

The Clearing House Customer Documentation

RTP® FUNDING AND SETTLEMENT FOR NON-FUNDING PARTICIPANTS AND FUNDING AGENTS

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The Clearing House Payments
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CHANGES

Version	Change	Comments
1.0	Creation	N/A

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1 INTRODUCTION

The Clearing House Payments Company, LLC (TCH) offers U.S. depository institutions (Participants) the opportunity to participate in the RTP® System so that they may offer their Customers new payment services that provide immediate funds availability to the recipient of a payment. In order to achieve immediate funds availability with no credit risk to the Receiving Participant, RTP Payments are immediately settled between the Sending Participant and the Receiving Participant by the RTP System. This is accomplished through credits and debits to ledger positions that the RTP System maintains for each Participant. As further explained in this document, positions on the RTP ledger are backed by funds held in a special deposit account (the RTP Prefunded Balance Account) held by the Federal Reserve Bank of New York. The Account is jointly owned by all Funding Participants and Funding Agents; TCH is the sole agent of the Account.

This document describes the RTP System's funding and settlement model, how the model applies to Funding Agents and Non-funding Participants, how it is used for settlement finality, and how Funding Agents may manage financial positions for their Non-funding Participants or themselves within the system, and important considerations for Funding Agents and Non-funding Participants in designing and developing reconciliation procedures.

Note: Capitalized terms have meanings attributed to them in the RTP Operating Rules.

1.1 Market Opportunity for Funding Agents

The opportunity presented to financial institutions (FIs) wishing to assume the role of a Funding Agent within the RTP System is the ability to generate revenue by offering to provide the liquidity, also referred to as prefunding, and receive liquidity disbursements from the system for other RTP Participants. These clients of a Funding Agent are called Non-funding Participants.

Examples of institutions that may want to serve in the Funding Agent role include commercial banks, bankers' banks and corporate credit unions that provide payments and liquidity funding services for financial institutions requiring such services.

In addition to becoming a Funding Agent, these institutions may also (separately) become a Participant of the RTP System, offering its commercial clients and retail customers (if applicable) the ability to send and receive Payments in real-time.

The majority of the roughly 10,000 depository institutions in the U.S. have under \$250 million in assets. Most of them rely on other banks or credit unions for their short-term liquidity needs. Envisioning this need, TCH has established an opportunity for institutions who already service this market to expand their service offerings by becoming an RTP Funding Agent.

1.2 Intended Audience

This document is intended as a reference for employees and agents of FIs – primarily banker's banks and corporate credit unions – that intend to be Funding Agents in the RTP System. FIs considering participation in the RTP system as Non-funding Participants may also find this

document useful to understand the relationship between their participation and the role of their Funding Agent. Third-Party Service Providers (TPSPs) that provide services to Funding Agents, Funding Participants, and Non-funding Participants should also be aware of functionality described in this document as it relates to their application interface to the RTP System and handling of certain funding related System Notification Messages (SNMs).

It is important to note that there are certain differences between the prefunding requirements, ledger positions, and disbursement rights of Funding Participants that are not covered in this document. Therefore, Funding Participants should reference the *RTP® Prefunded Settlement Model and Reconciliation for Funding Participants* document, which has more relevant information for their use of the RTP System.

Note: Any reference to FI systems in this document includes both an FI's own in-house system and any system that is provided to an FI by a technology agent.

This document includes the following topics:

- Section 2 – An overview of RTP System functionality including basic Payment Message Flows and the prefunded Settlement model. This section is intended to establish a baseline understanding of the funds flow associated with transactions between Funding Participants. This baseline understanding is important for potential Funding Agents so that they can better understand the role of a Funding Agent as described in the remainder of the document. Other documents provide a more detailed description of the RTP System's overall functionality including Payment-related (non-Payment) Messages. Suggested reading can be found in section 1.2 of this document;
- Section 3 – An overview of the role of a Funding Agent within the RTP System and the tools made available to them by TCH;
- Section 4 – A description of the newer model of RTP Funding Agent called a Funding Provider and its relationship to its Non-funding Participant clients called "Group Members." This section builds on the functionality of RTP basics found in section 2, and introduces the difference between how the RTP System functions between Funding Participants and Non-Funding Participants when Funding Providers are involved;
- Section 5 – A description of the original model of the RTP Funding Agent, called a Funding Manager and its relationship to its Non-funding Participant clients. This section builds on the functionality of RTP basics found in section 2, and introduces the difference between how the RTP System functions between Funding Participants and Non-Funding Participants when Funding Managers are involved;
- Section 6 – Additional detail on Reconciliation procedures and considerations that Funding Agents should take when designing a reconciliation process. This section provides information that will be needed by software developers as they begin to build automated reconciliation processes;
- Appendix A – A Glossary of all RTP-specific terms and acronyms used in this document.

1.3 Related Documentation

The table below lists other relevant documents which should be read in conjunction with this *RTP® Prefunded Settlement Model and Reconciliation for Funding Agents and Non-funding Participants* document.

Documents Relevant to Funding Agents	Purpose
<i>RTP® Prefunded Settlement Model and Reconciliation for Funding Agents and Non-funding Participants</i>	<i>This document</i>
<i>Introduction to the RTP® System</i>	<i>General background knowledge</i>
<i>Business Principles for the RTP® Network</i>	
<i>Real-Time Payments Operating Rules</i>	
<i>Real-Time Payments Participation Rules</i>	
<i>RTP® Prefunded Requirement for Sending Participants</i>	
<i>Information Security Standards and Requirements</i>	
<i>RTP® Prefunded Settlement Model for Funding Participants</i>	
<i>TCH RTP® Reports Specification</i>	<i>For Funding Agent Specific Reports</i>
<i>RTP Client Fedwire Interface Instructions</i>	<i>For Instructions related to Supplemental Funding and Disbursements</i>
<i>Business Application Header Specification</i>	<i>For receipt of liquidity event alerts</i>
<i>Administrative Message Specification</i>	
<i>Funding Agent MQ Setup Guide</i>	

Table 1. System Documentation Inventory relevant to Funding Agents.

Depository institutions that are also interested in becoming a Participant in the RTP System are invited to download and read *Introduction to the RTP® System* and refer to the Related Documentation section of that document for the names of additional RTP documentation to learn more details on the functionality of the RTP System from the viewpoint of a Funding Participant (as opposed to a Funding Agent).

2 RTP BASICS – MESSAGE FLOW AND SETTLEMENT

2.1 Payment Message Flows

Each Payment Transaction that occurs through the RTP System is settled and final in real time when the Transaction flow completes. As a result, Participants are able to make funds immediately available to their Customers (Receivers) (as required by system rules) without any interbank settlement risk. A prefunded, real-time gross settlement, is used to accomplish this.

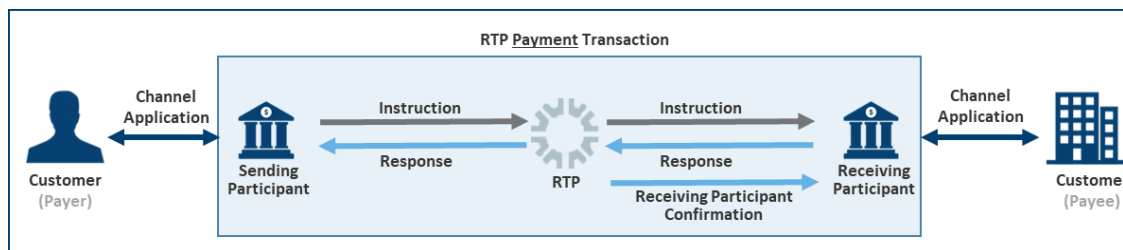


Figure 1. The RTP System's End-to-End Message Flow for Payment Messages.

RTP Payments are cleared and settled and their status is communicated to the Sender through a sequence of messages between the Participants and the RTP System. A Payment starts with a Customer (Sender) of a Sending Participant sending an instruction via a Channel Application (such as a treasury workstation, an online or mobile banking application, or an API gateway) made available to them by the Sending Participant. The Sending Participant creates an RTP Payment Message from the Sender's instructions which is sent through the RTP System for Message validation and network routing.

The Payment Message instructs another¹ RTP Participant, the Receiving Participant, to pay the Receiver.

The Receiving Participant acknowledges receipt of the Message (RTP Response Message) back to the RTP System which then routes that Response to the Sending Participant which then informs the Sender of the status of the Payment via the Sending Participant's Channel Application.

As part of this round-trip messaging:

- The Sending Participant sends the Payment Message to the RTP System;
- The RTP System performs technical and business validations of the Payment Message, reserves the Sending Participant's position in the amount of the Payment and routes the Payment Message to the Receiving Participant where the Payment Message is processed;
- The Receiving Participant sends an RTP Response indicating whether the Payment Message was Accepted, Rejected, or Accepted without Posting;
- Upon receipt of an Accept or Accept without Posting Response, the RTP System settles the Payment by debiting the Sending Participant's Net Position and crediting the Receiving Participant's Net Position. If the System receives a Reject Response, it will not settle the payment and will un-reserve the amount of the Payment so that it the amount is available for Settlement of other Payments.
- The RTP System sends the Response (Accept, Reject, or Accept without Posting) to the Sending Participant, and sends a confirmation message to the Receiving Participant;
- Upon confirmation by the RTP System, the Receiving Participant immediately posts the funds to the Receiver's Account and makes the funds available to the Receiver.

¹ The Receiving Participant may be the same Participant as the Sending Participant. In this case, the Message would be considered "on-us", but it behaves the same as any other RTP Message.

2.2 The Prefunded Balance Account and Prefunded Requirements

All RTP Payments that are Accepted or Accepted without Posting by the Receiving Participant are immediately and finally settled in real-time on an individual (rather than batch) basis. This form of settlement is real time gross settlement or RTGS. The RTP System settles each Payment by debiting the Net Position of the Sending Participant and crediting the Net Position of the Receiving Participant in the amount of the Payment.

The RTP System maintains a Current Prefunded Position (CPP) for Funding Participants². These Participants send funds to the Prefunded Balance Account via Fedwire to fund their CPP. Once the Funding Participant has provided initial funding to the Prefunded Balance Account, it can begin submitting Payment Messages to the RTP System. Upon receipt of a Payment Message from the Sending Participant, the RTP System checks to ensure that the Sending Participant has a sufficient CPP to cover the amount of the Payment.

As the RTP System increases and decreases the Net Positions of Participants to settle Payments, it also makes corresponding increases and decreases to the CPP of the Participants. These CPP's are backed dollar-for-dollar by funds held in the Prefunded Balance Account. Settlement and the relationship between Net Positions and CPPs are explained in more detail in sections below.

2.3 Prefunded Requirements

Each Funding Participant that is a Sending Participant has a Prefunded Requirement. Participants that only receive Payments (“Receive-only” Participants) do not have a Prefunded Requirement. TCH in its sole discretion determines the Prefunded Requirement for each Participant. In general, TCH will determine the Prefunded Requirement for a Participant based on its total U.S. Transactional Deposits based on public call report data.³

The tiers in Table 2 determine the initial and ongoing Prefunded Requirement for Sending Participants, based on ranges of domestic transaction account deposit balances. These tiers may change as TCH gathers data on RTP System volumes and/or other activity. The deposit balance used for these purposes is derived from the prior quarterly regulatory call report submitted by the Participant.

The minimum Prefunded Requirement for a Sending Participant is \$25,000.

Prefunded Balance Amount Tier	U.S. Transactional Deposits Range	Prefunded Requirement
1	>\$100 billion	\$10 million
2	\$30 – 100 billion	\$3 million

² The RTP System also maintains CPPs for Non-funding Participants that use Funding Agents that are Funding Managers. However, Non-funding Participants that use Funding Agents that are Funding Providers do not have CPPs in the system. (see section 5). Under this arrangement the Funding Provider, rather than the Non-Funding Participants, has a CPP.

³ Please refer to the *RTP System Prefunded Requirement for Sending Participants* document on the TCH website for more information regarding required prefunding amounts.

3	\$10 – 30 billion	\$1.5 million
4	\$5 – 10 billion	\$1 million
5	\$2 – 5 billion	\$500,000
6	\$1 – 2 billion	\$250,000
7	\$0.5 – 1 billion	\$125,000
8	\$250 – 500 million	\$75,000
9	\$100 – 250 million	\$50,000
10	<\$100 million	\$25,000
Receive Only:		\$0

Table 2. Prefunded Requirement tiers.

2.4 Immediate Settlement – How the Prefunded Settlement Model Works

A Sending Participant's CPP is its liquidity in the RTP System and it determines the amount of Payments it can send. When a Payment Message is sent to the RTP System, a check is performed to determine if the Sending Participant's CPP is sufficient to cover the Payment amount. If the CPP is insufficient, the RTP System will reject the Payment with the appropriate reason code, and it will not be settled. If the CPP is sufficient (and assuming all other the RTP System Message validations pass), the RTP System will reserve the Sending Participant's CPP in an amount equal to the Payment, thus preventing the Sending Participant from reusing that portion of its CPP for subsequent Payments while the current Payment is in-flight. The RTP System will then send the Payment Message to the Receiving Participant.

Name	ISO	Usage
Payment Messages:		
Credit Transfer	pacs.008	Sent by a Sending Participant to instruct a Receiving Participant to pay the Receiver.
FI-to-FI Credit Transfer (planned for future use)	pacs.009	Sent by a Sending Participant to pay a Receiving Participant as part of a mutually agreed arrangement in which the Sending Participant transfers liquidity (via the pacs.009 Payment) to the Receiving Participant in the event the Receiving Participant needs to increase its CPP when the Fedwire Funds service is not operating.

Table 3. There are currently two types of Payment Messages.

Upon receipt of the Payment Message, a Receiving Participant must respond with one of three responses: Accepted, Accepted without Posting, or Rejected. If the Receiving Participant responds with a Rejected response, the payment will not be settled. If the Receiving Participant responds with Accepted or Accepted without Posting, the RTP System will settle the Payment immediately through a simultaneous decrease to the Sending Participant's Net Position and increase to the Receiving Participant's Net Position for the amount of the Payment. The decrease to the Sending Participant's Net Position results in a corresponding decrease to the Sending Participant's (or its Funding Provider's if a Non-funding Participant) CPP. The increase to the Receiving Participant's Net Position results in a corresponding increase to the Receiving

Participant's (or its Funding Provider's if a Non-funding Participant) CPP. This Settlement for accepted Payments is final and irrevocable. See Figure 2.

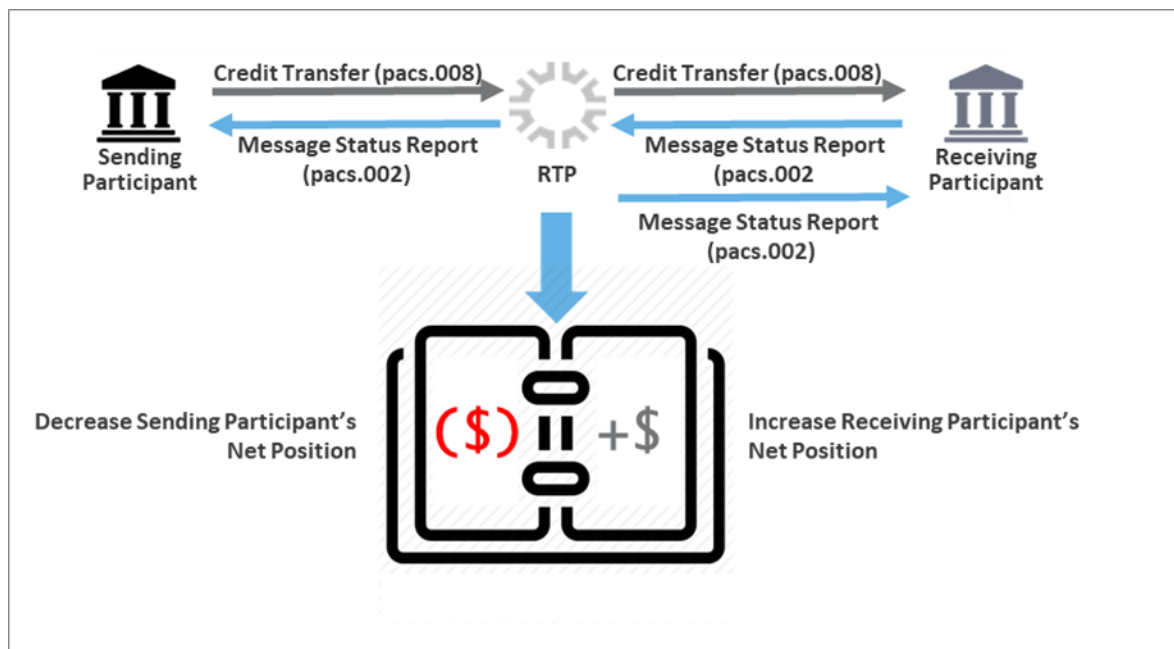


Figure 2. How an “Accepted” Credit Transfer Impacts the Net Positions of Sending and Receiving Participants.

A Receiving Participant that has Accepted without Posting and ultimately determines it cannot make funds related to the Payment available to the Receiver must return the funds related to the Payment to the Sending Participant, to the extent such return is not prohibited by applicable law.

2.5 Supplemental Funding and Disbursements

As explained above, if a Payment Message exceeds a Sending Participant's CPP, the Payment Message will be rejected by the RTP System. Such scenarios will cause a disruption to any Sender attempting to make a Payment and the Receiver expecting to receive a Payment, so Sending Participants should avoid such a disruption by actively managing their CPP.

The RTP Operating Rules require that each Sending Participant monitor its CPP and provide Supplemental Funding if its CPP falls below its Prefunded Requirement. If a Sending Participant's CPP is greater than its Prefunded Requirement but is running low given its anticipated Payment activity, it may provide Supplemental Funding into the Prefunded Balance Account and thereby increase its CPP.

A Participant may also request a Disbursement from the Prefunded Balance Account to withdraw amounts up to its Excess Liquidity from the RTP System. Excess Liquidity is the amount by which a Participant's CPP exceeds its Prefunded Requirement. For Receive-only Participants that have

no Prefunded Requirement, its entire CPP is Excess Liquidity. The RTP System will not allow Disbursements that exceed a Participant's Excess Liquidity.

All Funding Participants will be able to monitor their CPPs using a secure browser-based administrative portal called the RTP Management Portal.

2.5.1 Adding Supplemental Funds

- A Sending Participant that is also a Funding Participant provides Supplemental Funds to the Prefunded Balance Account via Fedwire;⁴
- Upon notification from the FRBNY that a Fedwire payment has been received in the Prefunded Balance Account (occurs in near real-time), the RTP System performs a series of validations on the Fedwire payment message to ensure that the funds can be applied to a valid Sending Participant's CPP;
- Assuming all validations are successful, the RTP System automatically calculates the new CPP for the Sending Participant and makes the new CPP immediately available for inbound Payments from the Sending Participant. The System also increases the Net Position of the Sending Participant in the amount of the Supplemental Funds;
- The RTP System sends a SNM to the Sending Participant, confirming that the Supplemental Funding has been received and applied to the Sending Participant's CPP.

2.5.2 Requesting Disbursements

- An employee of a Funding Participant (or its designated TPSP), who is an authorized user of the RTP Management Portal with the proper permissions to initiate a Disbursement request, inputs the required information for the request (amount and Participant ID);
- An employee of the Funding Participant (or its designated TPSP), who is an authorized user of the RTP Management Portal with the proper permissions to approve the Disbursement request, reviews and approves the disbursement;
- The RTP System calculates the new CPP should the Disbursement request be completed and checks that it will not reduce the Funding Participant's CPP to less than its Prefunded Requirement (i.e., that the Disbursement request does not exceed the Participant's Excess Liquidity);
 - If the change would cause the CPP to fall below the Prefunded Requirement, the RTP System makes no change to the CPP and marks the request as "Failed".
 - If the change would not cause the CPP to fall below the Prefunded requirement, the RTP System:

⁴ See the RTP Client Fedwire Interface Instructions for detailed information on the required format of the Fedwire message.

- Automatically initiates a Fedwire payment message that instructs payment from the Prefunded Balance Account to the Participant’s Federal Reserve account in the amount of the requested disbursement,⁵
- Receives an acknowledgement from the Fedwire Funds service and marks the request as “Completed”.
- If the Fedwire Funds acknowledgement is positive, the RTP System:
 - Updates the CPP to reflect the Disbursement request,⁶
 - Immediately starts to use the new CPP in all position checks for incoming Payments, and
 - Sends a final confirmation message to the Participant via a SNM.

2.6 How Daily Payment Activity Impacts Current Prefunded Position

At the beginning of each Reconciliation Window, a Participant’s Opening Prefunded Position is set to the CPP at the time of the cutover from the prior Reconciliation Window, and the Net Position is reset to \$0. See Figure 3. As Payments are sent and received during the Reconciliation Window, the Net Position (lower, dark blue curve) and CPP (higher, light blue curve) are updated. Net Position and CPP are also updated when a Participant provides supplemental funding or receives a disbursement.

⁵ If the Fed rejects the request or does not respond to the Fedwire request message in time, the RTP System will mark the Disbursement request as “Partially Successful”, and the Participant will need to contact TCH Operations Client Services to investigate and resolve the issue.

⁶ If the RTP System fails to reserve the funds in the active RTP sites due to a processing issue, the RTP System will mark the Disbursement request as “Partially Successful”, and the Participant will need to contact TCH Operations Client Services to investigate and resolve the issue.

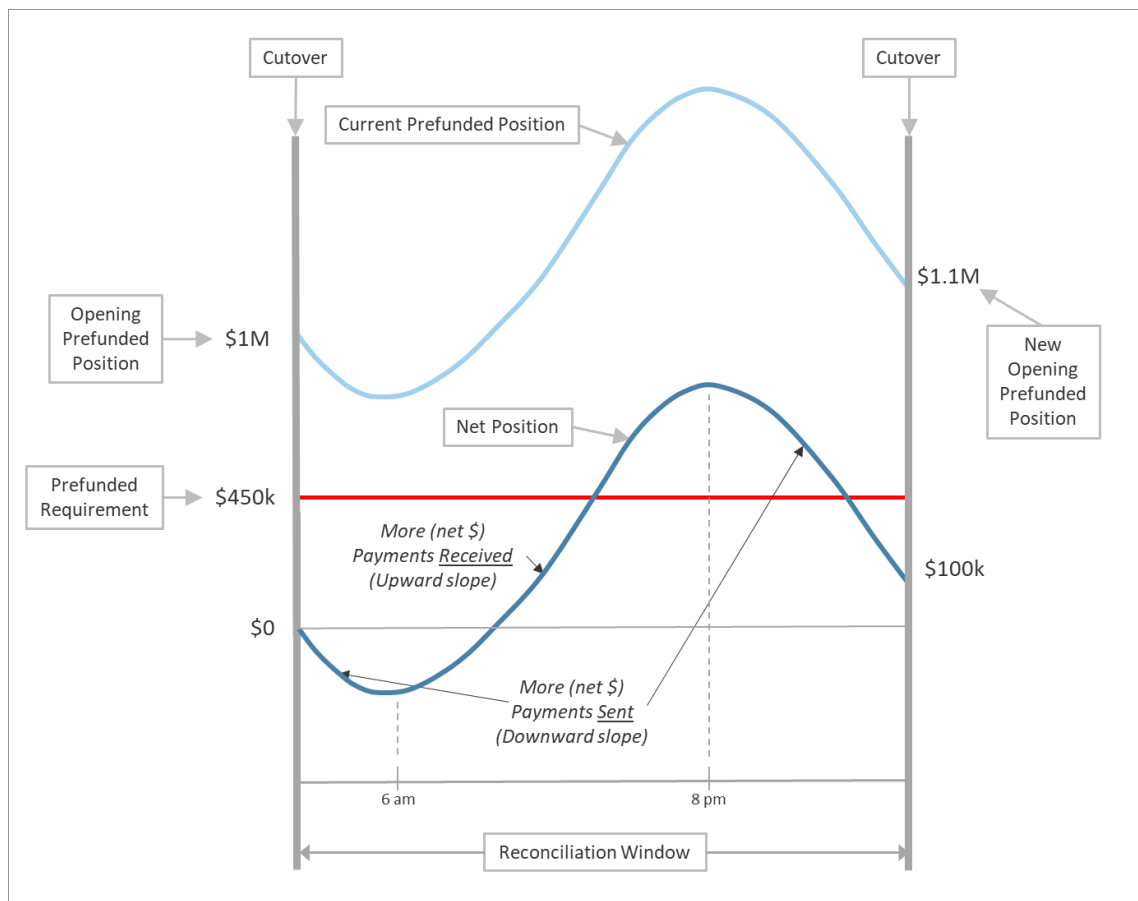


Figure 3. Definition of Current Prefunded Position

The Figure shows that as more Payments are sent out (in this example between the opening of the Reconciliation Window and 6am) the Net Position can fall below \$0. And when more Payments are received (between 6am and 8pm), the Net Position climbs above \$0. Correspondingly, the CPP falls below the Opening Prefunded Position (\$1M) as more Payments are sent and climbs above the Opening Prefunded Position as more Payments are received.

Net Position =
The net of all increases and decreases of RTP Payments + Supplemental Funding - Disbursements during a Reconciliation Window.

In the example, looking at the day overall, \$100k more Payments are received than are sent out (i.e., the Net Position at cutover was +\$100k). Therefore, the Opening Prefunded Position of the new Reconciliation Window increases by \$100k to \$1.1M.

Note that in this example, for this Sending Participant, there is no occurrence during the Reconciliation Window when the CPP falls below the Prefunded Requirement. Also note that no

Current Prefunded Position =
Opening Prefunded Position + Net Position

Supplemental Funding or Disbursements occur during the Reconciliation Window.

A Sending Participant is expected to maintain a minimum CPP equivalent to its Prefunded Requirement in order to ensure sufficient liquidity for its on-going payment activity within the RTP System.

A Sending Participant's CPP may go below its Prefunded Requirement at certain times due to its current Payment activity. If that occurs, the Sending Participant will be required to provide Supplemental Funding to bring its CPP back to the amount equal to or greater than its Prefunded Requirement within the timeframes specified in the RTP Operating Rules. If a Sending Participant's CPP falls below its Prefunded Requirement, its ability to send Payments will not be stopped. Payments will only be rejected if the Sending Participant's CPP is less than the individual Payment amount.

In Figure 4, during the Reconciliation Window, the Sending Participant sends out more Payments than it receives. Therefore, its CPP at cutover (\$700k) is less than its original Opening Prefunded Position (\$1M). In fact, in this example, the Opening Prefunded Position of the new Reconciliation Window is less than the Sending Participant's Prefunded Requirement of \$900k. This means that the Sending Participant will need to perform a Supplemental Funding of at least \$200k to bring its CPP back to at least its Prefunded Requirement.

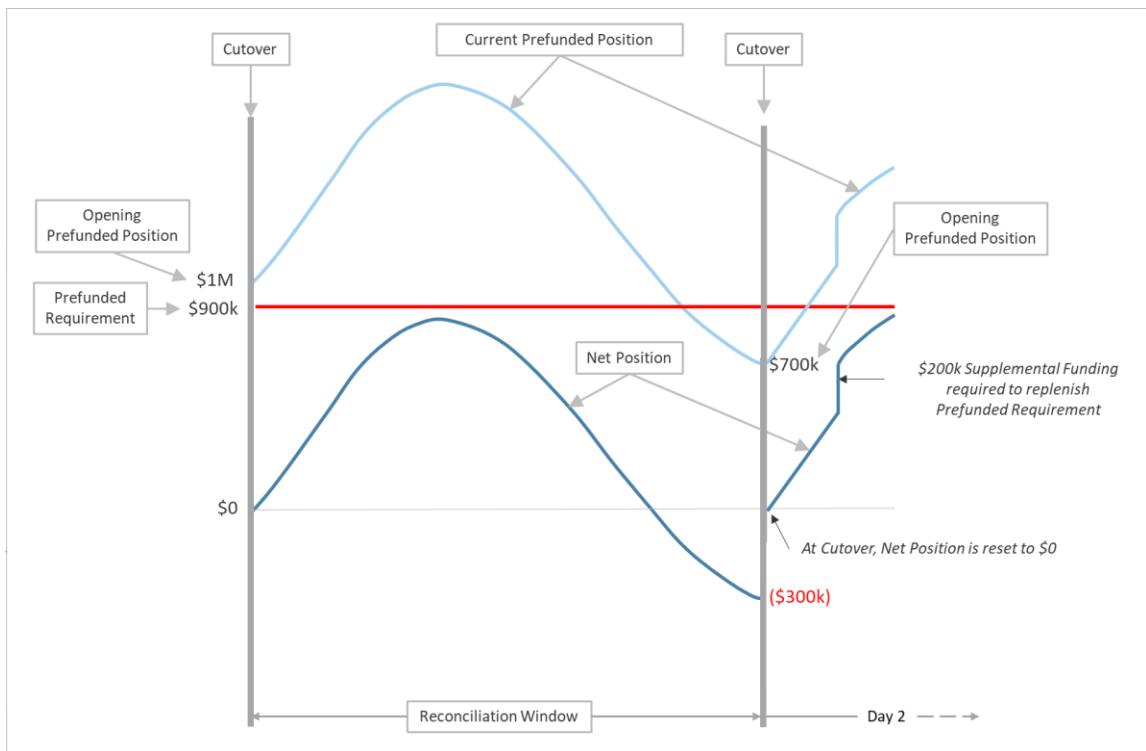


Figure 4. Example of when Supplemental Funding is required at the start of a new Reconciliation Window.

2.7 Reconciliation

Reconciliation is a process through which a Funding Participant ensures that its own system records match the RTP System records of transaction and funding activity. Within the Operating Rules, Reconciliation Window is defined as:

One or more defined time periods during the RTP Day for tracking Payment and funding activity for purposes of producing reconciliation reports at the close of the time period.

A typical Funding Participant may be accustomed to performing reconciliation on an “end-of-day” basis. Because RTP operates as a 24/7 system and because settlement of RTP Payment Transactions occurs immediately at the time the transaction completes, Funding Participants will need to establish reconciliation processes that may have key differences to the processes established for other payment systems.

2.8 Reconciliation Windows

The RTP System will track Payment Transactions, Supplemental Funding events, and Disbursement events throughout a Reconciliation Window. In each completed Payment Transaction, Supplemental Funding event and Disbursement event, the RTP System specifies the Reconciliation Window in which the activity will be reported to the Participant (see section 6.1 for more details).

At the end of each Reconciliation Window (i.e., at Cutover), the RTP System generates a series of reports that Participants can use to ensure their system records match the financial events that occurred within the RTP System during that Reconciliation Window.

2.8.1 Participant Reconciliation

Currently, Reconciliation Window Cutover is scheduled to occur once per calendar day at 11:59pm ET. TCH has the ability to update the Reconciliation Window calendar at any time, and may implement as a standard, multiple Reconciliation Window Cutovers per calendar day in the future. Before making a change to the calendar, TCH will provide reasonable notice to Funding Participants.

Further, TCH may insert a Reconciliation Window Cutover at any time if required to solve certain rare error conditions. Participants and TPSPs must be aware of the variability in Reconciliation Window Cutover timing as they develop their reconciliation window processes (see sections 3.5 and 3.6 for more detail).

The Cutover event triggers the RTP System’s Reconciliation Checkpoint function. During Cutover, the following steps are performed:

2.8.1.1 Opening Prefunded Position

The Funding Participant's Opening Prefunded Position for the new window is set to the CPP at the time of the Cutover from the prior Reconciliation Window (this is sometimes referred to as the "Closing Prefunded Position") and the Funding Participant's Net Position for the new Reconciliation Window is reset to \$0. Resetting the Funding Participant's Net Position to \$0 at Cutover allows for incremental reconciliation from Cutover to Cutover, avoiding the need to go back to the Participant's original go-live date (prior to any initial funding or transaction activity) to identify and isolate any discrepancy between RTP logs and the Funding Participant's system logs;

2.8.1.2 Reconciliation Status Notification

The RTP System sends an individual Reconciliation Status Notification as an SNM with Event Code = 999 to each Funding Participant.⁷ This message contains similar data elements to those included in the Participant Reconciliation Report, including Opening and Closing Prefunded Positions, count and aggregate value of Supplemental Funding, Disbursements, inbound and outbound Payment Transactions during the immediately preceding Reconciliation Window and is provided in XML format as specified in the RTP Message Specifications.

2.8.1.3 Reconciliation Reports for Funding Participants

Reconciliation Reports are generated for each Funding Participant to compare its own system records with the transactions that occurred within the RTP System. Reconciliation Reports are provided as a feature of the RTP Management Portal.

The Participant Reconciliation Report and the Detailed Payment Reconciliation Report are published shortly after the close of each reconciliation window. Both reports are provided by the RTP Management Portal in CSV and XML formats to facilitate the needs of the Funding Participant's system performing the reconciliation.

Non-funding Participants will receive the same Reconciliation Reports as Funding Participants. Funding Agents will receive those same reports and will also receive the Funding Agent Reconciliation Report which provides a transaction summary of all Group Member activity, including a summary of all Supplemental Funding and Disbursements made during the Reconciliation Window.

The Participant Reconciliation Report (Summary)

This report provides a high-level summary of the Payment activity that occurred for a single Funding Participant during the previous Reconciliation Window. The following information can be found in the report to assist with Reconciliation:

- The Reconciliation Window Date

- The Reconciliation Cycle number
- The Opening Prefunded Position at the start of the Reconciliation Window
- The CPP at the end of the Reconciliation Window (sometimes called the Closing Prefunded Position)
- The total number and value of Supplemental Funding into the Prefunded Balance Account
- The total number and value of Disbursements from the Prefunded Balance Account
- The Net Position at the end of the Reconciliation Window
- The total number and value of Payment Messages received and accepted (credits)
- The total number and value of Payment Messages sent and accepted by other Participants (debits)

The Detailed Payment Reconciliation Report

The Detailed Payment Reconciliation Report provides transaction level information to allow Participants to reconcile on a transaction-by-transaction basis its activity logs to that of the RTP System logs for a given Reconciliation Window. The report provides:

- The Reconciliation Cycle number
- Sending and Receiving Participant IDs and Names
- The Instruction ID (a unique identifier for each transaction)
- The direction of the Payment from the Funding Participant's perspective (Inward or Outward)
- The transaction status (whether it was accepted or rejected, and if rejected the reason)
- The amount of the Payment
- The timestamp associated with the original Payment Message (pacs.008)
- Certain other payment information such as Local Instrument Code.

3 FUNDING AGENTS AND NON-FUNDING PARTICIPANTS

Section 2 describes how the RTP System functions between and among Funding Participants that provide their own funds into the Prefunded Balance Account in order to meet the Prefunded Requirement as established by TCH and shown in Table 2. However, many institutions wishing to participate in the RTP System will want to follow the same model they use for liquidity in all of their other banking products. That is, to establish a relationship with a commercial bank, banker's bank or a corporate credit union acting as a RTP Funding Agent to provide the liquidity required by TCH to participate.

TCH expects that funding arrangements between Funding Agents and Non-funding Participants will be reliable and well-managed. Under the RTP Operating Rules, TCH may require a Non-funding Participant to change its funding arrangement if TCH determines that the Participant's current funding arrangement is unreliable or creates unacceptable risk for the RTP System.

3.1 Funding Agent Types Defined

There are two types of Funding Agents, each with its own attractiveness to potential Funding Agents and Non-funding Participants:

- **Funding Providers** – This newer type of Funding Agent provides an overall Prefunded Requirement amount which serves as prefunding for all of its Non-funding Participant clients, called Non-funding Group Members (“Group Members”). If it is using this type of Funding Agent, a Group Member will not have a Prefunded Requirement, an Opening Prefunded Balance, or a CPP. Instead, the Funding Provider has a CPP and a collective Prefunding Requirement for its sending Group Members. The Group Members satisfy the RTP System's requirement that all Payments be prefunded by using their Funding Provider's CPP, which must be sufficient to cover the Payments they send. A Funding Provider's Prefunded Requirement is calculated based on combined DDA balances of the Funding Provider's Group Members.

A Funding Provider has the ability to add Supplemental Funds and Disburse excess liquidity from the Prefunded Balance Account based on the level of its CPP relative to its Prefunded Requirement. Funding Providers interact with the RTP System as if they were a single Funding Participant and receive reports and SNMs to help them manage their CPP. See section 5 for a detailed description of how Funding Managers interact with the RTP System.

- **Funding Managers** – This original type of Funding Agent provides funding on behalf of one or more Non-funding Participants that have their own Prefunded Requirements (if they are Sending Participants) and CPPs on the RTP ledger. Rather than funding a single Prefunded Requirement that is shared among a group of Non-funding Participants, a Funding Manager provides separate funding for each of its Non-funding Participants. Unlike the Funding Provider, the Funding Manager does not have a CPP or its own Prefunded Requirement. Instead, the Funding Manager manages each client's position separately, including funding the Prefunded Requirement for each sending Participant client and providing any Supplemental Funding they may need to maintain their CPP at acceptable levels. Funding

Managers may also request Disbursements on behalf of each of its Non-funding Participants.

To the RTP System, in all other ways, these Non-funding Participants look like Funding Participants and are required to monitor their CPP and maintain proper funding of the Prefunded Balance Account. Therefore it is necessary that the Funding Manager and each of its clients maintain a high level of communication so that Supplemental Funding, if needed, is made available by the Funding Manager as quickly as possible. See section 4 for a detailed description of how Funding Managers interact with the RTP System.

3.2 Funding Agent Requirements

In order to become either type of Funding Agent within the RTP System, certain requirements must be met as specified by *The Real-Time Payments Operating Rules*:

- TCH will qualify Funding Agents based on a review of capital, liquidity, experience, and other factors and will monitor the Funding Agents' ongoing qualification and performance as a Funding Agent;
- A Funding Agent that is a Funding Provider is required to monitor and manage its CPP and provide Supplemental Funding if the CPP falls below its Prefunded Requirement;
- Funding Agents may have a liquidity arrangement with other Funding Participants or Funding Agents within the RTP System for additional liquidity if needed (e.g., when the Fedwire Funds service is closed and Supplemental Funds cannot be added to the Prefunded Balance Account to increase CPP).

In the future, the Operating Rules may have additional Funding Agent requirements (e.g., Funding Agent audits, concentration limits, etc.).

3.3 Funding Agent Onboarding Testing Resources

In order to enable testing and development of operational processes for Funding Agents, TCH will provide access to the RTP Bank Test environment, in which full Funding Agent functionality is available.

In the RTP Bank Test environment TCH provides two simulated Non-funding Participants which can be used to generate Transaction activity to flow through to reports and cause alarms to be raised (this will be performed through assisted testing with TCH Operations).

A Funding Agent that does not plan to also be an RTP Participant will be provisioned in Bank Test as a Funding Agent with one CPP.

A Funding Agent that also plans to be a RTP Participant will be provisioned in Bank Test as:

- A Funding Agent with one CPP,
- If applicable, using a Third Party Service Provider (TPSP) with a TPSP-owned Connection,
- At least two simulated Non-Funding Participants, and

- A Participant with the proper Funding Agent related data.

These Funding Agent/Participants will be expected to be able to perform testing without the assistance of TCH Operations, but may schedule assisted testing as necessary.

Funding Agents will be required to demonstrate their ability to send Supplemental Funding in the proper format for adding Funds to the Prefunded Balance Account.

3.4 Funding Agent Operational Tools

TCH will provide a number of tools for RTP Funding Agents to manage their clients' or their own CPP, including:

- Secure Access to the RTP Management Portal to view positions in real-time, manage Net Send Limits (for Funding Providers), initiate Disbursement Requests for itself (if a Funding Provider) and on behalf of its Non-funding Participant clients (if a Funding Manager), view Watermark thresholds, perform various Inquiries and view Reconciliation Reports;
- A VPN Connection to the RTP environment to receive:
 - Real-time SNMs for liquidity related events (e.g., low and high watermark SNMs and Notifications of successful Supplemental Funding and Disbursement Requests);
 - Daily Reconciliation Reports including a Funding Agent Reconciliation Report that rolls up Non-Funding Participant Activity.

4 FUNDING PROVIDERS

4.1 Overview

Funding Providers supply liquidity that is shared by a group of Non-funding Participants (Group Members). Group Members use the Funding Provider's Current Prefunded Position for their payment activity. A Funding Provider has a single combined Prefunded Requirement for its sending clients. Non-funding Participants (Group Members) using a Funding Provider do not have a Prefunded Requirement, an Opening Prefunded Position, or a CPP, while they retain a Net Position based on their activity during a Reconciliation Window.

Group Members satisfy the RTP System's requirement that all Payments be prefunded by virtue of the fact that the Funding Provider's CPP is sufficient to cover Payments being sent.

During the onboarding process, the Funding Provider adds funds to the Prefunded Balance Account that meet or exceed its Prefunded Requirement and establishes that amount as its initial Opening Prefunded Position. Each Group Member has a Net Position that starts at \$0 at the beginning of each Reconciliation Window, just as Funding Participants do. As a Group Member's Net Position changes, it affects the CPP of the Funding Provider.

The relationship between a Funding Provider's CPP and its Group Members combined Net Position is similar to that of a Funding Participant's CPP and Net Position as described in section 2.6 of this document. However, because there are multiple parties involved and several nuanced differences between the two models, it is appropriate to use the same example as in 2.6, but now explained in the context of a Funding Provider's CPP.

Note: One key difference the Operating Rules require of Funding Providers is the obligation to pay or otherwise settle up with each Group Member in the amount of any positive Net Position the Group Member has at the end of a Reconciliation window at least once each Fedwire operating day. Similarly, each Group Member must pay or otherwise settle up with the Funding Provider in the amount of any negative Net Position the Group Member has at the end of a Reconciliation window at least once each Fedwire day.

4.2 How Daily Payment Activity Impacts the Funding Provider's CPP

At the beginning of each Reconciliation Window, a Funding Provider's Opening Prefunded Position is set to the CPP at the time of the Cutover from the prior Reconciliation Window, and the Net Position of each of the Group Members is reset to \$0. See Figure 9. This example assumes that the Funding Provider made no Supplemental Funding and no Disbursement Requests during the Reconciliation Window.

As Payments are sent and received by Group Members during the Reconciliation Window, the Funding Provider's CPP (higher curve in light blue) is updated. The Figure shows that as more Payments are sent out by the Group Members as a whole (in this example between the opening of the Reconciliation Window and 6am) the sum of their individual Net Positions falls below \$0. And when more Payments are received (between 6am and 8pm), the sum of their individual Net Positions climbs above \$0. Correspondingly, in this example, the Funding Provider's CPP falls

below the Opening Prefunded Position (\$1M) as more Payments are sent and climbs above the Opening Prefunded Position as more payments are received.

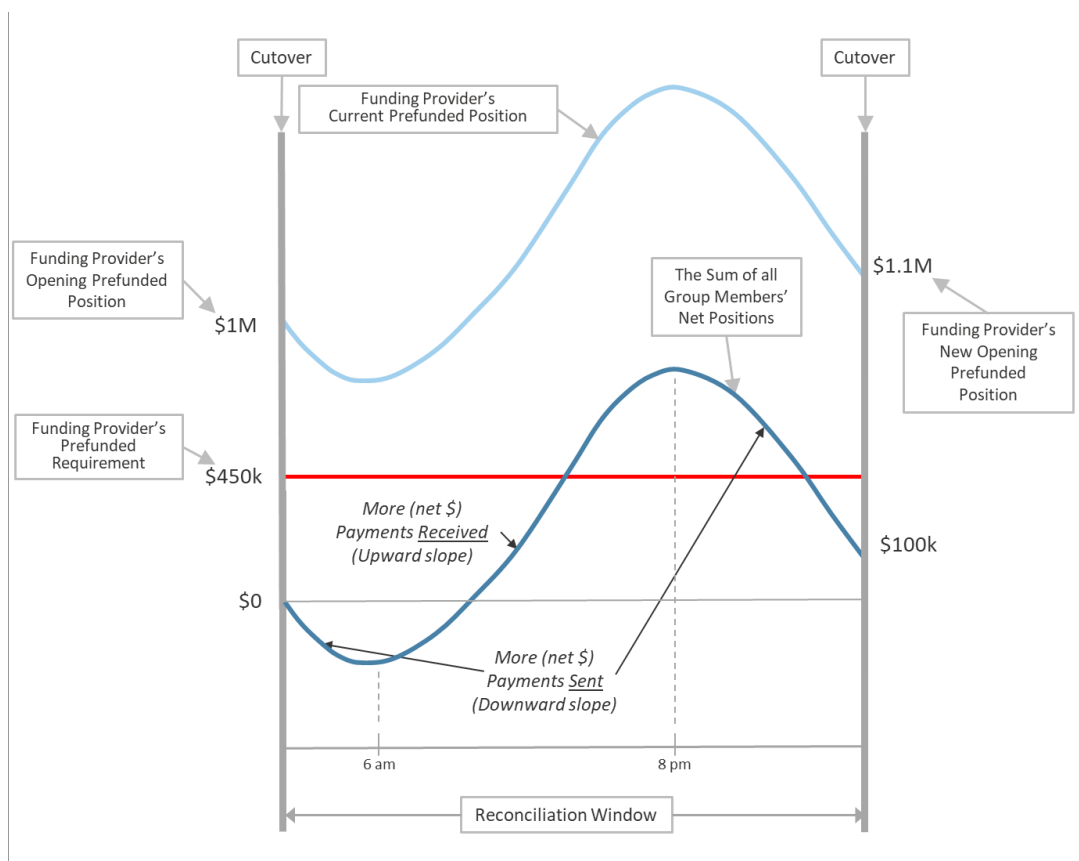


Figure 5. Funding Provider's CPP assuming no Supplemental Funding or Disbursements

In the example, looking at the day overall, \$100k more Payments are received than are sent out (i.e., the sum of the Group Members' individual Net Positions at Cutover was +\$100k). Therefore, the Funding Provider's Opening Prefunded Position of the new Reconciliation Window increases by \$100k to \$1.1M.

Note that in this example, there is no occurrence during the Reconciliation Window when the Funding Provider's CPP falls below its Prefunded Requirement of \$450k.

A Funding Provider's CPP however, might drop below its Prefunded Requirement at certain times due to its Group Members' Payment activity. If that occurs, the Funding Participant is required to bring its CPP back to the amount equal to or greater than its Prefunded Requirement within the timeframes specified in the RTP Operating Rules. If a Funding Provider's CPP falls below its Prefunded Requirement, its Group Members' ability to send Payments will not be stopped unless a Group Member's payment would exceed its Net Send Limit. Payments will only be rejected if the Funding Provider's CPP is less than an individual Payment amount or the Group Member that sent the Payment would exceed its Net Send Limit.

Figure 11 shows an example of Group Members sending out more Payments than they receive from other RTP Participants (downward slope of the sum of the Group Members' individual Net Positions, the dark blue line). As a result, the Funding Provider's CPP is quickly approaching its Prefunded Requirement. This means that the Funding Provider will need to provide Supplemental Funding to ensure the CPP doesn't fall below the Funding Provider's Prefunded Requirement or the value of Payments the Funding Provider anticipates its Group Members may send. Any Supplemental Funding will increase the Funding Provider's CPP. In addition, the Funding Provider may – if it wishes to increment a specific Group Member's Net Position – attribute those funds to that Group Member. In that case, both the Funding Provider's CPP and the Group Member's Net Position will show the Supplemental Funding increase.

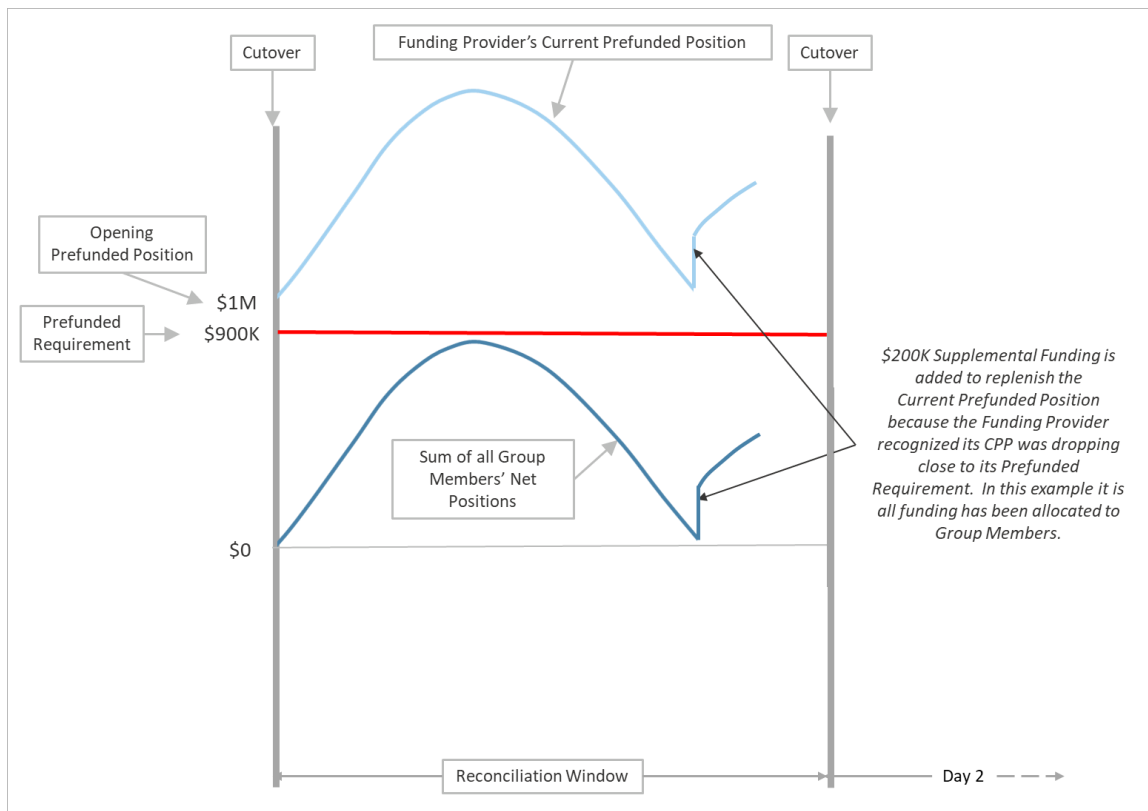


Figure 6. Example of when Supplemental Funding is required.

It is possible however, that a Funding Provider may add Supplemental Funds or make Disbursements that are not allocated to any of its Group Members. Because of this, the definition of a Funding Provider’s CPP is slightly different than the definition of Funding Participant’s CPP provided in section 2.6. While each Group Member’s Net Position includes any Supplemental Funds or Disbursements allocated to the Member by the Funding Provider, unallocated Supplemental Funds and Disbursements do not change any Group Member’s Net Position. Hence, a Funding Provider’s CPP cannot be just its Opening Prefunded Position plus the sum of the Net Positions of each Group Member. The Funding Provider’s CPP must also include unallocated Supplemental Funds and Disbursements.

A Funding Provider’s CPP =
Opening Prefunded Position
+ the sum of Group’s Net Positions
+ Supplemental Funding not
allocated to a Group Member
– Disbursements not allocated to a
Group Member.

Figure 12 shows the same Funding Provider as in Figure 10, however in this example it adds Supplemental Funds that are not allocated to any Group Members in addition to those added and allocated. The action impacts the Funding Provider’s CPP but does not impact any of the Group Members’ Net Positions.

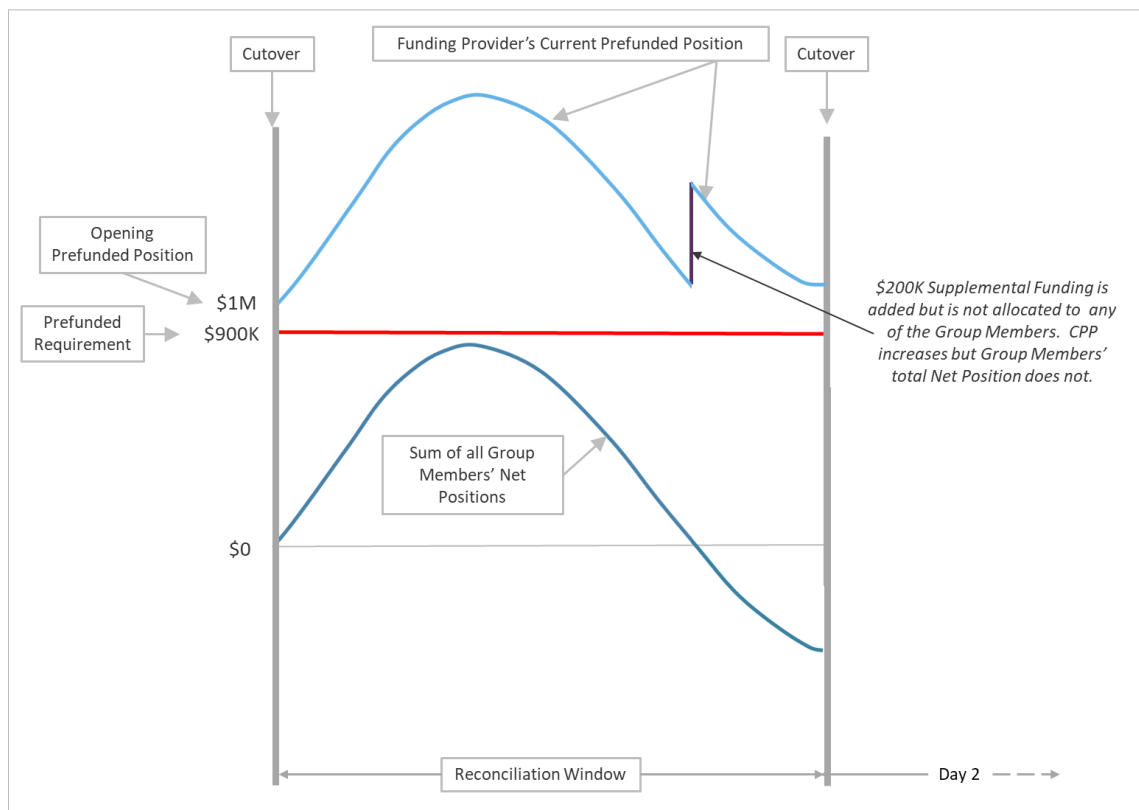


Figure 7. Funding Provider adds Supplemental Funding but does not allocate any of it to a Group Member.

4.3 Reconciliation Windows

At the beginning of each Reconciliation Window, a Funding Provider's Opening Prefunded Position is set to the CPP at the time of the Cutover from the prior Reconciliation Window and each of its Group Members' Net Positions are reset to \$0.

Group Members will receive the same Reconciliation Reports as Funding Participants, as described in section 2.8.1.3. Funding Managers will receive those same reports and will also receive the Funding Agent Reconciliation Report which is a transaction summary of all Non-funding Participant activity, including a summary of all Supplemental Funding and Disbursements made during the Reconciliation Window (See section 6.2).

4.4 Net Send Limits

Because Group Members share the liquidity associated with their Funding Provider's CPP, a Funding Provider sets a Net Send Limit (NSL) for each Group Member to control how much liquidity each Group Member can use. An NSL determines the amount by which the value of payments that a Group Member sends can exceed the value of payments that the Group Member receives during a Reconciliation Window. NSL is expressed as a negative number since a Net Position will be negative when a Participant has sent more payments than it has received. NSLs may be different for each Group Member and a Funding Provider may increase or decrease its Group Members' individual NSLs at any time if it spots trends of receiving or sending Payments that would warrant such a change. **Note:** a change to the NSL does not affect the Funding Provider's CPP.

In managing its Current Prefunded Position for use by its Non-funding Group, Funding Providers should take into account the impact of Reconciliation Windows on Net Send Limits. At the end of each Reconciliation window, the Net Position of each Non-funding Participant client of a Funding Provider will reset to \$0. Hence, each Group Member's ability to send Payments will be limited to the difference between zero and the member's Net Send Limit notwithstanding the fact that the member may have had a greater or lesser difference between its Net Position and its Net Send Limit at the close of the prior Reconciliation Window.

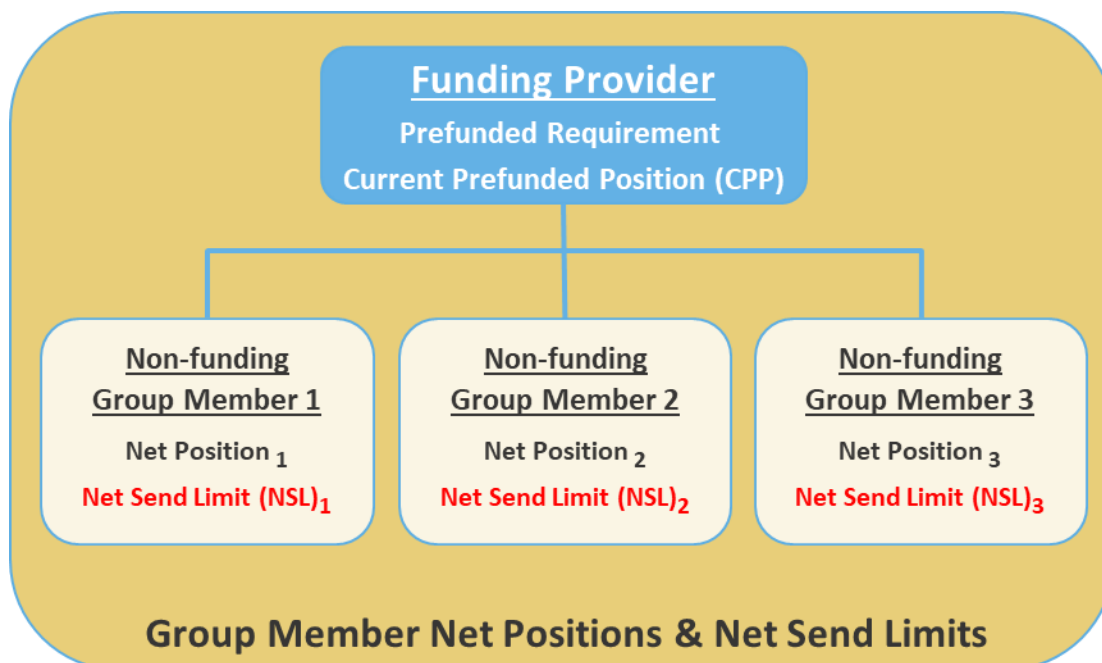


Figure 8. Group Members of Funding Providers do not have a Prefunded Requirement or CPP.

4.5 Multiples

A Funding Provider may set NSLs that collectively exceed its Prefunded Requirement. TCH reserves the right to require a Funding Provider's Prefunded Requirement to equal the sum of its Group's NSLs, if TCH determines that the funding arrangement is unreliable or creates unacceptable risk for the RTP System.

TCH limits the amount by which the sum of a Group's NSLs may exceed a Funding Provider's Prefunded Requirement. Specifically, the absolute value of the sum of all Group Members' NSLs (again, NSLs are negative amounts) must be less than or equal to a Multiple that TCH sets times the Funding Provider's Prefunded Requirement.

$$\left| \sum_{GM=1}^n NSL \right| \leq PR_{FP} \times Multiple$$

This Multiple is configured and managed by TCH. Multiple values range from 1.0 to 99.9 times the Prefunded Requirement. For example, if a Funding Provider has a Prefunded Requirement of \$1M, and a Multiple of 5.0, the sum of its Group Members' NSLs must not exceed -\$5M. TCH will inform a Funding Provider of the Multiple that TCH has established for its Group at the time the Group is provisioned on the RTP System, and at any time TCH changes the Multiple.

Said another way:

$$\frac{|\sum_{GM=1}^n NSL|}{PR_{FA}} \leq \text{Multiple}$$

If the Funding Provider adjusts any Group Member’s NSL to allow the Group Member to be able to send a greater net value of payments such that the adjustment will cause the Multiple to be exceeded in the above equation, the Funding Provider will no longer be able to increase any other Group Member’s NSL or watermark levels (see section 5.6), until (i) it adjusts the NSLs of other Group Members’ so that the sum of the Group’s NSLs does not exceed the multiple, (ii) TCH increases the Multiple, or (iii) TCH increases the Funding Provider’s Prefunded Requirement.

Further, if the Multiple has been exceeded, TCH will not provision any new Group Members for the Funding Provider until the Multiple is no longer exceeded.

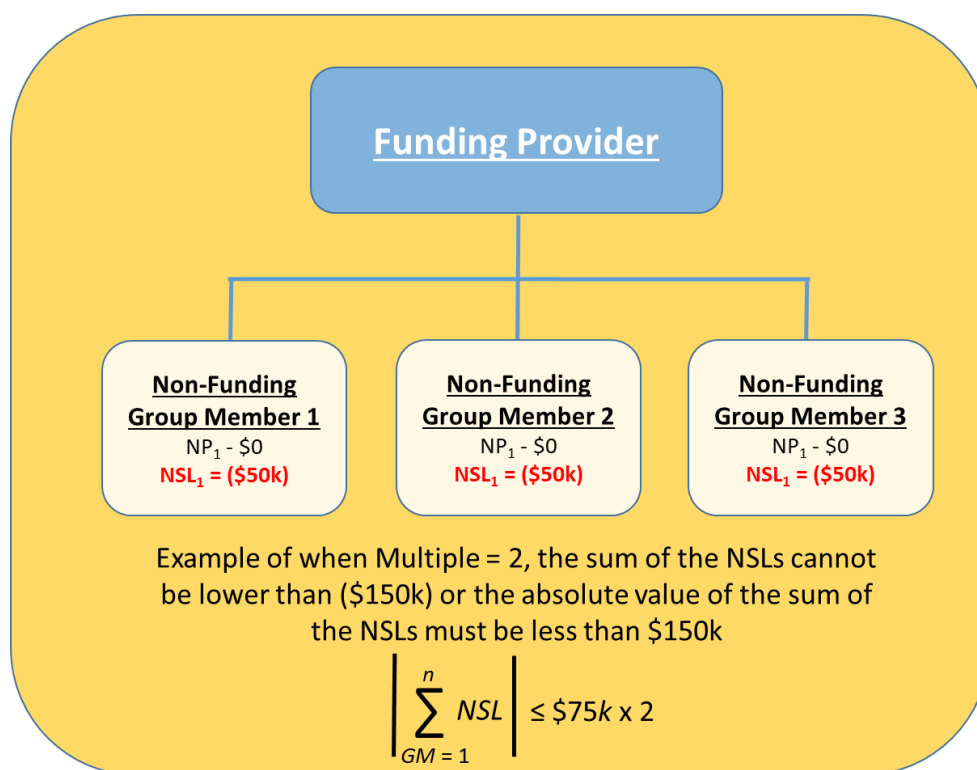


Figure 9. Example of a Funding Provider’s initial position.

Figure 13 shows an example of what an initial position might look like for a Funding Provider that has three Group Members, each with U.S. Transactional Deposits less than \$100M. TCH sets the Funding Provider’s Prefunded Requirement to \$75k (\$25k for each Group Member according to Table 2). Further, TCH decides to assign this Funding Provider a Multiple of 2. (Note that a Multiple of 2 is used here for ease of calculation; the actual Multiple TCH sets may range from 1 to 99.9.)

This means the Funding Provider can allow its Group Members a total of no more than (\$150k) in NSL, so it assigns (\$50k) to each of the three Group Members.

If, for example, the Funding Provider's opening CPP is \$200k, it would have a buffer of \$50k to make sure that as Payment Messages are sent and received, its CPP will not drop lower than its Prefunded Requirement of \$75k and require adding Supplemental Funds (see section 2.5).

The RTP System only releases a Group Member's Payment Message if Payment would not cause the (i) Member's Net Position to drop below its NSL and (ii) the Funding Provider's CPP to drop below 0.

A Funding Provider, like Funding Participants, must monitor its CPP and provide Supplemental Funding to increase its CPP to its Prefunded Requirement, if its CPP falls below its Prefunded Requirement. The time at which such Supplemental Funding must occur depends upon whether the Fedwire Funds service is operating at the time CPP falls below the Prefunded Requirement. If CPP falls below the Prefunded Requirement,

- During Fedwire operating hours, then Supplemental Funding must be provided before the next close of the Fedwire Funds service
- During non-Fedwire operating hours, Supplemental Funding must be provided at the next opening of the Fedwire Funds service.

The following two Figures show an example of each case.

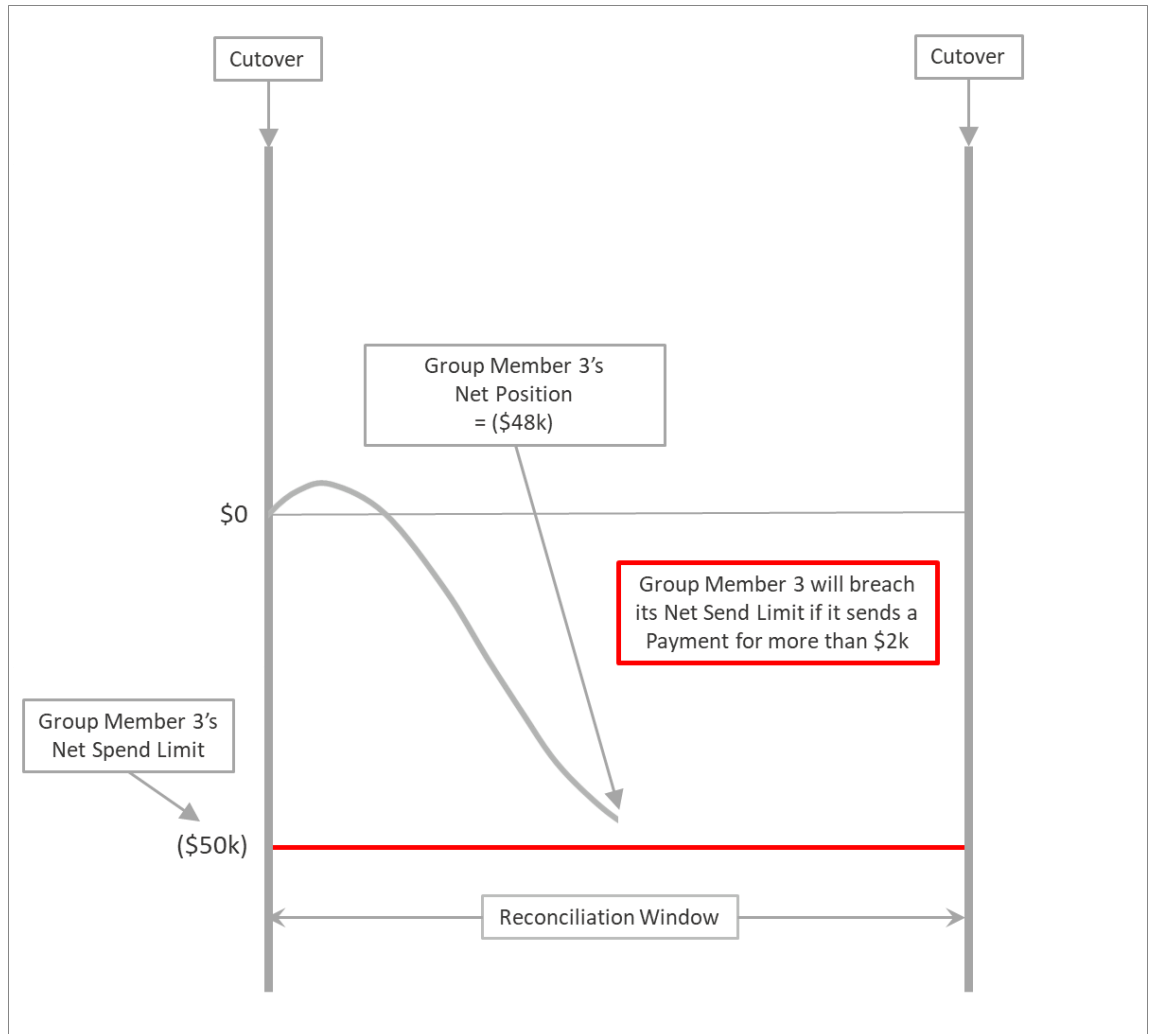


Figure 10. New Payment Message of \$2K will cause breach of Net Spend Limit.

Figure 14 shows that Group Member 3 which has a NSL of (\$50k) is sending out more Payment Messages than it is receiving (note the downward slope of its Net Position curve). Mid-way through the Reconciliation Window, its Net Position drops to (\$48k). This means that if Group Member 3 sends a Payment Message for more than \$2k to the RTP System, the System will reject the Payment Message because it would cause the Member to breach its NSL. Both the Group Member and the Funding Provider should proactively evaluate on a consistent basis whether the Group Member expects to send more Payments during the Reconciliation Window and whether the Group Member is likely to receive Payments that would increase the Group Member's Net Position by a sufficient amount that its NSL will not be breached. If the Group Member and Funding Provider think that the Group Member's NSL is likely to be breached, the following options are available:

- The Group Member stops or limits its Payment origination activity for the remainder of the Reconciliation Window, and/or;
- The Funding Provider adjusts the Group Member's NSL to allow it to send more Payments, and/or;

- The Funding Provider provides Supplemental Funding that is specifically allocated to the Group Member.

It should be noted however, that even if a Payment Message would not exceed a Group Member's NSL, if the Payment Message would cause the Funding Provider's CPP to drop below \$0, then the RTP System will reject the Payment Message and send an SNM to both the Funding Provider and the Group Member notifying them of the problem.

Figure 15 shows Net Position curves of all three Group Members defined in Figure 12. Since the Funding Provider has a Prefunded Requirement of \$75k and has funded the Prefunded Balance Account with \$200k, its Group Members cannot have Net Positions that are together lower than (\$125k) or the Funding Provider's CPP will fall below its Prefunded Requirement. The diagram shows a point during the Reconciliation Window when the sum of all three Group Members' Net Positions totals less than (\$125k). As the Prefunded Requirement has been breached, the Funding Provider is required to add Supplemental Funds as quickly as possible, but no later than the timeframes noted above. There are safeguards provided by the RTP System with low and normal watermarks (see section 5.5). It is incumbent on the Funding Provider to closely monitor its CPP and its Group Member's Net Positions and provide Supplemental Funding to the Prefunded Balance Account as needed.

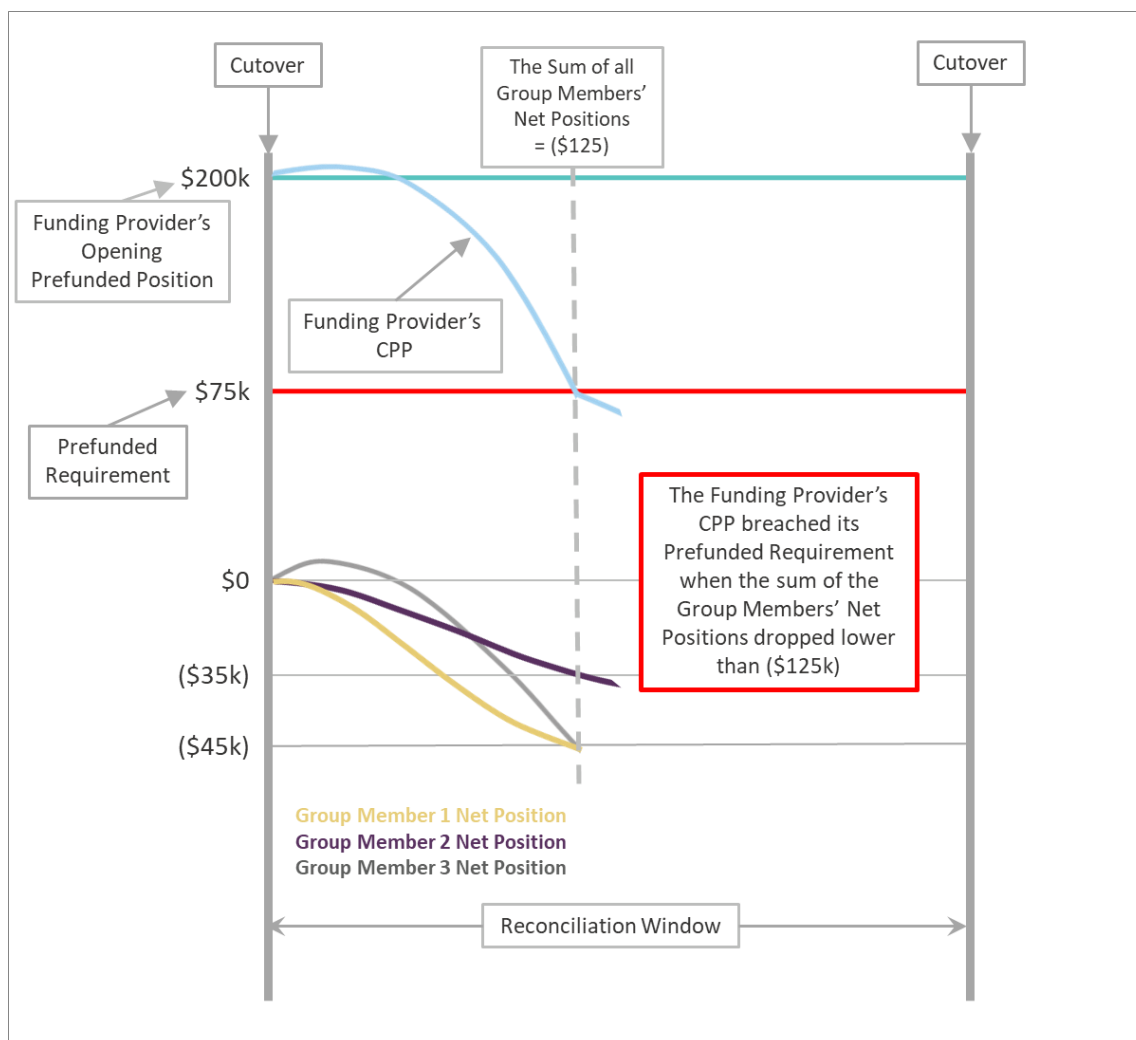


Figure 11. Funding Provider's CPP is less than its Prefunded Requirement, requiring Supplemental Funds.

4.6 Low and Normal Watermarks

Funding Providers will not want to risk the chance of having their CPP fall below their Prefunded Requirement frequently or even risk having it approach \$0, which would affect service to their Group Members' Customers. Because of this, TCH provides the feature of low watermarks and normal watermarks (also referred to as high watermarks) for the CPP. To assist Funding Providers in managing their CPPs, the RTP System provides the feature of low watermarks and normal (sometimes called 'high') watermarks. These watermarks are amounts that are initially set by TCH at the time of onboarding based on information provided in onboarding forms, but they are managed by the Funding Providers via the RTP Management Portal thereafter.

The low watermark is the value at which the Funding Provider will receive a notification via SNM that its CPP is low and requires attention. Once the Funding Provider's CPP falls to the low watermark value and the low watermark notification has been sent, the RTP System will not send any further notifications until CPP rises to or above the normal watermark value, at which point a normal watermark notification will be sent. The normal watermark serves as a reset for

the low watermark. This prevents the system from sending repetitive low watermark SNMs in a condensed period of time, which may be burdensome to the Funding Provider. Subsequently, if the Funding Provider's CPP rises above the normal watermark and then falls below the low watermark again, a second low watermark SNM will be received. It should be noted that a Funding Provider will not receive a normal watermark notification unless its CPP previously fell below the low watermark value and a Debit Cap Threshold Alarm is currently raised.

In the Funding Provider model, it is the Funding Provider's CPP that is being managed, not the Non-funding Participant's. Watermark amounts are initially set by TCH at the time of onboarding, but they are managed by the Funding Providers via the RTP Management Portal thereafter.

In addition, the Funding Provider may establish individual low and normal watermarks for each of its Group Members. However, since Group Members do not have a CPP, these watermarks are applied to a Group Member's Net Position and help to ensure that its Net Position does not drop below its Net Send Limit.

To illustrate these two different types of watermarks, Figures 16, 17 and 18 show the how watermarks are used with a Funding Provider's CPP and Figure 19 shows a Group Member's Net Position breaching its low watermark.

For example (see Figure 16), the low watermark may be an amount that is slightly above the Funding Provider's Prefunded Requirement. The RTP System will send an SNM to the Funding Provider the first time its CPP breaches the low watermark value. The SNM warns that the Funding Provider should immediately add Supplemental Funds to the Prefunded Balance Account in order to increase its CPP back to a normal level. This feature provides a buffer to decrease the probability that a Funding Provider's CPP will fall below its Prefunded Requirement and approach \$0.

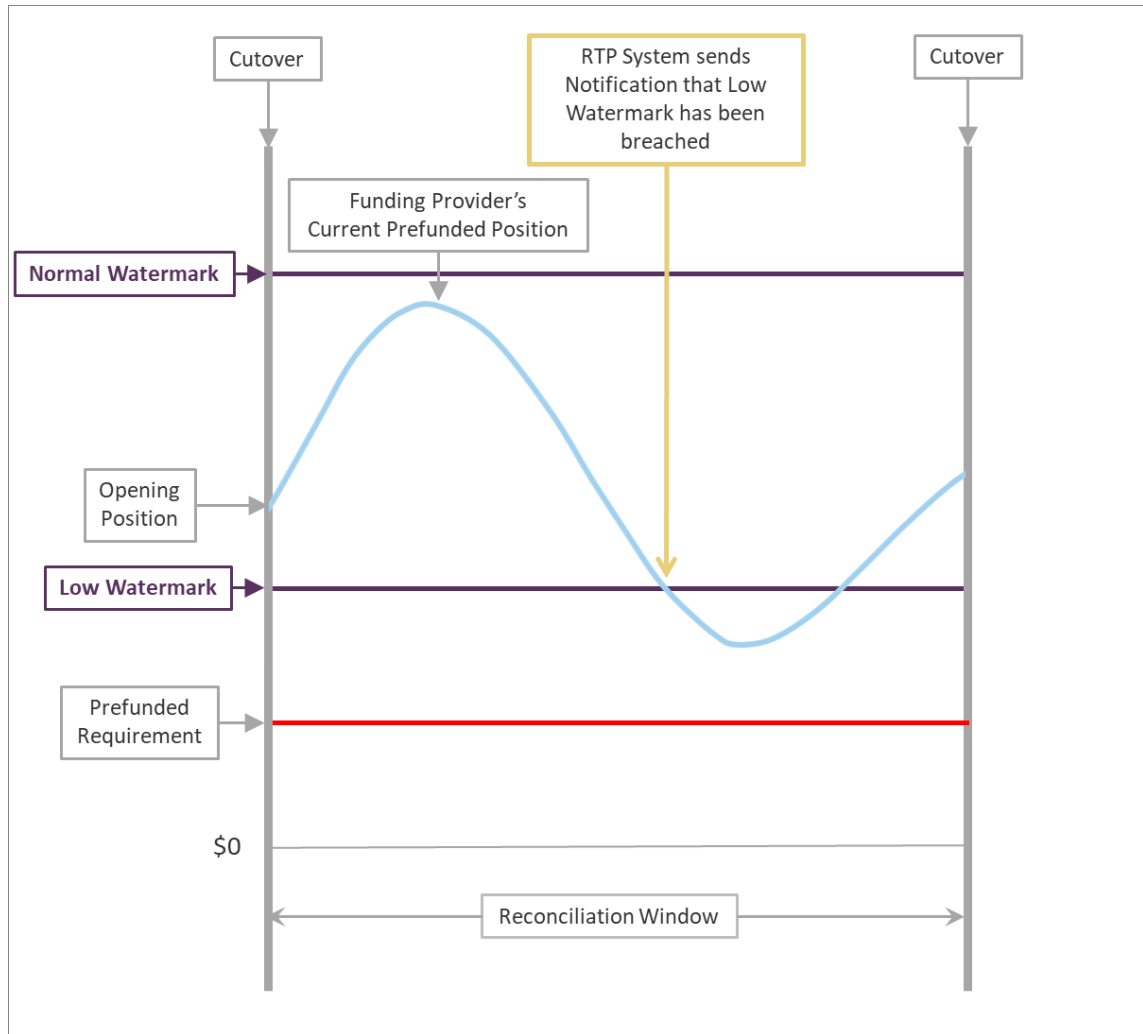


Figure 12. Funding Provider's CPP falls below a low watermark.

If a low watermark has been breached, a Funding Provider will want to add Supplemental Funds for an amount that will increase their CPP above its normal watermark. See Figure 17. When a Funding Provider's CPP reaches its normal watermark following a low watermark SNM, another SNM is sent to the Funding Provider which will serve as an indicator that the CPP has returned

to a normal level. This means the RTP System has reset its Notification calculations so it will issue a new low watermark SNM if the CPP again falls below the low watermark.

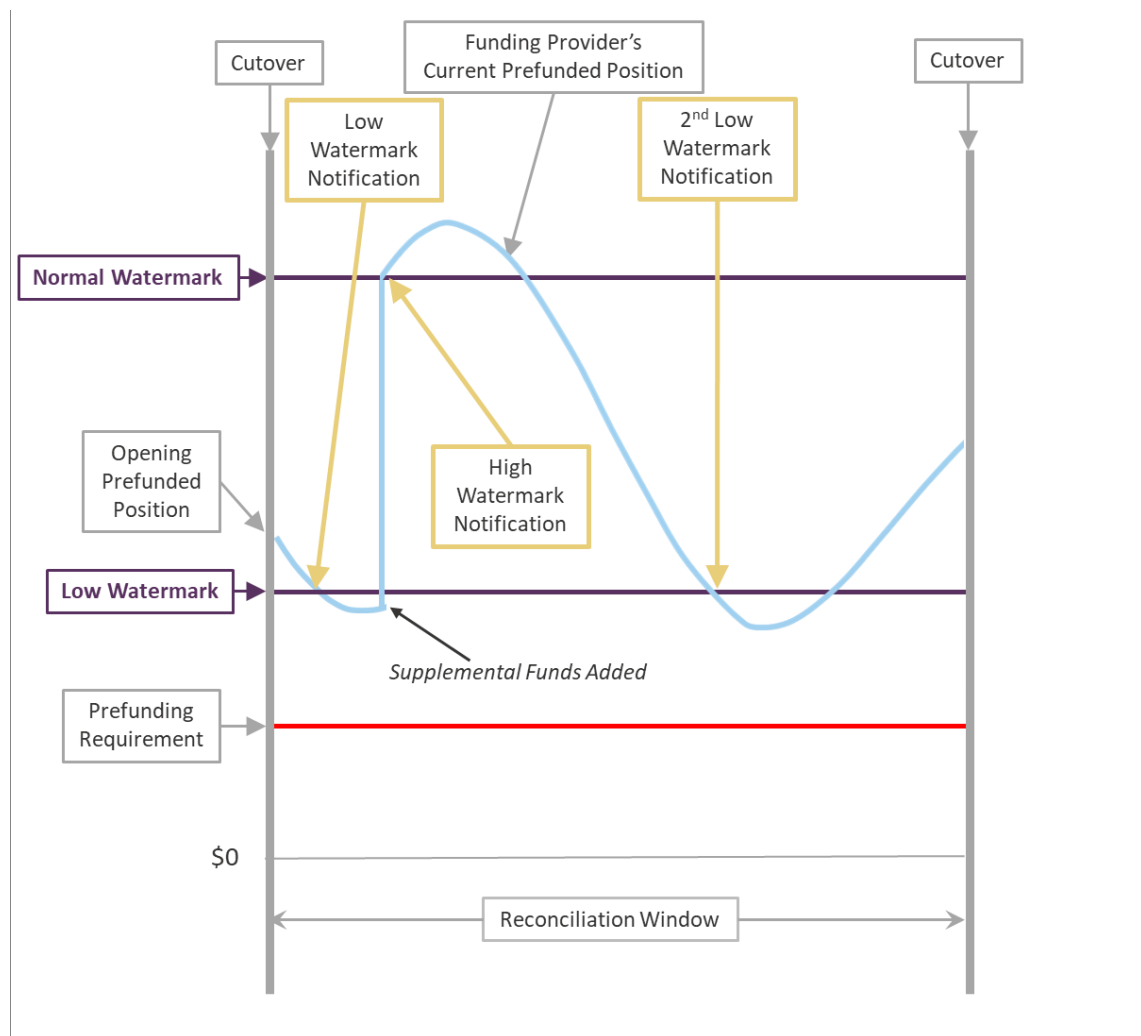


Figure 13. How High and low watermarks are properly managed with the use of Notifications (SNMs).

If however, the Supplemental Funding is not for an amount that would result in the Funding Provider's CPP reaching or exceeding the normal watermark, the RTP System will not reset its low watermark Notification calculations. This will not trigger a new low watermark SNM if the low watermark is breached again. The normal watermark serves as a reset for the low

watermark which prevents the system from sending repetitive low watermark SNMs in a condensed period of time, which may be burdensome to the Funding Provider. See Figure 18.

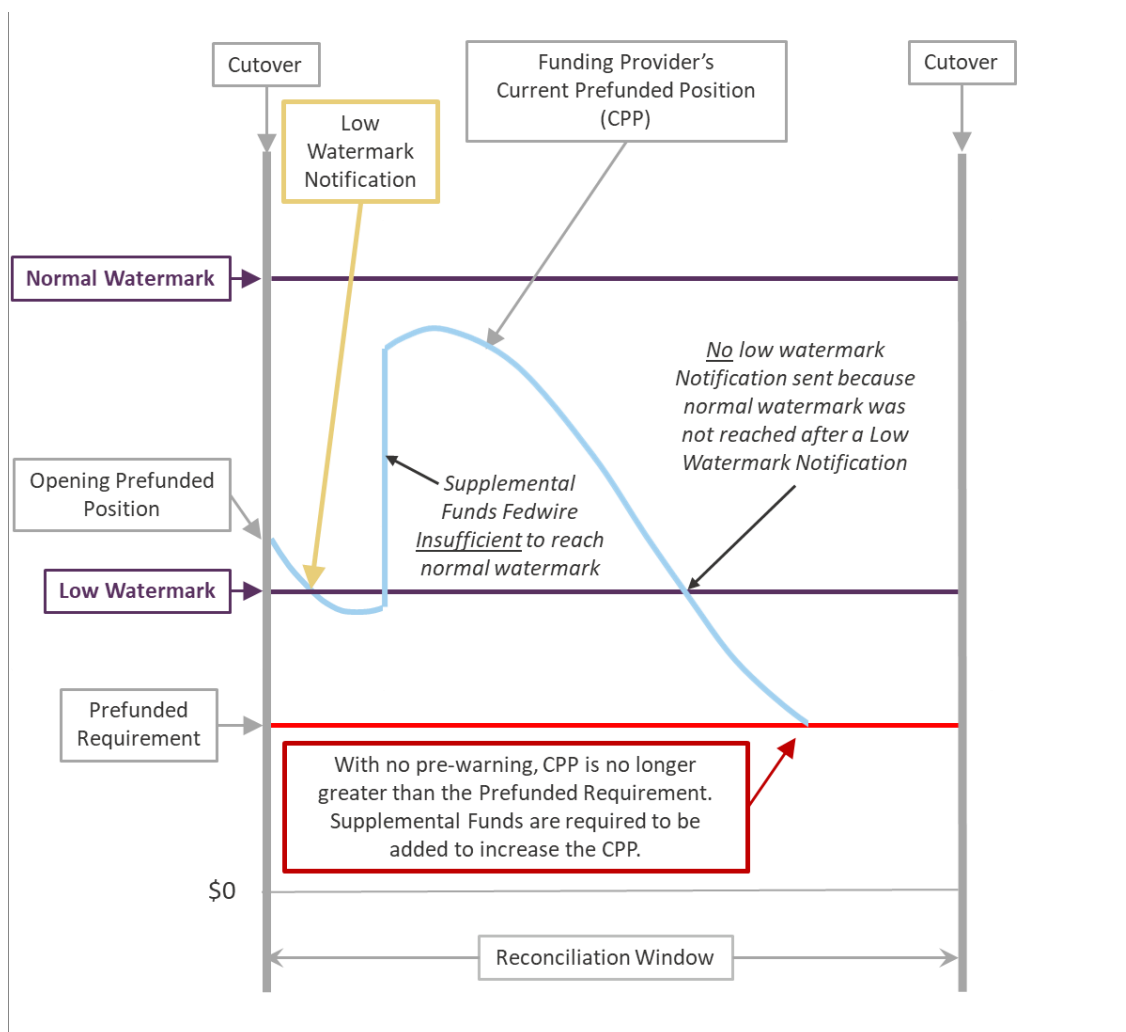


Figure 14. Supplemental Funding should be managed to take advantage of the RTP System's Notifications.

In combination with Funding Provider-level watermarks, a Funding Provider can set low and normal watermarks for each of its Group Members to help protect against the Group Member's Net Position dropping below its NSL. See Figure 19.

If Group Members' Net Position low watermarks are breached, both the Group Member and the Funding Provider receive an SNM notifying both parties about the event. The Funding Provider must adjust the Net Position Limit to a value that exceeds the Group Member's normal watermark in order to reset its Notification calculations, so it will issue a new low watermark SNM if the Net Position again falls below the low watermark.

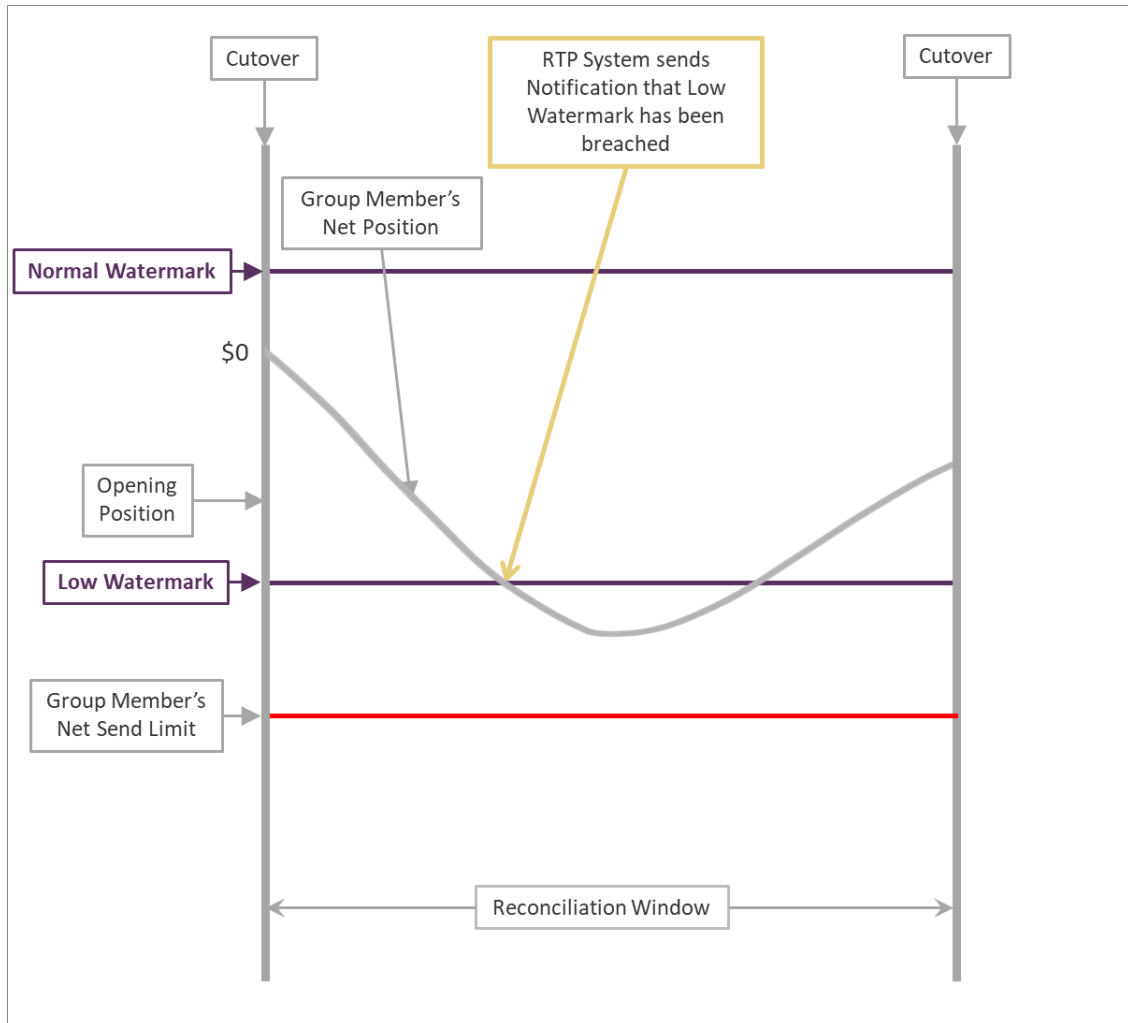


Figure 15. Group Member's Net Position falls below a low watermark set by the Funding Provider.

5 FUNDING MANAGERS

5.1 Overview

Funding Managers provide funding and make requests for disbursements on behalf of each of their Non-Funding Participants, which have their own CPP on the RTP ledger.

Regardless whether it is a Participant, as a Funding Manager, it will not have a Prefunded Requirement or a CPP. It is simply providing liquidity to its Funding Manager clients, which may be one or more Non-funding Participants.

A depository institution may be a Funding Manager without also being a Participant on the RTP System. If the institution chooses to be a Funding Participant offering RTP Payments to its own

Customers, it will have a Prefunded Requirement and carry a CPP, separate from any requirements as a Funding Manager.

In this model, each Non-Funding Participant has a Prefunded Requirement, CPP and a Net Position at any given time. See Figure 5.

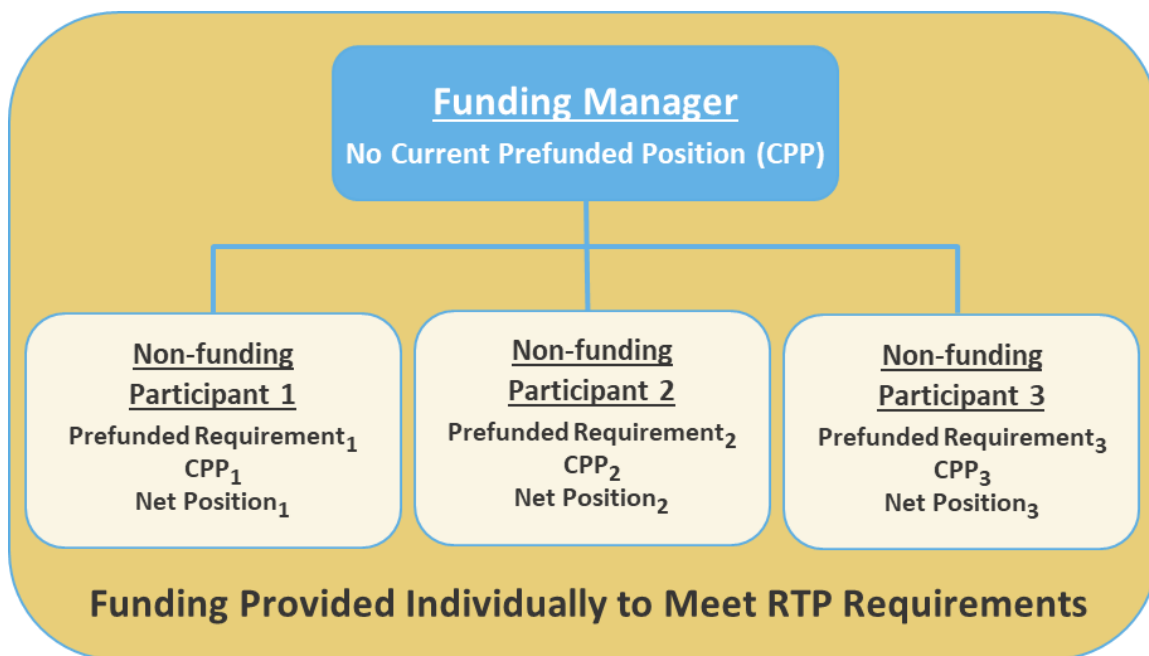


Figure 16. Funding Manager’s liquidity relationship with Non-funding Participants.

A Funding Manager provides a service that will satisfy the individual liquidity requirements of each of its Non-funding Participant clients by providing Supplemental Funding in an amount equal to or greater than each of the Non-funding Participants’ Prefunded Requirements to the Prefunded Balance Account. These funds will be recorded by the RTP System as separate Opening Prefunded Positions for each of the Funding Manager’s clients and as Payments are sent from or received by a client, the client’s Net Position and CPP changes. In this regard, all of the concepts and processes described in section 2 of this document apply to these Non-funding Participants.

However, there are some notable exceptions:

- Both the Non-funding Participant and the Funding Manger will receive copies of all liquidity event SNMs;
- If a Funding Manager learns from an SNM that a Non-funding Participant’s CPP has fallen below its Prefunded Requirement, the Funding Manager will be required to provide Supplemental Funding to the Prefunded Balance Account and identify the Non-funding Participant that should have an increase to its Net Position and CPP, in order to bring its CPP back to the amount equal to or greater than its Prefunded Requirement within the timeframes specified in the RTP Operating Rules;

Similarly, as a Funding Manager or a Non-funding Participant notices it has Excess Liquidity (i.e., CPP minus the Prefunded Requirement is greater than zero) and the Non-funding Participant wants to receive some or all of this liquidity from the System, the Funding Manager will send a Disbursement Request for the Non-funding Participant. Any Disbursement Requests will result in a decrease to the Net Position and CPP of the Non-funding Participant client.

Under the RTP Operating Rules, a Non-funding Participant and its Funding Manager are required to have appropriate communication and financial arrangements in place to ensure that the Funding Manager meets the Non-funding Participant's funding obligations in a timely and reliable manner.

5.2 Low and Normal Watermarks

To assist Funding Managers in managing their Sending Participants' ⁸ CPPs, the RTP System provides low watermarks and normal watermarks for their CPPs. Similar to the Funding Provider, these watermarks are also initially set by TCH at the time of onboarding based on information provided in onboarding forms, but they are managed by the Funding Managers via the Participant Portal thereafter.

The low watermark is the value at which the Sending Participant and the Funding Manager will receive a notification via SNM that the Sending Participant's CPP is low and requires the Funding Manager's attention. Once CPP falls to the low watermark value and the low watermark notification has been sent, the RTP System will not send any further notifications until CPP rises to or above the normal watermark value, at which point a normal watermark notification will be sent. The normal watermark serves as a reset for the low watermark which prevents the system from sending repetitive low watermark SNMs in a condensed period of time, which may be burdensome to the Funding Manager and Sending Participant. If the CPP rises above the normal watermark and then falls below the low watermark again, a second low watermark SNM will be received. It should be noted that a Participant will not receive a normal watermark notification unless its CPP previously fell below the low watermark value.

For example (see Figure 6), a Funding Manager may determine to set its low watermark to be an amount that is slightly above its client's Prefunded Requirement. The RTP System will send an SNM to the Sending Participant and the Funding Manager if the CPP falls below the low watermark value. The SNM warns that the Funding Manager may need to add Supplemental Funds to the Prefunded Balance Account in order to increase the CPP back to a normal level. This feature provides a buffer to decrease the probability that a Sending Participant's CPP will fall below their Prefunded Requirement and approach zero.

⁸ Funding Managers may have both Sending and Receive-only Non-funding Participants as clients. Receive-only Participants do not have a Prefunded Requirement.

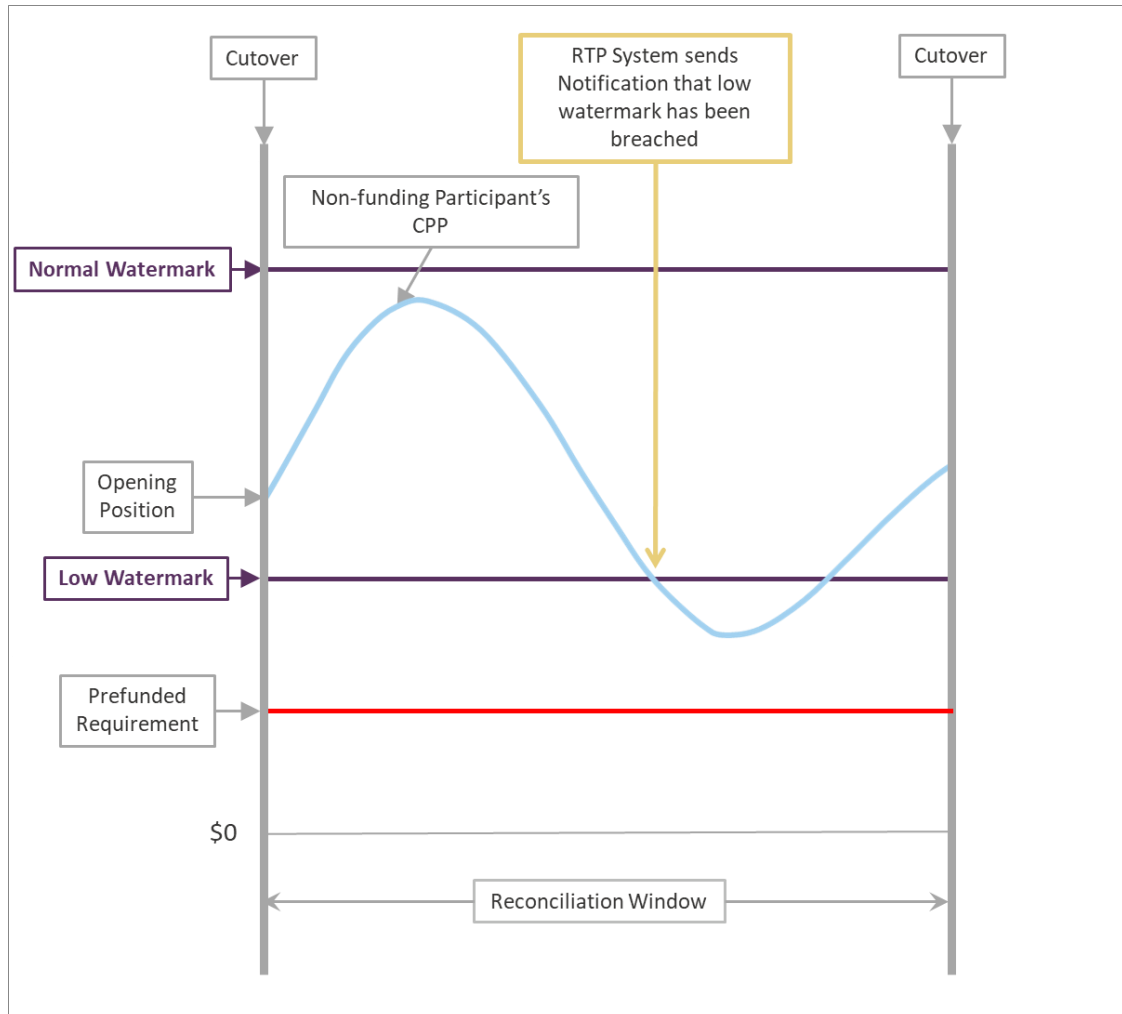


Figure 17. Non-funding Participant's CPP falls below a low watermark set by the Funding Manager.

Depending upon what the Funding Manager sets as its low watermark, if a Sending Participant's CPP falls below its low watermark, the Funding Manager may need to add Supplemental Funds for an amount that will increase its CPP above its normal watermark.⁹ See Figure 7. When a Sending Participant's CPP reaches its normal watermark following a low watermark SNM, another SNM is sent to the Participant and the Funding Manager, which will serve as an indicator that the CPP has returned to a normal level. This means the RTP System has reset its Notification calculations so it will issue a new low watermark SNM if the CPP again falls below the low watermark.

⁹ Note that a Sending Participant's CPP will also be increased if the Participant receives more Payments than it sends.

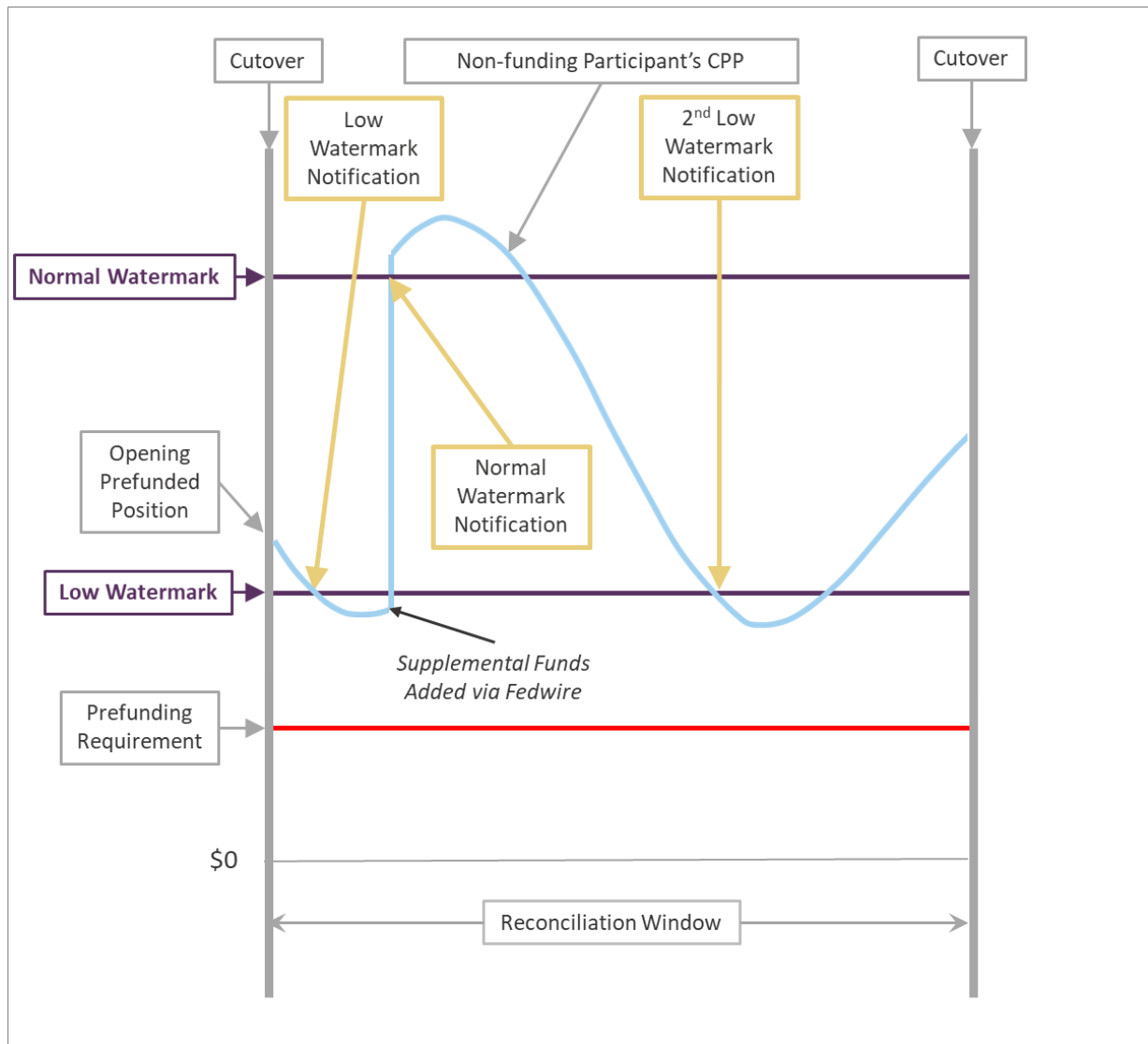


Figure 18. How normal and low watermarks are properly managed with the use of Notifications (SNMs).

If however, the Supplemental Funding is not for an amount that would result in the Participant's CPP reaching or exceeding the normal watermark, the RTP System will not reset its low watermark notification and will not send a new SNM if the low watermark is breached again. See Figure 8.

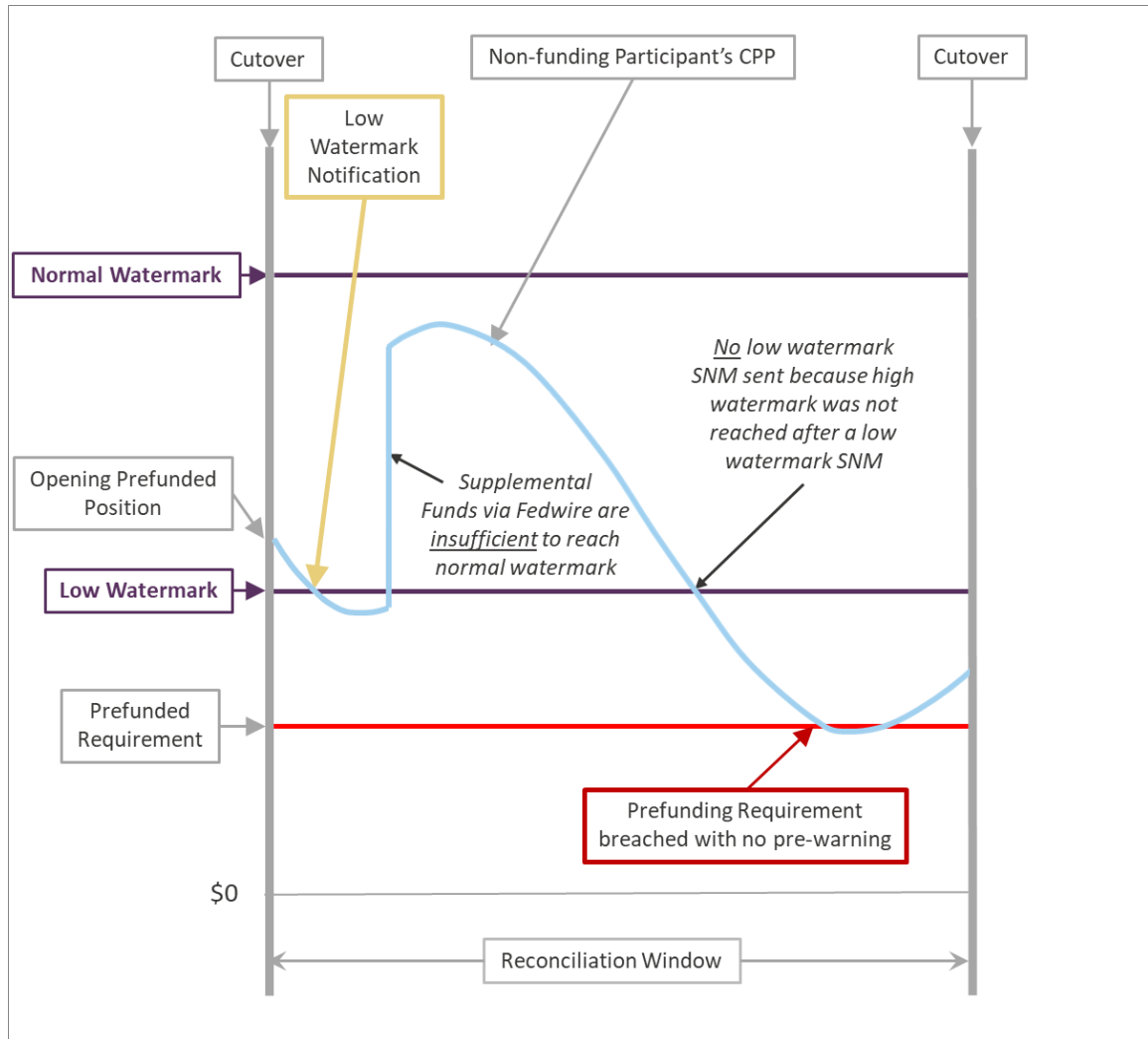


Figure 19. Supplemental Funding should be managed to take advantage of the RTP System’s Notifications.

5.3 Reconciliation Windows

At the beginning of each Reconciliation Window, a Non-funding Participant’s Opening Prefunded Position is set to the CPP at the time of the Cutover from the prior Reconciliation Window, and its Net Position is reset to \$0.

Non-funding Participants will receive the same Reconciliation Reports as Funding Participants, as described in section 2.8.1.3, Funding Managers will receive those same reports and will also receive the Funding Agent Reconciliation Report which is a transaction summary of all Non-funding Participant activity, including a summary of all Supplemental Funding and Disbursements made during the Reconciliation Window.

6 FUNDING AGENT RECONCILIATION PROCESSES

This section provides additional information that will be necessary in designing and implementing a Funding Agent's or a Non-funding Participant's reconciliation processes and procedures for RTP activity.

6.1 Reconciliation Window IDs

Each Reconciliation Window can be identified by the Reconciliation Window Date (the date on which the Window is scheduled to close) and the Reconciliation Window ID (a three-digit number assigned to each Window to uniquely identify it within a calendar day). These values are included in Messages to Participants to allow for easy and flexible reconciliation.

For example, if the only Cutover of the day is at its scheduled time of 11:59pm ET, then the Reconciliation Window Date will be the date the Cutover took place and the Reconciliation Window ID will be equal to 001. If there were two Cutovers during the day, then the Reconciliation Window Date is the day both Cutovers took place and the Reconciliation Window on the first Cutover will be 001 and for the second Cutover will be 002.

Figure 20 shows an example of a Funding Provider's activity over the course of two days Day 1 23:59pm ET to Day 3 23:59pm ET. After the initial Cutover on Day 1, there are three Reconciliation Windows that occur in the diagram. The first is the standard Cutover on Day 2 at 23:50pm ET but Day 3 has two Cutovers. At each one, an Opening Prefunded Position is established for the Funding Provider (see the upper, light blue curve), and all Group Members have their Net Position reset to \$0 (lower, dark blue curve).

For Funding Managers, each Sending Participant will have a new Opening Prefunded Position established at each Cutover and all Sending Participants' Net Positions will be set to \$0.

In both cases, an SNM is sent with summary information on activity that occurred within that Reconciliation Window and Reconciliation Reports become available with summary and detailed information on activity that occurred during that Reconciliation Window to the Funding Agent and the Non-funding Participants.

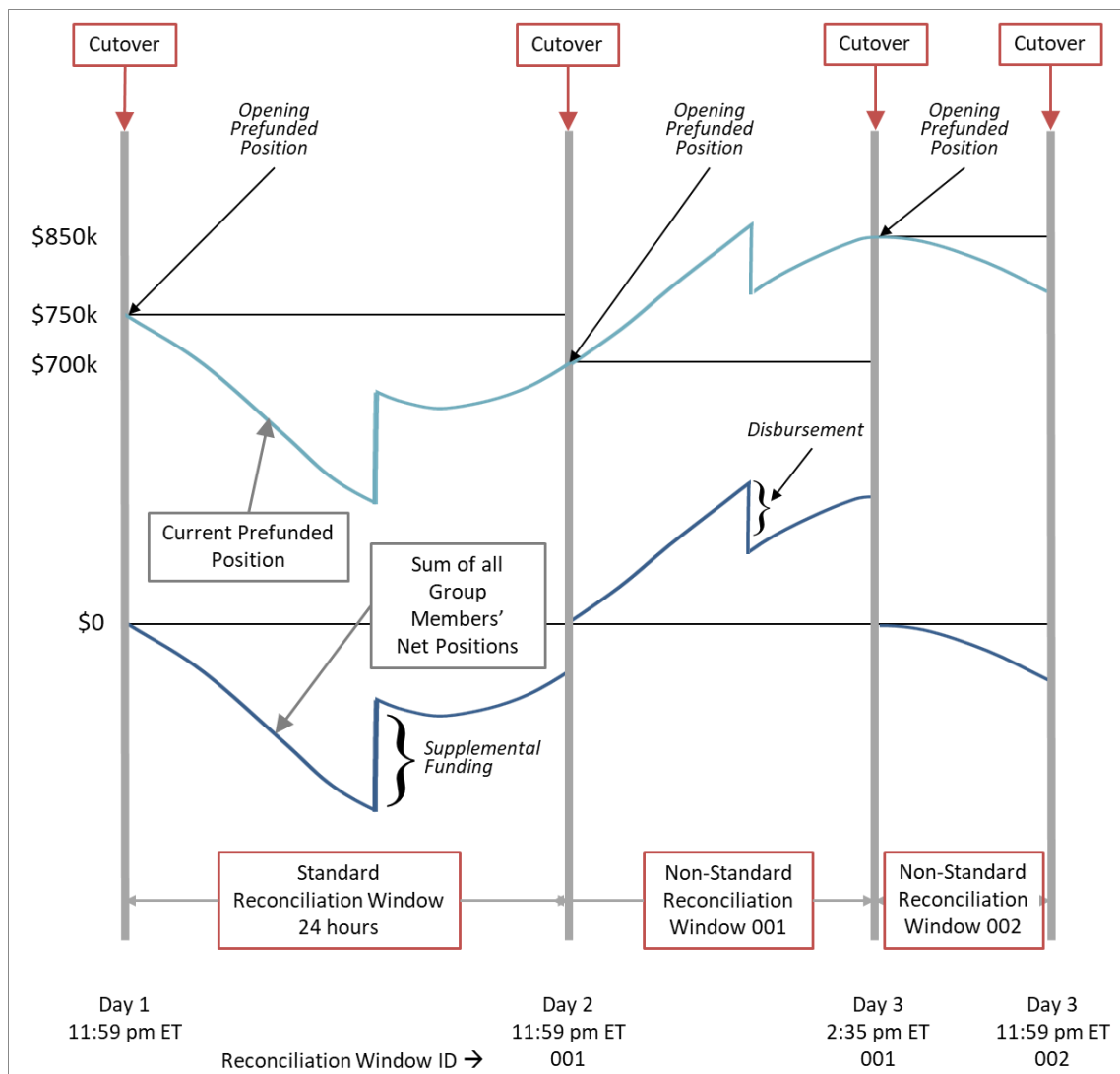


Figure 20. Example of a standard and two non-standard Reconciliation Windows for a Funding Provider.

6.1.1 Payment Messages and Reconciliation Window IDs

TCH defines the usage of the Reconciliation Window Date within Payment Messages as follows: “Date of the Reconciliation Window within which this transaction is processed and settled. If a Message starts being processed at the end of a Reconciliation Window and during processing crosses into another Reconciliation Window, the date of the Reconciliation Window during which the process started will be used.”

The RTP System marks each outbound Payment Message to the Receiving Participant with the relevant Reconciliation Window ID in the Clearing System Reference field and Reconciliation Window Date in the Interbank Settlement Date field. The System will also mark each outbound Payment Response with the relevant Reconciliation Window Date and Reconciliation Window ID in the same fields mentioned for the Payment Message above.

6.1.2 Funding Activity and Reconciliation Window IDs

In addition, each SNM that is sent to a Participant regarding a change to their CPP as the result of Supplemental Funding or a Disbursement Request includes the Reconciliation Window Date and Reconciliation Window ID during which the event applied.

6.2 Funding Agent Reconciliation Reports

As part of the RTP Cutover process, the RTP System generates a number of reports (see the *REAL-TIME PAYMENTS Reports Specification* for complete information on all RTP reports). Two reports in particular are designed for the purpose of allowing Funding Agents the ability to reconcile RTP Payment activity against its own internally logged transactions.

6.2.1 The Funding Agent Reconciliation Report

The following information can be found in the report to assist with Reconciliation:

Funding Agent Account Summary – The total value and total volume of all Payments in and out of the Funding Agent’s Account¹⁰, including total Supplemental Funds added and total Disbursements made.

Transaction Details – Certain transaction details of each Payment sent and each Payment received by each Non-funding Participant client of the Funding Agent. These details do not include the name or account number of the Sender or Receiver.

Funding Details – A list of the individual Supplemental Funds added and Disbursements made by the Non-Funding Participant clients of the Funding Agent.

6.2.2 The Funding Agent Tracking Position Summary (Funding Providers)

The Funding Agent Tracking Position Summary Report is designed to highlight Non-Funding Participant’s fluctuations between the Tracking Position and their Tracking Position Limit for the given reconciliation window¹¹.

The report details for each Group Member:

- The closing, minimum, and maximum Net Positions during the Reconciliation Window,
- The closing, minimum, and maximum Net Spend Limits (NSL) during the Reconciliation Window,
- The difference between the closing Net Position and closing NSL,

¹⁰ Notwithstanding use of the term “funding account” neither Participants nor Funding Agents have accounts in the RTP System. The term is used to describe a way to associate RTP ledger positions with a Funding Agent or Participant in certain RTP documents and systems.

¹¹ Tracking Position and Tracking Position Limit refer to a Non-funding Participant’s Net Position and Net Send Limit.

- The difference between the minimum Net Position and minimum NSL, and
- The difference between the maximum Net Position and maximum NSL.

6.3 Reconciliation Discrepancies

Non-funding Participants that have a CPP (or their TPSPs if applicable) should establish an automated reconciliation process that uses the Participant Reconciliation Report and the Detailed Payment Reconciliation Report as input to ensure its system logs match the RTP System logs. At a minimum, each Non-funding Participant that has a CPP should ensure that the Opening Prefunded Position, Net Position, and Closing Prefunded Position contained within these RTP reports align with similar values recorded within the Participant's systems.

In addition, the Detailed Payment Reconciliation Report may be used to manually research individual Payments in the event a discrepancy is identified.

Several scenarios explain why a discrepancy may occur:

- RTP Reconciliation report includes a Payment, Supplemental Funding or Disbursement that does not appear on the Non-funding Participant's system logs. This scenario could happen for example if a Payment Response Message (pacs.002) sent by the RTP System was never received by the Non-funding Participant's system so the event was never logged. Or, possibly the Non-funding Participant's system received the Response Message but a database issue caused the event to not be logged properly.
- RTP Reconciliation report does not include a Payment, Supplemental Funding or Disbursement that the Non-funding Participant's system logs show as having taken place. This scenario could happen for example if a Sending Participant submits a Payment Message to the RTP System and logs it as complete even though the Message timed out as never having been processed by the RTP System. While rare, this scenario could occur if the RTP System properly processes a Payment but the event is not recorded on the RTP System logs (Back Office logs).

6.4 Automated Reconciliation Process Requirements and Considerations

Non-funding Participants or their TPSPs building new automated reconciliation processes or configuring existing processes should include the following functional requirements within their system design:

- As Payments are settled and final at the exact time are processed, posting to Customer accounts must be immediate. Posting must not be reliant on receipt of RTP Reconciliation reports.
- The reconciliation process must be flexible enough to handle standard Cutover intervals (24 hours) and Cutover events that occur at non-standard times if found necessary by TCH. This should be accomplished using the Reconciliation Window ID (Cycle number) provided in both reconciliation reports and the Clearing System Reference field included within each Payment Message (pacs.008) processed through the RTP System;

- The standard Reconciliation Window completion (and thus the two reconciliation reports) may be delayed due to normal processing issues. While this could delay the close of a Reconciliation Window, it will not delay the opening of the new Reconciliation Window. The value of the Opening Prefunded Position for the new Reconciliation Window will be the value of the CPP at 11:59pm ET of the old Reconciliation Window even though the Cutover process was delayed. Non-funding Participants should continue to leverage the Interbank Settlement Date and Clearing System Reference field included within each Payment Message (pacs.008) to determine the Reconciliation Window Date and ID in which activity will be reported;
- Payments that are in flight at the time a Cutover process begins will be marked with the relevant information for the Reconciliation Window in which the Payment began. That is, if a Payment Message is sent by a Non-funding Participant on Day 1 just prior to Cutover but the Response Message is received just after Cutover on Day 2, the Response Message will contain an Interbank Settlement Date equal to Day 1;
- Reconciliation must be based upon the RTP Reconciliation Day not the calendar day. Payment Messages that begin during the minute between Reconciliation Day 1, 11:59pm ET (when Cutover occurs) and 12:00am ET (when the calendar day ends) are reported on Reconciliation Day 2. These Payment Messages will have an Interbank Settlement Date of Day 2 in its Payment Message and will appear in Day 2 Reconciliation reports even though the Non-funding Participant’s system logs show the payment was processed on the prior calendar day.
- In rare incidents when RTP System processed Payments are not properly recorded to the RTP System logs, RTP Reconciliation reports will not include that Payment for that Reconciliation Window even though the Payment is settled and final. Once TCH Support has been notified of the discrepancy by the Non-funding Participant, corrective measures will be taken to record the Payment in the RTP System logs but the corrected entry will be made in a Reconciliation report for the subsequent Reconciliation Window. This will result in the Non-funding Participant seeing a discrepancy on reports from two Reconciliation Windows for the same amount (one negative and one positive). This may also impact the Opening Prefunded Position of the Participants involved in the Transaction, as the Transaction will not be included in the calculation of Opening Prefunded Position. Instead, it will be included in the Net Position of the next Reconciliation Window.

When creating an automated reconciliation process, the items in the table below should be taken into consideration.

Do:	Don't:
✓ Reconcile internal logs to RTP Reports	✗ Assume internal logs match RTP logs
✓ Rely on the Interbank Settlement Date and Clearing System Reference within a Payment Message to determine	✗ Rely on the Creation Date and Time in a Payment Message to determine when the Transaction will be reported

when the Transaction will be reported	
<ul style="list-style-type: none"> ✓ Ensure your reconciliation process is flexible enough to handle delays in the completion of the Cutover process 	<ul style="list-style-type: none"> ✗ Hardcode the Reconciliation Window Cutover time as 11:59 PM ET
<ul style="list-style-type: none"> ✓ Anticipate non-standard Reconciliation Window Cutovers 	<ul style="list-style-type: none"> ✗ Rely on difficult manual processes in non-standard Reconciliation Window Cutover scenarios
<ul style="list-style-type: none"> ✓ Post Payments and make funds immediately available in accordance with RTP Operating Rules 	<ul style="list-style-type: none"> ✗ Hold funds availability until RTP Reconciliation Reports are available or remove funds availability should RTP Reconciliation Report availability be delayed

Table 4. Recommendations to follow when creating an automated reconciliation process.

7 APPENDIX A - GLOSSARY

The following table contains additional definitions of some common RTP System terms and acronyms used in this document and other documents in the RTP System documentation library.¹²

Term	Definition
Current Prefunded Position (CPP)	The RTP System shall continuously record a Current Prefunded Position for each Funding Participant, Non-funding Participant that has a Current Prefunded Position, and Funding Provider. The Current Prefunded Position of a Funding Participant or a Non-funding Participant that has a Current Prefunded Position is the sum of the Participant's Opening Prefunded Position and its Net Position (whether positive or negative). The Current Prefunded Position of a Funding Provider is the sum of (i) the Funding Provider's Opening Prefunded Position; (ii) the Net Positions (whether positive or negative) of all Non-funding Group Members that have a funding arrangement with the Funding Provider, (iii) any Supplemental Funding that has not already been used to increase the Net Position of a Non-Funding Group Member, and (iv) any that has not already been accounted for in the Net Position of a non-Funding Group Member.
Cutover	The Cutover (or close) of a Reconciliation Window immediately causes the current Reconciliation Window ID to be incremented and all new Messages received from that point are allocated to the new Reconciliation Window. Messages that were in flight at the time of cutover will complete within the old window.
Disbursement	A Participant (other than a Non-funding Group Member) and a Funding Provider may request that TCH, as the agent for all Funding Participants and Funding Agents, transfer funds from the Prefunded Balance Account to that Participant (or its Funding Manager) or to the Funding Provider in an amount up to the amount of any Excess Liquidity.
Excess Liquidity	The amount of a Participant's Current Prefunded Position that exceeds the Participant's Prefunded Requirement.
Fedwire	The Fedwire Funds Service™ operated by the Federal Reserve Banks.
Funding Agent	A depository institution that has become a party to the Prefunded Balance Account Agreement and, either as a Funding Manager or a Funding Provider.

¹² This list is not inclusive of all terms defined within the RTP Operating Rules. Please refer to the *Real-Time Payments Operating Rules* and *Real-Time Payments Participation Rules* for more information.

Term	Definition
Funding Participant	A Participant that has become a party to the RTP Prefunded Balance Account Agreement with the Prefunded Balance Account Bank and that requests and receives Disbursements from the Prefunded Balance Account, as permitted by these RTP Operating Rules, to its Federal Reserve account and if the Participant is a Sending Participant, prefunds for itself in accordance with the RTP Participation Rules and the RTP Operating Rules.
Normal Watermark (sometimes called 'High' Watermark)	Along with low watermark, these are predetermined amounts managed by the Sending Participant or Funding Agent (in the case of Non-funding Participants) that trigger warnings from the RTP System when breached. Watermarks help ensure the Participant's or Funding Provider's Current Prefunded Position is never lower than its Prefunded Requirement.
Low Watermark	Along with Normal watermark, these are predetermined amounts managed by the Participant or Funding Agent that trigger warnings from the RTP System when breached. They help ensure the Participant's or Funding Provider's Current Prefunded Position is never lower than its Prefunded Requirement.
Message	A transmission of a Request or a Response from one Participant to another Participant through the RTP System.
Multiple	A value set by the system operator (between 1.0 and 99.9) which limits the amount of credit that can be assigned by a Funding Provider to its Non-funding Group Members.
Net Position	A Participant's Net Position starts at zero at the beginning of each Reconciliation Window and is the net of all increases and decreases recorded by the RTP System for the Participant's Supplemental Funding, RTP Payments, and Disbursements (each, as applicable) during that Reconciliation Window.
Net Send Limit	A limit on the negative Net Position that each Non-funding Group Member may incur during a Reconciliation Window.
Non-funding Group Member	A Participant that is a member of a group of Non-funding Participants that use a common Funding Provider.
Non-funding Participant	A Participant that is not a Funding Participant and that has an agreement with either (i) a Funding Manager to act on the Participant's behalf with respect to its funding obligations or (ii) a Funding Provider to be a Non-funding Group Member.
Opening Prefunded Position	A Participant's or a Funding Provider's new Opening Prefunded Position is its Current Prefunded Position at the opening of a new Reconciliation Window. Once an Opening Prefunded Position is recorded, the position does not change until the opening of the next Reconciliation Window. The definition above is simplified from the <i>RTP Operating Rules</i> . Refer to the <i>Real-Time Payments Operating Rules</i> for the complete definition.
Participant	A depository institution that has entered into a Participant Agreement and Indemnity with TCH.

Term	Definition
Participant Portal	A browser based administrative portal provided by TCH that is accessed over the internet using a secure VPN.
Payment	A transfer of value from a Sender to a Receiver through the RTP System pursuant to a Payment Message.
Payment Message	A message in the format specified by the RTP Technical Specifications, submitted by a Sending Participant to the RTP System, that when released by the System, instructs the Receiving Participant to pay a fixed amount of money denominated in U.S. Dollars to the Receiver to effectuate an RTP Payment.
Prefunded Balance Account	The special deposit account established for the joint benefit of all Funding Participants and Funding Agents by the Prefunded Balance Account Bank for the purpose of supporting the operations of the RTP System.
Prefunded Requirement	A dollar amount determined by TCH that (i) is the minimum level of funding that a Participant or a Funding Provider is required to pay into the Prefunded Balance Account before the Participant or a Participant that is a Non-funding Group Member of the Funding Provider's Non-funding Group can begin sending Payment Messages using the RTP System and (ii) is equal to the Current Prefunded Position that a Participant or Funding Provider is generally expected to maintain in the RTP System at all times. Participants that only receive RTP Payments and Participants that are Non-funding Group Members will not have a Prefunded Requirement.
Reason Code	A code signifying the reason for the rejection of the original Message. It is used in the Payment Status Report (pacs.002) sent by the Message Sender or the RTP System (depending on where the rejection happened) to the Message Sender if the Request has been rejected.
Receive-only Participant	A Participant of the RTP System that chooses to offer Customers the ability to receive and not send RTP Messages.
Receiver	The Customer of a Receiving Participant whose Account is designated for receipt of an RTP Payment in a Payment Message.
Receiving Participant	The Participant that holds the Receiver's Account and that receives a Payment Message.
Reconciliation Window	One or more defined time periods during the RTP Day for tracking Payment and funding activity for purposes of producing reconciliation reports at the close of the time period.
Request	Any Message that initiates a new exchange of Payment or Payment-related information between two Participants in the RTP System or between the Participant and the RTP System. (Credit Transfer, Request for Payment, Request for Information, Remittance Advice, etc.)

Term	Definition
Response	Any status or acknowledgment Message sent immediately in response to a Request. Note: Messages such as the Response to Request for Payment (RRFP), Response for Request for Information (RRFI), and Response to Request for Return of Funds (RRFR) are initiated by the Participant as an answer to an earlier Request Transaction and are considered new Request Messages rather than Response Messages.
RTP or RTP System	The Real-Time Payment System.
Sender	The Customer of a Sending Participant that sends a Payment Instruction to the Sending Participant.
Sending Participant	The Participant that holds the Sender's Account and initiates an RTP Payment.
Supplemental Funding	A Sending Participant or a Funding Agent may transfer Supplemental Funds to the Prefunded Balance Account during Fedwire operating hours. Upon receipt of an advice from the Prefunded Balance Account Bank relating to such a transfer, the RTP System shall record an increase in the Sending Participant's Net Position and the Current Prefunded Position of the Sending Participant or the Funding Provider in the amount of the transfer.
System Notification Message (SNM)	Used by the RTP System to notify the Participants and Funding Agents, either individually or as a group, of significant events or information.
TCH	The Clearing House Payments Company L.L.C.
Third Party Service Provider (TPSP)	A commercial data processing service organization, a Person operating a data transmission facility, or any other Participant that acts on behalf of a Participant, as such Participant's agent, to transmit and receive Payment Messages, Payment Message Responses and Non-payment Messages through the RTP System and may also conduct technical testing as agent of Participant using the RTP Test Solutions.
Transaction	An individual transaction processed by the RTP System, it consists of both a Request Message and a Response Message.

Table 5. RTP System Terms and Acronyms Defined.