

DUCO

# THE RECONCILIATION MATURITY MODEL

PART 1

FROM MANUAL TO MACHINE LEARNING

## CONTENTS

- 3 Introduction: building the case for automation
- 4 Why is reconciliation so hard?
- 6 Machine learning - does it live up to the hype?
- 8 The five stages of maturity
- 9 Stage 1: Manual
- 10 Stage 2: Hybrid
- 11 Stage 3: Automated
- 12 Stage 4: Improving
- 13 Stage 5: Self-Optimising
- 14 Conclusion: moving to a Stage 5 future in the “Decade of Data”

# INTRODUCTION: BUILDING THE CASE FOR AUTOMATION



**Christian Nentwich**  
CEO Duco

Reconciliation is an essential control function in financial services, aimed at eliminating operational risk that can lead to fraud, fines or in the worst case, the failure of a whole firm. And yet, since an early push in the early 2000s that automated parts of the very back-end of the system (cash and custody), innovation in this area has stalled and operations reliant on people power and spreadsheets are prevalent.

It is now 2020 and technology has moved on. So how can firms automate and streamline their reconciliation function now? What options are there for updating and consolidating systems?

In this paper we introduce The Reconciliation Maturity Model - a best practice guide for all reconciliation practitioners, or executives

overseeing a reconciliation function. You can use the model to benchmark where your firm is in terms of reconciliation best practice, and what steps are needed to improve automation, efficiency and data quality.

We will look at why reconciliation is so hard to automate, what forward thinking firms are doing about it, and which types of technology are needed to take your processes to the next level.

We will also outline what it takes to achieve the “holy grail” in the future. A place where errors are spotted and corrected automatically, and the need for intersystem reconciliation is all but eliminated.

**We hope you find it insightful and useful.**

## WHY IS RECONCILIATION SO HARD?

The digital transformation of financial institutions has been extensive in recent years. Firms have systematically looked to eliminate repeatable tasks across all departments and geographies. But many are finding reconciliation a tough nut to crack.

In the vast majority of organisations, multiple point solutions are used for specific reconciliation tasks across the business. The result is a patchwork of disparate processes stitched together via spreadsheets, manual work or home-made applications. It's highly inefficient, there's no consolidation and every process is prone to errors and fragmentation.

**With enough training data, machine learning can spot errors, outliers and poor data quality at source, reducing the number of reconciliations required. Eventually, the process should be so seamless that intersystem reconciliations become unnecessary.**

### But why is this still the case?

#### + **A lack of standardisation**

In many cases in financial services there are no strict data standards. For example, different counterparties provide trade and position data in different formats. Each one requires a bespoke reconciliation process or expensive data normalisation.

#### + **Increasing complexity**

Cash or stock assets can be matched on a few basic fields, but for more complex products you need to take far more information into account. Most current systems are unable to deal with every asset type that crops up in a timely manner. And that's before we get to the range of data needed for regulatory reporting, and the associated reconciliations required.

#### + **Poor data quality**

The enemy of automation. Missing fields, inconsistent coding schemes and unavailability of common keys make automation difficult when using current solutions due to hardcoded assumptions within those systems.

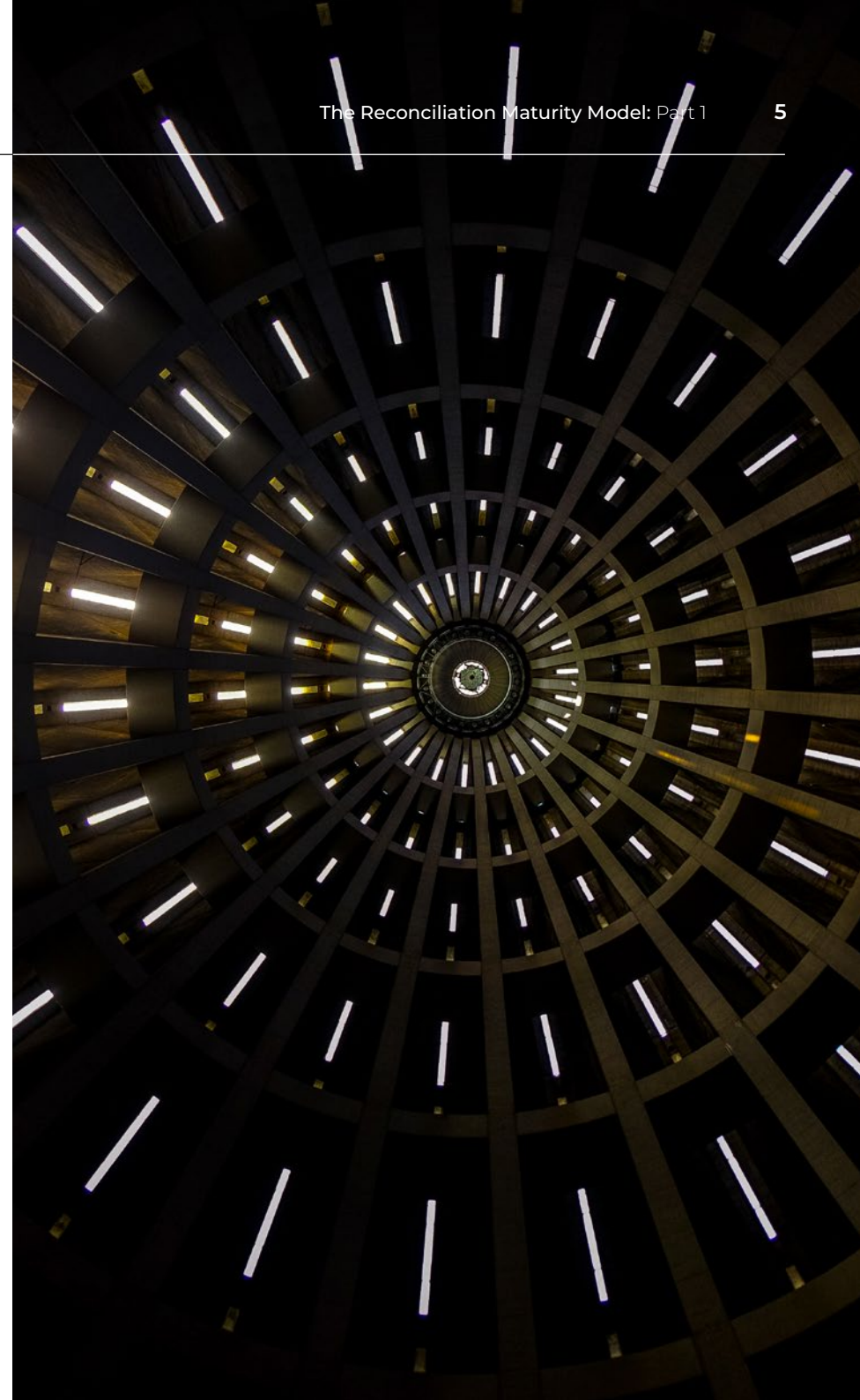
#### + **Data inconsistency and lineage issues**

As data passes through the organisation, moving from system to system, errors and inconsistencies can occur. Due to a proliferation of data types and formats, reconciliations are now being introduced into ever-increasing points in the data flow as consistency checks. As the firm grows in terms of size and complexity, the reconciliation function similarly balloons, introducing a smorgasbord of different systems, processes and reconciliation techniques across the business. The lack of a transparent, consolidated view over the firm's reconciliations becomes a major problem.

Under these conditions, reconciliation is a thankless task. Processes take too long, are often error prone, and when data volumes rise, so do costs and headcount. However, with the right tools and outlook, firms can overcome these problems and look to automate and then optimise their entire reconciliation function.

Processes can be consolidated, with manual and point solutions eliminated, enabling practitioners to analyse and drive additional value from their data. In addition, once all the data has been normalised onto one system, machine learning technology can be used to optimise every step of the process.

With enough training data, machine learning can spot errors, outliers and poor data quality at source, reducing the number of reconciliations required. Eventually, the process should be so seamless that intersystem reconciliations become unnecessary. That is what all financial organisations should ultimately be striving for. The Reconciliation Maturity Model provides a blueprint to getting there.



## MACHINE LEARNING - DOES IT LIVE UP TO THE HYPE?

Machine learning has recently replaced blockchain at the top of the hype curve in terms of technology that will revolutionise financial services. The majority of vendors in the reconciliation space are shouting about it, and it's easy to see why.

Machine learning, if implemented correctly can have a great number of uses in the context of reconciliation, including predicting correct configurations for matching and data normalisation, parsing unstructured data, predicting root causes of breaks and the clustering of related exceptions. However, it's essential to keep the following in mind:



### **Machine learning is only as good as the data it's trained on**

Without access to a large and varied set of training data, the benefits will be limited. This is especially important when you consider machine learning deployed on an installed system compared to a cloud-based system. In the installed version, the system can only learn from local data. In the cloud version, it can train on a much wider set. Imagine using a traffic app on your phone. The cloud-based version can give you information based on a huge range of anonymised data. But the local version can only provide information based on the journeys you have taken yourself.



### **Beware of imitations**

Machine learning is all about training models from data using supervised or unsupervised learning techniques. If you are using a product that requires a software release, configuration change or expensive consultancy to improve results, this may involve hardcoding rules rather than using machine learning. You won't get the benefit of a continuously improving model.





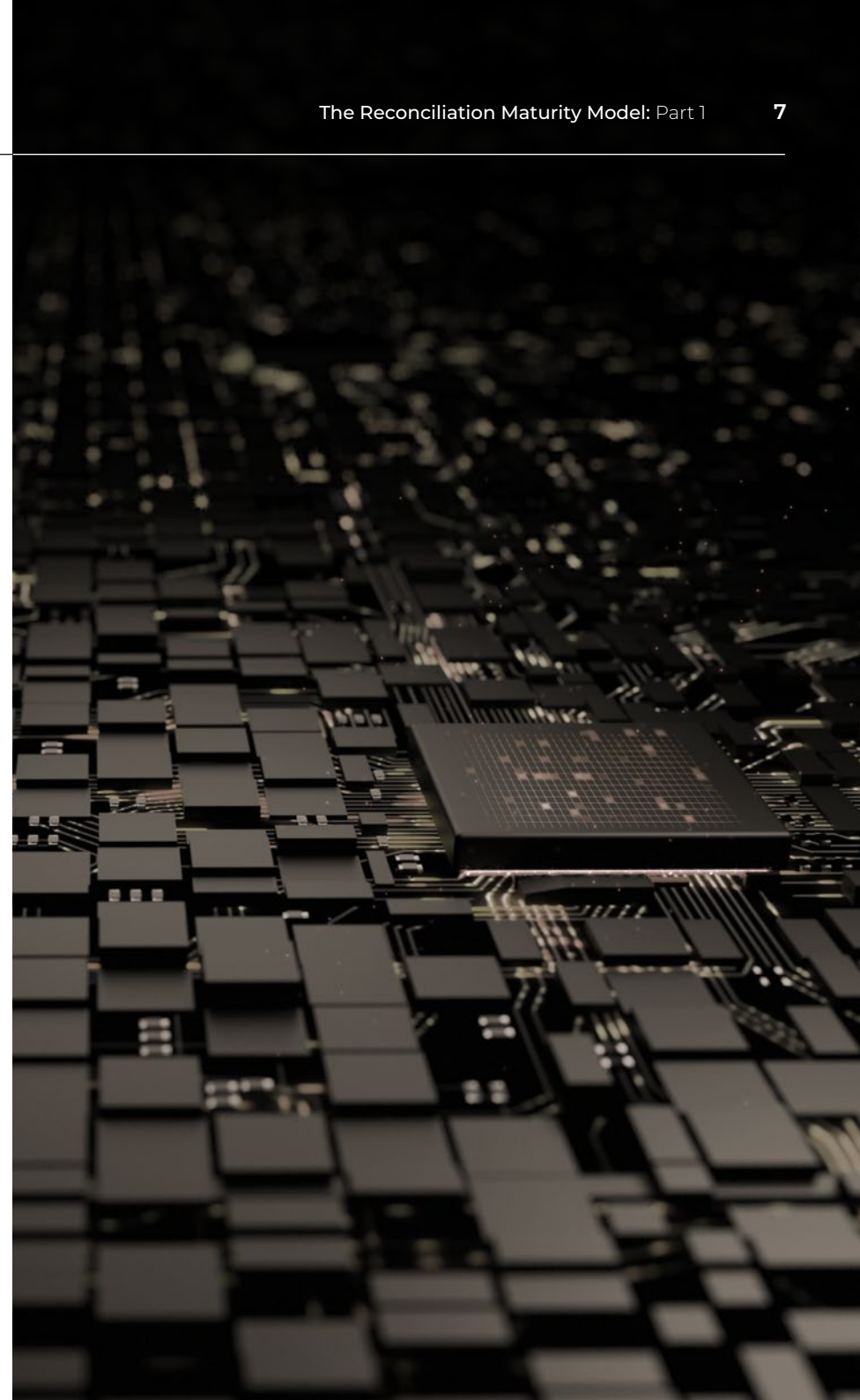
### Keeping a “human in the loop”

As reconciliation is a mission critical function, explainability is very important. If a machine-learning algorithm is making a decision, how do you demonstrate to the auditor how it arrived at the conclusion? Our strongly-held view is that machine learning is best used as a “recommendation” function in reconciliations. The algorithm should recommend a path of action, that a user then has to accept, thus creating an audit trail. This puts the human in the loop, and prevents algorithms autonomously making decisions.



### The user experience is key

In tandem with the above, firms delivering software in this space need to carefully consider how user actions are captured and fed back to the learning algorithm - to avoid nasty surprises. The impact of an action, such as declining a recommendation, must be made very clear to the user, as it will likely affect recommendations given in the future.



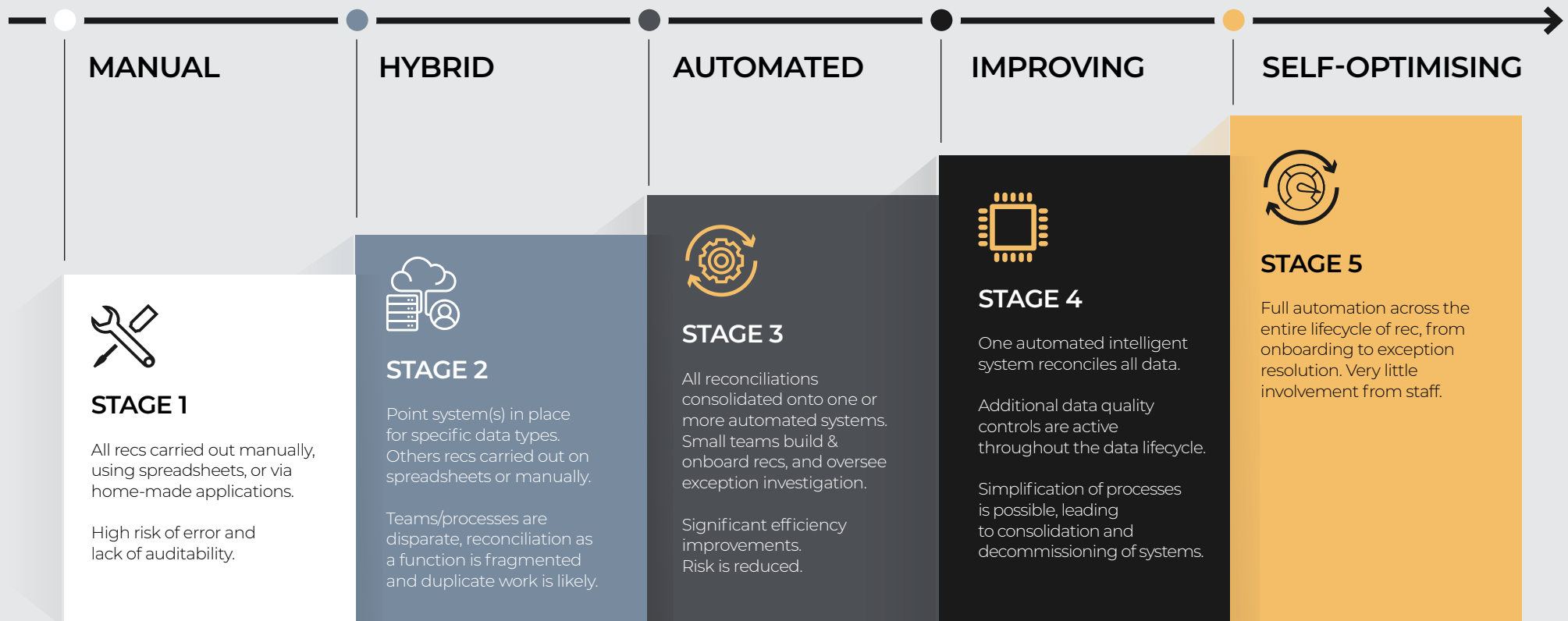
# THE FIVE STAGES OF MATURITY

While consigning intersystem reconciliations to history is not possible yet - the technology isn't quite there - firms can start to get their houses in order and position themselves to take advantage of the technology when the time comes.

For example, the machine learning algorithms we have discussed need large quantities of training data to be effective. Trying to layer intelligent

algorithms over manual processes, or non-standardised data residing in disparate systems across the business, ultimately won't provide any meaningful results.

The diagram below outlines the five steps of reconciliation maturity. The key is to recognise where your organisation lies within the model, and what steps you need to go through to move forward to Stages 4 and 5.



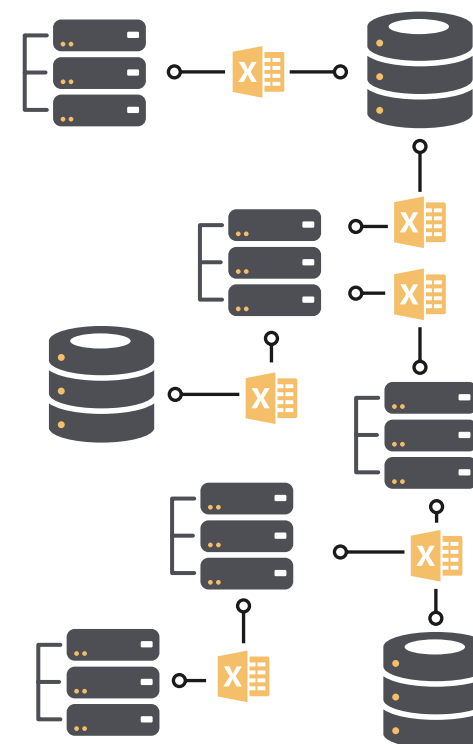


## STAGE 1: MANUAL

Almost all firms will start off by reconciling data “manually”. By this we mean using Excel or some other form of spreadsheet, macros, home-grown applications or - in some instances we’ve come across - printing out sheets of paper and marking inconsistencies with a highlighter pen!

The benefits are that manual processes are quick to set up, initially very cheap, and there are no development projects to worry about. However, as the organisation grows, and the data becomes more complex, the risk of error skyrockets. There’s no audit trail, no governance and it becomes increasingly expensive to scale. If in the 2020s you’re throwing an increasing number of bodies at a data matching exercise, you know something’s wrong.

With complex data, the macros start to become increasingly complex and opaque, creating key person dependencies. Before you know it, the only people who know the intricacies of a mission critical function, are a couple of VBA experts writing code in a backroom somewhere. Clearly as a firm grows, using purely manual reconciliation becomes unsustainable.



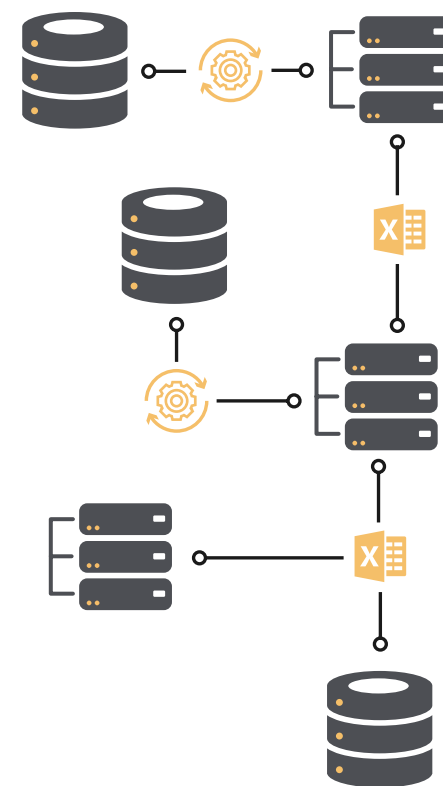
## STAGE 2: HYBRID

Once a firm has reached a certain size, or handles sufficient volumes of data, bringing in an automated reconciliation system becomes a necessity. For the majority of organisations, this takes the form of a point solution, usually deployed to automate high volume, low complexity reconciliations such as cash or custody.

These point solutions - by their very nature - tend to specialise in a certain type of reconciliation. Firms trading a wide range of assets, or those dealing with complex data, may need to use multiple point solutions to handle different reconciliation types.

Even so there will be many reconciliations that these point solutions are not able to handle elegantly. In these cases, firms tend to fall back on manual processes. The result is a patchwork quilt of different reconciliation approaches stitched together by manual work. The whole process is costly, difficult to keep track of, and difficult to scale.

At this point many firms centralise their reconciliation function into a low-cost location, enabling them to throw more bodies at the job at a lower cost to the business. Larger organisations using this model will often need to employ small armies of people to pick up the non-automated work. A recent study by Aite Group came across one Tier-1 bank that employed over 3,100 full time employees dedicated to reconciliation alone<sup>1</sup>. Full automation is needed before true efficiencies can be realised.



<sup>1</sup> Aite Group, Trends in Reconciliation Technology, September 2019

## STAGE 3: AUTOMATED

As organisations grow, they tend to progress through Stages 1 and 2 fairly naturally. However, getting to Stage 3 is not a natural jump. It requires all reconciliations to be automated, which in most cases breaks the architectural assumptions of traditional systems and requires a fundamental rethink of how reconciliation operations should be structured in the organisation. The good news is if the jump to Stage 3 is done correctly, then progression to Stages 4 and 5 is not only easy - it's inevitable!

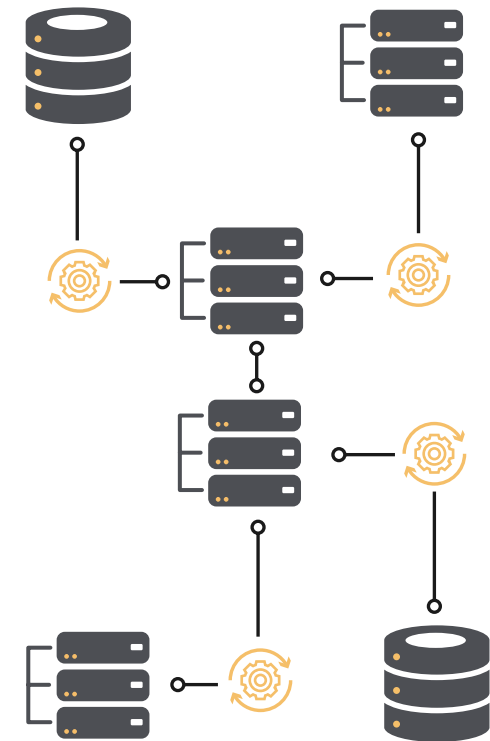
The key to getting to this stage is using the right technology. With traditional solutions, onboarding a reconciliation takes a long time. Aite Group reports that the average time to onboard a simple reconciliation is over 17 business days on average, while a complex reconciliation takes 74 days<sup>2</sup>.

With these timescales, automating all reconciliations is a near-impossible task, as new systems, data types, regulations and requirements crop up all the time. Using point solutions exclusively will always result in fragmented processes, no matter

how efficient they are at dealing with one type of reconciliation.

To reach Stage 3, firms need to be able to onboard reconciliations in hours or days, not weeks or months. They need to be able to rely on agile, flexible technology that can deal with complexity without multi-week data transformation projects. Once this technology is in place, complexity and risk can be vastly reduced, while increasing efficiency and transparency across processes.

It's worth noting here that at Stage 3 many firms will be using a combination of a legacy technology to deal with their core, high volume reconciliations, while employing a more flexible reconciliation solution on top to handle the more complex and bespoke data. This is mainly due to the fact that the legacy solutions are on-premise systems, often part of the infrastructure for many years, and are very difficult to remove. However, eventually they must be replaced and all reconciliations moved to a modern, agile system if the firm is to move on to Stage 4.



<sup>2</sup> Aite Group, Trends in Reconciliation Technology, September 2019

## STAGE 4: IMPROVING

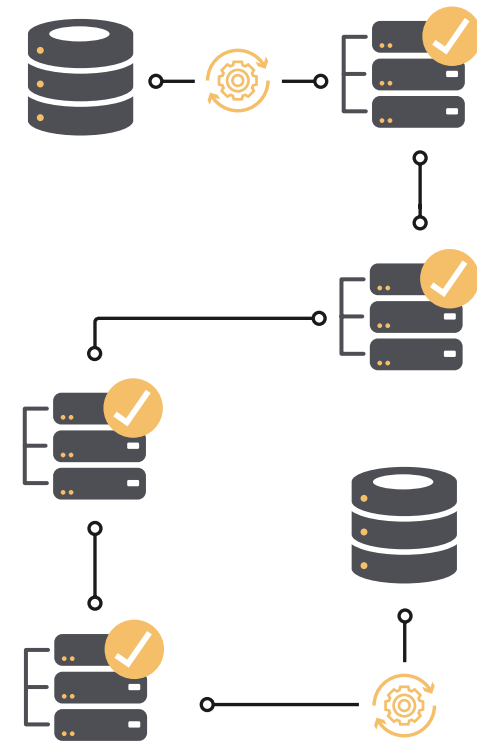
Here all reconciliations are automated on one intelligent solution. This enables greater efficiency and oversight of the reconciliation function as a whole. It also enables firms to normalise their data across the business and implement additional data quality checks across systems, highlighting areas of incomplete or incorrect data.

Organisations are then able to start consolidating systems and removing duplicate reconciliations which have already been handled upstream. Processes become leaner, more efficient and more transparent.

Just as importantly, at Stage 4 the role of the reconciliation department is elevated. Rather than being perceived as a cost centre, with ever-increasing overheads as the amount of data and complexity increases, the reconciliation function can consist of a small skilled team able to analyse where breaks are coming from and try to fix them at source.

With all reconciliation data in one place, the team can more easily run analytics on it, find which systems or third parties are causing the most operational pain, and provide valuable feedback to the wider business – rather than spending most of the time of manual tasks. The work is more rewarding and job satisfaction is higher.

The ease that a firm moves from Stages 2 and 3 to Stage 4 depends heavily on whether it has any entrenched legacy point solutions. For newer or more nimble organisations, getting to this stage will be fairly straightforward – they simply need to migrate all reconciliations to an agile system. But for firms that rely on an on-premise solution, the migration will be slower, with reconciliations moved across over a matter of years. This process is important, however, to enable the organisation to reach Stage 5.



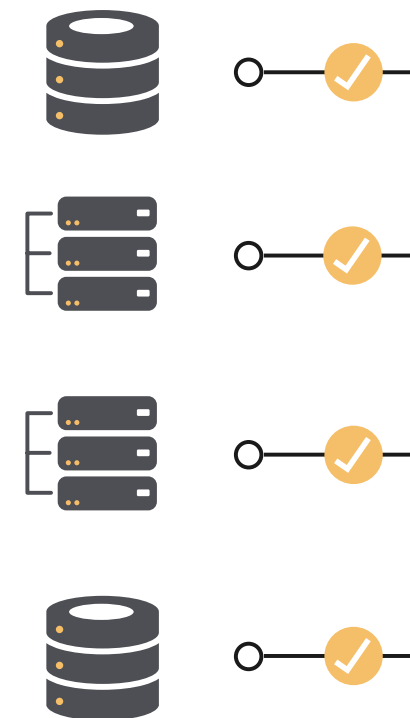
## STAGE 5: SELF-OPTIMISING

At the time of writing, a fully self-optimising system is not yet available. However, with machine learning technology improving by the day, it is very much in development. The below is what is possible in the not-too-distant future, assuming you have the technological foundations in place (ie all reconciliations are automated on an intelligent, machine-learning enabled system).

At Stage 5, the entire reconciliation process is automated from end-to-end. This covers onboarding, configuration, matching, exception identification, exception resolution and management reporting. Reconciliation practitioners only need to check and validate the decisions the system recommends.

As more data passes through the system it learns, improves, reduces reinvestigation and optimises resources. Then, as new data enters the organisation, the system spots errors and inconsistencies immediately, before they cause issues in downstream systems.

The number of internal intersystem reconciliations are reduced, and then eliminated entirely, as the reconciliation solution is able to flag and fix breaks at source, while providing full lineage as the data passes through the organisation. The reconciliation team becomes a very small group who validate the recommendations the system makes, and investigate any outlier breaks that the system is not able to identify and fix itself.



## CONCLUSION: MOVING TO A STAGE 5 FUTURE IN THE “DECADE OF DATA”

As we enter this new decade - the “decade of data” - we believe The Reconciliation Maturity Model will help more firms get closer to Stage 5: the “holy grail” of reconciliation.

This optimal future isn't that far away. Machine learning is already being employed within modern systems and offers exciting benefits for users, which will only improve with time. Also, as more people sign up to use these systems, this creates a flywheel effect as the machine learning algorithms start to improve with the amount of training data they can access.

Our recommendation to firms would therefore be: get ready to take advantage of machine-learning, and a future where reconciliation can be minimised.

The best way to do this is by choosing a SaaS system, where the amount of training data is ever-increasing. Machine learning algorithms on installed systems are only able to train on a limited set of data. By positioning themselves as Stage 4 (or 5) organisations, firms will not only see immediate benefits, they will also be ready to take advantage of new functionality when it arrives.

Attitudes towards cloud-based infrastructure will continue to change as the adopters reap the benefits and laggards struggle to keep up. The net beneficiary of all of this will be the people who work in reconciliations - who will get more power to do their jobs properly instead of doing tedious manual work - and the end clients receiving improved and more responsive service.

**As we enter this new decade - the “decade of data” - we believe The Reconciliation Maturity Model will help more firms get closer to Stage 5: the “holy grail” of reconciliation.**

**In future papers, we will look in depth at different parts of the reconciliation process, including:**

1. Onboarding and Configuration
2. Matching Control and Workflow
3. Reporting and Analytics
4. System Installation and Deployment





## About Duco

Duco is a global provider of self-service data integrity and reconciliation services. Our mission is to make managing data easy. The cloud-based Duco platform empowers end users to aggregate, normalise and reconcile data on demand - without infrastructure projects. Firms rely on us to increase business agility, reduce risk, stay compliant with regulation and dramatically improve efficiency across a range of mission critical tasks. Customers can be live in 24 hours, with results in

7 days and tangible business value in 30 days. Headquartered in London, with offices in New York, Luxembourg, Edinburgh, Wroclaw and Singapore, Duco's customers include global banks, brokers, asset managers, exchanges and middle and back office outsourcers.

**For more information go to [www.du.co](http://www.du.co)**