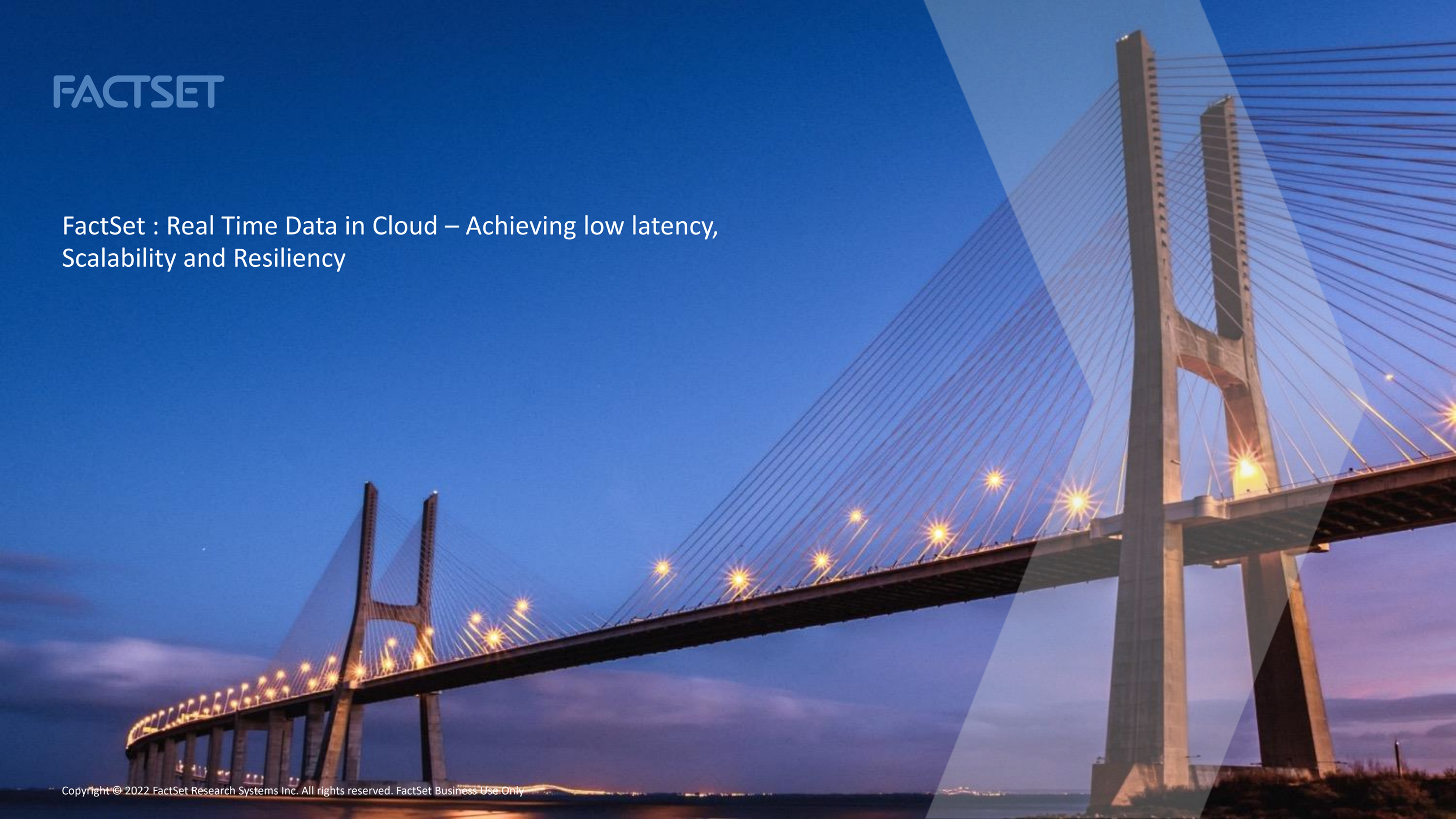
FactSet : Real Time Data in Cloud – Achieving low latency, Scalability and Resiliency



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- 15+ years, real time data services - previously at Vela, SIX and ICE
- FISD - FIA

FACTSET 〉 SEE THE ADVANTAGE

FINANCIAL DATA | ANALYTICS | TECHNOLOGY | SERVICES

250+
Exchanges

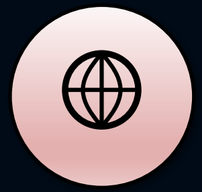
15
Collection PoPs

18+ Million
Symbols

5 Million
Msgs Per Second

20 Billion
Msgs Per Day

3 Terabyte
Storage Per Day



20 Years
Real-time Services

15
Data Centers

200,000+
Workstations

~300 Feed
Client Firms

50+
Real-time Products

Across 10
Firm Types

10+ Years of
Tick History

24x7
Support

Real Time in the cloud – What low latency do we need to achieve?

- Low Latency ULL, HFT, Co-lo?

- Consolidated market data feeds, Snap Shot, Streaming, Tick History
  - Global Coverage
  - The whole market, all instruments
  - Every Update
  - Depth of Book
  - Any market – OPRA?
  - Latency? 1-5ms for ticker plant latency plus a *reasonable* geographical latency

Real Time in the cloud – How have we achieved this?

"**Today some 93% of exchanges, trading systems, and data providers offer cloud-based products**", according to a recent survey by Coalition Greenwich, commissioned by Google Cloud.

How do we achieve low latency?

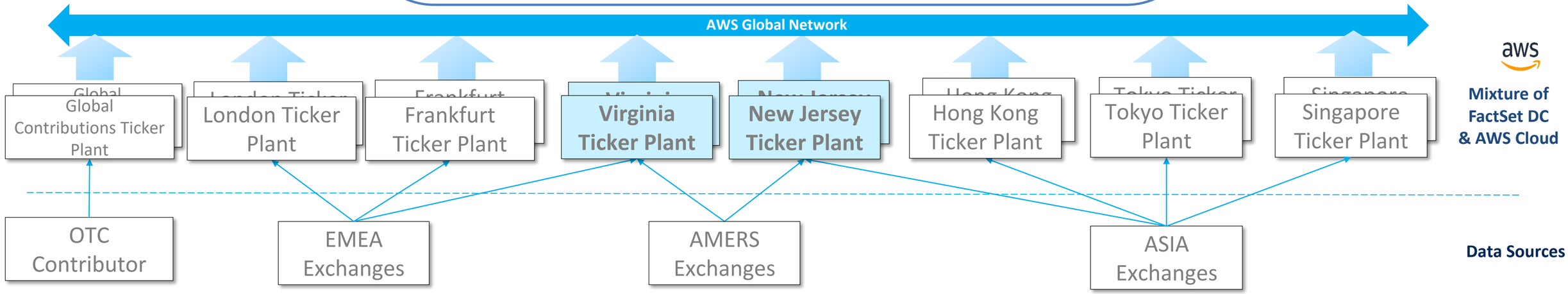
- Vendors may connect their physical Ticker Plants to a cloud connection

- What if the **Exchanges**, the **Vendors** ticker plant and the **Client** were all in the cloud. – Cloud First Strategy

- Overcome Latency limitations
- Overcome Bandwidth limitations
- Overcome Quality limitations

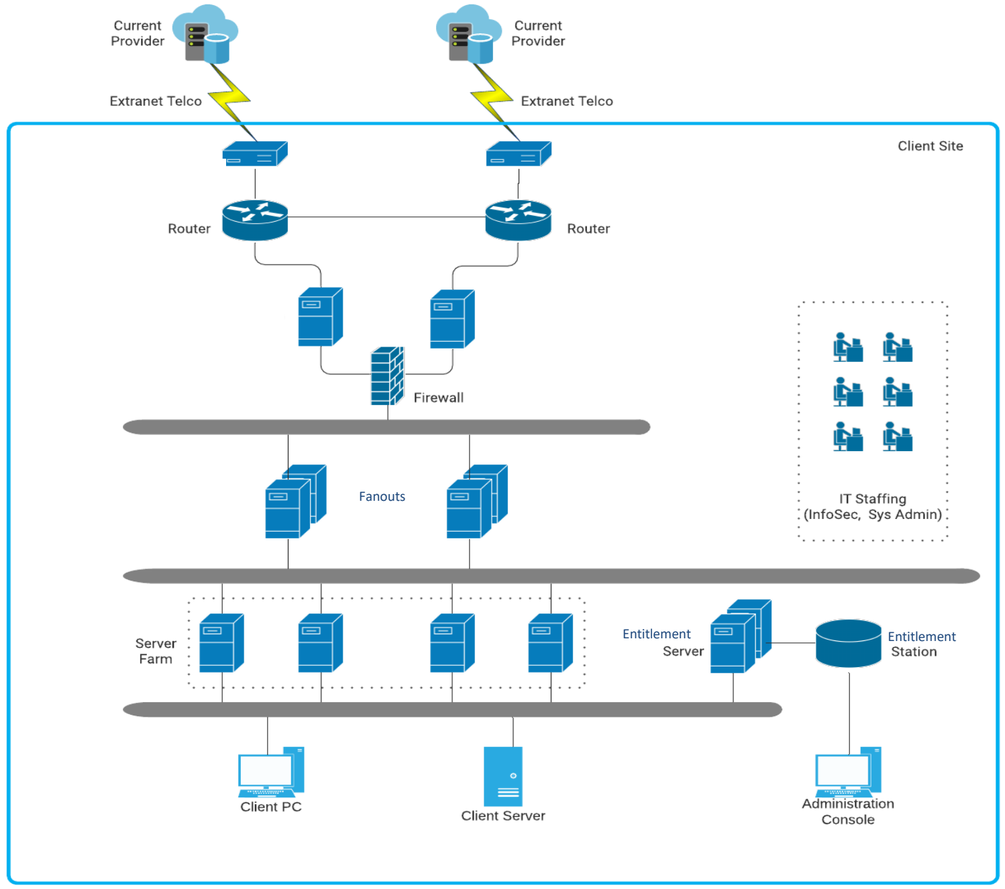
Why would we put our Ticker Plant in the cloud?

- **Ticker Plant in Cloud**:
  - Handle increase in data rates
  - Low end-to-end latency for local markets
  - Ability to turn up new regions for DR
  - Lower operating costs enable FactSet to transfer cost benefits to clients
  - Faster onboarding of venues and new features
  - Leverage high speed network routes in AWS
  - Multicast in cloud being tested: will enable turning up local ticker plants in many additional regions
  - Leverage AWS local zones as they become available in proximity locations, E.g., NY5

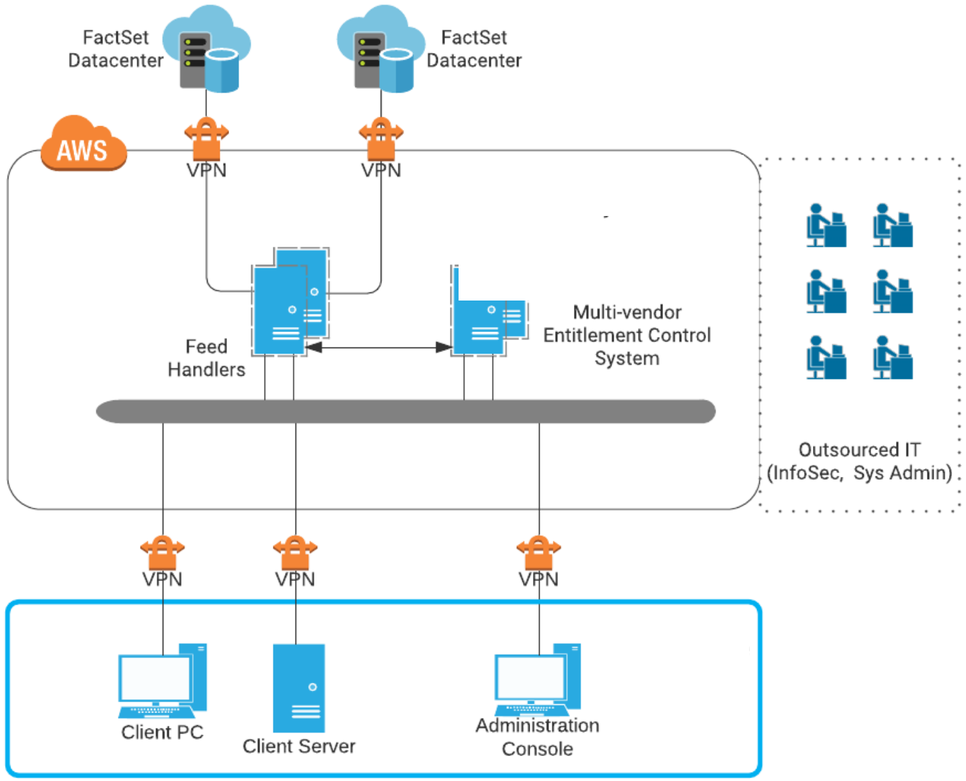


Scalability and Costs: Shift from traditional market data architecture to Cloud Based Managed Services

Conventional Market Data Architecture

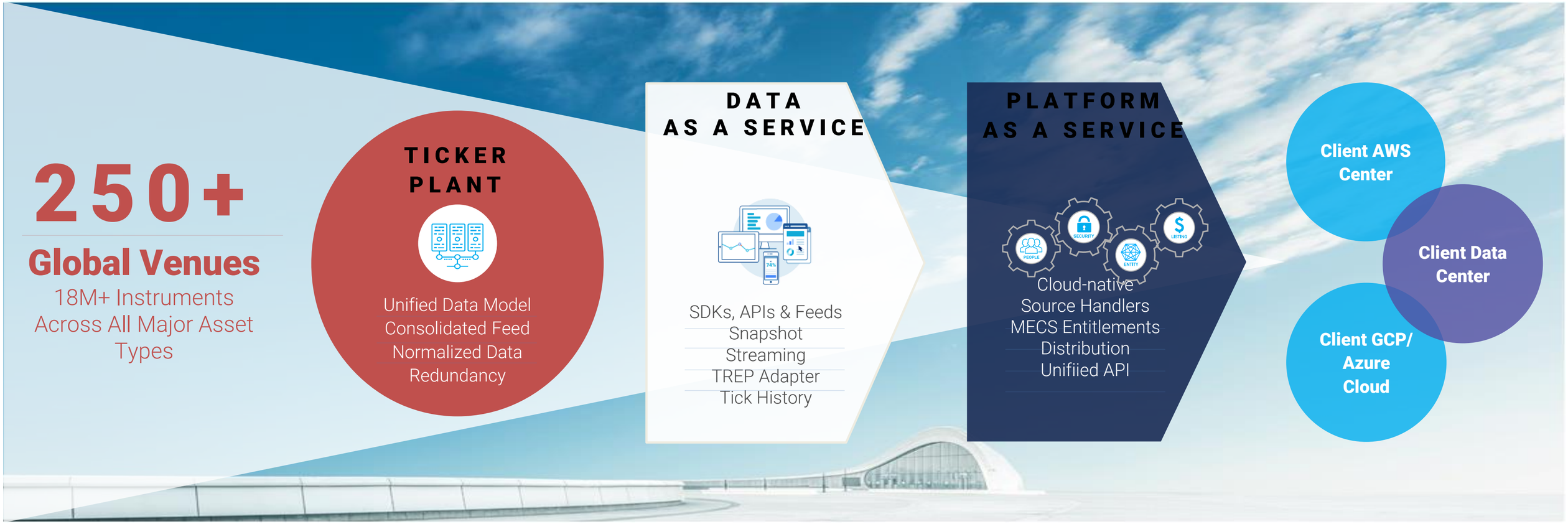


Market Data as a Service (MDaaS)



Market Data as a Service (MDaaS) Workflow

Clients no longer needs to host infrastructure to obtain reliable market data



FactSet ingestion, + normalization of global sources:

Direct Exchange Feeds, Broker Feeds, Reference Data, Corporate Actions

FactSet Real Time Solutions for Consolidated Feeds and Historical Data

Market Data hosted platform: Managed service, multi-tenant or single tenant

Client applications remain in own cloud VPC / data center