
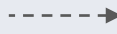

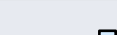







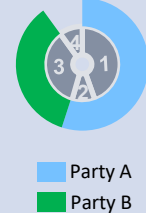
# **Clearing and Settlement in the Secured Financing Transaction Market**

**Trade Flow Mapping**

**Updated November 2022**

# Map Legend

Flows	Description
	<b>Two-Way Information Flow</b> (Trade Messaging, Confirmation, Matching, etc.)
	<b>One-Way Information Flow</b> (Delivery/Receive instructions, Settlement confirms, etc.)
	<b>Security Movement</b> (Movements across the Fedwire Securities Service or as a transfer on the books of a bank)*
	<b>Cash Movement</b> (Movements of cash)
	<b>Movement of Securities versus Cash</b> (Movement of securities against movements of cash)

Risk Event	Description										
	<b>Counterparty Credit Risk</b> (Risk of Counterparty nonperformance. Encompasses replacement risk, including associated market risk)										
	<b>Centrally Cleared Credit Risk</b> (Risk Central Clearing Counterparty assumes in becoming principal to the trade)										
	<b>CCP Counterparty Risk</b> (Buyer/Seller's risk of CCP nonperformance. Encompasses replacement risk, including associated market risk)										
	<b>Credit Extension Risk</b> (Risk assumed by parties advancing cash upon receipt of Treasuries on behalf of underlying Buyer. In the event of a Buyer's default, extended party must liquidate Treasuries and absorb credit and market risk)										
	<p>For clearing and settlement on a <b>bilateral basis</b>, over the <b>tri-party repo settlement platform</b> and for <b>securities lending transactions</b>, the numbered quadrants denote the following stages of the transaction life cycle:</p> <table border="0"> <tr> <td>1. Execution</td> <td>3. Clearing/Settlement</td> </tr> <tr> <td>2. Affirmation/Matching</td> <td>4. Final Settlement</td> </tr> </table> <p>For clearing and settlement <b>with a CCP</b>, the numbered quadrants denote the following stages of the transaction lifecycle:</p> <table border="0"> <tr> <td>1. Execution</td> <td>4. Final Settlement of Start-Leg</td> </tr> <tr> <td>2. Affirmation/Matching</td> <td>5. Clearing/Settlement of End-Leg</td> </tr> <tr> <td>3. Clearing/Settlement of Start-Leg</td> <td>6. Final Settlement of End-Leg</td> </tr> </table> <p>Colored regions denote parties exposed to risk during the corresponding life cycle stage</p>	1. Execution	3. Clearing/Settlement	2. Affirmation/Matching	4. Final Settlement	1. Execution	4. Final Settlement of Start-Leg	2. Affirmation/Matching	5. Clearing/Settlement of End-Leg	3. Clearing/Settlement of Start-Leg	6. Final Settlement of End-Leg
1. Execution	3. Clearing/Settlement										
2. Affirmation/Matching	4. Final Settlement										
1. Execution	4. Final Settlement of Start-Leg										
2. Affirmation/Matching	5. Clearing/Settlement of End-Leg										
3. Clearing/Settlement of Start-Leg	6. Final Settlement of End-Leg										

\*"Fedwire" is a registered service mark of the Federal Reserve Banks




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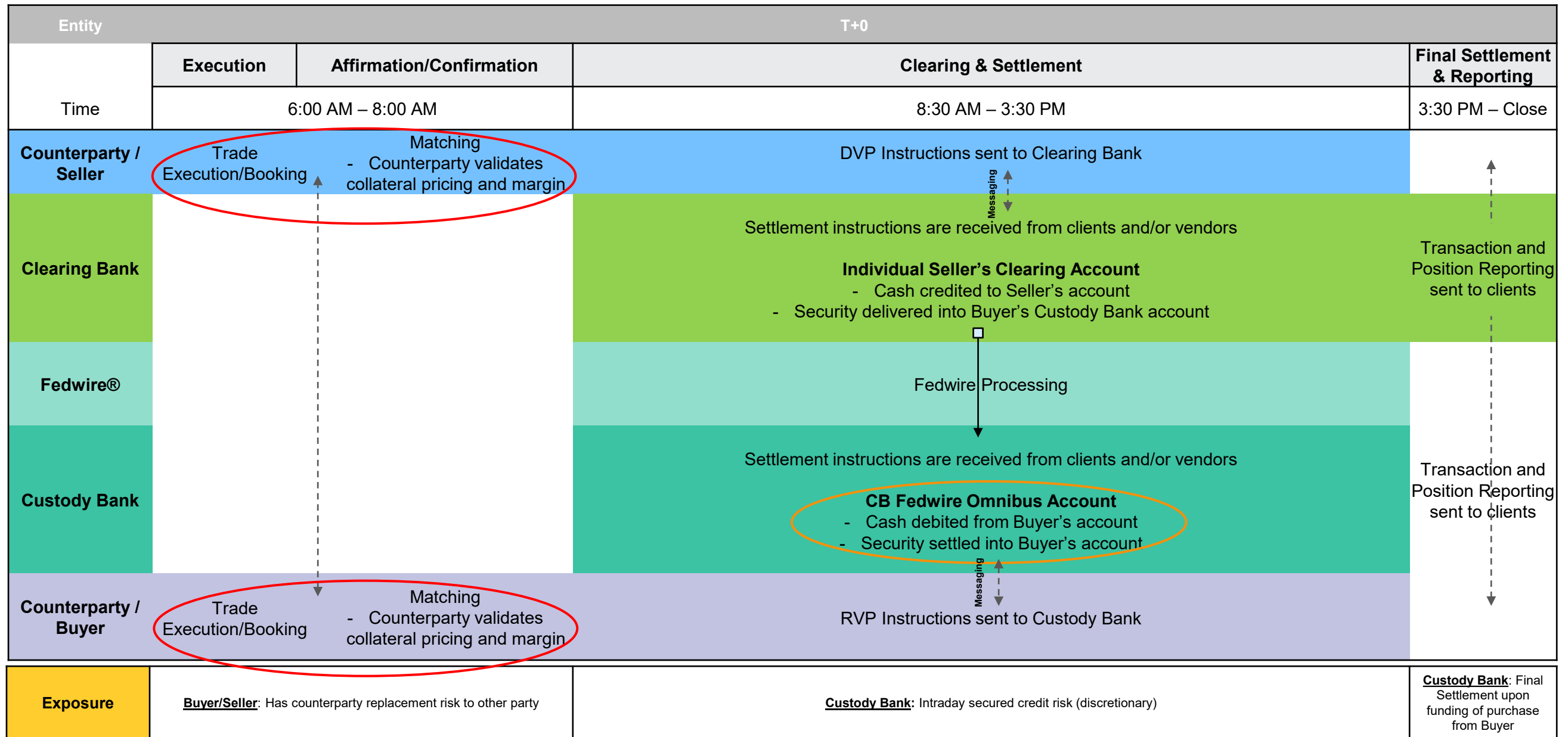
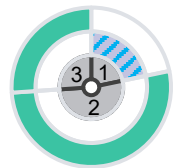
## Exhibits: Stylized maps and accompanying notes

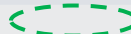
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# **1. Clearing and Settlement on a Bilateral Basis**




# Exhibit 1a. Bilateral Repo Flow – On-Leg of Repo T+0

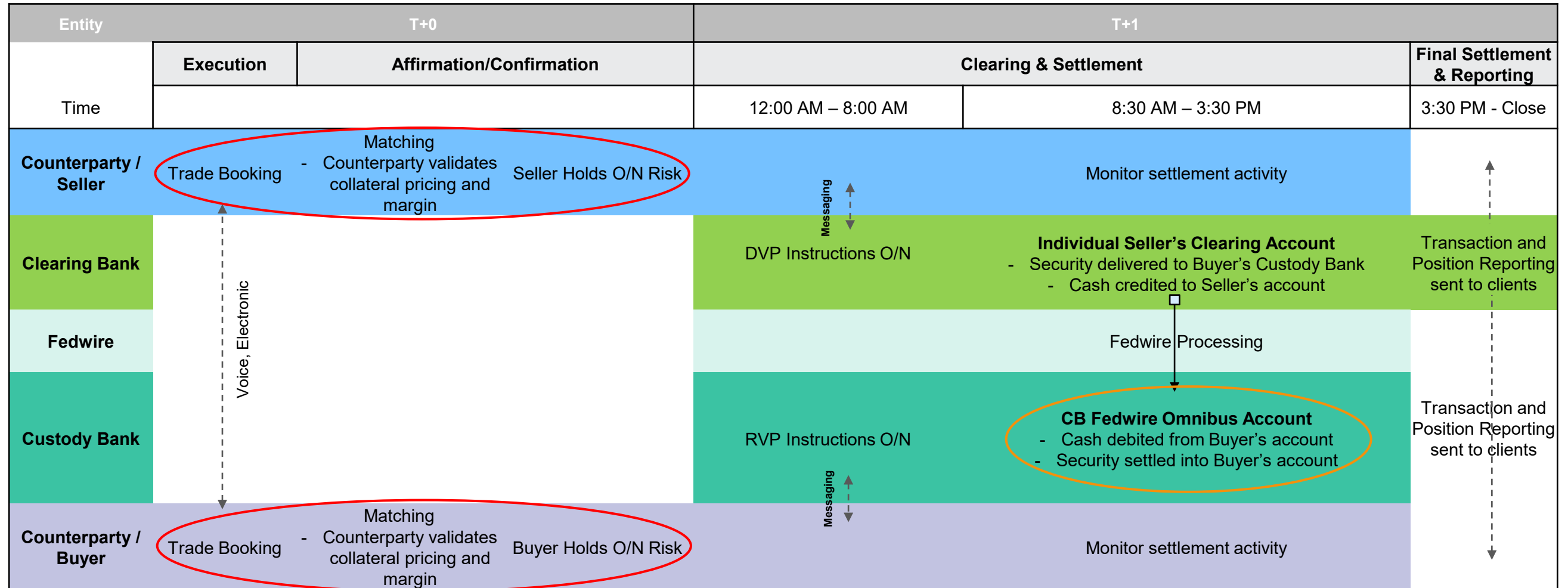
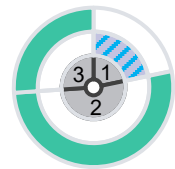
-  Buyer/Seller
-  Clearing Bank
-  Custody Bank



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

# Exhibit 1b. Bilateral Repo Flow – On-Leg of Repo T+N

 Buyer/Seller  
 Clearing Bank  
 Custody Bank



<b>Exposure</b>	<b>Buyer/Seller:</b> Has counterparty replacement risk to other party	<b>Custody Bank:</b> Intraday secured credit risk (discretionary)	<b>Custody Bank:</b> Final Settlement upon funding of purchase from Buyer
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Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		

# Bilateral Repo Flow – On-Leg of Repo Details

## Execution & Affirmation/Confirmation

### Buyer Actions

- DVP Repo Trade is executed over phone or electronic platform
- Buyer enters trade into their trading system
- Buyer receives details of the trade and collateral information from Seller
  - Trade Support uses this file as a confirmation and compares the details of the file to the trading system
- Buyer uploads collateral into their system and prices the collateral using a vendor for pricing service
  - Any pricing differences can be double checked using a third-party pricing source

### Seller Actions




- DVP Repo Trade is executed over phone or electronic platform
- Seller enters trade into their trading system
- Seller sends trade and collateral details to buyer for review and confirmation
  - Trade Support uses this file as a confirmation and compares the details of the file to the trading system

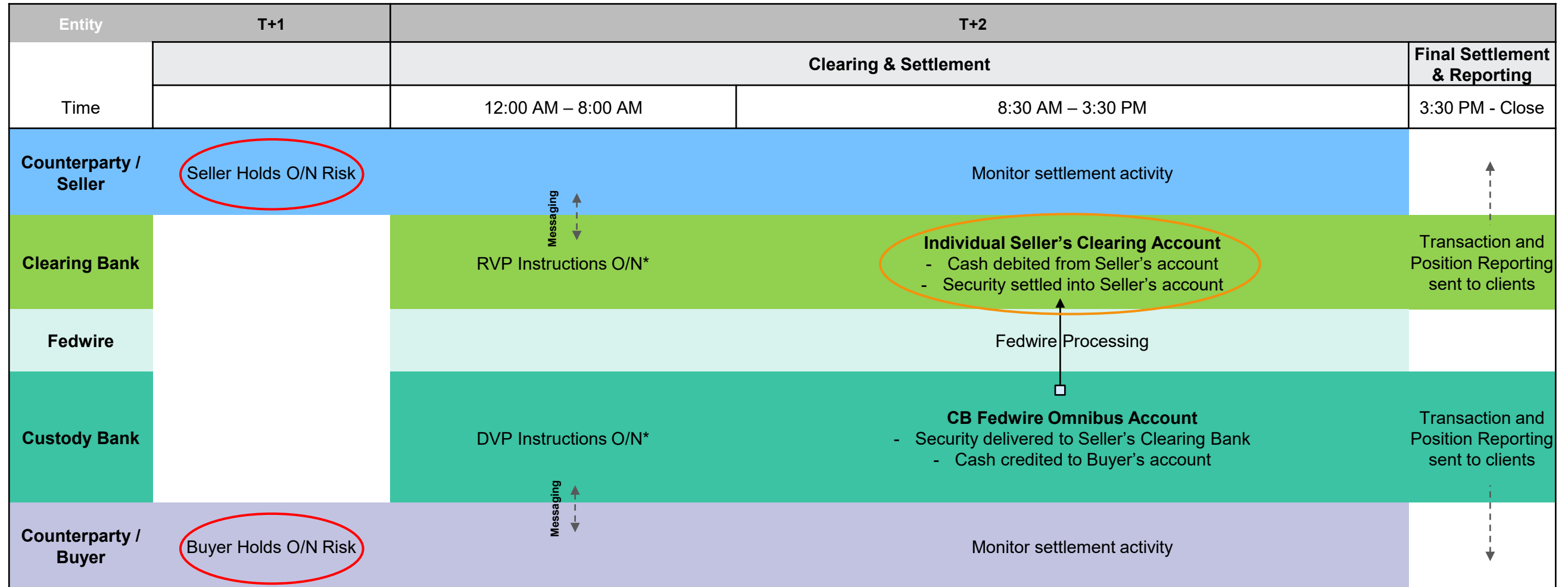
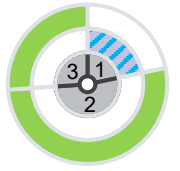
## Clearing and Settlement

- Buyer Actions
  - Once trade and collateral details are agreed to, Buyer's Trade Support notifies the Seller
  - RVP Instructions for approved collateral are sent to Custody Bank
    - Custody Bank can receive directly from Buyer, or from a vendor on behalf of the Buyer
- Seller Actions
  - Seller sends DVP Instructions to Clearing Bank to deliver collateral to Buyer
    - Clearing Bank can receive directly from Seller, or from a vendor on behalf of the Seller
- Term Trades
  - Mark to Market – will be handled between buyer and seller via a cash wire or pairing off the repos and rebooking based on the new collateral value
- 8:30 AM – 3:30 PM
  - Majority of trades are booked or agreed to prior to 12:00 noon
    - 11:00 AM – Approximately 80% of trades are settled by this time
  - Overnight trades are completely unwound the following day – cash and collateral are reversed out after the opening of Fedwire Securities\*
  - RVP/DVP Instructions sent via Messaging by both counterparties to their respective Clearing or Custody banks throughout the day
    - Upon settlement, there is an immediate exchange of cash and collateral between the Buyer and Seller
  - Clearing/Custody Banks may provide intraday credit to their customers to facilitate settlement at their discretion

\*Settlement can occur on T+0 or T+N

# Exhibit 1c. Bilateral Repo Flow – Off-Leg of Repo T+0 or T+N

-  Buyer/Seller
-  Clearing Bank
-  Custody Bank



<b>Exposure</b>	<b>Buyer/Seller:</b> Has counterparty replacement risk to other party	<b>Clearing Bank:</b> Intraday secured credit risk (discretionary)	<b>Clearing Bank:</b> Final Settlement upon funding of purchase from Seller
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Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

\*Instructions can be sent prior to settlement date



# Bilateral Repo Flow – Off-Leg of Repo T+0 or T+N Details

## Clearing and Settlement

- Rolling vs Non-rolling
  - Rolling repo involves the buyer and seller agreeing to similar terms as the day prior and netting the pricing and mark to market amounts via a net payment obligation between the two parties. The benefit of this is that it avoids the potential credit needs and operational settlement work involved in gross unwinds of the maturing repo in the morning followed by the creation of a new repo shortly thereafter.
  - Non-rolling repo assumes each trade is separate and distinct and restarts each day, even if the counterparty, collateral and terms are very similar
- Term Trades
  - Between the on-leg and off-leg settlement days, mark to market adjustments are processed between buyer and seller via a cash wire or pairing off the repos and rebooking based on the new collateral value
- 12:00 AM – 3:30 PM
  - Buyer Actions
    - Buyer's Trade Support notifies the Seller and instructs their Custody bank to return the approved collateral
      - Custody Bank can receive directly from Buyer, or from a vendor on behalf of the Buyer
  - Seller Actions
    - Seller sends RVP Instructions to Clearing Bank
      - Clearing Bank can receive directly from Seller, or from a vendor on behalf of the Seller
- 8:30 AM – 3:30 PM
  - Overnight trades are completely unwound the following day – cash and collateral are reversed out at the opening of Fedwire Securities\*
    - Upon settlement, there is an immediate exchange of cash and collateral between the Buyer and Seller
  - Clearing/Custody Banks may provide intraday credit to their customers to facilitate settlement at their discretion



## Final Settlement and Reporting

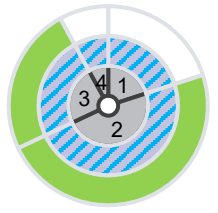
- 3:30 PM – Close
  - Clearing Bank sends transaction and position reporting to clients
  - Clients are expected to fund their accounts accordingly by end of day (debit or credit position)


\*Settlement can occur on T+0 or T+1

## **2. Clearing and Settlement on the Tri-party Repo Settlement Platform**

# Exhibit 2a. Tri-Party Workflow: Trade and Settlement Date

 Buyer/Seller  
 Tri-Party Agent



T + 0 (Same Day)					
	Execution (1)	Affirmation/Confirmation (2)	Settlement (3a) Collateralization and Funding	Settlement (3b) Collateral and Cash Exchanged	Reporting (4)
Time*	7:00 AM – 9:00 AM	10:00 AM - 3:00 PM	3:30 PM – 6:00 PM		Post 8:00 PM
<b>Seller (Collateral Provider)</b>	Agree to the trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-Party Agent of trade details	Collateral is allocated to the Tri-Party Repo settlement platform		
<b>Tri-Party Agent</b>		Match Trade instructions upon receipt  System creates Trade	System screens for eligibility, prices and margins collateral  	Cash is transferred to Seller's account; Collateral is transferred to Buyer's account.	Collateral reports transmitted to Buyer and Seller
<b>Buyer (Collateral Receiver)</b>	Agree to the trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-Party Agent of trade details	Cash is allocated to the Tri-Party Repo settlement platform		
<b>Tri-Party Exposure</b>	<b>Buyer/Seller:</b> Has counterparty replacement risk to other party	<b>Buyer/Seller:</b> Opportunity Cost should trade not match <b>Tri-Party Agent:</b> Potential need to finance/lend	<b>Buyer/Seller:</b> Opportunity cost should there be collateral/cash shortfall  <b>Tri-Party Agent:</b> Potential need to finance/lend		<b>Buyer/Seller:</b> Inability to reconcile if reports are not received

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

# Tri-Party Workflow: Risk Highlights & Mitigants

## 10:00 AM – 3:00 PM – Trade Instruction Matching Process

- Between 10:00 AM and 3:00 PM the Seller(s) and Buyer(s) transmit their trade instructions to the tri-party agent's deal matching system. These instructions can be transmitted via files or entered directly onto the Collateral Management system. There are two types of trade instructions that require matching (1) a maturing trade the buyer and seller would like to extend or (2) a new trade being booked. Should the tri-party agent not receive matched instructions by the 3:00 PM deadline (though deals can match up to 3:30 PM when unmatched triparty deals will unwind), at 3:30 PM the maturing deal will unwind. The risk for the Seller could be the Seller holding collateral they cannot finance, which would require internal financing or, if unavailable, a bank loan. Risk for the Buyer could be that they would hold cash they cannot invest overnight and could be held with their custodian bank overnight.
- **The potential reasons for a deal being unmatched intra-day:**
  - Timing – Buyer & Seller may send instructions at different times
  - Operational – Client may fail to send a specific trade instruction or may input trade details incorrectly
  - Technology – Could impact multiple counterparties; the tri-party agent would identify the issue and contact the impacted buyer(s) and/or seller(s)
  - Credit/Liquidity – one counterparty cannot honor its obligation(s) or has concerns about their counterparty and does not match the trade
- **Solutions/Workarounds for potential issue(s)**
  - Timing – the seller can request the tri-party agent delay the running of the settlement algorithm to allow additional time for instructions to be matched
  - Operational or Technology – the tri-party agent provides a bulk upload tool allowing buyer/seller to provide trade instructions which will be automatically uploaded into the collateral management system. For limited issues, the buyer/seller can enter the trade instructions directly into the system. If a trade instruction is entered incorrectly, that party would either modify the trade instructions, or if agreed to by both parties, the trade could be cancelled and resubmitted. If it is the seller's issue, the buyer can affirm the modified or new instruction.

## 3:30 PM – 6:00 PM: Eligibility Screening, Trade Collateralization

- Incorrect pricing or discrepancy in collateral pricing
  - Collateral may be a bad mix, requiring additional collateral, cash or potentially a bank loan
- Misallocation of Seller's collateral
  - Allocation logic can be driven by automatic allocation, allocation optimization, or directed allocations via the seller's allocation algorithm
- Buyer may wire insufficient cash or fail to wire any cash

## Post 8:00 PM: Collateral Reports Sent to Parties


- Delayed reports or failure to transmit reports can lead to reconciliation issues for both Seller(s) and Buyer(s) and potential impact to downstream systems/processes

# Exhibit 2b. Tri-Party Workflow: T+1 Actions and Maturity

T + 1											
	Mark to Market (1)		Allocations and Substitutions (2)						Return of Cash and Collateral (3)		
Time	2:00 AM	6:00 AM	7:00 AM – 9:00 AM	8:30 AM – 11:00 AM	12:00 PM	12:30 PM	12:45 PM	1:00 PM – 3:00 PM	3:30 PM	4:00 PM – 6:00 PM	
<b>Vendor</b>	Pricing files (with prior day pricing for all securities) sent to Tri-Party Agent*					Pricing files (for subset of securities) sent to Tri-Party Agent					
<b>Counterparty</b>											
<b>Seller (Collateral Provider)</b>			Initiates collateral allocation to ensure trade remains fully collateralized  - Raises liquidity to facilitate substitutions	<u>Collateral Substitution</u> DVP Instruction sent to Clearing/Tri-Party Agent	<u>Collateral Substitution</u> Allocate new/replacement collateral to tri-party trade			Initiates collateral allocation to ensure trade remains fully collateralized	Provide sufficient liquidity for trade maturity  - Raise liquidity to facilitate maturing trades as well as principal decreases		
				RvP Instruction sent to Clearing/Tri-Party Agent							
				-Verify trade is collateralized throughout the day -Can contact tri-party agent with price challenges							
<b>Tri-Party Agent</b>		<u>Mark-to-Market</u> Prices and indicative data are reflected in collateral management system*	Tri-Party Repo system processes allocation	<u>Collateral Substitution</u> - Collateral is removed from tri-party trade and replaced with cash generated from DVP - Collateral is delivered versus payment to counterparty	<u>Collateral Substitution</u> - Allocation is processed on Tri-Party Repo system - Cash is removed from trade and replaced with new/replacement collateral		<u>Mark-to-Market</u> Updated prices are reflected on collateral management platform**	Collateral management system processes allocation	<u>Facilitate maturity of deal</u> Ensure Seller has sufficient liquidity for trade unwind Simultaneous movement of cash and collateral - Debit Seller principal + interest - Credit Buyer account with principal + interest - Collateral returned to Seller	Collateral transferred off the Tri-Party Repo settlement platform. Cash transferred off the Tri-Party Repo settlement platform.	
				<u>Collateral Substitution</u> -Payment made to counterparty -Receive new/replacement collateral versus payment							
<b>Buyer (Collateral Receiver)</b>										- Verify trade is collateralized throughout the day - Can contact tri-party agent with price challenges	
<b>Tri-Party Exposure</b>	<b>Buyer:</b> Risk of being undercollateralized		<b>Seller:</b> Potential inability to substitute collateral if there is insufficient liquidity <b>Tri-Party Agent:</b> Credit extended against replacement collateral until such time it's allocated						<b>Buyer/Seller:</b> If Seller doesn't have liquidity, trade can't be unwound; Buyer won't be able to get cash back (but will remain collateralized) <b>Tri-Party Agent:</b> Potential to extend credit to facilitate unwind		

\*Prices are from prior day closing  
 \*\*Updated prices are for a subset of securities (Treasuries and Agency debentures)  
 Indicates this action is occurring at or has a "set deadline"

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
← - - - - - →	Two-Way Information Flow	- - - - - →	One-Way Information Flow	→	Security Movement	— □	Cash Movement

  Buyer/Seller  
  Tri-Party Agent  


# Tri-Party Workflow: Risk Highlights & Mitigants

## 2:00 AM and 12:30 PM – Vendor Pricing Files Sent to Tri-Party Agent

- Tri-Party Agent doesn't receive pricing files
  - Can lead to stale pricing in the system, which could lead to inaccurate collateral pricing, possibly exposing one of the parties to under/over collateralization
    - Technology monitors to ensure receipt of daily files and will contact the Vendor if a file is not received within a specified time frame. Alternative workarounds are in place with alternative Vendors.
- Vendor may send incomplete pricing files
  - Similar impact, uncertainty of what is correct vs incorrect
    - Technology will identify an incomplete file by record count or file size and contact the Vendor.
- Tri-Party Agent receives invalid or inaccurate pricing files
  - Exposes the Tri-Party Agent, Seller and Buyer to possible financial or reputational risk.
    - Tri-Party Agent has numerous validation and audit procedures designed to identify incorrect pricing. Tri-Party Agent validates and authorizes certain pricing on a daily basis. When such issues are encountered, Tri-Party Agent will engage the vendor. In many cases the vendor will also send out notifications of incorrect pricing.

## 7:00 AM – 9:00 AM – Collateral Allocation

- Tri-Party Agent identifies and monitors trades that are undercollateralized.
- At this time, the Buyer can potentially be exposed to the Seller (if shortage exceeds the margin).
- Seller allocates collateral to ensure trades are fully collateralized.

## 8:30 AM – 3:30 PM – Intraday Collateral Substitution

- Seller must have sufficient liquidity in order to process collateral substitution
  - When security is delivered versus payment, cash from delivery is used to replace substituted collateral.
  - If security is delivered free of payment, Seller must have liquidity to replace substituted collateral in order to process the free of payment delivery
- If Seller doesn't purchase new replacement collateral, Buyer will be holding cash instead of collateral
  - Until replacement collateral is allocated, the Tri-Party Agent is extending credit against the newly purchased collateral
    - If at 12:00PM the Seller has not allocated replacement collateral to tri-party trade, the collateral management system will automatically move collateral from Seller's account and allocate to tri-party trade, replacing the substitution cash and extinguishing the bank's extension of credit
- If Tri-Party Agent has a system issue preventing the substitution process from occurring, the Seller could fail on a delivery(s) and could be subject to fail charges.

## 3:30 PM – Unwind/Maturity of Deal\*

- Insufficient Liquidity – If Seller doesn't have sufficient liquidity, trade does not unwind. If liquidity is not obtained by close of Fedwire, Buyer will have margined collateral in their possession. Buyer must then decide if they want to extend the trade or modify the deal. Alternatively, if Buyer is concerned, they could issue a notice of Default.
  - It's important to note that the Buyer is always secured with either cash or collateral.
  - If notice of default is issued, there is an operational risk of delivering collateral in a timely manner.
- Bank's exposure to a Seller's inability to unwind (due to insufficient liquidity) could cause financial exposure for the Bank.

## 4:00 PM – 6:00 PM – Wiring Principal + Interest to Buyer

- Automated creation of wire(s) to custodian bank; affirmation from Buyer to Custodian Bank on amount of P+I is a manual process
  - Fed Cutoff of 6:00 PM could lead to failed wire(s), resulting in Buyer's cash remaining with Tri-Party Agent
- Any delay(s) from issues in the previous steps in the day can lead to a tightened window for settlement ahead of the 6:00 PM deadline
  - Workarounds include increased automation in payment processes and possible market extensions, if necessary, to avoid large fail(s)

\*On average, <10% of the U.S. tri-party book unwinds daily

### **3. Clearing and Settlement with a CCP**

## CCP Risk Management Practices\*

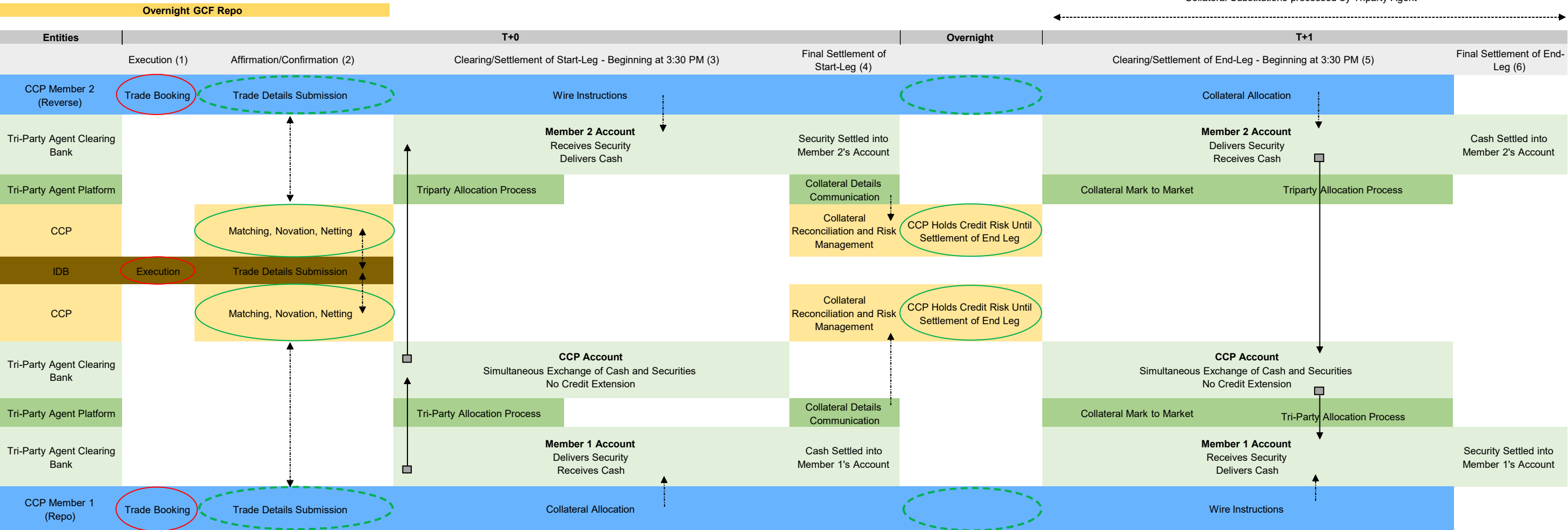
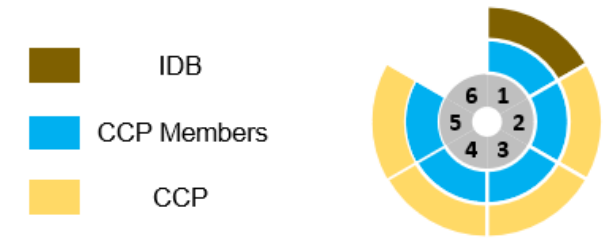
- CCP manages market risk for a Member's repo trade activity via two tools – collection of Clearing Fund margin and Mark-to-Market pass-through
- Clearing Fund margin:
  - Margin requirement is composed of two calculated components - Value at Risk and repo rate volatility
  - Margin is collected twice daily, through an Intraday and End of Day cycle\*\*
- Mark-to-Market Pass-through
  - Mark-to-Market pass-through adjustments are collected/paid twice daily, through an Intraday and End of Day cycle

\*CCP's risk management practices as they relate to the DVP Repo, GCF Repo, and Sponsored Repo transaction scenarios depicted

\*\*Although Clearing Fund collects margin from CCP Members twice daily through the Intraday and EOD cycles, CCP Member positions and margin components are recalculated on an hourly basis – CCP reserves the right to issue ad hoc margin calls



# Exhibit 3a.i. GCF Overnight Repo



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## GCF Overnight Repo

### Repo Start Date - T+0

- Trade is brokered by Inter-Dealer Broker (IDB), two trades are submitted to CCP by IDB on each CCP Member's behalf
  - At the point of trade execution, Counterparty Credit Risk exists between CCP Member 1 and the IDB, and CCP Member 2 and the IDB
  - CCP Members have visibility of the trade submitted on their behalf facing the IDB, and are required to Affirm IDB's trade submission
  - Trades are deemed to be Compared & Novated at the time of receipt by CCP from IDB
- Trade submission takes place between 7 AM – 3 PM EST. Shortly after 3 PM CCP's GCF Repo® service net takes place, netting GCF trade activity and establishing net long or short position per GCF Generic CUSIP per CCP Member
  - Trades included in GCF net include same day starting GCF Repo trades, forward starting trades due to start on current business day, and term repo trades that have started
  - CCP generates obligations to settle the position and communicates settlement obligations to Tri-Party Agent and CCP Members –GCF trades do not settle on a trade-for-trade basis, obligation is a net obligation
- Tri-party settlements begins at 3:30 PM EST – collateral providers allocate collateral to Tri-party platform of Tri-party Clearing Agent Bank, while cash lenders deliver funds to Triparty Agent to pay for purchase of collateral
  - Tri-Party Agent allocates collateral to cash lenders and cash to collateral providers through its allocation process to settle the start leg
  - Tri-Party Agent bank does not extend credit to CCP to facilitate settlement - in its allocation process, the Tri-Party Agent performs a look-through to the ultimate buyer prior to settling securities and cash
- Once GCF Repo settlement is complete, the Tri-Party Agent communicates the details of the collateral allocation to the CCP
  - CCP uses the details of the underlying securities allocated to generate Clearing Fund margin requirement based on the security positions due to be settled on T+1 (VAR only)

## GCF Overnight Repo

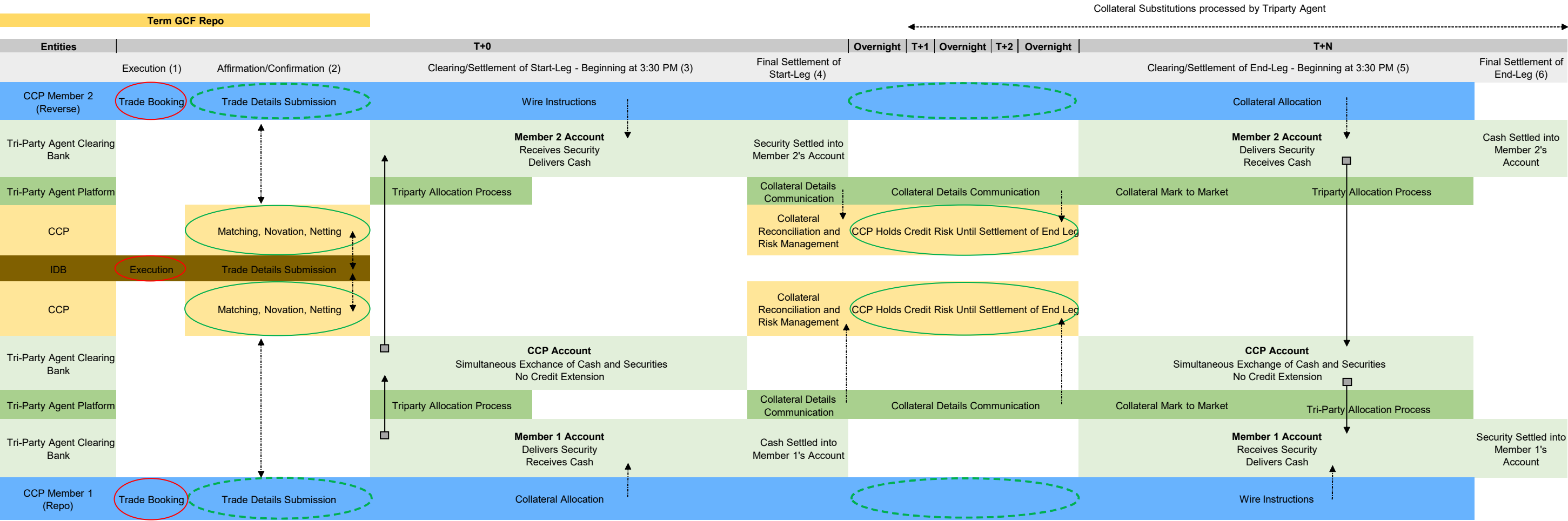
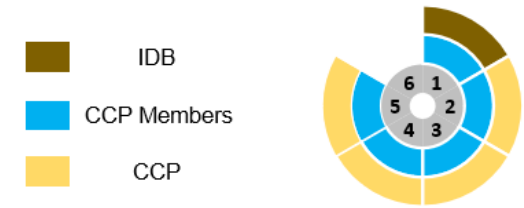
### Repo Start Date – T+0 (continued)

- Risk Management practices as applicable to this scenario:
  - **Intraday:** If trade is novated to CCP prior to noon, at intraday Clearing Fund margin requirement will be calculated based on repo rate volatility component, and collected from both CCP Members
  - **End of Day:** Clearing Fund margin requirement calculated based on VAR component
    - Repo rate volatility component ceases to be assessed as repo's end date is next business day
- Interest for the GCF Repo is calculated end of day on T+0, and settled start of day on T+1 via CCP's Funds-Only Settlement service

### Repo End Date - T+1

- Collateral Mark to Market is processed by the Tri-Party Agent on behalf of the CCP at **Start of Day** and **Intraday** – if security re-pricing results in under collateralization, collateral providers are required to top up
- Collateral substitutions may occur throughout T+1 up until unwind of repo trade – Tri-Party Agent communicates updated collateral allocation details to CCP on an hourly basis
- At **Intraday**, Clearing Fund margin requirement will be calculated for the CCP Members based on the VAR component
  - Security positions due to be settled post-3:30 PM
- Tri-Party settlement begins at 3:30 PM EST – collateral provider will now deliver funds to Tri-Party Agent to complete the purchase back of collateral
  - Tri-Party Agent allocates cash to cash lenders and collateral to collateral providers through its allocation process to settle the end leg

# Exhibit 3a.ii. GCF Term Repo



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## GCF Term Repo

- In terms of trade execution, submission to CCP, and settlement the life cycle remains the same as the overnight GCF Repo trade scenario
  - Key difference will be the number of days of the term repo as opposed to the overnight trade, and the extension of the CCP's risk management practices over the term of the trade

### Repo Start Date - T+0

- If the GCF Repo trade is submitted and novated to the CCP prior to noon, at **Intraday** a margin requirement will be calculated based on the repo rate volatility component of the Clearing Fund calculation for the trade
  - As the Start Leg of the trade has yet to settle, there is no securities position market risk to be managed via the VAR component
- At **End of Day** the Clearing Fund margin requirement will be calculated based on both the VAR of the collateral positions communicated to the CCP by the Tri-Party Agent, and the repo rate volatility component of the calculation
- At **End of Day** the CCP will assess a pass-through mark-to-market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

## GCF Term Repo

### Full Repo Term Day (T+1 to T+N – 2)

- Collateral Mark to Market is processed by the Tri-Party Agent on behalf of the CCP at **Start of Day** and **Intraday** – if security repricing results in undercollateralization, collateral providers are required to top up
- Collateral substitutions may occur throughout T+1/2/3/and so on, up until unwind of the repo trade on end date
  - Tri-Party Agent communicates updated collateral allocation details on an hourly basis to the CCP
- Clearing Fund margin requirement is calculated and collected from CCP Members at **Intraday** and **End of Day**, requirement is calculated based on both the VAR and repo rate volatility components
- At **End of Day** the CCP will assess a pass-through mark-to-market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

## GCF Term Repo

### Term Day Prior to Repo End Date (T+N – 1)

- Collateral Mark-to-Market is processed by the Tri-Party Agent on behalf of the CCP at **Start of Day** and **Intraday** – if security repricing results in undercollateralization, collateral providers are required to top up
- Collateral substitutions may occur up until unwind of repo trade
  - Tri-Party Agent communicates updated collateral allocation details on an hourly basis to the CCP
- Clearing Fund margin requirement is calculated and collected from CCP Members at **Intraday** and **End of Day**
  - **Intraday** requirement is calculated based on both the VAR and repo rate volatility components
  - **End of Day** margin requirement is calculated based only on VAR component, repo rate volatility component ceases to be assessed as of the End of Day cycle prior to repo end date
- CCP ceases to assess mark to market as of the End of Day cycle prior to repo end date
- Interest for the GCF Repo is calculated end of day on term date prior to repo end date, and settled start of day on repo end date via CCP's Funds-Only Settlement service

## GCF Term Repo

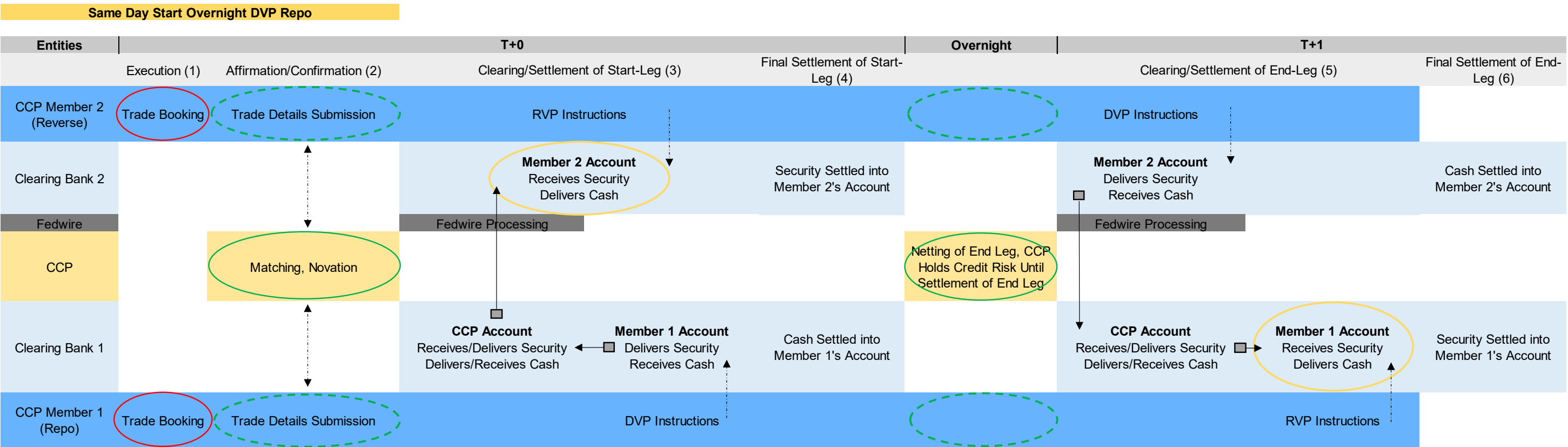
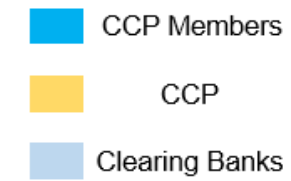
### Repo End Date – T+N\*

- Collateral Mark-to-Market is processed by the Tri-Party Agent on behalf of the CCP at **Start of Day** and **Intraday** – if security repricing results in undercollateralization, collateral providers are required to top up
- Collateral substitutions may occur up until unwind of repo trade
  - Tri-Party Agent communicates updated collateral allocation details on an hourly basis to the CCP
- At **Intraday**, Clearing Fund margin requirement will be calculated for the CCP Members based on the VAR component - security positions due to be settled post-3:30PM EST
- Trade end-leg is settled post - 3:30 PM EST

\*T+N represents the repo end date for a term GCF Repo of any tenor up to 735 days



# Figure 3a.iii. Same-Day Start Overnight Repo



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## Same-Day Start Overnight Repo

### Repo Start Date - T+0

- Repo trade is executed and submitted to the CCP on a bilateral comparison basis – both CCP Members must submit their side of the trade to affect a match
  - Once trade details are matched by CCP the trade is deemed Compared and Novated
- CCP will generate settlement obligations to settle the start leg of the repo on a trade-for-trade basis through the CCP, at repo start money
  - Settlement obligations are bound - repo side will deliver securities to CCP, CCP redelivers securities to the reverse side
  - As DVP repos settle on delivery vs payment basis, credit extensions to the CCP by the clearing bank exist for very short periods of time until the subsequent matched deliveries are made. The CCP operates on a matched book basis and always has a receive and deliver obligation that are bound to one another for settlement purposes. Each receipt of securities by the CCP is automatically redelivered to a contra in a long position.
- If the repo trade is compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components – if the start leg has not settled at noon, positions to be settled for the start leg and end leg net out the VAR component
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **End of Day**, mark to market is not assessed as trade is due to settle next business day

## Same-Day Start Overnight Repo

### Repo Start Date - T+0 (continued)

- End leg of the repo trade will be included in the CCP's DVP net, CCP will establish a net long or short position per CUSIP per CCP Member due to be settled on the next business day
  - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle the next business day
  - Once net position is established, CCP will generate settlement obligations to be settled the next day at CCP's market price for the security
  - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date

### Repo End Date - T+1

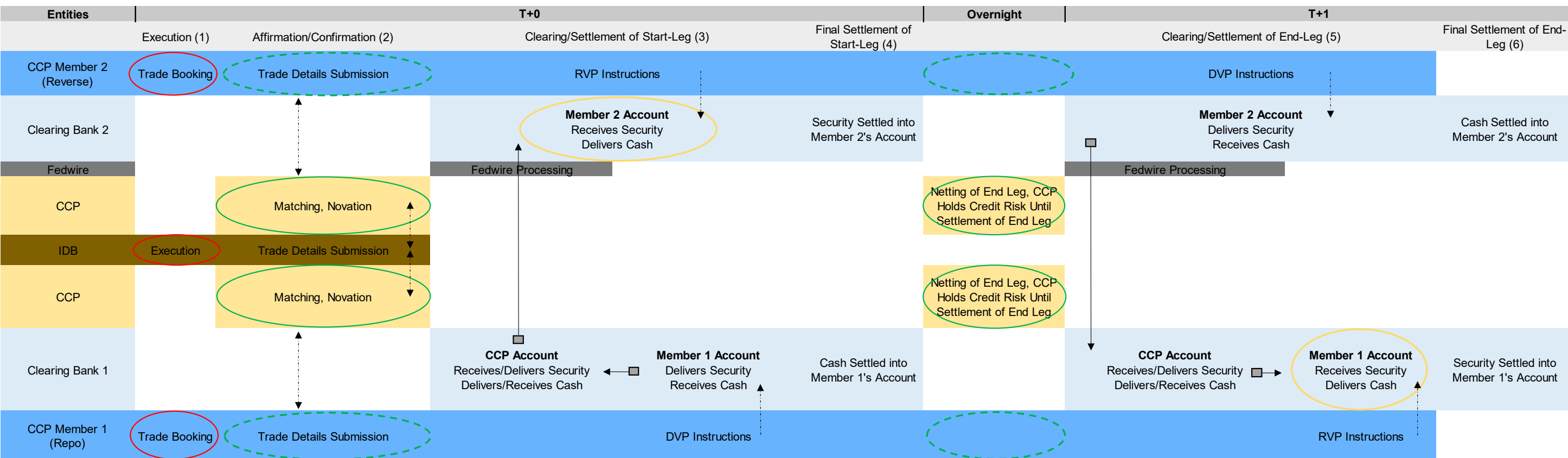
- If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- Securities are delivered by Reverse side to CCP, CCP redelivers securities to Repo side to settle the end leg of the trade

# Exhibit 3a.iv. Same-Day Start IDB Overnight Repo

- IDB
- CCP Members
- CCP
- Clearing Banks



## IDB - Same Day Start Overnight DVP Repo

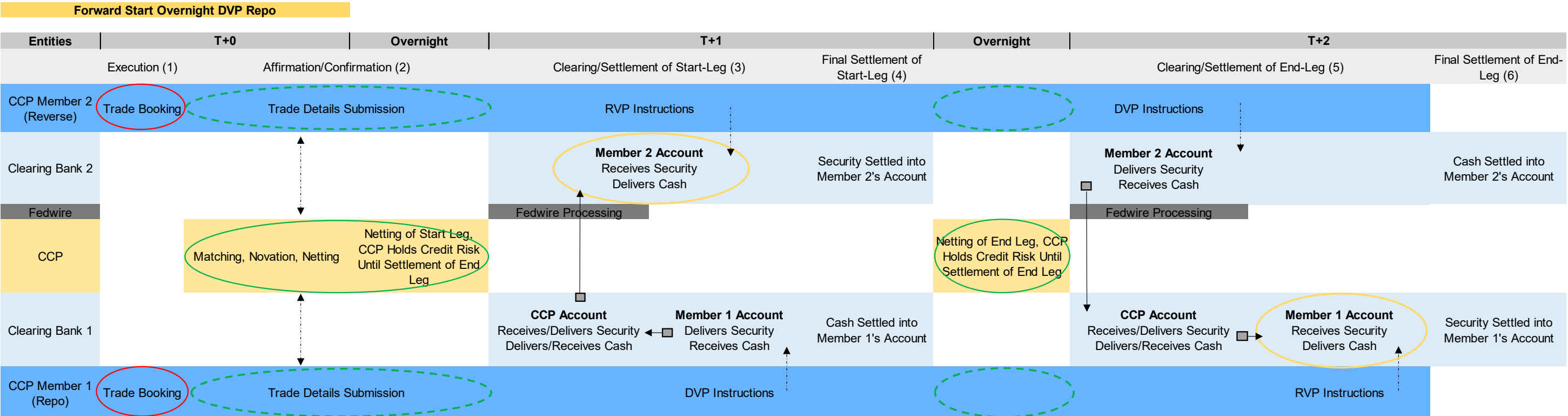
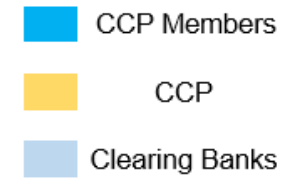


Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
<span style="border: 1px solid red; border-radius: 50%; padding: 2px;"> </span>	Counterparty Credit Risk	<span style="border: 1px solid green; border-radius: 50%; padding: 2px;"> </span>	Centrally Cleared Credit Risk	<span style="border: 1px dashed green; border-radius: 50%; padding: 2px;"> </span>	CCP Counterparty Risk	<span style="border: 1px solid orange; border-radius: 50%; padding: 2px;"> </span>	Credit Extension Risk	<span style="border-bottom: 1px solid black; width: 20px; display: inline-block; margin-right: 5px;"></span> →	Movement of Securities Against Cash
← - - - - - →	Two-Way Information Flow	- - - - - →	One-Way Information Flow	→	Security Movement	→ <span style="border-bottom: 1px solid black; width: 10px; display: inline-block; margin-right: 5px;"></span>	Cash Movement	<span style="border-bottom: 1px solid black; width: 10px; display: inline-block; margin-right: 5px;"></span> →	Movement of Securities Against Cash

## Same-Day Start IDB Overnight Repo

- In terms of repo trade settlement and risk management the life cycle remains the same as the Same Day Start Overnight Repo trade scenario
  - Key difference will be the execution of the repo trade via Inter-Dealer Broker (IDB) and its subsequent submission to the CCP
- Trade is executed on an IDB's platform, and will be submitted to the CCP by the IDB on behalf of the two CCP Members
  - At the point of trade execution Counterparty Credit Risk exists between CCP Member 1 and the IDB, and CCP Member 2 and the IDB
  - Two trades are submitted by the IDB on a Demand trade submission basis, with one trade submission being the IDB facing the repo-side CCP Member and the second trade submission being the IDB facing the reverse-side CCP Member
  - Both trade are deemed to be Compared and Novated at the time of submission to the CCP by the IDB
  - CCP Members have visibility of the trade submitted on their behalf facing the IDB, and are required to submit their side of the trade to compare it with IDB's submission to ensure accuracy of trade details
- Demand trade submission takes place between 7AM – 4PM EST, post 4PM trades submitted by IDBs will be subject to bilateral comparison versus the original execution parties (CCP Member 1 and 2) for Novation

# Exhibit 3a.v. Forward Start Overnight Repo



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## Forward Start Overnight Repo

### Trade Execution Date – T+0

- Trade is executed bilaterally between two CCP Members, with both sides needing to submit their side of the trade to affect bilateral comparison
  - Once both sides trade details are submitted to the CCP and matched, the trade is deemed Compared and Novated
- If the trade is Compared and Novated prior to noon, then at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on repo rate volatility component – the open positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- **At End of Day**:
  - Clearing Fund margin requirement will be calculated based on repo rate volatility component – the open positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

## Forward Start Overnight Repo

### **Trade Execution Date – T+0 (continued)**

- Start leg of the repo is included in the CCP's DVP service net, netting DVP trade activity and establishing net long or short position per CUSIP per CCP Member
  - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle the next business day
  - CCP generates obligations to settle the position on T+1 and communicates settlement obligations to CCP Members – repo start leg will not settle on a trade-for-trade basis, obligation is a net obligation
  - Settlement obligation is priced to settle at CCP's market price for the security
    - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date



# Forward Start Overnight Repo

## **Repo Start Date – T+1**

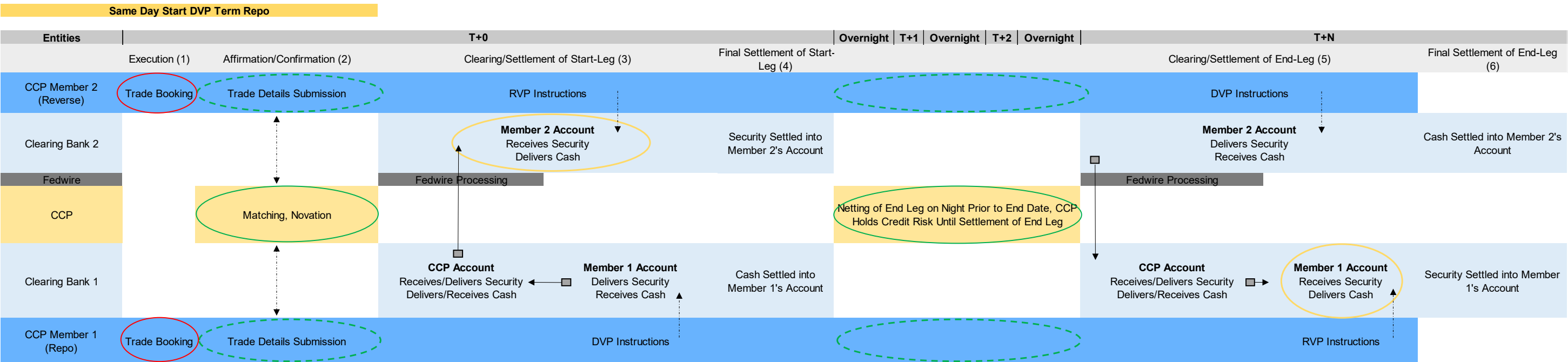
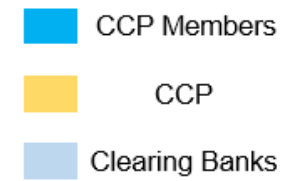
- Start leg is settled as part of net obligation – CCP Member 1 delivers securities to CCP, upon receipt CCP delivers securities to CCP Member 2
- As DVP repos settle on delivery vs payment basis, credit extensions to the CCP by the clearing bank exist for very short periods of time until the subsequent matched deliveries are made. The CCP operates on a matched book basis and always has receive and deliver obligations that are bound to one another for settlement purposes. Each receipt of securities by the CCP is automatically redelivered to a contra in a long position.
- **At Intraday:**
  - Clearing Fund margin requirement will be calculated based both on VAR and repo rate volatility components – if the start leg has not settled at noon, positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- **At End of Day:**
  - Clearing Fund margin requirement will be calculated based on VAR component – repo rate volatility component ceases to be assessed as of the End of Day cycle prior to repo end date
  - Mark to market is not assessed as trade is due to settle on the next business day
  - End Leg of the repo is included in the CCP's DVP service net, netting DVP trade activity and establishing net long or short position per CUSIP per CCP Member
    - CCP generates obligations to settle the position on T+2 and communicates settlement obligations to CCP Members – repo end leg will not settle on a trade-for-trade basis, obligation is a net obligation
    - Settlement obligation is priced to settle at CCP's market price for the security
      - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date (T+2)

## Forward Start Overnight Repo

### Repo End Date – T+2

- If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- Securities are delivered by Reverse side to CCP, CCP redelivers securities to Repo side to settle the end leg of the trade

# Exhibit 3a.vi. Same-Day Start Term Repo



Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## Same-Day Start Term Repo

- In terms of trade execution, submission to CCP, and settlement the life cycle remains the same as the overnight Same Day Start Repo trade scenario
  - Key difference will be the number of days of the term repo as opposed to the overnight trade, and the extension of the CCP's risk management practices over the term of the trade

### **Repo Start Date - T+0**

- If the repo trade is compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components – if the start leg has not settled at noon, positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- At **End of Day**:
  - Clearing Fund margin requirement will be calculated based on both VAR and repo rate volatility components
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

## Same-Day Start Term Repo

### Full Repo Term Day (T+1 to T+N – 2)

- **At Intraday:**
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- **At End of Day:**
  - Clearing Fund margin requirement will be calculated based on both VAR and repo rate volatility components
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

### Term Day Prior to Repo End Date (T+N – 1)

- **At Intraday:**
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- **At End of Day:**
  - Clearing Fund margin requirement will be calculated based only on VAR - repo rate volatility component ceases to be assessed as of the end of day cycle prior to repo end date
  - Mark to market is not assessed as trade is due to settle on the next business day

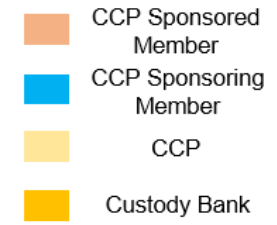
## Same-Day Start Term Repo

### Repo End Date – T+N\*

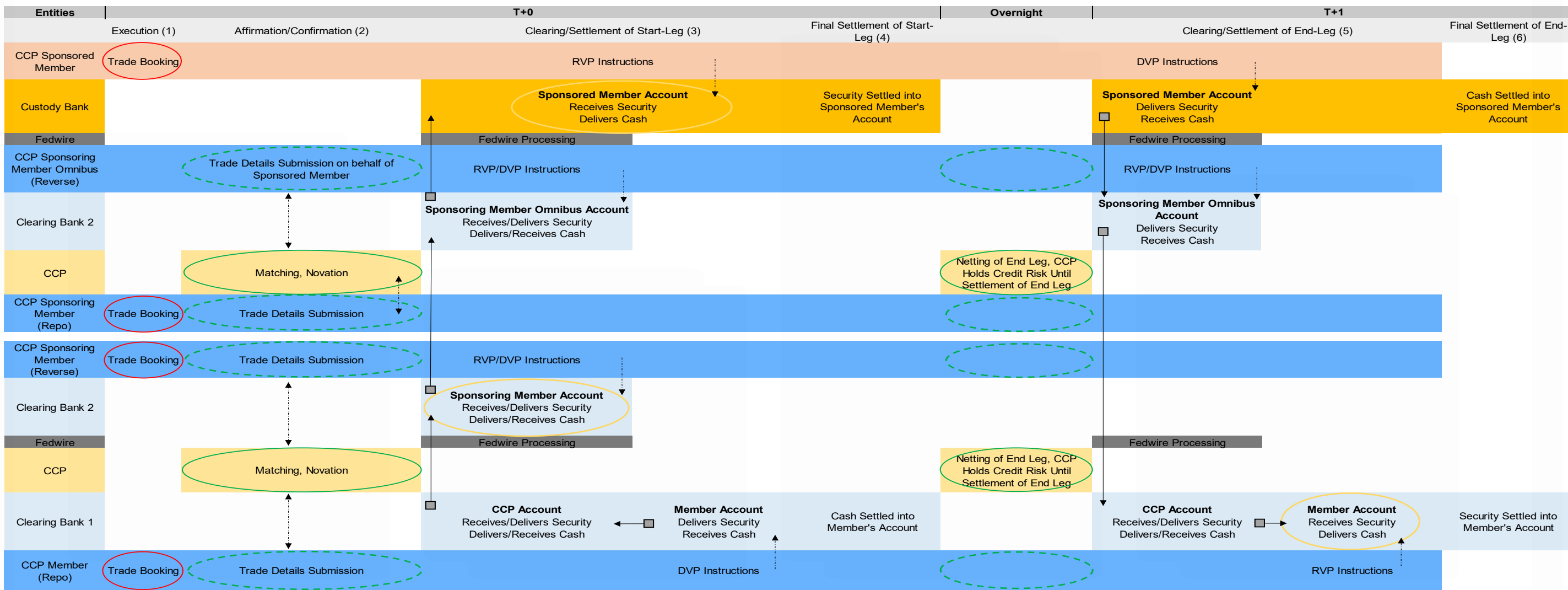
- If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

\*T+N represents the repo end date for a term DVP Repo of any tenor up to 735 days

# Exhibit 3b.i. Sponsored DVP Repo – DVP Repo Sourced Securities



Overnight Sponsored DVP Repo with collateral sourced from Dealer to Sponsor DVP Repo Transaction



\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored DVP Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two Way Information Flow		One Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

# Sponsored DVP Repo – DVP Repo Sourced Securities

## Repo Start Date - T+0

- Both the **Dealer to Sponsor DVP Repo** and the **Sponsored DVP Repo** trades are submitted to the CCP on a bilateral comparison basis – each side to a trade must submit to affect a match
  - Sponsoring Member's Omnibus account submits, clears and settles the trade on behalf of the Sponsored Member (Limited Member of the CCP) with the CCP
  - Once trade details are matched by CCP, the trades are deemed Compared and Novated
    - For the Sponsored DVP Repo:
      - The end leg of the repo trade is Novated to the CCP
      - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
- For the **Dealer to Sponsor DVP Repo**:
  - CCP will generate settlement obligations to settle the start leg of the repo on a trade-for-trade basis through the CCP, at repo start money
  - Repo side will deliver securities to CCP, CCP redelivers securities to the reverse side
  - As DVP repos settle on delivery vs payment basis, credit extensions to the CCP by the clearing bank exist for very short periods of time until the subsequent matched deliveries are made. The CCP operates on a matched book basis and always has a receive and deliver obligation which are bound to one another for settlement purposes. Each receipt of securities by the CCP is automatically redelivered to a contra in a long position.
- If the repo trade is compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components – if the start leg has not settled at noon, positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **End of Day**, mark to market is not assessed as trade is due to settle on the next business day



## Sponsored DVP Repo – DVP Repo Sourced Securities

### Repo Start Date - T+0 (continued)

- For the **Sponsored DVP** repo:
  - The start leg of the repo settles on a bilateral basis, away from the CCP
- If the repo trade is compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Members (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **End of Day**, mark to market is not assessed as trade is due to settle on the next business day

## Sponsored DVP Repo – DVP Repo Sourced Securities

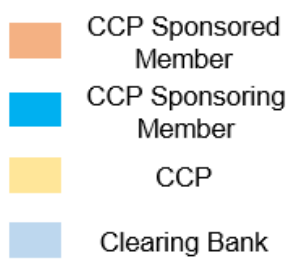
### Repo Start Date – T+0 (continued)

- At **End of Day**, end leg of both repo trades will be included in the CCP's DVP net, CCP will establish a net long or short position per CUSIP per full service CCP Member
  - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle the next business day
  - Once net position is established, CCP will generate settlement obligations to be settled the next day at CCP's market price for the security
  - Sponsoring Member's main account is netted out of settlement with the CCP
  - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date

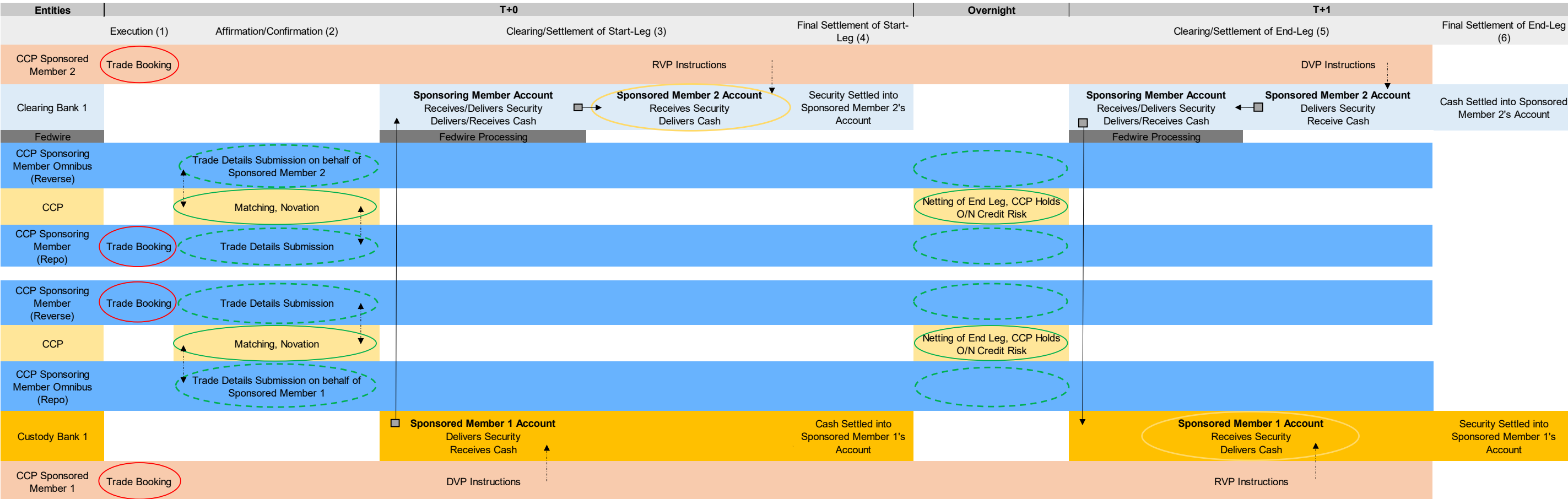
### Repo End Date - T+1

- If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- Securities are delivered by Sponsoring Member Omnibus account to CCP, CCP redelivers securities to CCP Member side to complete settlement of the net obligations generated from the two trades

# Exhibit 3b.ii. Sponsored DVP Repo – Sponsored Member Sourced Securities



## Overnight Sponsored DVP Repo between Sponsored Members



\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored DVP Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		

# Sponsored DVP Repo – Sponsored Member Sourced Securities

## Repo Start Date - T+0

- Both Sponsored DVP Repo Trades are submitted to the CCP on a bilateral comparison basis – each side to a trade must be submitted to effect a match
  - Sponsoring Member's Omnibus account submits, clears and settles the trade on behalf of the Sponsored Member (Limited Member of the CCP) with the CCP
  - Once trade details are matched by CCP, the trades are deemed Compared, and the end leg of the repos are Novated to CCP
  - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
- Start leg of both repos settle bilaterally, away from CCP
- If the repo trades are compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Members separately for each trade (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

## Sponsored DVP Repo – Sponsored Member Sourced Securities

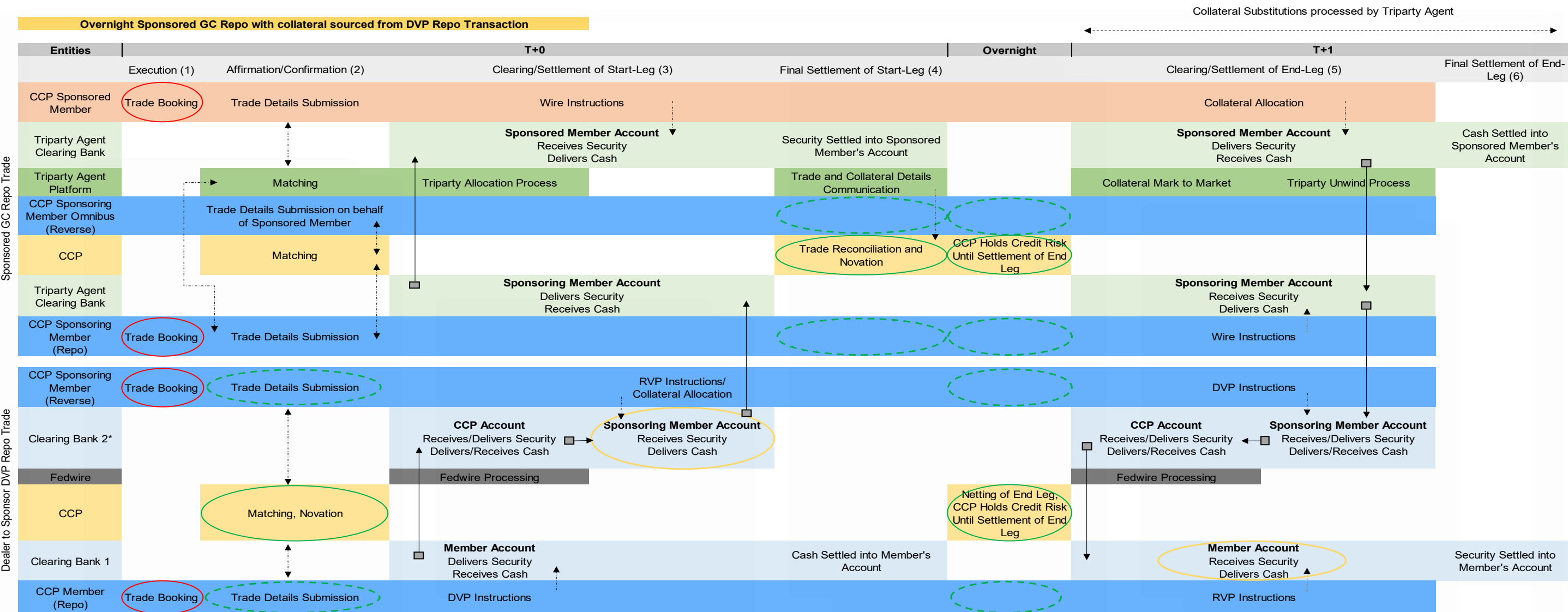
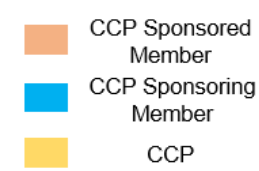
### Repo Start Date - T+0 (continued)

- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open positions to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **End of Day**, mark to market is not assessed as trades are due to settle on the next business day
- End leg of both repo trades will be included in the CCP's DVP net, CCP will establish a net long or short position per CUSIP per full service CCP Member
  - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle the next business day
  - Once net position is established, CCP will generate settlement obligations to be settled the next day at CCP's market price for the security
    - Offsetting trades result in the Sponsoring Member's main and Omnibus accounts netting out of settlement via CCP, end leg will be settled bilaterally
  - Sponsoring Member's main and Omnibus accounts are adjusted for any difference in repo end monies via Funds-only Settlement to be settled at Start of Day on repo end date

### Repo End Date - T+1

- Securities are delivered by Reverse Sponsored Member to the Sponsoring Member, Sponsoring Member redelivers securities to Repo Sponsored Member side to complete settlement of the two trades

# Exhibit 3c.i. Sponsored GC Repo – DVP Repo Sourced Securities



\*Clearing Bank 2 represents the DVP settlement platform of the Triparty Agent Clearing Bank

\*\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored GC Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

## Sponsored GC Repo – DVP Repo Sourced Securities

### Repo Start Date - T+0

- Both the Dealer to Sponsor DVP Repo and the Sponsored GC Repo trades are submitted to the CCP on a bilateral comparison basis – each side to a trade must submit to affect a match
  - For the **Sponsored GC Repo**:
    - Sponsoring Member's Omnibus account submits and clears the Sponsored GC trade on behalf of the Sponsored Member (Limited Member of the CCP) to the CCP
    - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
    - Sponsored GC Repo trade must also be submitted directly to the Tri-Party Agent by the Sponsoring Member and Sponsored Member for trade matching and settlement
    - Upon settlement of the start leg, Tri-Party Agent communicates that the trade is fully settled and submits the details of the collateral allocation to CCP - the end leg of the repo trade is Novated to the CCP at this time
  - For **Dealer to Sponsor DVP Repo**:
    - Once trade details are matched by CCP the trades are deemed Compared and Novated

# Sponsored GC Repo – DVP Repo Sourced Securities

## Repo Start Date - T+0 (continued)

- For the **Dealer to Sponsor DVP Repo**, once Compared and Novated:
  - CCP will generate settlement obligations to settle the start leg of the repo on a trade-for-trade basis through the CCP, at repo start money
    - Settlement obligations are bound - repo side will deliver securities to CCP, CCP redelivers securities to the reverse side
    - As DVP repos settle on delivery vs payment basis, credit extensions to the CCP by the clearing bank exist for very short periods of time until the subsequent matched deliveries are made. The CCP operates on a matched book basis and always has receive and deliver obligations that are bound to one another for settlement purposes. Each receipt of securities by the CCP is automatically redelivered to a contra in a long position.
- If the repo trade is compared and novated prior to noon, at **Intraday**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components – if the start leg has not settled at noon, positions to be settled for the start leg and end leg net out the VAR component at this time
  - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **End of Day**, mark to market is not assessed as trade is due to settle on the next business day
- End leg of the repo trade will be included in the CCP's DVP net, CCP will establish a net long or short position per CUSIP per CCP Member due to be settled on next business day
  - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle the next business day
  - Once net position is established, CCP will generate settlement obligations to be settled the next day at CCP's market price for the security
  - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date



# Sponsored GC Repo – DVP Repo Sourced Securities

## Repo Start Date - T+0 (continued)

- For the **Sponsored GC Repo** trade:
  - Repo start leg settles via Tri-Party Agent's allocation process on a trade-for-trade basis, with settlement taking place up until 5:30 PM EST
  - If trade is Novated to CCP prior to noon, then at **Intraday**:
    - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
    - Collateral mark to market is processed by Tri-Party Agent on behalf of CCP – if security repricing results in under collateralization, collateral providers are required to top up
    - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
- At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
  - Clearing Fund margin requirement will be calculated for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
- At **End of Day**, mark to market is not assessed by CCP as trade is due to settle on the next business day

# Sponsored GC Repo – DVP Repo Sourced Securities

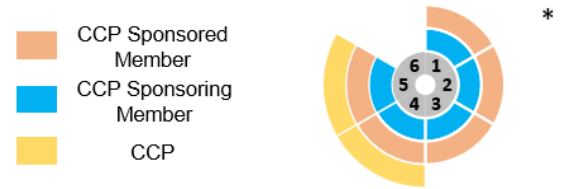
## Repo End Date - T+1

- For the **Sponsored GC Repo** trade:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in under collateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
  - Collateral substitution will be processed by Sponsoring Member at Tri-Party Agent so that they can receive the securities used as collateral to deliver back to the CCP for the offsetting DVP Repo trade
    - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
  - At **Intraday**, Clearing Fund margin requirement is calculated based on end leg positions to be settled for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - Beginning at 3:30 PM EST, settlement of end leg will take place on a trade-for-trade basis via tri-party allocation process, settling the repo trade's principal value and interest via the Tri-Party Agent

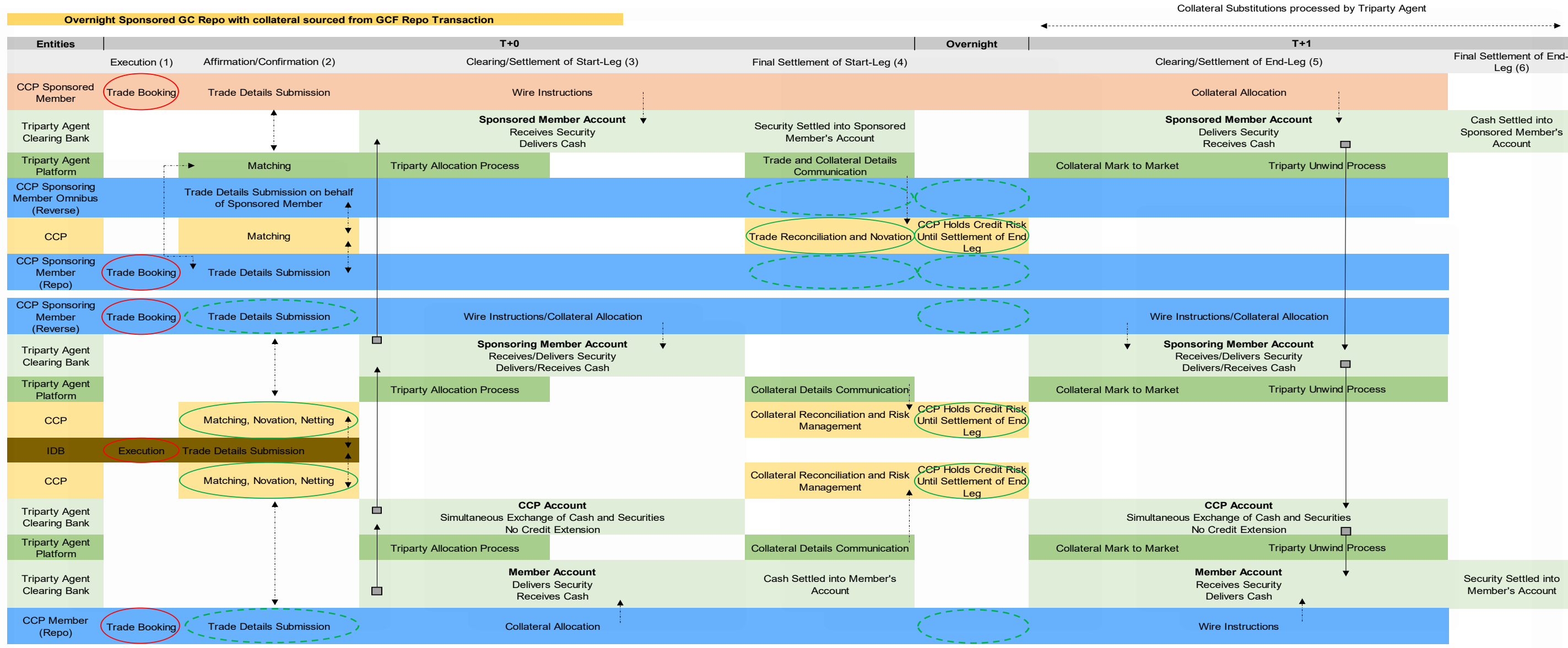
## Sponsored GC Repo – DVP Repo Sourced Securities

### Repo End Date - T+1 (continued)

- For the Dealer to Sponsor DVP Repo trade:
  - If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
    - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
    - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
  - Securities are delivered by Sponsoring Member to CCP, CCP redelivers securities to CCP Member side to complete settlement of the net obligations generated for the two Members



# Exhibit 3c.ii. Sponsored GC Repo – GCF Repo Sourced Securities



\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored GC Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash

# Sponsored GC Repo – GCF Repo Sourced Securities

## Repo Start Date - T+0

- For the Dealer to Sponsor GCF Repo trade:
  - Trade is brokered by Inter-Dealer Broker (IDB), two trades are submitted to CCP by IDB on each CCP Member's behalf
    - At the point of trade execution Counterparty Credit Risk exists between CCP Member 1 and the IDB, and CCP Member 2 and the IDB
    - CCP Members have visibility of the trade submitted on their behalf facing the IDB, and are required to Affirm IDB's trade submission
    - Trades are deemed to be Compared and Novated at the time of receipt by CCP from IDB
  - Trade submission takes place between 7 AM – 3 PM EST, shortly after 3 PM CCP's GCF service net takes place, netting GCF trade activity and establishing net long or short position per GCF CUSIP per CCP Member
    - Trades included in GCF net include same day starting GCF Repo trades, forward starting trades due to start on current business day, and term repo trades that have started
    - CCP generates obligations to settle the position and communicates settlement obligations to Tri-Party Agent and CCP Members – GCF trades do not settle on a trade-for-trade basis, obligation is a net obligation
- Tri-party settlements begins at 3:30 PM EST – collateral providers allocate collateral to Tri-party platform of Tri-party Clearing Agent Bank, while cash lenders deliver funds to Tri-Party Agent to pay for purchase of collateral
  - Tri-Party Agent allocates collateral to cash lenders and cash to collateral providers through its allocation process, settling the repo start leg
  - Tri-Party Agent bank does not extend credit to CCP to facilitate settlement - in its allocation process, the Tri-Party Agent performs a look-through to the ultimate buyer prior to settling securities and cash
- Once GCF Repo settlement is complete, the Tri-Party Agent communicates the details of the collateral allocation to the CCP
  - CCP uses the details of the underlying securities allocated to generate Clearing Fund margin requirement based on the security positions due to be settled on T+1 (VAR only)

# Sponsored GC Repo – GCF Repo Sourced Securities

## Repo Start Date - T+0 (continued)

- For the **Dealer to Sponsor GCF Repo** trade:
  - Risk Management Practices as applicable to this scenario:
    - **Intraday:** If trade is novated to CCP prior to noon, at Intraday Clearing Fund margin requirement will be calculated based on repo rate volatility component, and collected from both CCP Members
    - **End of Day:** Clearing Fund margin requirement calculated based on VAR component
      - Repo rate volatility component ceases to be assessed as repos end date is next business day
  - Interest for the GCF Repo is calculated at end of day on T+0, and settled start of day on T+1 via CCP's Funds-Only Settlement service
- For the **Sponsored GC Repo** trade:
  - Trade is submitted to the CCP on a bilateral comparison basis – each side to a trade must submit to affect a match
    - Sponsoring Member's Omnibus account submits the Sponsored GC trade on behalf of the Sponsored Member (limited Member of the CCP) to the CCP
    - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
  - Sponsored GC Repo trade must also be submitted directly to the Tri-Party Agent by the Sponsoring Member and Sponsored Member for trade matching and settlement
  - Upon settlement of the start leg, Tri-Party Agent communicates that the trade is fully settled and the details of the collateral allocation to CCP - the end leg of the repo trade is Novated to the CCP at this time

## Sponsored GC Repo – GCF Repo Sourced Securities

### Repo Start Date - T+0 Continued

- For the **Sponsored GC Repo** trade:
  - Repo start leg settles via Tri-Party Agent's allocation process on a trade-for-trade basis, with settlement taking place up until 5:30 PM EST
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+1 – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
    - Clearing Fund margin requirement will be calculated for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **End of Day**, mark to market is not assessed by CCP as trade is due to settle on the next business day

## Sponsored GC Repo – GCF Repo Sourced Securities

### Repo End Date - T+1

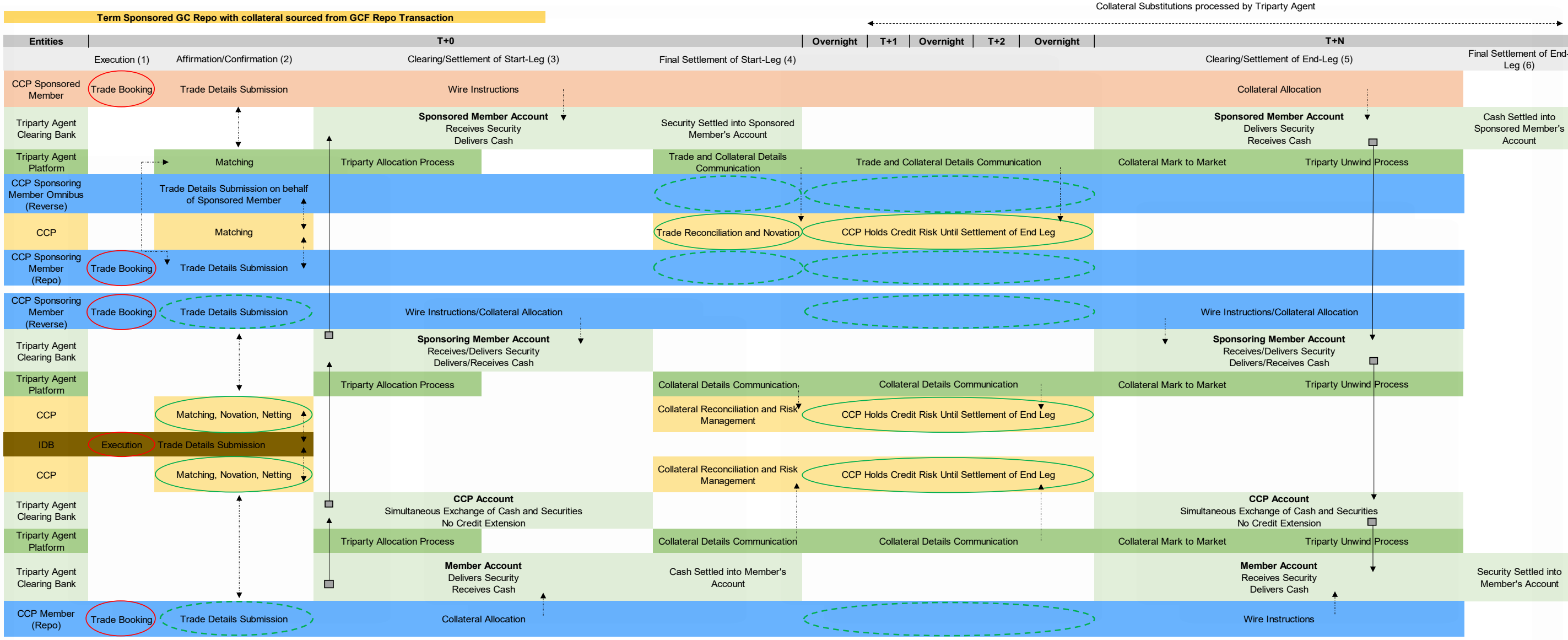
- For both the **Sponsored GC Repo** and the **Dealer to Sponsor GCF Repo** trades:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
- Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
  - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
- At **Intraday**, Clearing Fund margin requirement is calculated based on end leg positions to be settled for each repo trade separately and collected from the entities party to each trade
- Beginning at 3:30 PM EST, settlement of the **Sponsored GC Repo** end leg will take place on a trade-for-trade basis via tri-party allocation process, settling the repo trade and passing interest to the cash lender via the Tri-Party Agent
- Thereafter, the **Dealer to Sponsor GCF Repo** end leg will be settled as part of the net obligation calculated for the two Members via the triparty allocation process





# Exhibit 3c.iii. Sponsored GC Term Repo – GCF Repo Sourced Securities

- CCP Sponsored Member
- CCP Sponsoring Member
- CCP



\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored GC Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
<span style="color: red; border: 1px solid red; border-radius: 50%; padding: 2px;"> </span>	Counterparty Credit Risk	<span style="color: green; border: 1px solid green; border-radius: 50%; padding: 2px;"> </span>	Centrally Cleared Credit Risk	<span style="color: green; border: 1px dashed green; border-radius: 50%; padding: 2px;"> </span>	CCP Counterparty Risk	<span style="color: orange; border: 1px solid orange; border-radius: 50%; padding: 2px;"> </span>	Credit Extension Risk	<span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span>	Cash Movement
<span style="color: gray; border-bottom: 1px dashed gray; width: 20px; display: inline-block;"></span>	Two-Way Information Flow	<span style="color: gray; border-bottom: 1px dashed gray; width: 20px; display: inline-block;"></span>	One-Way Information Flow	<span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span>	Security Movement	<span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> <span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span>	Movement of Securities Against Cash	<span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> <span style="color: black; border-bottom: 1px solid black; width: 20px; display: inline-block;"></span>	

## Sponsored GC Term Repo – GCF Repo Sourced Securities

### Repo Start Date - T+0

- For the Dealer to Sponsor GCF Repo trade:
  - Trade is brokered by Inter-Dealer Broker (IDB), two trades are submitted to CCP by IDB on each CCP Member's behalf
    - At the point of trade execution, Counterparty Credit Risk exists between CCP Member 1 and the IDB, and CCP Member 2 and the IDB
    - CCP Members have visibility of the trade submitted on their behalf facing the IDB, and are required to Affirm IDB's trade submission
    - Trades are deemed to be Compared & Novated at the time of receipt by CCP from IDB
    - Trade submission takes place between 7 AM – 3 PM EST, shortly after 3 PM CCP's GCF service net takes place, netting GCF trade activity and establishing net long or short position per GCF CUSIP per CCP Member
      - Trades included in GCF net include same day starting GCF Repo trades, forward starting trades due to start on current business day, and term repo trades that have started
    - CCP generates obligations to settle the position and communicates settlement obligations to Tri-Party Agent and CCP Members – GCF trades do not settle on a trade-for-trade basis, obligation is a net obligation
  - Tri-party settlements begins at 3:30 PM EST – collateral providers allocate collateral to Tri-party platform of Tri-Party Agent, while cash lenders deliver funds to Tri-Party Agent to pay for purchase of collateral
    - Tri-Party Agent allocates collateral to cash lenders and cash to collateral providers through its allocation process, settling the repo start leg
    - Tri-Party Agent bank does not extend credit to CCP to facilitate settlement - in its allocation process, the Tri-Party Agent performs a look-through to the ultimate buyer prior to settling securities and cash
  - Once GCF Repo settlement is complete, the Tri-Party Agent communicates the details of the collateral allocation to the CCP
    - CCP uses the details of the underlying securities allocated to generate Clearing Fund margin requirement based on the security positions due to be settled on T+N (VAR only)

## Sponsored GC Term Repo – GCF Repo Sourced Securities

### Repo Start Date - T+0 (continued)

- For the Dealer to Sponsor GCF Repo trade:
  - Risk Management Practices as applicable to this scenario:
    - At **Intraday**, a Clearing Fund margin requirement will be calculated based on the repo rate volatility component of the Clearing Fund calculation for the trade
      - As the Start Leg of the trade has yet to settle, there is no securities position market risk to be managed via the VAR component
    - At **End of Day**, the Clearing Fund margin requirement will be calculated based on both the VAR of the collateral positions communicated to the CCP by the Tri-Party Agent and the repo rate volatility component of the calculation
    - At **End of Day**, the CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

## Sponsored GC Term Repo – GCF Repo Sourced Securities

### Repo Start Date - T+0 (continued)

- For the **Sponsored GC Repo** trade:
  - Trade is submitted to the CCP on a bilateral comparison basis – each side to a trade must submit to affect a match
    - Sponsoring Member's Omnibus account submits the Sponsored GC trade on behalf of the Sponsored Member (limited Member of the CCP) to the CCP
    - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
    - Sponsored GC Repo trade must also be submitted directly to the Tri-Party Agent by the Sponsoring Member and Sponsored Member for trade matching and settlement
    - Upon settlement of the start leg, Tri-Party Agent communicates that the trade is fully settled and the details of the collateral allocation to CCP - the end leg of the repo trade is Novated to the CCP at this time
  - Repo start leg settles via Tri-Party Agent's allocation process on a trade-for-trade basis, with settlement taking place up until 5:30 PM EST
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **End of Day**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

# Sponsored GC Term Repo – GCF Repo Sourced Securities

## **Full Repo Term Day (T+1 to T+N – 2)**

- For both the **Sponsored GC Repo** and the **Dealer to Sponsor GCF Repo** trades:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
    - Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
      - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
- For the **Sponsored GC Repo**, at **Intraday** daily accrued interest is settled between the Sponsoring Member and Sponsored Member via Tri-Party Agent
- At **Intraday** and **End of Day** for the **Sponsored GC Repo**:
  - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
- At **Intraday** and **End of Day** for the **Dealer to Sponsor GCF Repo**:
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components and collected from the two Members
- At **End of Day** for the **Dealer to Sponsor GCF Repo**, the CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service

# Sponsored GC Term Repo – GCF Repo Sourced Securities

## Term Day Prior to Repo End Date (T+N – 1)

- For both the Sponsored GC Repo and the Dealer to Sponsor GCF Repo trades:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
    - Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
      - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
- At **Intraday** for the Sponsored GC Repo:
  - Daily accrued interest is settled between the Sponsoring Member and Sponsored Member via Tri-Party Agent
  - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
- At **End of Day** for the Sponsored GC Repo, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+N – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- At **Intraday** for the Dealer to Sponsor GCF Repo, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components and collected from the two Members
- At **End of Day** for the Dealer to Sponsor GCF Repo, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+N – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
- Interest for the Dealer to Sponsor GCF Repo is calculated end of day on term date prior to repo end date, and settled start of day on repo end date via CCP's Funds-Only Settlement service

# Sponsored GC Term Repo – GCF Repo Sourced Securities

## Repo End Date - T+N\*

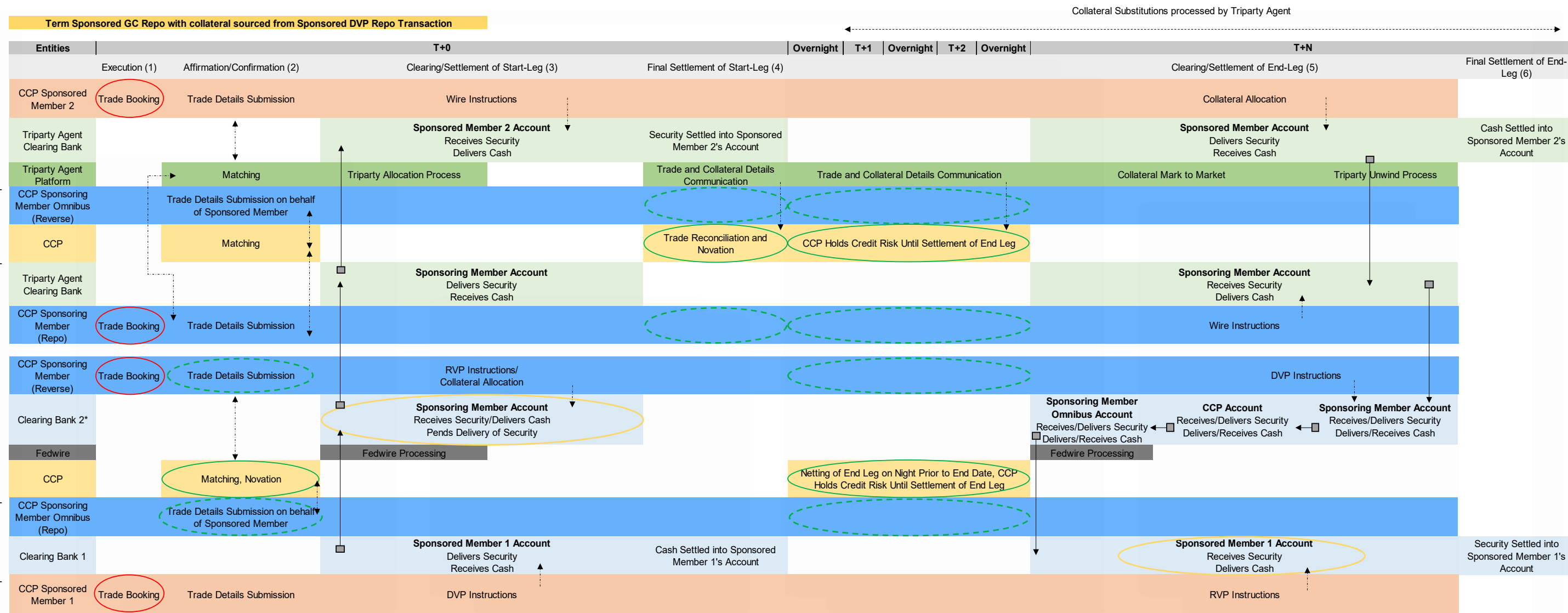
- For both the **Sponsored GC Repo** and the **Dealer to Sponsor GCF Repo** trades:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
  - Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
    - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
- At **Intraday**, Clearing Fund margin requirement is calculated based on end leg positions to be settled for each repo trade separately and collected from the entities party to each trade
- Beginning at 3:30 PM EST, settlement of **Sponsored GC** end leg will take place on a trade-for-trade basis via tri-party allocation process, settling the repo trade and passing the remaining daily accrued interest to the cash lender via the Tri-Party Agent as part of final settlement
- Thereafter, the **Dealer to Sponsor GCF Repo** end leg will be settled as part of the net obligation calculated for the two Members via the tri-party allocation process

\*T+N represents the repo end date for a term repo of any tenor up to 735 days



- CCP Sponsored Member
- CCP Sponsoring Member
- CCP

# Exhibit 3c.iv. Sponsored GC Term Repo – Sponsored Member Sourced Securities



\*Clearing Bank 2 represents the DVP settlement platform of the Triparty Agent Clearing Bank  
 \*\*The exposure to risk sundial diagram depicts lifecycle risk as it relates to the Sponsored GC Repo trade only

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		Movement of Securities Against Cash



# Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

## Repo Start Date - T+0

- Both the Sponsored DVP Repo and the Sponsored GC Repo trades are submitted to the CCP on a bilateral comparison basis – each side to a trade must submit to affect a match
  - Sponsoring Member's Omnibus account submits the trade on behalf of the Sponsored Members (limited Members of the CCP)
  - Once trade details are matched by CCP the trades are deemed Compared
    - **Sponsored DVP Repo** – once trade is Compared, the end leg of the repo trade is Novated to CCP
    - **Sponsored GC Repo** trade must also be submitted directly to the Tri-Party Agent by the Sponsoring Member and Sponsored Member for trade matching and settlement
      - Upon settlement of the start leg, Tri-Party Agent communicates that the trade is fully settled and the details of the collateral allocation to CCP - the end leg of the repo trade is Novated to the CCP at this time
  - Centrally Cleared Credit Risk exposure is between CCP and Sponsoring Member by virtue of Sponsoring Member Guaranty, in which Sponsor guarantees the settlement of all funds and securities obligations of its Sponsored Members
- For the Sponsored DVP Repo:
  - The start leg of the repo settles on a bilateral basis, away from the CCP
  - If the repo trade is compared and novated prior to noon, at **Intraday**:
    - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 1 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
    - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts settle via CCP's Funds-Only Settlement service
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **End of Day**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

## Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

### Repo Start Date - T+0 (continued)

- For the **Sponsored GC Repo** trade:
  - Repo start leg settles via Tri-Party Agent's allocation process on a trade-for-trade basis, with settlement taking place up until 5:30 PM EST
  - If the repo trade is Novated prior to noon, at **Intraday**:
    - Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 2 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
    - CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
    - Collateral mark to market is processed by Tri-Party Agent on behalf of CCP
      - If mark to market results in undercollateralization, collateral providers are required to top up
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **End of Day**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

## Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

### Full Repo Term Day (T+1 to T+N – 2)

- For the **Sponsored GC Repo** trade:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
  - Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
    - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
  - At **Intraday**, daily accrued interest is settled between the Sponsoring Member and Sponsored Member 2 via Tri-Party Agent
  - At **Intraday**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 2 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **Intraday**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 2 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account via Omnibus account)
  - At **End of Day**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

## Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

### Full Repo Term Day (T+1 to T+N – 2) (continued)

- For the **Sponsored DVP Repo** trade:
  - At **Intraday**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 1 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **Intraday**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 1 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **End of Day**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service

## Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

### Term Day Prior to Repo End Date (T+N – 1)

- For the **Sponsored GC Repo** trade:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
  - Collateral substitutions may be processed by Tri-Party Agent on behalf of collateral providers
    - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
  - At **Intraday**, daily accrued interest is settled between the Sponsoring Member and Sponsored Member 2 via Tri-Party Agent
  - At **Intraday**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 2 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **Intraday**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+N – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
  - At **End of Day**, mark to market is not assessed by CCP as trade is due to settle on the next business day

## Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

### Term Day Prior to Repo End Date (T+N – 1) Continued

- For the **Sponsored DVP Repo** trade:
  - At **Intraday**, Clearing Fund margin requirement will be calculated based on VAR and repo rate volatility components for the Sponsoring Member and Sponsored Member 1 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - At **Intraday**, CCP will assess a pass-through mark to market adjustment between the Sponsoring Member's main and Omnibus accounts and settle via CCP's Funds-Only Settlement service
  - At **End of Day**, Clearing Fund margin requirement will be calculated based on end leg open position to be settled on T+N – repo rate volatility ceases to be assessed as of the End of Day cycle prior to repo end date
  - At **End of Day**, mark to market is not assessed by CCP as trade is due to settle on the next business day
  - At **End of Day** the end leg of the repo trade will be included in the CCP's DVP net, CCP will establish a net long or short position per CUSIP per CCP Member due to be settled on the next business day
    - Trades included in DVP net are DVP buy/sell trades, forward repo start legs, and repo end legs due to settle on the next business day
    - Once net position is established, CCP will generate settlement obligations to be settled on the next day at CCP's market price for the security
    - The difference between the CCP's market price and repo end money will be settled via Start of Day Funds-Only Settlement on repo end date

# Sponsored GC Term Repo – Sponsored DVP Repo Sourced Securities

## Repo End Date – T+N\*



- For the **Sponsored GC Repo** trade:
  - At **Start of Day** and **Intraday**, collateral mark to market is processed by Tri-Party Agent on behalf of CCP
    - If mark to market results in undercollateralization, collateral providers are required to top up by 9 AM EST and following the Intraday repricing
  - Collateral substitution will be processed by Sponsoring Member at Tri-Party Agent so that they can receive the securities used as collateral to deliver back to the CCP for the offsetting Sponsored DVP Repo trade
    - Tri-Party Agent communicates updated collateral position data hourly to the CCP, CCP risk manages most up-to-date positions
  - At **Intraday**, Clearing Fund margin requirement will be calculated based on open end leg position still to be settled for the Sponsoring Member and Sponsored Member 2 (margin calculated at the Sponsored Member level, but settled on a gross basis via Sponsoring Member Omnibus account)
  - Beginning at 3:30 PM EST, settlement of Sponsored GC end leg will take place on a trade-for-trade basis via tri-party allocation process, settling the repo trade and passing the remaining daily accrued interest to the cash lender via the Tri-Party Agent as part of final settlement
- For the **Sponsored DVP Repo** trade:
  - If the settlement obligation is open (unsettled) as of noon, at **Intraday**:
    - Clearing Fund margin requirement will be calculated based on VAR component for the open position that is unsettled
    - CCP will assess a pass-through mark to market adjustment between the CCP Members and settle via CCP's Funds-Only Settlement service
  - Securities are delivered by Sponsoring Member to CCP, CCP redelivers securities to Sponsoring Member Omnibus side to complete settlement of the net obligations generated for the two Members
  - Sponsoring Member Omnibus account delivers securities to Sponsored Member 1 away from the CCP, settling on a bilateral basis

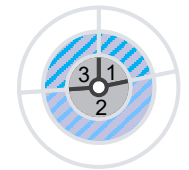
\*T+N represents the repo end date for a term repo of any tenor up to 735 days

## **4. Clearing and Settlement of Securities Lending Transactions**



# Exhibit 4a. Securities Lending Tri-Party Flow – Stock Loan Transaction DVP vs DVP

 Borrower/Lender  
 Tri-Party Agent



Entity	T + 0 (Same Day)				
	Execution (1)	Affirmation/Confirmation (2)	Settlement (3a) Collateralization and Funding	Settlement (3b) Collateral and Cash Exchange	Reporting (4)
Time*	7:00 AM – 3:00 PM	7:00 AM – 3:00 PM	7:00 AM – 3:00 PM		Post 8:00 PM
<b>Borrower (Stock Loan Transaction)</b>	Loan agreed (DVP) Returns agreed (DVP) Mark To Market (RQV)		Loan received/settled as DVP Returns delivered/settled as DVP		
<b>Collateral Borrower</b>	Agree to the Trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-Party Agent of trade details	Trade Settlement occurs  - Shares, bonds or cash are allocated to the trade on tri-party platform - Net Cash wire agreed between Borrower/Lender/Tri-party		
<b>Tri-Party Agent</b>		Match Trade Instructions upon receipt  System creates Trade (trade is typically open, so value is simply modified)	System screens for eligibility, prices and margins collateral	Trade is fully collateralized	Collateral Reports transmitted to Lender and Borrower
<b>Collateral Lender</b>	Agree to the Trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-Party Agent of trade details	Trade Settlements occurs  - Shares or bonds are allocated to the trade on collateral management system and by lender to agency client on the lender's books and records - Net Cash wire agreed between Borrower/Lender/Tri-party		
<b>Lender (Stock Loan Transaction)</b>	Loan agreed (DVP) Returns agreed (DVP) Mark To Market (RQV)		Loan delivered/settled as DVP Returns received/settled as DVP		
<b>Tri-party Exposure</b>	<b>Borrower/ Lender:</b> Counterparty Credit Risk	<b>Borrower/ Lender:</b> Opportunity Cost should trade not match <b>Borrower/ Lender:</b> Has Mark to Market risk	<b>Borrower/ Lender:</b> Opportunity cost should there be collateral/cash shortfall		<b>Borrower/ Lender:</b> Inability to reconcile if reports are not received

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		

# Securities Lending Tri-Party Flow – Stock Loan Transaction DVP vs DVP: Risk Highlights & Mitigants

## 7:00 AM – 3:00 PM – Trade Instruction Matching Process

- The primary differentiator with securities lending transactions is that they are typically inclusive of many loans, while a tri-party repo transaction is representative of a singular trade
- Between 7:00 AM and 3:00 PM the Borrower(s) and Lender(s) transmit their trade instructions to the tri-party agent's deal matching system. These instructions can be transmitted via files or entered directly onto the Collateral Management system.
  - There are three types of trade instructions that require matching:
    - (1) a revision of a trade already in the market (due to mark to market or changes in loan balances),
    - (2) a maturing trade the Lender & Borrower would like to extend or
    - (3) a new trade being booked.
  - Should the Tri-Party Agent not receive matched instructions by the 3:00PM deadline (though deals can match up to 3:30pm when unmatched tri-party deals will unwind), the previous day's matched instruction will remain valid.
  - The risk for the Borrower in a DVP settled loan could be the Borrower holding collateral they cannot finance, which would require internal financing or, if unavailable, a bank loan.
  - Risk for the Lender in a DVP settled loan could be that they would hold cash they cannot invest overnight and could be held with their custodian bank overnight
- **Solutions/Workarounds for potential issue(s) – same as standard tri-party solutions**
  - Timing – the Borrower can request the Tri-Party Agent delay the running of the settlement algorithm to allow additional time for instructions to be matched
  - Operational or Technology – the Tri-Party Agent provides an alternative trade loading solution allowing Lender/Borrower to provide trade instructions which will be automatically uploaded to the collateral management system. For limited issues, the Lender/Borrower can enter the trade instructions directly into the system. If a trade instruction is entered incorrectly, that party would either modify the trade instructions, or if agreed to by both parties, the trade could be canceled and resubmitted. If it is the Borrower's issue, the Lender can affirm the modified or new instruction.



## 3:30 PM – 6:00 PM – Eligibility screening, Trade Collateralization – same as standard tri-party solutions

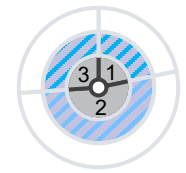
- Incorrect pricing or discrepancy in collateral pricing
  - Collateral may be a bad mix, requiring additional collateral, cash or potentially a Bank Loan
- Misallocation of Borrower's collateral
  - Allocation logic can be driven by automatic allocation, allocation optimization, or directed allocations via the Borrower's allocation algorithm
- Lender may wire insufficient cash or fail to wire any cash
- **When the unwind occurs**, there is the potential exposure risk that the borrower does not have sufficient funds, in which case the Tri-Party agent may need to finance/lend on behalf of the borrower in order to facilitate the unwind. In this situation, the Tri-Party Agent maintains a lien on the securities until the borrower has sufficient funds.

## Post 8:00PM – Collateral Reports sent to parties – same as standard tri-party solutions

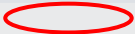

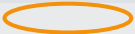
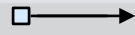



- Delayed Reports or failure to transmit reports can lead to reconciliation issues for both Borrower(s) and Lender(s) and potential impact to downstream systems/processes

# Exhibit 4b. Securities Lending Tri-Party Flow – Stock Loan Transaction FOP vs FOP

 Borrower/Lender  
 Tri-Party Agent



Entity	T + 0 (Same Day)				
	Execution (1)	Affirmation/Confirmation (2)	Settlement (3a) Collateralization and Funding	Settlement (3b) Collateral and Cash Exchange	Reporting (4)
Time*	7:00 AM – 3:00 PM	7:00 AM – 3:00 PM	7:00 AM – 3:00 PM		Post 8:00 PM
<b>Borrower (Stock Loan Transaction)</b>	Loan agreed (FOP) Returns agreed (FOP) Mark To Market (RQV)		Loan received/settled as FOP Returns delivered/settled as FOP		
<b>Collateral Borrower</b>	Agree to the Trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-party Agent of trade details  - Net collateral agreed between Borrower/Lender/Tri-party	Trade Settlement occurs  - Shares, bonds or cash are allocated to the trade on collateral management system		
<b>Tri-Party Agent</b>		Match Trade Instructions upon receipt System creates Trade (trade is typically open, so value is simply modified)	System screens for eligibility, prices and margins collateral	Trade is fully collateralized	Collateral Reports transmitted to Lender and Borrower
<b>Collateral Lender</b>	Agree to the Trade -Principal -Tenor -Start and End Date -Rate -Collateral Type(s)	Advise Tri-party Agent of trade details  - Net collateral agreed between Borrower/Lender/Tri-party	Trade Settlements occurs  - Shares or bonds are allocated to the trade on collateral management system and by lender to agency client on the lender's books and records		
<b>Lender (Stock Loan Transaction)</b>	Loan agreed (FOP) Returns agreed (FOP) Mark To Market (RQV)		Confirm collateral is allocated to Tri-party account - Loan delivered/settled as FOP - Returns received/settled as FOP		
<b>Tri-party Exposure</b>	<b>Borrower/ Lender:</b> Counterparty Credit Risk	<b>Borrower/ Lender:</b> Opportunity Cost should trade not match <b>Borrower/ Lender:</b> Has Mark to Market risk	<b>Borrower/ Lender:</b> Opportunity cost should there be collateral/cash shortfall		<b>Borrower/ Lender:</b> Inability to reconcile if reports are not received

Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
	Counterparty Credit Risk		Centrally Cleared Credit Risk		CCP Counterparty Risk		Credit Extension Risk		Movement of Securities Against Cash
	Two-Way Information Flow		One-Way Information Flow		Security Movement		Cash Movement		

# Securities Lending Tri-party Flow – Stock Loan Transaction FOP vs FOP: Risk Highlights & Mitigants

## 7:00 AM – 3:00 PM – Trade Instruction Matching Process

- The primary differentiator with securities lending transactions is that they are typically inclusive of many loans, while a tri-party repo transaction is representative of a singular trade
- Between 7:00 AM and 3:00 PM the Borrower(s) and Lender(s) transmit their trade instructions to the Tri-Party Agent's deal matching system. These instructions can be transmitted via files or entered directly onto the Collateral Management system.
  - There are three types of trade instructions that require matching:
    - (1) a revision of a trade already in the market (due to mark to market or changes in loan balances),
    - (2) a maturing trade the Lender & Borrower would like to extend or
    - (3) a new trade being booked.
  - Should the Tri-Party Agent not receive matched instructions by the 3:00 PM deadline (though deals can match up to 3:30 PM when unmatched tri-party deals will unwind), the previous day's matched instruction will remain valid.
  - The risk for the Borrower in a FOP settled loan could be that the Borrower does not receive the securities that they sought to borrow.
  - The risk for the Lender in a FOP settled loan could be that the Lender is unable to complete a loan and misses the opportunity to trade.
- **Solutions/Workarounds for potential issue(s) – same as standard tri-party solutions**
  - Timing – the Borrower can request the tri-party agent delay the running of the settlement algorithm to allow additional time for instructions to be matched
  - Operational or Technology – the tri-party agent provides an alternative trade loading solution allowing Lender/Borrower to provide trade instructions which will be automatically uploaded into the collateral management system. For limited issues, the Lender/Borrower can enter the trade instructions directly into the system. If a trade instruction is entered incorrectly, that party would either modify the trade instructions, or if agreed to by both parties, the trade could be canceled and resubmitted. If it is the Borrower's issue, the Lender can affirm the modified or new instruction.

## 3:30 PM – 6:00 PM – Eligibility screening, Trade Collateralization – same as standard tri-party solutions

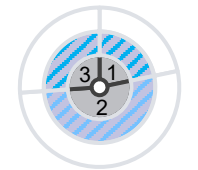
- Incorrect pricing or discrepancy in collateral pricing
  - Collateral may be a bad mix, requiring additional collateral, cash or potentially a Bank Loan
- Misallocation of Borrower's collateral
  - Allocation logic can be driven by automatic allocation, allocation optimization, or directed allocations via the Borrower's allocation algorithm

## Post 8:00 PM – Collateral Reports sent to parties – same as standard tri-party solutions

- Delayed Reports or failure to transmit reports can lead to reconciliation issues for both Borrower(s) and Lender(s) and potential impact to downstream systems/processes

# Exhibit 4c. Securities Lending Bilateral Flow – Stock Loan Transaction FOP vs FOP

- Borrower/Lender
- Tri-Party Agent
- Custody Bank



Entity					T+0				
Time	Execution		Affirmation/Confirmation		Clearing & Settlement			Final Settlement & Reporting	
			6:00AM – 8:00AM		8:30AM – 3:30PM			Post 8:00PM – Close	
<b>Borrower (Stock Loan Transaction)</b>	Loan agreed (FOP) Returns agreed (FOP) Mark To Market (Collateral FOP)		Loan agreed (FOP) Returns agreed (FOP) Mark To Market (Collateral FOP)		Returns delivered/settled as FOP			After Lender confirms receipt of collateral...  Loan received/settled as FOP	
<b>Collateral Borrower</b>	Trade Execution/Booking	Net Collateral Matching - Counterparty validates collateral pricing and margin		DVF Instructions sent to Clearing Bank					
<b>Clearing Bank</b>					Clearing bank delivers collateral to custody bank				Collateral reporting is generated
<b>Custody Bank</b>					Collateral securities are received into borrower's collateral custody account				Collateral reporting is generated
<b>Collateral Lender</b>	Trade Execution/Booking	Net Collateral Matching - Counterparty validates collateral pricing and margin		RVF Instructions sent to Custody Bank			Bonds are allocated to agency client on the lender's books and records		
<b>Lender (Stock Loan Transaction)</b>	Loan agreed (FOP) Returns agreed (FOP) Mark To Market (Collateral FOP)		Loan agreed (FOP) Returns agreed (FOP) Mark To Market (Collateral FOP)		Returns received/settled as FOP			Confirm collateral is settled to Custody account, then...  Loan delivered/settled as FOP	

<b>Exposure</b>	<b>Borrower/ Lender:</b> Has counterparty replacement risk to other party	<b>Borrower/ Lender:</b> Has Mark to Market risk	<b>Borrower/ Lender:</b> Inability to reconcile if reports are not received
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Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description	Indicator	Description
○	Counterparty Credit Risk	○	Centrally Cleared Credit Risk	⋯	CCP Counterparty Risk	○	Credit Extension Risk		
← - - - - →	Two-Way Information Flow	- - - - →	One-Way Information Flow	→	Security Movement	→ □	Cash Movement	□ →	Movement of Securities Against Cash

# Securities Lending Bilateral Flow – Stock Loan Transaction FOP vs FOP: Risk Highlights & Mitigants

## 7:00 AM – 3:00 PM – Trade Instruction Matching Process

- The primary differentiator with securities lending transactions is that they are typically inclusive of many loans, while a tri-party repo transaction is representative of a singular trade
- Between 7:00 AM and 3:00 PM the Borrower(s) and Lender(s) transmit their trade instructions to the Tri-Party Agent's deal matching system. These instructions can be transmitted via files or entered directly onto the Collateral Management system.
  - There are three types of trade instructions that require matching:
    - (1) a revision of a trade already in the market (due to mark to market or changes in loan balances),
    - (2) a maturing trade the Lender & Borrower would like to extend or
    - (3) a new trade being booked.
  - Should the Tri-Party Agent not receive matched instructions by the 3:00PM deadline (though deals can match up to 3:30pm when unmatched tri-party deals will unwind), the previous day's matched instruction will remain valid.
  - The risk for the Borrower in a FoP settled loan could be that the Borrower does not receive the securities that they sought to borrow.
  - The risk for the Lender in a FoP settled loan could be that the Lender is unable to complete a loan and misses the opportunity to trade, or releases the loan and is undercollateralized.
- **Solutions/Workarounds for potential issue(s) – same as standard tri-party solutions**
  - Timing – the Borrower can request the Tri-Party Agent delay the running of the settlement algorithm to allow additional time for instructions to be matched
  - Operational or Technology – the Tri-Party Agent provides an alternative trade loading solution allowing Lender/Borrower to provide trade instructions which will be automatically uploaded into the collateral management system. For limited issues, the Lender/Borrower can enter the trade instructions directly into the system. If a trade instruction is entered incorrectly, that party would either modify the trade instructions, or if agreed to by both parties, the trade could be canceled and resubmitted. If it is the Borrower's issue, the Lender can affirm the modified or new instruction.

## 3:30 PM – 6:00 PM – Eligibility screening, Trade Collateralization – same as standard tri-party solutions

- Incorrect pricing or discrepancy in collateral pricing
  - Collateral may be a bad mix, requiring additional collateral, cash or potentially a Bank Loan
- Misallocation of Borrower's collateral
  - Allocation logic can be driven by automatic allocation, allocation optimization, or directed allocations via the Borrower's allocation algorithm

## Post 8:00 PM – Collateral Reports sent to parties – same as standard tri-party solutions

- Delayed Reports or failure to transmit reports can lead to reconciliation issues for both Borrower(s) and Lender(s) and potential impact to downstream systems/processes