

Timeseries RAG:

Enabling GenAI breakthroughs in Trade Ideation, Execution and Risk Management



Conor Twomey, Head of AI Strategy





Powering Every Corner of Capital Markets



The **time series, vector, and streaming data leader**, pioneer and innovator.



The **bet-your-business choice**. Trusted by the top 50 global banks.



A key component of **mission critical trading, risk and compliance applications**, workflows & AI

Customers

Partners

Data Providers

Hyperscalers

Technology





kdb and STAC

KX have been a STAC member since 2010 and are used in SUTs that currently hold **56 out of 58 world records** for STAC-M3



Gold Standard

- **STAC** is the Gold Standard, and **kdb** is the “go-to” technology for vendors to leverage in STAC benchmarks to prove the performance of their technology



With our partners at the cutting edge

- **kdb** benefits directly from latency and throughput innovations found in the latest storage and compute solutions from vendors



Horizontally and Vertically Scalable

- In many cases, STAC SUTs observe better than linear scalability when running **kdb** analytics across 1 to 5 years+ of market data



Performance matters for our customers

- **kdb** maintains and stretches the lead in world record results for both centralised/shared storage, as well as for distributed and sharded “compute-local” storage models

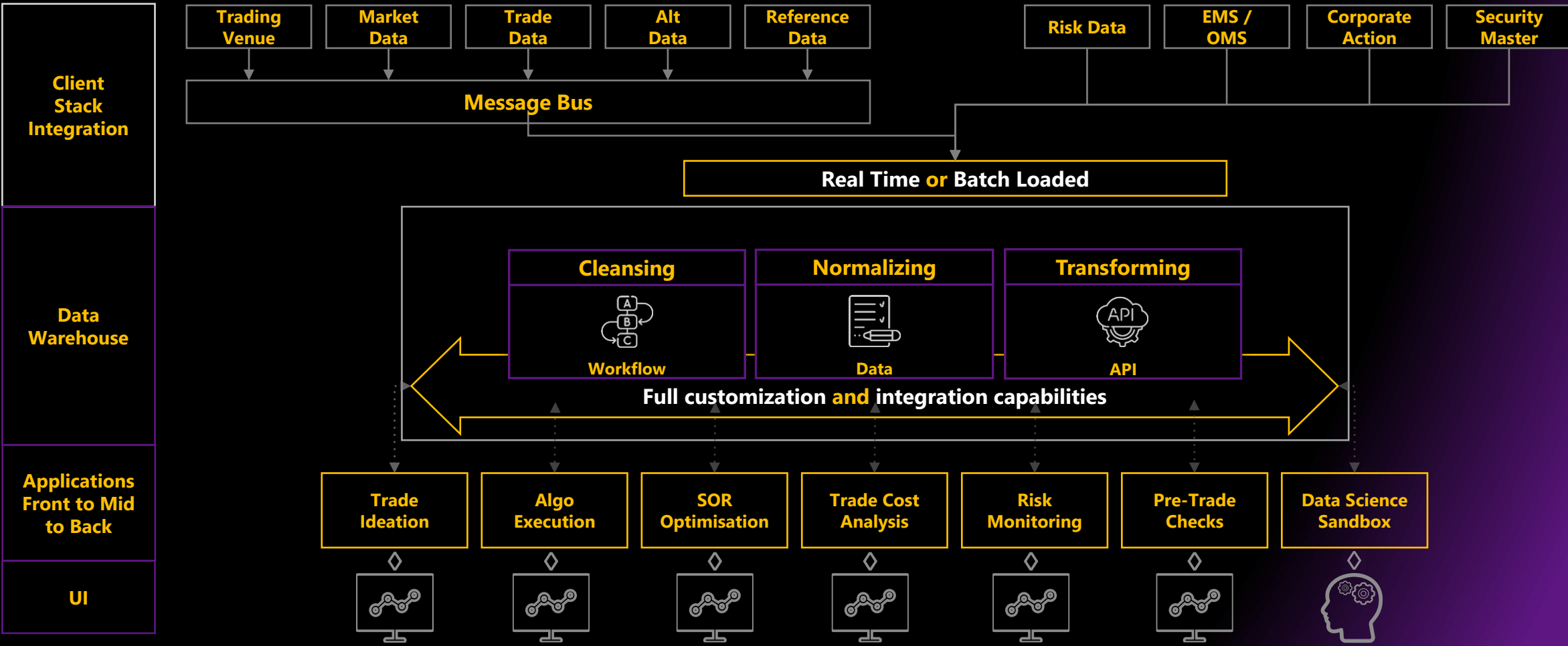


Get in Contact

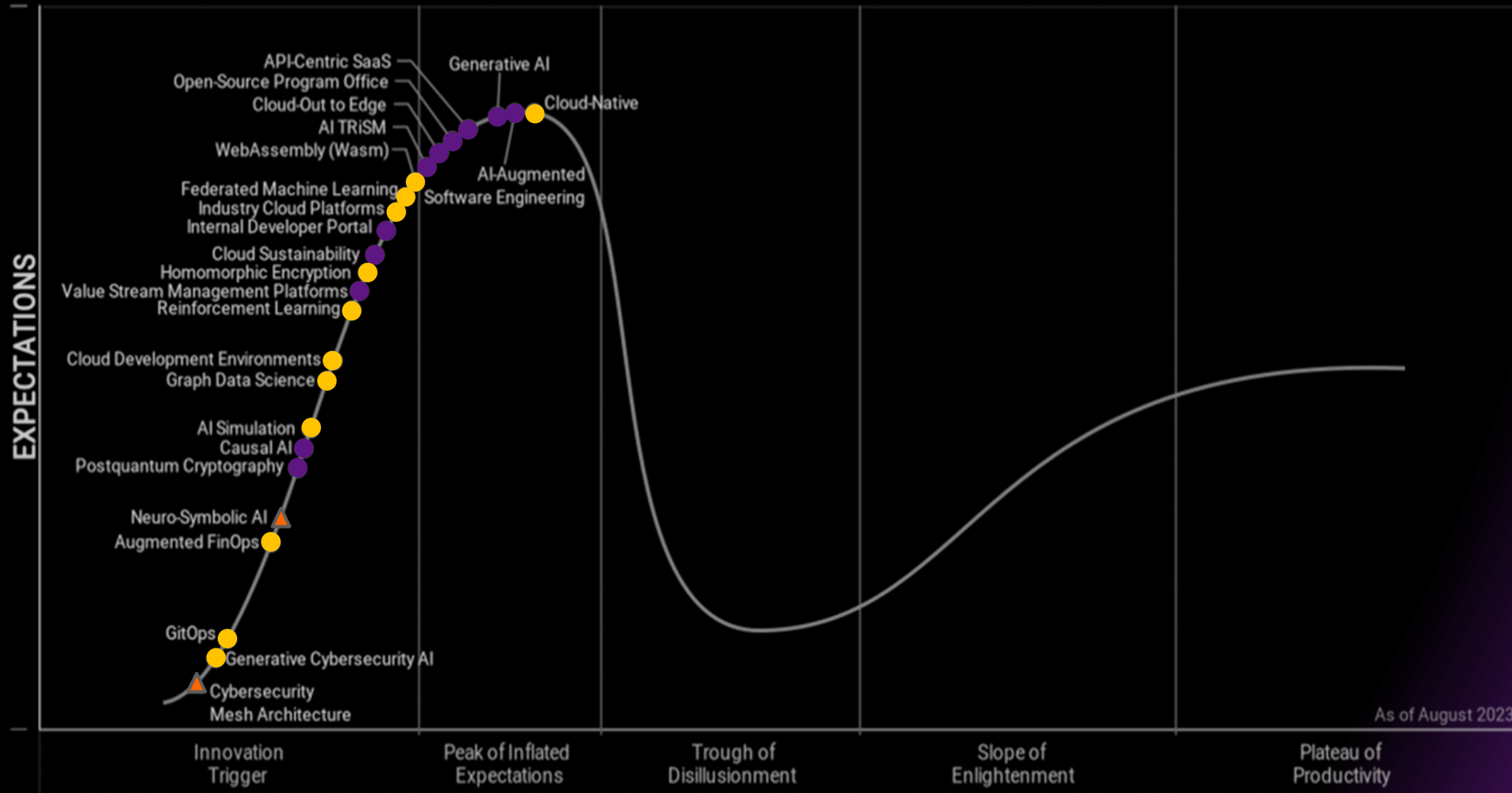
- Reach out if you’re planning to conduct a STAC benchmark!



Traditional – Front Office Data Strategy



Generative AI – There's Hype!



Plateau will be reached: ○ <2 yrs. ● 2-5 yrs. ● 5-10 yrs. ▲ >10 yrs. ⊗ Obsolete before plateau

3

AI IDEAS EVERYONE
CAN STEAL

&

REAL WORLD
AI QUANT APPS

2

KX



3 Ideas You Can Steal to Look Smart About Generative AI in any Conversation



1

AI is here to
**Augment
Human
Capabilities**

3 Ideas You Can Steal to Look Smart About Generative AI in any Conversation



2

The Future of AI is **Vertical Integration**

3 Ideas You Can Steal to Look Smart About Generative AI in any Conversation

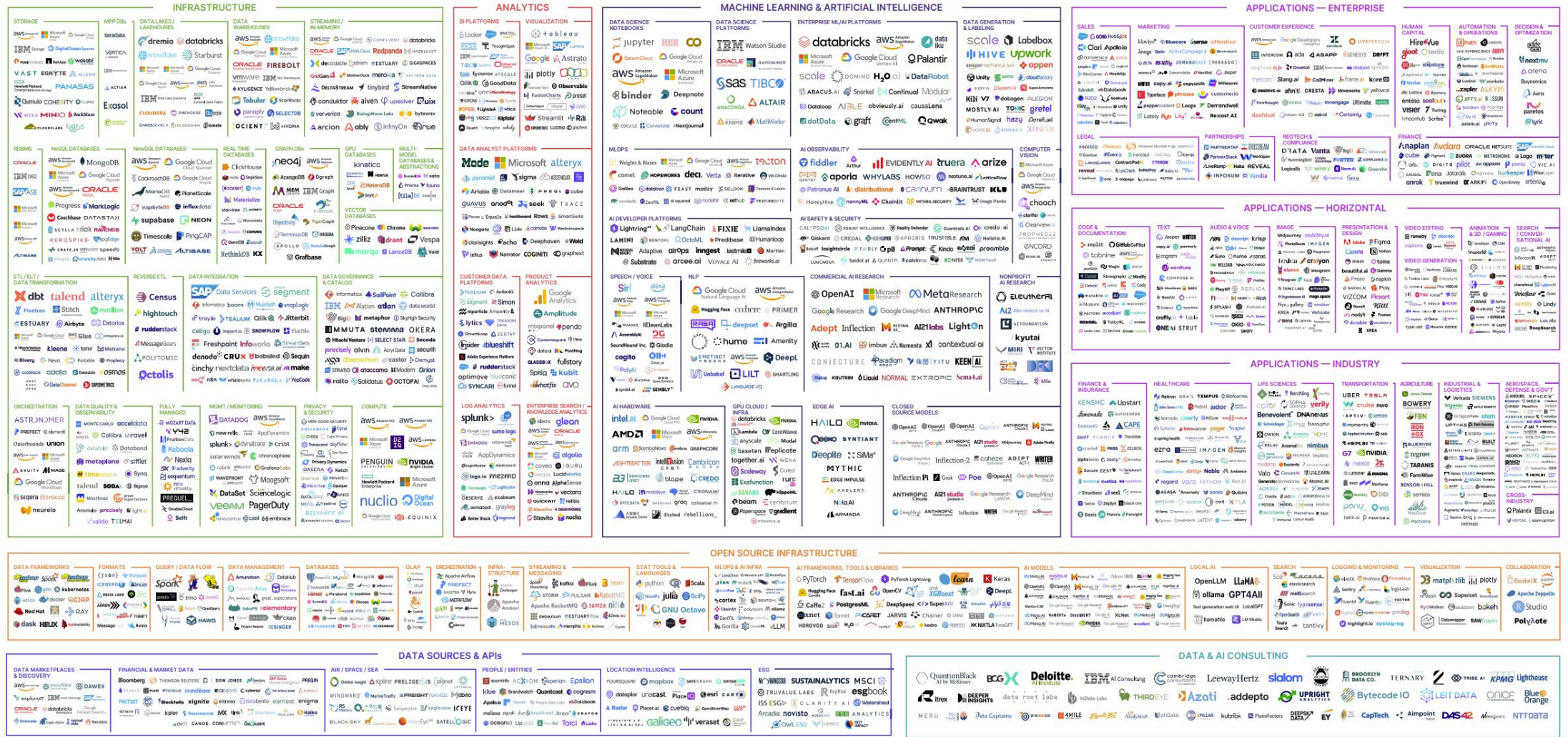
3

Navigating the
ROI/TCO
Challenge of
Enterprise AI



The AI Landscape – Signal From Noise

THE 2024 MAD (MACHINE LEARNING, ARTIFICIAL INTELLIGENCE & DATA) LANDSCAPE



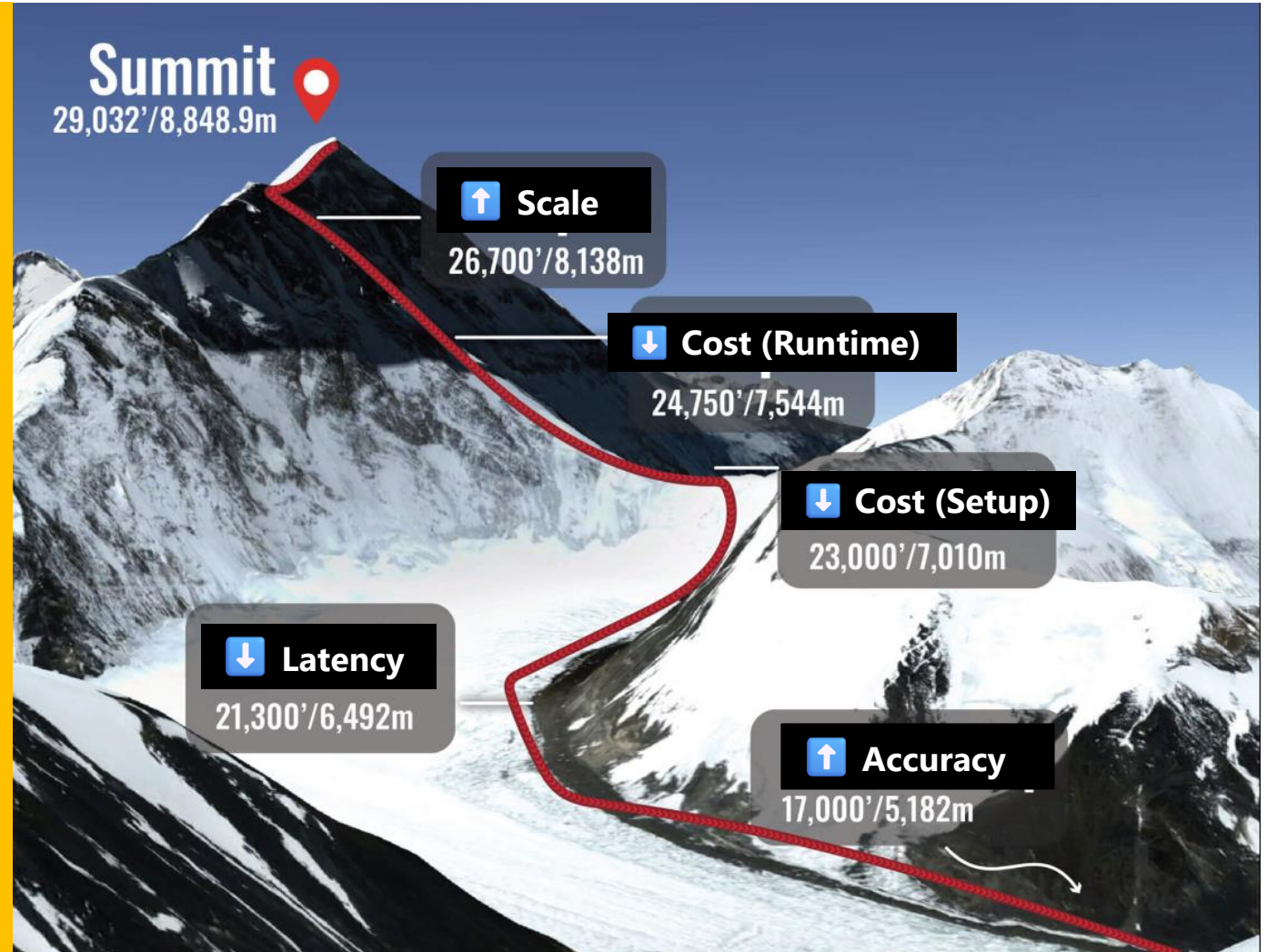
Version 1.0 - March 2024 | © Matt Turck (@mattturck), Aman Kabeer (@AmanKabier1) & FirstMark (@firstmarkcap) | Blog post: matturck.com/MAD2024 | Interactive version: MAD.firstmarkcap.com | Comments? Email MAD2024@firstmarkcap.com



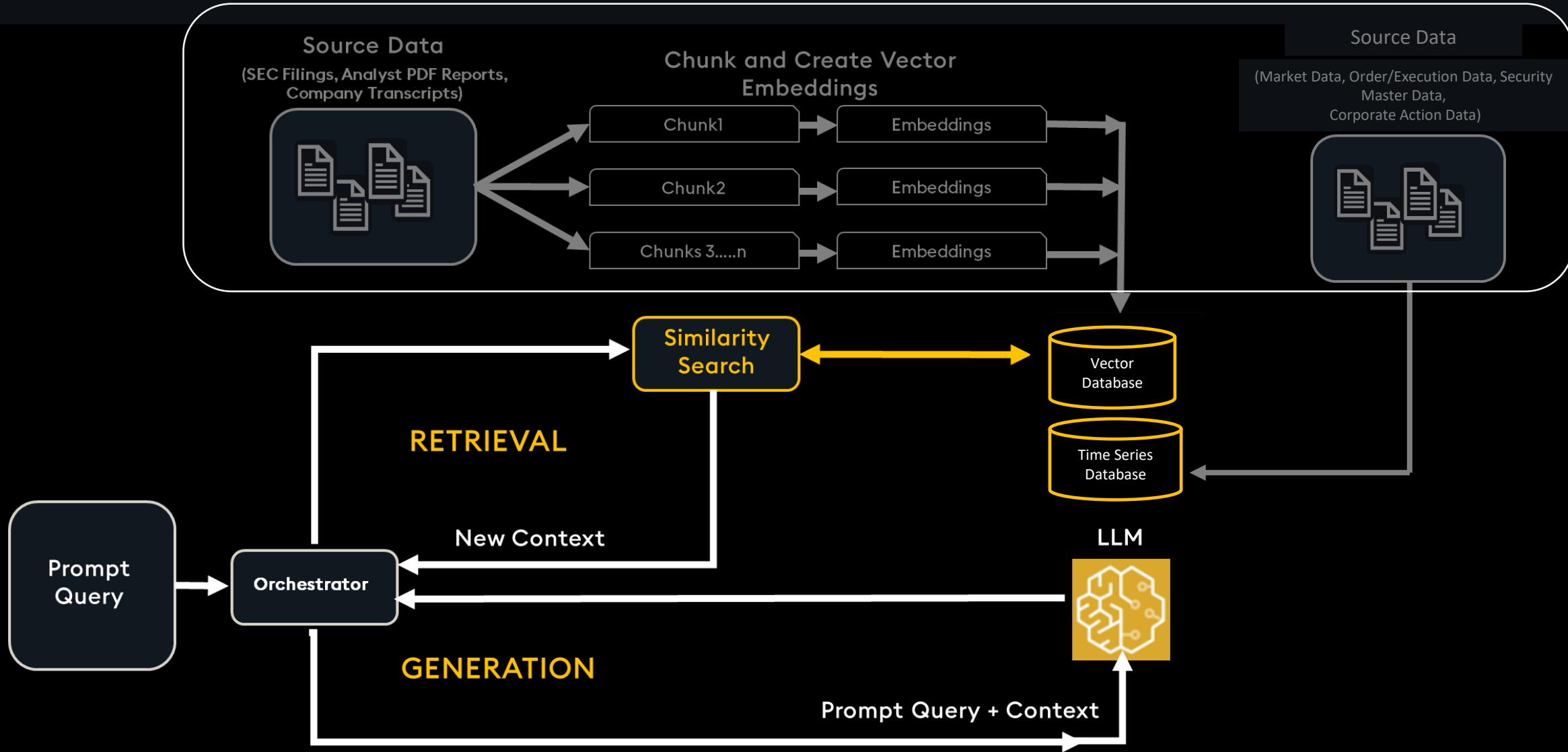
The AI Landscape – Challenges Capital Markets Face

Key Considerations for more **Precise & Timely** Predictions

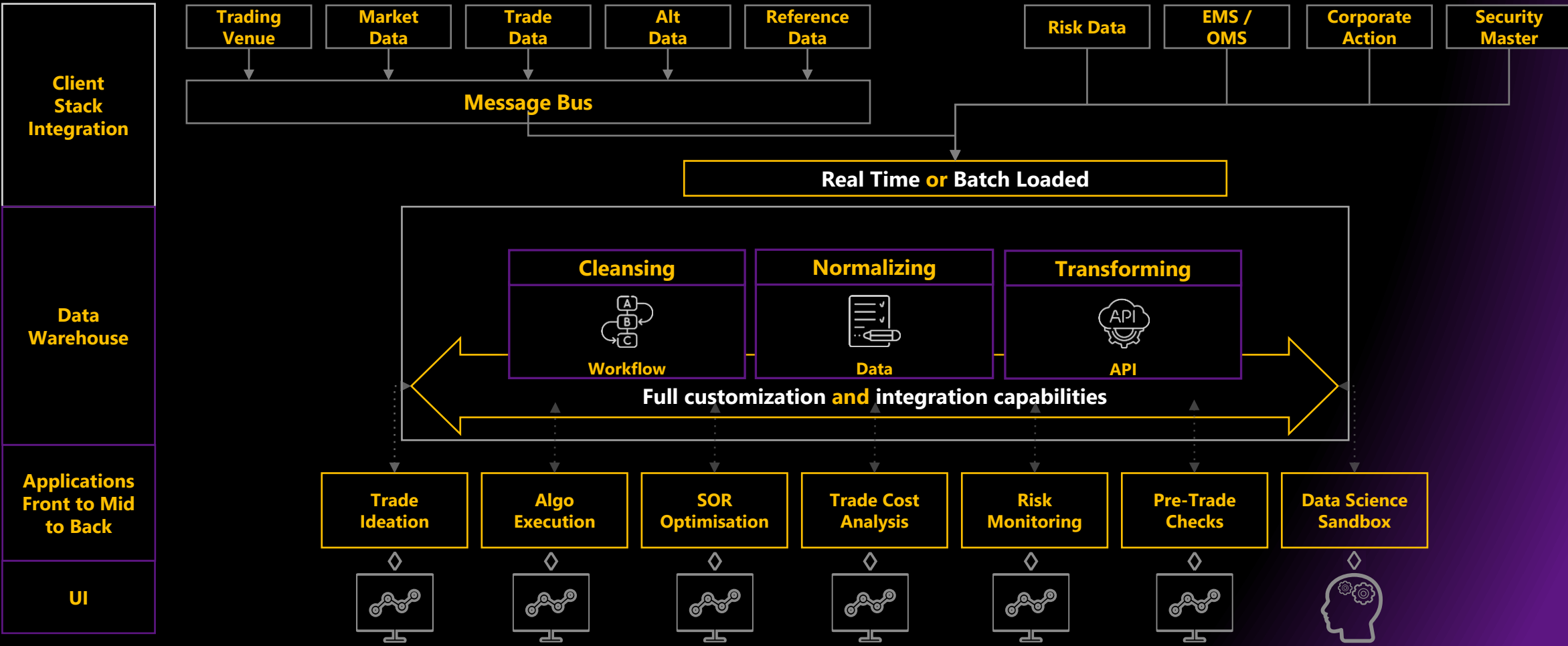
- handle high **velocity, volume, variety**
- combine **data at rest (historical)** and **data in motion (real-time)**
- fusion of **structured** and **unstructured time-oriented vector data**
- nexus of **traditional AI** and **generative AI**
- operate from **edge to cloud deployments** across highly **regulated, compliant** industries



Overview - Retrieval Augmented Generation



Traditional - Trade, Risk and Compliance - Data Strategy



Today - Trade, Risk and Compliance - Data Strategy

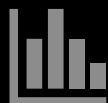
RAG Search

200K embeddings per GPU
10 ms queries
Constant search time



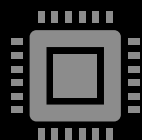
Ranked Facts

Not approximated, results contain exact numerical data

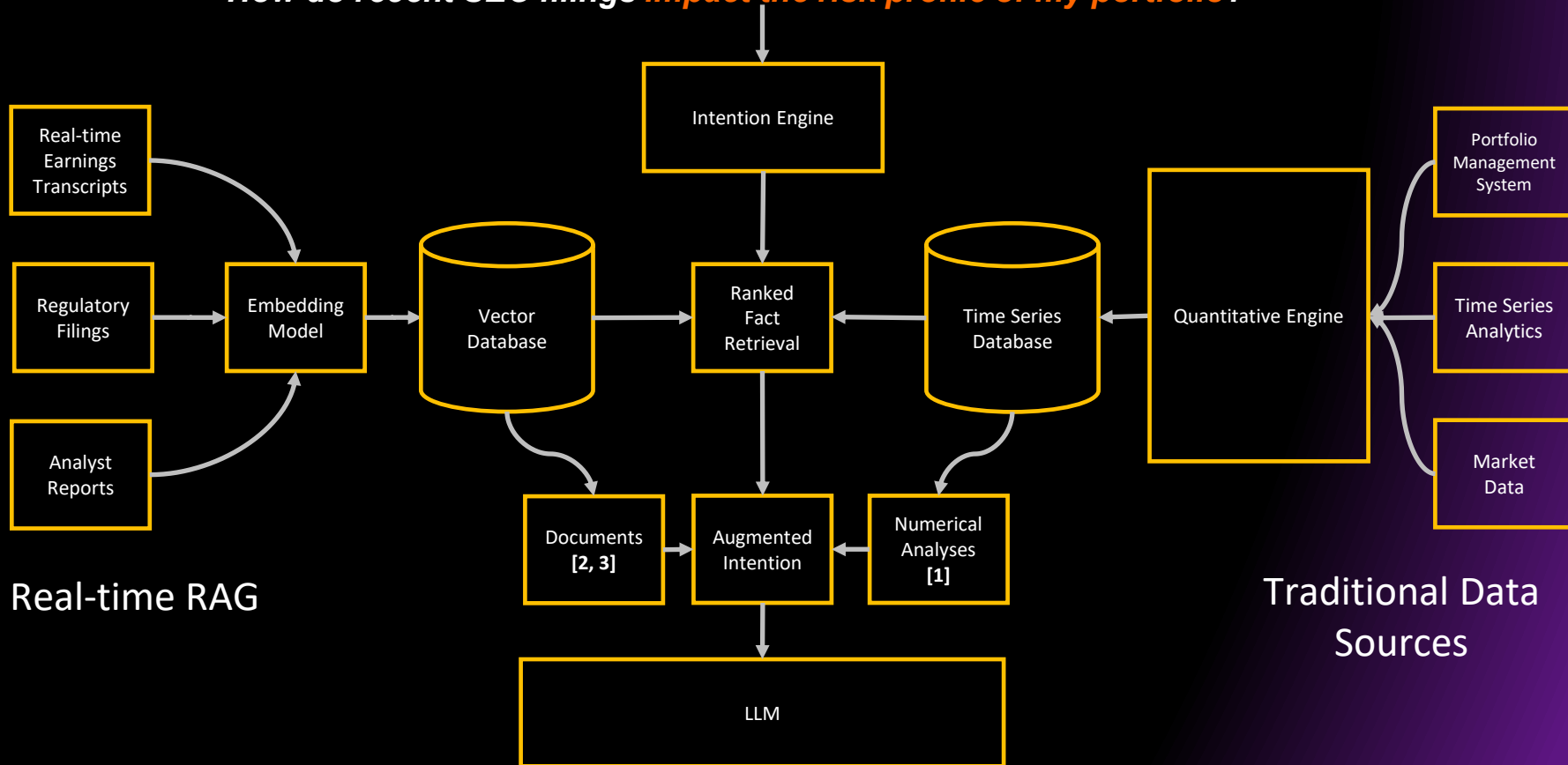


GPU Accelerated Quantitative Engine

1,000 scenarios per GPU



"How do recent SEC filings **impact the risk profile of my portfolio?**"



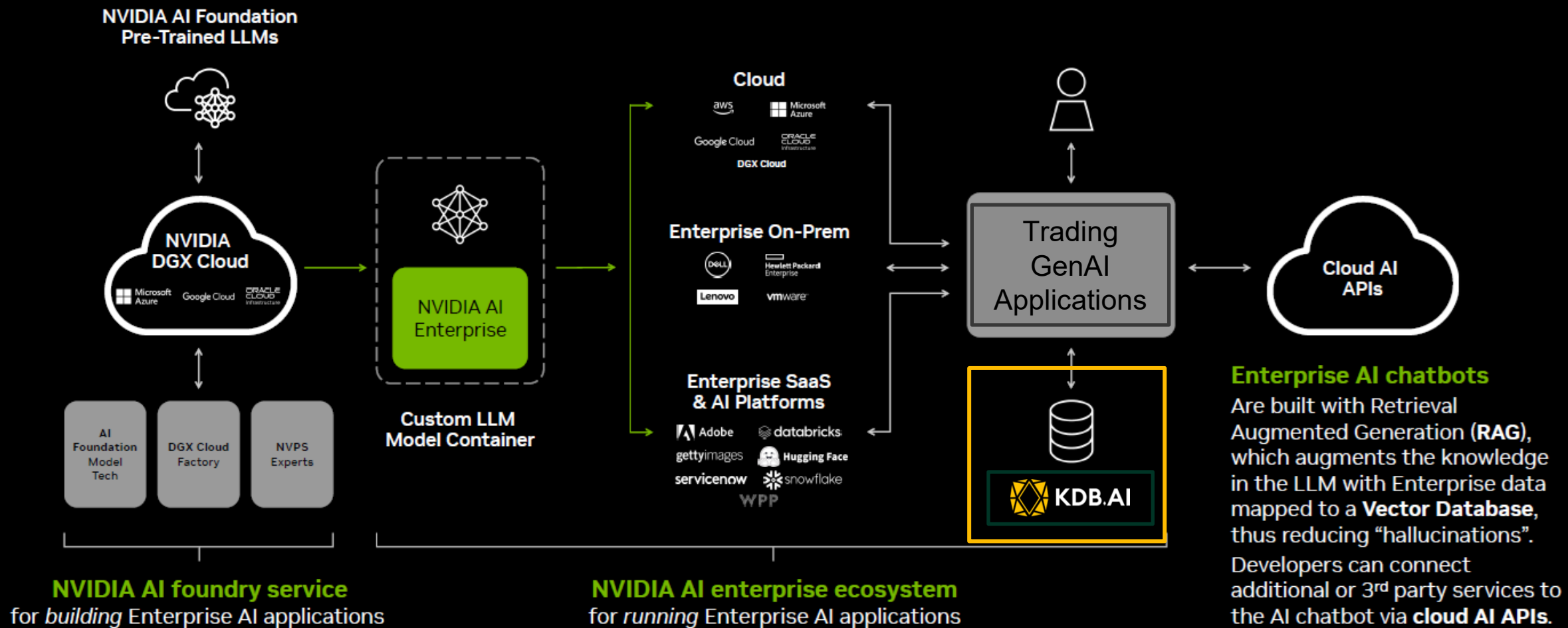
Real-time RAG

Traditional Data Sources

"**Your investment** in XYZ Corporation is **currently considered high risk due to** its above-average volatility [1] and recent negative developments, including regulatory investigations [2] and significant client loss [3]. It is advisable to reassess your investment strategy and consider risk mitigation measures."

Powering the AI Industrial Revolution

Building and Running Enterprise Gen AI Applications





NVIDIA AI Enterprise & KX

Trade Ideation, Trade Execution and Risk Management

Data Preparation

Data Sources

Structured

- Market Data
- Order/Execution Data
- Security Master Data
- Corporate Action Data

Unstructured

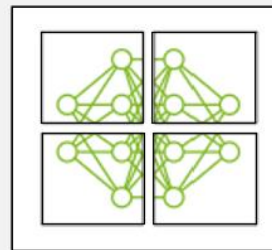
- SEC Filings
- Analyst Reports
- Company Transcripts
- News



Model Training



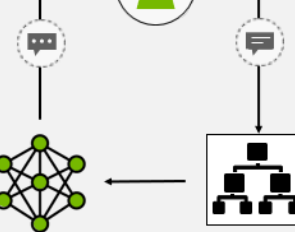
Hybrid RAG
Fine tuned
Model



NeMo Customizer



Vector
Database



Timeseries
Database

NeMo Retriever



Deployment



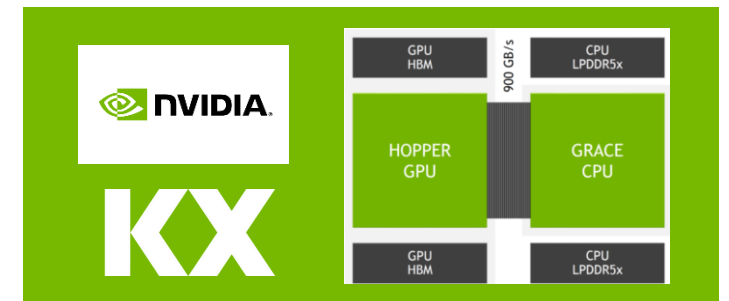
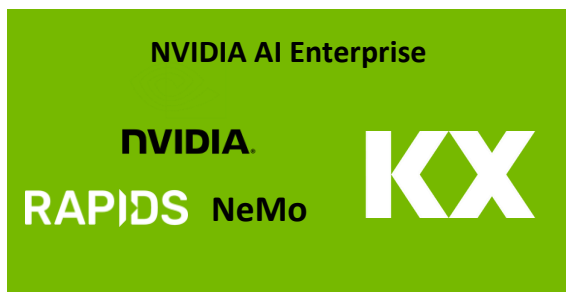
Trade Ideation & Research NIM



Trade Execution NIM



Risk Management NIM



time	sym	title
2023-08-02 17:51:10.35224		Maoyan Partners with iQIYI, Weibo to Release 2020 Mid-Year China ... Maoyan Partners with iQIYI, Weibo to Rel
2023-08-02 17:51:00.34653	DIS	When Are New Star Wars Shows Coming to Disney+? - Bloomberg Netflix released "Roma" in theaters and for :
2023-08-02 17:50:50.43442	AIRM	AIR MILES® provides Canadians with more options to book their ... "With thousands of Package Vacations avail
2023-08-02 17:50:40.36774	UBER	Uber Hack: Company Blames Notorious Extortion Gang Lapsus\$ for ...Sep 19, 2022 ... Uber Technologies Inc. sai
2023-08-02 17:50:30.35870	TRIP	Tripadvisor Names Best Beaches in the World for Travelers' Choice ... favorite beaches of the year, providing the
2023-08-02 17:50:20.31224	AMZN	Amazon Plans to Invest \$1 Billion in Movies for Theaters - Bloomberg in particular has aggravated cinema chair
2023-08-02 17:50:10.35673		Renewable Energy Investments Shift to Developing Nations ... Renewable energy investments are shifting to de
2023-08-02 17:50:00.34514	CITES	Big Cats Face Poachers, Safari Hunters, Coming Extinction ... Beverly Joubert: It's a 95 to 97 percent decline. Lior
2023-08-02 17:49:50.67943	DIS	Cable Fights For Its Movie Rights - Bloomberg Just as important, as cable has consolidated, the industry is able
2023-08-02 17:49:40.34696	CATS	Cats & Dogs SA - Company Profile and News - Bloomberg Markets
2023-08-02 17:49:30.32330	AAPL	Has the Influence of Big Tech Made Video Games Vulnerable to a ... There's a common narrative that the video
2023-08-02 17:49:20.33050	BI	BI Analyst Briefing: The Future of Video Games Bloomberg ... The video game industry has seen heightened in
2023-08-02 17:49:10.33209	NINTENDO	Nintendo and Sony Disagree About Games Industry Slump ... A shelf of Nintendo video games and accessories
2023-08-02 17:49:00.36326	AAPL	Apple (AAPL) Targets Sept. 7 for iPhone 14 Launch in Flurry of ...Aug 17, 2022 ... New products are expected to i
2023-08-02 17:48:50.36685	COVID	Covid Is Delaying All the Video Games - Bloomberg If the video game you've been looking forward to playing t
2023-08-02 17:48:40.35557	MLLY	Marley Spoon: Appendix 4C - Q4 2021 & Business Activity Report ... our meal kits contain step-by-step recipes
2023-08-02 17:48:30.45044	XMX	Mexico's President Defends His Covid Czar Over Beach Getaway ... reeling off a list of his qualifications in respo
2023-08-02 17:48:20.41498	EDEN	EDENRED S.A.: 2017 FOOD SURVEY: ONE OUT OF TWO ... in offering healthy and balanced meals, 87% of Frenc
2023-08-02 17:48:10.98480	XLNX	An NBA Star Thinks He Can Help Video Gaming Competitions Grow ... Video game sports are on the cusp of gc
2023-08-02 17:48:00.79099		Post-Pandemic Vacations Will Blend Work with More Family Time ... Work Moves to the Beach as 'Bleisure' Time
2023-08-02 17:47:50.33913	AMZN	Jeff Bezos Sees 'Millions' of People Living, Working in Space ... Amazon.com Inc. Chief Executive Officer Jeff Bez
2023-08-02 17:47:40.55608	SEC	Kim Kardashian's SEC Settlement: Fresh Warning on Celebrity ... Kardashian SEC Slap Is Fresh Warning Shot Ove
2023-08-02 17:47:30.32287	Xbox	Watch Are Video Games Really Getting Cheaper? - Bloomberg Have video games lost their recession-proof arr
2023-08-02 17:47:20.34372		2016 Was a Record Year for Data Breaches - BloombergJan 19, 2017 ... U.S. companies and government agencie
2023-08-02 17:47:11.20653	AAPL	Video Games Are Accidental Incubators of Future Tech. Up Next ... Video Games Are the Accidental Incubators
2023-08-02 17:47:00.32136	SNE	Jason Schreier - Bloomberg relates to 'Last of Us' Multiplayer Video Game Faces Setbacks at Sony.
2023-08-02 17:46:50.36313		Renewable Energy Is So Cheap Fossil Fuels Used in Electricity May ... The exponential growth of renewable ener
2023-08-02 17:46:40.32824	OOZI	Oozie Cats or Uzi Katz: From Fugitive to Tech CEO and Back Again ... As the boss of a successful, if obscure, techn

News Stream

Showing all 173 rows

Lookforward

180

Drag a column header and drop it here for grouping Hide Filters | Excel | CSV

sym	title
AAPL	Heading: Apple Lineup Reaching Sales Ceiling Puts Pressure on Cook ... the company's first new products since 2010 to revive growth
AMC	Heading: Coherus Highlights Anticipated New Product Launches and Immuno ... Commercial Update: Preparing to launch as many as
AAPL	Heading: When Will Apple (AAPL) Release New iPhone SE 5G and iPad Air ... Also: The company takes another hit to its App Store bus
AAPL	Heading: Apple Pushes Back Mixed-Reality Headset Debut Two Months to ... It's meant to be a centerpiece of Apple's new product lin
SNOA	Heading: Sonoma Pharmaceuticals Announces Expanded Dental Care Line ... The company's products reduce infections, itch, pain, sca
ΔΔPI	Heading: What's Coming at Apple's (ΔΔPI) Sept. 7 Far Out iPhone 14 Event ... Apple Inc. made it official this past week: The company'

Showing all 17 rows

Market Investigation

time	sym	title
2023-08-02 17:51:10.35224		Maoyan Partners with iQIYI, Weibo to Release 2020 Mid-Year China ... Maoyan Partners with iQIYI, Weibo to Rel
2023-08-02 17:51:00.34653	DIS	When Are New Star Wars Shows Coming to Disney+? - Bloomberg Netflix released "Roma" in theaters and for:

Lookforward

NewsRecord

Element	Value
PublishTime	2023-08-02 17:50:40.367747000
MarketTicker	UBER
Alert	CompanyDataBreach

News Content

Uber Hack: Company Blames Notorious Extortion Gang Lapsus\$ for ...Sep 19, 2022 ... Uber Technologies Inc. said the hacker responsible for a data breach reported last week is affiliated with a notorious extortion group named ...

Generative AI Insight

Uber Technologies Inc. has been hit with a data breach, with the company blaming a notorious extortion gang Lapsus\$ for the attack. This news event has caused a significant shift in the view of the company, as the breach has exposed the company's lack of security measures and could lead to a loss of customer trust. The risk and market impact of this news event could be significant, as the company's reputation could be damaged and customers may be less likely to use the service.

Create Newsletter

Source: <https://www.bloomberg.com/news/articles/2022-09-19/uber-blames-notorious-extortion-gang-lapsus-for-hack>

News Stream

2023-08-02 17:46:50.363		renewable energy is so cheap fossil fuels used in electricity may ... the exponential growth of renewable ene
2023-08-02 17:46:40.32824	OOZI	Oozi Cats or Uzi Katz: From Fugitive to Tech CEO and Back Again ... As the boss of a successful, if obscure, techn

Showing all 173 rows

Market Inve

SNOA	Heading: Sonoma Pharmaceuticals Announces Expanded Dental Care Line ... The company's products reduce infections, itch, pain, scz
Δ Δ PI	<h>Headline</h> What's Coming at Apple's (Δ Δ PI) Sent 7 Far Out iPhone 14 Event ... Apple Inc. made it official this past week: The company'

Showing all 17 rows

We've updated the dispute procedures in our [Terms of Service](#) ("Terms"). By continuing to use the site, you accept and agree to these updated Terms.

Business
Cybersecurity

Uber Blames Notorious Extortion Gang Lapsus\$ for Hack

- No customer data was involved, but internal messages accessed
- Lapsus\$ crew previously took credit for Cisco, Okta breaches

Facebook Twitter LinkedIn Email Print

Gift this article

By [Margi Murphy](#)
September 19, 2022 at 3:02 PM EDT

[Uber Technologies Inc.](#) said the hacker responsible for a data breach reported last week is affiliated with a notorious extortion group named Lapsus\$, which also targeted technology companies including [Microsoft Corp.](#), [Cisco Systems Inc.](#), [Okta Inc.](#) and [Samsung Corp.](#) this year.

Uber shut down some of its internal software and messaging systems on Thursday, after an attacker infiltrated its network and sent employees messages warning that Uber had been hacked.



time	sym	title
2023-08-02 17:51:10.35224		Maoyan Partners with iQIYI, Weibo to Release 2020 Mid-Year China ... Maoyan Partners with iQIYI, Weibo to Rel
2023-08-02 17:51:00.34653	DIS	When Are New Star Wars Shows Coming to Disney+? - Bloomberg Netflix released "Roma" in theaters and for :
2023-08-02 17:50:50.43442	AIRM	AIR MILES® provides Canadians with more options to book their ... "With thousands of Package Vacations avail
2023-08-02 17:50:40.36774	UBER	Uber Hack: Company Blames Notorious Extortion Gang Lapsus\$ for ...Sep 19, 2022 ... Uber Technologies Inc. sai
2023-08-02 17:50:30.35870	TRIP	Tripadvisor Names Best Beaches in the World for Travelers' Choice ... favorite beaches of the year, providing the
2023-08-02 17:50:20.31224	AMZN	Amazon Plans to Invest \$1 Billion in Movies for Theaters - Bloomberg in particular has aggravated cinema chair
2023-08-02 17:50:10.35673		Renewable Energy Investments Shift to Developing Nations ... Renewable energy investments are shifting to de
2023-08-02 17:50:00.34514	CITES	Big Cats Face Poachers, Safari Hunters, Coming Extinction ... Beverly Joubert: It's a 95 to 97 percent decline. Lior
2023-08-02 17:49:50.67943	DIS	Cable Fights For Its Movie Rights - Bloomberg Just as important, as cable has consolidated, the industry is able
2023-08-02 17:49:40.34696	CATS	Cats & Dogs SA - Company Profile and News - Bloomberg Markets
2023-08-02 17:49:30.32330	AAPL	Has the Influence of Big Tech Made Video Games Vulnerable to a ... There's a common narrative that the video
2023-08-02 17:49:20.33050	BI	BI Analyst Briefing: The Future of Video Games Bloomberg ... The video game industry has seen heightened in
2023-08-02 17:49:10.33209	NINTENDO	Nintendo and Sony Disagree About Games Industry Slump ... A shelf of Nintendo video games and accessories
2023-08-02 17:49:00.36326	AAPL	Apple (AAPL) Targets Sept. 7 for iPhone 14 Launch in Flurry of ...Aug 17, 2022 ... New products are expected to
2023-08-02 17:48:50.36685	COVID	Covid Is Delaying All the Video Games - Bloomberg If the video game you've been looking forward to playing t
2023-08-02 17:48:40.35557	MLLY	Marley Spoon: Appendix 4C - Q4 2021 & Business Activity Report ... our meal kits contain step-by-step recipes
2023-08-02 17:48:30.45044	XMEX	Mexico's President Defends His Covid Czar Over Beach Getaway ... reeling off a list of his qualifications in respo
2023-08-02 17:48:20.41498	EDEN	EDENRED S.A.: 2017 FOOD SURVEY: ONE OUT OF TWO ... in offering healthy and balanced meals, 87% of Frenc
2023-08-02 17:48:10.98480	XLNX	An NBA Star Thinks He Can Help Video Gaming Competitions Grow ... Video game sports are on the cusp of gc
2023-08-02 17:48:00.79099		Post-Pandemic Vacations Will Blend Work with More Family Time ... Work Moves to the Beach as 'Bleisure' Time
2023-08-02 17:47:50.33913	AMZN	Jeff Bezos Sees 'Millions' of People Living, Working in Space ... Amazon.com Inc. Chief Executive Officer Jeff Bez
2023-08-02 17:47:40.55608	SEC	Kim Kardashian's SEC Settlement: Fresh Warning on Celebrity ... Kardashian SEC Slap Is Fresh Warning Shot Ove
2023-08-02 17:47:30.32287	Xbox	Watch Are Video Games Really Getting Cheaper? - Bloomberg Have video games lost their recession-proof arr
2023-08-02 17:47:20.34372		2016 Was a Record Year for Data Breaches - BloombergJan 19, 2017 ... U.S. companies and government agencie
2023-08-02 17:47:11.20653	AAPL	Video Games Are Accidental Incubators of Future Tech. Up Next ... Video Games Are the Accidental Incubators
2023-08-02 17:47:00.32136	SNE	Jason Schreier - Bloomberg relates to 'Last of Us' Multiplayer Video Game Faces Setbacks at Sony.
2023-08-02 17:46:50.36313		Renewable Energy Is So Cheap Fossil Fuels Used in Electricity May ... The exponential growth of renewable ener
2023-08-02 17:46:40.32824	OOZI	Oozie Cats or Uzi Katz: From Fugitive to Tech CEO and Back Again ... As the boss of a successful, if obscure, techn



Drag a column header and drop it here for grouping

Hide Filters | Excel | CSV

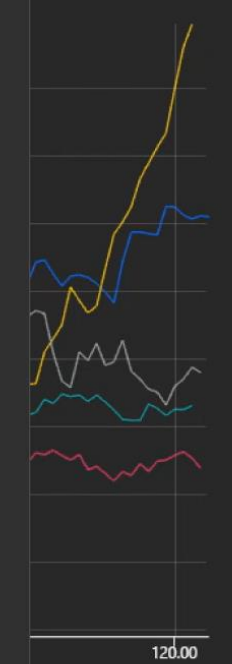
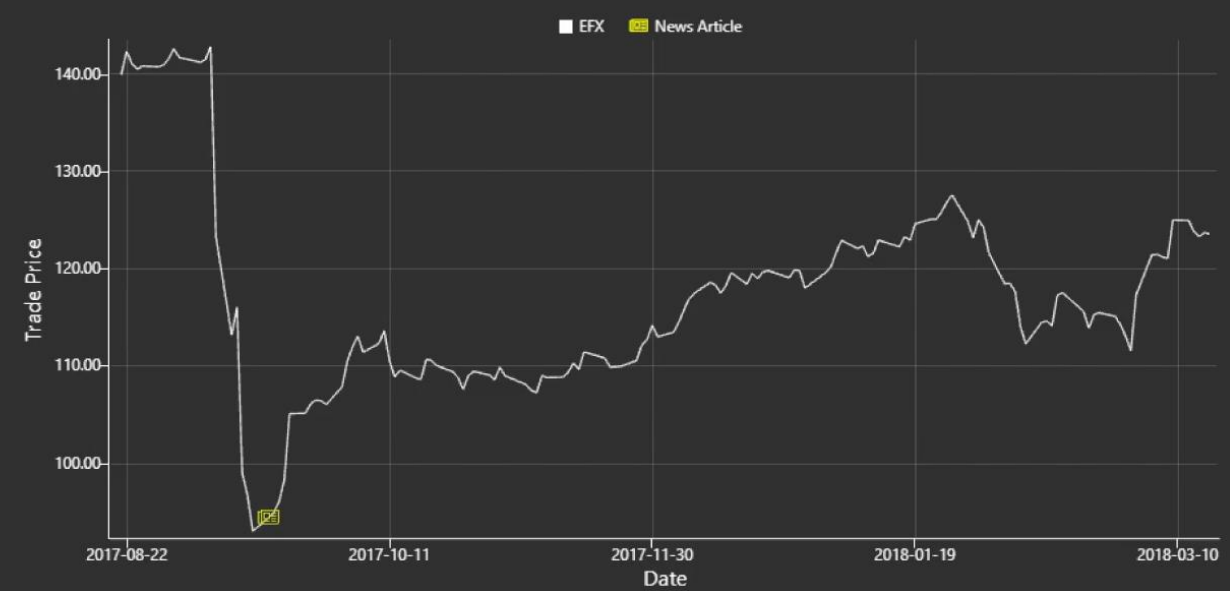
sym	title
JPM	Heading: JPMorgan's Data Breach Reveals Growth Market for Insurers ... Demand for coverage has accelerated after some of the large
MDLZ	Heading: Federman & Sherwood Investigates Mondelez Group, LLC for Data ... Federman & Sherwood Investigates Mondelez Group,
UBER	Heading: Uber's Former Security Chief Convicted of Data Hack Coverup ... Joe Sullivan, the former head of security at Uber, leaves cou
UBER	Heading: Uber Sued for Negligence After Disclosing Massive Data Breach ... Company accused of failing to take reasonable security st
EFX	Heading: Equifax Suffered a Hack Almost Five Months Earlier Than the Date It ... In a statement, the company said the March breach v
INI	Heading: Data Breach at Jimmy John's Could Damage Franchisees - Bloomberg As retail hacks continue to make news, franchisees wi

Showing all 8 rows

time	sym	title
2023-08-02 17:51:10.35224		Maoyan Partners with iQIYI, Weibo to Release 2020 Mid-Year China ... Maoyan Partners with iQIYI, Weibo to Rel

Lookforward

time	sym	title
2023-08-02 17:51:00.346		Drilldown
2023-08-02 17:50:50.434		Company: EFX
2023-08-02 17:50:40.367		
2023-08-02 17:50:30.358		Heading: Equifax Suffered a Hack Almost Five Months Earlier Than the Date It ... In a statement, the company said the March breach was not related to Equifax hired the security firm Mandiant on both occasions and may ...
2023-08-02 17:50:20.312		
2023-08-02 17:50:10.356		
2023-08-02 17:50:00.345		Original Description: Equifax Inc. learned about a major breach of its computer systems in March -- almost five months before the date it has publicly disclosed, according to three people familiar with the situation.
2023-08-02 17:49:50.679		
2023-08-02 17:49:40.346		
2023-08-02 17:49:30.323		
2023-08-02 17:49:20.330		
2023-08-02 17:49:10.332		
2023-08-02 17:49:00.363		
2023-08-02 17:48:50.366		
2023-08-02 17:48:40.355		
2023-08-02 17:48:30.450		
2023-08-02 17:48:20.414		
2023-08-02 17:48:10.984		
2023-08-02 17:48:00.790		
2023-08-02 17:47:50.339		
2023-08-02 17:47:40.556		
2023-08-02 17:47:30.322		
2023-08-02 17:47:20.343		
2023-08-02 17:47:11.206		
2023-08-02 17:47:00.321		
2023-08-02 17:46:50.363		
2023-08-02 17:46:40.32824	OOZI	OOZI Cats of Ozi Katz: From Fugitive to Tech CEO and Back Again ... AS the boss of a successful, if obscure, techn



Source: <https://www.bloomberg.com/news/articles/2017-09-18/equifax-is-said-to-suffer-a-hack-earlier-than-the-date-disclosed>

Showing all 173 rows

Showing all 8 rows

Capital Markets: Signal Generation from Unstructured Data at Scale



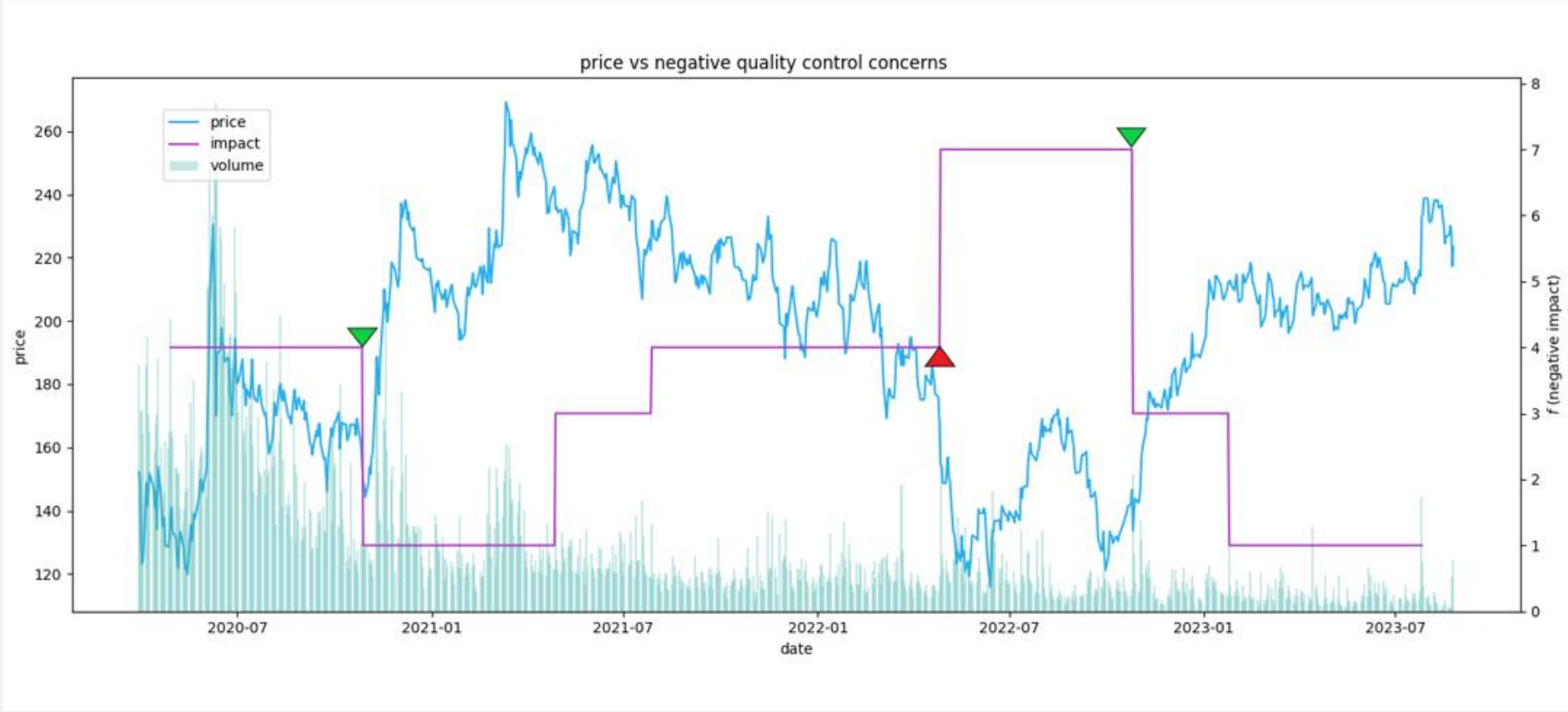
Portfolio Manager

I have a thesis for how to maximize my returns on a given investment strategy – let me test it

Trade Execution Desk

Our client wants to execute on a trade idea – help me minimize market impact

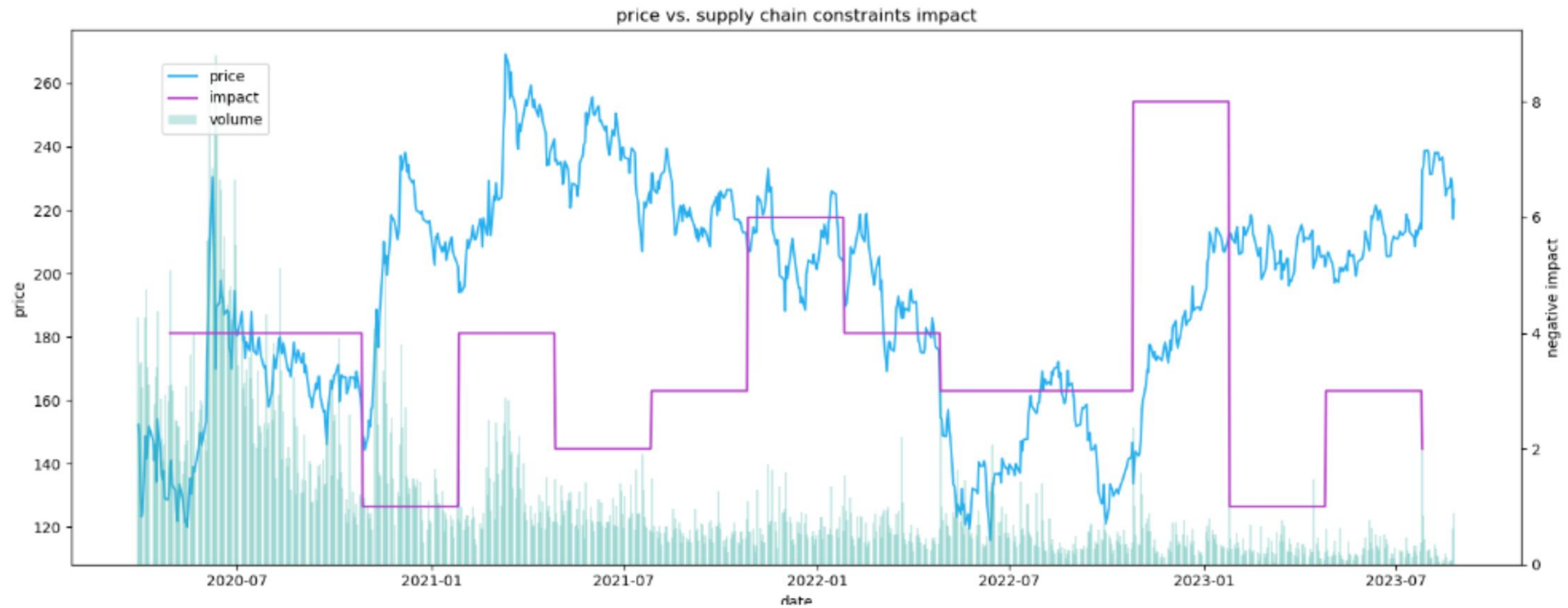
Is Quality Assurance a leading indicator of price movement?





Identify the **oil price volatility** impacts in the transcripts:

- Operating efficiency and demand for sustainable aviation fuels (2022 Q3)
- Ability to offset sharply higher fuel prices (2021 Q3)
- Impact on customers' fleet needs and sustainability performance (2020 Q4)
- Impact on operating margins and EPS (2022 Q3, 2021 Q3)
- Impact on wide-body program production rates (2021 Q4)



Identify the **supply chain constraints** impacts mentioned in the transcripts:

- Labor shortages (Q1 2022, Q3 2021, Q2 2020, Q1 2020)
- Raw material availability (Q4 2021)
- Technical challenges (Q2 2021)
- Parts shortages (Q2 2020)
- Logistics challenges (Q4 2021)
- Supplier quality issues (Q1 2020)



THANK YOU