transforming global foreign exchange markets

e-FOREX

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ELECTRONIC FX
Is the current model sustainable?

RISK MANAGEMENT
Accelerating to smart treasury

EVALUATING FX ALGOS
The need for common analytics infrastructure

COMBINING FX DATA & ANALYSIS
Delivering insights to preserve alpha

PROVIDER OF THE MONTH
Bloomberg looks to take the lead in shaping the client e-FX trading experience

COVER INTERVIEW
MICHAEL SIWEK
Founding Partner, DMALINK

LIQUIDITY • RISK MANAGEMENT • STP • E-COMMERCE

Welcome to

e-FOREX

transforming global foreign exchange markets

August 2021

Much of this months edition is focused on the growth of algorithmic trading. The uptake of FX execution algos is being driven by many factors and it is also facilitated by their increasing availability. They have proved useful during the recent Pandemic in helping firms to manage their orders whilst keeping market impact to a minimum and the clear electronic audit trail of this type of trading activity has also delivered compliance benefits as companies shifted to a work-from-home environment. As the level of understanding about these toolsets increases trading firms are also becoming more aware that the liquidity which algos are interacting with is extremely important and as a result many are getting much more engaged with this and other aspects of the algo trading process. However, choosing the right algorithm for individual needs still remains a challenge largely because there is a lack of common data and analytics. A growing number of market participants are seeking independent, third-party evaluation and benchmarking of algos and the work which is now being done to close this key information gap will be welcomed by the industry.

Next month we will be publishing an overview of the recent changes to the FX Global Code which include a raft of measures aimed at increasing disclosures in algorithmic FX trading designed to provide firms with an easier and more transparent understanding of the services being offered.

Interest in Digital Assets continues to grow amongst institutional traders and investors and almost every week we read about how institutional money is pouring into the crypto market. We are also keenly aware that changes to the legacy plumbing of many Institutional FX trading infrastructures are likely to be significantly influenced by Digital Asset, blockchain and DLT technologies. In response to these developments at the end of this year we will be launching the Institutional Cryptocurrency Handbook. This will be published once a year and is designed to be a guide for institutional investors, asset managers, family offices and professional trading firms all over the world. It will provide regulatory perspectives, market commentary, trading technology features and industry viewpoints on the fast evolving institutional cryptocurrency space and it will also contain a directory of platform, technology and investment service providers. We will be making more information available about this Handbook in the Autumn.

As usual we hope you will enjoy reading this edition of the magazine.
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CONTENTS

Vivek Shankar
Market evolution

Xavier Porterfield
Benchmarks

Brendon Bigelli
Rise of FX algos

Tod Van Name
Provider Review

Michael Siwek
e-Forex Interview

Daniel Chambers
FX data & analysis

COMPANIES IN THIS ISSUE

CLS completes migration to new platform

CLS has completed Convergence, a significant phase of its multi-year technology investment program, to deliver one of the most sophisticated, resilient, scalable and flexible post-trade technology platforms across global financial market infrastructures (FMIs). With the implementation of Convergence, CLS has migrated CLSSettlement onto its Unified Services Platform (USP), thereby optimizing the underlying technology platform supporting its settlement services. Tom Barkhuff, Chief Information Officer, CLS, commented: "At CLS we are constantly assessing and evaluating new methods to improve our services for the benefit of our members. Our Convergence program is testament to our commitment to this strategy. The priority for us is that new technological solutions meaningfully drive efficiency while also meeting extraordinarily high standards of resilience. Through a multi-year technology investment program, we have kept this focus and delivered upon our objective of implementing a best-in-class technology stack for the industry, addressing the needs of our members while maintaining the high standards expected of a systemically important FMI."

Tom Barkhuff

DMALINK adds Traiana's NetLink to its platforms

DMALINK has announced that Traiana's NetLink will be used to aggregate trades on its New York and London platforms available to all qualifying participants via its prime broker, NatWest Markets. The addition of NetLink enables DMALINK clients to increase operational efficiency by aggregating trades, which provides credit efficiencies through netting. The additional cost saving will allow DMALINK users to enjoy a broader spectrum of trade sizes and enable new counterparty types to join the DMALINK ecosystem. Manu Choudhary, CEO of DMALINK, said: "We're pleased to be enabling the NetLink aggregation service and opening up the DMALINK platform to market participants transacting any ticket sizes. We are now able to fully service high volumes of any trade size in a cost-efficient way. NetLink enables us to add more neutral flow to our FX ecosystem, which benefits the buy and sell side."

Manu Choudhary

Chronicle Software partners with Reactive Markets

Chronicle Software has announced the expansion of Chronicle FIX connectivity providing simplified access to additional pools of FX and Cryptocurrency liquidity. In partnership with Reactive Markets, Chronicle now offers their clients out of the box integration with the Reactive Markets institutional trading network, Switchboard. Switchboard gives liquidity takers free, instant access to fully disclosed pricing from a rapidly growing list of FX and Cryptocurrency OTC liquidity providers. Liquidity providers using Chronicle FIX can scale their distribution through Switchboard by pricing to any taker on the network. Phil Morris, CEO of Reactive Markets, added: "Chronicle is a market leader in high performance FIX solutions so we're excited to offer their clients the ability to trade with all their FX & Cryptocurrency counterparties via Switchboard. There is zero fee for liquidity takers on Switchboard so coupling the Chronicle FIX platform with our cutting edge institutional trading network is a highly cost effective way for clients to trade."

Phil Morris

Advanced Markets enhances partnership with Centroid Solutions

Leading Prime of Prime liquidity provider, Advanced Markets Group, has announced an enhanced partnership with pioneering technology provider Centroid Solutions which will deliver innovative and world-class solutions to FX brokers, traders and asset managers alike globally, and will provide them with the tools to compete in today's highly competitive and dynamic marketplace. "With this enhanced partnership, we are striving to deliver best of class service for our clients that will not only provide cost efficiency, but also deliver out of the box solutions for brokers looking to deploy superior Advanced Markets Liquidity to their trading environments. By bringing together Centroid Solutions' expertise and knowledge with Advanced Markets' unmatched institutional liquidity solutions, the companies will continue to deliver significant benefits to FX brokers, traders, and asset managers throughout the world", said Natallia Hunik, Chief Revenue Officer at Advanced Markets Group.

Natallia Hunik

Exclusive Capital chooses Trade Processor ecosystem by TFB

International technology company Tools for Brokers (TFB) has announced that Exclusive Capital has joined the TFB ecosystem. The company will be using the Trade Processor liquidity bridge on the MetaTrader 4 and MetaTrader 5 platforms to provide top-level liquidity and trading experience for their clients. Tools for Brokers offers an ecosystem of products that covers the most critical brokerage needs. With Trade Processor, a liquidity bridge, being the cornerstone of the ecosystem, it is supported by an advanced monitoring and reporting solution, a money management system, and multiple plugins and applications targeting specific broker challenges. "We are glad to have Exclusive Capital join us as partners. As a global broker with a long-standing history in the trading world, they provide investors with an excellent service, and we are glad we can support them in their further expansion", added Albina Zhdanova, the COO of Tools for Brokers.

Albina Zhdanova

Beeks launches Proximity Cloud

Beeks Group has launched Proximity Cloud, a fully-managed and configurable compute, storage and analytics rack built with industry-leading low latency hardware that allow capital markets and financial services customers to run compute, storage and analytics on-premise. Utilising high precision timing tools, and supporting Unicast and Multicast datasets, the platform can be deployed on customer sites anywhere in the world. "We've got a long and unique history of delivering on-demand compute in financial services," says Gordon McArthur, CEO at Beeks Group. "We know the pain points our customers encounter, and Proximity Cloud is our most comprehensive offering to date. We aim to eliminate some of the risks and a lot of the costs that come with in-house infrastructure solutions and to make it a lot easier to get value to the business."

Gordon McArthur

GoDoFX selects Integral

Integral has announced that GoDoFX, a next generation retail brokerage in the UAE, has selected Integral MarginFX to support the growth of its FX and CFD business. GoDoFX selected Integral for its institutional-grade technology, which afforded a high degree of customization in the trading workflow, seamless connection to the market through a hosted MT4 solution, and sophisticated pricing engine and risk management services. As standard with Integral technology, MarginFX operates in a highly flexible and interoperable cloud-based environment, which allowed GoDoFX to design workflow and deploy services at an exceptionally fast rate.

"We've listened carefully to the brokerage community and have thoughtfully developed the full range of technology and trading services needed to grow their business and reduce trading costs," said Harpal Sandhu, CEO of Integral. "We are delighted to be working with GoDoFX and deliver fully customizable trading solutions to meet their evolving requirements."

Harpal Sandhu

MetaQuotes Ltd joins HFM Connect services directory

MetaQuotes Ltd has joined the professional fund services directory of HFM Connect alongside the most advanced products of IT services dedicated to infrastructure solutions, risk management and cloud technology for global hedge funds. Jack Lewis, Senior Business Development Manager of HFM Global, commented: "We are delighted to have MetaQuotes as an HFM Connect partner, and we look forward to helping them raise awareness of their products and services with our growing community of operational leaders within the global hedge fund industry". "MetaTrader 5 for hedge funds is a concise, simple yet flexible and advanced product for fund managers and investors", says Renat Fatkhullin, CEO of MetaQuotes Ltd. "Through the HFM Connect community, we would like to share our achievements in an all-in-one exchange terminal with a unified system of risk management, analytics and maximum transparency for investors".

Eurex launches deliverable cross currency swaps and OTC FX clearing

Following a successful test phase, Eurex Clearing has gone live with its clearing service for deliverable cross currency swaps and OTC FX. Commerzbank has joined J.P. Morgan and Morgan Stanley as Clearing Members to enable the completion of testing and go-live of the service. The transactions are cleared and settled on a net basis across cross currency swaps and OTC FX. This significantly reduces capital requirements under SA-CCR, the standardized approach for measuring counterparty credit risk. Erik Müller, CEO of Eurex Clearing: "Central clearing and guaranteed settlement for cross currency swaps in CLSClearedFX is a world first. We are pleased to have launched this together with CLS to deliver capital, liquidity and settlement benefits – providing further resilience to the market."

Erik Müller

Increased electronification, higher costs, and lower yields for LPs: How will FICC markets evolve?

All market participants desire efficient markets and low cost risk transfer. Electronification has seemingly offered a path to achieving this. However, is the current model unsustainable? Vivek Shankar investigates.

Vivek Shankar

The financial markets have evolved constantly since their inception. The advent of electronic trading ushered in an era of efficient execution and tightening top-of-the-book liquidity. Common wisdom suggests electronification unlocks greater value for investors and drives costs lower.

However, the reality that LPs face is much different. Electronification has introduced costs into workflows that result in LPs realizing zero net marginal returns. A part of this result is created by trading platforms charging fixed fees that allow steady margin collection for themselves.

Thus, LPs face a situation where unfavorable trading protocols make it impossible for them to achieve returns on their cost of capital. As the industry grapples with this issue, the following fact has become clear: Trading on multi-dealer platforms under current protocols is unsustainable.

INCREASING COSTS AND IMPACT ON LPS

The global spot forex (FX) market witnesses some of the most sophisticated use of technology in delivering liquidity and managing risk. As such, it's a good proxy for measuring the rate at which technology has played a role in creating the modern market landscape.

FX markets have almost entirely transitioned away from voice-driven order management systems. Data collected in Coalition Greenwich's 2019 Global Treasury Services Facility indicates that 58% of investment management order flow and 61% of corporate order flow is executed via multi-dealer platforms.

Despite the presence of multiple order channels, the data confirms that spreads have shrunk to a point where marginal market-maker yields have plunged to zero. Meanwhile, the costs charged by intermediaries have not

"...research indicates that execution costs are not necessarily lowered by increasing the number of LPs accessed."


Nickolas Congdon

reduced at the same rate and clients suffer because of it.

Nickolas Congdon, Head of eTrading Services at Commerzbank, is well aware of the issue and its possible consequences. "There's been a paradigm shift in how spot FX is traded" he says. "Technology is the driving force behind this and the divergence is increasing between those that have the resources to innovate and advance and those that do not."

The costs across the board have risen steadily for LPs. Data released by J.P. Morgan suggests that as of Q4 2020, indexed trading volumes were as high as ever while yields firmly remained close to zero.

It's crucial to note that incremental costs that LPs incur are eventually passed onto clients. Zero yield doesn't mean better execution. As Thomas Jacques, Senior Research Manager at Coalition Greenwich explains, "Clients may be disadvantaged as over the medium term, LPs will rationalize their businesses and only focus on the markets where they have a competitive advantage and can capture a return. Hence we may see reduced liquidity in some markets." The zero yield phenomenon is also prevalent in credit markets. Clients are increasingly aware that the rates offered on a platform aren't the same as the ones offered by their LPs, thanks to hedging costs and indirect fees charged by platforms. Brokerage costs are determined via complex fee schedules. Platform participants also face a range of implicit and explicit costs, including credit intermediation, platform, ancillary service, data, and administration costs.

One of the most irksome costs occurs when trading activity data is captured, repackaged, and sold back to end-users. Typically, these data feeds are charged in aggregate, and attributing them to individual transactions is tough.

Trading volume-based costs are also hard to justify. For instance, should a platform charge 10X the fees for executing a $1bn notional versus a $1mm notional ticket? After all, the platform doesn't assume any credit risk or face any additional costs when executing either trade.

Lastly, market participants also face the cost of information leakage, which is hard to quantify. RFQs sent to large third-party platforms pose significant hurdles to achieving market efficiency and place strain on a market participant's ability to hedge their books.

Currently, economies of scale are the only way of dealing with this challenge. This will force consolidations on both the buy and sell-side. Given the high costs of establishing and maintaining a market-making business, market participants expect larger LPs to capture greater portions of order flow. Smaller firms will be forced to focus on their core competencies and priced out of certain lines of business.

DIRECT CONNECTIVITY- A POSSIBLE SOLUTION?

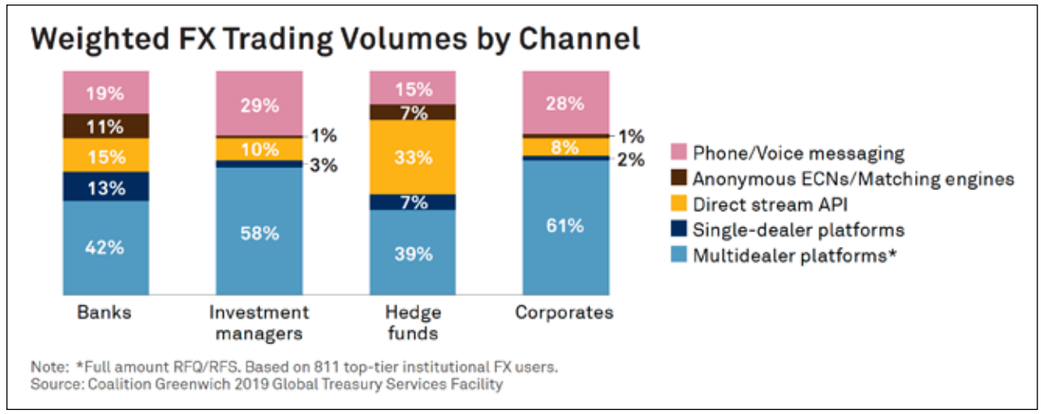
As electronic volumes increase, costs rise, and market participants (except for platforms) face diminishing returns. Jacques identifies one possible solution. "A cap and floor fee model is something we are seeing platforms introducing. It is third-party platforms that are bringing in these models as they seek to partner with their buy and sell-side stakeholders in response to concerns being raised." he states.

There are other solutions afoot as well.

Currently, the buy-side is aware of the issues that LPs face and are working with them to determine the best possible execution methods for their transaction flow. Some platforms are also working with LPs to create a


Thomas Jacques

"We're already seeing a blurring of the lines between buy and sell sides, and I expect this to continue."



healthy ecosystem that ensures fair outcomes for everyone involved.

However, the larger question that participants are tackling involves the efficiency of the RFQ-driven trading models. Larger LPs desire interacting directly with clients and feed prices into liquidity takers' order management systems (OMS) via application programming interfaces (APIs).

Subodh Karnik, Head of Client Intelligence Marketing at Coalition Greenwich, believes this makes a lot of sense. "Connecting via an API eliminates brokerage costs incurred while executing on a platform. Moreover, APIs reduce implicit costs as there is less inherent information leakage. Although obviously there are initial investment, and ongoing maintenance costs in running an API" he says.

While direct connectivity eliminates some of the challenges of the current model, it brings hurdles of its own. LPs face a tough time getting buy-side firms to switch since policies mandate traders seek multiple price quotes to ensure competitive outcomes, even if best execution isn't guaranteed.

"There is an element that the buy-side may believe they will receive better pricing if they reach a wider range of LPs through an MDP or ECN network," Commerzbank's Congdon says. "However, research indicates that execution costs are not necessarily lowered by increasing the number of LPs accessed."

Setting up direct connectivity channels brings high initial outlay costs. The result is firms find it simpler to connect to a central platform. There are solutions mitigating this problem in the market currently. For instance, API hubs standardize connections for everyone but maintain distinct information channels. Channel data is never aggregated or sold, and costs are kept to a minimum, ensuring a fair environment for all participants.

OTHER SOLUTIONS

Another possible solution that has emerged is EMSs that aggregate multiple LP execution APIs. Congdon points out that, "Clients are fundamentally reviewing both the way they execute and where and from whom they source liquidity from. There has been increased growth in venues such as FXSpotStream where they provide a model that allows clients to access multiples LPs via a single API. This also allows LPs to stream prices tailored specifically for a client's needs without bearing the large integration costs."

For now, many buy-side firms have invested heavily into integrating third party platforms into their workflows. Costs of change are a significant consideration for firms adopting this solution. Switching platforms has monetary costs and qualitative costs since traders need time to familiarize themselves with new systems.

There are also constraints on the choice of execution venue. Buy-side firms have worked to retain the right to choose LPs, but market structure and technology limitations prevent them from fully exercising their choice.

Meanwhile, as yields plunge to zero and volumes increase, competition is increasing with new communication channels emerging. Some of these new competitors have delivered EMS/OMS solutions in fixed income. As such, they're playing a significant role in dictating how the markets evolve.

MARKET EVOLUTION

Regulators have focused their attention on these new communication channels to determine whether they meet the definition of a multilateral system. If so, the consequences could be significant. If the new systems have to register as regulated trading venues, costs will increase, and the benefits that participants currently gain will be erased.

While the industry is appealing to regulators and hopes that innovation

Brokerage Fees—Explicit and Implicit Costs

COST	DESCRIPTION
Execution costs	The individual costs to trade on a platform. These are normally scaled by notional—so a $1bn notional trade costs 1,000x as much as a $1mm notional trade.
Credit intermediation	Per ticket cost for provision of credit intermediation.
Platform costs	The fixed fees charged by platforms in order to trade on the platform. These can take the form of end-user licenses.
Ancillary service costs	Charges from platforms for services such as credit netting, limit monitoring, etc.
Data fees	Charges related to accessing market data necessary to build a price.
STP charges	Costs related to post-trade ticket servicing.
Platform administration costs	Charges related to the production of trade reports, etc.

Source: Coalition Greenwich 2021

won't be throttled, there are no guarantees. Buy-side firms, for their part, are evaluating alternative trading rules and methods. For instance, in the credit and rates markets, more firms are exploring rules-based trading instead of the traditional RFQ model.

A part of this move is dictated by the buy side's desire to control more of their data and avoid information leakage. Greater control over data would enable them to selectively send flows to dealers, thereby avoiding revealing their hands.

For their part, dealers have worked to respond to RFQs on a systematic basis. They've reworked their strategies to respond holistically to flow rather than leave it up to individual line traders to respond to requests. Long-only managers and insurance firms have begun adopting portfolio trading in an all-or-nothing context to minimize information leaks. This move is in response to the inefficiency in sending out large orders to a long list of LPs who might not fulfill the manager's instructions.

A NEW DAWN

As electronification continues to change markets, market participants are reacting to conditions. With the drive to zero yields a reality, LPs, buy-side firms, and dealers alike are reconsidering their business models.

Subodh Karnik

"Connecting via an API eliminates brokerage costs incurred while executing on a platform. Moreover, APIs reduce implicit costs as there is less inherent information leakage."

There are a few promising solutions, such as direct connectivity via APIs, but significant hurdles remain. So what does the future hold?

"Markets function best with the appropriate level of transparency for the given asset class," says Jacques. "We're already seeing a blurring of the lines between buy and sell sides, and I expect this to continue." In practice, this might mean that the buy-side becomes a source of liquidity while the sell-side provides services that manage risk transformation.

Karnik adds, "This may take the form of provision of interesting solutions or it may take the form of going back to the future and focusing on relationships while other specialized firms with little client business, focus on market-making."

There's no doubt that the markets will evolve into a better version of what we're witnessing today. Ensuring a balance between enhanced transparency and business viability offers the best way to move forward.

Why you need independent data to differentiate between execution processes

By Xavier Porterfield CFA, Head of Research at New Change FX

Xavier Porterfield

All transaction costs can be more accurately defined as search costs. In over the counter (OTC) markets, such as Foreign Exchange, the fair price is hidden. To discover the best available price participants must deploy resources (search) to achieve a good deal. The FX market is de-centralised, or fragmented. This means the market clearing price cannot be inferred from individual market quotes. At what point can market participants determine whether they have identified the best available price and call the search off? This ambiguity creates opacity, producing a positive incentive for market-making, but also a negative incentive, from the customers' perspective, of discriminatory pricing which treats customers unequally. Typically, it's the smaller participants who get the worst deal.

The emergence of independent mid-rates has made price opacity optional. To paraphrase Gibson, a fair and efficient FX market is already here, it's just not evenly distributed yet. Let's establish what makes a mid-rate independent and then examine how independent mid-rates are being employed in a number of different market solutions to distribute the benefits of price transparency beyond market insiders.

HOW THE FAIR PRICE IS HIDDEN

In OTC markets dealers quote or stream the (two-way) prices at which they will buy and sell a given currency pair for a given amount. The mid-rate is the inferred mid-point between the bid and the offer price. It is also the theoretical equilibrium rate at which two equal and opposite transactions with the same dealer would clear. A consolidated mid-rate is therefore the natural clearing rate at which all market orders would clear. Changes to the mid-rate represent changes to the equilibrium level of the market that matches supply and demand. A consolidated view of the FX market is difficult to achieve. Unlike lit markets such as equities, there is no central counterparty that publishes a consolidated market tape. The view of the market is fragmented. Prices on different venues may differ, and no one venue can claim to be the undisputed primary venue for Foreign Exchange. The top venue perhaps sees as much as 10% of average daily volumes. That is less than the average daily volume of the some of the largest market makers. Each FX venue aggregates pricing from panels of bank and non-bank market makers but the prices on the venues differ from one another. The mid-rate on one venue may be higher than on another.

These differences reflect biases that arise from the positioning of market makers, the costs and privileges of venue participants and other factors. These differences in prices are called skew. Pricing from one venue will never be able to identify whether better pricing is available on another venue.

Single source pricing, whether it is aggregated or not, can never be independent. And without an independent mid-rate, it is not possible to identify skew. Inability to identify skew is not the only problem that arises from not having access to an independent mid-rate. Two-way pricing reflects a cost of risk transfer in that market, but the mid-rate from a single counter party or platform as we have just discussed offers a very restricted view of the market. This is further evidenced when we examine the cost of risk comparing independent mid-rates that are constructed from multiple platforms and venues, to the cost of risk calculated from a single venue sourced mid-rate.

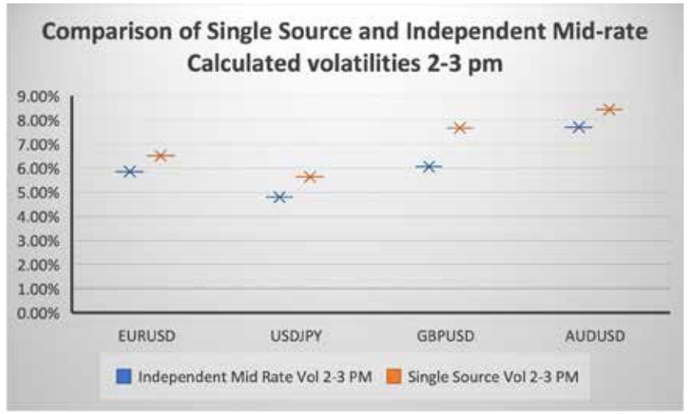


Fig 1. NCFX calculated historic volatility over 1 hour between 2-3 PM 30th June 2021

Fig 2. USD Cost of Volatilities calculated using NCFX independent mid-rates and Single Venue Mid-rates

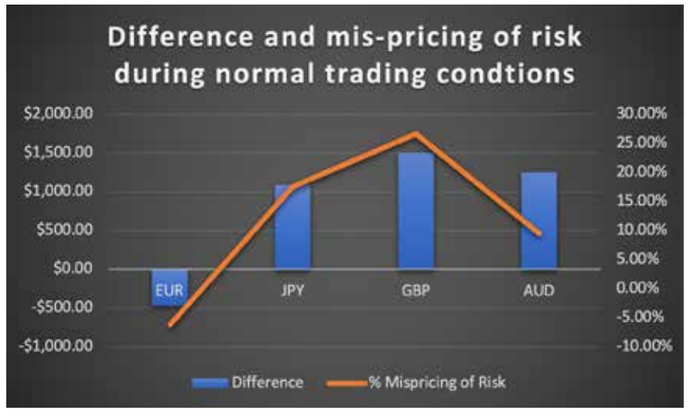


Fig 3. The % differences between NCFX calculated USD cost of volatility using NCFX independent mid-rates and single source mid-rates

To illustrate, we collected aggregated data from a single ECN and compared it to the NCFX Mid-rate. The only difference between the data sets is that the NCFX data set is aggregated from multiple ECNs and venues, while the single source ECN data is created from aggregating data from a single venue. To compare the data sets we calculated realized volatilities from each data set.

The first thing to note is that just as there are absolute differences between independently aggregated consolidated mid-rates and single venue/provider mid-rates, the realized volatilities are also different. This means the behaviour of single source venues relative to broader consolidated market is not the same. These differences can translate into significant mispricing of risk.

In Fig. 1 we show realized volatilities for four currency pairs over a one-hour period at one of the busiest times of day, from 2pm to 3pm local time in the London trading session. To help comparability the volatilities have all been annualized.

The differences are obvious, but it is difficult to translate annualised volatility into monetary exposure over the given period. In the case above, the historic volatility was calculated over 1 hour. What does this translate to in USD terms?

To better understand what volatility is showing us we translate period volatility into USD by using NCFX's USD cost of volatility method. We multiply the period volatility (not the annualised number) by the base amount and convert into USD. For USD 10 million of exposure, over the period of 1 hour the respective USD cost of Volatilities are given in Fig 2.

When volatility is low, differences between single source and independent mid-rates are still noticeably different. In USD terms this gives us the following differences.

Why you need independent data to differentiate between execution processes

Fig 4. NCFX calculated mispricing of risk in percentage terms at the quarter end 4 pm Fix

These mispricing can be both positive and negative. The quantum of mispricing is given by the percentage differences (Right Hand Scale). 15% to 25% mispricing of risk for 3 of the top 4 most actively traded currency pairs. However, when markets become very active, particularly around well-known events such as month end Fixing, these differences become more pronounced.

Calculating the USD Cost of Volatility over the 1 hour leading up to the 4 pm fix we find the USD Cost of Volatility for AUD calculated using the NCFX Mid and the Single ECN mid jumps to $15366 and $20,711 respectively.

A summary of the differences in the calculation of risk in the hour leading up to the end of Quarter 4PM Fix is given in Fig 4.

We can see that the mispricing of risk has become strongly positive. This makes intuitive sense. In periods of high activity, the single source view magnifies the impact of increased trading. Greater disparity of pricing is not captured by the single source venue. Its sample size becomes less representative (and sampling error increases).

Sampling error is strongly correlated with volatility as we might expect. In a short ten-minute burst of volatility in AUDUSD on 3rd August, annualised vol reached 30% calculated using NCFX independent mid-rates, while the single source venue showed annualised volatility of 39%. An hour later when the market had stabilised AUDUSD annualised volatility had fallen to 6.6% (Independent) and 6.94% (single source)

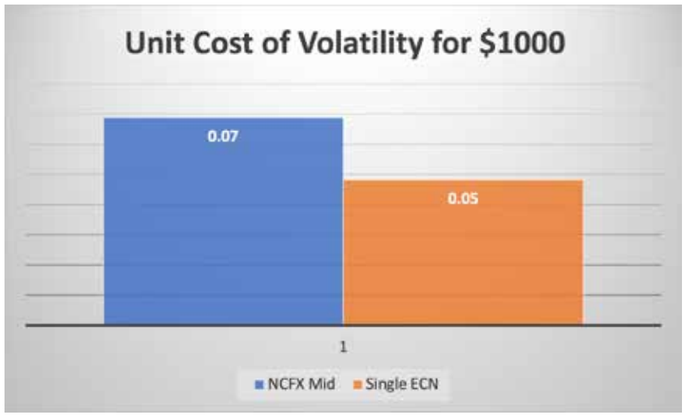


Fig 5. Unit Cost of Volatility calculated using NCFX Mid or Single ECN mid-rates

One of the most useful tools we use at NCFX to understand costs is the Unit Cost of Volatility metric. This contextualises transaction costs by dividing cost by the USD cost of volatility to which the trade was exposed to. For instance, a trade for 10 million euros in EURUSD that takes 2 minutes to complete is exposed to 2 minutes' worth of volatility. By calculating costs as a ratio to risk we can compare transaction costs across different currency pairs, different trade amounts, different market conditions. The lower the ratio of cost to USD cost of volatility, the lower the normalised cost. By calculating volatility using a myopic, single ECN sourced rate, not only is the price of risk miscalculated, but normalised costs appear lower than they actually are. The choice of mid-rate hides costs.

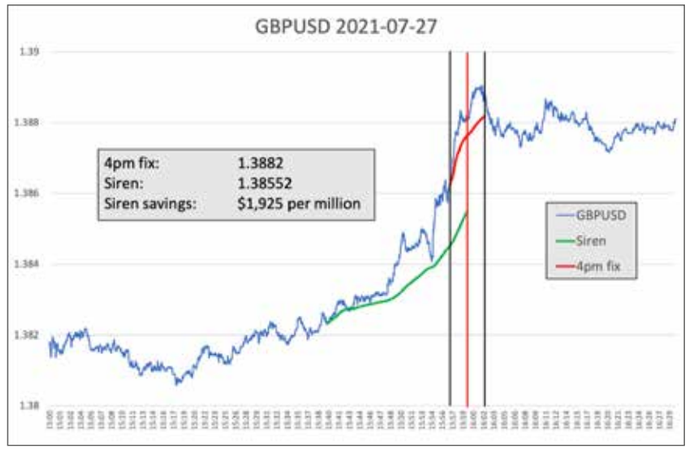
To illustrate, look what happens to the unit cost of volatility for AUDUSD calculated using USD cost of volatility with the NCFX mid and the Single Source ECN mid. Keeping trade costs constant at $1000 we find the Unit Cost of Volatility is almost 30% lower using single ECN mid-rate calculated volatility.

It might be tempting for a broker to prefer costs be measured against a single ECN sourced mid-rate, but President Lincoln once said "you can fool all of the people some of the time" but this isn't a long-term strategy.

SIREN – AN ALTERNATIVE TO THE 4 PM FIX

We have seen that broker and venue neutral independent mid-rates play

Why you need independent data to differentiate between execution processes



a key role in correctly identifying transaction costs and calculating risk exposure. The error term rises substantially around key market events, such as the 4 pm Fix. The Fix has well known flaws that accentuate market volatility. It takes market prices from one or two ECNs and equally weights observations during a 5-minute window taking no view on market impact or market risk.

A new alternative to the FIX, the SIREN benchmark proposes a methodology based on an optimisation framework that seeks to minimise market impact for the market risk exposure over a 20-minute time frame. The siren benchmark is calculated polling the underlying NCFX mid-rates every second through the window and smoothing participation exponentially into the close, specifically aiming to minimise market impact. The difference in outcome for users of SIREN benchmarks are compelling.

As the chart above shows, GBPUSD showed evidence of strong pre-hedging going into the 4pm fix on 27th July. This accentuated price impact resulted in buyers at the 4pm fix paying substantially more ($1395 per million more) for the 4pm fix than buyers of the SIREN 4 pm benchmark.

REDUCING MARKET IMPACT

Market impact increases costs and those costs increase with trade size. Prices from the market contain biases and skew which lead to price uncertainty. How much information from a large order will leak into the market and how much can be saved by reducing orders before they go to market?

Siege FX peer to peer platform went live this year. It brings together buyside firms to match interests at the regulated, broker and venue neutral NCFX mid-rate. Back-testing netting results with external market transaction cost analysis suggested that potential savings are in excess of $100 per million matched on average and almost double that for less liquid pairs. Siege participants (peers) include top global asset firms, pension plans and corporates.

INDEPENDENT TCA

The market prices participants receive from dealers contain biases and skew. It is difficult to de-construct dealer bids and offers to determine the market clearing rate. Independent mid-rates, rates that are broker and venue neutral provide complete post trade transparency.

As we have seen single ECN venue mid-rates hide the bias and skew of the platform and misstate the true cost of risk. It follows therefore that transaction costs must be calculated against data that is venue neutral. Otherwise, the TCA is about as useful as setting foxes to guard the hen house.

The publication of independent mid-rates and the dissemination of independent mid-rate data through various market access channels acts to redress the information deficit that market participants face. Independent mid-rates exist to police the market to make sure that clients are treated fairly. And that is good for business.

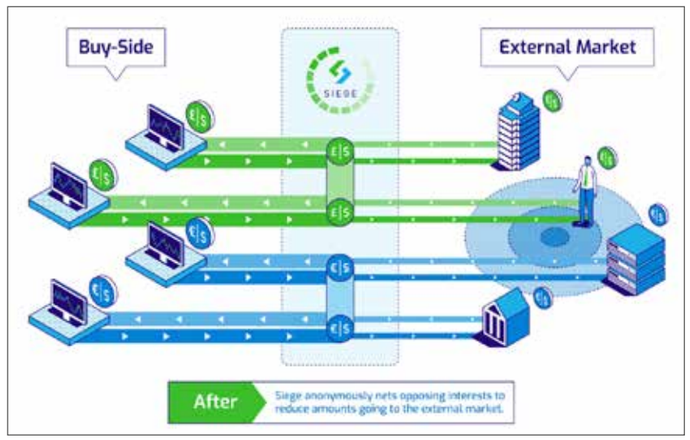


Fig 6. How Siege Pre-Trade Netting works

The inexorable rise of FX Algos

By Brendon Bigelli, EMEA Spot & Algo Specialist at 360T


Brendon Bigelli

Arguably one of the most consistent trends within the FX industry in recent years has been the growing adoption of execution algos amongst market participants. This has been driven by a number of different factors. For instance, in a market where liquidity is heavily fragmented, such as FX, algos can be used to aggregate order book data across various different liquidity pools, chop orders up into smaller pieces and then execute them across these liquidity pools. This can help to achieve better pricing and reduce market impact, particularly when executing larger orders.

Another benefit is that, much like automated trading more broadly, algos help to drive efficiencies while also reducing the operational risks that are inherent in any manual process on the trading desk.

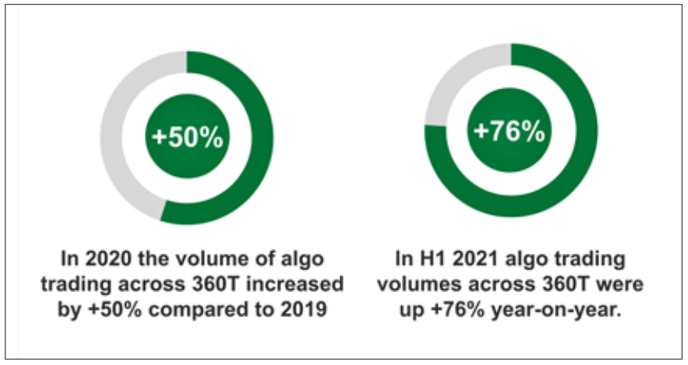
And then there is the fact that the algos themselves have steadily improved over the years, as well as become much more widely available. FX algos have evolved from tools designed to slice up orders in a fairly basic fashion and feed them through the market to more sophisticated and adaptive products that can react in real-time to changing market conditions. The increased availability of high-quality FX market data has further improved the algos on offer.

The sharp uptick in the use of transaction cost analysis (TCA), particularly amongst buy-side firms, is also a reason why FX algos have become more popular. These firms have become more focused on measuring execution quality, signalling risk, optimising liquidity pools and market impact and this increasing sophistication around execution has in many instances led firms to introduce algos into their toolkit as an alternative means of executing their FX trades.

ADAPTING TO VOLATILITY

But while these broader trends have been driving algo adoption in the long-term, the pandemic has proven to be an additional driver in the short-term. In March 2020 as volatility surged many market participants turned to algos as risk transfer spreads widened out dramatically, especially for larger orders. Passive algos allowed users to manage their orders over time at prices inside the bid-ask spreads and keep their market impact to a minimum. In addition, because algos inherently provide a clear electronic audit trail of all trading activity in some cases there were compliance benefits to using these tools as companies shifted to a work-from-home environment.

The increased adoption of FX algos in 2020 was reflected across 360T, as the volume of trades executed using these tools increased by 50% year-on-year. And the fact that we saw algo volumes increase again during the first half of this year by 76% compared to H1 2020 suggests that the shift towards algo execution is likely to be a permanent rather than temporary feature of the FX industry.

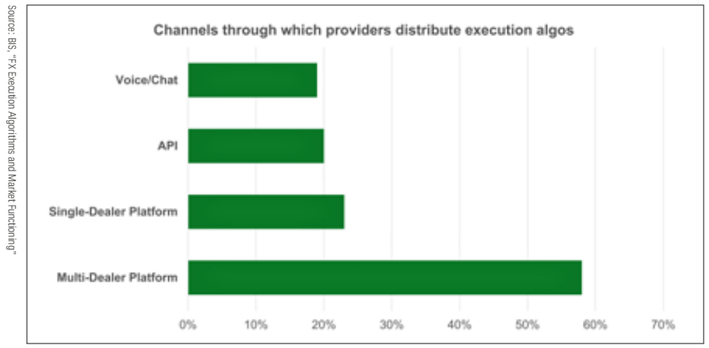


Source: 360T internal data

FINDING THE RIGHT LIQUIDITY

As the adoption of FX algos continues to increase, so too has the level of understanding around these products on the buy-side. One consequence of this is that firms are becoming more conscious that the liquidity which the algos are interacting with is as important (some might argue more so) than the actual construction of the algos themselves in terms of achieving the desired execution outcome.

This is why FX market participants are becoming more selective about which venues they deploy algos across, with multidealer platforms proving to be the most popular as they enable users to access algos from a wide array of different providers all in one place via one single point of entry.

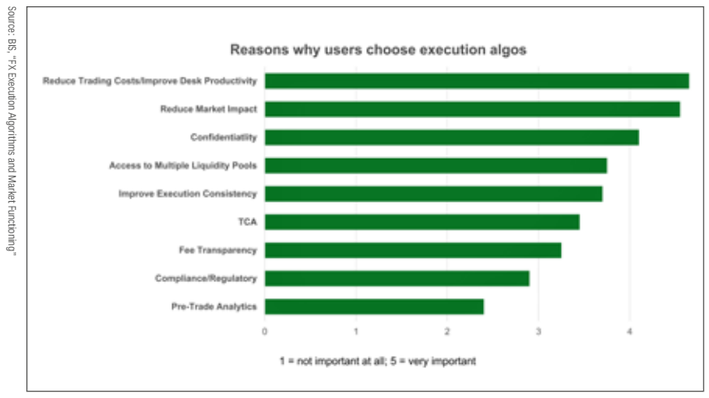


Source: BIS, "FX Execution Algorithms and Market Functioning"

Traditionally, firms have relied on their liquidity providers (LPs) to help them curate what liquidity their algos are facing, for instance they might want to only execute these algos across firm liquidity.

Now, however, we see clients taking this directly into their own hands. Rather than highlighting which venues they want their algos to execute across to their LPs, clients are instead utilising algo tiles which enable them to determine this for themselves. Thus, we increasingly see firms using such tools to select 360TGTX as an optimal venue for their algo to interact with because of the unique liquidity on the platform which can result in lower market impact when executing.

In addition to becoming more selective about venues, market participants are also becoming much more discerning about the liquidity pools within them. On the top-tier venues today it's possible to create bespoke, highly curated pools of liquidity designed specifically to help a given firm achieve the most optimal execution outcomes possible.



Source: BIS, "FX Execution Algorithms and Market Functioning"

Building and maintaining such liquidity pools requires deep expertise and the ability to conduct sophisticated analysis on execution patterns and liquidity conditions. Of course, not all firms who trade FX have the skill set to do all of this in-house, is why we see a growing demand for platforms to offer liquidity management services.

It's also worth pointing out that one reason the concept of algo execution is attractive to buy-side firms is that they can offer an extra layer of anonymity. Using a bank provided algo gives the first level of anonymity but then this is enhanced if a firm were, for example, to use one of the four central counterparties (CCPs) which offer a credit path to trade on 360TGTX.

This benefits the buy-side firm because the algo provider is likely to have more sources of liquidity available to interact with and then using the CCP model to trade anonymously on 360TGTX helps to minimise signalling risk and information leakage, leading to less of a footprint in the market.

BETTER EXECUTION

With the use case for algos having been thoroughly validated in recent years, the important question is: what comes next?

One ongoing trend is the adoption of FX algos across different client segments, with a particular uptick

The inexorable rise of FX Algos

occurring amongst asset managers and corporates.
Regulatory changes are one factor which has prompted this change in behaviour amongst asset managers. On the one hand, best execution requirements have caused these firms to look for ways of trading whereby the quality of their execution can be clearly quantified. On the other hand, capital requirements have reduced appetite amongst their bank counterparties to warehouse FX risk as it has become more costly to deploy their balance sheets. Algos help to alleviate both of these challenges.

The fact that asset managers are increasingly executing their FX trading across a wider variety of channels is also creating a virtuous circle as it causes liquidity fragmentation to increase, and thus bolsters the need for algos.

On the corporate side, algos have provided greater transparency, automation and sophistication across treasury desks. With a pre-agreed fee, firms can better anticipate execution costs while leveraging sophisticated execution algorithms with the ultimate aim of achieving a lower cost of trading.

These benefits are being recognised by corporates with research from Coalition Greenwich showing that these firms went from using algos to execute 10% of their Spot FX volumes in 2015 to 28% in 2017. Meanwhile, the Bank for International Settlements (BIS) indicated last year that some large multinational corporations are now executing about 20-25% of their total FX trades via algos.

THE NEXT FRONTIER

The use of algos is not just spreading across client segments, but also instrument types. Historically, they have most commonly been used to trade Spot FX, with the BIS estimating that 10-20% of the daily global Spot FX turnover, equating to $200-$400 billion of notional volume, is being executed via algos.

The next frontier where we see algos being deployed is the forwards market, and particularly in the NDF market. NDF liquidity continues to improve as the notional volume of these instruments being traded each day almost doubled in just the three year period between 2016 and 2019.

This improved liquidity has led to more demand for Streaming NDF pricing, and because this subsequently creates a tighter top-of-book spread in addition to a deeper order book it means that market participants are now getting better execution outcomes when utilising algos to trade these instruments. With an ever-increasing universe of data available in the NDF space, liquidity and market access naturally are becoming more commoditised while algos can provide greater sophistication in what is still a relatively untapped market.

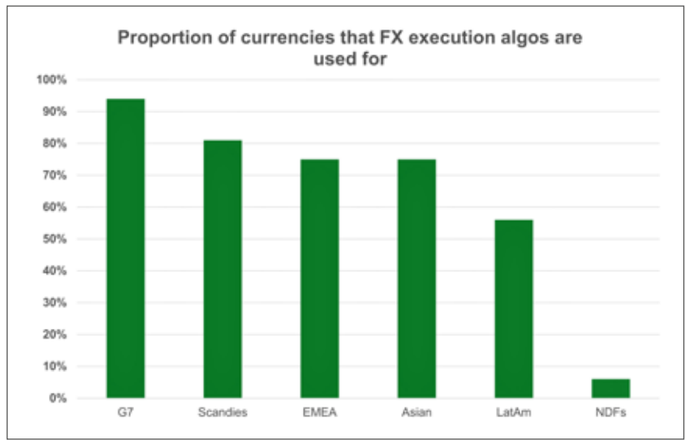
Another driver towards greater algo usage for NDF trading is the fact that more electronic trading venues than ever are offering access to these products, meaning that there are now more sources of liquidity for the algos to tap into.

Aggregating these different sources of liquidity together enables firms to create a more holistic view of a marketplace where liquidity can sometimes be thin, in addition to an order book to participate with. This helps to reduce signalling risk and market impact. In most instances it should also enable market participants to execute orders more efficiently as an aggregated streaming environment yields greater liquidity depth but also participation.

A CLEAR TREND LINE

At this point in time, the trend line for FX algo usage is quite clear and it is clearly pointing towards even greater adoption. As the products themselves become more sophisticated, platforms make a wide array of FX algos increasingly available to market participants and traders grow more comfortable using them, adoption will inevitably grow across both client and product segments.

Ultimately, the firms that we partner with in the FX market are looking for more ways of interacting with liquidity, and in this regard algos are simply one additional tool that can



Source: BIS, "FX Execution Algorithms and Market Functioning"

Digitally enabling risk management: Accelerating to smart treasury

By Yi Hahn Chin, Head of eFX Solutions - EMEA, Corporates at Citi, and his colleagues Erik Johnson, Dr. Duncan Cole, Kelvin Ang and Ray Pereira.

Corporate treasury is now facing change of a different magnitude. A fundamental shift in how it needs to operate, going beyond the heroic crisis response in recent months to building sustainable resilience into its operating model. The overarching objective is to prepare for a new way of managing risk across the evolving business landscape, supporting realignment in both distribution and supply chains.

Treasury now has a critical role to play in how it manages the usual risks associated with treasury and determines the appropriate actions needed to support business recovery. In our view, the current crisis for many businesses brought about by the pandemic response of governments and health officials across the world has become the unexpected tipping point for the full automation of treasury risk management processes.

The appetite for prescriptive analytics — the provision of digitally enabled recommendations — has shifted further as a likely consequence of the challenge faced by treasury this past quarter. Before the COVID-19 outbreak, we were already seeing a measurable shift in client appetite for prescriptive analytics to support human decision making in treasury. With the onset of the current crisis, the automation of treasury is now for many a "must do" initiative to build the required resilience into their operation to manage risk.

Use of algorithmic techniques to predict and determine next action is increasing, and with this, we expect new value to be unleashed, offering treasuries the ability to digitalize at a pace and at a confidence level previously unachievable, but now necessary, to increase post-crisis resilience. The advent of new technologies and the evolution of financial services had already prompted treasury to rethink its future, but there is now a renewed focus by treasury to accelerate the delivery of its digital strategy to better support corporate objectives. A client webinar poll hosted by Citi in April 2020 indicates that over the half clients that joined are accelerating their digital strategy as priority. A further indepth survey was conducted in 2021 indicating a heathy appetite for algo risk management

Fully automating the fundamentals, coupled with prescriptive analytics to augment human decisions, is a well-documented requirement to realize the Future Smart Treasury. The mobilization of digitization initiatives is now prolific across treasury as a post-crisis response to building future operational resilience.

At Citi, we are running a number of initiatives in which we are collaborating with our clients and

Figure 1: Poll results from Citi/Client webinar in Q4 2019 showing the shift in appetite away from static reporting to prescriptive analytics in the next 3 years

Source: Citi Treasury Leadership Client Forum, November 2019

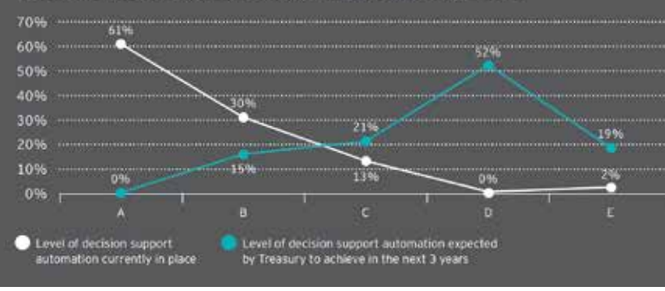
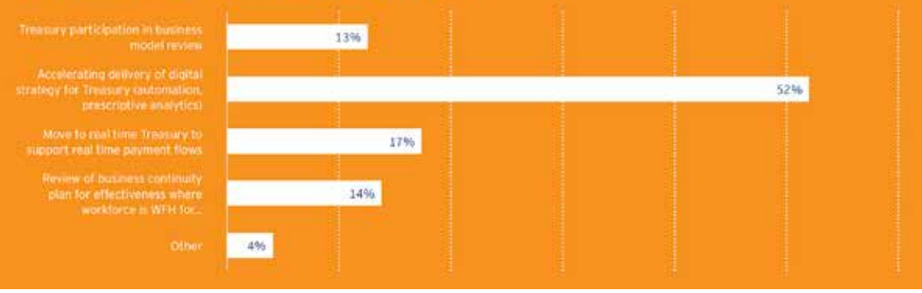


Figure 2: Poll results from Citi/Client webinar in April 2020, showing the post COVID-19 acceleration in treasury focus on digitalization through automation and prescriptive analytics



their technology partners with the shared objective to empower treasury decision-making by digitalizing processes using algorithmic techniques. There is opportunity now to reimagine treasury through this symbiotic relationship between people and data-fuelled predictive and prescriptive algorithms, with some even moving to consider that final step in the journey to smart treasury: deploying AI-enabled machines to execute next actions on their behalf. Establishing trust in machine–led execution of next action for risk mitigation is expected to come about through collaborative experimentation across corporates, banks and technology partners.

SMART TREASURY PROCESSES

The flow diagram in Fig 3 breaks out the logical steps involved in the build-up of smart treasury processes. Firstly, treasury policy is validated and combined with forecasted currency position (and variance) fed into a prescriptive analytics engine to determine appropriate hedging action. Secondly, recommended actions are inferred, providing decision support to treasury risk managers. Thirdly, what follows is extending to offer auto-execution of the prescribed actions, with feedback loops to support machine learning through subsequent iteration. The result delivers AI-enabled currency risk management. Policy validation moving from an infrequent manual response to a more frequent continuous digitized process offers resilience to allow for market disturbances and consequential currency exchange volatilities.

TRANSITIONING TO A MODEL OF CONTINUOUS VALIDATION OF POLICY SUFFICIENCY

Let us start by defining what we mean by continuous validation of policy sufficiency:

- The availability of a toolkit to deliver against policy objectives.
- Sufficient visibility, connectivity and machinery for continuous monitoring of the suitability of deployed instruments.

Together, these ensure policy flexibility sufficient to meet the prescribed risk mitigation action. Before we describe how such continuous validation can be brought about, let us briefly remind ourselves how treasury can create a risk management policy today and what characterizes best practice. A successful program relies on identifying and quantifying risk, consistent with a risk-based approach.

Treasury and the business are closely aligned in setting hedge objectives and setting risk tolerances. They design an optimal hedge solution to reduce corporate-wide earnings-at-risk to acceptable levels. And they have established a high level of resources and technological infrastructure around risk management often under a centralized treasury concept. Applying these basic components, the process for a best practice to managing financial risks becomes the following five steps:

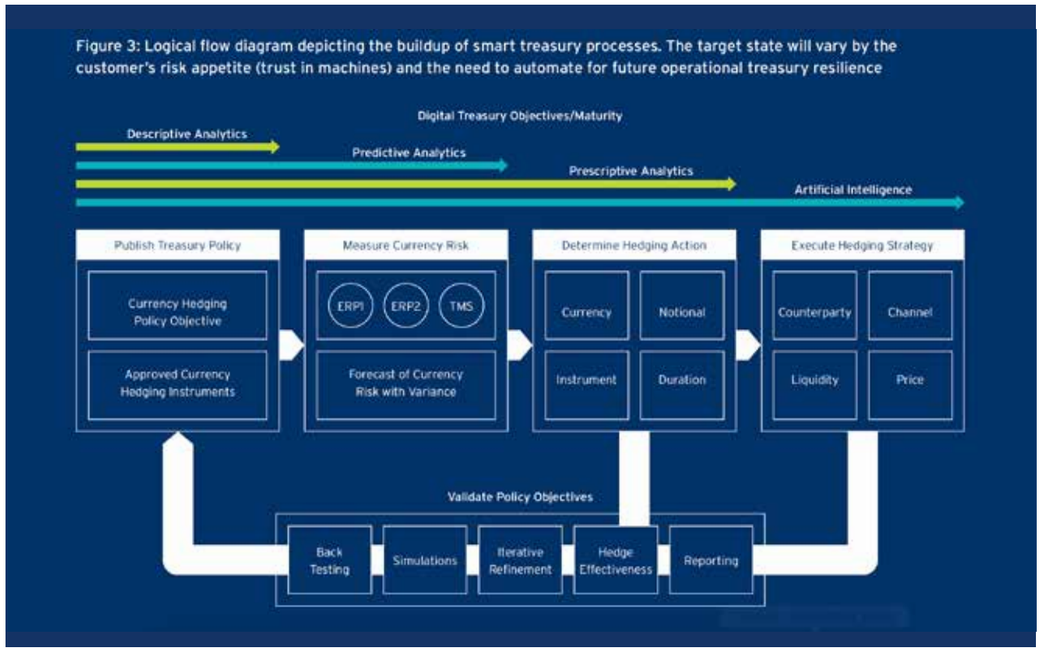


Figure 3: Logical flow diagram depicting the buildup of smart treasury processes. The target state will vary by the customer's risk appetite (trust in machines) and the need to automate for future operational treasury resilience

1. Determine overall business objectives. Business objectives and factors that might influence risk management objectives include: expectations of or promises made to equity analysts in regards to financial performance, marketing and product pricing strategies, competitive position in an industry, industry trends, and business philosophy and risk preferences

2. Identify and measure risk. This involves identifying exposures based on a functional currency approach, categorizing exposures (i.e. accounting, economic), designing methodologies for quantifying the potential impact of market prices on an entity's financial performance, and performing analysis to determine the overall risk to the company.

3. Set risk tolerances and hedge objectives. Based on the overall business objectives of the company, define how much risk the entity is willing to tolerate and the overall objectives of the hedging program. Clearly articulate these objectives in a formally approved risk management policy. Define the procedures necessary to support the risk management process.

4. Design a strategy and implement. Evaluate different hedging alternatives in terms of instrument selection and management style. The choice of strategy should be consistent with policy objectives and subject to constraints (i.e. accounting, lack of resources, and dependability of forecasts).

5. Track, measure and report performance. Determine whether risks have been reduced below approved risk tolerances. Assess the effectiveness of hedging relationships periodically as required by your applicable accounting standard. Benchmark performance against an actionable, passive, and sanctioned hedging alternative. Report hedging results to senior management.

Benefits of deploying continuous risk management
Policy objective enablement
Economic output and effectiveness validation
Reduction of risk without need to remedy risks such as forecast error
Transparency
Risk management insights and identifying opportunities in meeting policy objectives
Resource and cost optimisation

Table 4: Benefits expected from a continuous risk management process

These steps define the manual process today for managing risk and applying appropriate hedging solutions based on company policy and objectives. This is a risk-based approach because many of the best practices rely on the quantification of risk as the basis for designing an appropriate response. However, it is impossible to respond in a timely manner to a potential risk if you are unable to measure, visualize, and quantify your risk profile on a continuous basis. This is where technology comes into play. The future of risk management best practice relies on the ability to continually, or regularly, monitor and validate the appropriate instrument selection and adjusting the risk mitigation accordingly.

Table 4 captures some of the benefits of moving to a continuous risk management process. As part of this initiative at Citi, we expect that best-in-class treasury will transition to a continuous digital monitoring of policy to provide sufficient flexibility and built-in resilience to market disruption.

DETERMINING ACTIONS NEEDED BY TREASURY TO DELIVER RISK MANAGEMENT OBJECTIVES

The appropriate set of actions and instruments needed to mitigate currency exposure to risk-policy levels and ratios is determined by combining the forecast of currency exposure over time with those policy objectives. The effectiveness of the hedge put in place directly correlates with the accuracy of the forecasted exposure. Inaccurate forecasted exposures can lead to the frequent adjustment of placed hedges. Such adjustment actions can depend on corporate cash reserves and whether the adjustments themselves generate a positive or negative cashflow.

We have already discussed the opportunity to continuously monitor risk policy sufficiency through process automation. We now

examine the increasing adoption of algorithmic forecasting and the auto-determination of required next action, where determining required next action incorporates forecasted currency position and forecasted variance within risk policy parameters into a prescriptive algorithm.

THE CASE FOR ALGORITHMIC FORECASTING

Many corporates today face challenges in preparing accurate forecasts. Fractured data sets and technology infrastructure deficiencies are driving manually intensive processes. In a recent benchmark study at Citi of over 400 treasury professionals, approximately half report that their treasury management systems do not fully support financial risk management processes, with 63% noting that their TMS is not fully integrated with their ERP, and 77% lacking full integration of their ERP with banks.

Traditionally, and primarily for these reasons, forecasting has been a mostly manual process with people gathering, compiling, and manipulating data within spreadsheets. With more and more data available, this manual forecasting approach has become an unwieldy, time-consuming process that makes discerning what is important next to impossible. As a result, individuals tasked to execute this process often resort to their own intuition and judgement, which opens the door to unconscious biases and conscious sandbagging.

Corporates are shifting away from traditional techniques to forecasting processes that involve people working symbiotically with data-led predictive algorithms replacing the manually intensive spreadsheet-based aggregation of predictions from business units. Algorithmic forecasting solutions are becoming increasingly available in the market from technology companies, such as Citi Ventures-invested Cashforce, and those solutions tend to have the following attributes:

- Statistical models best fit to past commercial activity that describe what is likely to happen in the future, and data science deducing models to predict based on historical flows and market data.
- Machine learning algorithms incorporated to course correct and improve forecast accuracy over time, learning from previous cycles.
- Combining with human intelligence to evaluate machine conclusions providing another feedback loop to further enhance the algorithms.

AUTO-DETERMINATION OF NEXT ACTION

Forecasted currency risk position with a variance measure by currency over time arising from the algorithmic techniques described above provides one set of inputs. The second set of inputs is a measure of currency risk profile/appetite for the treasury: namely, risk management instruments allowed and stated treasury objectives such as cost optimization, VaR tolerance, and/or best rate achieved.

With these two sets of inputs, logic creates a prescriptive algorithm to deduce the necessary hedging actions. The output of such algorithms goes beyond simply offering an opinion and extends to providing an evidence-based set of outputs, providing the rationale as to the why the recommendations were made, offering full transparency for human/machine trust creation.

Historical back-tested data and instrument profiles are used to suggest optimal trade recommendations. An important component of this prescriptive algorithm is its ability to incorporate forecasted error, which, fed into the algorithm at the same cadence as the algorithmic forecasted currency positions, produces an optimum outcome. This, we expect for some, may approach a near-real-time feedback loop of forecast error, enabling a high-frequency validation of the hedging policy and resulting in a possibility for a near-continuous tracking of hedge effectiveness through market disturbance events.

Currency movement forecasting models that provide the necessary signals to risk managers to adjust their hedging programs form part of an extensive suite of emerging decision-support tools. The availability of tools that forecast the direction of specific currencies within a specific time horizon has increased, providing needed supports for individuals making more refined hedge decisions.

With the combination of algorithmic forecasting (as more specialized vendors enter the market), advanced currency movement forecasting models, and algorithms to determine the best next action, coupled with the automation of policy validation practices, the advancement of decision-support tools for risk managers to determine and prescribe next action is accelerating. The next step for corporate treasury is to identify the most cost-efficient means of realizing currency risk management objectives through the auto execution of prescribed next actions.

REALIZE THE RECOMMENDED ACTIONS VIA INTELLIGENT AUTOMATION OF TRADE EXECUTION

Perhaps the most common form of automation in currency risk management is the integration of a company's TMS with an electronic FX execution venue. Most companies tend to be satisfied executing through FX liquidity aggregators (e.g. FXALL, 360T), citing key reasons such as consolidated reporting, competitive pricing, and the ability to efficiently distribute their FX wallet among their banking partners.

Direct connectivity with banks tends to happen only when there are gaps with these aggregators. Typically, that's due to unavailability in specific markets (such as highly regulated countries), specific instruments (such as complex options), or channels (such as algorithmic execution). Therefore, only the most global of banks have direct connectivity with clients, who tend to be the most global of corporate treasuries.

The process steps covered by this intelligent automation are:

1. Required FX hedges generated in the TMS.

2. Transmit FX hedges to the desired execution venue, typically via an API.

3. Log on to the user interface of the execution venue.

4. Review pricing provided, select the respective liquidity provider and transact.

5. Transmit completed FX hedges including both confirmed price and FX counterparty details.

Typically, as well, the exposures in step 1 are tagged in such a way that the associated hedges in step 5 are identifiable from a hedge-accounting point of view. An increasing number of companies are skipping step 4 either because they view that best execution is achieved by the multiple liquidity providers bidding for the deal, or because they view that associated costs have been pre-agreed with their respective liquidity providers, in the case of a direct connectivity.

As discussed, though, the process that leads up to step 1 is still predominantly manual and cumbersome for a treasury. As risk management gets more prescribed via the real-time algorithms described in this article, hedge determination is made fully automatic. Connecting the results of prescriptive analytics to initiate automated hedges will be the new normal. As forecasts are adjusted on a real-time basis, hedge adjustments will naturally be more frequent but smaller in size.

Importantly, treasuries will also look to step away from typical hedge cycles (usually monthly) to one that is happening constantly. The shift of focus for a corporate treasury at this phase will be less on price discovery and more on ensuring that in this new touchless environment, there are ample failsafe mechanisms to ensure that the right people are notified at the right time for any manual intervention.

To elaborate further, things can go wrong during auto execution for a multitude of reasons such as lack of credit allotment by the price provider causing rejects, latency in the network causing a lack of response and code errors that result in the duplication or incorrect notional of trades being sent. Prescriptive analytics may provide the most accurate of recommended actions, but poor management in the execution phase can lead to significant losses when issues are not addressed in a timely fashion.

Other considerations would also need to be made, such as the impact of liquidity when a company transacts, as attempting to transact large transactions at the wrong time can be costly — particularly with too many liquidity providers.

Another example is avoiding concentration risk by ensuring that counterparty exposures are managed evenly between banking partners. Therefore, the algorithms required to be deployed in this phase will need to incorporate these crucial parameters and not just focus on achieving best price. That said, auto execution is a fairly mature field and already firms have begun the process of shifting parts of their portfolios into a rules-based environment.

With the right structured test plan to iron out all foreseeable issues and robust failsafe mechanisms in place, a typical treasury should be able to find sufficient comfort to kick things off. It is therefore not too far away. With the advancements of prescriptive analytics discussed in this article, this final linkage to execution paves the way for the era of Artificial Intelligence in treasury currency risk management with full end-to-end intelligent automation.

TOWARDS A SMART TREASURY FUTURE

The innovations described in this article are some of the key components of the suite of initiatives at Citi targeted to support our clients' smart treasury aspirations. Future treasury will be defined not only by the automation of repetitive tasks but also by the utilization of prescriptive analytics to determine best next action. Treasury that is sensitive to market fluctuations will be able to offer a more resilient function that is more capable of dynamically adjusting to future shock events.

Bloomberg: Taking the lead in shaping the client e-FX trading experience

Bloomberg is a pioneer in supporting the growth and evolution of electronic trading in FX. e-Forex spoke to Tod Van Name, Global Head of Foreign Exchange electronic trading at Bloomberg, about how it is leading the way in the ongoing development of this space despite the accelerated pace of change in recent months.

Tod Van Name

Bloomberg has been making a number of changes to its e-FX services over the past year. What has been driving those enhancements?

The main thing that really drives us here at Bloomberg is the interaction that we have with clients. Especially now, clients across all business areas are looking at practical ways to improve their performance and reduce their transaction costs. We are driven to deliver the tools which can help them to achieve this, whether that is by increasing automation tools, making it easier for them to access the market or helping to streamline their workflows. For example, firms that trade many different asset classes, such as bonds, stocks, or commodities, tend to aggregate currency risk and they need a more effective way to manage that process.

Clients have also been talking to us about how to manage the shifts in liquidity that we've seen of late. Asia Pacific (APAC) has had a really remarkable increase in volume, with Singapore, Hong Kong, Tokyo and Sydney trading much more actively than they were five or six years ago. In addition, there is the recent update to the FX Global Code, designed to improve transparency and efficiency but will clearly impact liquidity providers and platforms. These are the type of trends we listen to and which help drive what we build and deploy to our clients.

Can you share more detail about some of the specific features or new products which you have recently released?

Of course – at Bloomberg we release new software nearly every week, in part because the market changes so rapidly but also because it can take some time to develop and build a new product which can add real value to our clients. One recent example is the new Supplementary Cost Tool which we added to FXGO at the end of last year.

This tool allows our users to evaluate the pricing that they're getting from their liquidity providers, but also allows them to also factor in any additional costs such as prime broker fees, custodial fees or banking charges, which they would not normally see until the execution was complete.

With the supplementary cost tool, the software will return to the user the best actual prices, net of fees, not just the best prices that the liquidity providers are showing. This is important because it allows clients to account for more than just the exchange rate but also the associated costs.

It's a tool that has really taken off and the monetary benefits this has delivered to clients so far has been substantial. It is something many clients have requested, and we are looking to expand this feature.

Another key release has been our Slippage and Retry tool which allows the user to determine a tolerance for accepting fills within a specified parameter. For example, in fast moving or volatile markets clients may be unable to complete trades on rates that constantly change in milliseconds. Slippage and retry allows traders to set a tolerance, in fractions of a price, and aggress other quotes within that parameter.

Our Slippage and Retry tool

Trade negotiation in this manner is completed immediately, within tight proximity without having to chase a market that may be running away. In addition, clients also have settings that will allow them to retry a trade attempt at the server level, which reduces the latency of trying to click on the next price when it appears on the screen, If you put those two things together, the success that clients can have trading in very volatile and very fast moving markets has greatly increased and their risk of price movement has been reduced, providing a more fluid experience and greater confidence.

Another brand new release has been our RFQ Manager, which allows clients who trade by RFQ to create templates for frequent trades with default parameters like currency pair, notional amount or tenor without the hassle of typing in those parameters every time they want to request a price.

RFQ Manager is a component that allows the user to define a limitless number of templates in an organized and intuitive structure. It also allows them to create a list of their favorite counterparties for each template, and then quickly send an RFQ, saving time and reducing the risk of keying errors.

The RFQ Manager is a launchpad component that fits neatly into the users' desktop, and can even be linked to news, charts and other contextual components.

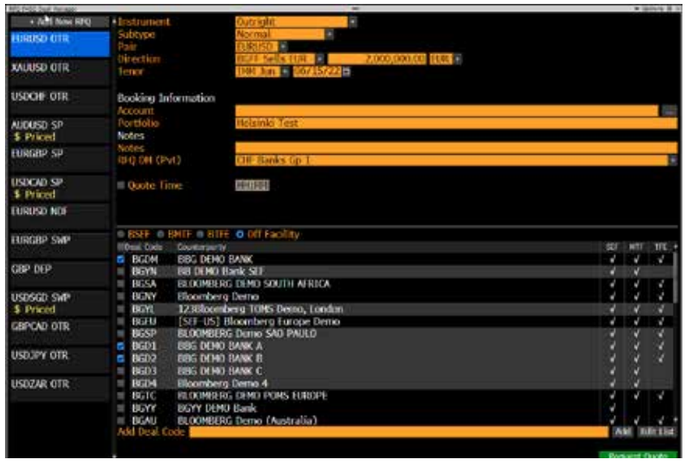
The important thing that all of these recent developments have in common is that they solve problems where there is process friction, and where it can make client workflow more efficient while minimizing risk.

Our clients have been excited and eager to offer feedback while working with us through the development phase, ensuring that what we release has widespread support and rapid adoption. We view this collaboration as essential to building successful and innovative solutions.

Has there been a change in demand for execution analytics and how have you responded?

Absolutely, no question at all. One of the benefits to the increase in electronic trading, particularly in the FX market, is it provides a significant amount of trading data which you can now use and analyze. In the early TCA days this was primarily just looking at the post trade data, but the growth in available data means we now have much better tools that help clients evaluate pre-trade execution strategies as well.

As a major liquidity platform, we have really focused on things that



Our RFQ Manager allows clients to create templates for frequent trades

Bloomberg: Taking the lead in shaping the client e-FX trading experience

Our tool that allows clients to view and evaluate their streaming performance

we can do to introduce information that improves the ability of clients to make better, more informed decisions. One of the features that we released recently is a feature that allows clients to view and evaluate their streaming performance.

As a buyside client this allows you to look at the performance of your liquidity provider across several parameters, such as risk reject ratios, the cost of the reject if you miss a trade, what the response time is from your counterparties, spread analysis, and the impact of trades on the market. These analytics become very powerful for clients that are looking to make intelligent decisions about how to optimize trade negotiation using quantitative metrics.

One other thing that we've introduced, which has already had a really great response from our clients, is the ability for a liquidity provider to take their proprietary analytics, in areas like FX algo trading, and display this unique intellectual property within a window inside the FXGO platform.

For example, if you want to know what the liquidity profile of GBP/USD looks like right now, and you are enabled, you can look at a particular liquidity provider and review an array of parameters, and compare risk transfer pricing to various algo strategies. When ready to proceed with an algo order, clients can send the order directly to the LP, and observe as the order is filled in real time. Once complete, the performance of the fill can be assessed through a variety of post-trade analytics.

What users really like about this is that it's customized by the liquidity providers. We started that with one bank a year and a half ago and now we've got three other banks as well providing analytics. It's been a very interesting evolution in how you can manage and marry different technologies together to provide a much more powerful experience for the user.

Where do you think the future evolution of the electronic FX trading market will take us?

We're at a really interesting time in the market. Our clients tell us that what they're really looking for are ways that they can improve efficiency and reduce risk. The solutions that they are most focused on involve improving workflow processes, and using technology to mimic that workflow, but doing it in an automated fashion so that it's much faster and much less error prone.

We've actually developed automation tools allow clients to do that, such as Trade Best which enables them to set the parameters to trade by RFQ, or Rule Based Trading, which I think we're going to see a lot more of in the future, which allows a client to specify under what conditions they want an order executed and then, when those conditions are met, they can go to market. Automation will continue to evolve and find increasing adoption among a wide range of market participants.

We've already begun to see an increased use in electronic trading for derivatives, particularly for NDFs and options, and this trend is going to continue. Clients have found that even complicated structures can be traded electronically. June, for example, was a record month for us in electronically traded options, and the number of banks which support automated pricing continues to grow. We have 23 banks now that provide electronic pricing for options, across a wide range of currency pairs and structures, and we expect this to continue as clients migrate toward the efficiency of electronic trading.

Another important change is managing complex workflows. Client demand greater flexibility in how they stage orders, provide account allocation, net or aggregate them, and then manage the trading process, whether by RFQ or streaming, batch or list trading, fixing orders, local or generic orders, or by a combination of methods including direct order routing (DOR) or via an API. One thing is certain, the FX market will continue to evolve and client demand for robust, reliable solutions will continue to increase.

Michael Siwek

DMALINK

A very smart operator looking to disrupt the FX status quo

e-Forex spoke to Michael Siwek, Founding Partner of DMALINK to gain an insight into how an idea drawn up 7 years ago on the back of a paper napkin is shaping out to overhaul the FX ECN model for the buy-side and challenge the status quo of double charging, reporting inefficiencies, and costly use of credit. Since its launch, DMALINK has undergone significant transformations from operating an FX agency to a data-centric platform with a unique ECN-model, delivering benchmarked trading services that enable market makers to price buy-side clients at $0, blended with upcoming AI-powered liquidity management and anomaly detection across spot, forwards, futures, and NDFs

Why do buy-side clients and banks connect to DMALINK?

Funds, CTAs, and corporates, amongst other buy-side participants that trade foreign exchange, particularly within an emerging market context, enjoy our data-centric approach. We quantify the true cost of execution and empower buy-side clients to understand, in real terms, how much their trading strategy costs. We do this through benchmarked liquidity access and proprietary logic that identifies the most relevant mid-market rates at specific points within a deal execution lifecycle. Our service is delivered through one single API without any third-party TCA or reporting fees, and we are working on the delivery of a web portal to provide further value and improve the experience for our platform participants.

Compliance Officers, especially those within banks, take advantage of the service to help with internal and external reporting requirements from a best execution perspective. One of our early business differentiators has been to provide no-cost access to market makers. The approach delivers benefits to the sell- and buy-side alike, and it has been very well received by the industry.

Please tell us more about your ECN model.

We are an institutional venue for buyers and sellers of emerging markets cash foreign exchange and precious metals. Natwest Markets centrally clears and settles deals on DMALINK platforms. Except for self clearing entities, all participants transact via a Prime Brokerage or Prime of Prime relationship.

Post-trade, we provide trade execution reports, which can be sent to the back-office or directly to the client's credit provider.

DMALINK - A very smart operator looking to disrupt the FX status quo

Ashwind Soonarane co-founded the business with me in 2014

We deliver electronic streaming prices (ESP) across 60+ currency pairs, with a particular focus on emerging markets, including XAU. Benchmarked liquidity, market data, GUI-white label, and regulatory reporting services further enhance the trading platform.

Participants cross-connect to our low latency infrastructure co-located in Equinix NY4 (New York) and Equinix LD6 (London) via FIX and binary API. We also offer over-the-internet connections and a GUI for manual trading. The service is available to buy-side clients, including funds, CTAs, SMEs, Proprietary Trading Houses, and banks.

Liquidity management is a fairly manual process. Do you foresee any overdue changes?

Great question.

Liquidity management (LM) is somewhat of a balancing act between relationship management and data science. Some ECN processes have been automated by technology. LM is not one of them. Aggregators of all sizes tend to involve a range of people to create a custom stream for their clients. This manual and non-static process requires significant oversight and labour.

At the end of the day, no human can analyse several gigabytes of data on a daily basis. We feel that Artificial Intelligence with deep learning models can help relationship managers provide a superior and more efficient output that allows clients and market makers to create and maintain a harmonious trading relationship.

We are heavily investing in the creation of intellectual property within this space. We have teamed up with Axyon AI to develop and deploy custom AI across a range of workflows and systems. We believe that this will greatly improve trading performance and strengthen relationships in the coming months. It will also likely make DMALINK one of the earliest implementers of deep learning AI within the industry.

Beyond liquidity management, do you plan on deploying AI elsewhere?

As the AI models are deployed, we want to help the industry avoid credit over-allocation, especially from Prime Brokers and other credit providers such as Prime of Prime firms. We all know that the most expensive part of the trade lifecycle is credit. As such, we are deploying solutions that will enable PBs and CCPs to only make available what is necessary to support their client's business, rather than over-allocating across data centres and relationships.

Our dynamic AI-based credit engine can save up to 65% of credit-related fees, which in turn can help the market to reduce counterparty settlement risk, amongst other credit considerations.

We have begun discussions with two Tier 1 financial institutions in New York to deploy our new credit engine to manage NOP exposure using our adaptable calculation methods not purely on consumption, but factor in other events which may impact counterparty credit worthiness, such as the SNB event in January 2015.

Last year DMALINK co-launched DeFinity. Please tell us about that.

Yes, that was very exciting, especially since we did it through a decentralised and permissionless offering, which for the institutional space, is a very novel idea.

We have recently secured an investment round to support the design and development of the tech stack for the service. The objective is to remove the cost and risk of credit by creating an ecosystem where all foreign exchange participants can clear and settle their deals intraday. Despite the name, DeFinity Digital Assets does not support cryptocurrency. Instead, it evolves within the institutional financial and capital markets, namely foreign exchange, bonds, commodities and, in the near future, equities.

Based on current market feedback from some Tier 1 institutions, we feel that there is a real appetite for a near-instant settlement service that can be used by buy-side and sell-side clients, one that will also help clearing houses

Manu Choudhary, our CEO also looks after strategic enterprise deals and partnerships. He will deliver the keynote speech at the upcoming Trade Tech USA FX event which will be held in Miami in early 2022

DMALINK - A very smart operator looking to disrupt the FX status quo

Ashwind Soonarane assumed our CTO role last year

and central banks provide a better service.

Your business is bank- and exchange-independent. What is it like to be one of the last independent ECNs?

Although we are bank- and exchange-independent, we are fortunate to be partly owned by the UK government. This means that we benefit from existing industry knowledge and UK-based incoming investors who believe in the opportunity of regulatory and technological change in the foreign exchange market, for which DMALINK is prepared.

This position affords us the freedom to realise ideas and adapt quickly to change. Our team is experienced in the FX market and although we are small compared to some of the businesses who started 20 years+ ago, clients realise the advantages of an intimate team and a personalised boutique-style service.

Having a smaller team allows us to be very focused in our approach towards our clients, new and old. Everyone knows their role, and everyone plays the part to the very best of their abilities. Having more than just 'catch-up' relationships with our participants allows us to work closely with each individual team, ensuring their eFX franchise needs are met. We all know some FIs are flow-focused, some yield-focused, and some seek to improve their overall execution experience and require in-depth reporting. Being cognisant of individual goals enables us to connect suitable buyers with sellers.

The DMALINK platform GUI

Speaking of the team, please tell us about who is behind the business.

When I founded the business in 2014 with Ashwind Soonarane, we did not know the great team we would have today. Fast forward 7 years, and we have the pleasure of working with some very talented individuals.
Manu Choudhary, our CEO, joined us in 2019 from Lloyds Bank, where he spent 12 years in acquisition finance, derivatives, and FX sales, working with global SMEs. Prior to this, he spent 3 years at Barclays Investment Banking. Today, at DMALINK, Manu looks after strategic enterprise deals and partnerships, alongside fulfilling CEO duties.

More recently, we were fortunate to attract Michael Idzkowski to the Sales Director role in London. Michael joined us from ADS Securities, where he was the Head of Relationships across all of their existing business units.
Clients count on our Mauritius-based Operations team to provide round-the-clock coverage. The team currently consists of six team members.
Our data science team in the UK is currently made up of two people. Our data scientists focus on the research and development of systematic models to detect patterns and improve performance across all our

Clients count on our Mauritius-based Operations team to provide round-the-clock coverage.

platforms. Although overarching across several departments, Ashwind Soonarane assumed the CTO role last year. He ensures that we stay ahead of technological innovation, acquire intellectual property, and deploy strategic plans.

My primary objective is to grow our client base globally and I therefore look after our vendor and partner relationships.

Finally, our advisory board and investors are well-equipped to provide DMALINK with guidance, FX-based opportunities, and they also oversee the overall governance of the business, which will be especially important as we gain momentum as a group.

Are you planning to grow the team further in 2021?

To help with the onboarding of clients and SG1 expansion plans, we are increasing the head count over the coming weeks and months across sales, operations, and data science. As such, Michael Idzkowski will work with his US and APAC counterparts to look after existing and incoming buy-side and sell-side relationships.
On our operations team in Mauritius, we will see three new team members, alongside a seasoned Head of Operations, ensuring optimal performance and service delivery across departments.

You currently support cash FX and precious metal products. Can you share details about your upcoming NDF service?

Michael Idzkowski is our EMEA, Sales Director based in London

The NDF market has been steadily growing over several years as investors look for more ways to hedge their market exposure, meanwhile those hunting for alpha are utilising NDFs as a means of generating PnL for their desks. Moreover, Asian NDFs, such as CNY, INR, KRW, TWD, and other off-SEF non-deliverable forwards, have grown significantly between 2013 and 2021.
To support demand, we have decided to launch in the SG1 datacentre in

Singapore over the coming months, working closely with the Monetary Authority of Singapore and Equinix. A select few FIs have agreed to help us beta-test the new streaming broken-date NDF platform, using our benchmarked mid-rate functionality. This will also allow us to expand within established relationships and broaden client penetration, including with those who previously could not assign resources to a spot FX and precious metals-only business.

You recently reported that Nomura and other Asian FIs are joining the DMALINK platform to bolster the upcoming NDF and cash eFX book. What's the story behind this?

That is correct. Nomura and several other APAC-focused financial institutions have signed up to the service to provide customised Asian eFX pricing to our buy-side platform participants in New York and London, with Singapore being added in due course.

The addition of Nomura to the DMALINK ecosystem enables select users to sustainably access suitable pricing pools during Asian hours. As we continue to develop our company and technology and apply deep analytics to improve execution, we envisage that the APAC footprint will outgrow New York in the coming two years, in line with client demand.

How, if at all, has the pandemic impacted your business?

From an FX market perspective, the past year and a half has been reflective of global economic and geo-political events, which tend to drive volatility and, in turn, create trading opportunities for our clients. This has had a knock-on effect on incoming investment as savvy investors seek to diversify their portfolio away from retail and brick-and-mortar businesses seeking pandemic safe-havens for their cash. We plan to use this opportunity to build out our tech stack and product offering aggressively over the next five years so that we will become the venue of choice for buy-side clients seeking execution, reporting, market data, and settlement services.

Institutional clients trade fairly large clips. Do you offer SME solutions facilitating smaller trade sizes?

Traditionally, we have supported trade sizes in excess of $100,000. More recently, we have decided to aggregate trades using the Traiana NetLink service. The addition of NetLink enables DMALINK clients to increase operational efficiency by aggregating trades, which provides for credit efficiencies through netting. The additional cost saving will allow DMALINK users to enjoy a broader spectrum of trade sizes and enable new counterparty types to join the DMALINK ecosystem, such as SMEs and other second- and third-tier participants. NetLink enables us to add diverse flow to our FX ecosystem, which benefits the buy- and sell-side. All trades will continue to be cleared and settled through Natwest Markets.

What's in store for 2022 and beyond?

We understand that the FX market is changing rapidly, both from a regulatory and technology perspective, but also because of the advent of digital currencies, especially those backed by central banks. We plan to roll out regulated FCA- and MAS-backed products to help clients achieve better trading results, whilst staying ahead of the regulatory landscape using DMALINK and DeFinity tools, which are available to all clients across the group of companies.

2022 and beyond looks very exciting and challenging at the same time! DMALINK will keep investing in innovative technology and tools to provide better execution for our clients, whilst also broadening the scope of tradeable instruments. Through strategic collaborations, we are already working on a range of solutions that, largely based on client feedback, will fill market gaps. We are additionally leveraging solutions under development by partners, subsidiaries, and affiliates to propose a unique offering to our clientele.

Looking ahead, how do you think the FX markets will change?

I believe that CBDCs will become a reality to a certain degree over the next 5 years in Europe and the US. But e-GBP, e-EUR, and e-USD, to name but a few, will not replace cash right away, although we may see a push from the government and central banks in that direction. As such, I believe that we will see strong growth across the industry, which can be fuelled by the addition of central bank digital currencies across certain parts of the world.

The key will be preparedness, and we aim to provide a cutting-edge service to a wide range of participants through DeFinity, in co-operation with DMALINK. Also, it is likely that we will see enhanced regulation squeezing compliance officers globally to incorporate the relevant framework to meet their fiduciary responsibilities. Beyond deal execution, clients will demand more from their execution venues.

We plan to become the venue of choice for buy-side clients seeking execution, reporting, market data, and settlement services

Obermind

Taking platform development to the next level

Alexander Talei is the Founder of Obermind, a fast growing quantitative research and technology development firm which has set out to help financial technology and trading firms to build, deploy and scale on its new platform. We asked him to tell us more about this venture and the toolsets and robust infrastrature Obermind is building for intelligent automation across a wide array of markets.

Alexander Talei

Why did you decide to engineer the Obermind platform and what factors influenced how you went about that?

Simply because there was no platform out there that had all I needed and did all that I wanted to do. To get what I wanted I would have to put together some very expensive tools that I frankly couldn't afford. So I called a friend of mine, just one phone call and we put together our team in a week's time and started building the Obermind Platform. Most other firms, not just startups, feel the same way. The tools out there are insanely expensive and so closed-ended that no one really controls their own technology. People are locked with off-the-shelf products; they can't stand-out or get new ideas out in the market without building their own systems from scratch, which is not the cheapest endeavour out there.
I always knew that "the platform" didn't exist - so we built it.

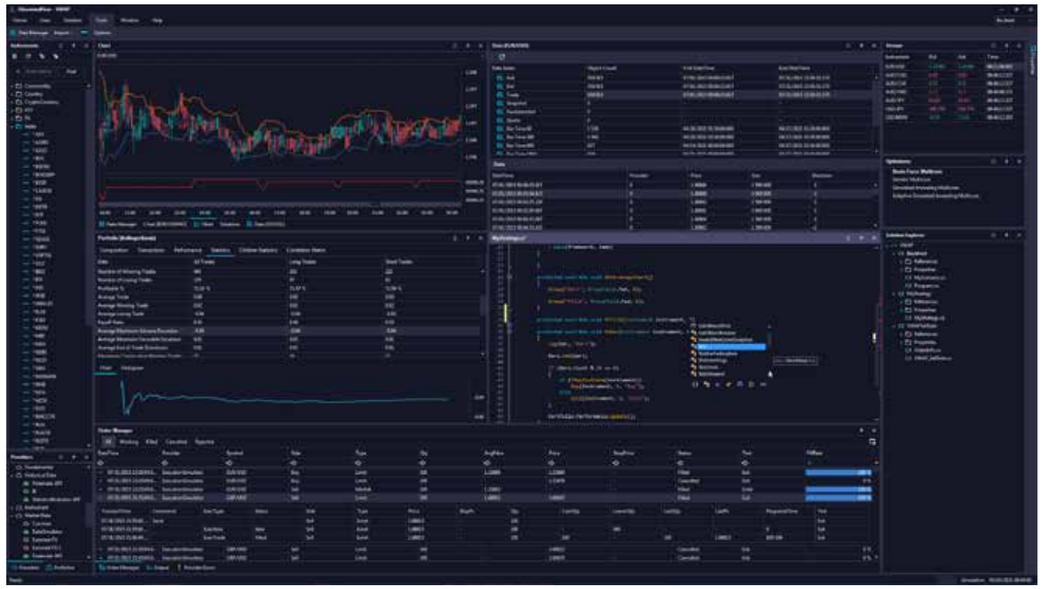
In what ways have you leveraged the latest technology to ensure the platform has maximum flexibility and configurability?

Well for us it was easy to build the platform for speed and performance. That's what we have been doing all our adult lives, but the challenge was: how can we architect the platform so we maintain performance and agility without cutting back on performance or locking ourselves into a box and ending up being another legacy system? How can we make sure our platform is future-proof? Should it support both decentralised and centralised use cases? How can we build a system that is built to perform for a prop trading firm and for a broker/dealer distributing consumer-facing applications across numerous devices to thousands of end-users?

It was a big challenge and I knew we needed to make sacrifices somewhere to reach this goal, kind of forking out to suit a specific user base or user case only. But I felt we would become like every other platform out there then, that we would have a product instead of an actual platform that our user-base could take on and build out to things we ourselves couldn't even imagine. Most who have launched financial technology understand the wariness you get when it comes to introducing new code, features or updates. That's what prohibits progression in one way for most firms, I didn't want to end up in that box.

It was a difficult decision to make, but I decided that we will not give up on the platform's interoperability and performance. So we ensured that the platform:

1. Is portable and cross-platform.
2. The APIs and libraries are split into core and non-core, while remaining open and accessible to all our users.
3. The API must support numerous use cases and support popular scripting languages (like Python for back-testing) as well as OOP languages to build more high performance systems and not be "just another REST API" - as that kind of shuts down most production use cases.



Obermind FLOW is an advanced multi-asset, broker-neutral trading platform and portfolio management system that scales with you

4. Instead of creating a "product", we need to build applications on the platform and distribute it for free to our clients who don't have in-house developers and want to launch and run their platform with no-code.
5. Enabling users to actually own their platform and develop or configure the systems they want to launch to a greater extent than what is possible today. We give our clients the ability to branch out on their own.
6. Be transparent about it all, constantly thinking "I need to keep this proprietary, I need to ensure this can get monetised" will cripple usage, adaptation and progression. Just put it out there, if it's good - I'm sure others will copy, that's just how things work. But at least we will continue to progress and be the platform we want to be.

This way, I believe we can maintain a future-proof platform that is open to a wide array of use cases without jeopardising the platform's ability to scale into the future and our ability to continuously roll out new features and applications. Most importantly, every user has the ability to branch out at any time and build what they want using core libraries while cherry-picking new functionality using the API as we move ahead.

What key features and functionality are available with Obermind?

Let me run through a few use-cases that your readers might be interested in briefly, that should answer the question easier:

Sell-side bridge / connectivity hub: We have built libraries and have a fast growing API connectivity list enabling firms to manage their entire connectivity network from one platform. From market data to order execution, routing and beyond. The logic and rules can easily be hard-coded by users or they can use our pre-built order execution algorithms and easily update parameters for no-code users.

Multi-asset buy-side portfolio manager: For a quantitative portfolio manager, we enable coding, back-testing, optimisation, simulations, quant libraries and more to devise their strategies. Once ready to deploy, strategies can easily be distributed on numerous venues across a global cloud as high-performance cross-platform console applications. Most importantly, all of this can be monitored and controlled through feature-rich, pre-shipped or customised user interfaces where literally every messaging, regardless of asset class and venue, is unified. For a high-touch portfolio manager, well it's even easier. We have built it pretty much to be "plug-and-trade".

Broker-dealers and Exchanges: For broker/dealers and exchanges, we have an end-to-end solution, where they can distribute front-ends for native Windows, web and mobile, completely custom made and owned by them so they can create new features, design and configure their own applications without us - or simply just "plug-and-trade".The Obermind Platform has modules to manage anything from on-boarding and security (OAuth, multi-factor authentication) to multi-asset credit management (using our wide variety

Obermind STREAM utilises a powerful financial engine built to handle the most complex and demanding use cases

of pre- and post-trade credit engine tools capturing trades in microseconds), to managing payments using our online web application and more.

Firms can then easily serve market data and manage order execution using our low-latency Stream server, easily deployed on any Windows or Linux server in minutes. It comes as both native portable applications running over TCP for high throughput using our binary protocol, or via built-in FIX server that can be configured and deployed in a day and as a websocket application for broker/dealers redistributing over the internet.

This can easily be configured with no-code to run both asynchronous and synchronous risk-management and internalisation or build light-weight sell-side algorithms using our sell-side library with a few lines of code to automate building limit order books, order execution, pricing or internalisation.

Centralised, decentralised - completely up to them. Our proprietary in-memory financial data server ObermindDB is being used in both "worlds" and can be configured to suit numerous use cases. They can then plug that into standard pre-configured SQL RMDBs or use custom user-specific time-series databases or proprietary systems.

Our suite of data visualisation tools can be highly configured to display anything from decay curves, hit rates, fill ratios and more.

Fintech: Other than creating slick cross-platform applications with our pre-built apps using Razor and React, or using their own framework and integrate Obermind libraries, they need connectivity, they need to be able to manage settlements, payments and more - that's where Obermind really helps out launching solutions much faster and easier than before. Instead of rewriting and reinventing the wheel, the platform has all the modules they need built-in so they just focus on building their products and solutions and getting to market faster than their competitors.

Proprietary Trading Firms and Prime Brokers: Obermind is used by prop firms to manage centralised credit, risk and connectivity gateways which traders connect via to prevent run-away algos or to customise limits, connectivity, market access and much more - and all built for a multi-asset world. We built it to suit both low-touch algorithmic and high-touch firms.

How would you describe the key benefits of Obermind and why it is different from many other trading platforms?

It really is a platform to use to build new platforms and financial systems on top of. Our pre-built applications can also be "white labelled" and configured to launch a platform in days for those who don't have the resources to develop their own system.

Other than the technical aspects I briefly described, more importantly we want our clients to own their platform and build value instead of just paying license and ticket fees. So we do provide source-code, redistribution rights and one-off perpetual licenses, so firms know what their system costs without any surprises and they understand what value they are building.

We built the platform, we probably know it better than most, so we are always there on Slack, email or on the phone to get things done, whether it is custom development or helping configuring the platform or trouble-shooting, we're there every day of the week.

Every client gets a dedicated Project Manager that follows through the entire project life-cycle from planning and requirements to production and updates. We use agile project management tools, with full audit-trail of requirements, work and communication to ensure the firms we work with and their stakeholders, management, compliance and developers alike get the tools they need to understand the entire project life-cycle.

What we have seen for now that attracts most, is that we don't have any ticket fees, per million fees, or if launched on our managed cloud

Obermind has deep experience in Public, Private and Hybrid Cloud infrastructures and offers Proximity or Co-located Virtual or Bare-Metal Servers in a wide variety of global locations

instead of on-premises, there are no licensing or software re-distribution fees either. This dramatically reduces technology and transaction costs from the traditional ~6-8% of revenue that most financial firms are exposed to. I do believe in the long-run, this will trickle down to lower end-users transaction costs as well.

What types of trading firm and FX market participant are you targeting with the new platform?

Right now it is mainly prop trading firms, fintechs and broker/dealers that are rolling out using Obermind. Mainly in Futures and crypto trading space but also in FX. I believe more and more FX firms will join us. Most firms have already realised the importance of standing out with their own technology, not just to encourage brand-awareness and create captive audiences but also to take control of their future and be able to launch new functions, features and asset classes as they please and not when everybody else does it. In FX, there is very little that differentiates between providers and competitors, particularly when it comes to the technology offering. I hope Obermind will help change that.

What deployment options are available with Obermind?

Community License, Managed Cloud or On-premises.

Our Community License is for individual and academic use. It has everything needed for the startup or buy-side "bedroom-traders" to research and devise automated strategies and start out their portfolio management business or fund. That's free. We also provide free hosting for it as long as we can afford it.

For trading firms and institutions we have two options:

Managed Cloud, where the platform is hosted on our hybrid network. There are no additional fees other than the regular hosting fees. No licensing, software, plugin or ticket fees or such. We cover more than 17 locations from near proximity to co-location and take care of cross-connects, security, optimisation and everything else in-between. For firms who want a more proactive management or take care of the management on their own, we do have the option to just monitor up-time and they do the rest.

We set up custom SLA's when needed and support a real hybrid cloud infrastructure for financial firms, from latency sensitive usage to low-cost storage or container needs on the "big three" clouds.

Our On-Premises licensing is simple and customisable, we can either do a one-off perpetual license, source-code license or simple monthly subscriptions - whatever our clients prefer. We also don't charge ticket fees with On-Premises. Our clients can then host the platform wherever they want, they still get our full support all the way.

Whatever option our clients choose, we believe that training is crucial to get out what you need from the Obermind Platform. We provide on- and off-site training and certification when required to ensure the platform is used to its maximum potential.

What plans do you have to roll out more functionality with the platform over the coming months?

Right now we are rolling out our free market data API. Millions of historical data points, near real-time market data on almost 30,000 instruments and markets, from ETFs and equities to FX and crypto - to statistical indicators, dividend calendars, SEC filings, commitment of traders reports and much more. Free to use, super-cheap to redistribute. Our API and integrations list is constantly growing, so worth checking out there. There is more in the pipe-line but too early to mention.

What's the easiest way for people to find out more about Obermind?

Our website https://obermind.com has most of it covered. We are updating it quite frequently and adding documentation and more. We are also pushing out more of our pre-built applications in stages for free usage.

Evaluating FX algos: the need for common analytics infrastructure to enable better decision making

By Alexei Jiltsov, Co-Founder of Tradefeedr

Usage of foreign exchange algorithmic execution has grown steadily. Emerging in the FX market in the early-2000s, the adoption has been especially active over the last decade. Growth has also been driven by a range of factors including growing FX markets fragmentation, the decreasing balance sheet of FX dealers, the demand from regulators to develop a more holistic approach to best execution, and sharp increase in passive tracking assets under management with the focus on execution costs to minimise tracking errors.

In response to these factors, buyside trading desks are adopting algorithms to source liquidity from different banks, minimise trading costs and place trades in multiple venues, reducing information leakage and impact on the market. Algos support efficient market functioning, but users need to have sufficient knowledge and information to deploy them effectively.

Meanwhile, banks are investing in their algos, for example by incorporating artificial intelligence and machine learning, to enhance their executions and help clients reduce the cost of trading. With the increasing complexity and sophistication of algos has come a greater desire for transparency and advanced analytics tools.

Choosing the right algorithm for individual needs remains a challenge for the buyside. The main challenge is lack of common data and analytics - trading information is siloed and

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there has long been a lack of reliable benchmarks or rankings, despite the fact that a growing number of market participants are seeking independent, third-party evaluation of algos. Closing this information gap is critical to ensure greater transparency, efficiency and a level playing field.

COLLABORATION, ALGO PROVIDER "LAST MILE" AND DATA AGGREGATION ARE CRUCIAL

Typically, the buyside is presented with myriad algos from a wide range of providers.

It is vital to choose an FX algo in a data-driven manner rather than relying on hope or luck. In this article I outline the many pitfalls which must be considered in any data-driven approach.

First, what is needed is a service that provides all the data. The devil is in the detail because the impact of seemingly small details on algo performance can be significant. (See case study and Figure 2).
Second, the feedback loop between algo provider (bank) and algo user is important. Algo providers (not TCA companies) are typically the ones with the most knowledge about their algos and hence are the best positioned to communicate with their clients. But without a common analytical framework and agreed up metrics algo providers and algo users cannot have a productive dialogue.

A typical algo user takes more risk in exchange for (hopefully) better return (see Figure 1) and guidance from the algo provider is crucial for solving this trade off in optimal way.

Finally, as buyers and users of FX algos, market participants can benefit significantly from other people's knowledge (pooled data, decreasing the noise component on Figure 1) provided it is quantifiable, impartial, and reliable.

CHOOSING THE RIGHT TOOL FOR THE JOB

The first challenge for the buyside is that FX algo data is different across different banks – for example, their terminology and ways of presenting data are different. Algos also work differently and have different controls. To be helpful, the data on algos needs to be comparable.

Secondly, even with all the data, comparing algo performance is a technology challenge. While banks have the technology to do this, they focus on their own specific set of algorithms, and have no ability or data to provide an objective view of their strengths and weaknesses in comparison to those of competitors. It therefore is necessary for algo users (on the buyside) to invest in technology to store algo execution details and compare them in a consistent way. That is difficult for each buyside firm to do on its own, because of limited budgets to spend on this specific technology. It is also sub-optimal because it will create additional complexity – what is needed is one standard approach to promote effective dialogue. This makes the case for the third party with the capability to store execution detail and analyse FX algos for multiple clients. Using such a third party enables the buyside to benefit from economies of scale while keeping the flexibility of being able to carry out custom research (as every buy side has unique use case)

The third challenge facing the buyside in selecting FX algos is the independence of the data that they use as the basis of their decision.

Many algo evaluation firms are owned by major market participants, giving them an incentive to recommend a particular set of algos. It is not enough for an evaluation firm to be independent: the buyside needs to understand the detail of execution. As asset managers have fiduciary responsibility to their clients, they should not take a third party's word on the relative merits of different algos. Instead, they should have the tools and access to the raw data to validate these merits themselves.

There should also be a feedback loop between the algo user and the algo provider, as sometimes people do not use algos correctly.

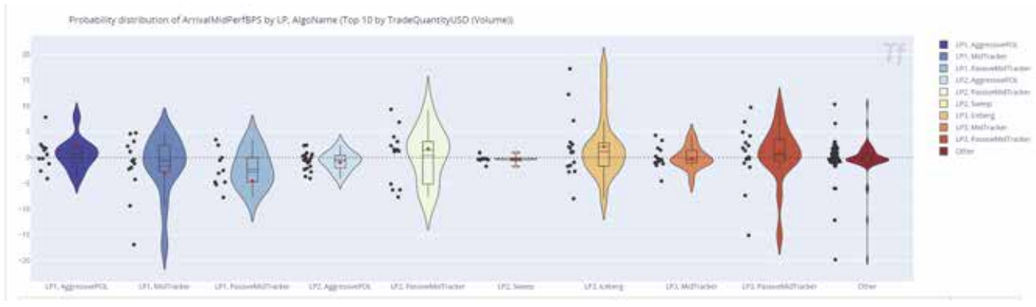


Figure 1: Algo Performance – Signal and Noise

Why do people misuse algos? There may be a misunderstanding of what algos are doing. Sometimes people intervene too much by changing the parameters, restrict the algorithm to trade on certain venues or require unrealistically fast execution. No third party is qualified enough to advice client on all aspects of execution. That is the old model of transaction cost analysis provider, and it is sub-optimal. Direct dialogues between buyside and data vendors are the most efficient way to understand problems and come up with solutions.

An algo is a complex black box with lots of controls. The user can trade faster or slower, change the way he executes, switch to a more passive mode or stop the execution altogether. All such decisions contribute to performance. Ultimately, the user needs a technology that will record the P&L implications of all their decisions.

Collaboration is crucial. User permissioned data pooling and sharing is important so that algo users can work with their peers and liquidity providers to make better use of data assets. An independent provider can handle the data management while enabling market participants to remain in control of how they collaborate with each other.

CASE STUDY: CLEANING DATA FOR ALGO WHEEL

Consider a case in which a user aggressively manages the algo execution with a limit price (green line in the picture below). The algo is selling USDJPY, so every time the spot (blue line) is below the limit price the algo is not able to execute due to user instructions.

The P&L of such an "cyborg" algo execution is a joint effort of user and machine. A good technology solution should be able to split the attribution of the P&L between user and algo (machine). If this algo P&L is part of the algo decision framework (algo-wheel), its performance should be adjusted for user performance. In most scenarios, only machine P&L should be used. The implementation details are crucial as well and the technology solution should be transparent and customizable to the end user building an algo wheel. Otherwise, it can be a "garbage-in" / "garbage-out" type of scenario.

SOLUTIONS: STANDARDISED DATA AND ENGAGEMENT

Let's now turn to the solutions to these challenges. The first critical piece of the jigsaw is to have all the data in a standard format and located in one place. That involves an expensive technology layer that someone has to build. The buyside needs to be able to control this data so that it can fulfil its fiduciary responsibility by cross-checking the results. That means having a standard data and analytics layer that allows asset managers to rank algos and create allocation rules. The second element, as mentioned above, is having a dialogue with the bank (or other algo provider) about commonly accepted metrics.The third element is the ability to learn and expand your horizons. There are more products in the market than an individual buyside firm will have access to. Theoretically, a person can trade 50 algos, but typically people trade only five to 10 because they know those and not others.

Using your 10 favourites and not looking around at alternatives is sub-optimal. Data pooling is the answer. Each user should use 5 or 10 algos according to their needs but they should be selected on a fully data-driven basis from the universe of 50 possible ones.

Having a database that aggregates performance improves efficiency. It is useful to have access to all sorts of user feedback in a quantified way and to be able to conclude that certain algos seem to be best for certain scenarios. The buyside aims to have a framework to learn about algo performance in a relevant trading context. That trading context couldrange from a basic variable such as time of the day to a range of market conditions such as market trend, volatility and liquidity conditions.

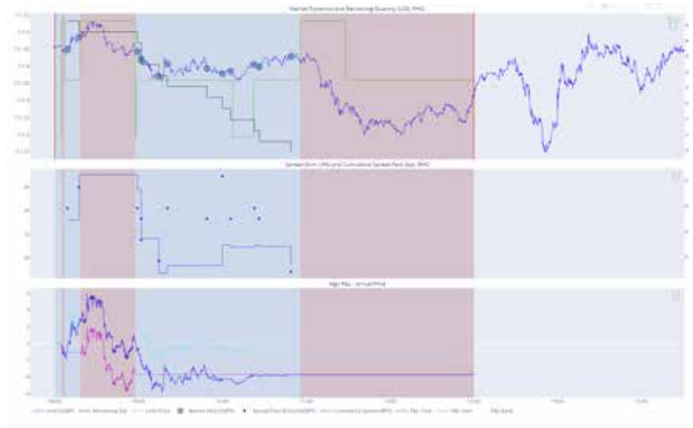


Figure 2: Cyborg algos and P&L attribution – build your own algo wheel

INERTIA CAN BE A PROBLEM

There is significant inertia around which algos the buyside uses. The execution desk decides which algo to use and whether to use an algo at all. If they decided to deviate from their usual algos and it went badly, they would be

Evaluating FX algos: the need for common analytics infrastructure to enable better decision making

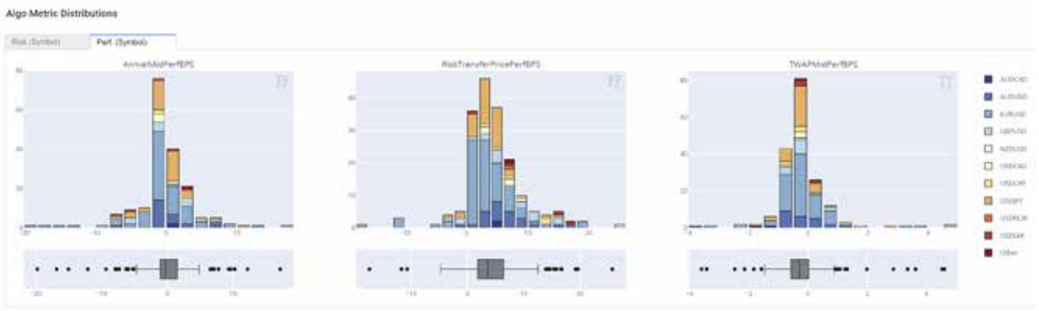


Figure 3: Algo Data Pack, illustration only

questioned about why they made that decision.

Although data is available from banks, the lack of common, independently calculated metrics make it difficult to compare algo across providers. Having a common platform allows an algo provider to produce a "data pack" for potential users. This data pack would provide the potential algo user with statistical data for many algo runs and allow them to justify using the new set of algos, if indeed the presented data suggests that it make sense. The data pack helps to overcome inertia and help to arrive to more optimal selection of algos.

An execution desk is rarely challenged on their choice of algos as it is commonly accepted that experimentation is expensive. Typically, people focus on outlier runs. If the execution desk tried a new algo without any statistical evidence on the performance and the result is disappointing, they would be challenged on why the experimentation was done, this is why the execution desk is conservative. It does not want to explore something new without a good reason. However, there is no doubt that trying new algos improves efficiency of execution over time. It just must be done in efficient, data-driven way. If a common, trusted statistic demonstrates that an algo works in certain scenarios and has been verified to be better than the status quo, then the risk of experimentation is reduced.

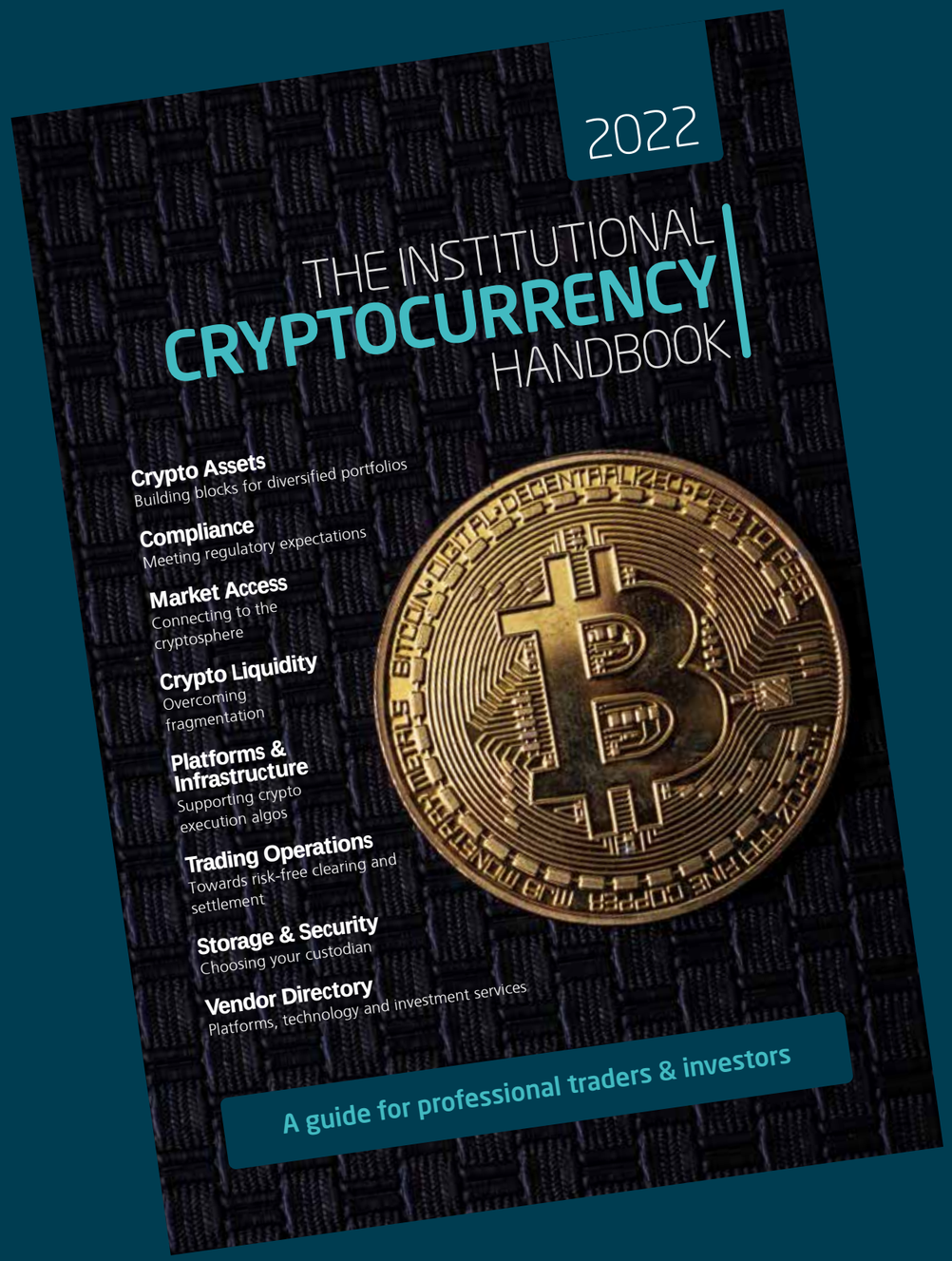
CONCLUSION: A DIALOGUE BASED ON COMMON DATA AND METRICS

Clearly, every asset manager is different because they are complex organisations. They have to decide their own approach, but they generally lack the resources to invest heavily in technology, data collection and standardisation. Even if the buyside embarks upon setting up the technology independently, the dialogue with banks would be challenging because each asset manager would speak to each bank in a different language.

Asset managers can benefit significantly from an independent tool that gives them access to all the data they need to evaluate FX algos across different providers. To achieve better execution, both liquidity providers and liquidity consumers need to engage better, and what has been missing in that interaction is a common data platform that allows the buyside to extract the information that they need in a data-driven way. The sell side will benefit from more efficient marketplace for liquidity in general and algos in particular. They can connect to their client directly if data and analytics metrics are common, transparent and controlled by no-one and hence remove intermediaries from their dialogue. Liquidity optimisation requires a dialogue based on common data and metrics, while keeping things flexible so a complex institution can validate that the algos they select will help them achieve their goals.

Finally, the independent third party should not be the sole judge of metrics and the quality of execution. Instead, it should only serve as a flexible technology and analytics layer allowing market participants to use it and draw their own conclusions. This is likely to improve market efficiency and address the challenges outlined above.

To achieve better execution, both liquidity providers and liquidity consumers need to engage better



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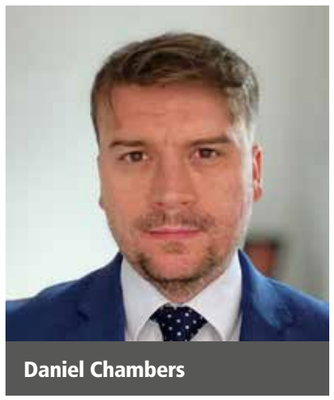
Combining FX data and analysis gives asset managers insight to preserve alpha

By Daniel Chambers, Head of Data & Analytics at BidFX



Daniel Chambers

Everyone now knows the value of "big data." However, as with everything that is perceived to have some value, owners have quickly become protective. Some FX platforms are disrupting this trend, realising that the power of data collection from varied sources can enhance the decision-making process and Alpha opportunities for both buy- and sell-side clients.

A sophisticated FX platform makes life easier for clients by taking over the burden of data collection and analytics production. And it can do so for a lot less because of development and maintenance costs being shared across the entire user base, rather than financed by a single, independent provider. But data alone isn't the answer unless clients have the capability to distil and decipher it for their own benefit.

Although FinTech firms are popping up with regularity to offer some part of the solution, the few that can provide a combination of both data and analysis look set to be victorious. Instead of just big data, the key differentiator to controlling execution costs and preserving Alpha is being able to apply attribution to that data. It's not just about what you spent, but about knowing where you spent it.

TRANSACTION COST ANALYSIS BECOMES EVERY COST ANALYSIS

So, what has changed? The early demand from buy-side clients focused on cost control, with the emergence of Transaction Cost Analysis (TCA) providing a benchmark for trading costs that primarily ticked the regulatory due diligence box. However, what that data provided was a snapshot of a specific time at the point of execution, which only really had information on liquidity and spread. Yet there are many more factors that go into the total cost of execution. Alongside spread, there is skew, slippage, time to market, and speed of execution, all of which have a bearing on the potential loss of Alpha.

What the most sophisticated platforms can now offer clients is not just TCA, but attribution to determine where those costs were incurred. For example, by waiting until later in the day, a client may execute in a market that has better liquidity, allowing the providers to show a tighter spread. But how much Alpha was potentially

Combining FX data and analysis gives asset managers insight to preserve alpha

Buy-side clients may also choose to share their own data to improve their relationship with a liquidity provider

destroyed by the delay between the time of receiving the order and actually executing it? The ability to have that deeper layer of analysis, and the insight such granularity provides, creates an exponential increase in the value of that data.

Beyond that, composite historical data from streaming prices can also help clients decide how to execute particular trades. Should a portfolio manager choose to exit Japan in favour of Australia, the FX trader can study data on spreads and slippage to determine whether the best course of action is simply to sell JPY versus AUD in a single trade, or to break the trade into its components and deal over the USD, potentially getting greater competition on pricing, better liquidity, and tighter spreads. More sophisticated hedge funds may take it a step further and choose to analyse the merits of delaying one side of the trade in order to create Alpha—all from the availability of attributable data to support the decision.

LIQUIDITY PROVIDERS CAN BENCHMARK THEIR OWN PERFORMANCE VERSUS THE MARKET

Data on the actual liquidity provided can also give clients another valuable tool to improve overall execution costs. Analytics will reveal their strengths and weaknesses and isolate where they can be most effective. The data will uncover what type of market conditions are best suited to their trading needs; in which currency pair they are most competent, and whether their access to liquidity allows for efficient exit of trades.

Buy-side clients may also choose to share their own data to improve their relationship with a liquidity provider. Without needing to reveal other counterparties, a client can show collated data to Bank A as to where and why it missed out on business to Bank B or C, either because of less liquidity, wider spreads, skewed prices, slippage, or any combination thereof. By helping to identify where a liquidity provider needs to improve its service, the client stands to benefit from better execution on future trades.
Of course, the liquidity providers also have access to their own data that they can analyse. They can compare their individual pricing against the broader market to evaluate their own performance versus the market at a given time. The smarter platforms even have their own composite pricing data, so that either the client or the liquidity provider can benchmark their performance against an independent source, not just at the time of execution, but at any point on any given day.

Over time, banks can also create their own benchmark level of performance and then compare current data against historical figures to see whether standards are being maintained. Longer-term data can also reveal patterns and trends that may show changing market dynamics a liquidity provider would need to be aware of and react to accordingly.

STREAMING NDFS BOOST LIQUIDITY AND AID AUTOMATION

A lack of liquidity, and therefore pricing transparency, has long been a complaint of the buy-side when using Non-Deliverable Forwards (NDFs), making them one of the most expensive FX trades, not only in nominal terms of the cost of transactions, but also in potential loss of Alpha stemming from poor execution.

Even today, hardly any platforms can provide a decent body of reliable data—other than a basic screenshot of the liquidity at the time of execution—from which to derive an accurate Transaction Cost Analysis.
Those few that have developed streaming NDF pricing have a distinct advantage in being able to offer much more than just a tighter spread due to better liquidity. Reducing implementation shortfall, or slippage, is another key consideration for the overall cost of a transaction.

The ability to collect and analyse data from streamed pricing provides the immediate benefit of being able to determine the best method of execution—from how much it will cost to trade a specific amount at a given point in the day, to which liquidity provider is offering the best pricing at that time. These pre-trade decisions

help facilitate greater automation that, in turn, reduces operational risk, which can have a significant impact on the potential to achieve provable best execution.

However, a pricing platform also needs to be supported by a robust Execution Management System (EMS) to process a more complex NDF trade than a simple spot transaction. That includes features such as staging incoming orders pre-trade and straight through processing (STP) after the trade.

NDF trading currently only accounts for around 4% of the total FX trading, making it a marginal activity for many providers. However, with Emerging Market economies gradually, but steadily, increasing their share of global GDP against Developed Markets, that percentage is only going to rise, with the G20 already becoming a more important body than the more tight-knit G7.
With the FX market boasting turnover of $8.7 trillion a day, based on the latest Bank of International Settlements (BIS) survey, even a trajectory to just 10% of that total would be a substantial increase in volume. Future entrants to streaming NDF pricing and data may discover that late is too late, and their more nimble and sophisticated competitors have already captured the lion's share of the market, pushing the barrier to entry ever higher for the newcomers.

DATA ANALYSIS WILL BE ABLE TO HIGHLIGHT THE EFFECTIVENESS OF POLICY DECISIONS

In addition, while the latecomers are struggling to catch up, the early movers are not exactly standing still. The best platforms are already developing software to be able to aggregate anonymous data to improve a client's ability to gain valuable insight and analysis.
By adding the ability for a client to annotate their data, they can effectively pinpoint a moment in time when a specific change was made. From there, the post-change data can be compared with the pre-change historical data to see whether they achieved the desired results. Much in the same way a digital marketing campaign can be tweaked to reflect various responses, clients will have an almost real-time conclusion about the effectiveness of their decisions.
Another advance that's just around the corner is the introduction of a so-called Verdict system. Clients soon will be able to place a set of parameters on their trades to ensure every transaction meets their internal due diligence criteria. Clients will be able to determine their own priority of factors such as spread and speed of execution to adhere to their internal cost controls and receive a warning when one or more aspect is outside of those boundaries. Ascertaining this information before executing the trade is far more valuable than a post-mortem on where things went wrong. This system has the additional benefit of potentially improving communication between clients and liquidity providers. Armed with this data, a client can inform its liquidity provider what aspect of the transaction caused the client not to trade, whether that was because pricing was too slow, the spread was too wide, or for some other market-related reason.

SITTING IN THE MIDDLE IS THE BEST OF BOTH WORLDS

The use of data has already become an essential part of FX trading and its importance will only grow with time. While many FinTech companies offer data as a service, it is very much on the Costco model of "more is better," yet still only a restricted cross-section from the time of execution. In addition, many providers are more reliant on the sell-side that provides the liquidity, rather than the buy-side that needs it, so much of their data goes back to the people that provided it.

A sophisticated multi-dealer FX platform is in the unique position of sitting in the middle, able to collate data from both sides, with the sum of the parts being greater than the whole. Clients have already realized that analysing this data can save them money. The next step will be when they embrace the trading algorithms that run off this data and start using it to identify and seize opportunities to generate Alpha as well.

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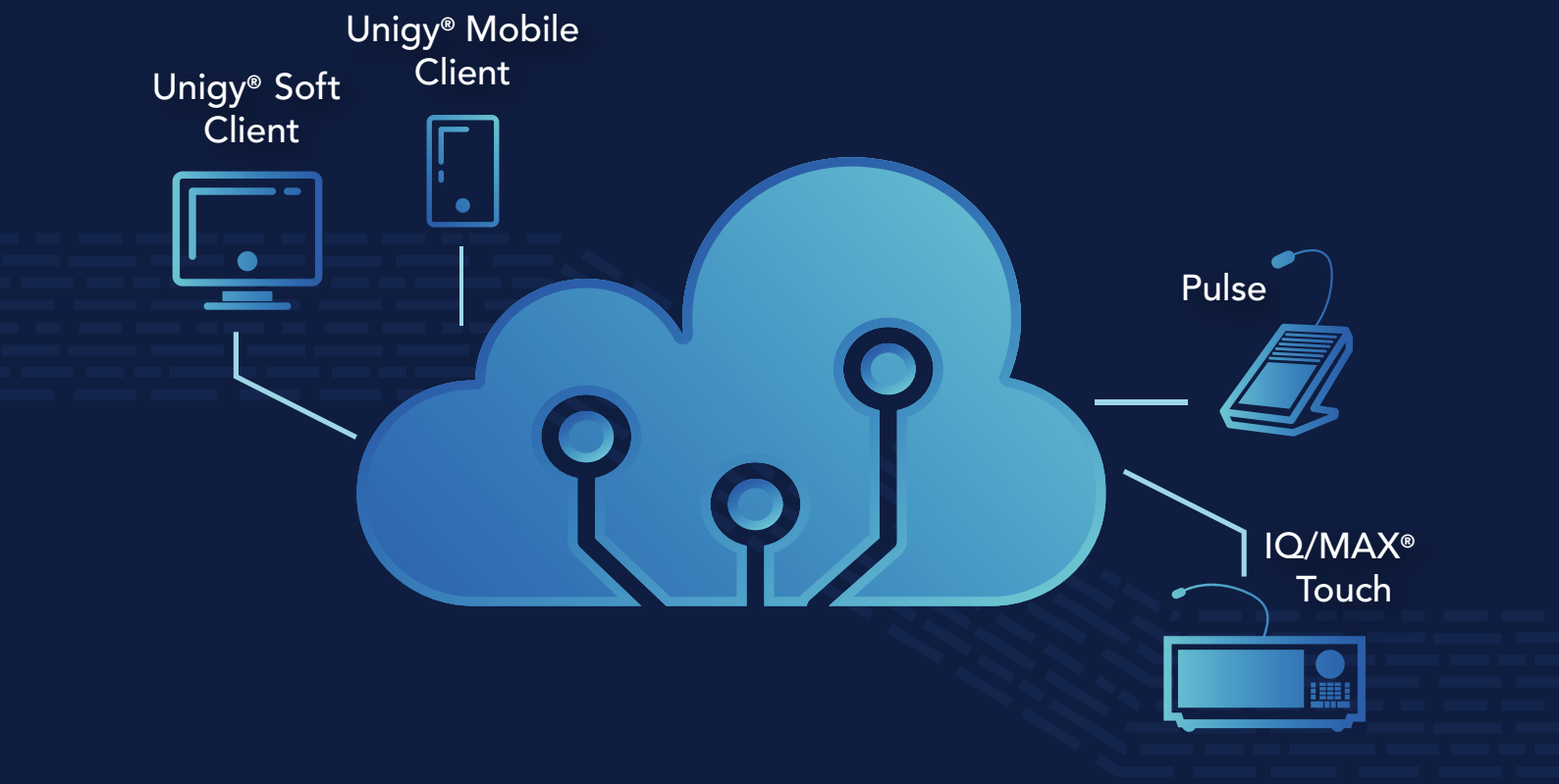

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