



Murex at ASIFMA Tech and Ops Week



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BLOGS

Have Agile Work Practices Become More Important for Banks During the COVID-19 Pandemic?

This blog post from AFME and Murex explores what Agile work practices are, why banks have adopted them and what opportunities they present in the context of the COVID-19 pandemic.

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Why the time is right to embrace Agile

Now with the requirement for companies to accelerate digital transformation and update legacy software in response to a very wide and sudden global crisis such as Covid-19, thinking in a more agile way is now more important than ever.

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Have Agile Work Practices Become More Important for Banks During the COVID-19 Pandemic?

by Emmanuel Le Marois, AFME associate director, technology and operations, and Arnaud De Chavagnac, head of cloud, technology and services marketing at Murex

Introduction

The COVID-19 pandemic has clearly demonstrated the importance of technology for maintaining productivity and collaboration across a remote workforce (e.g., video conferencing use, cloud-based tools). However, new ways of working, such as Agile work practices, have also played an important role during this period. As first identified in a 2020 [report](#) we developed with Murex, the collaborative nature of Agile work practices has been embraced by remote teams, helping to maintain connectivity for delivering IT projects and business as usual activities.

Due to benefits Agile work practices provide, and an increasing focus from regulators on the importance of technology to support recovery efforts related to the pandemic, we expect the adoption of Agile work practices to increase in importance.

To be successful, organizations must now identify the benefits and lessons learned from adopting Agile work practices during the last 12 months, especially as they look at day-to-day solutions for more permanent hybrid working arrangements or innovative ways to deliver large-scale transformation. Agile work practices should be seen as another important tool, providing the workforce with necessary skills, connectivity and control over their time to remain productive and engaged.

What are Agile work practices, why have banks adopted them and what opportunities do they present now?

Agile work practices set out an alternative way to deliver IT projects, moving away from a traditional "waterfall approach" (a linear process of design, test, build activities), toward quicker, iterative, development cycles (known as "sprints"). This meant IT projects could be broken into smaller parts, allowing for feedback and changes to be made more quickly, in turn increasing the quality of the end result.

The original Agile concept for IT projects has since been adopted by organisations, such as banks, and subsequently adapted to a wider range of change and business-as-usual activities known as "Agile work practices". Adopting Agile work practices has helped banks achieve a range of benefits, such as delivering incremental updates to business applications more quickly or more dynamic allocation of resources based on changing operational needs. For example, some banks have used Agile work practices for client-onboarding to incorporate new features and requirements for KYC processes more quickly (this use has increased during the COVID-19 pandemic due to the changes needed to onboard clients digitally).

The importance of new ways of working such as Agile work practices was recently acknowledged by the European Commission in their 2020 [Digital Finance Strategy for Europe](#). The strategy emphasised that the adoption of new technologies in financial services such as cloud, DLT and AI increasingly require an Agile approach because their development is by nature more open and collaborative (e.g., new technology adoption, such as AI, is increasingly encompassing a wider range of internal staff roles, and third parties, to develop and implement).

Our 2020 report with Murex on Agile work practices, developed as the COVID-19 pandemic began to unfold, highlighted that the disruption faced by banks required them to be increasingly flexible to change (e.g., quickly deploying new remote working tools across the workforce) and able to quantify and mitigate any impacts on productivity.

The value of Agile work practices in navigating ongoing disruption and uncertainty

Six months since the publication of our 2020 [report](#) with Murex, we have again engaged senior members of AFME's Technology and Operations Committee to assess how the adoption of Agile work practices has been helpful to overcome ongoing challenges in the current operating environment. Our members observed that Agile work practices have had a positive impact on banks' day-to-day and ability to cope with the disruption, and are likely to increase in importance throughout 2021.

Instead of being dedicated to delivering specific projects, Agile work practices are now being incorporated into the day-to-day running of teams. Pre-pandemic, teams would usually organize weekly meetings to discuss individual and common priorities or increase team-building. It is not uncommon today for teams to have daily Agile "stand-ups." These short, time-boxed status checks offer benefits to dispersed teams, as they can synchronize work more regularly, allow priorities to be reassessed, and connect staff to increase team-building.

Agile tools such as "virtual white-boarding," "user stories" or "customer journeys" have also been used to maintain staff productivity and engagement, by shifting the focus of work toward the main key stakeholders of a project (e.g., looking at delivery from the perspective of a future user or client). This has been effective to make work more meaningful in a period of significant uncertainty.

Agile work practices also provided banks with greater flexibility and control over resource allocation by implementing tools that measure productivity. For example, common Agile tools such as "burndown charts," "velocity charts," "escaped defects," and "cycles times" have provided dispersed teams with reporting tools used to measure progress more accurately.

This was an advantage during the COVID-19 pandemic for banks with mature Agile teams—they were more prepared to provide insights on productivity gains or losses and ultimately had greater flexibility, control and transparency over resource allocation. Banks with mature Agile work practices were able to quickly shift resource allocation, on a cross-border basis, to address short term priorities while maintaining focus on strategic multiyear programs, such as the London Inter-Bank Offered Rate ([LIBOR](#)) transition or the Fundamental Review of the Trading Book ([FRTB](#)).

Agile work practices have also played an important role in attracting talent and enabling continuous workforce upskilling. For example, Agile work practices have enabled increased staff development by driving cross-functional teams (e.g., combining the skills and knowledge of multiple roles into a single team). This has resulted in a positive impact on company culture by breaking silos and increasing collaboration during a time where face-to-face interaction has dramatically reduced.

What does this mean for Agile work practices in 2021 and beyond?

Agile work practices are now increasingly being incorporated into the culture and day-to-day of teams. Adopting new ways of working, such as Agile, will therefore continue to be an important area of focus for banks.

We believe the adoption of new ways of working, such as Agile work practices, will become increasingly important for all financial market participants, including regulators, as we continue into 2021 and beyond. Their adoption at scale will in turn act as a catalyst for the EU's [Digital Finance Strategy](#) and its ambition to increase collaboration and new technology adoption within financial services.

It is now crucial that Agile work practices, benefits and lessons learned are identified, as banks look toward more permanent hybrid working arrangements and innovative ways to deliver large-scale transformation. Agile work practices should be seen as another important tool to drive efficiency and productivity, providing staff with necessary skills, connectivity and control over their time.

For more on AFME initiatives, see:

- AFME Report: [Adopting Agile Work Practices at Scale in European Capital Markets](#)
- AFME Webinar conference panel: [Adopting Agile Work Practices at Scale within European Wholesale Markets](#)
- AFME White Paper: [The Adoption of Public Cloud Computing in Capital Markets](#)

Why the time is right to embrace Agile

A perspective from Arnaud de Chavagnac - Head of cloud, technology and services marketing at Murex

When the COVID-19 pandemic hit nearly two months ago now, we like the rest of the world were thrust into remote working and a scenario of unknowns and wait and sees. We reacted quickly, adapted and put measures in place to ensure business continuity for our staff, our clients and our partners. For our 1000-person strong customer division, who are responsible for leading major IT implementation projects, and for servicing our 50,000 daily users in 60 markets, there was almost no change in our working practices. Thanks to the deep relationships with our clients, we continue to deliver projects remotely and provide the same if not better quality and attention.

Much of this smooth transition happened because we have long championed the Agility and DevOps approach to client transformation and implementation projects and, we ourselves have experienced our own internal digital and agile transformation over the past years. Adopting Agile and DevOps approaches and [the cloud](#) has given us the opportunity to create greater flexibility within our own IT infrastructure, the MX.3 platform and in our overall ability to respond quickly to the unexpected.

Now with the requirement for companies to accelerate digital transformation and update legacy software in response to a very wide and sudden global crisis such as Covid-19, thinking in a more agile way is now more important than ever.

Firstly, what do we mean by Agile and DevOps?

Agility offers a flexible and adaptable path to change, enabling organizations to respond more quickly to disruptions, whether they be external or internal drivers. Cross-functional teams focus on outcomes, not tasks, and commit to outcomes that deliver value.

DevOps is a natural extension of Agile development methods, and it aligns Development and IT Operations activities, embracing the entire Software Development Life Cycle (SDLC), from design, through the development process, and into the implementation phase.

The **benefits of the Agile** methodology include:

Improving quality: Testing happens earlier in the chain which enables this approach to deliver better quality, as issues are identified and corrected earlier. This helps provide more frequent, incremental delivery to the client making testing efforts smoother.

Reduced cost and improved efficiency: Earlier and more frequent testing also means less time and money spent on validation. This makes it possible to be more responsive to changing requirements even at the latter stages.

Greater collaboration: The process of software development is more fluid, encourages end-to-end ownership and is collaborative as opposed to being focused on individuals delivering tasks. Among other things, DevOps relies on the continuous collaboration enabled by the shared code repository access by all parties involved in the SDLC. In current times, with all teams working in different locations, it is critical to have the tools and best practices in place, to keep everyone up to date on the progress of the project. Collaboration, teamwork and open communication is key to keep projects on track.

Enhancing predictability: With an Agile implementation, there are fewer surprises later in the project. For example, typically issues are uncovered at the user acceptance and validation stages, which is an ineffective use of time and resources. The Continuous Testing aspect of DevOps results in earlier feedback and opportunities to resolve complexities sooner rather than later in a much more cost-effective way.

Enabling flexibility: In DevOps, testing does not happen at the end of the project cycle, it happens throughout. The automated testing done early in the process with DevOps enables projects to cope with last minute changes without jeopardizing the go live. The automation of the testing provides speed and high confidence in the results. This allows for greater flexibility and the ability to respond to critical business evolutions and circumstances, such as the current pandemic.

In the current context, our customers have even higher expectations on the time to market, so we simply cannot afford to have additional testing and project delays. Our scaled agile methodology means we can consider change to be "Business as usual".

Is DevOps right for your organization?

If your organization has already successfully adopted some elements of Agile working, it is more likely that you are ready to reap the benefits of working in partnership with a shared DevOps methodology. Once these elements are embedded and working well for you, the business will be in a far greater position to move to full DevOps. Financial institutions that have a well-established change management team with the right people, structure, and culture, may also be ready to begin the journey to DevOps.

DevOps offers great potential as an approach for more flexible and effective software development and client delivery. It provides a scalable foundation for the capital markets and [banks](#) to respond to future scenarios, accelerate time to market and drive the business forward even in these uncertain times.

The demand for innovation will only increase, the world will only become more digital, remote working will continue, and there will be a long-lasting legacy from this period. The shifts and changes in mindsets that are developing during this pandemic will be the catalyst for transformation and will require organizations to adapt an agile approach.

For more information on adapting an agile approach or methodology, contact us [here](#).



Reaping the Benefits of Agility in Capital Markets

White Paper

Reaping the Benefits of Agility in Capital Markets



We have found that, with a DevOps approach, validation timescales can be cut in half when compared to traditional methods.

Hassan Kamal

Head of Software Engineering
Department, Murex

The pressure to deliver transformative technologies and gain competitive edge in the capital markets sector is relentless. The need to control costs and risks, provide better service, and maintain regulatory compliance is critical. Disruptive technologies and increasing competition mean that financial institutions must be more flexible in their response to changing client and regulatory demands. Capital markets participants face the challenge of upgrading their technology as existing infrastructure struggles to keep up.

In this paper, we share experiences from our work applying Agility and DevOps to client implementation projects, as well as our own internal Agile transformation. It explores how our industry can benefit from the latest development approaches while addressing some of the technology challenges specific to capital markets.

Why embrace Agility?

Agility offers a flexible and adaptable path to change, enabling organizations to respond more quickly as business requirements evolve. It is characterized by autonomous, cross-functional teams that commit to outcomes that deliver value, not to ticking off completed tasks. While this approach can sometimes take a little longer in the initial stages, there are fewer surprises and delays later, meaning overall project timescales are reduced.

DevOps is a natural extension of increasingly widespread Agile development methods. DevOps aligns Development and IT Operations activities. It embraces the entire software creation lifecycle, from design, through the development process, and into the implementation phase. This is made possible by Continuous Testing and Continuous Delivery, which automate the testing and delivery elements within DevOps. This approach enables incremental ongoing development and is more responsive to evolving requirements than the Waterfall approach (see figure 1, page 3).

Benefits of the Agile methodology include:

Improving quality: Testing happens earlier in the chain which enables this approach to deliver better quality, as issues are identified and corrected earlier. This helps provide more frequent, incremental delivery to the client making testing efforts smoother, while avoiding a tunnel effect.

Earlier and more frequent testing also means less time and money spent on validation. This makes it possible to be more responsive to changing requirements even at the latter stages of validation. The process of software development is more fluid, encourages end-to-end ownership and is collaborative as opposed to being focused on individuals delivering tasks.

Enhancing predictability: Previously, issues were uncovered at the user acceptance and validation stages, which was far too late. With an Agile implementation, there are fewer surprises later in the project. The Continuous Testing aspect of DevOps results in earlier feedback and therefore opportunities to resolve complexities.

Enabling flexibility: In the past, testing happened toward the end of the project cycle. Consequently, any late change in the design of the target solution requested by the client could result in months of additional testing and project delays. The automated testing done early in the process with DevOps enables projects to cope with last minute changes without jeopardizing the go-live.

Glossary

Agile: Agile practices started as a software development philosophy and in recent years have evolved to become a broader project management approach. Agile software development describes an approach whereby requirements are developed collaboratively by cross-functional teams. It is characterized by adaptive delivery and continuous improvement, focusing on being able to adapt to change even when the development is underway.

Agile Release Trains: Teams using the Scaled Agile Framework (SAFe) are organized into a virtual program structure called the “Agile Release Train” (ART), or simply “train”. Each train is a long-lived, self-organizing group of Agile teams (typically 5 to 12 teams), along with other stakeholders, that plan, commit, execute, inspect, and adapt together. The train program structure aligns teams to a common mission, provides architectural and user experience guidance, facilitates flow, and provides continuous objective evidence of progress.

Scrum: Scrum is an Agile development at team level, often used to manage complex software and product development. It uses iterative and

incremental practices, where the product is built in small but valuable pieces and refined constantly over a sequence of iterations, allowing the smooth management of changing requirements.

DevOps: is a combination of practices, tools and cultural approach, aligning Development and IT Operations. The approach enables an organization to deliver reliable and secure software products along with their evolutions more quickly than using traditional software development and infrastructure management processes.

Continuous Delivery: New code is merged into the build every day/week with the objective of having software ready to be released into production at any time.

The concept of Continuous Delivery encompasses:

- **Continuous Testing:** As developers write the code, they create the means of testing it, and test the code in parallel with development activity.
- **Continuous Integration:** Traditionally developers write a branch of code, ensure the branch is tested and errors are fixed, then merge the individual

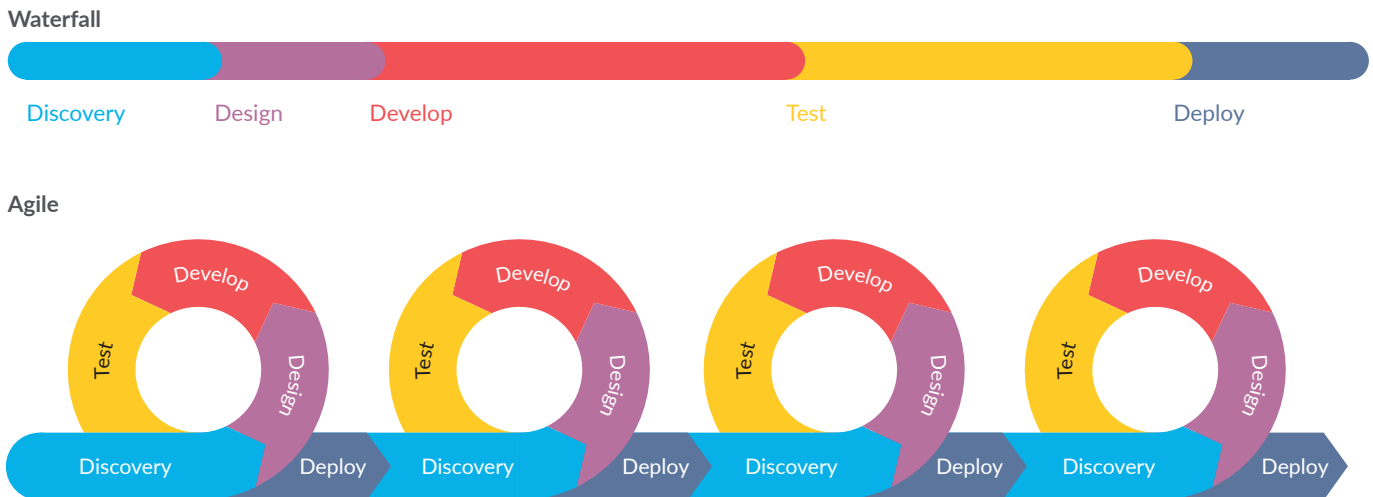
branch into the shared mainline code frequently. With Continuous Integration there is no delay integrating the branch. This allows for continuous quality control and faster deployment.

CT / CI principles apply equally to both layers that are delivered to a client during a project implementation; the software development layer and the client configuration layer.

SAFe: Scaled Agile Framework is a collection of Agile best practices for executing agility at scale. SAFe synchronizes alignment, collaboration, and delivery for large numbers of Agile teams. Scalable and configurable, SAFe allows each organization to adapt it to its own business needs. It supports smaller-scale solutions employing 50–125 practitioners, as well as complex systems that require thousands of people.

Like standard Agile practices, e.g. Scrum, SAFe also prescribes its own ceremonies. The most interesting ceremonies are the “big-room” planning events, where all members of the Agile Release Train come together to collaborate and plan for the next increment of working product.

Figure 1: From Waterfall to Agile



The challenges facing capital markets players

Improving your ability to quickly add new business and technology features is critical in capital markets. CIOs working with legacy IT face a real challenge introducing additional functionality for trading, post-trade operations and risk management. This is due to highly complex and specific requirements, demanding deep customization and sophisticated testing at the implementation stage.

In the context of the capital markets the sheer complexity of the content adds a unique set of challenges. Financial institutions operate within a highly regulated ecosystem, where information is constantly changing and evolving. The emergence of new regulations creates dependencies between front, risk and back office. Software development cannot be managed in a silo. In the delivery of client projects we see the emergence of large-scale programs that require business process reviews and the rationalization of disparate data.

Organizations must deliver IT projects against this backdrop. A firm's IT infrastructure is often a complex landscape with a high degree of interdependencies between different existing systems. Commonly, there are multiple parties working across parallel streams to deliver a solution, including internal IT resources, the software provider and system integrators.

Despite the trend toward standardization, the capital markets sector demands a higher degree of customization than other industries. Customization requirements may come from various sources, including regional or local practices, existing infrastructure as well as organization or business needs.

Compared to consumer software development firms, such as Google or Amazon, where a standardized product is used off-the-shelf by all clients, the capital markets industry brings unique challenges for a vendor like Murex, which is often required to create specific configurations for individual clients.

DevOps and capital markets

Many capital market participants have adopted the Agile approach, which started life in software development and consumer technology companies. It spread to project management as projects became more complex and the traditional, top-down Waterfall approach was no longer delivering the required levels of quality, visibility and predictability.

Some banks are adopting Agile and DevOps approaches to create greater flexibility and increase their ability to respond quickly to change. DevOps introduces the benefits of Agile throughout the entire lifecycle of software development and implementation.

Quality, predictability and flexibility improvements offered by a DevOps approach are especially important in a sophisticated and competitive capital markets context, where project implementations require a high degree of customization. The DevOps approach makes it easier to check if the development is diverging from client needs. It enables much tighter control over software development timescales that, in turn, makes it easier to predict the delivery date with certainty. Banks can then be more confident that they can meet the requirements of regulators in time. CIOs and Heads of IT will have more certainty around when solutions will be delivered and what they are able to promise to management.

The DevOps approach embeds quality through Continuous Development and Testing that calls for a frequent review of requirements and outcomes across all parties. This continuous adaptation ensures quality even for the smallest of changes.

In addition, it allows you to scale up quickly to meet new needs. By accelerating testing and implementation, and focusing on using tools at every stage of the project, it allows for more consistent, effective development across teams. In the past, it might have taken four separate projects, each with significant operational costs and risks, to scale a solution to match new needs.

Configuration management alone may have represented a significant cost, added to which is the expense of moving configuration from one environment to another. Now, with Continuous Integration, you can merge multiple lines of code into the target environment more efficiently and with better quality.

Testing that used to be manual and time-consuming is now automated. What used to take place at the end of a development or project cycle, now happens earlier in the process resulting in an overall higher level of quality.



The most notable difference at Murex is a change in the way we plan and execute solution development. We do not commit to tasks - we commit to outcomes, and we let the teams decide how best to get there.

Wissam Ghamroun

Head of EMEA Customer
Delivery Services, Murex

Murex's first-hand experience

At Murex, we are on our own journey to DevOps.

Murex is in a unique position. As a software developer, we have our own software factory teams creating and improving our product's code for several hundred clients globally. In addition, Murex is a partner to our clients and works in unison with them to deliver large-scale implementation projects. This provides us with a full view of the entire delivery chain, from software creation through to client go-live. We consider the full cycle, from build to delivery, as one single problem that we approach holistically.

Murex software factory — Agile transformation

For several years, Murex has adopted Agility internally for the development of the MX.3 capital markets platform. As software developers, this represented a complete transformation of the way we work. We introduced Agility in a core team of engineers and are now extending it to our entire software factory of more than 1,000 people. This represents a huge change in executing the full development cycle.

While an Agile approach can be applied to small teams, in order to achieve an enterprise-level transformation we adopted the Scaled Agile Framework (SAFe). This helped us reach our scalability, predictability and adaptability objectives. SAFe is a source of best practice in terms of aligning a large number of people with the same level of mission awareness and motivation about a project. It also enables individuals and teams to be autonomous in how they deliver the project.

The SAFe approach has also helped us adopt best practice engineering standards around test-driven development, behavior-driven development and Continuous Integration. There have been many lessons learned along the way, and we continue to develop our practice to reap the benefits of extending the Agile approach through client implementation projects.

Piloting DevOps for client implementation projects

In 2017 we launched a pilot project with one of our largest FX clients and applied a DevOps approach to the project implementation. Phase 1 of the project was launched utilizing Continuous Testing, Integration and Delivery methodology.

The pilot project saw both design and build activity across three key test areas: configuration of the platform; verification of the inbound and outbound data protocols; and the non-functional tests which include performance, latency, throughput, stability, resilience, as well as functional correctness under load testing.

This has been achieved largely thanks to having the correct tooling in place, and the ability to manage configuration as code. DevOps implementation projects apply the same principles to build and test the configuration layer as within the software development factory. We have developed some of the tools required for Continuous Testing in-house, whilst leveraging industry standard tools such as GIT and Jenkins (for versioning of configuration items to help with automation of merge and testing) wherever feasible. We develop the tools in-house that are closely related to our specific platform content and are currently regrouping usage of all these tools within a common user interface.

These tools create a chain between development, testing and deployment that is shared with the client, the system integrator for the project and Murex. They can also be used for Waterfall or more traditional implementation methodologies.

Now that we have the tools in place to Continuously Test, Integrate and Deploy new code, the client can see the new code incrementally and provide feedback as it is tested, as opposed to waiting weeks between client delivery drops. The pilot project 'go-live' is scheduled for late 2017, and we aim to launch another round of pilot projects next year.

A culture of change management

These new approaches align the activities of development and operational staff, removing traditional top-down command and control management hierarchies. This may be different from software development and project delivery practices currently in place.

A change in mindset is required from the project management team. For example, a stream lead who was focused on design and build is now required to write and automate testing while merging code into the master repository. This demands new skills as new roles are created (e.g. scrum master) and new governance practices are established (e.g. SAFe ceremonies) in order to provide the same information across all levels of the organization, and help promote autonomy to deliver projects.

When applying DevOps to a client implementation project, there is also a large amount of trust required between software house and client. An Agile approach means the end result is agreed without predefining all the tasks and steps required to get there. Clients also need to accept some changes in the way they work with their software vendors and system integrators. They will need to design and provide acceptance testing criteria much earlier in the project cycles, and be prepared to respond quickly and test more frequently than in the past.



DevOps presents a big change; it asks programmers to become testers, and many of them will need to gain new skills.

Hassan Kamal

Head of Software Engineering
Department, Murex



Some managers will fear the loss of control and may need support with making this transition – in trusting the team to collaborate, be creative, and deliver an outcome without a detailed task plan in place.

Wissam Ghamroun

Head of EMEA Customer
Delivery Services, Murex

Could you benefit from DevOps?

These methodologies are starting to become the new norm within software development but haven't yet spread widely to client delivery projects for capital markets.

DevOps offers benefits to capital markets participants, ranging from the ability to improve and update your software more quickly and responsively, through to greater control over the costs and risks associated with software development. Financial institutions can also benefit from adopting individual elements of DevOps, such as Continuous Testing and Continuous Integration, which deliver better quality software with more predictable timeframes.

Not every firm is ready for a full DevOps approach. As with any change management project, the initial cost of working during the transition is higher, and could result in a higher than expected spend in the first 12 months, with savings coming in subsequent years. In addition, stakeholders may need some persuasion that this new approach is more efficient, because compared to Waterfall the initial phase of a project is more time consuming. This time is, however, more than gained back during the user acceptance stage of a project.

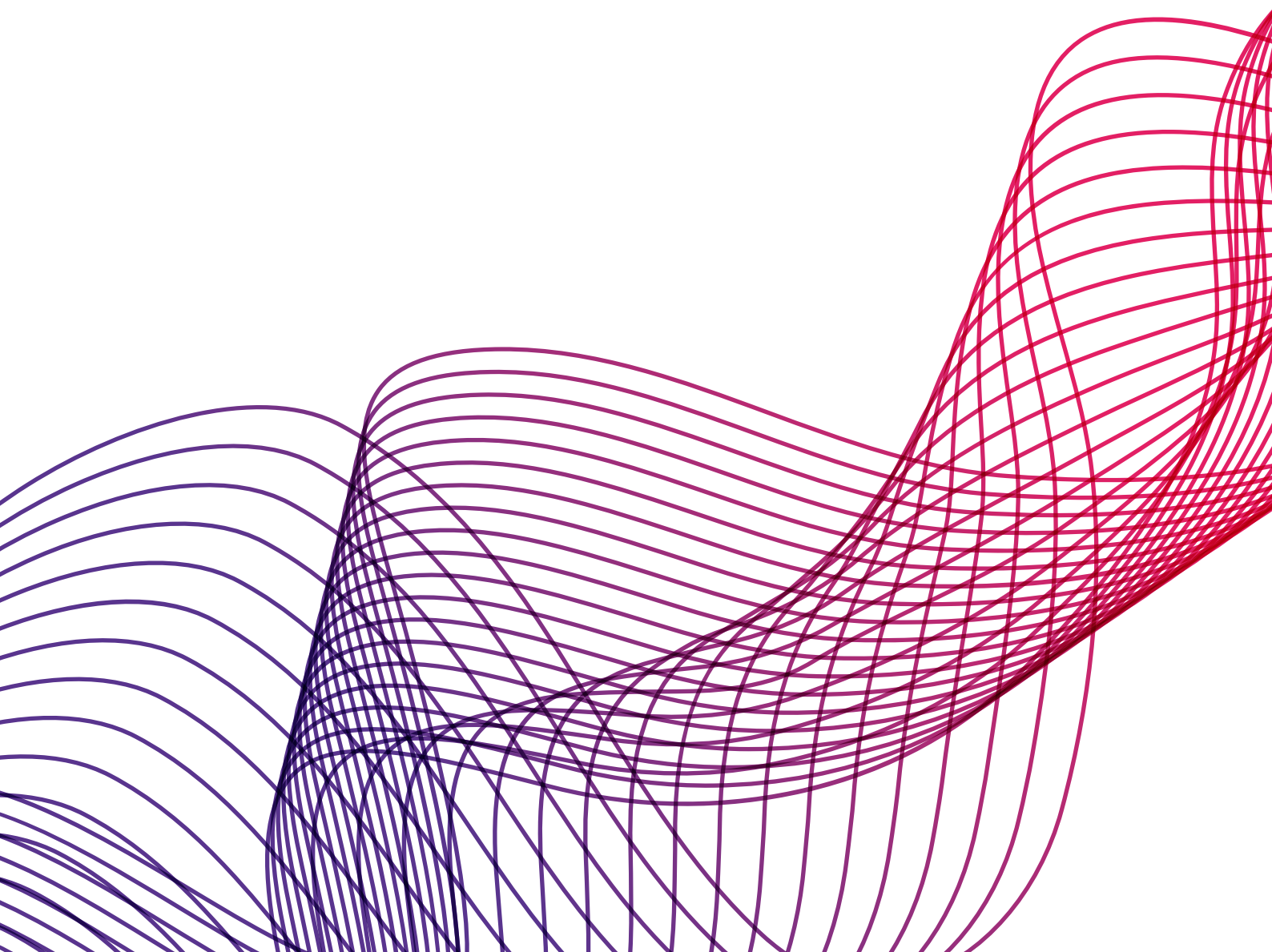
If your organization has already successfully adopted some elements of Agile working, it is more likely that you are ready to reap the benefits of working in partnership with a shared DevOps methodology. Once these elements are embedded and working well for you, the business will be in a much better position to move to full DevOps. Banks that have not yet adopted Agile principles, but that have a well-established change management team with the right people, structure, and culture, may also be ready to begin the journey to DevOps.

DevOps offers great potential as an approach for more flexible and effective software development and client delivery. It provides a scalable foundation for banks to respond to changes, accelerate time to market and drive the business forward. When software development and deployment become a single cycle with consistent principles and engineering standards, the result is an adaptable solution that is capable of meeting current and future needs.



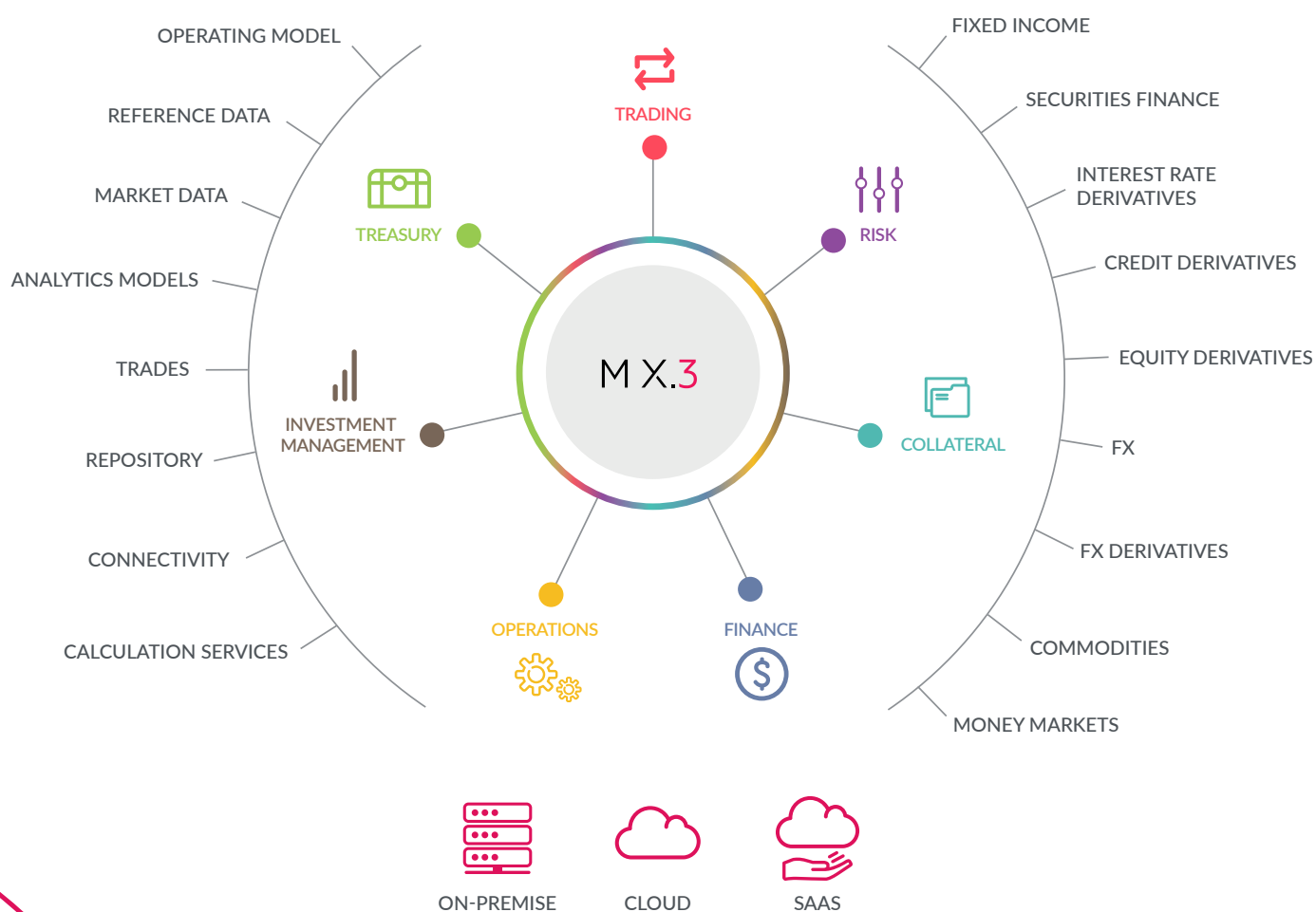
Murex Cloud Solutions

From IaaS to SaaS



Discover MX.3

One platform, multiple solutions.



The full power of MX.3 on the cloud

Whether you want to run MX.3 infrastructure on AWS or Azure, or prefer a fully-managed private SaaS approach for all Murex business solutions, Murex cloud and SaaS solutions are tailored to meet your needs. Combining the full power of a leading capital markets platform with the expertise and infrastructure to manage it, our buy- and sell-side clients have more time to focus on their core business, enjoy continuous platform innovation and the freedom to enhance their IT infrastructure in an agile and cost-effective way.

IaaS benefits with AWS or Azure

Focus on your business

Outsource non-core activities to cloud and Murex platform specialists to focus on core business priorities and increase the agility of your IT system.

Provisioning revolution

Access unlimited storage and compute capacity, and apply any necessary infrastructure changes simply and quickly.




Optimize TCO

With a flexible pay-as-you-go model, infrastructure costs are based on actual rather than peak usage and all cloud items consumed are closely monitored, giving you greater visibility.

Cloud-certified for the latest innovations

MX.3 is certified with Azure and AWS and we continuously identify, test and optimize cloud features that can be applied to MX.3, making sure our customers can keep pace with the latest cloud innovations.

Murex Cloud and SaaS solutions

		Infrastructure as a Service by   Microsoft Azure	Software as a Service by  MUREX
IT asset services	Infrastructure management (compute, storage, security, hosting, network)	✓	✓
	Managed database	Client* or AWS RDS Oracle	✓
Run services	Production hosting	✓	✓
	Disaster recovery hosting	✓	✓
	Test and development environments hosting	✓	✓
	Murex operating environment management (RDBMS, OS patch, java, middleware)		✓
	Production environment health checks, monitoring and capacity provision		✓
	On-demand penetration tests		✓
	Grid computing management		✓
	Interfaces management		✓
	Application management, batch processes scheduling, BAU management, EOD management		✓
	Business and after-hours support		✓
Change services	Test and development additional environments spin-up		✓
	MX.3 customizations and extensions		✓
	MX.3 configuration management		✓
	MX.3 upgrades		✓

*The client is responsible for the technical and functional administration, management and evolution of their MX.3 application. Support from Murex or System Integrators is available if assistance is required.

The full power of MX.3 on the cloud (continued)

Additional benefits with Murex SaaS

Accelerate market compliance

Get immediate access to leading capital markets, business and IT best practices and expertise.

Boost innovation

Get a head start with fast, unlimited infrastructure provisioning and technical platform components for the agility to adapt quickly to future market changes and to ensure strategic readiness.

Keep full control of your business content

Instead of traditional SaaS models that offer limited functional scope and no flexibility, you have a dedicated single-tenant SaaS, using your own configurations and data privacy, with the ability to evolve on-demand.

Trusted application management

Murex teams stand out for their expertise, capacity to support any complex instrument and advanced IT setups, such as grid computing, as well as experience in supporting demanding production instances.

Secure

Maximize resilience with regional disaster recovery sites and safeguard security at all levels with options to encrypt data at rest and in transit.

Murex's cloud vision

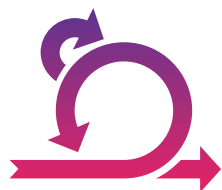
The first milestone on the Murex cloud journey was reached in October 2017, following the certification of MX.3 on both Azure and AWS IaaS, paying special attention to security, stability, performance and user experience across all functional modules.

Certifying a Database as a Service (DBaaS) offer is a step towards providing our clients with additional PaaS options. PaaS complements IaaS with managed services that are key for the Murex application. Database and middleware managed services are typical PaaS offerings that can be outsourced to focus on high value activities and differentiators.

Murex is investing in cloud to provide a market-leading user experience to financial institutions and to help clients better control TCO. For example, we are selectively moving computationally-intensive workloads onto the cloud, such as certain risk, trading and processing activities. Newly developed business and regulation solutions designed by Murex are cloud-native, naturally benefitting from the elasticity and ease of use provided by IaaS and PaaS.

Our cloud journey





**Increase the
agility of your
IT with cloud**

Murex cloud deployment options: public or hybrid

Take advantage of the latest innovation, quickly access unlimited compute capacity and be ready for the future capital markets with a flexible range of Murex cloud deployment options.

Production

Murex helps determine the sizing requirements for your cloud infrastructure for production and can also make security recommendations. In production, cloud provides you with increased agility, with the ability to adapt production infrastructure to changing business demands.

Disaster Recovery

By leveraging cloud to replicate the production installation, you will avoid unnecessary investment in infrastructure, while also reducing the costs and complexity associated with managing and maintaining disaster recovery infrastructure.

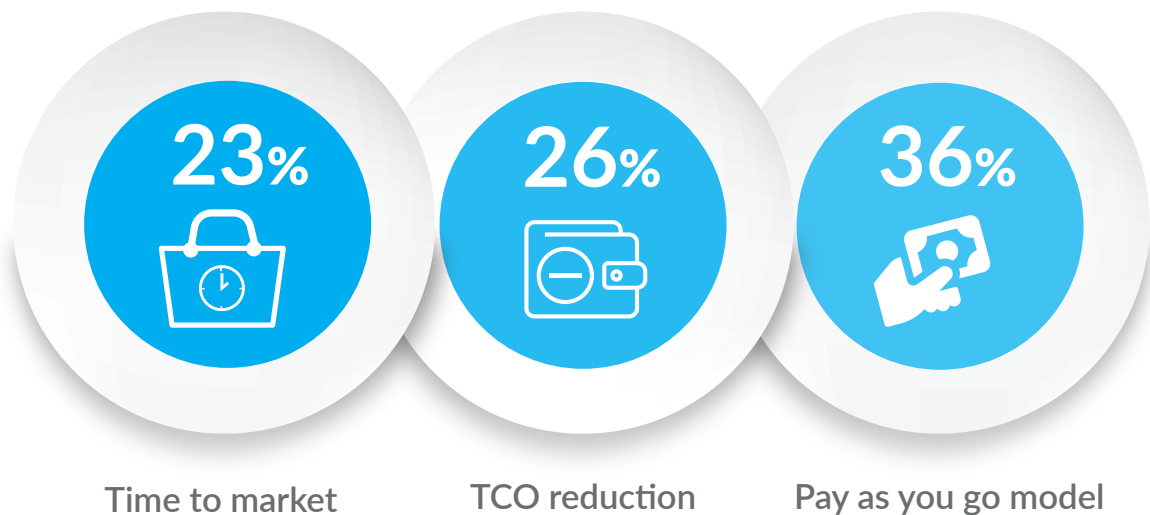
Grid computing

With the option of deploying Murex grid technology or third-party solutions, such as DataSynapse or IBM Symphony, on the cloud, you can benefit from elastic compute to augment grid infrastructure on-demand with CPUs/GPUs. Reduce costs and increase capacity for dynamic compute intensive, stateless workloads.

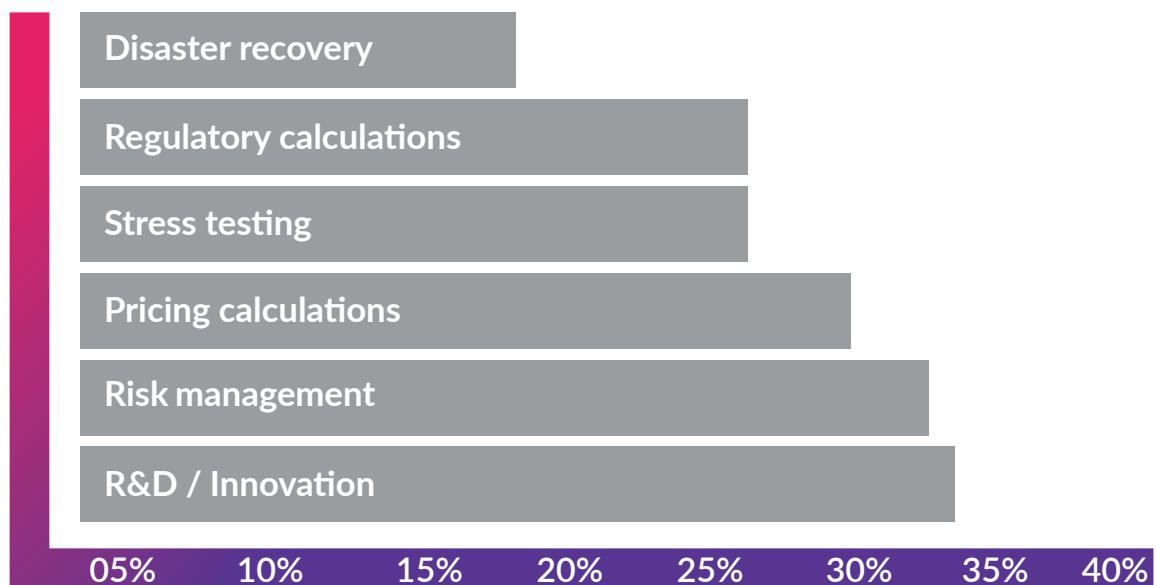
Development and test

Use Murex tools and cloud infrastructure templates to copy MX.3 environments on the cloud and enable the rapid provisioning of development and test environments, reducing deployment time and management cost.

What is the most significant benefit coming from the cloud in your organization?



Which applications are you using the cloud for?



Results coming from a private poll during the cloud webinar organized by Murex on September 20th 2018. Several selections were possible when answering each question.

Murex SaaS services for application and infrastructure management

With years of project and support expertise, Murex provides comprehensive SaaS services, bringing leading security and availability to the management of your application and infrastructure.

Infrastructure hosting

Fully hosting IT infrastructure on the cloud simplifies systems management and gives you better control over growth and cost. Murex takes care of the entire provisioning and administration of hosting, servers, storage and networking.



Cloud and SaaS can help to reduce time to market

Deployment and monitoring

Murex is responsible for initial set-up and proactive monitoring. We also take care of the entire licensing, installation and administration of the virtualization, operating system, RDBMS and middleware layers, along with the MX.3 instances. The technical layers, MX.3 and End of Day (EOD) are monitored to maximize availability.

Application management and support

Murex SaaS experts are in direct contact with your internal team to deliver a high-quality experience to MX.3 end users. Housekeeping tasks include MX.3 daily back-up, external vaulting and purges. Murex SaaS covers all functional and technical questions related to your usage of MX.3.

Ecosystem management

Interfaces to and from external systems are jointly managed by Murex SaaS experts and your in-house teams so that your business can enjoy smooth connectivity to market, static and trade data, as well as custom interfaces.

Production management

Leverage Murex tools and experience to manage your production and safeguard the stability of your installations, without the cost of maintaining a dedicated internal production team of technical experts.

Disaster recovery management

Murex SaaS includes disaster recovery site where production data is replicated. The site is geographically separated from the primary data center. In the unlikely event that the SaaS service production facilities at the primary data center are rendered unavailable, the required hardware, software, and internet connectivity can be accessed in the secondary site. Annual disaster recovery plan tests are also conducted as part of the SaaS offering.



Development and test environment management

Replicate and spin-up new MX.3 environments on-demand for development and test purposes, including user acceptance testing (UAT). Without the need to worry about hosting, hardware, OS, RDBMS and other underlying components, access and run your MX.3 project environments.

Grid computing

Murex SaaS gives you the power of high-performing Murex analytics on grid and the experts to manage advanced features. It means you don't need in-house grid specialists or advanced knowledge of CPU/GPU cores.

After hours support

Murex experts are on-hand to support your system 24/7. Their technical knowledge and experience in MX.3 operations is unparalleled in the market.

Additional penetration test

Murex SaaS security experts are available to organize a campaign to re-assess the security of your data if required.

How can I transform and evolve on the cloud?

Whether you are still exploring what cloud approach best fits your business needs, or are ready to move your IT system to the cloud, Murex has experts on-hand to advise you and share lessons learned during past projects. Our services ensure you have support at every step of your transformation journey.

Cloud readiness

With cloud vendors injecting innovation into the market at a rapid pace, part of Murex's cloud strategy includes the identification and testing of the best emerging cloud technologies for MX.3. Murex selects relevant cloud features that add value to our solutions, allowing clients to bypass time-consuming research, selection and testing stages and adopt certified deployment options quickly.

Murex collaborates with cloud vendors to deliver best practices for deployment and has established quick and reliable communication channels with these partners for leading client support.

Cloud migration services

Our cloud migration service helps clients to move their infrastructure to the cloud smoothly and quickly. It covers both initial exploration and migration. Moreover, to assist customers on their cloud journey, certain Murex system integration partners have large cloud teams that they combine with their Murex practices to offer the unique skills and experiences required to run an efficient cloud project for a mission-critical system, such as MX.3.

Exploration

During this exploration phase, Murex analyzes the customer's cloud strategy. At this point, potential cloud vendors are identified and IT security constraints assessed. An audit of current hardware is conducted, cloud requirements defined, and best practices shared. Proof of concepts are carried out for the deployment of a development instance of MX.3 in the cloud. Scoping is conducted for the migration of development and test instances, production, grid and disaster recovery.

"Lift & shift" to a certified cloud platform

During the move of MX.3 installations to the cloud, Murex can review the integration changes and provide support when you are performing test and validation cycles. We also share best practices for monitoring procedures and for the production support process in the cloud.

SaaS additional services

Implementation services

Our MXpress agile methodology and content can be leveraged when implementing Murex SaaS, providing you with best practices to optimize infrastructure set-up. The SaaS project team includes both functional and technical consultants, as well as support experts that take care of production after go live.

Evolution services

As the capital markets change, so must your IT system. Murex's SaaS team is the primary contact for evolution discussions and is responsible for applying and running requested production changes. For the implementation of regulatory requirements, our global delivery services team is available to provide additional assistance during functional configuration and technical tuning. Combining DevOps with controlled and flexible infrastructure, Murex SaaS facilitates the injection of innovation into your IT at a faster pace and further strengthens collaboration and integration in the cloud framework.



With SaaS, there is no "one size fits all", you need the best fit for your business.

Testing services

Leverage MXtest, the standalone test automation tool for the MX.3 platform covering test design, scripting, execution, reporting and evolution. Fully integrated in the SaaS framework, this tool allows for close collaboration between Murex and our clients, increasing the quality of software delivery.

Upgrade services

New versions of MX.3 can be adopted efficiently and rapidly with Murex SaaS. Our upgrade service includes comprehensive non-regression testing, configuration change management, as well as the execution of the upgrade procedure. It can be combined with Murex testing services to further optimize time to market.



For more information visit murex.com
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