Oracle Cloud Infrastructure

Understanding the data mesh architecture

Greg Genovese
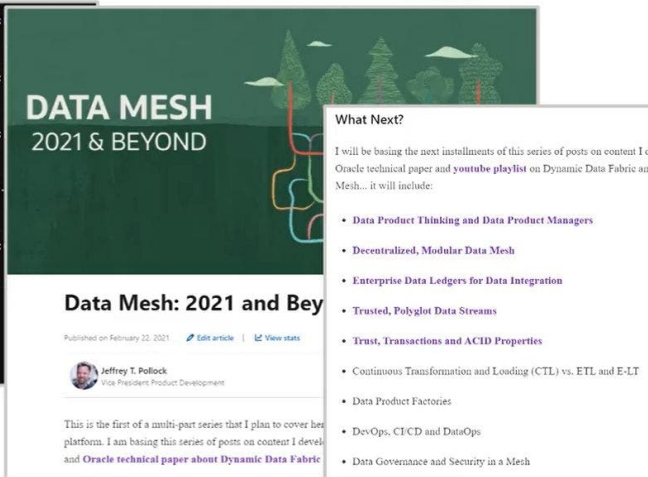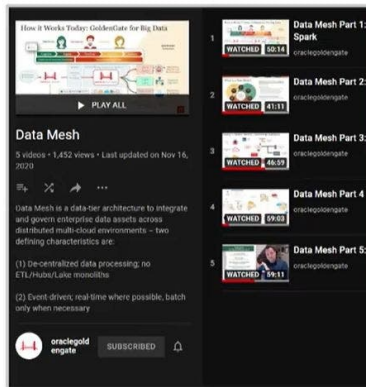ORACLE DATABASE SPECIALIST
ORACLE

Oracle Engagement on Data Mesh

Improve business outcomes
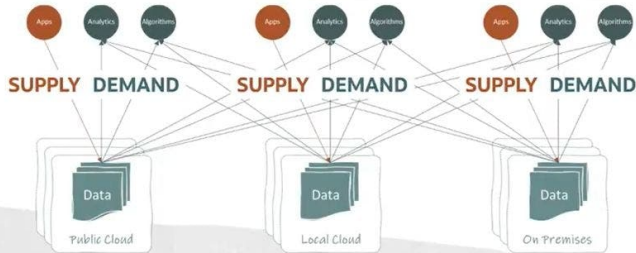
Oracle Engagement on Data Mesh

Thought Leadership

Tools for data products

Decentralized event-driven architectures

Streaming patterns

Data as Capital, and Liquidity of Data

Scope of Data Mesh Concepts

Organizational/Systems

Design Thinking

Strategy: Data Product Thinking

Jobs to be Done Theory

Data Architecture

- Anti-monolith/pro-decentralization

- Business domain oriented – catalog, graph, metadata, etc.

- Event-driven, real-time, and streaming

Scope of Data Mesh Concepts

Organizational/Systems	Strategy: Data Product Thinking	Data Architecture

Jobs to Be Done Theory

- Anti-monolith/pro-decentralization

- Business domain oriented – catalog, graph, metadata, etc.

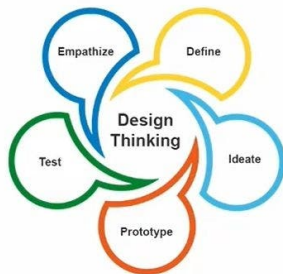- Event-driven, real-time, and streaming

Scope of Data Mesh Concepts

Organizational/Systems

Strategy: Data Product Thinking

Data Architecture

- Anti-monolith/pro-decentralization

- Business domain oriented – catalog, graph, metadata, etc.

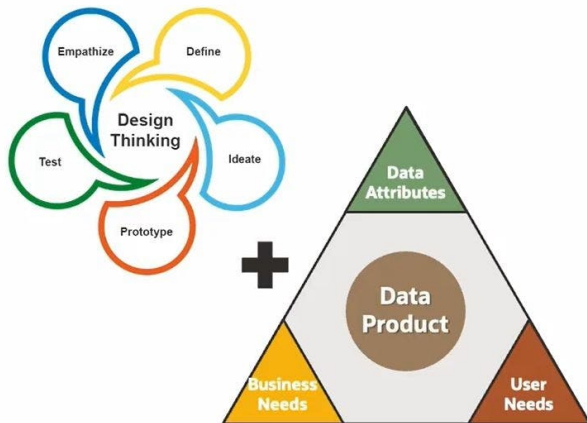- Event-driven, real-time, and streaming

Digital Capital and Superstar Firms[1]

25%
of a firm's value is digital capital.

"Digital capital" refers to factors of production that are
1) complementary to IT assets, but
2) are not otherwise recorded on the balance sheet

Total clarity

Operational data availability

Faster innovation cycles

Reduction in data engineering

Digital capital is more concentrated than any other asset class.

The most value is concentrated in the top decile of firms by market value.

Digital capital accumulation predicts firm productivity three years out.

Hidden Data Economy

Wide variety of shapes and structures

Applications   **Sensors**   **Devices**
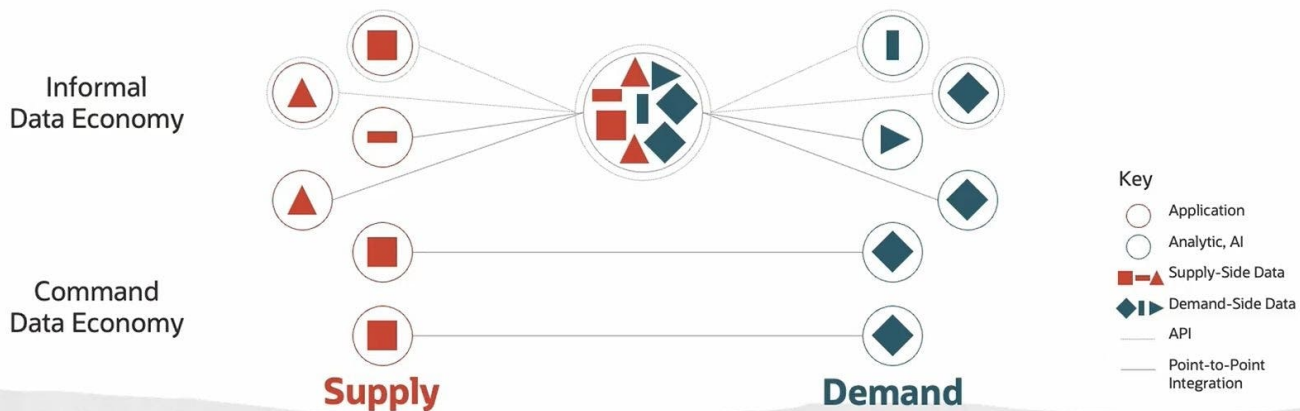
Demand side

Analytics   **AI**
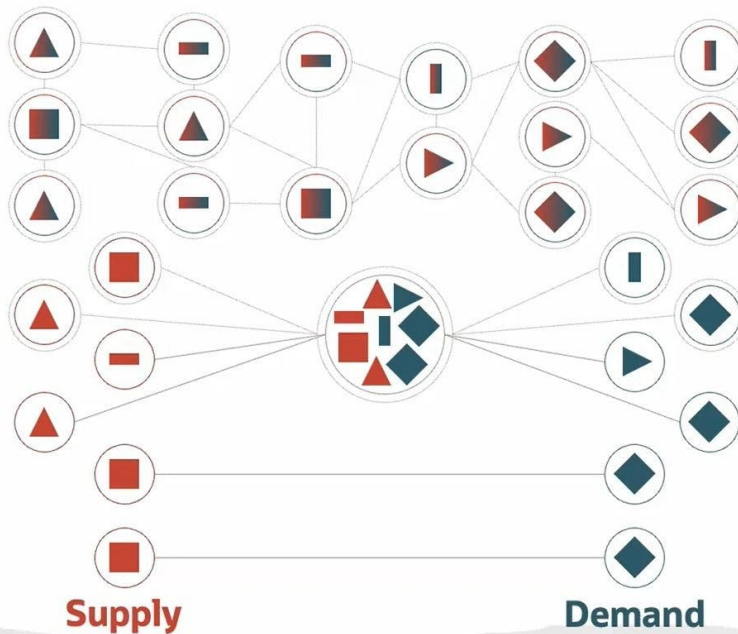
Hidden Data Economy
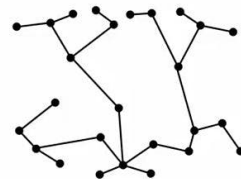
Websites

Mobile Applications

Informal
Data Economy

Command
Data Economy

Supply

Demand

Key

- ⬭ Application
- ⬭ Analytic, AI
- ■—▲ Supply-Side Data
- ◆▮▶ Demand-Side Data
- — API
- — Point-to-Point Integration

Hidden Data Economy

Decentralize

Market Data Economy

Informal Data Economy

Command Data Economy

Supply

Demand

Key
- ◯ Application
- ◯ Analytic, AI
- ■ ▬ ▲ Supply-Side Data
- ◆ ▮ ▶ Demand-Side Data
- ── API
- ── Point-to-Point Integration

What does the hidden data economy lead to?

DEAD
DATA CAPITAL

Trapped in silos

Labor intensive to repurpose

Undiscoverable

Allowed uses unclear

Twin Threats of Digital Transformation

Loss of competitive advantage

Legal and reputational damage

Data Strategy That Reinforces Competitive Strategy

Yes!

Data Strategy That Reinforces Competitive Strategy

Competitive Strategy

**Create unique value
in a unique way**

Value your customer can only get from you

Through activities your rivals cannot easily copy
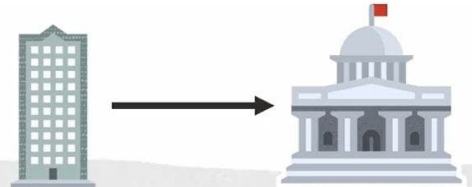
Data Strategy

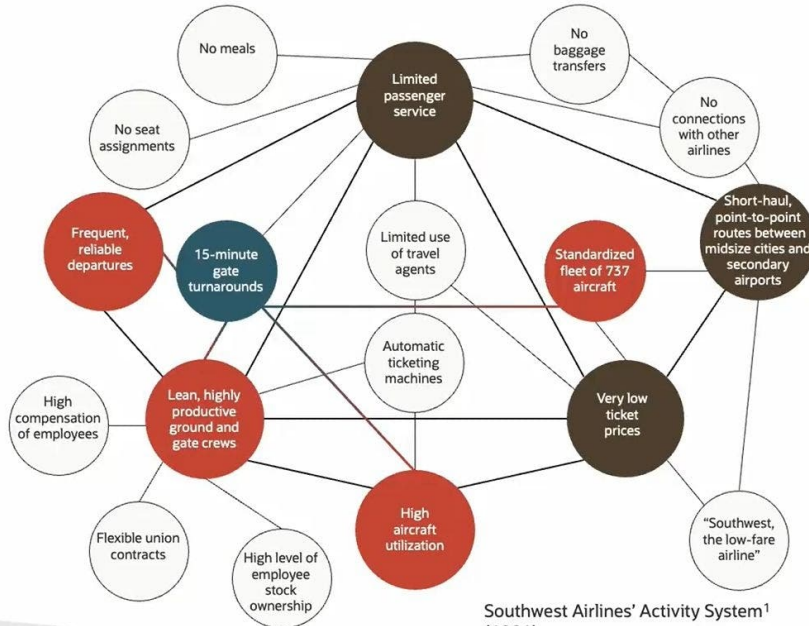**Create unique data assets**

Use them to enhance uniqueness

Protect observer and observed

Observations only you possess

Differentiation, cost position, or both

Safeguards for all data stakeholders

# Activity Systems Tie Data Strategy to Competitive Strategy

Southwest Airlines' Activity System[1] (1996)

Can we use predictive maintenance to get to 10-minute turnarounds?

Sensor data
Engines, subsystems
Record data
Aircraft utilization, repair and maintenance, arrivals and departures

Anonymize, mask employee records
Monitor model for performance as planes age

Data Products, the Building Blocks of Data Strategy
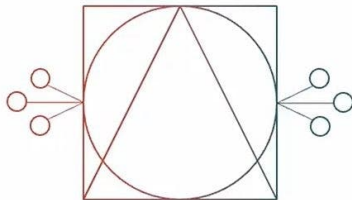
A data product is a discrete set of observations and its complementary code designed to fulfil one or more jobs to be done.

Supply Side
Mostly passive: Data that **is** something

Data Sets
  Sets of observations in different shapes, formats
Models
  Domain objects, data models, ML features
Libraries
  Inert algorithms, technical definitions of business semantics

Demand Side
Mostly active: Data that **does** something

Analytics
  Reports and dashboards, real-time and historic
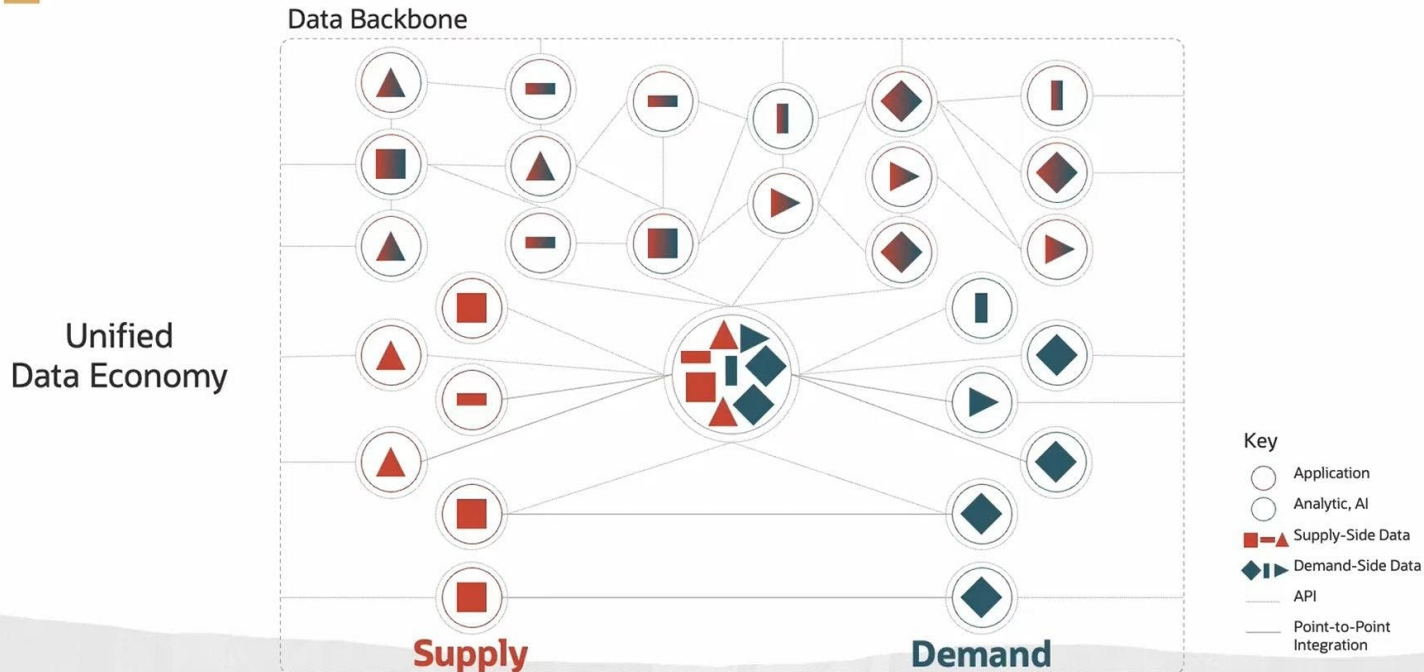Algorithms
  ML models, scoring, business rules
Data Services
  Payloads, topics, authorization

A Unified Data Economy Requires a New Data Backbone

Principles for Translating Data Strategy into Data Architecture

Data Liquidity

Ease of data reuse and recombination[1]

Data Productivity

Value created as a result of data usage per unit of work, dollar invested, or resource consumed

Data Security

Protections against external and internal threats

Data Governance

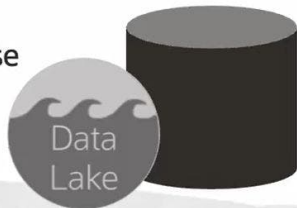Assurances of data quality, compliance, ethics

A Data Mesh Is...

A data solution for enterprise-scale domains and/or event-driven data-centric cloud projects

A data architecture approach focused on outcomes (data products), IT agility (service mesh), and speed (streaming data)
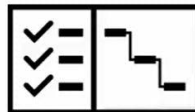
A Data Mesh Is Not...

An alternative point-solution for data warehouse or data lakes

Data Lake

A finite project that can be run by a LoB Departmental IT org in isolation
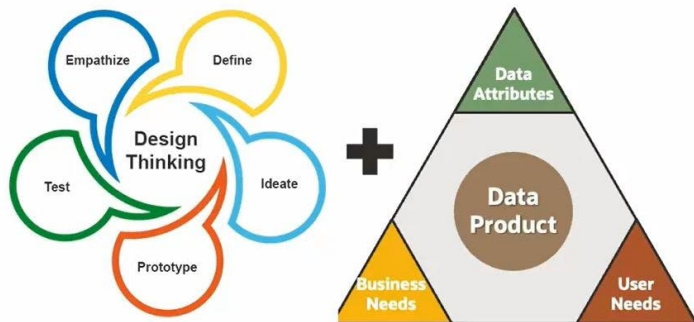
A single tool or single cloud service that you can buy

Attributes of a Trusted Data Mesh

Upgrade legacy enterprise data architecture, monolithic integration tools, and outmoded batch processes.
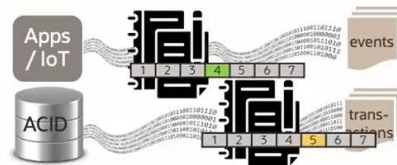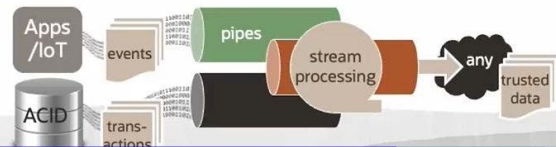
Value-Focused, Data Product Thinking

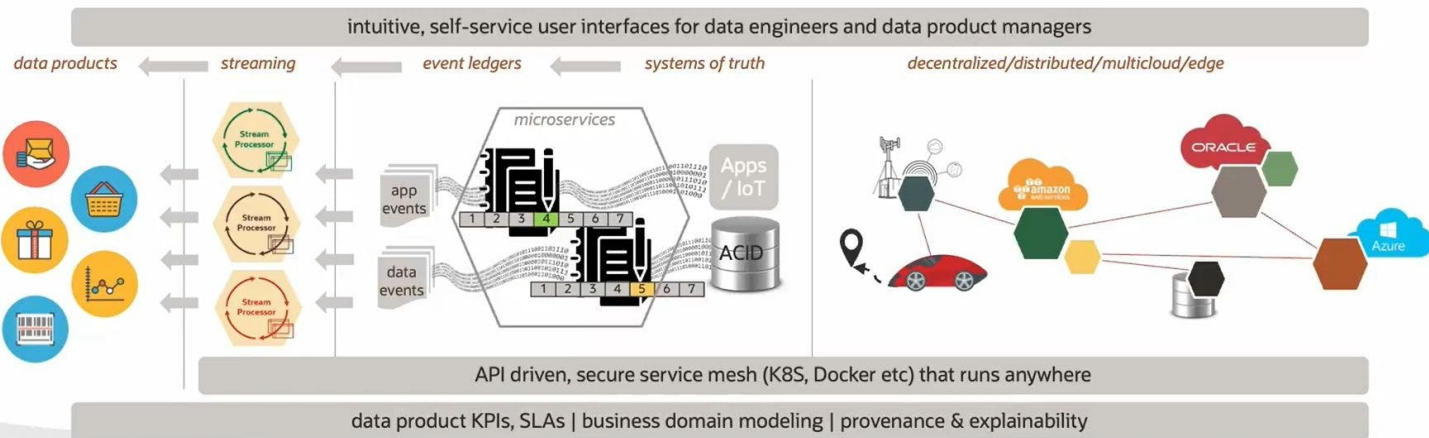## Decentralized, Multicloud Mesh

Enterprise Data Ledgers

Trusted, Polyglot Streams

What is a Data Mesh?

A trusted Data Mesh is a data architecture approach focused on outcomes (data products), IT agility in a multicloud world (service mesh), trusted data of all kinds (polyglot data streams), and faster business innovation cycles (event-driven integration).

OCI-Based Data Mesh Blueprint