

# JOURNAL

THE CAPCO INSTITUTE JOURNAL OF FINANCIAL TRANSFORMATION

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## BUSINESS MODELS

Reconciliations: Five trends  
shaping the future landscape

ARIF KHAN

# AUTOMATION

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# Reconciliations: Five trends shaping the future landscape

ARIF KHAN | Principal Consultant, Capco

## ABSTRACT

Reconciliations are found throughout the financial services industry. In an increasingly complex world, with stricter regulatory requirements, reconciliations are applied heavily, and contribute significantly to the cost of doing business for financial institutions (FIs). This paper aims to explore some of the key emerging trends in the world of reconciliations. It looks at how cutting-edge technology, such as blockchain, machine learning, and robotic process automation (RPA), combined with the move to reconciliation managed services, are defining the reconciliation model for the FIs of tomorrow.

## 1. INTRODUCTION

Financial institutions have long relied on reconciliations as a key control to ensure accurate data. Reconciliations are not only essential in accounting and in the finance areas, but are heavily used across the capital market space. Any operational department in a financial institution (FI) will have many such processes, typically reconciling with clients, prime brokers, and external exchanges. Reconciliations were introduced as key controls in operational processes, yet seemed to have spawned beyond this. Increased regulatory scrutiny, larger amounts of data, and increasingly complex financial products have led to operational departments having to operate hundreds of reconciliations daily.

The macro picture for FIs is an environment of falling revenues, increased cost of business due to regulation, and the constant need to “do more with less.” Cost reduction is more of a focus than ever. At the same time as this pressure is being applied there are technological advances that are claiming they will change the way we do business for ever.

This paper looks at five key trends shaping the world of reconciliations, ranging from industry-wide utilities to artificial intelligence (AI) technologies that will automate key areas of the processing.

## 2. BACKGROUND

Reconciliations are essentially checks to ensure that two or more data sources agree with each other. They are typically performed between two points in a business process. Some examples of the types of reconciliation typically found in a FI are:

- **FOBO (front office to back office)** – risk system reconciled to books and records platform.
- **Exchange** – FI's trade, position, and cash records reconciled to clearing houses records.
- **Nostro** – payments made and received reconciled between books and records and Nostro bank account.
- **General ledger** – reconciling the general ledger to the relevant sub-ledger.
- **BOBO (back office to back office)** – reconciling back office data with another source from the back office.
- **Inter-system** – data integrity and completeness check between two systems.
- **Trading: total equity** – a combined reconciliation of

trades, position, and cash between a central clearing party and a clearing broker, or the broker and a customer.

This paper explores the following five areas that have been identified as trends defining the reconciliation landscape of tomorrow:

1. Automation of manual reconciliations via self-service tooling
2. Elimination of intersystem reconciliations
3. Blockchain and distributed ledger technology
4. Outsourcing reconciliations to industry utilities
5. RPA and machine learning

This paper will look at the cause of these underlying trends, and explore how each is changing the market offerings around reconciliations.

## 3. AUTOMATION OF MANUAL RECONCILIATIONS VIA SELF-SERVICE TOOLING

The first area to look at is the problems associated with slow on-boarding times for new reconciliation processes, and how this problem is being tackled by the fintech world.

### 3.1 Long onboarding time

Aite Research group concluded that it takes on average 64 days to set up a single new reconciliation.<sup>1</sup> On-boarding a reconciliation on to SmartStream's TLM platform, a leading vendor known by a majority of FIs,<sup>2</sup> takes between 22 days and six months.<sup>3</sup> This causes an immediate issue for business and operational units requiring rapid turnaround of changes to reconciliations. These units are under increasing pressure to not only address changing regulatory and client needs, but to also fix bugs in the existing reconciliations themselves. There is a valid discussion to be had around the cause of this time frame, not least the huge variance. It is not necessarily correct to attribute a long on-boarding time solely to the vendor system being employed to perform the reconciliations. Asked about the six-month on-boarding timeframe for new reconciliation on to TLM, often quoted by operational users, Rocky Martinez, CTO of SmartStream highlighted that “It's not actually

<sup>1</sup> Aite Group LLC, Feb 2016, “Reconciliation trends in 2016: regulation and nervous recs,” 19

<sup>2</sup> Aite Group LLC, April 2014, “Reconciliation Technology Solutions in 2014: recs get ready to rumble ...,” 25

<sup>3</sup> Ibid, 27

the TLM product itself, it's the data received. When we receive data from the customer it needs to be cleaned then fed into the various production cycles. It's actually a pretty complex operation but it's a unique part of the service we provide."<sup>4</sup>

Data preparation is a key part of any reconciliation, with users often combining the data sourcing effort with the building of a reconciliation, when obtaining an estimate. A six-month turn around would also typically incorporate a period of "user acceptance testing" (UAT), which is often set at one-to-two months by the internal policy of FIs.

### 3.2 Firm-wide reconciliation groups

There is another important factor to consider when understanding the long on-boarding times associated with these platform, and that is the creation of central firm-wide functions within FIs. These groups are responsible for the on-boarding of new reconciliations and management of reconciliations output and platforms. In a move to create these teams within their companies and to obtain economies of scale, several FIs have created centralized technical and operational expertise around reconciliations in a single low-cost location. These are often referred to as "centers of excellence" (CoEs). While moving to this model with CoEs reduces cost, centralizes governance, and co-locates those working on reconciliations, it has one serious downside; namely, that it creates a bottleneck for any requests for changes to these platforms.<sup>5</sup>

### 3.3 MS Excel- and Access-based solutions

Over time, the bottleneck from CoEs, along with the prospect of a six-month turnaround time, leads to teams building tactical solutions. The tools many turn to are Microsoft Excel and Microsoft Access, software typically available to all users in the institution, and ones operational users work with daily. These tools allow operational users to build their solutions in a few days and quickly apply them to their operational procedures. Unsurprisingly, these tactical approaches end up becoming embedded in procedures and lead to several key problems,<sup>6</sup> such as manual processes using up operational capacity each day, working against cost cutting initiatives, solutions not being scalable, reliance on a single user with knowledge of the control, hence increasing the risk of fraud, and lack of audit details, or any metrics, around these solutions.

### 3.4 "Self-service" tooling

This is the area targeted by reconciliations solutions that offer a "self-service" capability to operational users, allowing non-technical users to build reconciliations directly and in a short period. These solutions are scalable platforms with features such as audit trail and version control. One such vendor is DUCO.

DUCO's CEO, Christian Nentwich, explains their market focus in the following words: "What we really go after is all of the work that banks still do manually. There are a lot of people armed with spreadsheets and highlighter pens. All the labor arbitrage is already done, so they may be sitting in some offshore locations, but they are still doing it manually. At the end of the day comparing data is not a job for humans."<sup>7</sup>

DUCO aims to empower non-technical users to directly build and run reconciliations. Their DUCO Cube solution utilizes technology in "natural language processing" (NLP), along with an intuitive "user interface" (UI), to enable configuration and set up time for new reconciliations to be greatly reduced. The formula appears to be gaining traction with company revenues up 120% in the last year and the company growing rapidly. DUCO's technology leads to the ability to rapidly set up reconciliations, with an average set up time of 2.4 days versus the industry average of 64 days.<sup>8</sup>

There are other solutions on the market that have a similar approach, targeting those reconciliations done manually or via Excel macros. Once such solution is RecsHub from the vendor Xceptor. The solution also utilizes a rules-based configuration that allows users to "define and manage their reconciliations processes, without having to rely on IT support."<sup>9</sup> While DUCO aims for an NLP-based approach to make rules easy to configure, Xceptor RecsHub uses the paradigm of MS Excel using the same names and syntax for common functions. Operational users can configure rules to process data and perform the matching directly via the UI and not require IT intervention.

<sup>4</sup> Rocky Martinez – SmartStream CTO, 4th September 2017, personal interview

<sup>5</sup> Paul Clapis, Vice President, Engineering and Architecture, Reconciliation, Institutional and Wholesale, FIS, 26th September, personal interview

<sup>6</sup> Ibid, 18

<sup>7</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview

<sup>8</sup> Keith Whelan – DUCO Managing Director, EMEA, August 2017, "Reconciliations: from boring necessity to key business function."

<sup>9</sup> Xceptor reconciliation hub, <http://bit.ly/2x941Xq>



### 3.5 What is the target operating model?

These self-service tools solve an immediate problem and they do so rapidly, as per their design. Operational teams benefit from some “quick wins,” as they are able to avoid a lengthy technology book of work with an optimized reconciliation process. It remains to be seen, however, whether this model of self-service lead by operations is sustainable within large organizations. Do operational teams want to be responsible for the maintenance and upgrades to any reconciliations, along with their tasks of day-to-day processing? In a decentralized model, such as this one, where are the governance and controls around the process to avoid duplications and the creation of reconciliations that may not be needed in the first place? Introducing additional platforms for any business process leads to teams having to manage split-processes and lack of a single combined view of a given function for management. The running of reconciliations, the workflow around management of breaks, and the dashboards and management information views these tools provide are immediately more complex with multiple tools.

The “silver bullet” of self-service reconciliations appears to certainly solve one problem but, unless appropriate governance and processes are put in place, it does in fact create new issues.

Despite these issues, there is a clear argument to be made that having these reconciliations on a platform, such as DUCO or RecsHub, is a step forward from having them done completely manually on a spreadsheet. Managers may not be able to easily get a single overview of all of their reconciliations, but they are getting far greater control and audit capability than when the process was manual.

### 3.6 Temporary reconciliations

Another everyday use case for reconciliations that aligns perfectly to the self-service tools is the area of temporary reconciliations. These throw-away reconciliations are useful to add control during an operation such as a system upgrade or migration. Teams require a reconciliation process to be in place to ascertain the successful completion of the activity but will no longer need the reconciliation after this. The only economically viable solution for this type of reconciliation is something that can be set up quickly and easily without requiring IT involvement.

In the current landscape, there is sufficient justification for self-service reconciliation systems to be employed

by FIs. This split model is only justified, however, because the better-established platforms have failed to make their solutions fast enough for on-boarding new reconciliations. If the more established reconciliation platforms can solve this problem and make their products more agile, and open to “self-service,” then

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**“The introduction of a true distributed ledger means that multiple reconciliations are avoided as the accuracy of the single, shared representation of the contract is agreed upon via a consensus algorithm.”**

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they can once again claim to offer “one-stop-shops” for reconciliations. We will return to this topic in the section on machine learning and look at how one such vendor, FIS, has responded to this situation.

## 4. ELIMINATION OF INTERSYSTEM RECONCILIATIONS

The main use cases for reconciliations at “sell-side” firms are internal (69%) and intersystem (57%) reconciliations.<sup>10</sup> These reconciliations are borne out of the complex IT architecture often found in back offices of large FIs. Typically, multiple systems contain data relating to trades, positions, and balances at different stages of the trade lifecycle, and are reconciled to ensure that they are aligned.

In 2016, when announcing their Strategy 2020 vision to investors and the wider public, Deutsche Bank revealed that they have over 1,000 intersystem reconciliations.<sup>11</sup> At the same time as unveiling this figure, they also announced ambitious targets to reduce these by 70% to around 300 by 2020. If reconciliations are essential controls in processes, what is the approach for removing so many reconciliations? The fact that they can be reduced by 70% illustrates that there is a level of redundancy here. Below we look at the options that exist for replacing intersystem reconciliations.

### 4.1 Mis-use of reconciliations?

“Reconciliations are borne out of an insecurity around data process,” explains an enterprise architect at a Tier-1 Global Investment Bank. “Whenever data crosses a

<sup>10</sup> Ibid, 9

<sup>11</sup> Deutsche Bank, 2016, “Deutsche Bank annual press conference,” <http://bit.ly/2g3qv6D>

boundary, system or organizational, there is a demand for a reconciliation. In large financial institutions, there are a lot of these boundaries.”<sup>12</sup>

This approach to data validation naturally leads to very large numbers of intersystem reconciliations, which quickly become embedded into operational procedures. To reduce the number of these checks, a holistic review of the end-to-end process is required. “We actually talk to many banks about this.” explains Christian Nentwich, CEO and co-founder of DUCO. “The ones that are more active investigate which of these manual controls they actually need. There is definitely a thread running here where people say that internal system reconciliations mask systemic issues that shouldn’t occur in the first place.”<sup>13</sup>

The back office of investment banks is one area where large numbers of reconciliations are typically found. Many of the core back office systems are based on outdated technology and batch processing. This architectural landscape is another key factor in driving data validation towards reconciliations, invariably run post batch on a T+1 basis. There are solutions to this problem. The first solution has been around for many years, and is part of a well-established industry-wide trend of moving from “T+1” data processing to a “T0” world.

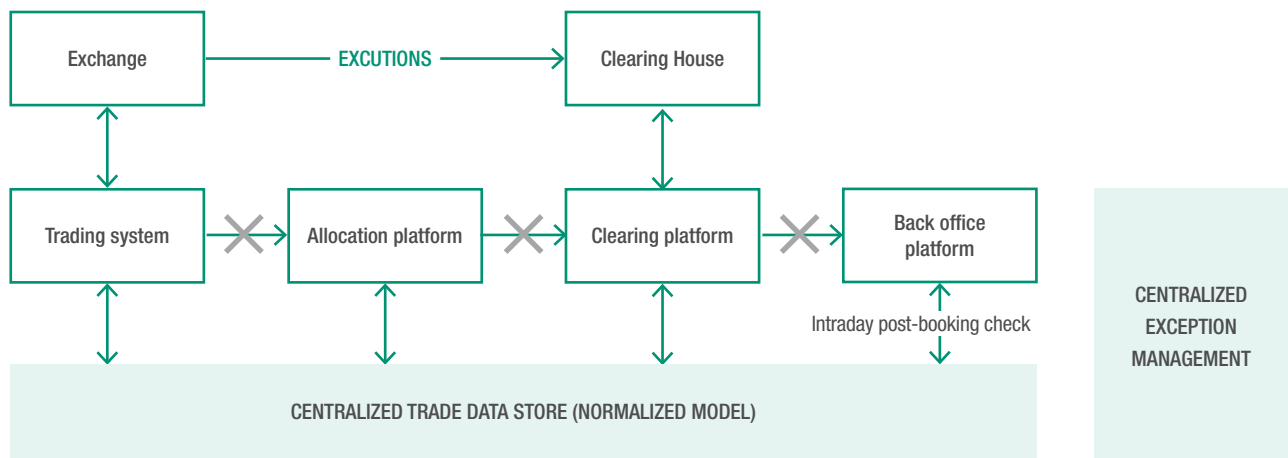
## 4.2 Real-time exception-based processes

The concept of a centralized trade data store is one that is well known in the world of capital markets. As regulation tightened around regulatory reporting, many firms adopted such solutions, centralizing their trade data in a single repository. This same approach of centralizing data can directly help with one subset of intersystem reconciliations, which are those performed during the trade lifecycle.

Figure 1 shows an example of an architectural blueprint for moving from point-to-point flow to a centralized model, where a single version of the trade is updated, and enriched during the trade lifecycle.

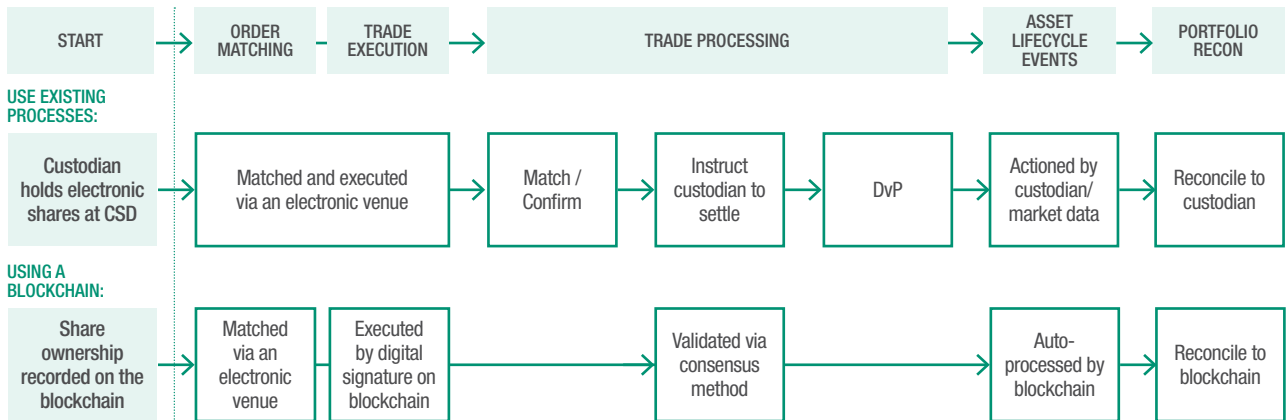
This model is combined with centralized real-time exception management, and a single user interface (UI) showing the status of the trade. The final part of the trade flow is booking the trade into the books and record platform. The books and record systems are often platforms that are decades old, and not built for real-time message based processing (for example, ION’s RANsys listed derivatives back office processing platform). In this situation, using message queues is not always possible. In Figure 1, a proposed solution for this challenge is an intraday post-booking check.<sup>14</sup> This approach moves the validation of the booking to a T0 process, rather than something that would need to be picked up in a T+1 post trade reconciliation.

Figure 1: Example flow through trade lifecycle – listed derivatives



<sup>12</sup> Enterprise Architect Tier-1 Global Bank, September 14th, 2017, personal interview  
<sup>13</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview  
<sup>14</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview – “If your STP is perfect why should you need an intersystem reconciliation? At least if you do perform this reconciliation, do it in real-time instead of these big batch processes.”

Figure 2: Equities transaction trade lifecycle – current process alongside possible blockchain process



Source: Innovate Finance blockchain DLT and the Capital Markets Journey – Oct 2016

This not only eliminates the need for an intersystem reconciliation, but also helps errors to be captured and corrected on T0, before they impact any calculations or downstream processes (e.g., client margin calls).

Moving to this form of architecture takes time and intersystem reconciliations may need to be in place for a temporary period while the system is tested and operational teams and managers gain confidence in the flow. Re-engineering trade flows in this way, and moving to more real-time data validation will allow FIs to eliminate many intersystem reconciliations. While re-engineering existing solutions in this way may be costly, at a minimum FIs should ensure that any new applications being rolled out conform to this real-time data validation pattern and additional intersystem reconciliation are not put in place.

## 5. BLOCKCHAIN AND DISTRIBUTED LEDGER TECHNOLOGY (DLT)

A more cutting-edge technological approach to reducing the number of reconciliations is to have a single immutable representation of the data. A blockchain is a type of distributed ledger, comprised of unchangeable blocks of digitally recorded data. Each link in the blockchain includes a check to validate and ensure the data has not been altered. Crucially, there exists a single, shared view of the data, rather than multiple versions requiring reconciliation. The accuracy of the data on the blockchain is verified through consensus validation, with a single audit log showing the chain of events.

There is scope for this technology to dramatically alter

the landscape of how trades are executed, processed through their lifecycle, and settled. This overhaul of the way financial markets operate would impact reconciliations across many areas. If the solution was shared across multiple FIs, exchanges, clearing houses, and regulators, then DLT can have a revolutionary impact. Figure 2 maps out what a theoretical future blockchain based solution for processing an equities transaction may look like in comparison to the current process.

The elimination of reconciliations is regularly cited as one of the key tangible benefits of the industry adopting this form of technology and architecture. As we have seen, reconciliations are a growing problem and FIs are constantly on the lookout for ways to reduce the costs associated with them. Currently, financial markets operate “based on the logic of ‘consensus-by-reconciliation’” [Morini (2017)].<sup>15</sup> The only way confidence is established in the details being accurate is if both counterparties have the same records in their respective systems. Getting to this agreement spans across multiple business processes, such as “confirmation, affirmation, communication to central bodies.”<sup>16</sup> The introduction of a true distributed ledger means that multiple reconciliations are avoided as the accuracy of the single, shared representation of the contract is agreed upon via a consensus algorithm. This approach moves the paradigm from a “consensus-by-reconciliation” to a “distributed ledger” model.<sup>17</sup>

<sup>15</sup> Morini, M., 2017, “From ‘blockchain hype’ to a real business case for financial markets,” *Journal of Financial Transformation* 45, 30-40

<sup>16</sup> *Ibid*, 32

<sup>17</sup> *Ibid*, 38

## 5.1 Smart contracts

These techniques can be applied to a deal consisting of multiple payments, like a bond, through the concept of a “smart contract.” These contracts aim to model financial contracts in self-contained modules of programming code. The agreement on the terms of the smart contract take place at the start of the trade lifecycle, and from then on the relevant counterparties agree to refer to the single version of the deal on the distributed ledger. Combining DLT and smart contracts provides the basic building blocks for creating a model of the financial markets that operates in a very different way to what we have today.

Is this technology going to make the world of reconciliations obsolete soon? While there is a growing view that this is the future model for how things should work, there is a nagging feeling that the speed of change will not be as fast as many would hope for. The world of financial services and large FIs are not known for rapid adoption of new trends, and fast establishment of new standards or technologies. In addition, there are many key areas of technology and defined standards that would need to be in place for such a solution to get off the ground:

1. **Privacy:** ensuring the data security around financial data for multiple FIs, which is very sensitive and in a highly-regulated area.
2. **Scalability:** there are no proven solutions combining DLT with smart contracts at the scale that would be required for this area.
3. **Definition of standards:** standards for the definition of smart contracts would need to be agreed and formulated, with strong opinion already voiced that fpML would not be fit for purpose

Christian Nentwich summarizes this when talking about DUCO’s strategy: “On the bet of where you make your money in the next five years; is it doing what we do or is it blockchain? In the near term, I bet on what we do.”<sup>18</sup>

## 5.2 Distributed ledger – internal

The chances of this sort of major fundamental change to the core infrastructure of the capital markets within the next five years are slim. What is, however, far more plausible and achievable within that time frame is the introduction of a distributed ledger within a given organization. As the data passes through the trade lifecycle, each system in the chain is referring to a

single shared representation of the data, rather than having its own copy. This change would lead to far less of an impact in the financial markets than a distributed ledger across many external parties, but it would be one practical option for eliminating multiple copies of data within FIs, and, thus, multiple reconciliations. Internal systems in the FIs are often multi-instance and geographically spread. A consensus-based model would bring benefit in to this environment. Is this approach to the issue new, or is it just re-packaging the centralized data store?

Centralized data stores are not a new concept but the focus and buzz around blockchain could become a catalyst to firms adopting better architectures. As the amount of data stored and analyzed grows, there is an increased focus on firm-wide data quality, and data lineage, which will get these topics on to the agenda of CIOs. DLT also has some key differences from a centralized data store that need to be understood.<sup>19</sup> Firstly, DLT increases fault tolerance and avoids a “single point of failure.” Secondly, it avoids centralized operating risk. Finally, it avoids risk and accusation of central data store owner of manipulating the data.

In conclusion, DLT has the potential to eliminate large numbers of reconciliations<sup>20</sup>, but the market is many years away from having a working solution. It remains to be seen if such a solution will materialize, although it should be noted that industry committees are formed already and proposing specific work streams in this space.<sup>21</sup> The introduction of this technology into the wider market place, however, is an excellent opportunity for FIs to re-evaluate and re-engineer their solutions. Adopting such an approach, even within a single FI, would allow for the reduction in intersystem reconciliations.

## 6. OUTSOURCING RECONCILIATIONS TO INDUSTRY UTILITIES

Another way to eliminate the burden of setting up, running, and maintaining reconciliations, is to outsource them. As FIs become more open to allowing their data to be shared with vendors, and hosted on systems outside their physical core network, new options are opened for managing reconciliations. Aite’s surveys showed that the number of respondents having “no interest in

<sup>18</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview

<sup>19</sup> Morini (2017)

<sup>20</sup> Innovate Finance, 2016, “Blockchain, DLT and the capital markets journey: navigating the regulatory and legal landscape,” October, 32

<sup>21</sup> ISDA MITOC, September 2017, “Data and process standards,” 2

managed reconciliation services” dropped rapidly from 57% in 2013 to just 17% in 2015.<sup>22</sup>

One such vendor offering this is SmartStream and their CTO explained their entry in to this space: “As we’ve seen the mass adoption of outsourced reconciliations solutions it just makes sense to use a provider, like SmartStream, that can supply the only purpose-built solution that is totally agnostic and works at an enterprise level with many, if not all, complimentary services the customer may need.”

### 6.1 Differing levels of outsourcing

There are several different models for the outsourcing of reconciliations, with each iteration giving a little more of the process over to the vendor. This is illustrated in Figure 3.

The appetite for the different models was gauged as part of Aite’s research, which found that the most popular offering was the “fully managed service,” with 52% of respondents expressing interest in this model. The “partial service” had 17%, and “hosted service” and “full outsourcing” had 8% and 7%, respectively.<sup>23</sup>

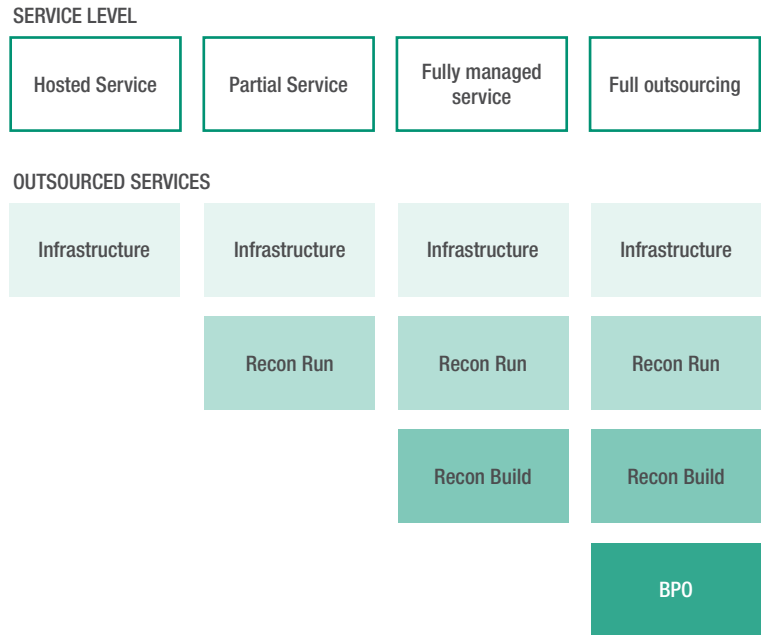
The adoption of even a basic hosted service does provide some tangible benefits such as:

- **System administration:** banks no longer require in-house teams responsible for maintaining the IT hardware and keeping systems up and running. For the utility, this can be a service offered to multiple clients using a shared pool of resources, providing some efficiency.
- **Harmonize versioning:** all platforms can be upgraded to the latest format, having a consistent edition across the infrastructure. This reduces complexity and unlocks the features of these latest versions.
- **Latest technology releases:** the vendor can apply and gain benefit from tooling that has either not yet been released to the market, or is a module the FI had not previously taken out. These new modules and upgrades can be directly applied across the client base.

### 6.2 Full outsourcing

It is not surprising to see that the least popular option in the Aite survey, conducted in 2015, was the “full outsourcing” model. This model is the newest and the most drastic in terms of the level of responsibility handed over to a third-party. Could moving to this model really be an effective way for FIs to reduce some

Figure 3: Differing levels of outsourcing and the corresponding services provided by the vendor



of the cost and headache of maintaining and running these processes in house day-to-day?

The utility model is gaining popularity with several vendors and consultancies announcing such solutions in the past two to three years. To obtain the benefits of such a model, and for the utilities to be successful business operations generating profit for the owners, increasing efficiency must be top of the agenda. One market utility that appears to be gaining critical mass is the FIS Derivatives Utility. FIS launched this utility in 2015, when SunGard (now owned by FIS) partnered with Barclays as their anchor client. SunGard took not only the hosting of the post-trade processing, but also the management of the operational services around the technology, resulting in a complete outsourcing offering to the market.

Unsurprisingly the views from the industry vary depending on which part of the FI landscape you are in.

One middle office risk and control manager from a Tier-1 Global Investment bank questions the business benefit of moving to the model offered by FIS. The officer initially questions if it is “really a utility or just moving teams and systems?” He further highlights the lack of a “standard model” and questions if “banks [are] just

<sup>22</sup> Ibid, 27-28

<sup>23</sup> Ibid

doing this as a short-term way to reduce their bottom line?”<sup>24</sup> This is a valid question to be raised, as in some cases, such as Barclays adoption of the FIS Derivatives Utility, employees from the FI were transferred over to the provider to then provide the same service they were providing previously.<sup>25</sup> Is this utility a significant step for the industry, or is it just a “lift-and-shift” of people and technology?

Christian Nentwich of DUCO also questions the first step of this model, describing it as “pretty underwhelming” given that the cost savings are around 20%.<sup>26</sup> He believes that to really unlock the potential of this type of offering, the focus needs to move to the “changes and improvements [that] are required to achieve savings of 50-60% rather than these marginal gains.”<sup>27</sup>

Richard Chapman, a VP in Strategy and Business Development, Reconciliations for FIS, explains how step one of the process is indeed purely about moving the processes “as-is” out of the FI and into the utility with virtually no changes. Soon after this, however, he points out that you “quickly start to identify, in a much clearer fashion, bottlenecks and pain-points.”<sup>28</sup> This starts the process of optimizing the processes and improving the efficiency of the utility. In the case of the FIS Derivatives Utility, Richard explains their approach for unlocking the real value of the utility: “The focus with a utility is on realizing economies of scale; how can you get efficiencies so you can reduce cost and increase market adoption quickly? This naturally now leads in to Artificial Intelligence and, in particular, machine learning.”<sup>29</sup>

## 7. RPA AND MACHINE LEARNING

The drive for more efficiency gains greater purpose with the introduction of a utility. Today, it is the latest technology trends that are enabling faster reconciliation set-up and automation around resolving the breaks. The utilities have strong business justification for investing heavily in advanced technology, as high-levels of automation are fundamental to their business model.

While there is a lot of talk and hype about the potential for applying artificial intelligence techniques to the area of reconciliations, few practical examples of this exist outside innovation labs or proof of concept builds.<sup>30</sup> One solution that has been released to the market place, and does utilize this technology, is Intellimatch Accelerator.<sup>31</sup> Head of Product Management for Reconciliations at FIS, Michael Maggio, explained the approach of focusing AI technology where FIS were seeing the “biggest pain points” for their clients and “in the broader market.”<sup>32</sup>

Pain was observed in both “reconciliation construction and reconciliation execution.”<sup>33</sup>

### 7.1 Automation: on-boarding reconciliations

FIS claim that the Accelerator product brings the time required to create a new reconciliation down from 45 hours to one hour.<sup>34</sup> The marketing material for the tool talks of the system “automating” the on-boarding of new reconciliations, but what techniques are being employed here and is this possible?

There are three main techniques employed in the setting up of the reconciliation. Each technique is employed to provide the user with the information to streamline the setup of the reconciliation.<sup>35</sup>

- **Heuristic techniques** – automate the analysis and mapping of data fields based on previous data.
- **Match data quality** – present the user with details of match quality and match rates for potential matches.
- **Direct feed** – this on-boarding tool can feed rules directly in to the existing Intellimatch platform and is not a third-party analysis tool sitting outside the process.

As discussed, empowering operational and business users through self-service tooling resolves one of the key bottlenecks in the setup of reconciliations. Combining this with machine learning techniques, to detect the quality and integrity of data and to suggest potential matches, speeds up the process even further.

Work is already underway on additional features of the tool to further improve the experience for users, and reduce on-boarding time. Michael Maggio explains the latest feature of this platform, which is “to allow clients to focus purely on defining their specific reconciliation

<sup>24</sup> Operational Risk and Control Manager Tier-1 Global Bank, September 13th, 2017, personal interview

<sup>25</sup> SunGard, Press Release, 2015, “SunGard launches industry utility to transform derivatives clearing processing globally,” <http://bit.ly/2yjjgvB2>

<sup>26</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview

<sup>27</sup> Ibid

<sup>28</sup> Richard Chapman, Vice President Strategy and Business Development, Reconciliation, Institutional and Wholesale, FIS, 26th September, personal interview

<sup>29</sup> Ibid

<sup>30</sup> Christian Nentwich – DUCO CEO, August 22nd, 2017, personal interview – DUCO have performed research into completely autonomous set ups. Christian stated they had done some work in this area and planned to do more in the future.

<sup>31</sup> FIS Global, 2017, “Intellimatch Accelerator – reconciliation | automating the creation and refinement of reconciliations,” <http://bit.ly/2yPYLu1>

<sup>32</sup> Michael Maggio, Vice President, Head of Product Management, Reconciliation, Institutional and Wholesale, FIS, September 26th, 2017, personal interview

<sup>33</sup> Ibid

<sup>34</sup> FIS Global (2017)

<sup>35</sup> Paul Clapis, Vice President, Engineering and Architecture, Reconciliation, Institutional and Wholesale, FIS, September 26th, personal interview



business process, and allow our Artificial Intelligence engine to do the rest.”<sup>36</sup> This will empower the end-users by graphically representing the business process they are looking to reconcile, and using this as a further input to the AI engine for automating the setup.

Although it appears that the Intellimatch Accelerator is the first tool to market bringing together all these concepts, other vendors are actively working in this space. Both DUCO and SmartStream cited automation around the reconciliation setup process as an area of research they were involved in.<sup>37</sup> The AI techniques mentioned are a good fit for the automation of these reconciliation process setups. The number of vendors and offerings that utilize these techniques will only increase, and in turn the time taken to set up reconciliations will continue to decrease.

## 7.2 Automation: rule-tuning

One area not highlighted to date in this paper is the concept of the degradation of matching fidelity over time with a given reconciliation process. A reconciliation running today with a high matching rate can run tomorrow with a lower rate of match quality, as the rules are outdated or due to changes in the data source that have not been reflected in the business logic. The values being highlighted are in fact false positives, rather than genuine business breaks that require attention. This problem is serious enough for it to be another focus for FIS. Once more, it is machine learning

that is being utilized to solve this problem. “We keep track of what staff are doing” explains Michael Maggio, “to manually correct issues caused by degradation, and then use machine learning techniques to automatically replicate this activity.”<sup>38</sup>

Through this product, FIS have been able to take machine learning and AI technology and apply it directly to these two problem areas of reconciliations. This will speed up the onboarding of new reconciliations, and help to keep them running effectively. What they do not help with, however, is the manual process of handling the genuine breaks that are highlighted by the reconciliations. Workflow features are very common in reconciliation solutions, allowing different breaks in different reconciliations to be assigned to different teams or individuals, yet resolving these breaks is still a manual process.

In the final section of this paper it is this problem to which we turn our attention. Can this manual process of resolving breaks be something we automate using RPA?

## 7.3 Automation: break resolution via RPA

RPA is another of the buzzwords of the moment within

<sup>36</sup> Michael Maggio

<sup>37</sup> Rocky Martinez – SmartStream CTO, September 4th 2017, personal interview, “We’re currently in discussions regarding the use of our data dictionary and the automation some of the previously manual processes.”

<sup>38</sup> Michael Maggio

the technology innovation space. RPA is a software robot that simulates human actions through user interfaces. These robots are setup to perform the same processes that humans currently perform. While RPA may conjure up the same imagery of autonomous machines as machine learning there is an important difference. Paul Clapis, VP Engineering and Architecture – Reconciliations for FIS, explains: “It [RPA] is an interesting contrast to the machine learning [we use]. The strength of RPA is in automation of tasks that are distributed across multiple systems, but that are highly repeatable.”<sup>39</sup>

Through collaboration with their RPA function based in Pune, the FIS team are in the process of building out solutions to automatically resolve breaks that occur. There are three AI techniques that are being used in unison to provide the required functionality in this space<sup>40</sup>:

- (1) **Heuristic techniques** – looking at how humans make decisions and applying some basic logic via rules.
- (2) **Classification techniques** – taking the actions that users perform as a training set of data. Once trained on these examples the system can then make predictions about appropriate remediation. As more examples feed through the system, and it is retrained with more data, the quality improves.
- (3) **Clustering techniques** – identifying patterns in actions taken around resolving breaks that users themselves had not identified.

## 7.4 Remediation activity

These AI techniques allow the system to be able to predict what the appropriate action is to resolve the break, and it is RPA that will allow these actions to be performed automatically. An example of such an action would be a robot connecting to an upstream reference data source and inserting a missing product ISIN in that system, in response to a reconciliation break on ISIN.

This combination of machine learning and RPA to automate key problem areas of the setup and management of reconciliation is a powerful one. The timing of this technology coming of age is ideal for reconciliation utilities. These technologies can provide the automation they require to gain the efficiencies they need to make their models profitable. Even better news for the utilities is that this technology is available today and at least one vendor is already having success applying these methods.

## 8. CONCLUSION

In conclusion, it is clear to see that the reconciliation landscape is evolving, and there are many different drivers behind this. The push for reduction in cost is forcing FIs to look at outsourcing models that were not even offered in the market a few years ago. Utilities are here to stay and more companies are actively pitching to FIs in this space. As these utilities strive for better efficiency, it is technology, such as machine learning and RPA, that is proving a key enabler for them to achieve economies of scale through automation.

The impact of blockchain remains to be seen. There are several key obstacles for its adoption as a multi-institution platform, where it would provide the biggest benefit and disruption to the world of reconciliations. The technology may bring some benefit for FIs by re-engineering their internal processes as an alternative to a pure centralized data store, moving from a “consensus-by-reconciliation” model to automated algorithms already used in the world of Bitcoin.<sup>42</sup>

These technology advancements for FIs are good news and very timely. FIs need to re-define their reconciliations strategy in response to these new market offerings and start to reap the rewards of these cutting-edge technological developments.<sup>41</sup>

<sup>39</sup> Paul Clapis, Vice President, Engineering and Architecture, Reconciliation, Institutional and Wholesale, FIS, September 26th, 2017, personal interview

<sup>40</sup> Ibid

<sup>41</sup> Ibid

<sup>42</sup> Coindesk, 2014, “How bitcoin mining works,” December, <http://bit.ly/2vGa0dz>



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