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EXITUS ACTA PROBAT

AI TESTING

Your strategic guide to a deeper understanding of financial technology

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INNOVATE WITH AI TESTING

Exactpro: industry's trusted innovation partner

Exactpro is an independent provider of AI-enabled software testing services for financial organisations. Our clients are financial market infrastructures across 24 countries. We help our clients to improve scalability, latency and operational resiliency, decrease time to market and maintain regulatory compliance.

Headquartered in the UK, Exactpro operates delivery centres in Georgia, Sri Lanka, Armenia, the UK, representative offices in the US, Canada and Italy, and has a global distributed network of consultants.

Exactpro uses its industry-proven applied excellence in *AI Testing* to review software testing processes and platforms used in your organisation and help to set up new quality assessment procedures for various purposes.

With deep domain expertise at the intersection of finance, technology and artificial intelligence (AI), we have been successfully guiding financial technology operators to a deeper understanding of their progressively more complex technology assets through AI-enabled software testing.

Our client network

Reach out to us via ***info@exactpro.com*** to set up an introductory meeting.

Meet our clients and partners

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Meet the global team

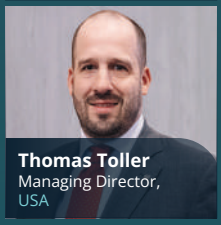
Iosif Itkin
CEO, Exactpro Group, Malta

Alexey Zverev
CEO, Exactpro Group, UK

Natia Sirbiladze
CEO, Exactpro Georgia, Georgia

Kirill Zagorouiko
Chief Operating Officer, Canada

Alyona Lamash
Director, Head of Risk Management Practice, UK



Thomas Toller
Managing Director, USA

Marina Kudryavtseva
Head of DLT & Corda, SVP, Technology, UK

Ian Salmon
Business Development, UK

Michael Smith
Head of Sales, UK

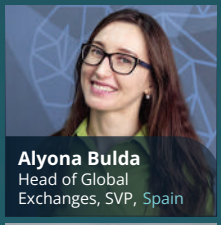
Maxim Rudovsky
Chief Technology Officer, UK

Mikhail Odintsov
Head of Functional Testing, Georgia

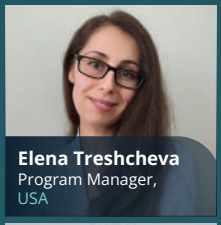
Victoria Leonchik
Technology, Data Warehouse, UK

Pavel Medvedev
Head of Non-functional Testing, Canada

Anna-Maria Lukina
Marketing Director, Portugal



Alyona Bulda
Head of Global Exchanges, SVP, Spain



Elena Treshcheva
Program Manager, USA

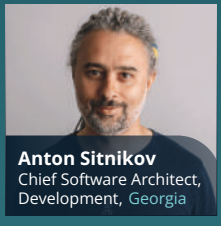
Dmitry Kolpakov
Chief Financial Officer, Sri Lanka

Asya Legotina
Technology, Big Data, UK

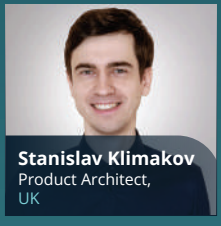
Dmitry Doronichev
Head of Post Trade Division, Sri Lanka

Sona Oganesyan
CEO, Exactpro Armenia, Armenia

Daria Degtiarenko
Marketing, Communications, Georgia



Anton Sitnikov
Chief Software Architect, Development, Georgia



Stanislav Klimakov
Product Architect, UK

Maxim Nikiforov
Technology, NFT, UK

INNOVATE WITH AI TESTING

AI Testing: value multiplied across use cases

Exactpro's AI Testing approach combines the power of AI algorithms with model-based testing principles. Developing digital models ('digital twin') of client systems and enhancing them with AI methods allows testing teams to:

- effectively explore the behaviour of the system, the interconnectedness of its components and their interrelations with surrounding systems – such as market surveillance, market data, and other real-time feeds – without the need to access the systems' source code;
- have the test framework fully match the complexity of the client system, regardless of the underlying technology or architecture (e.g. traditional, hybrid, AI-based systems);
- achieve comprehensive – yet resource-efficient – test coverage by producing a minimal acceptable amount of realistic feature-rich end-to-end test scenarios simulating authentic user actions;
- continuously improve the quality of the test library over the course of testing phases by fine-tuning the model's accuracy and generative capabilities;
- facilitate the development of reusable testing patterns and artifacts transferable to other use cases within the organisation;
- foster AI Testing expertise that can be extrapolated organisation-wide.

AI adoption in organisations: strategic advice

- ☑ **Build a strong foundation for an AI-ready environment**: embed pervasive internal AI literacy, start training all business and technical staff now.
- ☑ **Prepare to drive holistic change**: platforms will be just one of the components, factor in upcoming changes in supporting workflows and processes, security and people.
- ☑ **Start small but plan big**: launch pilots in high-impact, low-risk areas.
- ☑ **Set up governance early**: ethics, testing, security and compliance principles and frameworks should not be afterthoughts.

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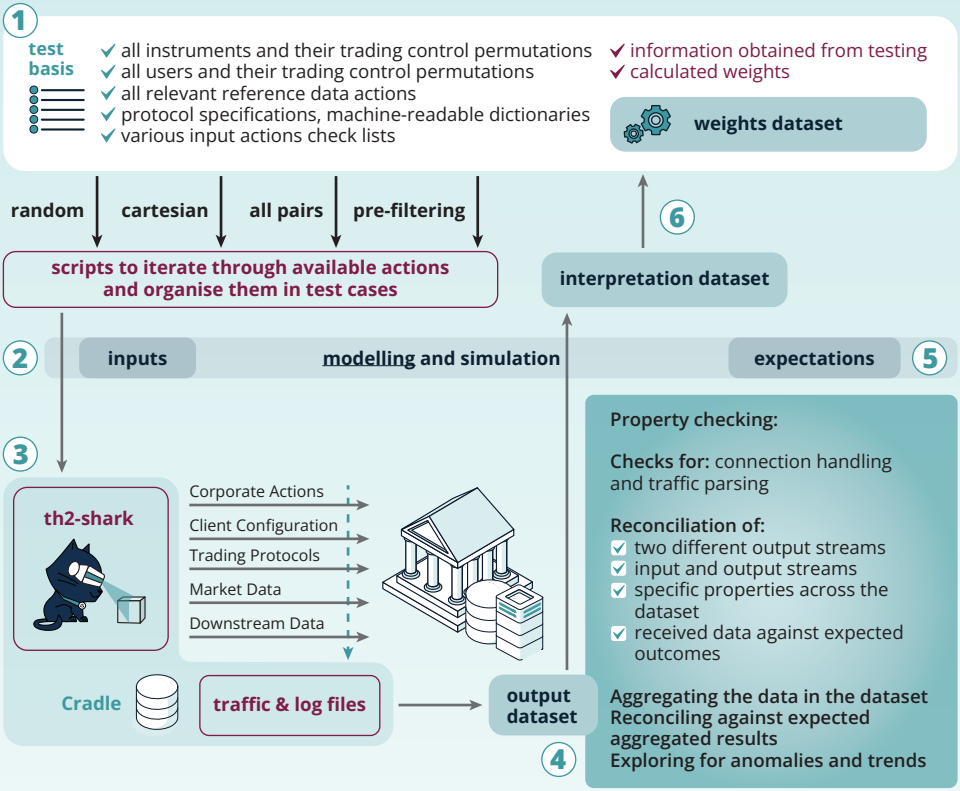
AI Testing: exchange systems*

CASE STUDY



To see examples of AI Testing implementations for investment banking and clearing & settlement systems, visit exactpro.com/ai-testing.

Test library generation and optimisation

Would you like to see the benefits of AI-enabled test library generation and optimisation for yourself? Watch our latest AI Testing demo by following this QR code.

INNOVATE WITH AI TESTING

Pilot engagement in AI Testing

An **AI Testing** engagement with Exactpro allows organisations to:

- ☑ Understand the AI momentum and safely explore the value of AI for the organisation in a controlled, low-risk environment;
- ☑ Focus not just on the present, but look into the future: start with sandbox experimentation and education, foster top-tier talent and necessary cultural changes;
- ☑ Build a solid foundation in AI Testing to propel innovation across all business lines.

Organisations can select a relevant system and run a time-boxed proof-of-concept (PoC) engagement to explore its functionality and available artifacts, assess the applicability of AI-enabled tools, assemble a prototype test harness and experiment with test design.

Running a time-boxed pilot engagement in **AI Testing** enables:

- **Practical**, **hands-on exposure to AI**, introducing internal QA, DevOps, and engineering teams to real-world AI usage – AI-enabled test case generation, defect analysis and prediction, results analysis, continuous model improvement – in a controlled environment without needing to build internal AI capabilities from the ground up;
- **Fast feedback on value and risks** across a set of criteria including software testing speed, costs, quality of the information obtained about the system being tested, and quality of the models involved in testing, whilst offering measurable outcomes to support or adjust broader AI strategies;
- **Knowledge transfer & upskilling** for internal teams getting introduced to AI Testing insights, tooling practices, and evaluation metrics relevant for further AI integration;
- **Trust and better internal buy-in**, reducing AI resistance via safe and well-contained experimentation;
- **Scalable**, **reproducible governance practices** aligned with future AI initiatives (e.g. ISO 42001 readiness).

An AI testing partnership is a pilot project that delivers value fast, builds foundational knowledge and reduces the perceived risk of adopting AI organisation-wide.

Join our PoC programme for banks

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Test strategy development

*'In the high-risk, compliance-heavy environments where financial systems operate, the role of testing as an information gathering tool is sometimes overlooked. Formulating a **robust test strategy** helps prevent potential negative factors and defects early, well before they can occur further in the lifecycle, and formulate all stakeholder needs well ahead of the last development stages. The test strategy defined during a collaboration can provide an industry-tested software transformation framework transferable to client's projects of any scale.'*

Iosif Itkin
CEO and co-founder,
Exactpro

At early stages of software delivery, organisations can benefit from a comprehensive tailor-made test strategy (including an AI strategy, in cases of AI integration) in the form of a structured testing framework aligned with industry's recommended practices. For ongoing projects, organisations may choose to have their existing test strategy reviewed and enhanced from the perspective of using AI-enabled tools and highly optimised test libraries.

Exactpro helps **streamline** the development and implementation of guidelines that can be applicable across **clients' projects of any scale** and describe in detail the approaches relevant to specific testing sub-processes. The test strategy covers the **overall approach to software testing**, an integrated **product quality model** and the **test policy** reflecting the corporate view on testing in the organisation. It also helps outline and analyse the relevant **regulatory frameworks**, **test environments**, **tools**, and **data** required for comprehensive testing. It lays the groundwork for agile development and **parallel workstreams**.

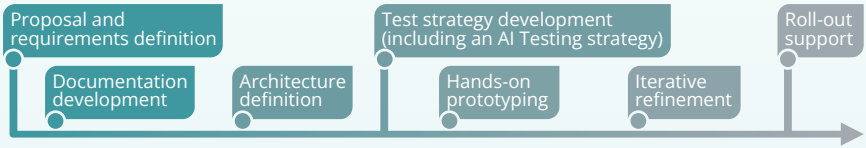
By addressing key architecture-related questions from the outset, a well-rounded test strategy helps **shape system design**, **define risk factors** and **delivery criteria**, embedding testability into the design. The proposed test strategy accounts for **non-functional requirements and system characteristics** such as resilience under spikes (e.g. market volatility), failover and recovery capacities, scalability, data integrity across APIs and services – and ensures they are **factored into future development from the start**.

Test, collaborate, lead: turning industry engagement into strategic advantage

INNOVATE WITH AI TESTING

Full-cycle prototyping and delivery support

Exactpro delivers full-cycle solution prototyping tailored to the needs of financial organisations, ensuring that **every innovation-driven initiative** aiming to explore, validate and scale new solutions is **built on a solid foundation**. Drawing on vast expertise in financial technology, we support clients across the entire lifecycle:



By integrating AI-enabled testing considerations into the earliest delivery phases, we help organisations de-risk innovation, accelerate time-to-market, and align prototypes with enterprise-level resilience and compliance expectations. Whether shaping PoCs to validate feasibility, preparing RFP responses that demonstrate capability, or developing MVPs that pave the way for production-ready solutions, we act as a partner in innovation.

Our delivery capabilities are industry-tested in client engagements. Just to name a few:

- The **SSImple** platform fully automates SSIs, ensuring seamless compliance with FMSB and UK/EU Taskforce goals to support T+1 settlement.
- **Gevamu** integrates Distributed Ledger Technology (DLT) networks with payment service providers, bridging DeFi with mainstream banking systems.
- The **ClearTH test automation framework** for post trade was adapted for software testing of DLT applications built using DAML, the open-source smart contract language created by Digital Asset.
- **Tokenization platforms** developed in collaboration with client teams digitise traditional assets into secure blockchain-based representations.
- The functional testing approach for the Corda-powered **Central Bank Digital Currencies (CBDC)** Sandbox was developed to demonstrate the effectiveness of our testing methods for DLT-based tokenised assets.

Our team's prototypes have received recognition at **Swift Hackathons**.

2025: Honourable mention in the Technical challenge – DLT-based ISO 20022-compliant solution Coincento.
2022: Digital Assets Ownership challenge winners – Project Footprint.
2021: Synthetic Data Generation challenge runners-up – the solution showcased Exactpro's AI-based product development expertise.

Swift HACKATHON at Sibos

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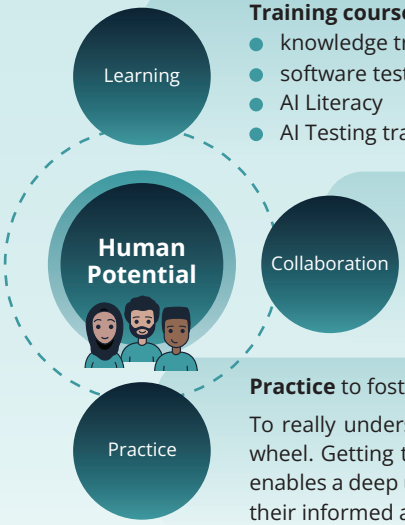
Capability building in AI literacy and expertise

The right time to start developing AI expertise is now, here's why:

- The convergence of technology, data availability, and competitive pressure presents a **strategic moment** to **plan for AI adoption**.
- AI adoption is a journey. You may miss the window needed to shape the internal AI culture, **develop in-house expertise** and **set governance practices early**.
- Your data ecosystem and workforce may not be ready when you finally decide to transition. This may lead to rushed and risk-prone deployments, misaligned workflows or implementations that do not allow the organisation to **fully reap the benefits of AI**.
- Falling behind in **AI integration** could mean losing market share to more agile competitors.

The versatile learning opportunities provided by Exactpro enable firms to boost their human potential and foster knowledge exchange and skills development within their teams. Participation in interactive workshops provides expertise in AI Testing via hands-on training covering relevant methodologies and tools.



Training courses:
- knowledge transfer programmes for specific projects/goals
- software testing basics training
- AI Literacy
- AI Testing training

Knowledge sharing through hands-on workshops:
- personal and professional growth
- new skills and perspectives
- an interactive, hands-on environment
- learning from experts

Practice to foster individual creativity and growth:

To really understand how a wheel is made, one has to reinvent the wheel. Getting to reinvent technology/tools that are at your disposal enables a deep understanding of their internal structure. It empowers their informed and responsible application as well as innovation.

Productive collaboration initiatives may result in establishing an AI Testing Centre of Excellence as the next step towards AI integration.

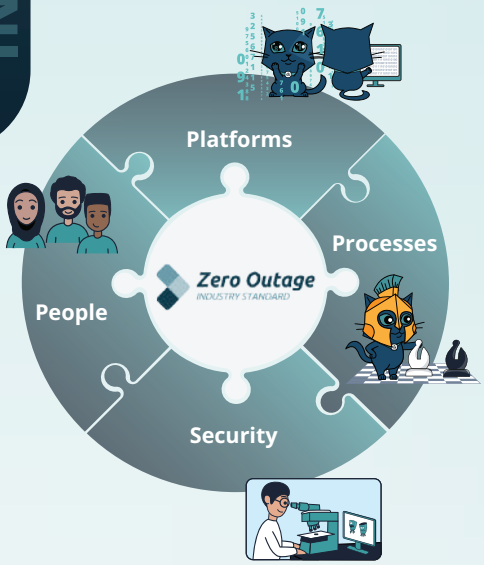
INNOVATE WITH AI TESTING

AI Testing Center of Excellence in your organisation

Enterprise-level adoption of AI is afflicted by the 'productivity paradox': widespread implementation is slow due to lack of tangible organisation-level productivity gains. In addition, it is hampered by scalability, safety, ethics, compliance and other concerns. To adopt AI in a tightly-regulated mission-critical space, one should demonstrate overcoming the issues of transparency, explainability, interpretability, autonomy and human intervention.

Due to the nature of financial technology systems, we face these issues every day. We tackle them every time we analyse and test complex non-deterministic technology, build and use large-scale libraries of automated checks, analyse and review the test coverage and high-volume outputs from non-functional test executions, and manage the pace of technological changes.

Our multi-year experience with traditional and hybrid financial technology helps organisations **build AI Testing Centers of Excellence** through a strategic approach that has proven itself on many of our projects, it relies on the People, Platforms, Processes and Security pillars of the Zero Outage Industry Standard (ZOIS).



Developing an AI Testing Center of Excellence ensures building a strong foundation for an AI-ready environment: pervasive internal AI literacy capabilities, developing ethics, testing, security and compliance principles and frameworks, training all business and technical staff.

We also help to establish a **Learning**, **Collaboration** and Practice framework to help develop human potential within organisations, with initiatives ranging from knowledge transfer courses for specific projects to those meeting **tailored AI literacy** and **AI Testing** goals.

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Guiding the industry with ISTQB®-accredited programmes

Software testing basics for financial industry

The ISTQB® Certified Tester Foundation Level (CTFL) Training Course provides essential knowledge and skills in software testing. It covers the fundamental testing principles and concepts relevant for all software delivery approaches.

Learn more about the programme and the next intakes

A-Team Innovation Awards 2024

WINNER

Exactpro

Most Innovative Professional Development Initiative

AI Testing training course

A comprehensive training course with filled with theory, visual materials, live workshops, hands-on exercises, live explanatory sessions and expert support helps to:

- understand what AI is and how to approach it;
- automate workflows and everyday project tasks, enhancing their efficiency using the AI toolkit;
- test AI-based systems – including self-learning functionalities – from the functional and performance perspectives, mitigating issues such as biases, ethics, non-determinism, and the challenges related to transparency and explainability;
- apply AI for test case generation and test library optimisation, ensuring responsible AI practices.

Learn about the next intake

Workshops upon request:

More workshops

BUILD SOFTWARE TO TEST SOFTWARE

INNOVATE WITH AI TESTING

Enhancing the quality of banking technology platforms through a hybrid AI Testing approach

Iosif Itkin
CEO & co-Founder,
Exactpro

Elena Treshcheva
Program Manager,
Exactpro

In the dynamic landscape of the banking sector marked by increased operational complexity and regulatory scrutiny, the pursuit of innovation demands a strategic approach. While offering enhancements in cost, quality and speed, it should mandate a cautious consideration of the risks inherent in the integration of emerging technologies. With the continuous advancement of artificial intelligence (AI), particularly, generative AI (GenAI) – as a method for improving process automation and streamlining dataflows and customer onboarding, among other use cases – its wider adoption in the financial industry demands careful consideration of the associated risk implications.

On top of regulatory compliance, aspects such as ethical considerations, potential biases, and the need for human oversight remain critical in AI-driven product development and testing. This paper* advocates for a software testing approach capable of addressing the complexities of banking technology platforms. Rooted in the principles of model-based testing, the proposed approach leverages GenAI algorithms to achieve extensive test coverage of the distributed systems and simultaneously employs rule-based analytics to refine the generated datasets, optimising coverage for faster test library execution and efficient resource utilisation. Such an approach is in line with a risk-averse innovation strategy, as it balances the smart creativity with more deterministic discriminative mechanisms.

Following the proposed approach, banking technology operators get to innovate, while learning about potential issues persisting in their systems faster and mitigating risks better, making timely and informed release decisions.

Welcome to our PoC Programme

Exactpro has been successfully applying its AI Testing approach across capital markets use cases for two years. It has helped enhance protocol-based testing of matching engines, market data, market surveillance, clearing and settlement systems worldwide. In addition to helping improve the quality of their systems, the approach has helped our clients decrease time to market, maintain regulatory compliance, improve scalability, latency and operational resiliency.

We are now looking to expand the scope of the approach beyond capital markets. We kindly invite participants from the banking industry to join our Proof-of-Concept (PoC) Programme to partner on exploring innovative ways to improve quality assurance processes across a variety of banking use cases.

PROGRAMME OBJECTIVES

- Helping banks and banking organisations benefit from cutting-edge software testing technology solutions and having them assessed for applicability and comprehensiveness against the existing bank infrastructure setup;
- Advancing the development and testing of innovative Machine Learning (ML), Artificial Intelligence (AI) and Generative AI (GenAI)-based solutions in the banking sector;
- Exploring use cases of ML, AI, and GenAI implementation in the banking space, while maintaining full regulatory compliance.

APPLICATION PROCEDURE

To submit your PoC Programme application, please fill out the short form on the Exactpro website (via the QR code on this page). A member of the Exactpro PoC Programme team will get in touch with you within 1-2 business days.

Feel free to contact our team via *info@exactpro.com* with any additional questions.

Attaining reliable AI-driven decision systems in FMIs

Alyona Bulda
Senior Vice President, Technology, Exactpro

Daria Degtiarenko
Senior Marketing Communications Manager, Exactpro

With AI-enabled systems becoming embedded in enterprise-level tasks – across sectors, but in finance in particular – the safety guardrails should be as strong as ever, if not stronger, and financial services organisations can lead the way. Quality frameworks in financial technology are grounded in both expert domain knowledge and comprehensive frameworks like ZOIS and DORA which epitomise and stand for continuous cross-sector work for the sake of reinforced operational and cyber resilience across diverse sectors and fields of knowledge.

As a technology services provider directly involved in helping exchanges, post-trade system operators and banks enhance the operational resilience of their systems, we have recently contributed to the AI quality discourse. In our **Test Strategy and Framework for RAGs** case study (available via the QR code below), we transpose the software testing approach historically tailored for smart order router (SOR, an inherent part of algorithmic trading) systems to Retrieval-Augmented Generation (RAG) systems. The former represents a more traditional financial platform and the latter an AI-enabled infrastructure with a Generative AI component(s). In the case study, we compare the two system types and explain why RAG and other Gen-AI-driven system operators can benefit from the industry-proven AI Testing approach.

Insights from an independent software testing perspective can contribute to a deeper understanding of the system and its technology and limitations by system operators. Such insights can be used for better planning and strategic prioritisation at the early stages of a new project, as well as during ongoing projects, in technology migrations and prior to launches of brand-new systems.

Engaging AI-enabled testing as a managed service or a capability building program on either traditional or emerging financial technology implementations provides access to cutting-edge know-how – not as an experiment, but as an industry-tested service proven to deliver tangible improvements in capacity, reliability, test coverage and time to market. In the context of AI-enabled systems in digital finance, the methodology helps embed transparency, reproducibility and safety of AI-driven decisions, fostering greater confidence in their real-world applications.

Scan to unleash *Ragsor*

Access the full article

Confident innovation: digital twins for operational resilience in exchanges and CCPs

First published in
the World Federation of Exchanges Focus Magazine

focus | Monthly insight from the WFE and our member exchanges

'Digital twins' are known to be a reliable means of system simulation across industries: automotive, space, manufacturing – used to obtain valuable insights about a system's quality, analyse its performance, and even prevent or remediate breakdowns. However, building digital twins for modelling complex transaction-processing systems such as exchanges, payment, clearing and settlement systems for the purpose of assessing their quality is an area explored less extensively. This article aims to shine the well-deserved spotlight on the significance of simulation in fintech systems delivery.

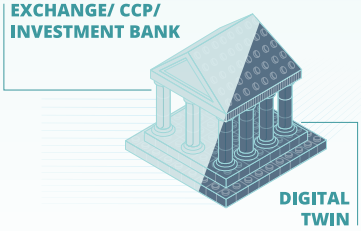
Any given exchange environment can require one to two hundred servers to stay operational. A model of the same environment may require just two servers to run the simulations covering all of the system's quality assessment needs. Significantly optimised resources cut down the associated hardware footprint and costs.

Sufficiently thorough regression testing can require substantial time and effort. Using a model, however, would provide a highly efficient version of the regression test library that leverages computing capabilities to produce and analyse diverse scenarios. Increased testing speed enables faster delivery as well as promotes risk-informed decisions and better delivery strategies.

It is possible for a model to be built as the system matures, which, in line with agile software development methodologies, enables stakeholders to receive objective information about the system early in the development lifecycle and resolve most issues long before they become critical.

Due to its ability to unlock greater control over system components and functions, system modelling provides a fundamentally deeper extent of system analysis, compared to SLA-outlined requirements traceability matrices – more so with the use of AI.

Continue reading about *The Synergy of System Modelling and AI* on our website.



Trading technology testing

CASE STUDIES

EXACTPRO – JSE COLLABORATION TO TEST THE MILLENNIUM EXCHANGE™ PLATFORM

The case study highlights the Exactpro deliverables in setting up automated functional and non-functional testing of the Millennium Exchange™ trading platform provided to the Johannesburg Stock Exchange (JSE) by LSEG Technology.

ATHENS STOCK EXCHANGE (ATHEX) TRADING SYSTEM FIX MIGRATION

OASIS Upgrade Testing & Coverage Analysis

The case study is a reference use case for supporting trading system migrations to FIX-enabled technology, it also highlights the role of passive testing approaches in performing and automating regression testing and improving test coverage.

MEMX – EXACTPRO COLLABORATION ON EXCHANGE QUALITY ASSURANCE

The case study reviews the extensive functional testing and test automation delivered by the Exactpro team.

MARKET SURVEILLANCE SYSTEMS TESTING

The case study highlights the challenges and the complexity of testing market surveillance systems connected to trading platforms, market data providers, involving various data mining processes, alerting mechanisms, and having different degrees of process distribution complexity. The case study is based on the experience of testing a number of market surveillance systems across different markets and locations.

MARKET DATA SYSTEMS TESTING

Recommended Practices for AI-enabled testing of market data, ticker plant, consolidated tape, Securities Information Processor and direct-feed solutions that handle market data from trading venues.

AI-ENABLED SOFTWARE TESTING FOR ARTEX MTF

The case study highlights Exactpro's AI Testing approach tailored to ARTEX needs and encompassing E2E functional and non-functional testing of the MTF's protocol and matching engine software.

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Post-trade technology testing

CASE STUDIES

POST TRADE: FUNCTIONAL AND NON-FUNCTIONAL TESTING

In times of high market volatility, CCPs are one of the finance infrastructure links that are hit the hardest. This case study focuses on the Exactpro approach to testing large-scale post-trade infrastructures with emphasis on enhancing system resilience and increasing the level of process automation. The latter is achieved via leveraging the latest data mining and machine learning techniques.

RISK MANAGEMENT

The case study focuses on the challenges of testing risk management systems and Exactpro's test automation and testing approach developed and implemented for our client, a central counterparty responsible for clearing and risk management of CCP-eligible transactions on a leading European exchange.

COLLATERAL MANAGEMENT

The case study features scenarios for testing of collateral and liquidity management systems for a leading global rates and multi-asset clearinghouse and a multi-national central counterparty.

AUTOMATING CUSTOMER CONFORMANCE CERTIFICATION

Conformance certification (also known as conformance testing) is a mandatory step in ensuring that customer systems comply with the officially declared exchange/broker certification rules. Conformance certification is conducted in order to prevent the occurrence of compatibility issues between the trading platform and the systems of the trading participants connecting to it. The list of parties conducting conformance certification includes but is not limited to exchanges, alternative trading systems (ATSs), multilateral trading facilities (MTFs), Swaps Execution Facilities (SEFs), broker and post-trade systems. The case study describes Exactpro's passive-testing-based solution for streamlining customer conformance testing automation.

Introduction to AI Testing: guide to ISTQB® CT-AI certification

I endorse this book as a valuable companion to the ISTQB® CT-AI certification and as a resource for those seeking to build responsible, robust, and intelligent systems. I trust it will inspire and equip the next generation of AI-aware testers across the globe.

Foreword by Dr. Klaudia Dussa-Zieger,
President of ISTQB®, Head of the ISTQB® AI Taskforce

It's clear this book was written by professionals with real-world experience testing complex systems in high-stakes industries.

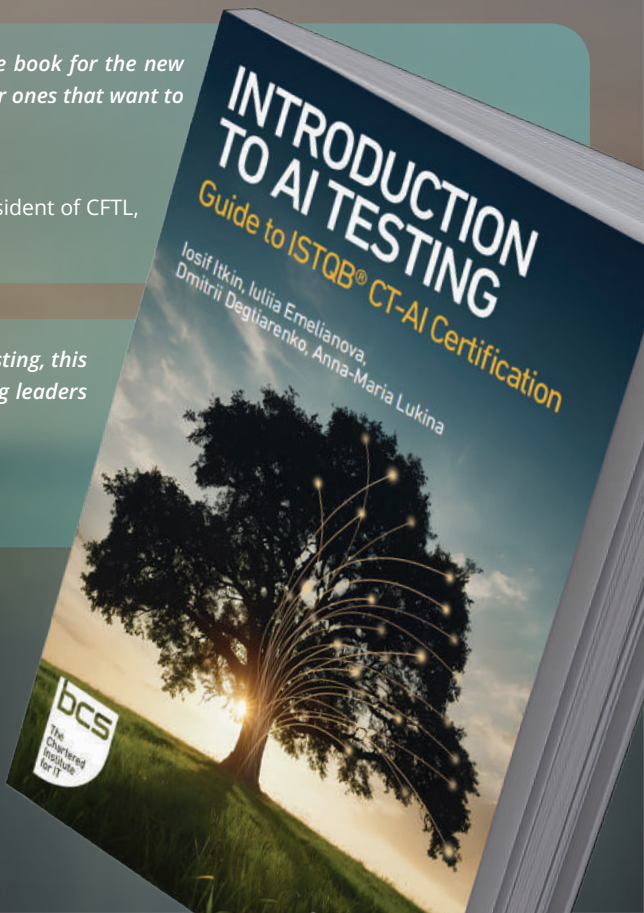
Sophie Lafont,
Consultant in Software Regulatory Compliance, Financial Services Industry

Without a doubt, an essential bedside book for the new generation of QA-ers, and for the older ones that want to keep abreast with progress.

Olivier Denoo,
Vice-President of the ISTQB® and President of CFTL,
Vice-president of ps_testware SAS

With its methodical approach to AI testing, this book fills a critical gap for engineering leaders navigating AI risk.

Sri Kolagani,
Senior Engineering Manager, Elastic



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