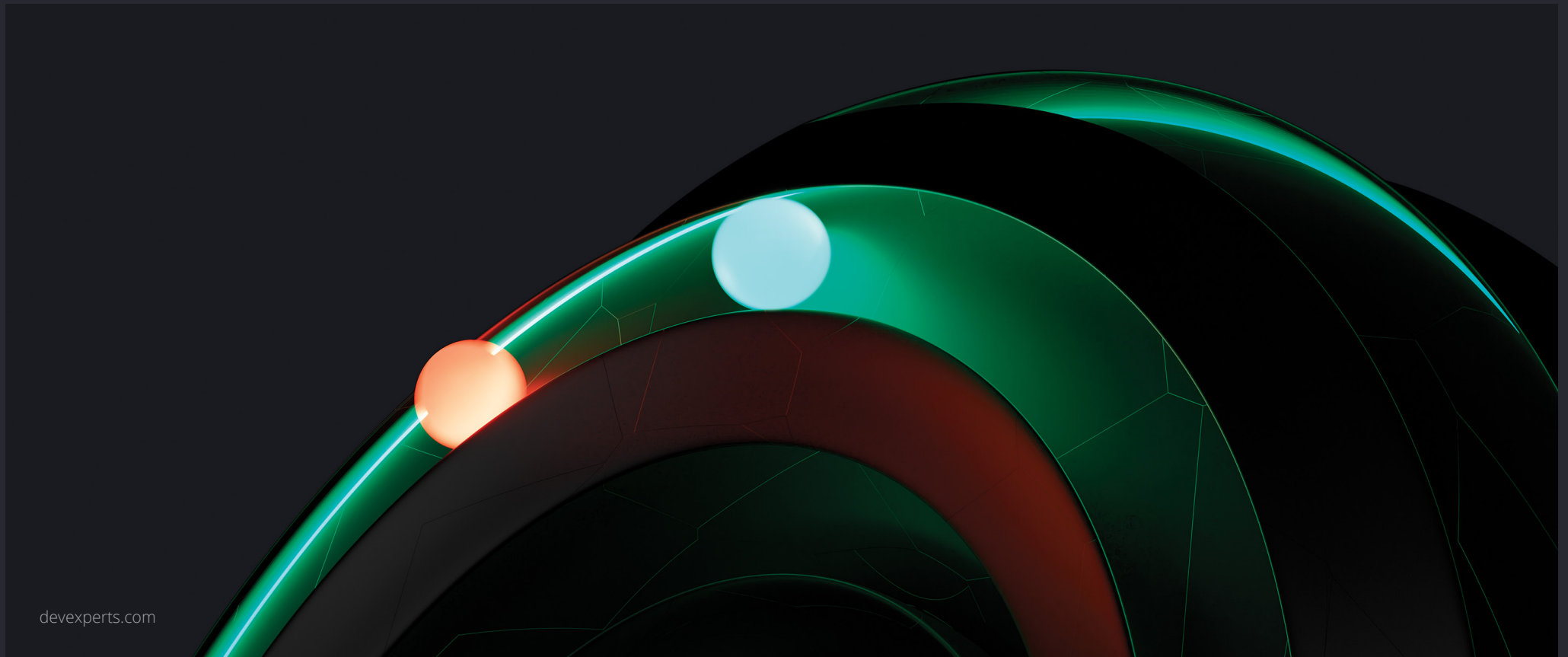# The New Exchange Technology Essentials

For 2024 (And Beyond)

Preparing exchanges for the future of trading

Exchanges operate in an increasingly volatile and disruptive landscape. To survive, exchange organizations—and the people working in them—need speed, flexibility, and operational resilience.

Yet, complex legacy infrastructure frequently holds exchanges back, unable to deliver the near-instantaneous trade execution, seamless scaling, and bulletproof security that's demanded. Trying to force aging technology built for a different era to meet today's demands is an uphill battle.

The solution lies in re-architecting exchange technology from the ground up. The latest ultra-low latency matching engines, intelligent risk management, and adaptive architecture set a new bar for performance, reliability, and innovation potential.

In this guide, we draw from Devexperts' extensive experience spearheading these types of projects and provide real-world insights and examples, which you can leverage too.

IN THIS GUIDE, YOU'LL LEARN:

➜ Why is exchange technology transformation needed?

➜ Understanding the cost of change

➜ What the new exchange technology essentials are

➜ Build vs buy: Key considerations

➜ How the right tech benefits the entire ecosystem

Why is exchange technology transformation needed?

Exchange organizations, worldwide, face unprecedented pressure to adapt. Accelerating compliance changes, exploding asset diversity, and breakneck technological transformation make standing still untenable. Many organisations are still using highly inefficient legacy systems that are (at least) 10+ years old and weren't even designed for today's complex tasks.

While legacy technology used to keep up, it's no longer enough. Nearly 90% of businesses are hindered by legacy technology. And then there's the issue of technical debt. Budgets are often plagued by legacy technology management.

Plus, dynamic market conditions—and the dizzying pace of technological and regulatory change—mean that agility, sub-millisecond latency, flexibility, and resilience are now key. Today's exchanges need a matching engine that provides ~100-microsecond end-to-end latency to process over eight million orders per day. This presents a significant challenge for legacy tech.

It's time for a much-needed reality check on exchange technology.

Sergey Samushin,
Head of Exchange Solutions

"Businesses have been getting by this way for over two decades. But in an era where firms are optimising at every turn, this approach simply won't cut it anymore."

90% of businesses are held back by legacy technology

How bad is yours?

See how your technology performs with an independent audit check by our specialists.

Potential savings

$1,000,000
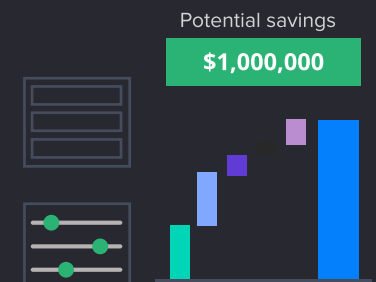
Understanding the cost of change

For years, exchanges worldwide have forced legacy systems, built for a different era, to somehow handle today's trading volumes, asset diversity, and customer expectations. But this square peg in a round hole approach is hitting a breaking point.

Why 2024 is the tipping point

Attempting to drag outdated infrastructure further into the future ignores market realities:

➜ Over 250 new digital asset exchanges launched since 2020
➜ Doubling down on legacy technology loses businesses $1.8 trillion yearly
➜ 87% of IT decision makers say retaining old systems leaves businesses more vulnerable to security threats

Legacy systems weren't designed for real-time adjustment of risk models for thousands of coin pairings. They can't provide microsecond order execution to satisfy 24/7 crypto trading.

And patchwork upgrades to legacy tech pale compared to demands. Add surging traditional trading volumes, inflation volatility, and changing compliance looming—and it's clear to see exchanges using legacy tech have hit an expiration date.

Understanding the cost of change

Inefficiency has its costs:

- Your team is constantly frustrated, sinking morale
- Budgets are wasted on temporary band-aids
- A lack of flexibility prevents adapting to new instruments
- You miss out on key growth opportunities

The result? Everything falls into place:

- Your talent is happy with the highly flexible UX
- Compliance is met and risks minimized
- Budgets are reduced
- New revenue streams are unlocked

Enter modern technology, like Devexperts.
A solution like DXmatch is asset-agnostic, offers unparalleled resilience, with ultra-low latency and high throughput that scales.

In summary, if you're serious about achieving these outcomes, there's no skirting around it—you need to significantly update your technology. And that involves more than just good intentions. It means embracing and leveraging cutting-edge technology.

The new exchange technology essentials
(4 core pillars)

In essence, building a successful, future-proof exchange in today's disruptive markets boils down to getting four key technology pillars right. You need speed, scale, security, and adaptability all rolled into one.

As we've seen, legacy systems fail on all fronts: high latency loses trades, poor scalability caps growth, vulnerabilities risk asset safety, and brittle architecture prevents growth.

To compete, you need to re-architect core exchange infrastructure from the ground up.

The latest matching engines, risk frameworks, and auxiliary components must all synchronize to create a cohesive high-performance foundation. This is no small feat, which is why many organizations struggle with piecemeal upgrades that never fully deliver.

The solution lies in holistic next-generation exchange platforms ready to install, configure, and scale. In essence, success boils down to four key pillars that must be balanced meticulously:

PILLAR 1	PILLAR 2	PILLAR 3	PILLAR 4
Ultra-low latency & high throughput	**Security and risk**	**Flexibility and perational resilience**	**Scaling and growth**

We'll explore these core pillars further in the following section.

PILLAR 1

Ultra-low latency and high throughput

Achieving ultra-low latency is critical for modern exchanges. Even microsecond delays can mean missed opportunities. Outdated systems simply can't keep up with today's near-instantaneous trading. Instead, exchanges need an infrastructure designed from the ground up to minimize latency. This starts with utilizing the latest software frameworks and hardware optimizations to ensure the fastest possible order execution. Strategically distributed architecture, advanced caching, and parallel processing techniques also play a key role.

With the right technology, exchanges can achieve consistent single-digit microsecond latency. This gives traders the confidence to execute their strategies with precision, unlocking higher volumes and more opportunities. (We cover this in much more detail in our article, Achieving Consistent Low Latency on an Exchange. If you need to refresh your understanding of low latency, bookmark this article.)

Hand-in-hand with low latency is the ability to handle extremely high throughput. Exchanges operate in a world measured in millions of messages per second across countless instruments. Legacy systems will inevitably bottleneck under these demands. Modern matching engines utilize horizontally scalable architecture to increase capacity on demand. Intelligent load balancing ensures traffic is smoothly distributed to avoid congestion points. Purpose-built software removes bottlenecks, supporting millions of orders per second with ease.
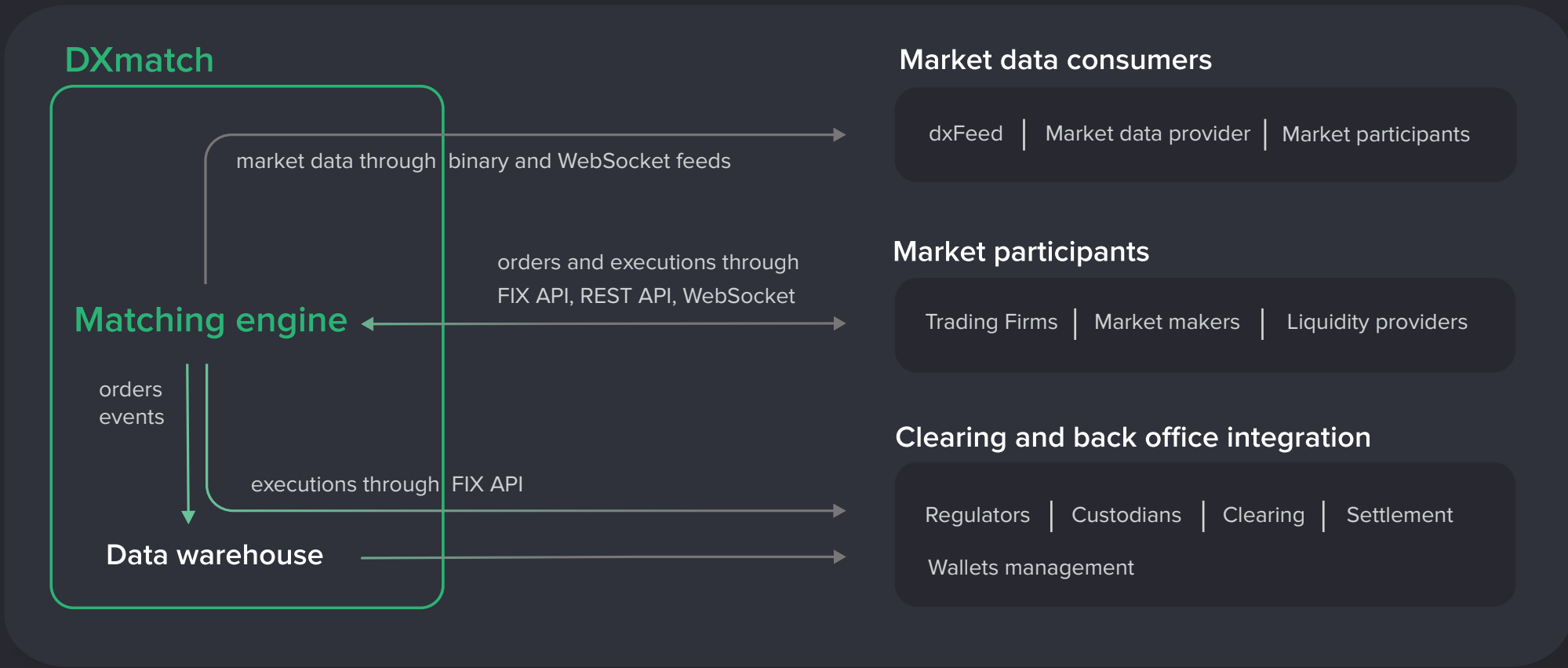
The result is an exchange primed for growth, ready to take on new customers, capitalize on emerging trends, and meet trader's expectations of near-instant execution even under heavy load.

PILLAR 1

Ultra-low latency and high throughput

While the matching engine provides the speed and reliability, the interface makes the experience seamless. Too often, teams need to battle convoluted legacy UIs. A poor user experience adds unnecessary friction, impacting adoption and engagement. It also places undue burden on technical support teams. That's why modern exchange technology bakes in simplicity and elegance. Intuitive dashboards remove complexity. Stateless APIs speak the language developers want. The result is happy traders, productive engineers, and lower operational costs.

DXmatch

Matching engine

orders
events

Data warehouse

market data through binary and WebSocket feeds

orders and executions through FIX API, REST API, WebSocket

executions through FIX API

Market data consumers

dxFeed | Market data provider | Market participants

Market participants

Trading Firms | Market makers | Liquidity providers

Clearing and back office integration

Regulators | Custodians | Clearing | Settlement

Wallets management

PILLAR 2
Security and risk management

Running an exchange in today's highly dynamic regulatory environment requires meticulous risk management and ironclad security. Maintaining trader trust and protecting your reputation depends on it. Outdated systems full of vulnerabilities simply won't cut it anymore. Exchanges need safe and resilient infrastructure.

Leading exchange technology, like DXmatch, offers a sophisticated rule engine for configuring advanced risk checks. These include things like min-max order limits, self-trade prevention, message throttling, and aggregation group limits. Configurable circuit breakers act as a kill switch to pause matching during volatile swings or error conditions. Bulk cancel on disconnect ensures orphan orders don't linger. Plus, all risk parameters auto-adjust based on holding duration, order type, client group, etc.

Fat finger protection

DXmatch ensures traders won't enter an erroneous order with a price that's too far from the market price.

Price slippage limit

The DXmatch algorithm sets a limit price for Market and Stop orders to prevent order execution too far from the best market price.

Self-trade prevention

The system prohibits matching buy and sell orders from the same market participant, ensuring appropriate order placement.

Mass cancel

Exchange operators can cancel all working orders by market participant, symbol, and instrument type at once.

PILLAR 2

Security and risk management

Min/max order quantity

Validation of order quantities and prices to comply with min and max limits. Market participants are protected from entering an order with invalid quantities.

Kill switch

All working orders pertaining to a market participant can be canceled at once while preventing new ones.

Cancel on disconnect

Automatically cancel all orders of a market participant in the event of a FIX API's disconnect.

Message throttling

Limits the number of messages received per second from a market participant.

The result is confidence that market integrity is ensured at all times, even during turbulent market events or unforeseen circumstances. Security is baked into every component of next-gen exchange infrastructure. Encryption, authentication, strict access controls, activity logging, and rigorous penetration testing all combine to achieve bank-level security. Plus, compliance capabilities can be tailored to regional regulatory standards. Auditing tools and reports offer transparency into all account activities so nothing escapes scrutiny. By leveraging such security best practices, modern exchanges protect client assets and data while maintaining regulatory compliance.

Flexibility and operational resilience

Running a successful exchange in today's fast-moving markets requires a flexible and resilient technology foundation. As new assets emerge, regulations shift, and disruptions occur, you need infrastructure designed to rapidly adapt. Legacy systems with hard-coded business logic simply can't keep up. The core of any exchange is matching buyers and sellers across a variety of instruments. Rather than taking months to add support for new asset types, next-gen matching engines utilize asset agnostic models. This means extending support to new derivatives, cryptocurrencies, or other exotic instruments is simply a matter of configuration—no coding required. As demand dictates, your exchange can swiftly capitalize on hot new markets before competitors.

In today's world, expecting the unexpected is the new normal. Pandemics, wars, and rampant cybercrime all underscore the need for resilient systems. Modern exchange infrastructure is designed for self-healing and instant scalability to absorb whatever shocks come your way. Strategies like active-active redundancy eliminate single points of failure across data centers. Hot standby nodes enable zero-downtime maintenance. Elastic scalability means capacity can be added immediately to handle spikes in volatility or volume. Software is delivered as a RPM-packaged application for installation to any RPM-based Linux operating system (RedHat, Oracle, CentOS, OpenSUSE, Rocky Linux).

In-cloud

For maximum flexibility: Google Cloud (GCP, Amazon Web Services (WAS), Microsoft Azure

Bare Metal

For the most stable progressing latency

By leveraging these capabilities, you gain the power to weather ANY storm and provide traders with continuously fair and orderly markets.

Scaling and growth

Of course, a key imperative for any successful exchange is the ability to efficiently scale operations while controlling costs. Modern matching engines and related components are designed from day one for rapid growth and maximum profitability. Truly future-proof exchange infrastructure offers horizontal scale-out capabilities to expand capacity on demand. Adding matching engines, risk checks, data replicas, and query capacity is a seamless process without service disruption.

Multi-region deployment strategies spread operations for better performance, as well as enabling growth into new geographic markets. No more turning away new participants or scrambling when volatility spikes — you'll have room to grow. As Sergey puts it:

Sergey Samushin,
Head of Exchange Solutions

"Legacy exchange systems require significant care and feeding in terms of skills, maintenance, and continual upgrades. The perpetual drain on budgets steals resources better spent on developing new products and features."

Whereas, next-generation solutions utilize the latest software frameworks that perform better while requiring less back-end infrastructure to support equivalent workloads. Automation and clever optimization remove waste so you can do more with less.

The result is vastly improved economies of scale: less overhead, lower human capital costs, and the ability to channel savings directly into profit-driving innovation.

Build vs buy: Key considerations

If you're reading this ebook, chances are that you might be thinking about upgrading your exchange technology. However, it is not always clear whether it is better to build the solution in-house or buy a solution from an external provider. When deciding on a partnership or building in-house, we see four points to consider:

Time to market

Building an exchange solution in-house takes significant time. From licensing applications, building a team, developing matching models, plus servicing, and internal workflows.
We estimate that an in-house solution takes 2-3 years to bring to market. This timeline can be extended if you do not already have the team and internal expertise required to develop a solution. Partnering, we estimate to take 3-6 months.

Risk and compliance

Financial provisioning and the associated compliance challenges are traditionally highly regulated. An in-house build would have to factor in the regulatory obligations and requirements, while partnering means this has already been tested and can prove the software complies with local authority standards.

Control

When building in-house, you have 100% control over the product. You won't have to worry that a partner cannot meet your specific needs. If choosing a partner, you may get to a high level of control with some providers, but never to the same level as you would if building in-house. That's why finding the right partner with a good cultural and strategic fit and flexible licensing models is important. So is finding a partner who offers to buy out the code of a client's customized solution, as a separate service.

Costs

When building in-house, you bear all costs, including; initial scoping, tech resources to build, operational support resources, management, maintenance, and all ongoing tech and software upgrades. Partnering places most costs, including software-related development with the partner. A clear advantage.

Bottomline: Nowadays, time and experience are scarce resources. If an organization chooses to build, there is likely another project or feature they cannot do. Further, directing your core team away from the building and delivering the core product will likely present a substantial loss of momentum in the business. Partnering has the advantage of lowering opportunity costs and ensuring limited internal distraction.

How the right tech benefits the entire ecosystem

Implementing next-generation exchange infrastructure powered by pillars of speed, scale, resilience and flexibility sets off a positive chain reaction across the entire trading ecosystem. Traders enjoy near-instant order execution, liquidity abundance, and continuous fair market access — even during turbulent times. The result is more investor confidence, increased volumes, and expanded business opportunities, such as capitalizing early on growing asset classes.

Operations and development teams are relieved of legacy system headaches. Instead of wasting cycles on aging technology, they can focus on profit-driving innovation and providing best-in-class trader experiences. Market oversight authorities benefit from more transparent and tightly controlled risk management capabilities. Advanced surveillance tools also support better oversight and policymaking.

In summary, moving off of rigid legacy exchange systems in favor of adaptive, high-speed infrastructure is a necessary step to thrive in fast-moving, increasingly competitive capital markets. The time for upgrading is now.

Interested to learn more? We invite you to contact Devexperts for a demo of our exchange solution.

Get in touch