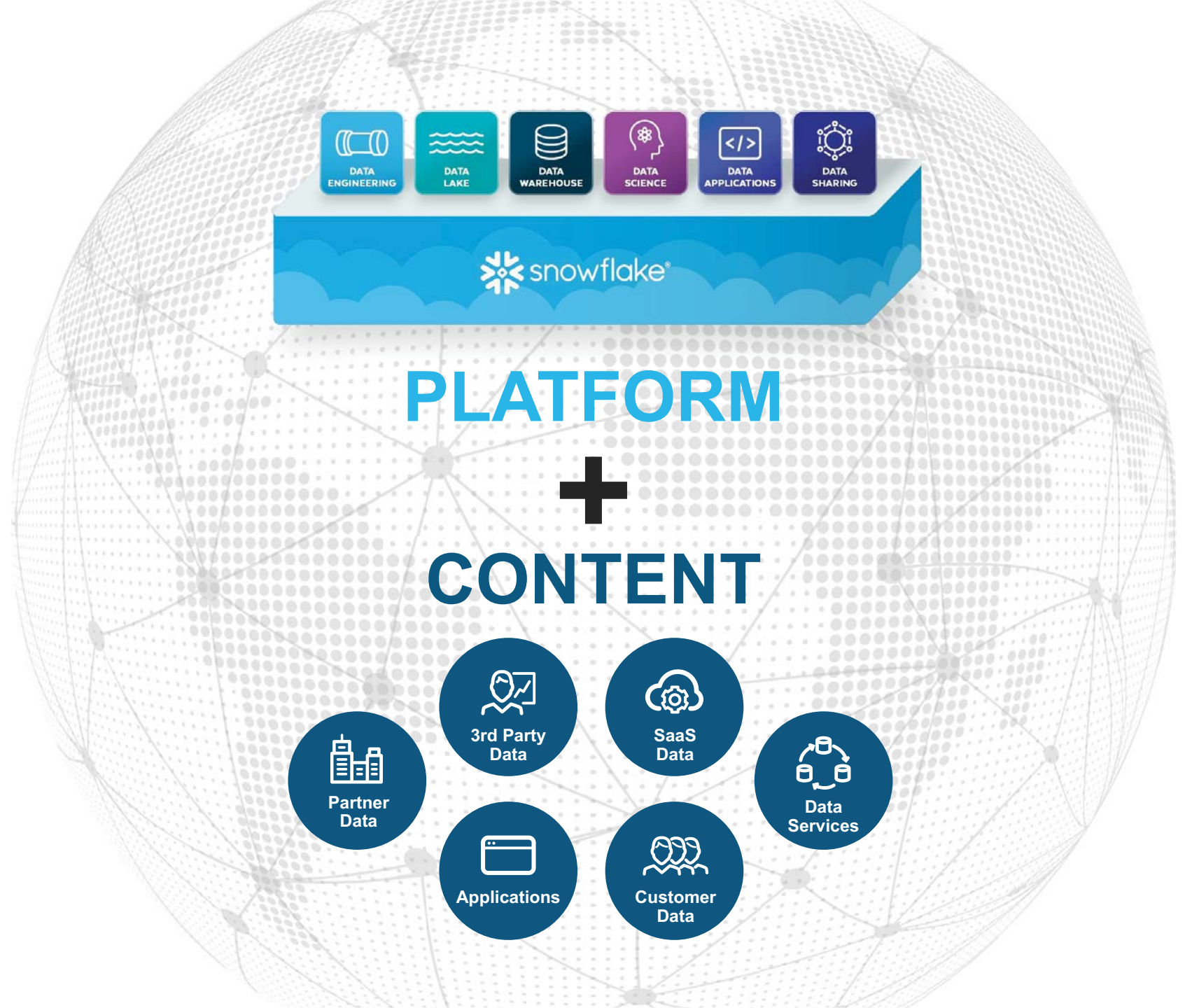
Data siloed across companies

Governing and securing copies of data is difficult

Creating new data pipelines is slow and processes are complex and fragile

ELEMENTS OF THE DATA CLOUD

PLATFORM + CONTENT

DATA ENGINEERING · DATA LAKE · DATA WAREHOUSE · DATA SCIENCE · DATA APPLICATIONS · DATA SHARING

snowflake®

Partner Data · 3rd Party Data · SaaS Data · Data Services · Applications · Customer Data

SNOWGRID

WITHIN AND ACROSS CLOUD AND REGION

(1) Move Data Cross-Cloud & Cross-Region
Fast, Easy, Secure
All Within a Transaction

(2) Unified Governance
Policies, Entitlements, Masking
Follows the Data Not the Cloud

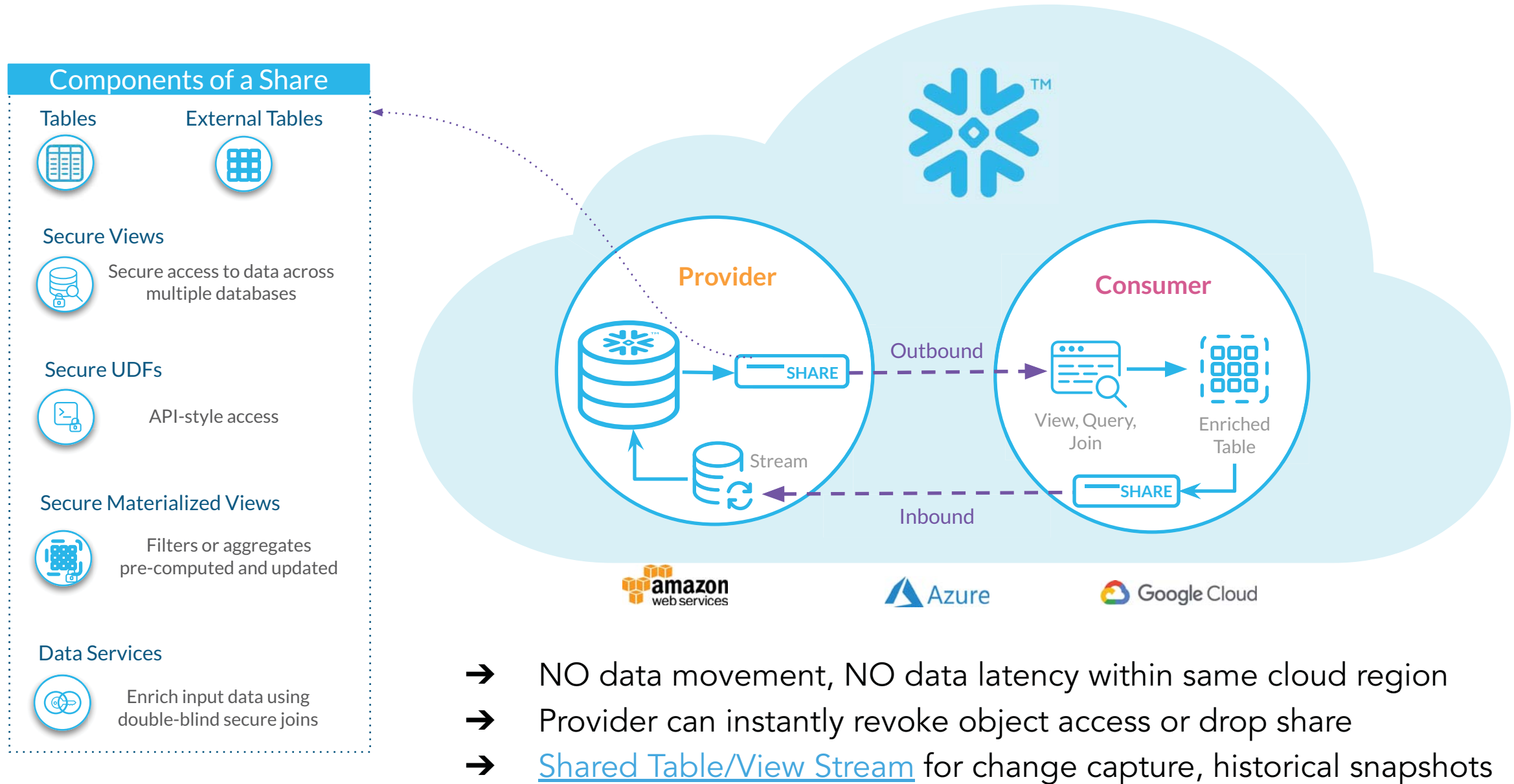**(3) Share Data**
Public and Private
Snowflake Marketplace

(4) Coprocess Data/Code
Multi-Party Cleanrooms
Shared Functions

aws

Azure

Google Cloud

SECURE DATA SHARING
within a Snowflake region on any cloud

Components of a Share

Tables

External Tables

Secure Views

Secure access to data across multiple databases

Secure UDFs

API-style access

Secure Materialized Views

Filters or aggregates pre-computed and updated

Data Services

Enrich input data using double-blind secure joins

Provider

Consumer

Outbound

SHARE

View, Query, Join

Enriched Table

Stream
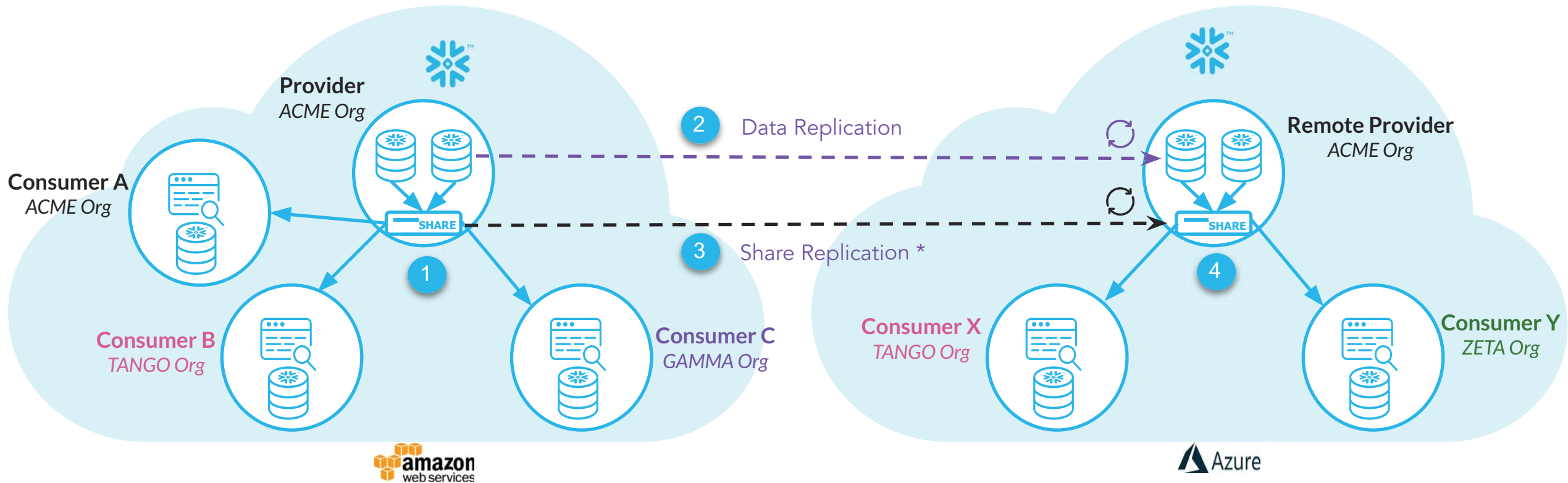
SHARE

Inbound

amazon web services

Azure

Google Cloud

➔ NO data movement, NO data latency within same cloud region

➔ Provider can instantly revoke object access or drop share

➔ Shared Table/View Stream for change capture, historical snapshots

GLOBAL DATA SHARING

*across Snowflake deployments in different regions or clouds*

1. Provider (Acme Org) shares with Consumers A, B, C in AWS us-east-1
2. Provider replicates *shared databases* to Remote Provider (<u>must be</u> Acme Org) in Azure aus-east
3. Provider replicates *share definition* to Remote Provider (*preview feature)
4. Remote Provider shares with Consumers X, Y. Tasks refresh data and share at desired interval.

EVOLUTION OF DATA LIFECYCLE
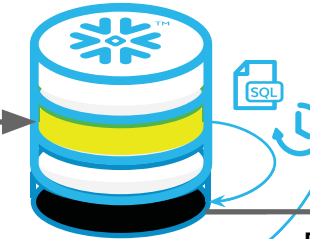
6 Create and administer your Data Exchange
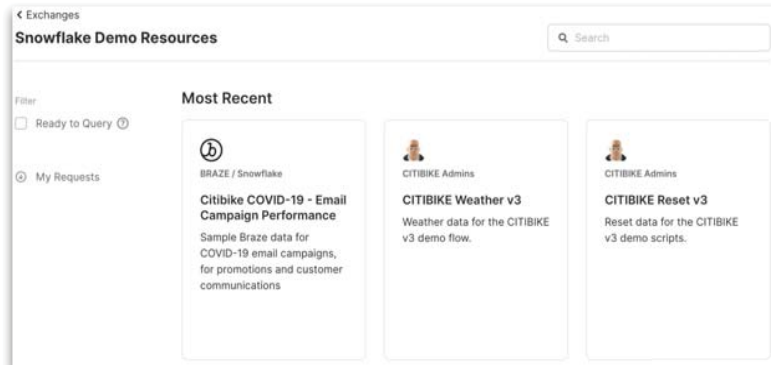
1 Publish listings in the Snowflake Data Marketplace

Publish
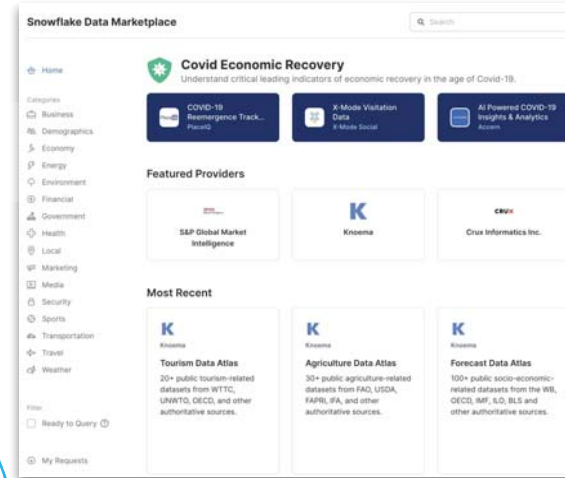
<u>Get</u> free listing
<u>Request</u> personalized listing

Customer

Data Provider

HQ

Data Consumer

2

3 Monetize, fulfill requests
(Auto-fulfillment cross-cloud and region, personalized shares)

4

Enrich and Re-share

Data Science

Portfolio BUs

AU-DW

EU-DW

HR

5 Share with a non- Snowflake customer

Managed Reader or **Full** Account

BI, Query Tools

A DATA CLOUD FOR

ROAD TO CHIPLETS

Plant & Operations

Devices & Sensors

CRM & Marketing

ERP

IC Test & Assembly

All of Your Organization's Data, on One Platform

A DATA CLOUD FOR

ROAD TO CHIPLETS

All of Your Organization's Data, on One Platform

Your Ecosystem
Partners, Suppliers, Customers

Logistics/Delivery Partners
Contract Manufacturers
Analytics Partners
Plant & Operations
Devices & Sensors
CRM & Marketing
ERP
IC Test & Assembly
Distributors/ Dealers
Regulatory Compliance
Customer-generated machine logs

A DATA CLOUD FOR

ROAD TO CHIPLETS
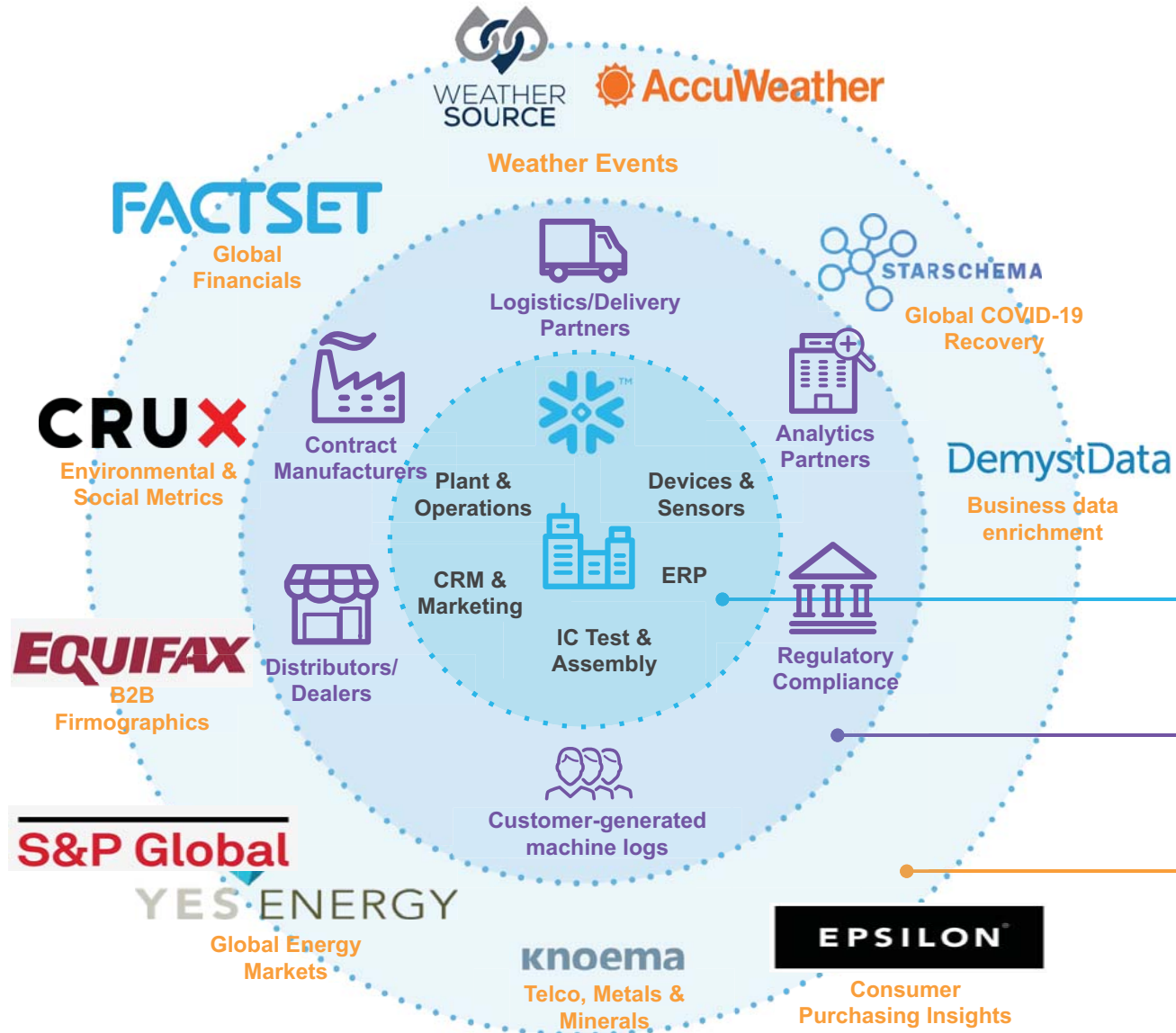
All of Your Organization's Data, on One Platform

Your Ecosystem
Partners, Suppliers, Customers

Snowflake Data Marketplace
Industry Datasets, Data Services, Applications

WEATHER SOURCE · AccuWeather — Weather Events

FACTSET — Global Financials

STARSCHEMA — Global COVID-19 Recovery

CRUX — Environmental & Social Metrics

DemystData — Business data enrichment

EQUIFAX — B2B Firmographics

S&P Global

YES ENERGY — Global Energy Markets

knoema — Telco, Metals & Minerals

EPSILON — Consumer Purchasing Insights

Logistics/Delivery Partners

Contract Manufacturers

Analytics Partners

Plant & Operations

Devices & Sensors

CRM & Marketing

ERP

IC Test & Assembly

Distributors/ Dealers

Regulatory Compliance

Customer-generated machine logs
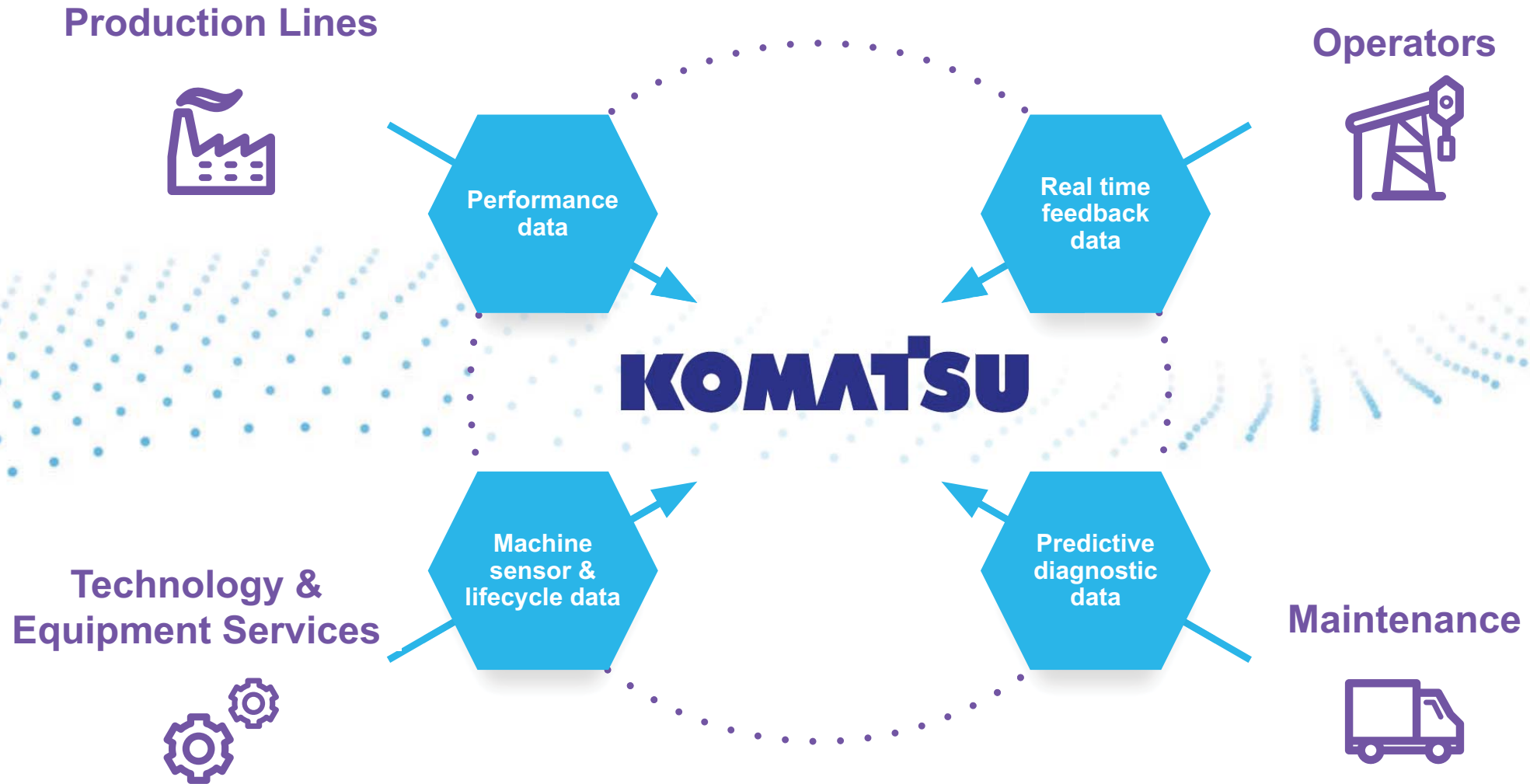
IMPERATIVES IN MANUFACTURING

DECREASE COSTS WITH GLOBAL MATERIALS AND LOGISTICS MANAGEMENT

IMPROVE PRODUCTIVITY AND INCREASE EFFICIENCY WITH IOT INSIGHTS

LOWER COSTS AND RISK THROUGH 360° SUPPLY CHAIN VISIBILITY

Komatsu: Real-Time IOT Insights

Production Lines

Operators

Performance data

Real time feedback data

KOMATSU

Machine sensor & lifecycle data

Predictive diagnostic data

Technology & Equipment Services

Maintenance

Micron: Hardware Manufacturing Analytics

About
Micron manufactures a broad portfolio of high-performance memory and storage technologies

Challenges
Severe, consistent downtime & delivery issues

Enterprise architecture team spent 1/3 of time tuning

Significant impact to cost, manufacturing, productivity

Results with Snowflake

95% reduction in downtime events

Game changing productivity and query performance

Faster speed to delivery for 30K+ BI users

> With Snowflake, the separation of storage and compute makes it much simpler to manage across our areas of business. Now, we have consistent query times and everything is much more predictable."

Mike Cunliffe
System Architect, Micron

"Network Devices": Component Quality Feedback

- Contract Manufacturers (CM): Flex, Foxconn, ~18 in total
  - Complex data pipeline (20 years): CM collects data as XML/JSON files, SFTP to regional servers that route to central data center
- Component Quality Feedback: Samsung (DIMMs), Intel (Chips, ASICs), Seagate
  - Network Devices sends component attributes after a failure is flagged
  - Supplier sends back root cause analysis, aggregate reliability data, predictive analysis for component replacement

Business Problem: exchange network choked, leads to poor quality outcomes
- Was 1-5 TB/year, now 100 TB/year raw data; only 5% data actually sent to Network Devices to minimize transfer
- Quarter close impacted because important metrics are missing: root cause was saturated transfer network from massive growth in CM and Quality data
- Control security and visibility: Flex must not see Foxconn's data

DATA MESH PRINCIPLES

Distribute responsibility for data pipelines and data quality to people with domain knowledge.
Serve data as-a-product using a common self-service IT infrastructure platform.

Domain-Centric Ownership & Architecture

Data pipelines owned by teams with domain knowledge

Domains own cleansing, refinement, historization, pre-aggregation, etc.

Domains responsible for governance, lineage, etc.

Domains treat data with consumers in mind

Data as-a-Product

Data is discoverable

Data is easy to obtain and use

Data is documented

Domains responsible for the quality of their data

Self-Serve Infrastructure as-a-Platform

Domain-agnostic, common tool set

Easy to use and low maintenance to support

Easy to deploy repeatable patterns for common requirements:
cleansing, transformation, automation, storage, security, governance, sharing

Federated Governance

Global interoperability standards across domains

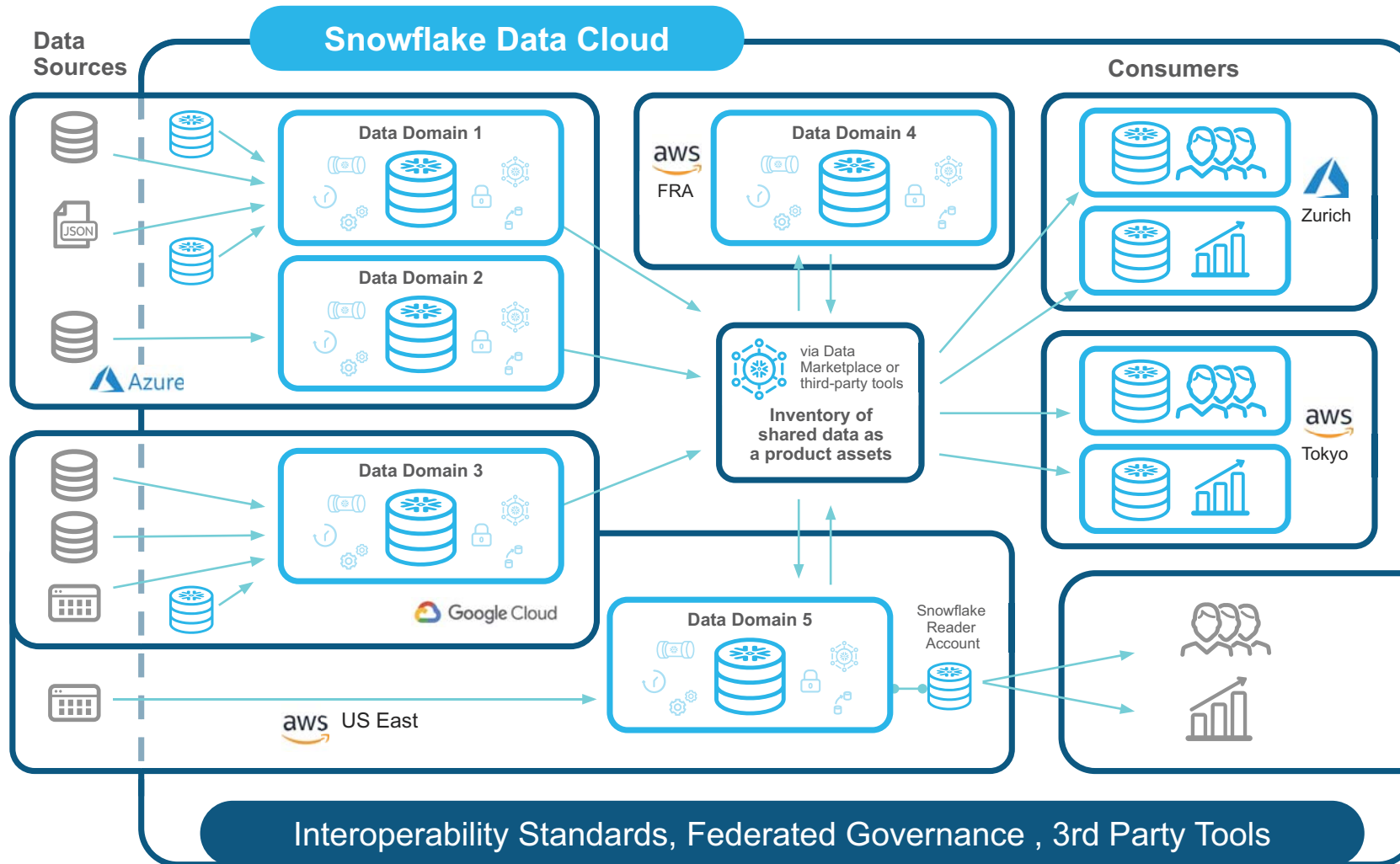Define and use global data governance policies

Define and apply governance within each domain and propagate downstream

DATA MESH REFERENCE ARCHITECTURE

Snowflake enables a truly global and multi-cloud data mesh

- Data sources, data domains, and consumers can sit in different regions and different cloud platforms

- Snowflake enables a truly global and multi-cloud data mesh
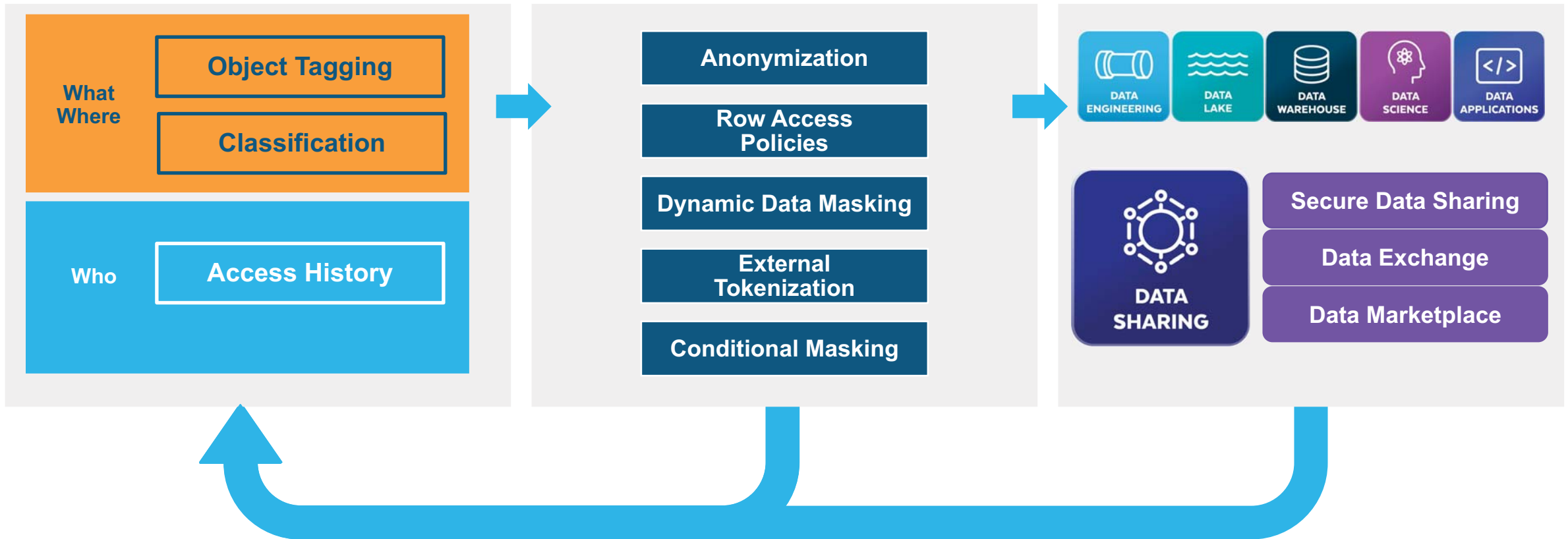
GOVERNANCE

Know Your Data
Understand, classify, and track data and its usage

Protect Your Data
Secure sensitive data with policy-based access controls

Unlock Your Data
Securely collaborate and share data across teams

SNOWFLAKE GOVERNANCE CAPABILITIES

Know Your Data

Protect Your Data

Unlock Your Data

Know Your Data

What Where
- Object Tagging
- Classification

Who
- Access History

Protect Your Data
- Anonymization
- Row Access Policies
- Dynamic Data Masking
- External Tokenization
- Conditional Masking

Unlock Your Data
- DATA ENGINEERING
- DATA LAKE
- DATA WAREHOUSE
- DATA SCIENCE
- DATA APPLICATIONS

DATA SHARING
- Secure Data Sharing
- Data Exchange
- Data Marketplace

THANK YOU

Thank you sponsors!

Amkor's Differentiators

Technology

Advanced Packaging Leadership
Engineering Services
Broad Portfolio

Quality

QualityFIRST Culture
Execution
Automation

Service

Design & Test Through Drop Ship
Manufacturing Footprint
Local Sales & Support

Global Companies Rate Advantest THE BEST ATE Company 2021

Advantest receives highest ratings from customers in annual VLSIresearch Customer Satisfaction Survey for 2 consecutive years.

Global customers name Advantest THE BEST supplier of test equipment in 2020 and 2021, with highest ratings in categories of:

Technical Leadership – Partnership – Trust – Recommended Supplier – Field Service

"Year-after-year the company has delivered on its promise of technological excellence and it remains clear that Advantest keeps their customers' successes central to their strategy. Congratulations on celebrating 33 years of recognition for outstanding customer satisfaction."

— **Risto Puhakka**, President VLSIresearch

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