
Portfolio Reconciliation in Practice

ISDA[®]

INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION, INC.

Portfolio Reconciliation in Practice

Contents

Section	Page
1.0 Introduction	4
2.0 Background and Objectives	6
3.0 Value Added – A Strategic Solution.....	7
4.0 Overview and Key Points	8
5.0 The Value of Proactive Reconciliation.....	10
6.0 The Portfolio Reconciliation Control Model.....	11
7.0 The Reconciliation Model in Practice.....	14
7.1 Organisational Model & Industry Commitment	14
7.1.1 The Organisational Model	14
7.1.2 Industry Commitment – Counterparty focus & response..	15
7.2 Reconciliation Process & Bi-Lateral Matching Models	16
7.2.1 Process Outline	16
7.2.2 High-Level Portfolio Reconciliation Process	17
7.2.3 On-Boarding.....	18
7.2.4 Submit Data	20
7.2.5 Generate Reconciliation Report	22
7.2.6 Review Results	23
7.2.7 Break Resolution	24
7.3 Data Standards & Bi-Lateral Matching Models	24
7.3.1 Overview	24
7.3.2 Issues & Findings	25
7.3.2.1 Matching Criteria	25
7.3.2.2 Data Format and Presentation	26
7.3.2.3 Trade Booking	27
7.3.2.4 Credit and Legal Set up	29
7.3.2.5 Valuations	29
7.3.2.6 Procedural.....	30
7.3.3 Standard Data	30

Section	Page
7.0 The Reconciliation Model in Practice (cont)	
7.4 Technology, Performance, Reporting	31
7.4.1 Generic Functionality Requirements	32
7.4.2 Critical Path Requirements	33
7.4.3 Manual Matching and Validation	34
7.4.4 Enhancing Performance	35
7.4.5 Reporting, High-Level MI Categories	36
8.0 Conclusion	39

1.0 Introduction

A key component of the post-trade execution process for over-the-counter (OTC) derivatives transactions is the efficient and timely reconciliation of portfolios in order to ensure an accurate and common reflection of trade population and trade economics between counterparties. **Portfolio reconciliation**, or the verification of the existence of all outstanding trades and comparison of their principal economic terms, is considered good market practice.¹ Bilateral reconciliation at regular intervals has been identified by market participants as a trend in collateral management, and for some time has been an area of focus for ISDA's Operations Committee (*Recommended Practices for Portfolio Reconciliation* (February 2006)), the Collateral Committee (Collateral Data Standards (April 2003)), various FpML working groups and other industry groups. The operational advantages of being able to verify portfolios of trades between counterparties on a group-to-group, multi-product basis are widely recognised, not least in the collateral management space.

The Collateral Framework Group (CFG) was formed in 2005 as an ad-hoc group of senior collateral managers from four dealer firms and soon expanded to fourteen dealer firms. The CFG recognised a need to mitigate operational and credit risks resulting from the margin call process, particularly around disputed margin calls. Portfolio reconciliation was identified as the tool needed to reduce those risks. The process is one of mutual trade recognition and matching using live system data (i.e. the books and records of a firm). It is not a replacement for the confirmation process, nor does it seek to duplicate that important step. Where the confirmation delivers a detailed view of transaction terms at one point in time, portfolio reconciliation monitors the full population of transactions for breaks – amendments, business and trade events, novations, booking errors and valuation model mismatches – over the life of the portfolio.

Portfolio reconciliation was recognised by the CFG as a process having such significant advantages (including outside of the collateral space), that it merited the launch of a pilot program among the dealer firms. As a result of this pilot program, portfolio reconciliation has moved from the conceptual to the practical and has now been implemented as a business as usual (BAU) function within a number of dealer firms. Large portfolios of OTC derivatives are now regularly reconciled bilaterally using live system data (i.e. the books and records of the firm) in a highly efficient and automated process.

The results of the pilot program have been collated as *lessons learned* and are presented by ISDA in this paper as a collective experience of how to effect portfolio reconciliation and what tools are required. The scope of this paper is not intended to be prescriptive but rather is a set of guidelines that will assist industry participants in understanding the process, requirements and benefits of portfolio reconciliation.

The Collateral Framework Group²

ABN- Amro	Citigroup	Goldman	Lehman	RBS
Barclays	Credit Suisse	HSBC	Merrill Lynch	UBS
Bank of America	Deutsche Bank	J P Morgan	Morgan Stanley	

¹ BIS CPSS report-New Developments in Clearing and Settlement Arrangements for OTC Derivatives (March 2007).

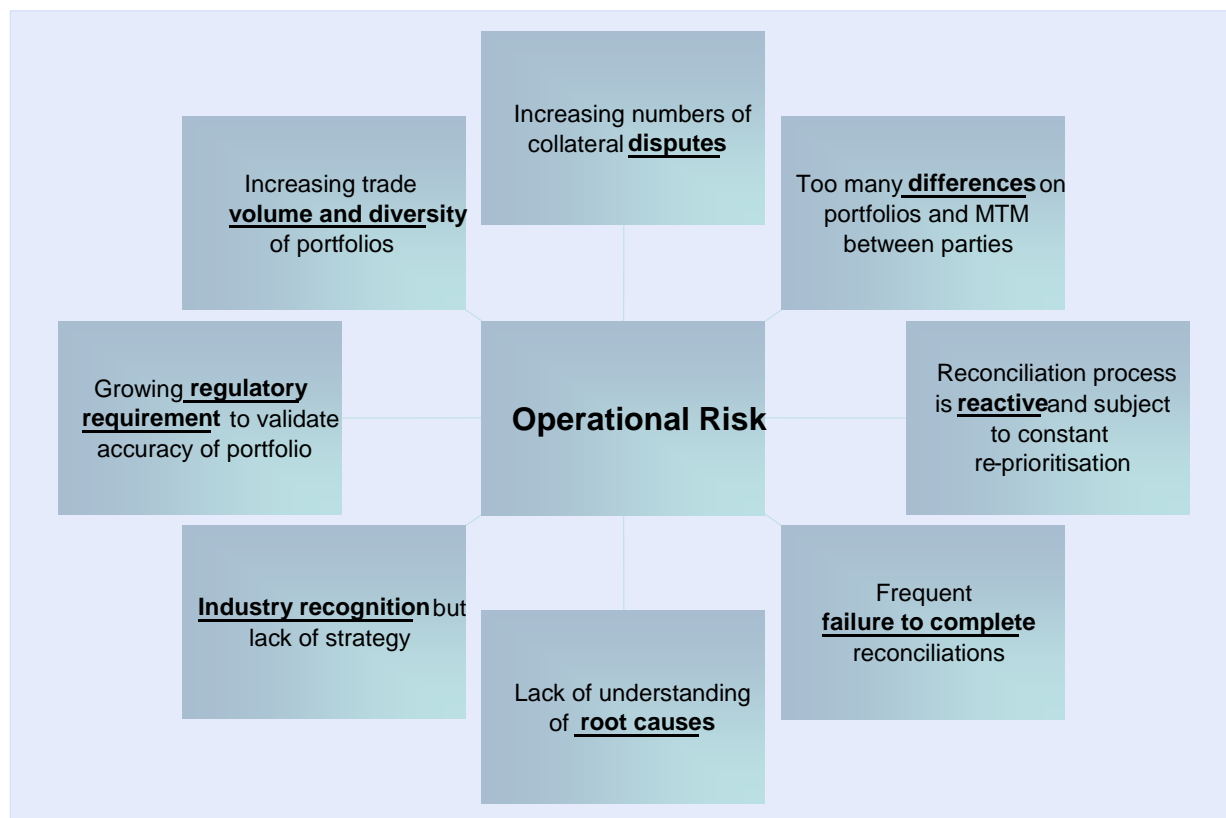
² In April 2007, the ISDA Collateral Framework Working Group was formed from this core group of ISDA member firms.

In fact, recent market events have shown the value of systematic portfolio reconciliation as a fundamental information resource for firms. Among other things, members have discussed the effectiveness of portfolio reconciliation as an effective tool for credit and risk managers. ISDA plans to publish a short paper summarizing these collateral practitioner observations, together with lessons learned and recommendations for the future. It is expected this report will be very similar to the 1999 Collateral Review in content.

“Portfolio Reconciliation in Practice” shows that proactive portfolio reconciliation extends throughout firms in terms of accurate, validated trade records. It also proves to be of immediate benefit to collateral managers via the reduction of disputes and more efficient management of counterparty exposure. Having such a complete picture of a firm’s portfolio of OTC trades will be particularly important during periods of a disturbance in market conditions.

2.0 Background and Objectives

A number of residual operational risks arise from the “margin call process” that firms need to carefully consider: **Operational Risk = Credit Risk**

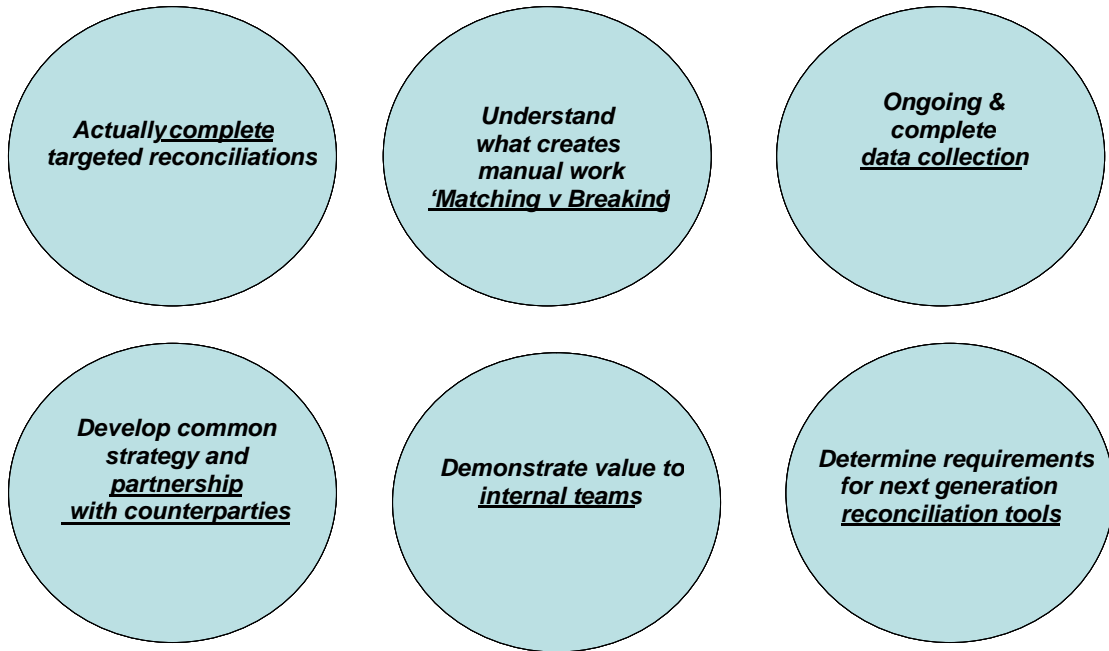


In an effort to reduce the above-referenced residual operational risks, the CFG set out to prove the value of performing proactive and frequent reconciliations with the following defined objectives:

- Determine the accuracy and effectiveness of the portfolio reconciliation process
- Prove the operational model
 - Identify resources
 - Determine location within firms
 - Identify internal dependencies
- Improve the accuracy of the portfolio: completeness and valuation
- Reduce the number and age of disputes
- Complete and leverage a root cause analysis of errors and trends
- Build industry partnership and focus
- Develop tools and work with service providers
- Assess the value-added input of the process
- Develop a reconciliations strategy and make recommendations for the industry

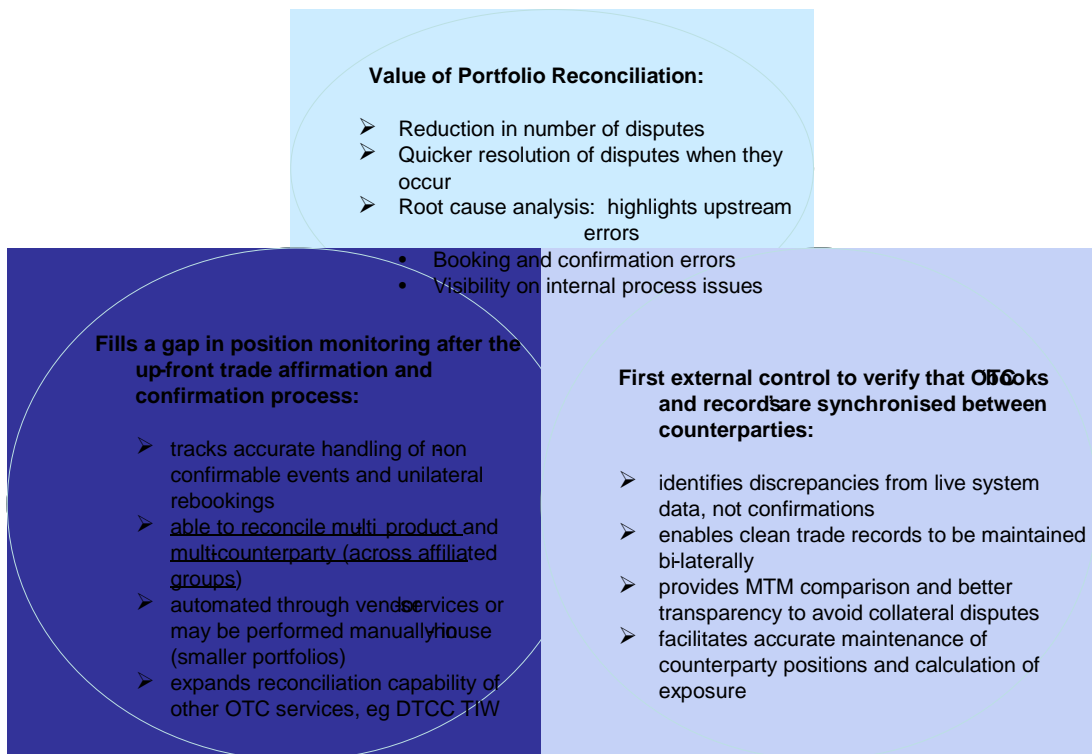
This document is primarily focused on the bilateral reconciliation process between two separate firms, rather than how an organisation needs to work internally towards data and issue resolution.

To achieve these objectives, the CFG identified key aspects of an approach that would enable firms to fully understand the problems and requirements of the portfolio reconciliation process:



3.0 Value Added – A Strategic Solution

Portfolio reconciliation is seen as a strategic solution to ensure that OTC derivative portfolios are, and remain, synchronised between counterparties:



4.0 The Manual Reconciliation Control Pilot

Portfolio reconciliation is a key method for establishing the accuracy of a firm's entire trade population as compared to its counterparty's records of that portfolio as of a given business day. The comparison may be done on a group-to-group, multi-product basis, reviewing all live transactions between the parties.

All live OTC derivative transactions within a portfolio should be reconciled, including credit derivatives, interest rate products, equity derivatives, foreign exchange and commodities, as well as all structured transactions and hybrids. In other words, all transactions covered by the relevant credit support documentation between two parties should be reconciled (or, when performing group to group reconciliations, transactions covered by multiple credit support documents). While more complex transactions may require a significant amount of data configuration before the reconciliation process can commence, this is largely a one-off process performed at the outset with each counterparty.

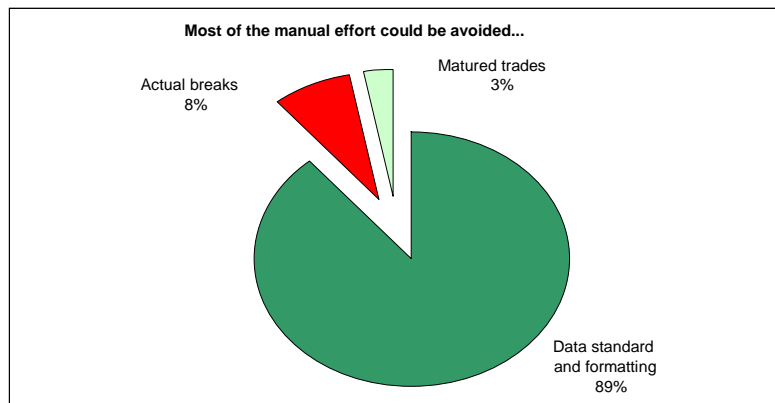
In order to differentiate between similar transactions, a greater number of data fields are required than would generally be assumed. There needs to be a balance between having too many matching fields (or criteria) and too few. The number of data fields should facilitate accurate matching of similar trades while not rendering the reconciliation process too complex. In practice the CFG has found that a set of ten data fields provides a reliably high and accurate match rate.

It is important to distinguish between what is meant by matching and breaking trades:

Matching = establishing that two or more trades belong together

Breaking = trades that match but with a difference, or trades that do not have a match

When investigating breaks, almost 90% of the manual effort is caused by lack of data standards, i.e. how and when trades should be represented in the portfolio.



A number of high-level issues consistently arise when undertaking portfolio reconciliation and this may be useful to bear in mind when approaching reconciliations for the first time. These issues have been identified from analysis of a control pilot in which trades were manually investigated to ensure correct matching and to understand the underlying cause of breaks.

High-level Manual Reconciliation Findings:

Principal categories

Reconciliation Process		Trade Flow Process	
Data Standards	Data Reporting	Data Discrepancies	Valuations
<ul style="list-style-type: none"> ➤Lack of standard field formats in data submitted for matching ➤Availability of trade data and minimum requirements for trade submission 	<ul style="list-style-type: none"> ➤Trades booked using multi-leg approach ➤Lack of standard methodology for key fields: <ul style="list-style-type: none"> •Maturity date: expiry v exercise •Notional or Quantity •Underlyer •Product Names 	<ul style="list-style-type: none"> ➤Transactions booked to incorrect legal entity by either counterparty ➤Novations – unrecognised transactions ➤Transactions confirmed in DTCC not included in cpty portfolio ➤Other unrecognised transactions <ul style="list-style-type: none"> •Timing of bookings •Pending transactions/ Preliminary bookings •Tear-ups •Payments/upcoming maturities 	<ul style="list-style-type: none"> ➤Difficult to determine valuation and agree differences using basic % of notional methods ➤Inconsistency between parties in approach and methodology for valuations
<h4>Reconciliation Procedures</h4> <ul style="list-style-type: none"> ➤Achieving counterparty coordination of resource and priority ➤Extensive time required to reconcile manually ➤Low resource saturation point in terms of counterparty coverage ➤Dependency on internal teams and systems (operations and product controllers) 		<h4>Trade Flow Procedures (Trade capture & confirmation)</h4> <ul style="list-style-type: none"> ➤Addressing root cause of issues ➤Ownership for remedying discrepancies ➤Monitoring and Escalation procedures 	

The manual reconciliation pilot demonstrated the low saturation point in terms of counterparty coverage and the need to develop a highly automated and efficient solution for large portfolios of trades to achieve any real degree of scalability. Third party service providers have worked with market participants to develop solutions in support of this need.

Previously reconciled data enabled the CFG to test and prove the integrity of the matching algorithm which is central to any portfolio reconciliation service. The automated solution achieves volume insensitivity and takes out the challenge of reconciling large portfolios of trades. It is now possible to embed this function as a BAU exception-based process and gain significant internal benefits and efficiencies as a result.

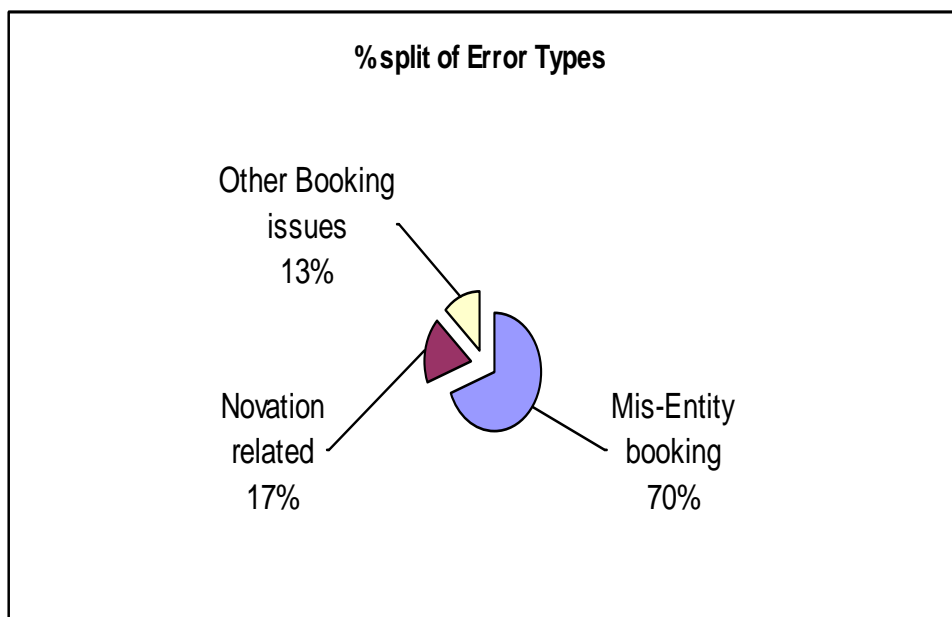
5.0 The Value of Proactive Reconciliation

The CFG has seen the value of regular and proactive reconciliation in a number of key areas which are expected to grow as dealer firms continue to perform more reconciliations and to reduce the time between each cycle:

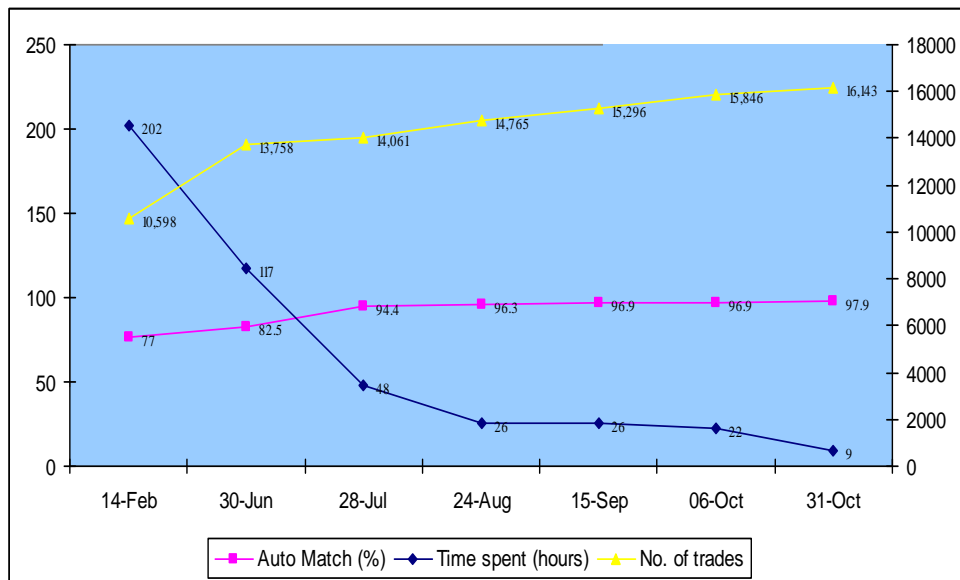
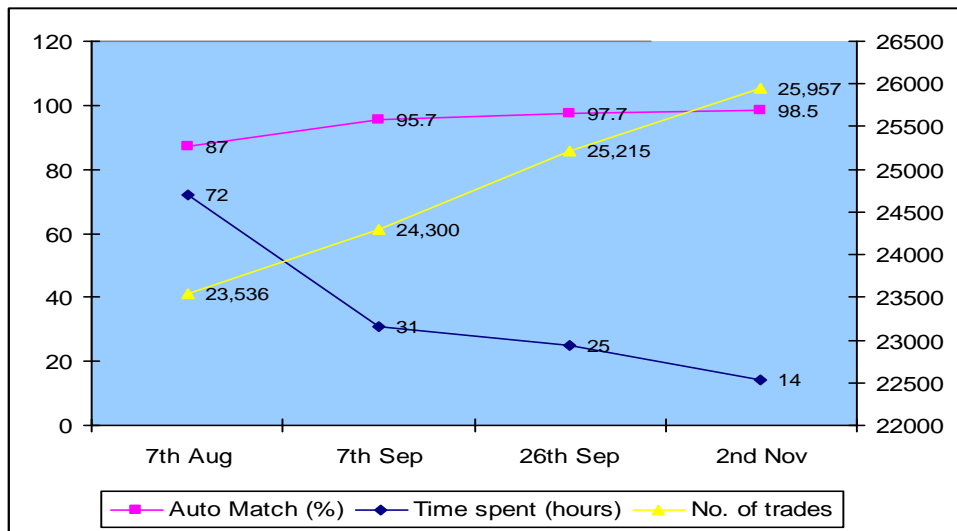
- Reduction in numbers of margin call disputes
- Quicker resolution of disputes when they occur
- Root cause analysis: highlighting upstream process errors
 - Booking and confirmation errors
 - Working to address issues upstream through regular reporting to derivatives team managers

Each reconciliation increases automatching rates and reduces time spent on disputes despite rising trade volumes. Real examples of the benefits include a reduction in the overall number of disputes and further enablement of upstream error analysis:

Enabling upstream error analysis.....



Auto-match increasing / Time spent decreasing despite trade volumes growing..

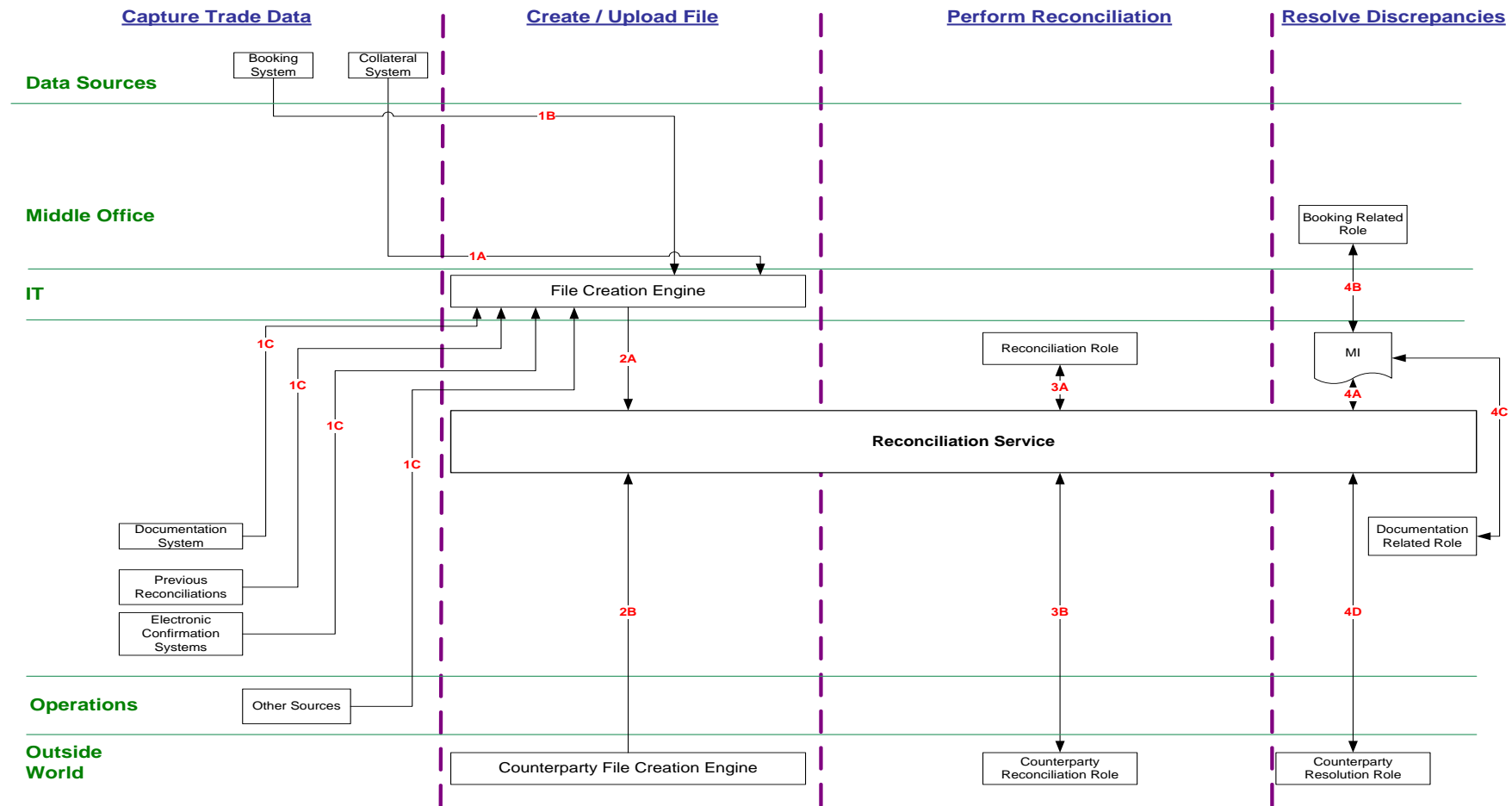


6.0 The Portfolio Reconciliation Control Model

The CFG’s Portfolio Reconciliation Control Model (the “Control Model”) identifies the functions and organisational input to the reconciliation process and highlights the key steps performed in the process.

The concept of the Control Model is generic and may be applied to any firm irrespective of its organisational structure. It provides a high-level picture of the data flows involved in performing portfolio reconciliation, identifies the processes associated with these, and enables a degree of insight for firms into what may be potential dependencies and issues.

The Control Model

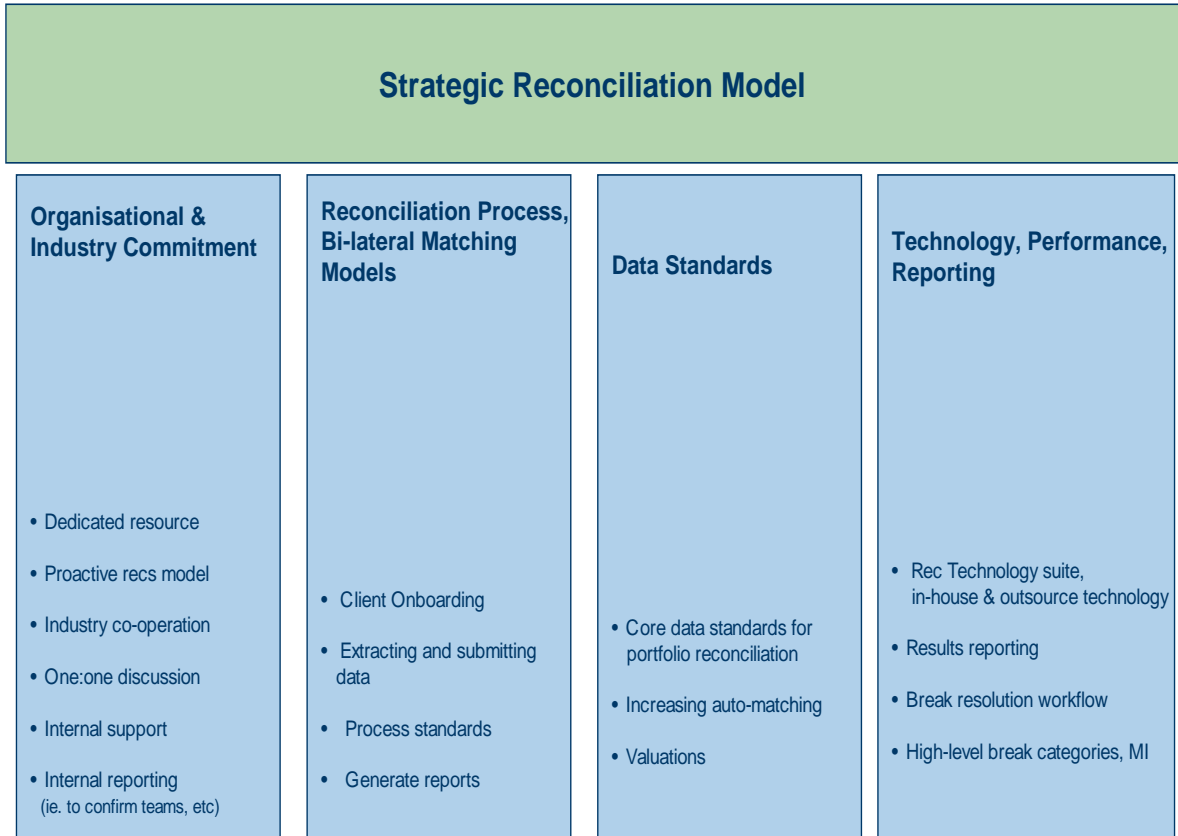


Control Model Processes

Link	Process	How
1A	Obtaining Collateral Sourced Data	Core portfolio population sourced from internal systems by Collateral or IT
1B	Obtaining Trade Booking Data	Additional trade data required by the reconciliation process but not available from Collateral system to be sourced from the trade booking systems
1C	Obtaining Counterparty Trade IDs	Counterparty Trade IDs to be sourced from multiple sources; direct from the confirmed results from electronic confirmation systems such as DTCC and Swapswire by IT, from non electronic confirm process from in-house systems by IT, from previous reconciliations by the Control Group or from any other source (such as advices received from other Ops areas) by the Control Group
2A	Creating and Uploading Trade File to Reconciliation Service	A File Creation Engine combines all the data sourced into a single, consistent file, which is uploaded to the Service Provider either by IT or by the Transaction Control Group.
2B	Creating and Uploading Trade File to Reconciliation Service (Counterparty)	To be determined by each counterparty
3A	The Reconciliation is performed	The Reconciliation analyst reviews the results provided by the Service Provider and accepts and/or corrects matches as and when required.
3B	The Reconciliation is performed (Counterparty)	The Reconciliation analyst reviews the results provided by the Service Provider and accepts and/or corrects matches as and when required.
4A	Reconciliation Results MI produced for escalation and resolution.	An internal MI of the discrepancies and results to be produced from the data supplied by the Service Provider.
4B	Booking related discrepancies resolved and status fed back into the Service Provider.	The Middle Office to review the MI and action all booking related discrepancies, the status of which to be fed back to the Service Provider either directly by the MO or via the MI to the Control Group. Who will update the Provider themselves.
4C	Documentation related discrepancies resolved and status fed back into the Service Provider.	The Documentation role to review the MI and action all confirm related discrepancies, the status of which to be fed back to the Service Provider either directly by the Documentation role or via the MI to the Reconciliation role. Who will update the Provider themselves.
4D	Discrepancies Resolved and status fed back into the Service Provider. (Counterparty)	To be determined by each counterparty

7.0 The Control Model in Practice: Strategic Reconciliation Model

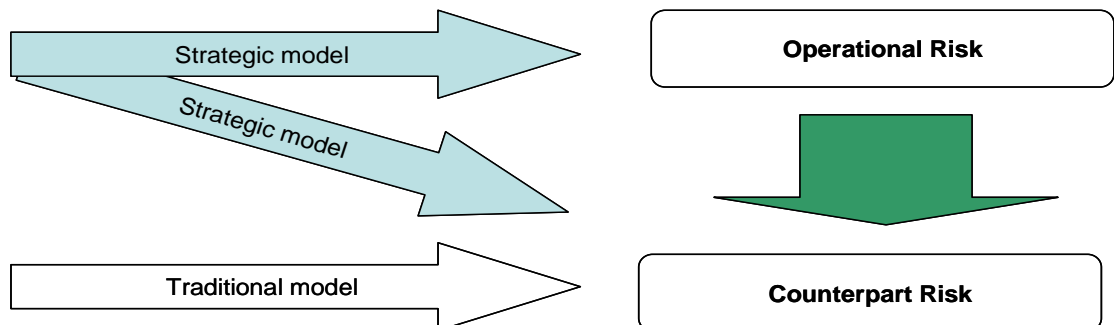
In reviewing the lessons learned from the CFG’s portfolio reconciliation pilot, the output suggests that a successful **Strategic Reconciliation Model** is built on four key pillars, developed in more detail below:



7.1 Organisational and Industry Commitment

7.1.1 The Strategic Reconciliation Model: Implementation

The traditional approach to portfolio reconciliation has been reactive, limited to investigation of underlying problems when a margin call dispute occurs. The Strategic Reconciliation Model addresses ongoing wider operational risk by identifying portfolio discrepancies with counterparties before problems occur.



Core dependencies for implementation of the Strategic Reconciliation Model are:

- Dedicated resources
- Proactive (frequent and regular) and dispute driven approach
- Reconcile to completion (i.e. resolve all breaks)
- Break tracking and ageing
- Root cause determination, reporting and follow-up
- Technology suite: Third party vendors and in-house solutions

Dedicated Business Resources

The Strategic Reconciliation Model benefits from a focused and dedicated business unit, ideally a Portfolio Reconciliation Team. While the CFG has not identified the requisite number of headcount required in such a business unit, it is clear that the use of an automated solution facilitates the reconciliation of hundreds of thousands of trades by a limited number of personnel.

Internal Support

Awareness and understanding of the Strategic Reconciliation Model and the purpose and function of the Portfolio Reconciliation Team by other internal areas of the firm (e.g. Confirmations, Middle Office, Settlements, Product Control) is crucial. Clear communication of what the Portfolio Reconciliation Team does; why they perform their function; and how they benefit “upstream” processes is critical. There should be regular points of contact in those groups to enable break resolution and information exchange, and escalation points at management level.

Proactive and Regular Reconciliations

The Strategic Reconciliation Model is a proactive process rather than being an event driven or reactive process.

Factors to be taken into account in determining frequency of reconciliations are portfolio size, volatility, client credit risk weighting, dispute history and reconciliation performance history.

7.1.2 Industry Commitment - Counterparty Focus and Response

A prerequisite to successful reconciliation (i.e. matching all trades and resolving all breaks) is the full cooperation of the counterparties. Counterparties need to agree between themselves a process, timeframes, contact and escalation points for remedying breaks, and use of as many tools as possible, including lock-ins, to keep the process of break resolution moving forward.

The CFG has observed that some counterparties are not prepared to or in a position to allocate resources to work on reconciliations. Without full counterparty commitment to the entire process, including resultant investigations, little progress will be achieved.

In these circumstances, although breaks may be identified, they will not be rectified and will reappear for action at the next reconciliation. In the meantime, a margin call dispute may occur and the counterparties will have to expend additional resource and time to resolve this dispute.

7.2 Reconciliation Process and Bilateral Matching Models

7.2.1. Process Outline

The intention of the portfolio reconciliation process is to reconcile OTC derivative portfolios at regular intervals in order to ensure accurate and common reflection of trade population between counterparties.

In order to do this in the most effective way a number of **counterparty groupings** are helpful to allow optimal use of resources:

1. Broker dealers (further classification within this group might be appropriate)
2. Hedge funds
3. Institutional investors and Prime Brokers
4. Internal (inter-company)

In addition, **prioritisation parameters** can be applied based on:

1. Portfolio size
2. Credit risk (e.g. credit rating and number/value of disputes)
3. Transaction frequency (frequent traders)

The counterparty groupings and the prioritisation parameters may be used to determine the frequency of portfolio reconciliations. It is generally agreed that due to the large number of new transactions executed for counterparty groupings 1 and 2, the following reconciliation frequencies is recommended:

- Once a week for counterparty groupings 1 and 2 (potentially daily in the future)
- Once a month for counterparty groupings 3 and 4

If counterparty groupings 3 or 4 meet any of the prioritisation parameters, these portfolios would potentially be reconciled more frequently. The CFG's pilot has proved that more frequent portfolio reconciliations do contribute to a reduced number of unmatched trades.

It is also recommended that a **proactive** rather than a **reactive** (after a dispute or a credit event) reconciliation strategy should be pursued. However if a dispute occurs, portfolio reconciliation with the counterparty involved should be prioritised.

As previously mentioned, this *Portfolio Reconciliation in Practice* is primarily focused on the bilateral reconciliation process between two separate firms, rather than how an organisation needs to work internally towards data and issue resolution.

The key players (Primary and Secondary Actors) encountered in the Portfolio Reconciliation process are:

Primary Actors

- Service participants (the counterparties)
- Service providers (counterparty using in-house tool; or a vendor provided service)
- Service participant on behalf of a third party (vendor service; non-participant)

Secondary Actors

- Internal departments (for issue resolution)
 - Credit risk
 - Front office
 - Settlement
 - Clearing
 - Product Control
 - Operations
 - Other, as appropriate
- Regulators, Supervisors, Auditors
- Third party submitting data via a service participant

7.2.2 High Level Portfolio Reconciliation Process**Pre-conditions for Service Participants**

- Access to a highly automated reconciliation tool that is acceptable to counterparties
- Access to readily available portfolio data files in an acceptable format and to agreed standards
- Access to additional resources (e.g. staff) to perform portfolio reconciliations
- Established break resolution processes in place

Main Flow of Events

In the following table, we have set out the main flow of the portfolio reconciliation process that allows counterparties to onboard data files and then submit data files regularly to perform portfolio reconciliations. Each event is described in more detail below.

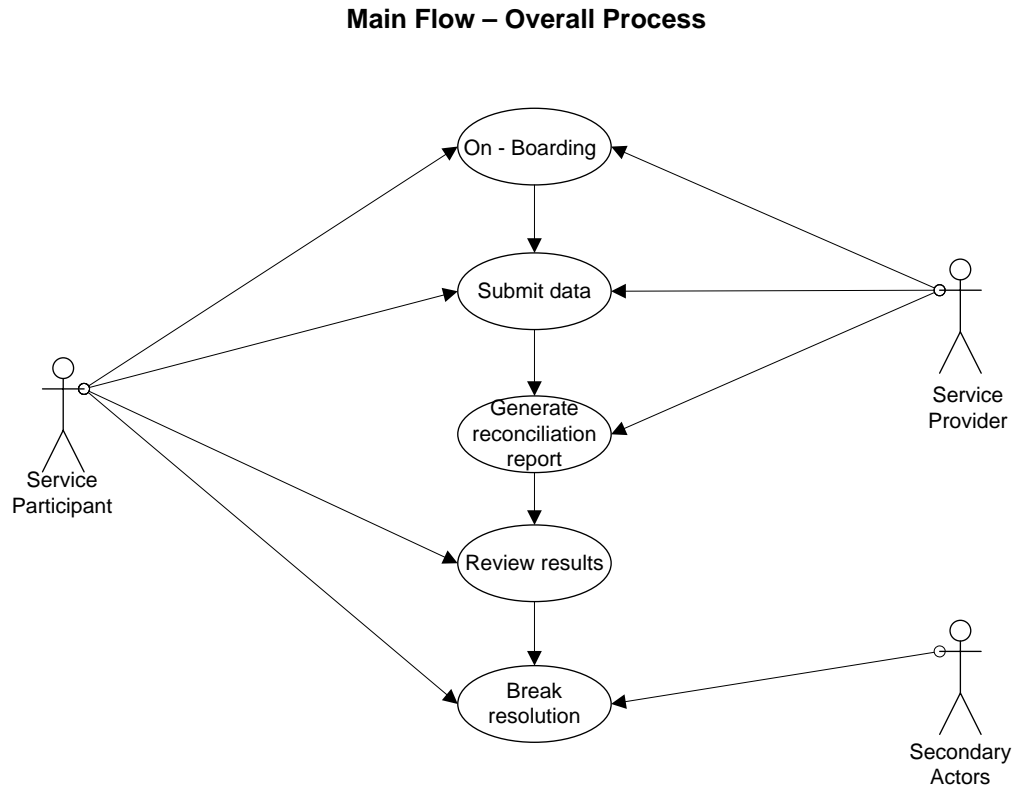
Event	Activity
1.	On-boarding of the initial portfolio of trades by a new service participant
2.	Submit data
3.	Generate reconciliation report
4.	Review results
5.	Break resolution
6.	Use case terminates

The above main flow of events leads to:

- Credit risk mitigation
- Complete portfolio reconciliation
- Improved accuracy of the portfolio: completeness and valuation

Use Case Diagram

The following use case diagram represents the main high level flow of events in the portfolio reconciliation process:



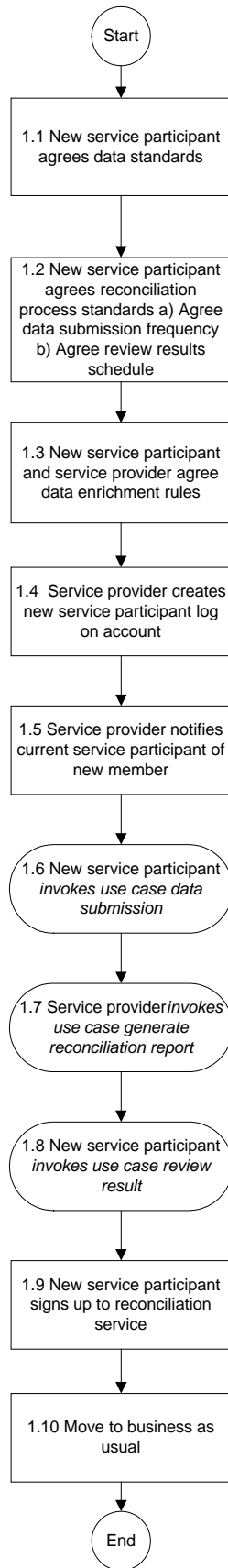
7.2.3 On-boarding

On-boarding is the initial process that introduces new service participants to the portfolio reconciliation service.

Pre – Conditions

- Data standards to be agreed by counterparties
- Reconciliation process steps agreed by counterparties
- New service participant has access to a portfolio reconciliation service

Activity Diagram and Main Flow of Events: On-boarding



Event	Activity
1.1	New service participant agrees data standards
1.2	New service participant agrees reconciliation process standards - Agree data submission frequency - Agree review results schedule
1.3	New service participant and service provider agree data enrichment rules
1.4	Service provider creates new service participant log on account
1.5	Service provider notifies current service participants of new member
1.6	New service participant <i>invokes use case data submission</i>
1.7	Service provider <i>invokes use case generate reconciliation report</i>
1.8	New service participant <i>invokes use case review results</i>
1.9	New service participant signs up to reconciliation service
1.10	Move to business as usual
1.11	Use case terminates

7.2.4. Submit Data: Business as Usual (BAU)

The data submission process explains how service participants can submit data to the service provider in preparation for a portfolio reconciliation cycle.

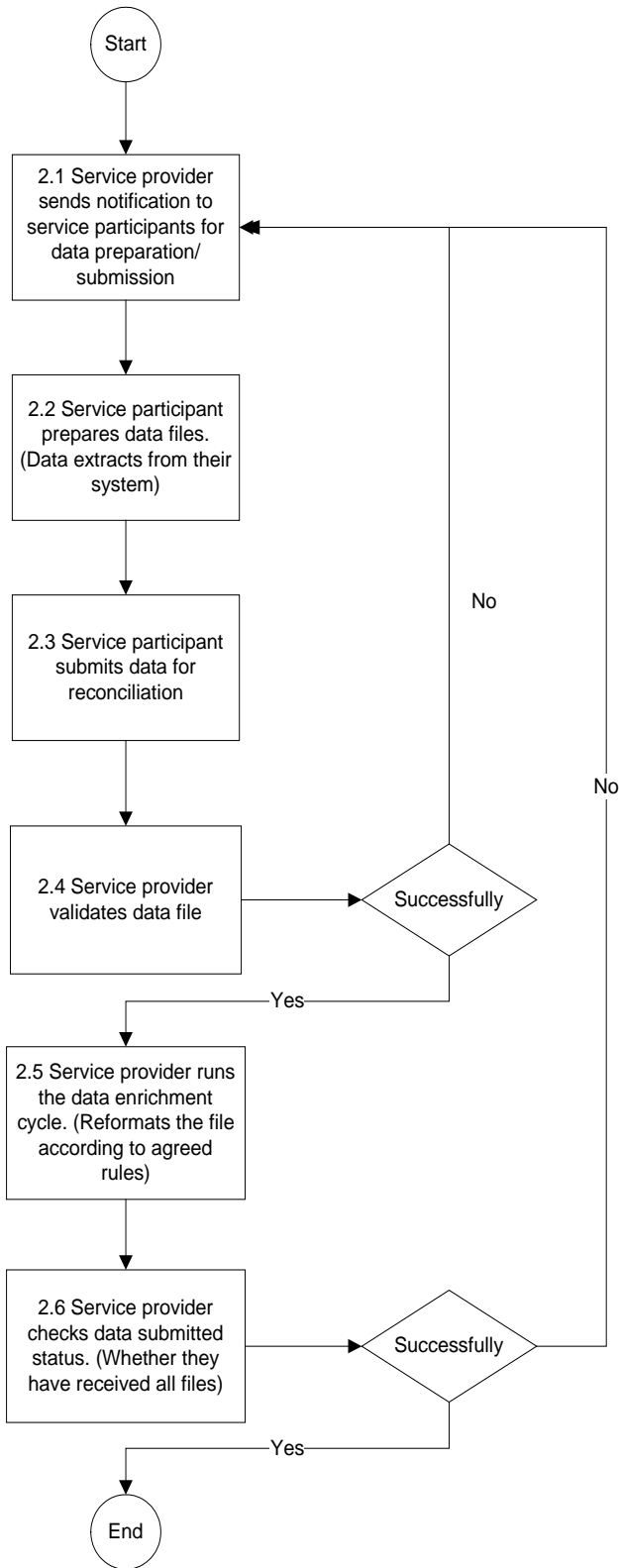
Pre-Conditions

- Service participant agrees to data submission frequency to vendor service
- Vendor service is available for data submission
- All participants have agreed terms of the vendor service (except potential participants that are going through the on-existing service participant)
- Agreed data standards to be in place and data to be sourced through an automated process in order to avoid formatting manual errors
- Ensure consistent (between submissions) data quality
 - Format - how counterparties report data
 - Content - the data they need for accurate transaction reporting

Alternative Flow Pre-Conditions

- The service provider rejects data file submitted by a service participant, as the file validation process showed an error.

**Activity Diagram and Main Flow of Events:
Submit Data**



Event	Activity
2.1	Service provider sends notification to service participants for data preparation/submission
2.2	Service participant prepares data files (data extracts from their system)
2.3	Service participant submits data for reconciliation
2.4	Service provider validates data file
2.5	Service provider runs the data enrichment cycle (reformats the file according to agreed rules)
2.6	Service provider checks data submitted status (whether they have received all files within the submission window)
2.7	Use case terminates.
Alternative Flow	
File rejected because of error	
2.4.1	<i>This flow is invoked from the main flow step 2.4 - when the service provider rejects a file submission by one of the service participants (due to incorrect data formatting)</i>
2.4.2	Service provider notifies submitting party of the rejection
2.4.3	Submitting party reformats data file
2.4.4	Submitting party resubmits data
2.4.5	Return to main flow step 2.4.

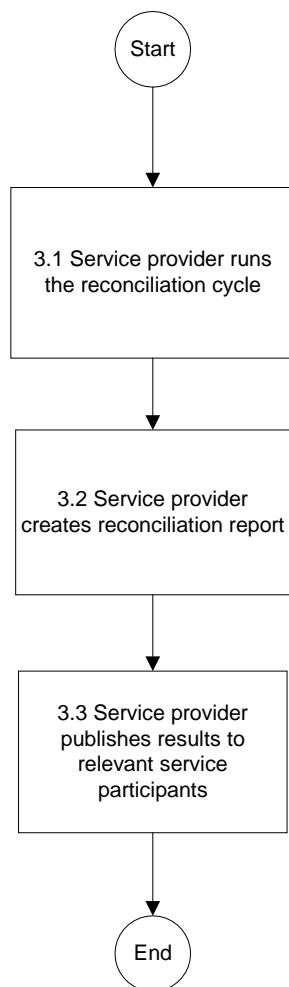
7.2.5. Generate Reconciliation Report

The service provider runs the portfolio reconciliation cycle once the relevant data files have been submitted and produces a report describing the reconciliation results available to all relevant parties.

Pre – Conditions

- The service provider has received all data files from the service participants.

Activity Diagram and Main Flow of Events: Generate Reconciliation Report



Event	Activity
3.1	Service provider runs the reconciliation cycle
3.2	Service provider creates reconciliation report
3.3	Service provider publishes results to relevant service participants
3.4	Use case terminates

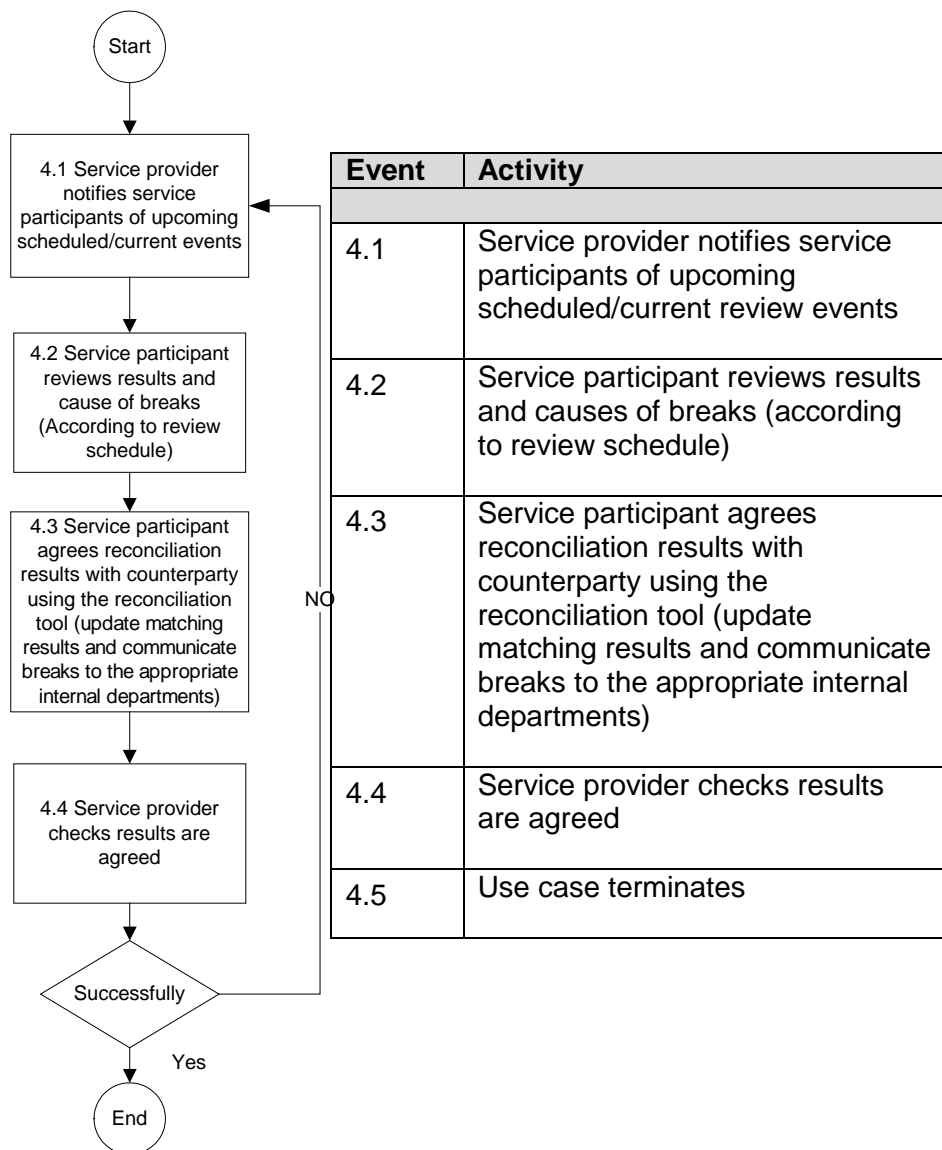
7.2.6 Review Results

Following completion of the reconciliation cycle, the review results process highlights the steps (at a high level) that service participants need to follow in order to reconcile their portfolios based on available results.

Pre – Conditions

- Service participants agree to review results as scheduled (or agree to review results of an ad-hoc portfolio reconciliation – initiated by a dispute for example).

Main Flow of Events and Activity Diagram: Review Results

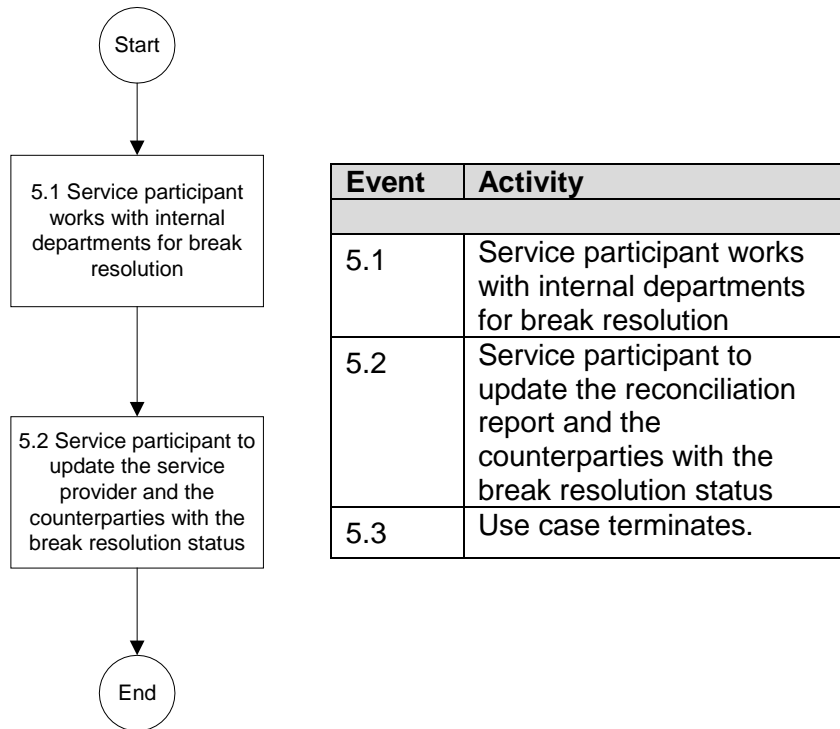


7.2.7 Break Resolution

Pre – Conditions

- Service participant has an internal issue resolution process in place (working with other internal departments for break resolution)

Activity Diagram and Main Flow of Events: Break Resolution



7.3 Standard Data and Bilateral Matching Models

7.3.1 Overview

Lack of standard data cause 90% of the manual effort in matching breaking trades. This is an important area for the industry to focus on, and one in which several important lessons learned were gained from the portfolio reconciliation pilot:

- Pragmatic standard date recommendation
 - Focus on key fields only
 - Aim for no more than twelve fields
 - Focus on genuine intention to implement
- Bilateral matching rules
 - Technology dependent
 - Functionality to translate data inconsistencies
- Process standards
 - Bilateral agreement to key aspects of process
 - Ensure consistent approach to reconciliation

- Focus on developing matching models bilaterally
- Increase the focus on key data issues but reduce the dependency

Regardless of how firms perform a reconciliation, it is vital that the data provided by both counterparties are in a consistent format. Otherwise, resources are spent either pre-processing the data to facilitate matching, or reconciling each record manually.

There needs to be sufficient data to differentiate transactions. This data needs to be internally consistent within the portfolio (and across products) and the data needs to be in a form that can be readily exported to a reconciliation tool.

For example, notional data missing from a portfolio submission makes it difficult to match trades with any degree of confidence, thereby negatively affecting a reconciliation.

The portfolio reconciliation process is relatively immature and there are many opportunities for improvement. For example, working to establish bi-lateral matching models with counterparties is very effective in terms of time saved on pre-processing data.

There is great benefit in striving to improve data. Better quality data provides higher match rates and less exception processing.

A commitment to providing data of sufficient quality to reconcile, and the ability to match data that does not match automatically, are important to achieving an efficient process.

7.3.2 Issues and Findings

During the pilot program, several common themes were identified that account for the un-reconciled portion of the portfolios. We have broken the issues down into six key areas:

- 1. Matching Criteria**
- 2. Data Format and Presentation**
- 3. Trade Booking**
- 4. Credit and Legal Terms Set Up**
- 5. Mark-to-Market**
- 6. Procedural**

7.3.2.1 Matching Criteria

Issue: Lack of standardisation:

The required matching criteria by product varies between counterparties. Criteria and tolerances are best discussed and pre-agreed between the parties.

7.3.2.2 Data Format and Presentation

Many counterparties have data constraints that work against reconciliation and require data manipulation before any reconciliation can begin. The differences in data format and presentation severely hamper the ability to reconcile and reduce the value of any reconciliation tool (i.e. less automatic matching).

Issue: Multi-leg bookings:

Counterparties differ in their methods for booking some trade types. Some counterparties will book at a structure level and some will present at an individual booking level. We therefore see multiple trades in the portfolio to represent one actual position (many to one matching).

Examples:

- Credit default swaps (3 bookings), currency swaps (2 bookings), FX trades (2 bookings)
- Swaptions booked as 2 trades, one to reflect the option component, the other to reflect the potential swap

Issue: Data inconsistency between entities of the same counterparty:

Differing architecture within counterparties can result in the same product being reported quite differently across group entities.

Example:

- CDSs booked in a bank entity are identified as part of a single credit trade, but a similar transaction is booked in an affiliate entity as two separate transactions, a bond option and an interest rate swap.

Issue: Data field availability or inaccuracy:

Certain important fields may not be available in portfolios to be reconciled.

Examples:

- “Quantity”: the field may be missing or included as “notional” instead (Notional = Quantity x Strike).
- Counterpart reference number: In many cases the trade has already been confirmed and the counterpart reference number is recorded in the confirmation system. This field is commonly not provided in the portfolio.
- Expiration and Termination Dates: Certain trade types have different Expiration and Termination Dates (e.g. swaptions), but in some cases only one date is provided. Some banks will reflect Termination Date as the Exercise Date rather than the actual Expiration Date, compared to most counterparties who report the maturity date as the Expiration Date.
- Product name: Some counterparties provide portfolios without an accurate or understandable product name.

Issue: Lack of Standard Formatting for certain attributes:

The absence of any market standard for portfolio presentation results in a failure to auto-match fields and requires manual matching.

Examples:

- Reference Entity and Reference Obligation: presented in multiple formats and no standard name is used (i.e. RED)
- Dates: presented in different formats causing matching difficulties
- Novation Trade Dates: use of original Trade Date or Novation Trade Date in the Trade Date field
- Different Counterparty References: counterparties do not necessarily utilise the same references in their portfolios as those references on their confirmations

7.3.2.3 Trade Booking (Unmatched Trades)

While matching criteria and data formatting issues are a sign of failures in the reconciliation process, trade booking issues are most commonly indicative of a failure in another process (booking, confirmation and settlement).

Issue: Wrong entity bookings:

In most cases of entity mis-booking, the initial root cause is easily identified (e.g. booking error by the front office). However, a subsequent error may occur that prevents the mis-booking being identified before the reconciliation process. As well as the initial booking error, these subsequent failures require discussion and investigation.

Issue: Written confirmation process fails to pick up mis-booking:**Example:**

- Incoming confirmation for an interest rate transaction stated that the trade was with Bank A rather than Bank A's affiliate. This was not picked up during the confirmation check process and the transaction was not amended to reflect the correct booking entity for some months until the discrepancy had been uncovered by portfolio reconciliation.

Issue: Written confirmation identifies difference but correction not made:**Example**

- Incorrect entity booking was identified by Confirmation team at Bank B. A new confirmation was manually initiated but the trade was not actually re-booked until discovered by portfolio reconciliation.

Issue: Inconsistency of account names between trading and operations systems:

Account naming conventions differ between internal core systems. Trading systems may not see the same legal entity options as are available in operations systems. In overcoming issues, it is helpful if Counterparty accounts within trade booking systems can be linked to the appropriate electronic confirmation system reference.

Example

- A number of transactions were booked by Bank C to an affiliate of Bank D. However, these had been confirmed in DTCC with Bank D. Bank C's configuration of the DTCC confirmation process was set to automatically confirm all deals to Bank D, irrespective of the actual Bank D entity traded with.

Issue: Settlement differences:

Where trades were booked to the wrong entity, settlement events on these trades would have been made to the wrong instructions. This issue failed to come to light through the Nostro Reconciliation process and was picked up by portfolio reconciliation.

Issue: Novations:

Failure to follow Novation Protocol and advise counterparty.

Example

- An equity option deal with Bank F, novated to Bank G, was reported by Bank F's Outstanding Docs Escalation process as counterparty preparing documents. However Bank G was not aware of the assignment, which was highlighted and rectified by the portfolio reconciliation process. As a result of the large exposure on the transaction, Bank F and Bank G were unable to agree collateral margin for several months until this transaction was picked up.

Issue: Timing of trade booking:

Parties may book a new transaction at different times (over days) Instances of delays in a leg of a transaction being booked. Due to the multiple trade bookings reflected in some products, it is not uncommon for one component to be delayed due to timing issues, cut-offs etc. with the result that the trade appears quite different in the portfolio as compared to the deal it actually represents. For example on a Credit Default Swap, if there is a delay in the default option being booked, the trade is reflected as an interest rate swap and thus would not be immediately reconcilable.

Issue: TriReduce Tear Ups:

If both parties do not rebook the effected transactions for the correct Tear Up date then the transactions will continue to be reflected in their portfolios, creating false un-reconciled transactions and utilising valuable resources to identify.

Some counterparties, for example, have a limit to the number of entries that can be handled by the back office systems at any one time. If a particular tear up cycle involves a large number of credit default swaps, the ensuing entries generated by unwinding all the payment flows for the life of the transaction can overwhelm the system and as a result are often not booked until the next non-business day. This can result in transactions remaining in the portfolio for up to seven days after they have actually been terminated.

Issue: Maturing Trades:

The treatment of maturing transactions in a collateral portfolio is often times not clearly set out in the collateral documentation and there are differing interpretations as to whether matured transactions should be included or excluded. Transactions that mature on the close of business same day or close of business plus one may or may not be included in a portfolio although the trade is recognised by the counterparty.

Issue: Future Effective Novation:

A novation from Party A to Party C is agreed between all parties effective on a future date in two months time. Party C includes in their portfolio immediately, but party A will not reflect against Party C until the two month date is due.

7.3.2.4 Credit and Legal Set-Up**Issue: Consistency of Product Inclusion:**

Both counterparties should include the correct product set to be consistent with each ISDA Credit Support Annex (CSA) in place between them on a group-to-group basis.

Examples:

- FX Spot Trade included in error
- Equity Derivatives included in portfolio by counterparty when they were not covered by the CSA

7.3.2.5 Valuations and Mark to Market**Issue: Methods for Determining Tolerances:**

Methods differ between parties, but are commonly too simple and result in too many trades being flagged as requiring investigation. As a result of the 'noise' created, real issues are potentially missed.

A key objective of portfolio matching is to reduce potential margin disputes. This is difficult to do without consistency between parties in their approach and methodology for valuing trades. The key here is how to distinguish an acceptable valuation difference from a real problem. Parties need to discuss and agree this point.

However, acceptable trade valuation differences can create a sizeable total portfolio valuation difference and there's currently no method for managing these kinds of issues, except through bi-lateral discussion.

7.3.2.6 Procedural

Issue: Regular Re-reconciliation:

We have seen the value of immediately re-reconciling between counterparties. This increases the first pass auto matching and helps to validate that issues have been resolved correctly (ie. matching previous issues).

Issue: Dependency on internal Operations teams and systems:

The collateral team and systems are dependant on portfolio accuracy on a daily basis. The majority of 'upstream' errors (Trade booking, Confirmation, Settlement, Systems) will effect the portfolio and therefore the accuracy of the Collateral calculation. Trade booking needs to be accurate and timely, Confirmation processes need to be effective and highlight any errors, and system feeds need to be robust and timely.

Whenever breaks and issues are uncovered within a reconciliation, help is required from the relevant Derivatives Operation team. This creates a significant resource demand on the other teams which may be additional and should be considered when setting up the internal process.

Issue: Dependency on Product Controllers:

Validation of MTM differences currently requires extensive liaison with the Product Control teams. A large number of MTM differences need to be referred to Product Control for opinion with respect to the size and nature of the difference. As with the other internal teams, this creates additional resource demand on those teams and again should be a factor taken into account.

7.3.3. Standard Data

The ability of parties to submit specific data is limited by (a) what is available from their systems and (b) formatting constraints. These are common issues for the industry and it is therefore not possible to be prescriptive about fields to be submitted. In practice, most data inconsistencies can be accommodated by vendors as part of their onboarding procedures, and any field bi-laterally submitted can be matched.

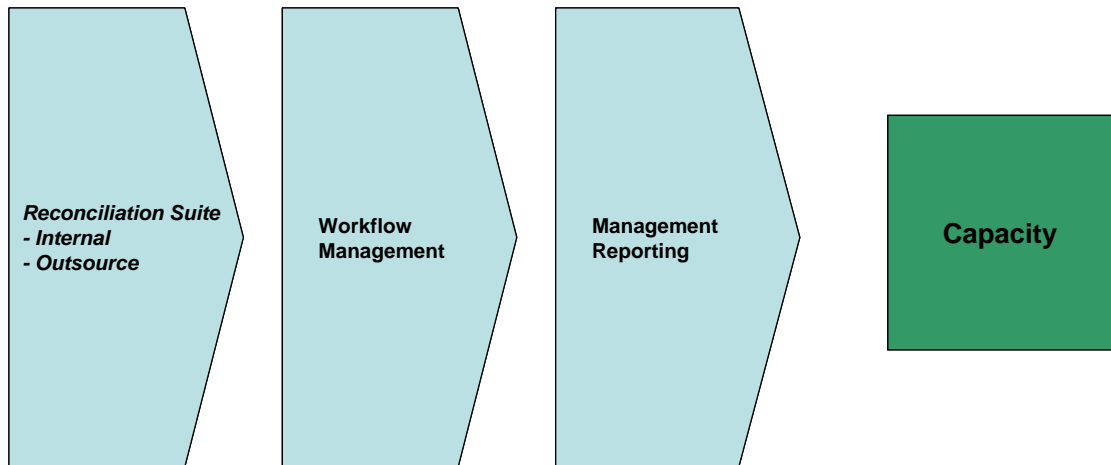
By way of guidance, we found certain core fields gave consistently high and accurate trade matching results, as set out in the table below:

Column Name	Explanation	Mand or Prod	Product Applicability
Mandatory fields			
TRADE_ID	Trade identifier	M	All
PARTY_ID	Party identifier	M	All
CP_ID	Counter party identifier	M	All
PRODUCT_CLASS	Categorisation of trade	M	All
TRADE_DATE	Trade date	M	All
END_DATE	End date	M	All
NOTIONAL	Notional amount	M	All
TRADE_CURR	Currency	M	All
MTM_DATE	Mark-to-market date	M	All
MTM_VALUE	Mark-to-market value	M	All
MTM_CURR	Mark-to-market currency	M	All
External identifiers			
CP_TRADE_ID	Counterparty trade identifier		All
Trade classification			
TRADE_GROUP_ID	Combination of trades		All
Generic columns			
UNDERLYING	Reference to underlying asset		All
CSA_TYPE	Credit support agreement type		All
CSA_DATE	Date of signing of CSA		All
Product specific columns			
PAY_REC	Payer or Receiver	P	Swap
COUPON_RATE	Fixed coupon rate	P	Interest Rate
START_DATE	Start date		All
NOTIONAL2	Second notional for multicurrency trades	P	Cross Currency, FX, Equity, Commodity, Energy
TRADE_CURR_2	Second currency for multicurrency trades	P	Cross Currency, FX
STRIKE_PRICE	Strike price for options	P	Option
ASSIGNMENT_DATE	For assigned trades. This represents the date the original party steps out and the new one steps in.		All
STEP_OUT_PARTY	The name of the stepping out party.		All

7.4 Technology, Performance, Reporting

The final pillar in the Strategic Reconciliation Model is having the technology necessary to get the added value from portfolio reconciliations.

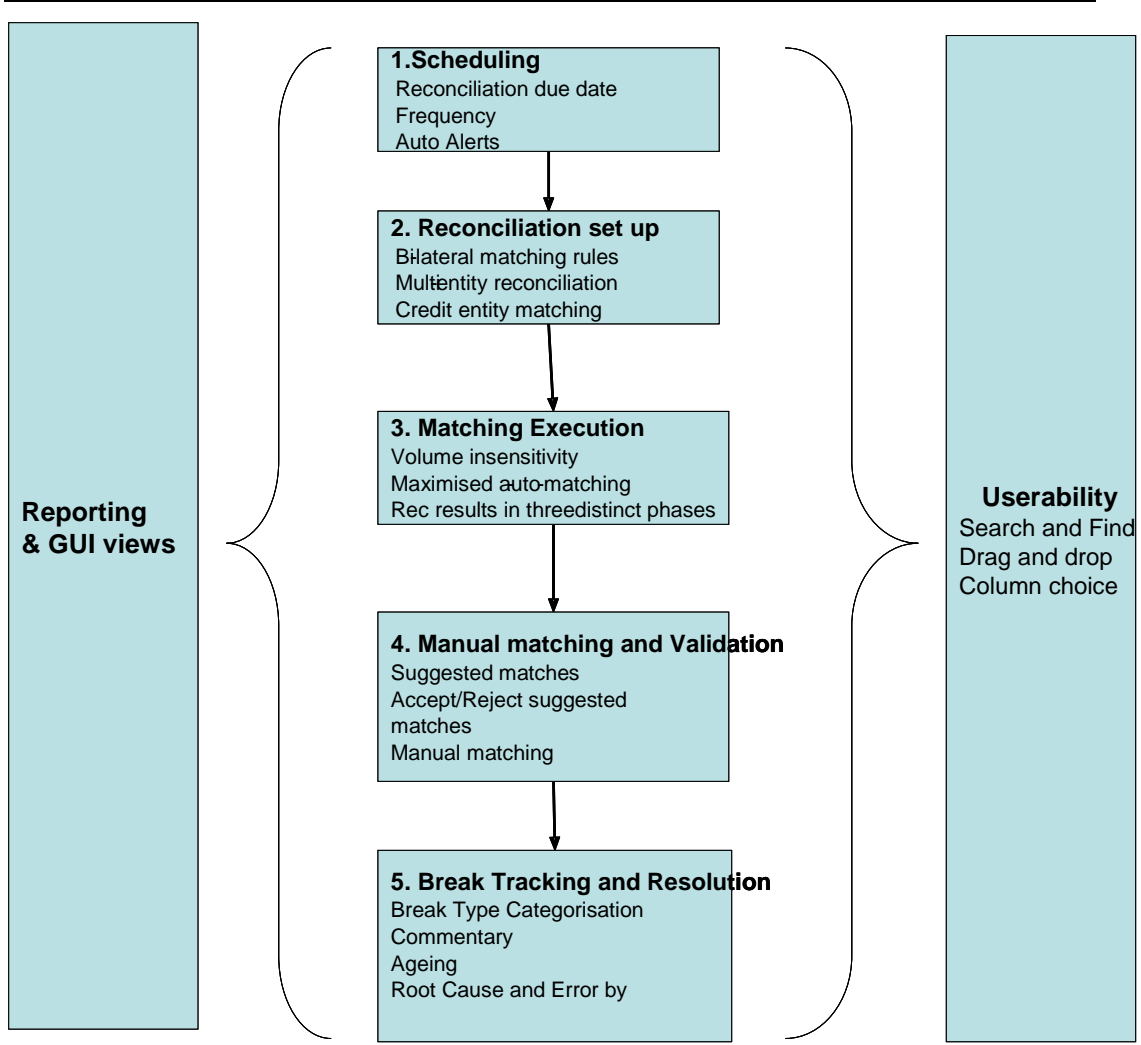
Scalability is critical and technology is key to realising scale.



7.4.1 Technology: The generic functionality requirements for Portfolio Reconciliation

A key requirement is functionality which allows counterparts to match trades, review and update results easily, and re-run the reconciliation as of a given business date to increase the overall matching rate. The matching algorithm used should be capable of 'intelligent' updating on a regular basis so that parties may configure their data to get best 'first pass' results at subsequent reconciliations.

In trials, we have found that, once initial data configuration is complete, a standard first-pass match rate can be expected in the region of 90% of trades in the portfolio. Subsequent reconciliations increased the match rate to around 95%, before any root-cause analysis or break investigations were conducted.



7.4.2. Technology – Critical Path Requirements

We believe that counterparts should make use of reconciliation technology for reconciling their portfolios – whether that comprises an in-house solution, an out-sourced solution, or both. The more automated solutions will reduce significantly the amount of resource necessary to reconcile portfolios over time resulting in a very limited headcount being able to process a very substantial number of trades.

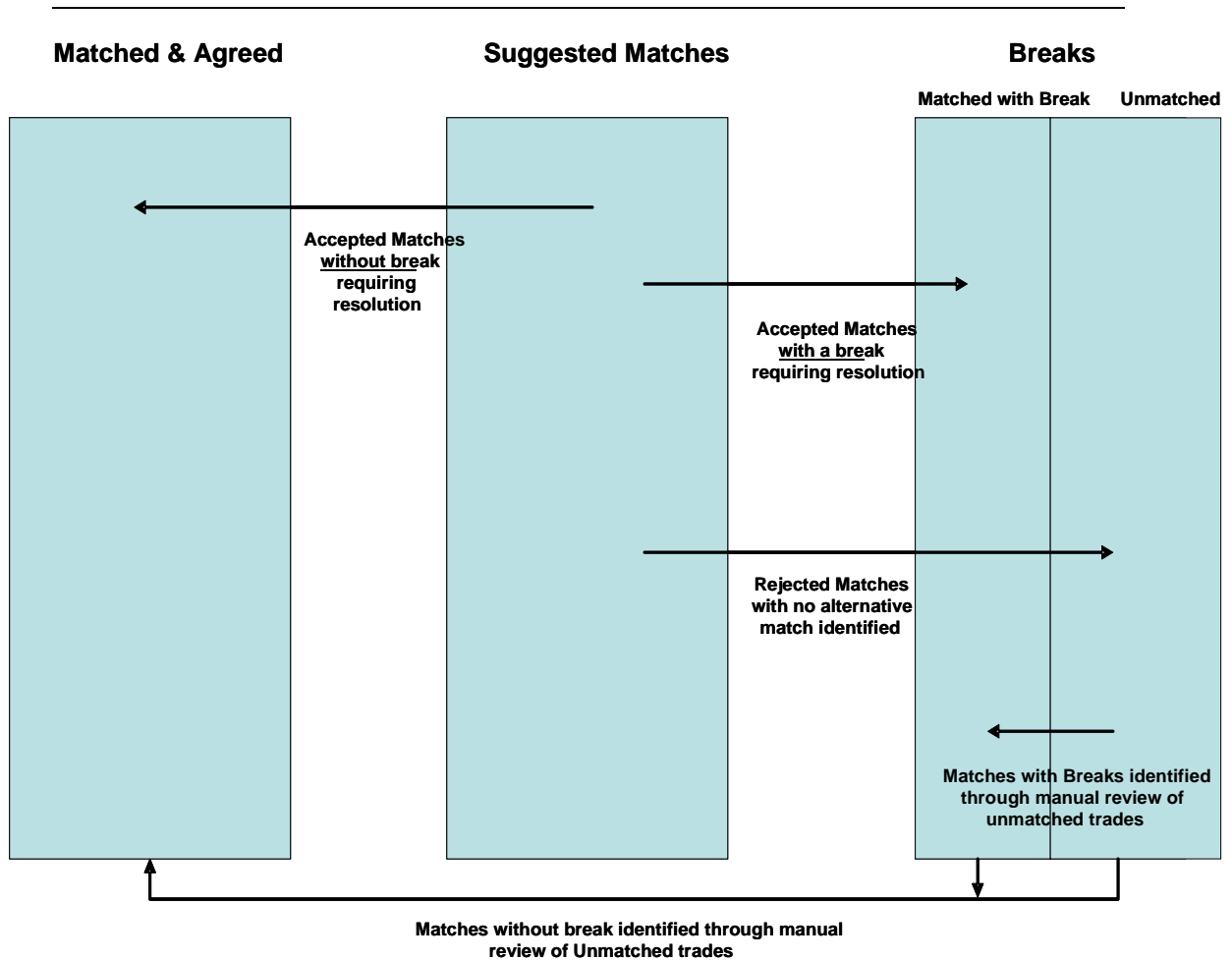
The main requirements of any technology solution are summarised in the table below:

Reconciliation Stage	Critical Functionality
Scheduling	<ul style="list-style-type: none"> • By Counterpart • Next Rec due date, Portfolio request date • Rec frequency (ie. weekly, monthly, etc)
Submission	<ul style="list-style-type: none"> • Auto feed from internal technology for principal portfolios (NB. Principally an internal Tech requirement)
Set up	<ul style="list-style-type: none"> • Credit entity mapping and matching • Rule set pick list and ability to apply by counterpart • Mapping simplicity • Approval/verification for rules and criteria set up – As a report control • Trade Level tolerances
Matching Execution	<ul style="list-style-type: none"> • Volume insensitivity • Target over 98% auto-match rate • Reconciliation results split by 1. Matched & agreed 2. Suggested Matches 3. Breaks
Manual Matching & Validation	<ul style="list-style-type: none"> • Interoperability between 3 Status categories • Accept/Reject suggested matches • Manual matching • Multi option Sort, Filter and Views
Break Tracking and Resolution	<ul style="list-style-type: none"> • Break type categorisation and priority • Commentary • Ageing • Ownership/Assigned to • Error by • Root Cause • Break closure
Reporting	<ul style="list-style-type: none"> • As defined in separate Reporting requirements list • Includes Time Spent record

7.4.3 Technology: Manual matching and validation workflow requirement

There is a tangible benefit to be had if the technology used can actively help to improve the reconciliation process through the provision of increased auto-matching, workflow management, the collation of root-cause analysis and the production of MIS.

Whilst industry-adopted standard data for portfolio presentation are critical to achieving the highest possible match rates, there remains a need for manual intervention to handle matching of complex (multi-leg) and unmatched trades. Once matches have been identified, trades should be permanently linked so that the break does not reoccur on next presentation of the portfolio unless there has been a change to a matching field (eg MTM difference above the agreed tolerance level).



7.4.4. Enhancing Performance, Increasing Automatching Rates

Reconciliation Procedures

Successful reconciliation (that is, a timely and accurate reconciliation), depends on both parties working together at the same time and with similar levels of priority. Portfolio reconciliations can be a time-consuming activity, and much of their relative success depends on other internal groups and systems.

Trade Flow Procedures

Trade flow issues in general are probably more difficult to get to the bottom of than reporting issues. There is a need to address the root causes of booking and valuation discrepancies, to establish ownership for the remedying of issues and to monitor and escalate discrepancies if they persist over time.

Industry agreed Data Standards

Presentation by counterparties of portfolios for reconciliation in a consistent format and to agreed standards is the vital ingredient to achieving the highest auto-matching rates.

An ISDA Data Standards Working Group (DSWG) in conjunction with FpML, various vendors and this Collateral Framework Group have agreed a recommended Data Standard. This Data Standard continues to adapt based on market practice but is recommended as a best practice.

Many counterparties may not be in a position to supply all data fields in the recommended form, but we consider it helpful to have proven data fields available to participants to reference in developing their own capability.

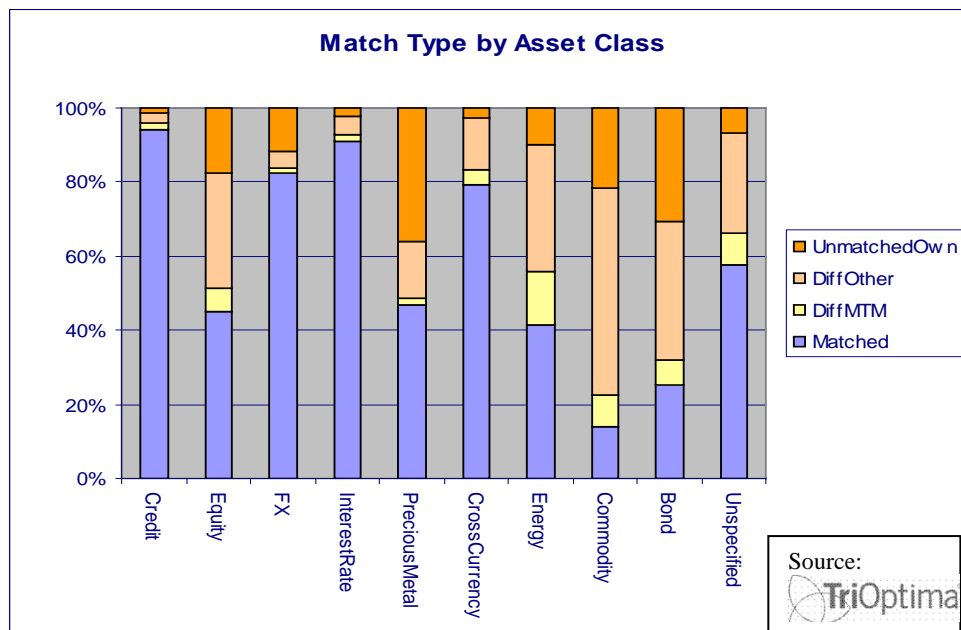
7.4.5. MI and Reporting

Powerful exception-based reporting generated automatically following reconciliation and available immediately to both parties for action is a key requirement in managing the break resolution process, root cause analysis and risk management.

Metrics and tailored reporting are two essential elements of the reconciliation function, providing industry benchmarks as to the relative performance of different reconciliations and acting as a measurement tool. MI and reporting not only aid the escalation and resolution of breaks, but also can provide concrete data to demonstrate the necessity of the function as an operational risk mitigant.

Metrics and reporting can be leveraged to provide justification for internal system or process changes to address common root causes. In turn, providing a workflow for users actioning a number of different reconciliations and ensuring that transparency and focus is given to high value or aged breaks is important as well.

Comparison against industry benchmarks gives insights into potential internal problems and more generalised market issues. The graph below analyses over three million trades by product class to show credit, FX, IRS and cross-currency trades with high match rates and few differences, whilst commodity, metals and energy are less standardised. Individual reconciliation results against benchmarks may indicate internal issues; alternatively, valuation of energy derivatives would appear to be a market problem.



In practice, the following MI categories (and underlying internal root causes) are effective in enabling counterparties to prioritise their approach:

- **Data Standards:** Reporting standards differ between counterparts

Low-Level Categories: *Currency, End Date, Product Class, Reference Entity, Trade Date, Notional.*
- **Independent Amount:** Initial margin calculation

Low-Level Category: *Independent Margin.*
- **Margin Agreement:** Inclusion/exclusion of monitored trades.

Low-Level Category: *CSA.*
- **Matured:** Past end date submission

Low-Level Categories: *Cancellation, Cancelled - Late Booking, Expiry, Matured, Novated.*
- **System/Technology:** Technical issues

Low-Level Categories: *PMT - Incorrect in portfolio, Spot FX, Timing, Under Investigation.*
- **Trade Booking:** Misbooked or late trades

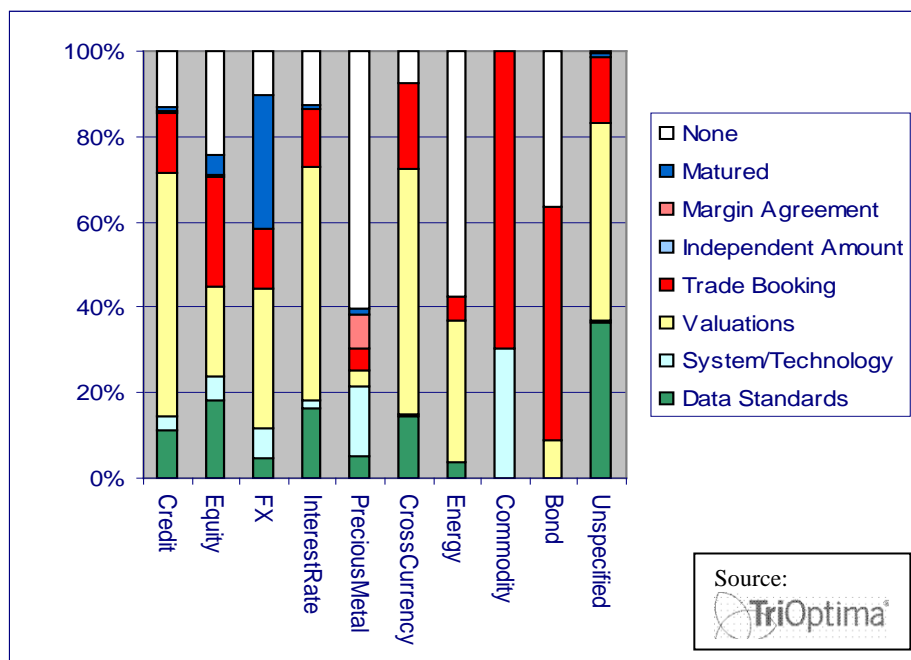
Low-Level Categories: *Entity Misbooking, General Misbooking, Not full leg population, Not Recognised, Notional Misbooking, Novation.*
- **Valuations:** MTM differences over \$500k.

Low-Level Categories: *\$500k - \$1mm, > \$1mm.*

- **Reporting by Root Cause**

These are exceptions grouped to look at the root cause of breaking fields. The example below shows a high-level breakdown of common issues.

It should be borne in mind that the percentage breaks in individually matched portfolios is probably quite small (circa 2% – 4%). Not all breaks, system/technology and data standards, have an economic impact, and represent field differences arising from the way the trade is booked and data is presented.



Being able to access detailed reporting of your own reconciliation results, and root cause analysis, creates powerful transparency. For example, the way that trades are booked and presented, ie data standards, are ultimately an industry problem that requires the development of a consistent approach over time. Alternatively, MTM valuation mismatches may be a more immediate issue as a cause of call disputes which represents a current risk in the portfolio.

In order to quantify the impact of breaks from a risk perspective, a weighting may be applied that corresponds to the volume and value of the exceptions within age brackets e.g. exceptions aged 90+ days have the largest weighting and aged 0 - 5 days have the smallest.

8.0 Conclusion

This group, and the body of work it has produced, is a product of industry cooperation and the benefits of this continuing to develop are clear. Significant amounts of work have gone into the development of reporting, break analysis and establishment of common data standards, to achieve optimal benefit from the portfolio reconciliation process.

There is also great benefit of parties to a reconciliation meeting regularly to discuss their issues – both at analyst and management levels - at an analyst level to highlight issues and to work together to resolve breaks, and at a management level to provide direction and to synchronise relative priorities and resources.

Powerful automatching and reporting allows portfolios to be managed in the collateral space on an exception basis and, as we move towards daily reconciliations, opportunities arise to replace existing manual processes with automated ones, eg telephone confirming.

Benefits extend throughout the organisation but are immediately felt in the collateral space through reduction of disputes and more efficient management of exposure. Recent turbulence in the financial markets raised a flurry of call disputes and brought under the spotlight the power of these new tools at our disposal. Using Portfolio Reconciliation, the industry was able to pinpoint causes of disputes within hours and agree calls quickly.

The development of a means to successfully reconcile large portfolios on an automated exception basis has opened up a wide range of possibilities for using this technique which seem almost limitless. Within quite a short space of time, we believe that Portfolio Reconciliation will be accepted as an important way forward for the industry in terms of trade validation, control and managing OTC risk.