



OPENMAMA AS A MIDDLEWARE STANDARD:
ENSURING USER CHOICE IN MESSAGING SYSTEMS

FEARGAL O'SULLIVAN – NYSE TECHNOLOGIES

The Linux Foundation Enterprise End User Summit
- April 30, 2012



Agenda

- ❑ Introduction to NYSE Technologies
- ❑ Message Oriented Middleware (MOM) Primer
- ❑ OpenMAMA Overview
- ❑ Use Case: Solace Systems
- ❑ Use Case: NYSE Technologies Data Fabric
- ❑ Summary
- ❑ Q&A



NYSE Technologies



NYSE TechnologiesSM

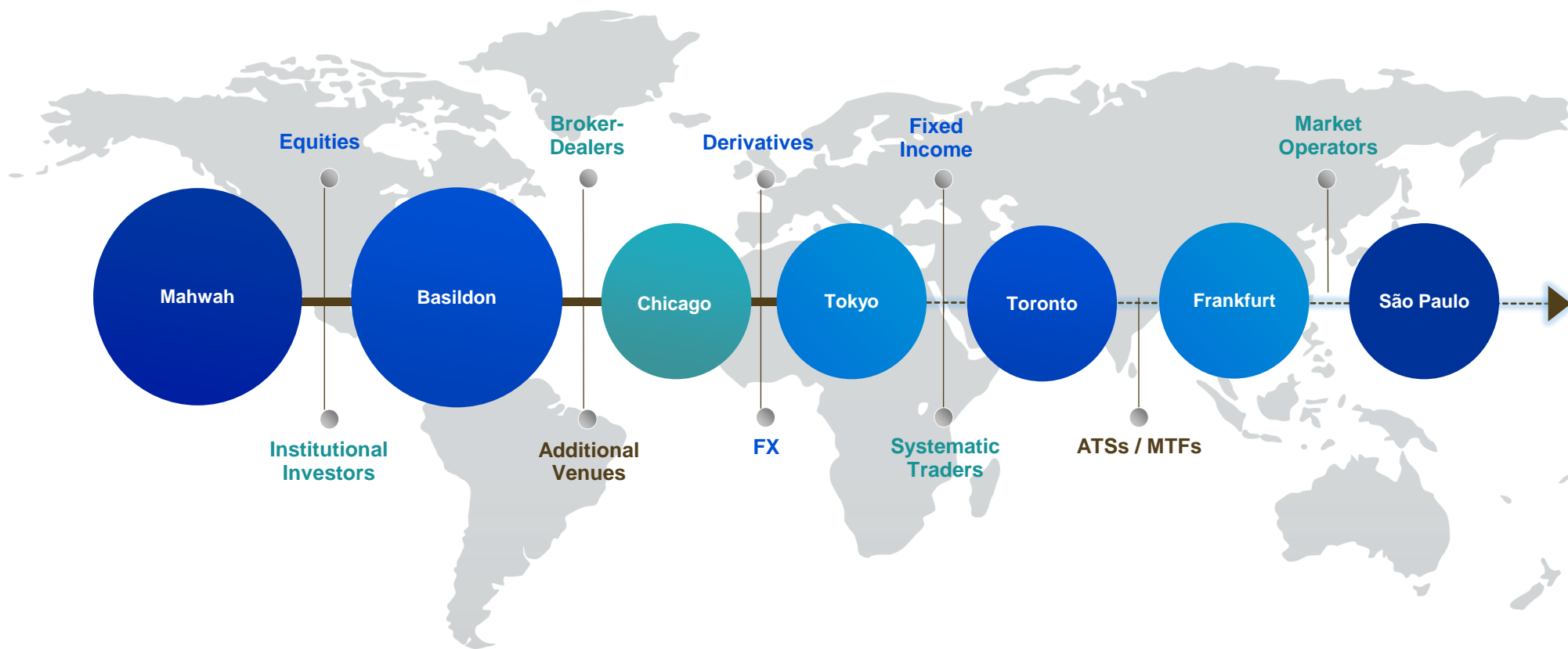
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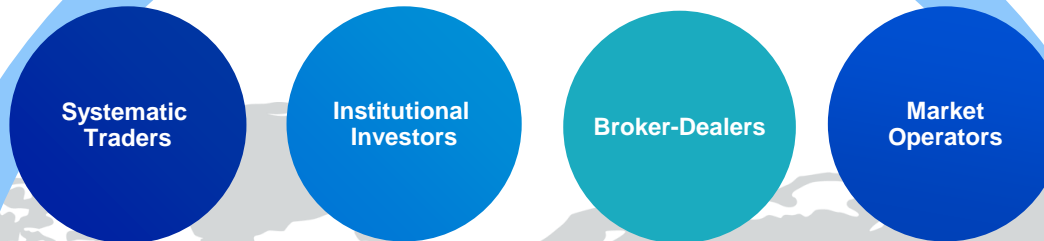
Our mission is to
“reduce trading friction”





Enabling a Global Market Place...





Platform As A Service (PAAS)

- REAL-TIME MARKET DATA
- MANAGED TRANSACTIONS
- TICK HISTORY

Infrastructure As A Service (IAAS)

- COMPUTE ON DEMAND PHYSICAL
- COMPUTE ON DEMAND VIRTUAL
- CO-LOCATION (MIS)

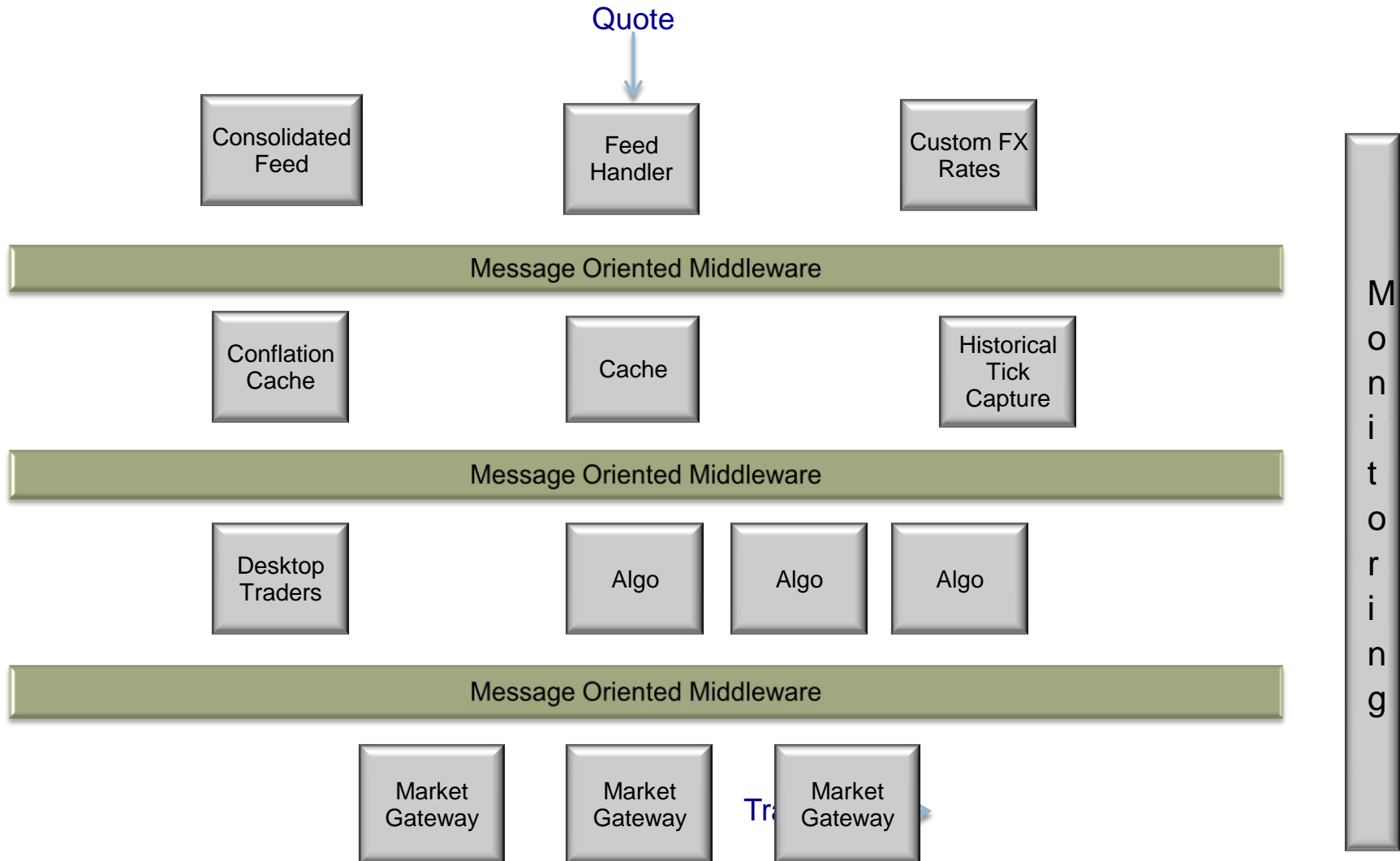


What is Message Oriented Middleware?

- MOM provides a means for applications to send information to each other, without establishing explicit connections, and with little-to-no knowledge of each other
- Two common paradigms: publish/subscribe and queuing
- Topic based naming for routing of messages
- A messaging API is typically proprietary to its own messaging service

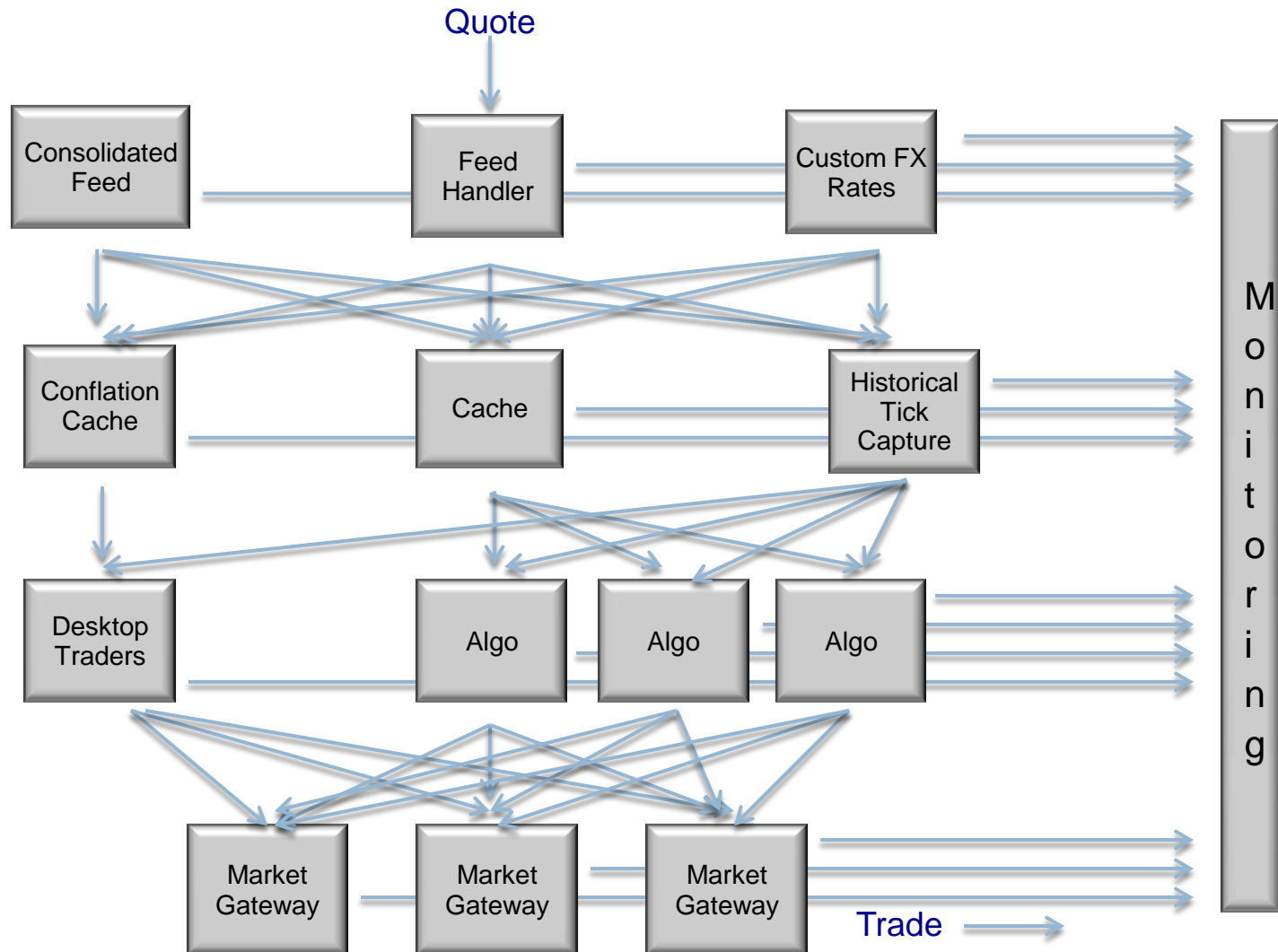


Why Message Oriented Middleware?





The Alternative





Other Use Cases

- ❑ High Performance Computing
 - Job distribution

- ❑ Service Oriented Architecture systems
 - Decoupled 'objects'

- ❑ Scalable web database queries
 - Multiple app servers to multiple databases

- ❑ Transactional applications
 - Multi-phase commits



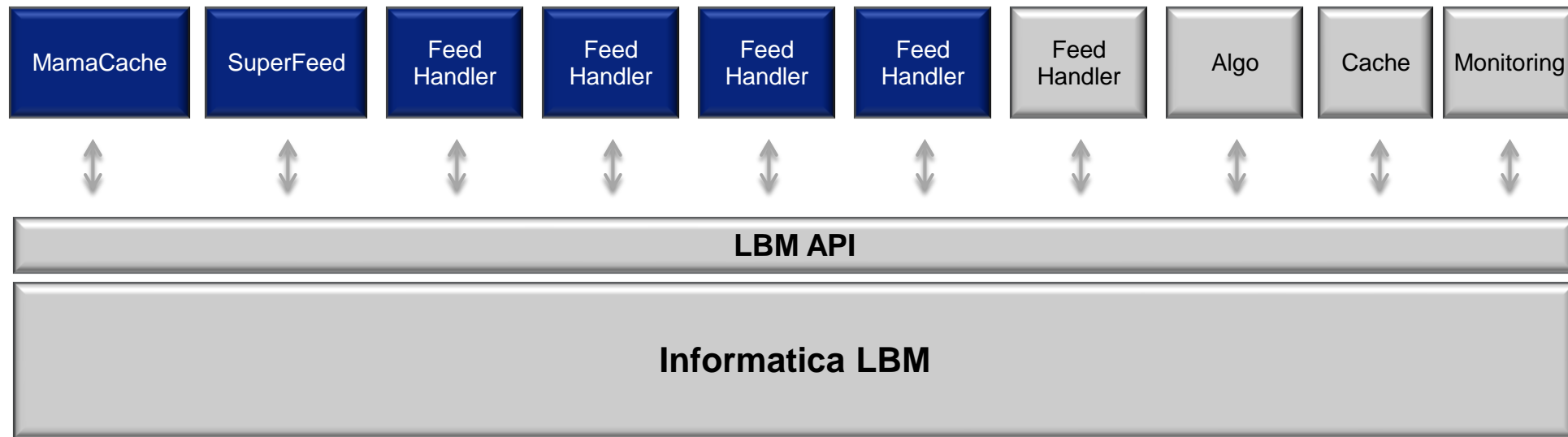
What is OpenMAMA?

OpenMAMA is:

- ❑ **Open Middleware Agnostic Messaging API**
- ❑ Supports a variety of MOM platforms
- ❑ A consistent abstraction layer
- ❑ High performance
- ❑ Open Source
- ❑ Hosted by the Linux Foundation
- ❑ Governed by a group of industry stakeholders



How does OpenMAMA ensure user choice?



Let's say you want to change your middleware to take advantage of new innovations...

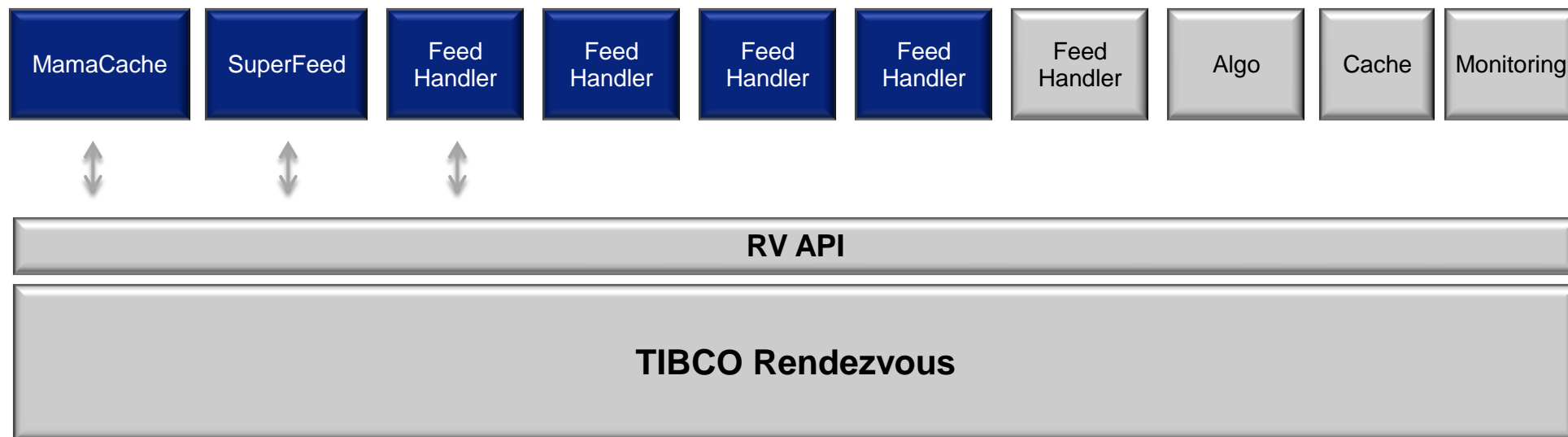
Developed by NYSE Technologies

Developed by Third Party Vendor

Open Source



How does OpenMAMA ensure user choice?



Without OpenMAMA:

- Each application needs to be written to a new API
- Which is time consuming and expensive
- And locks you into yet another vendor specific API

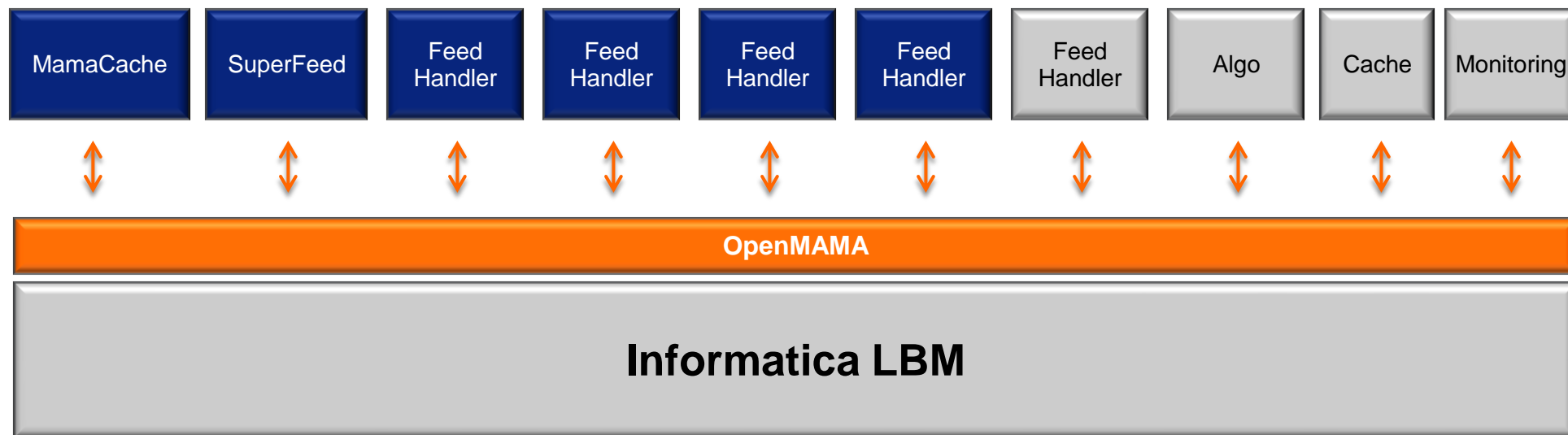
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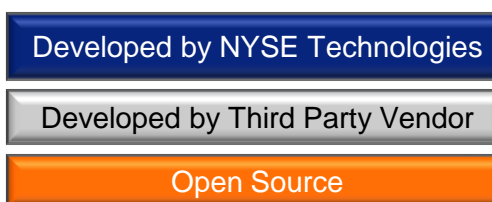


How does OpenMAMA ensure user choice?



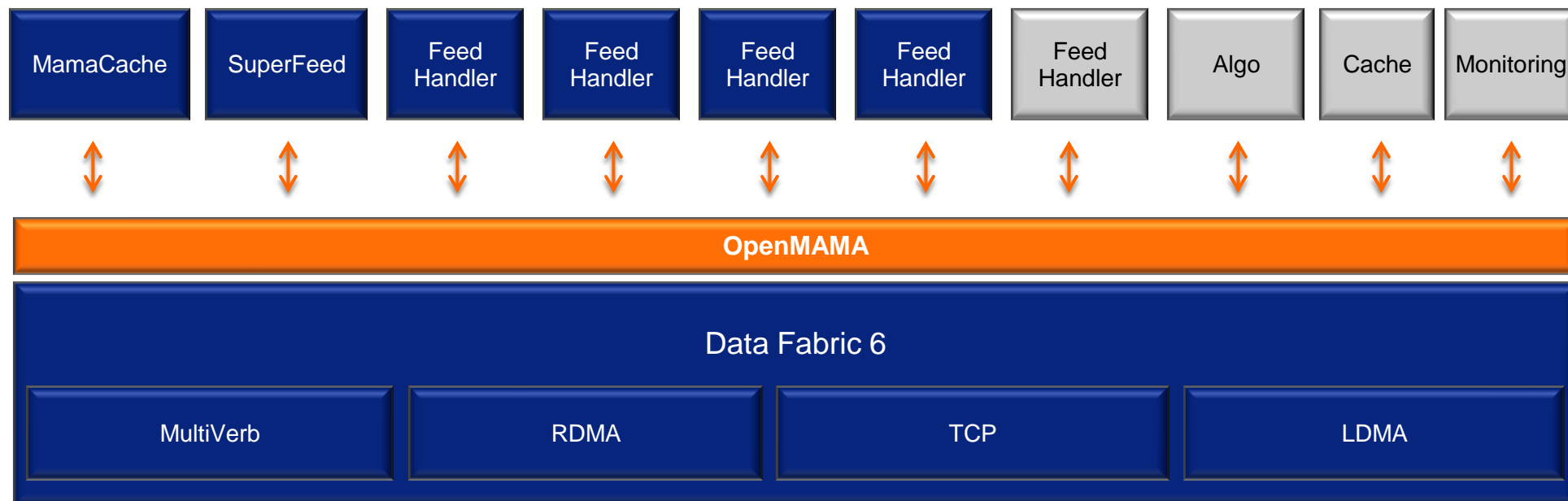
Leveraging OpenMAMA:

- OpenMAMA lets you code your apps once



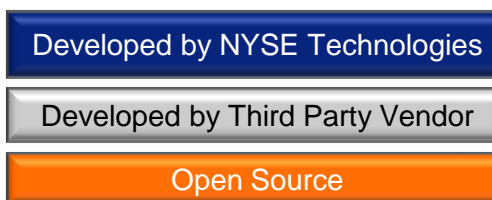


How does OpenMAMA ensure user choice?



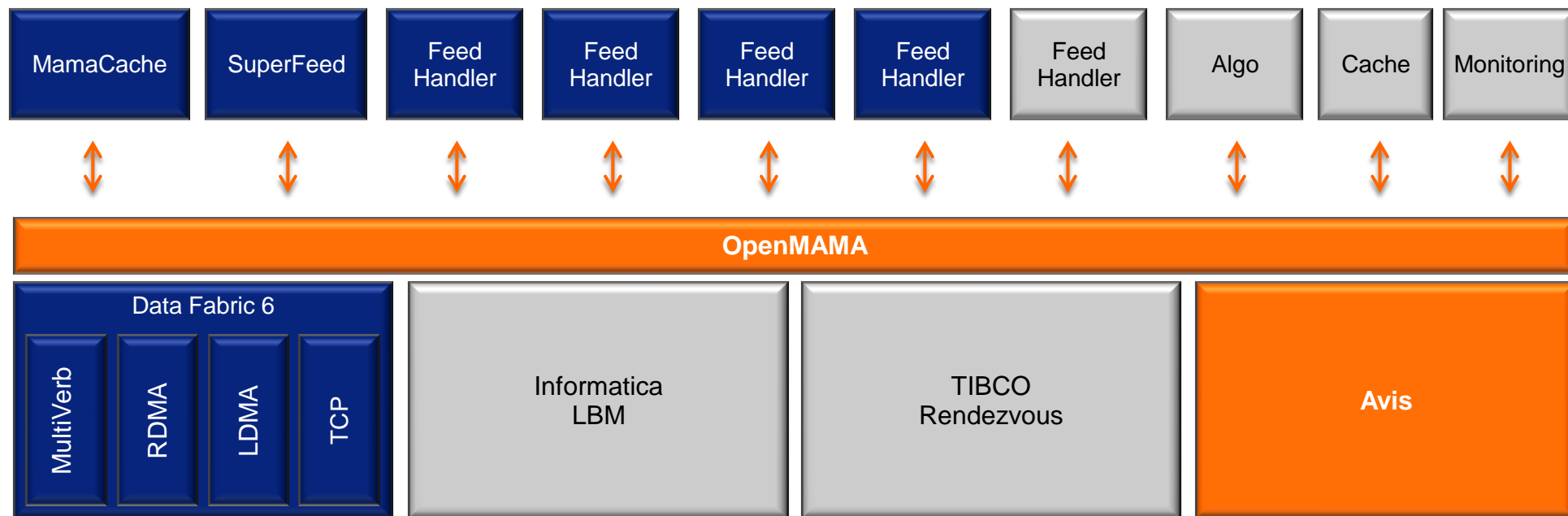
Leveraging OpenMAMA:

- OpenMAMA lets you code your apps once
- Easily upgrade your Middleware or Applications





How does OpenMAMA ensure user choice?



Leveraging OpenMAMA:

- OpenMAMA lets you code your apps once
- Easily upgrade your Middleware or Applications
- Support multiple middlewares with multiple applications

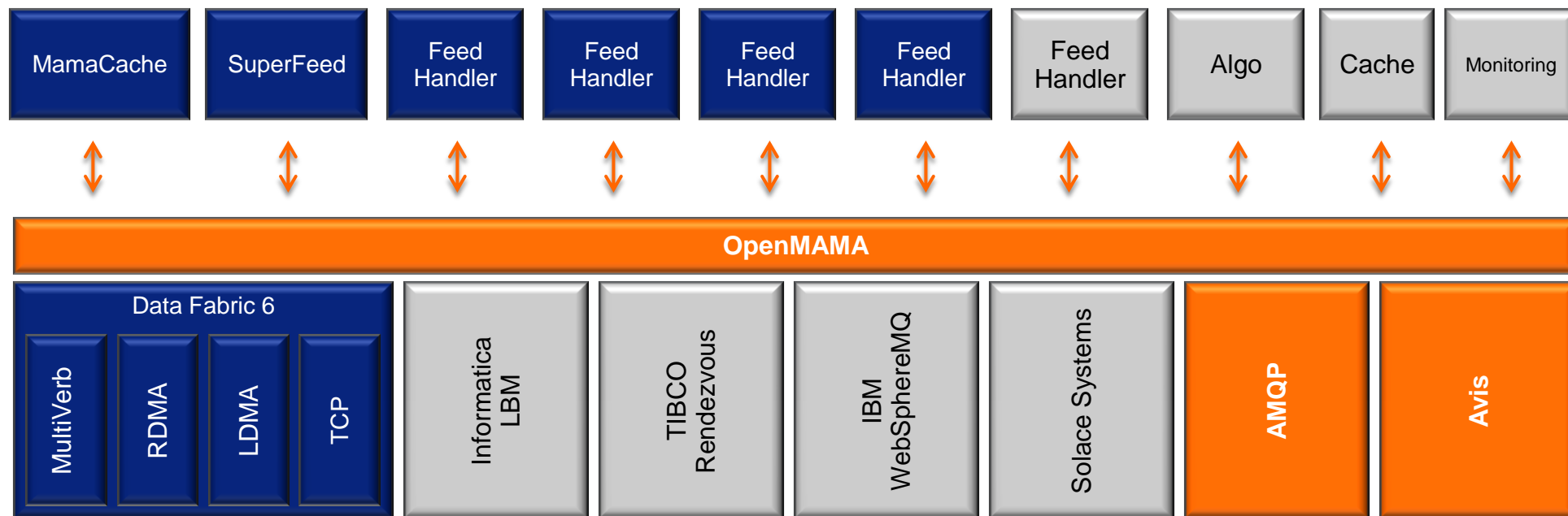
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How does OpenMAMA ensure user choice?



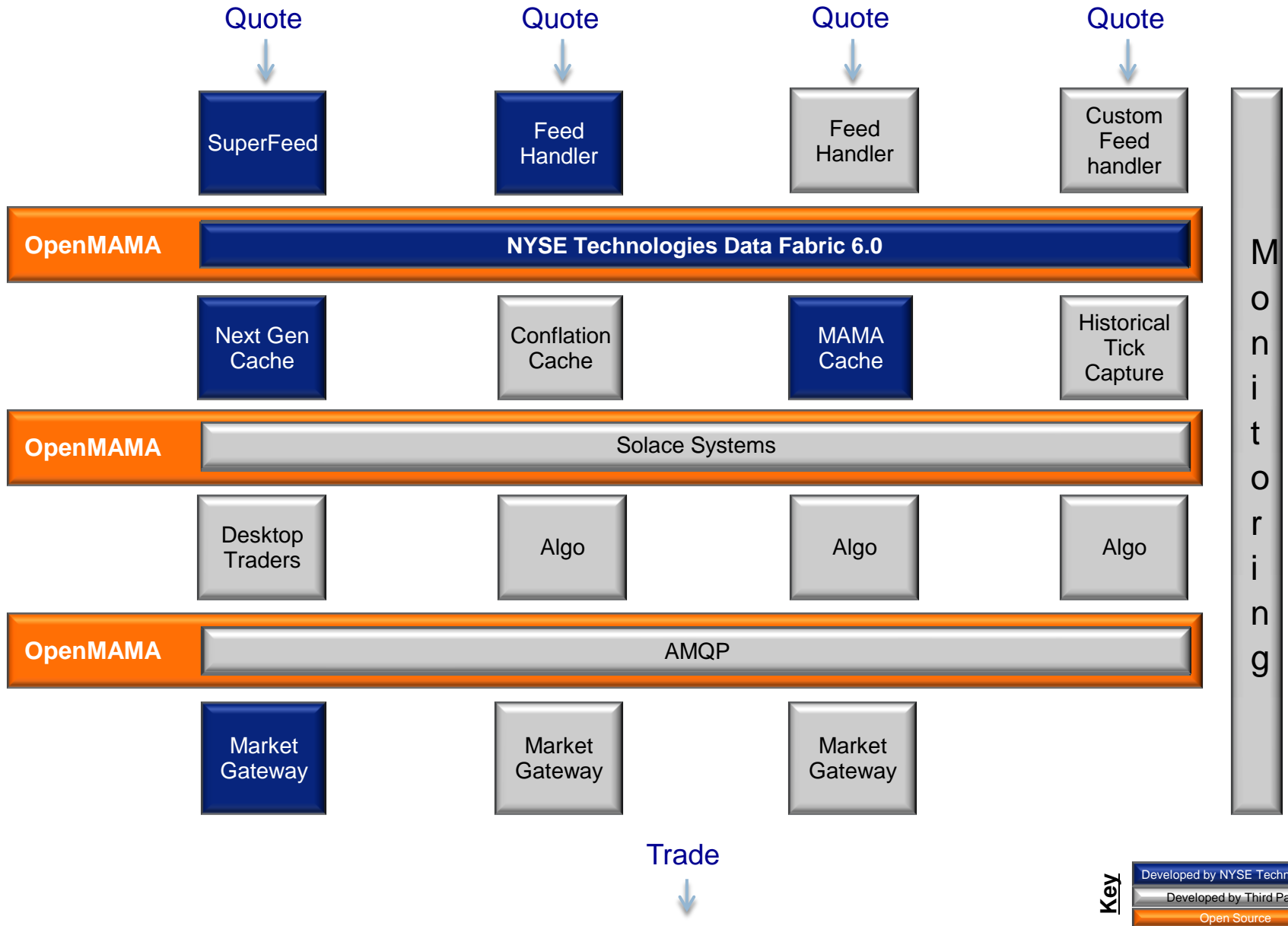
As an Open Solution OpenMAMA:

- Enables anyone to write a middleware bridge
- 3rd Party applications can support OpenMAMA out of the box
- Applications and middleware become pluggable / interchangeable

Developed by NYSE Technologies
Developed by Third Party Vendor
Open Source



Result is flexibility and user choice





Who is on the Steering Committee today?

J.P.Morgan

Bank of America 

 NYSE Technologies.

EMC²

 **FIXNETIX**
The ultimate trading advantage

IBM

 T I C K 4 2

 Interactive Data

 **TS-Associates**
Precision Instrumentation

 **eXegy**

**A Major NY based
Hedge Fund**



How to participate in OpenMAMA?

- Participation is open to any developer, corporation or entity
- Use OpenMAMA in your applications – encourage standardized access to other proprietary middleware systems
- All industries are encouraged to join
- Join the Steering Group, Technical Group or just contribute new features and code

If you want to get involved or have questions please reach out through the OpenMAMA development mailing list: openmama-dev@lists.openmama.org. Alternately if you are considering joining our steering committee or want to learn more complete the [application form](#) or contact Mike Woster at mwoster@linuxfoundation.org



Use Case: Solace Systems

Presented by: Shawn McAllister



Solace Simplifies Real-Time Information Sharing

Within Datacenters



Across Datacenters



Web and Mobile Apps



Hardware Datapath

- Highest throughput, lowest latency
- Consolidation and low TCO with built-in virtualization

Unified Messaging Platform

- Any data, anywhere, any QoS, all with one system

Turnkey Appliance

- “Rack and run” deployment speeds time to market
- Integrated HA, Management, Security, Monitoring



Typical Solace Use Cases



Financial Services

- Market Data Distribution
- Trading Platforms
- OMS and Middle Office
- Reference Data Distribution



Internet / Cloud

- Online Gaming, Betting, Auctions
- eCommerce



Transportation

- Positive Train Control
- Package/Vehicle Tracking
- Ticketing Logistics



Telecommunications

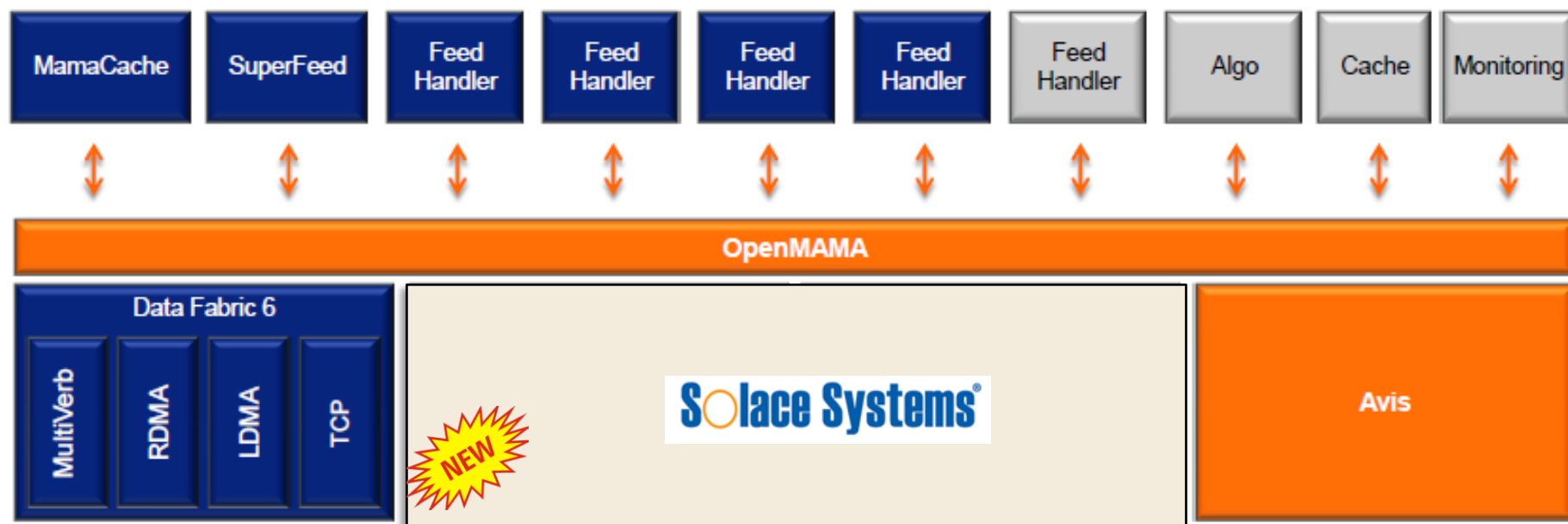
- OSS/BSS Infrastructure
- Real-Time Mobile Services

Across Industries

- Enterprise Messaging / ESB
- Mobile Application Communication Infrastructure
- Distributed Data Synchronization
- Collection/Routing of Sensor Readings



Solace as an OpenMAMA Transport





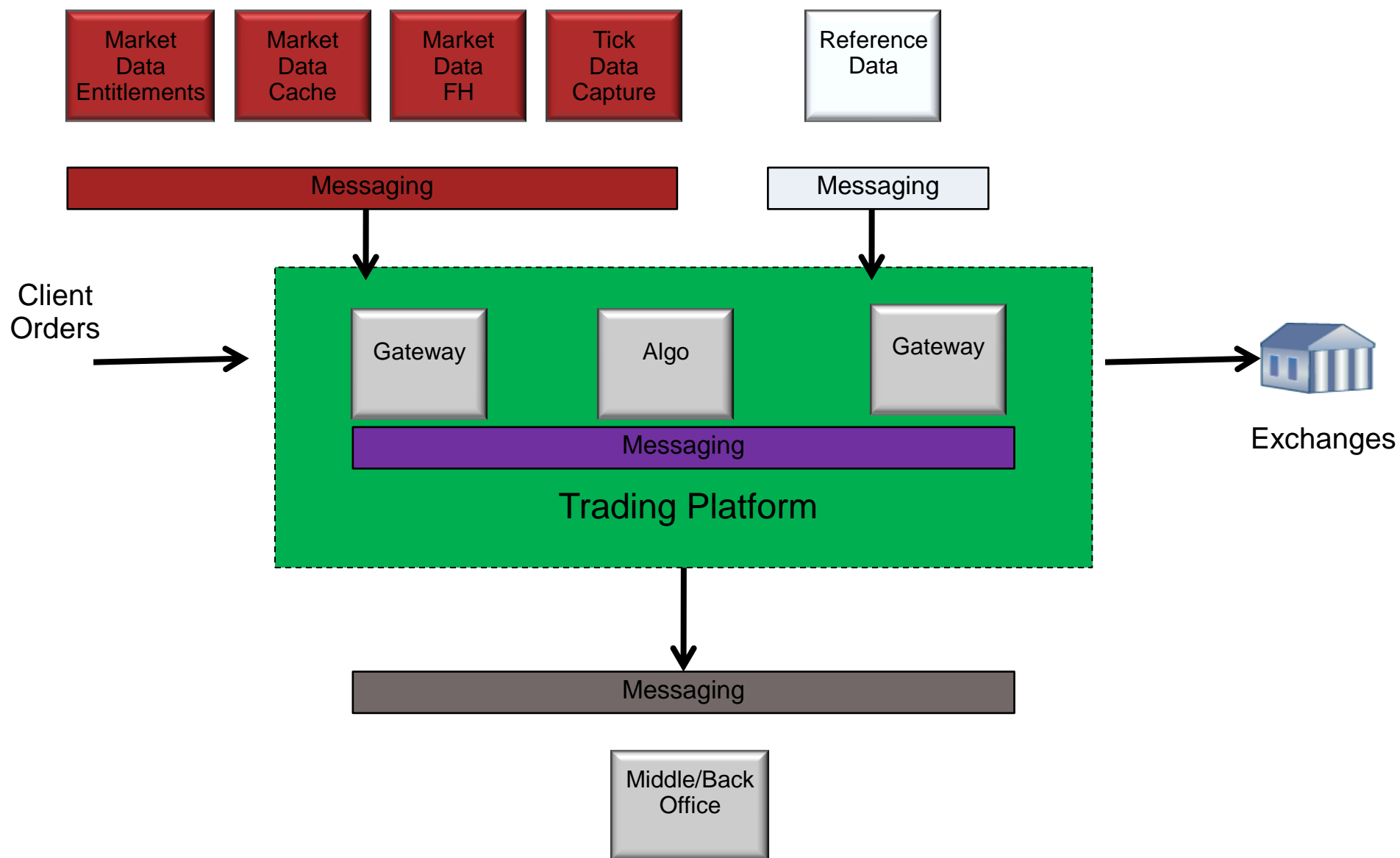
Why does Solace see value in OpenMAMA?

- ❑ Removes API lock-in and drives innovation to create best of breed
- ❑ Reduces barriers for adoption of best of breed technologies
 - Mix & match 3rd party applications – feedhandlers, gateways, Tick DB, Entitlements AND messaging
 - Isolates custom apps from underlying transport technology – gateways, algos, OMS, desktops
- ❑ Allows creation of hybrid transport infrastructures that remain uniform as viewed by applications
- ❑ Potential for usage outside FSI especially in high performance applications

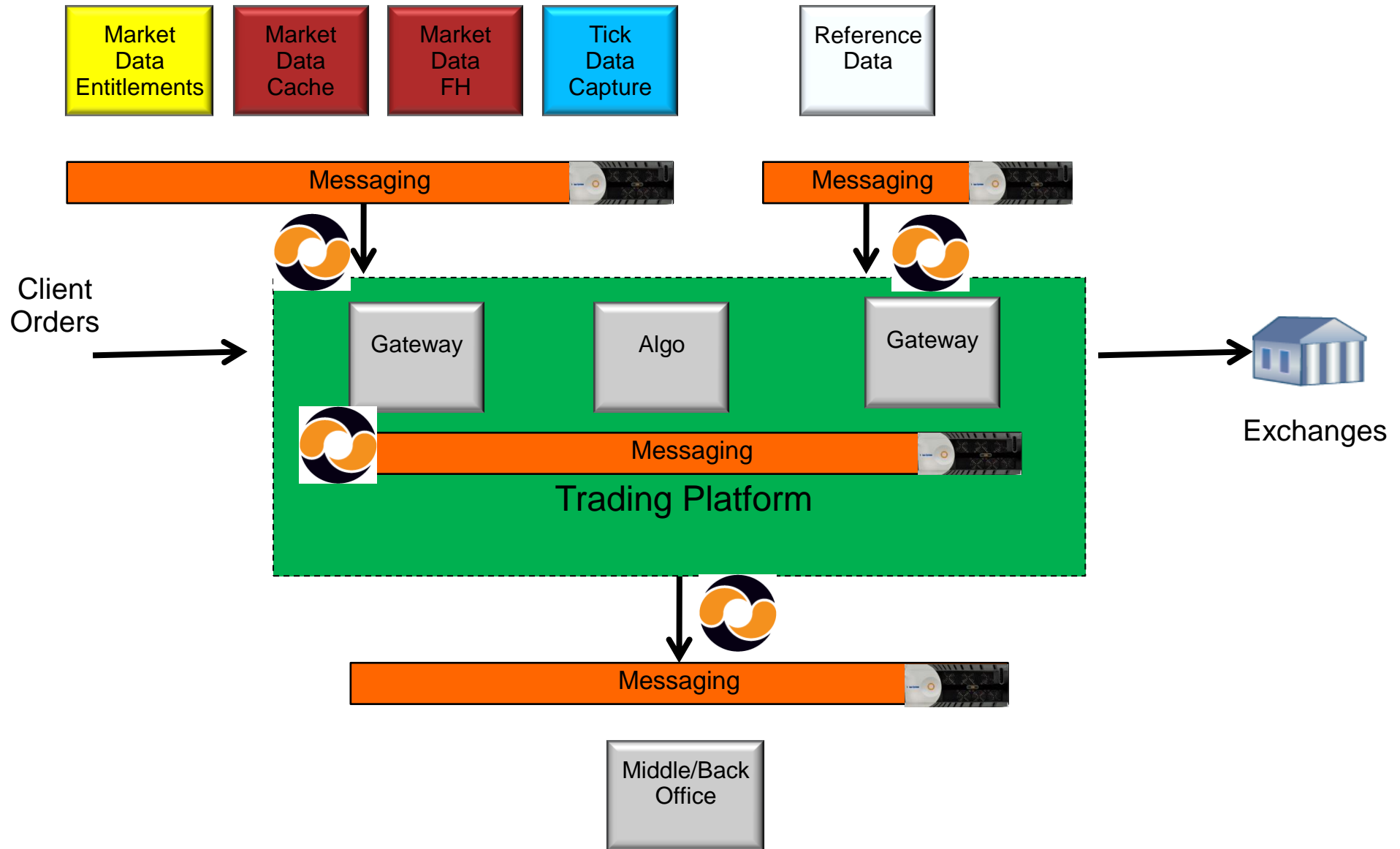


Today's Trading Platform

Many Messaging Systems & APIs



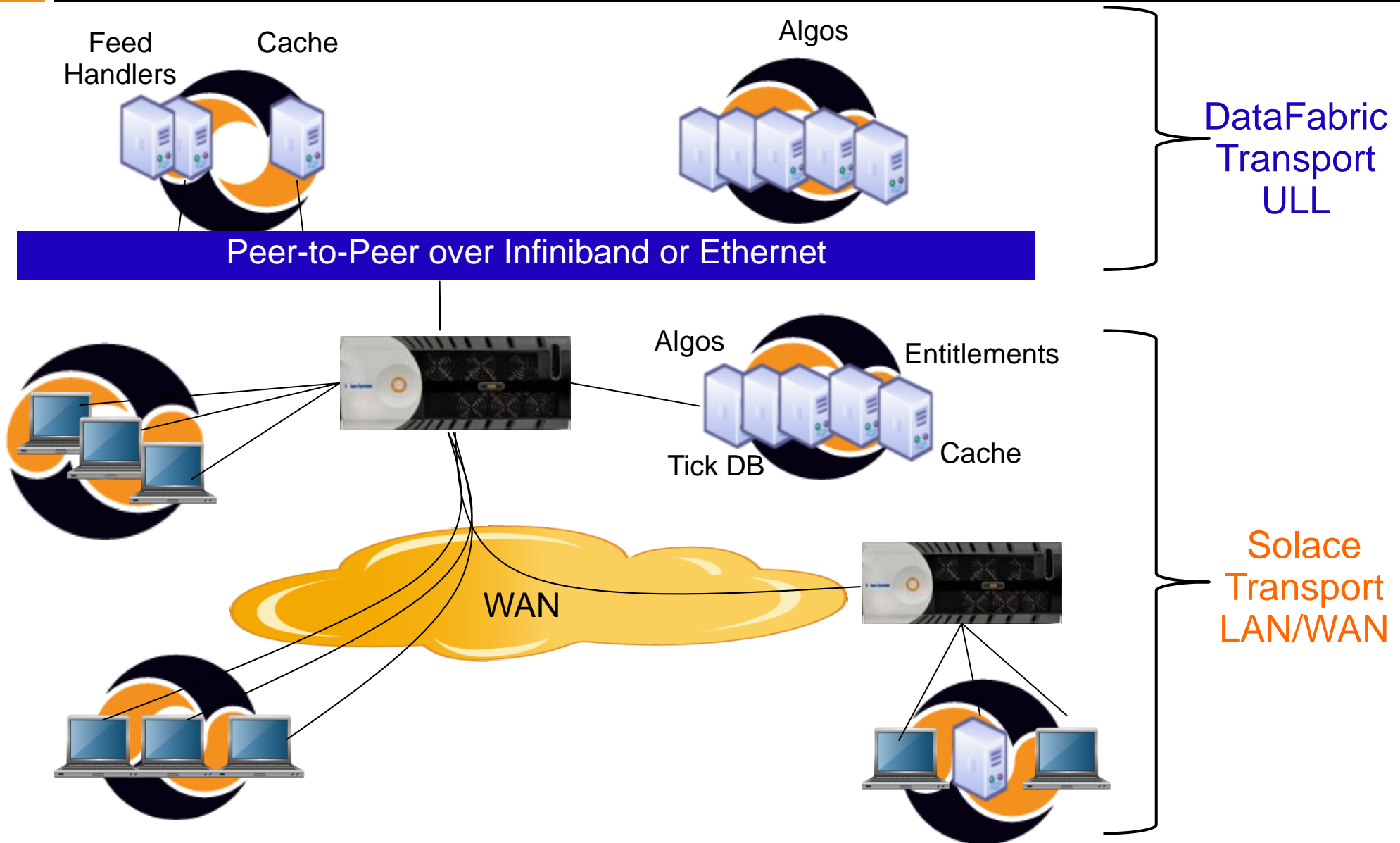
With OpenMAMA Fewer Messaging Systems & APIs, More 3rd Party Apps





OpenMAMA Enables:

Multiple Transports, Single API, Single Data Model





Conclusion

- ❑ Open interface standards change the landscape by reducing lock-in which promotes competition and innovation
- ❑ This is the value Solace sees in OpenMAMA



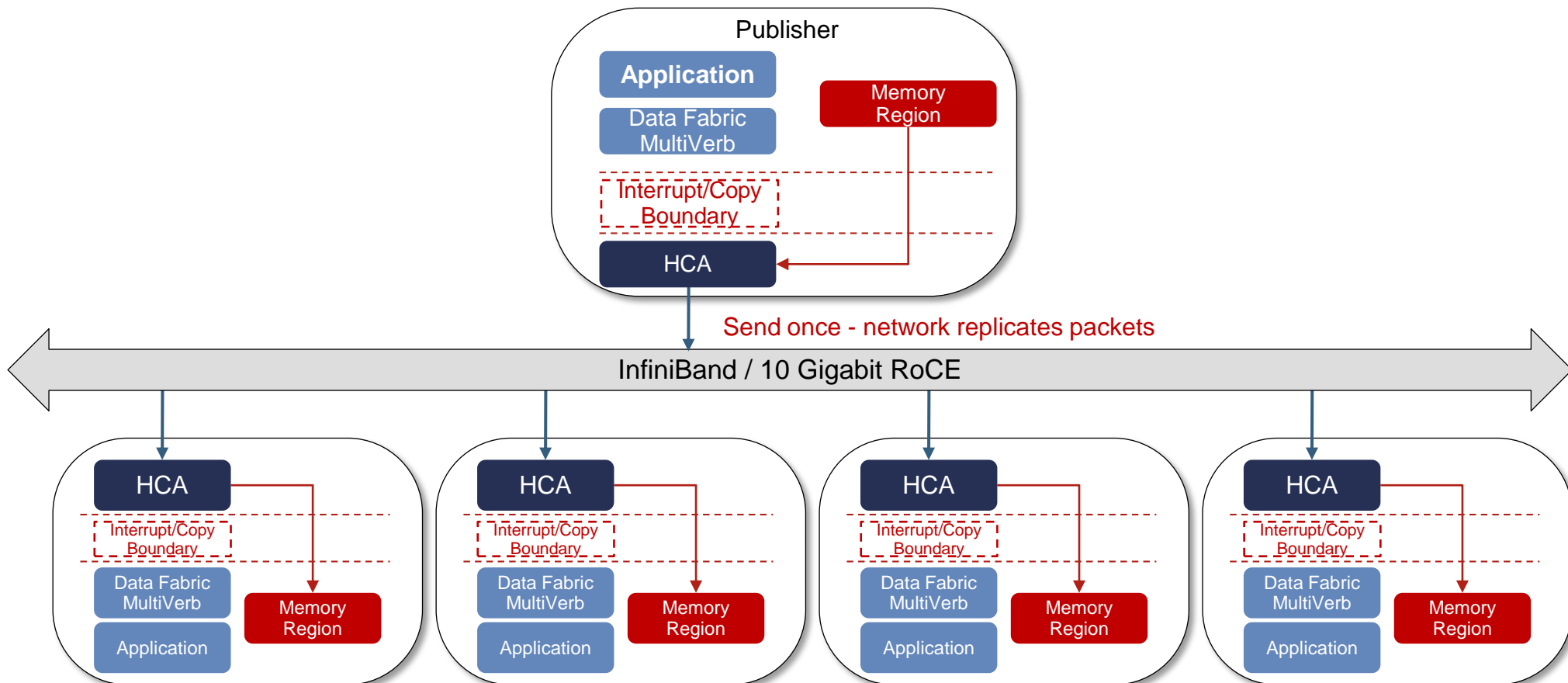


Use Case: NYSE Technologies Data Fabric

Presented by: Brian Doherty



Data Fabric MultiVerb



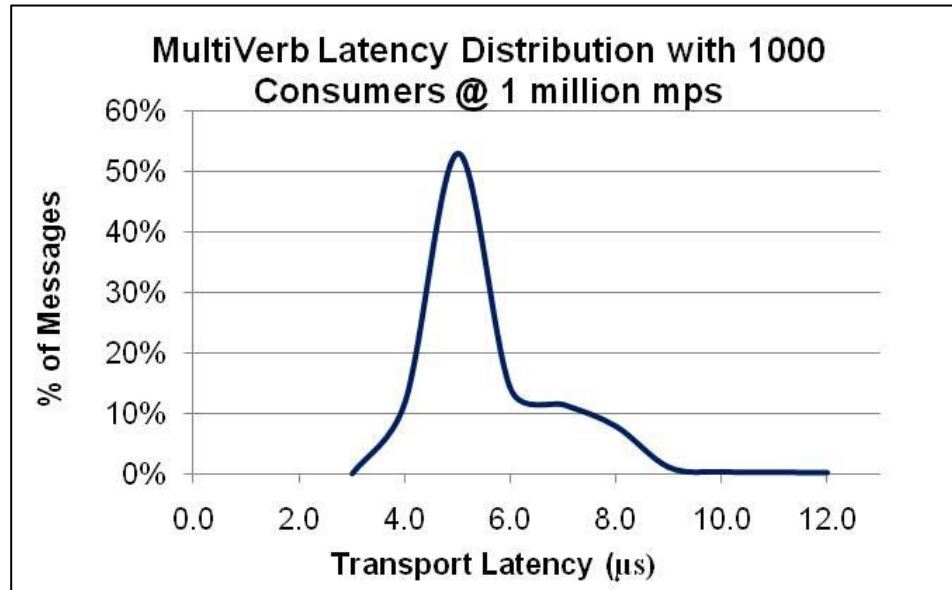
- Hardware accelerated, kernel bypass, multicast messaging middleware
- Single-digit microsecond transport latency with scalable fan-out distribution
- No exotic components required – operates on industry standard hardware



MultiVerb Performance Intel® CRT Datacenter

Test Details

- 300 servers equipped with dual Intel Westmere X5670s
- 1:1000 publisher-to-consumer application ratio
- Throughput set to 1 million, 200-byte messages per

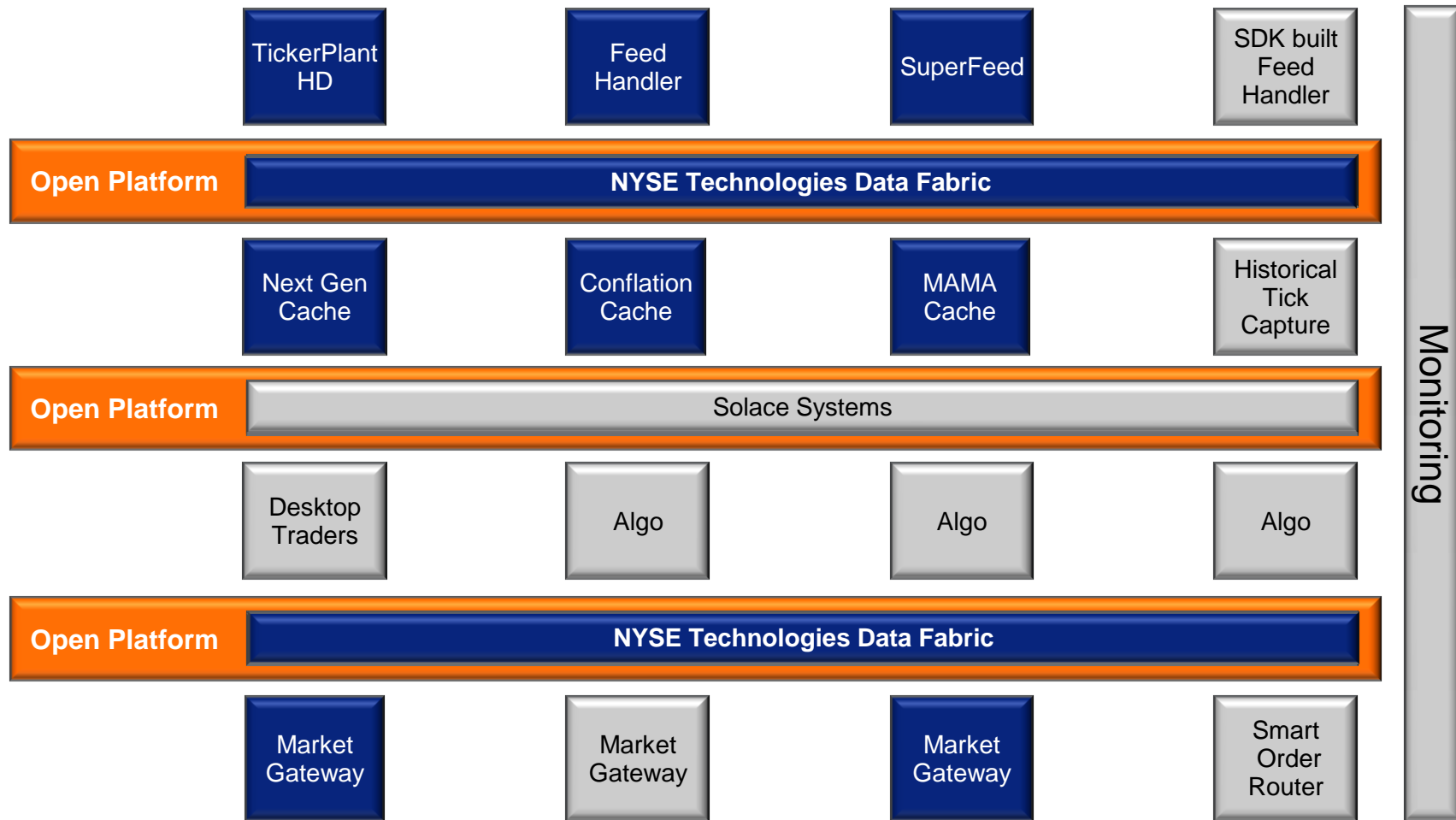


Results

- Average latency: **4.5 µs**
- 99.99% latency: **19 µs**
- Aggregate rate of 1 billion messages per second over a 7 hour period

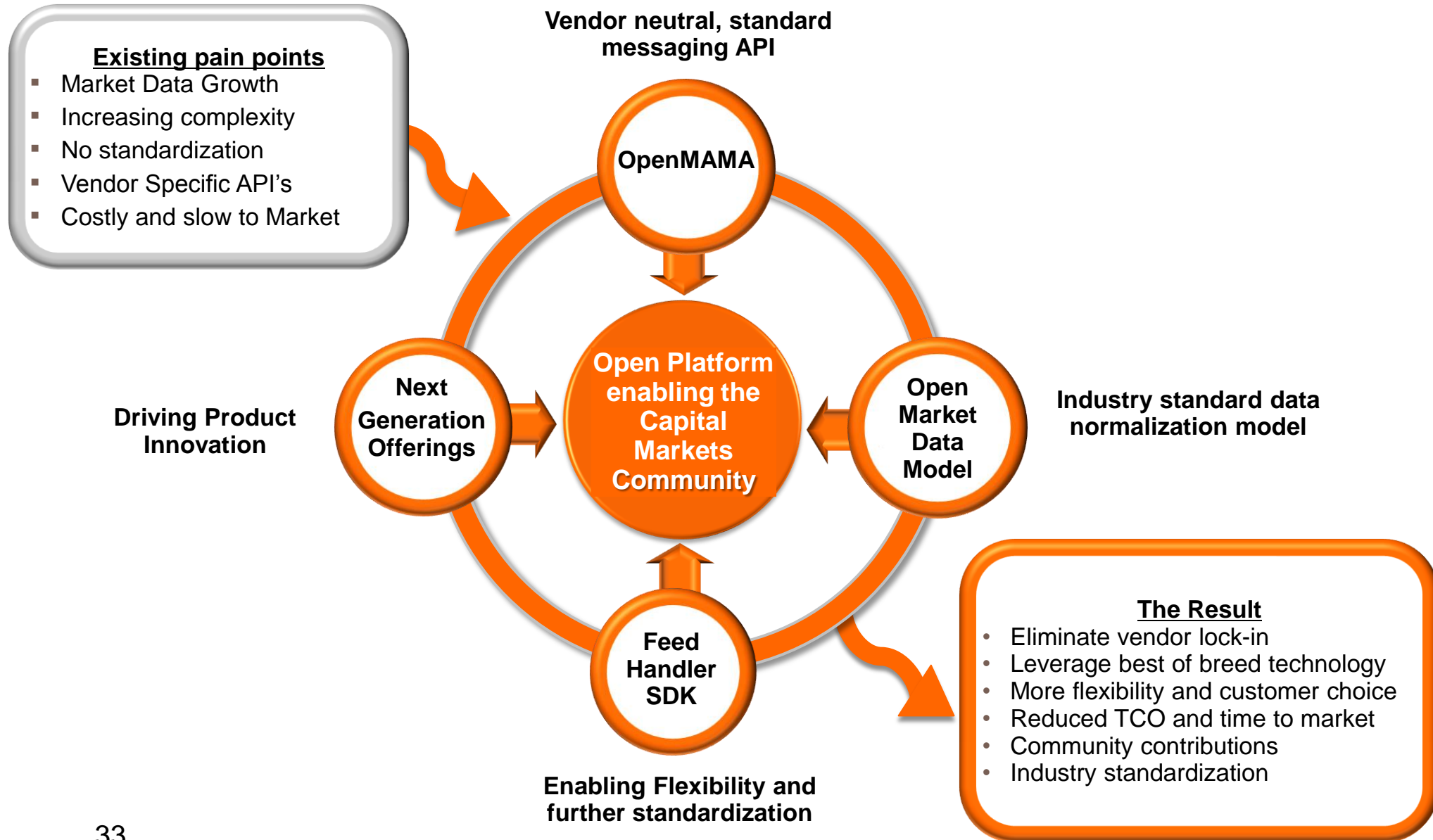


Open Platform





Creating a Neutral, Open Platform





Summary

- ❑ NYSE Technologies contributed OpenMAMA to encourage innovation and promote the Capital Markets Community Platform
- ❑ OpenMAMA simplifies the development and deployment of applications that use Message Oriented Middleware
- ❑ It is hosted by The Linux Foundation under an LGPL 2.1 License
- ❑ Widespread industry participation is highly encouraged



Questions?





<http://www.openmama.org>