



TCH Public

The Clearing House Customer Documentation

RTP® PREFUNDED SETTLEMENT MODEL AND RECONCILIATION FOR FUNDING PARTICIPANTS

Version 1.0
November 2020

AUTHORIZATION

THIS DOCUMENT ("DOCUMENT") IS PROVIDED UNDER THE TERMS OF THIS RTP DOCUMENTATION AGREEMENT ("AGREEMENT"). ANY USE OR REPRODUCTION OF THE DOCUMENT CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT.

This Agreement is an agreement between Recipient and The Clearing House Payments Company, L.L.C. ("**Payco**"). Capitalized terms used but not defined in this Agreement shall have the meanings given to such terms in the Real-Time Payments Operating Rules or Real-Time Payments Participation Rules released by Payco from time to time (collectively, the "**Rules**") which are available for download at Payco's website, <https://www.theclearinghouse.org/payment-systems/real-time-payments>. For purposes of this Agreement, "**Recipient**" means the person who receives this Document from Payco or, if the person who receives this Document from Payco is the representative of a juristic person, that juristic person.

Subject to the terms of this Agreement, Payco hereby grants Recipient a worldwide, non-assignable, non-sublicensable, non-transferable, non-exclusive, royalty-free copyright license to reproduce this Document and prepare derivative works of this Document that are products and services that integrate with the Real-Time Payments service provided by Payco ("**Works**") and publicly display, publicly perform, distribute and sublicense the Works (the "**License**"). As a condition to exercising the rights and licenses granted hereunder, Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to distribute the Works, it is Recipient's responsibility to acquire that license before distributing the Works.

The Document is the property of Payco and Payco retains all right, title, and interest in and to the proprietary rights expressed in this document and the information contained therein. Recipient shall not disclose the Document to any third party and no rights in the Document are granted other than those specifically authorized by the License. Any reproduction of the Document must reproduce this Agreement, including partial copies. The Document must be returned to Payco or the Works and Document must be destroyed immediately, upon Payco's request. In the event of such a request, Recipient will provide a certification if it is a natural person, or a certification of a senior officer or executive if it is a representative of a juristic person, that all copies of the Document and Works have been destroyed or returned to Payco as required.

If you are a Participant, you acknowledge and agree that this agreement and the licenses granted hereunder are subject to your Participant Agreement and the Rules, and you agree that nothing herein shall relieve you of your obligation to comply with the foregoing. In the event of a conflict between this Agreement and the Participant Agreement or the Rules, the Participant Agreement or the Rules, as applicable, shall control.

EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, THE DOCUMENT IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Recipient is solely responsible for determining the appropriateness of using the Document and assumes all

risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations.

Recipient shall, at its sole cost and expense, indemnify and hold Payco and its affiliates harmless from and against any and all damages arising out of or related to Recipient's use and reproduction of the document and works.

PAYCO SHALL HAVE NO LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR REPRODUCTION OF THE DOCUMENT OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER BY RECIPIENT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

If Recipient institutes patent litigation against Payco or any affiliate of Payco (including a cross-claim or counterclaim in a lawsuit) alleging infringement of Recipient's patent(s), then the License of this Agreement shall terminate as of the date such litigation is filed.

All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use of the Document and Works as soon as reasonably practicable. However, Recipient's obligations under this Agreement shall continue and survive.

This Agreement is governed by the laws of the State of New York and the intellectual property laws of the United States of America. Each party waives its rights to a jury trial in any resulting litigation.

CHANGES

Version	Change	Comments
1.0	Creation	N/A

CONTENTS

Authorization.....	2
Changes.....	4
Contents.....	5
1 INTRODUCTION	6
1.1 Intended Audience	6
1.2 Related Documentation	7
1.3 RTP Payment Message Flows	7
1.4 Terms and Acronyms	9
2 THE PREFUNDED SETTLEMENT MODEL	10
2.1 Prefunded Requirements.....	10
2.2 Immediate Settlement – How the Prefunded Settlement Model Works	11
2.3 Supplemental Funding and Disbursements.....	12
2.4 How Daily Payment Activity Impacts Current Prefunded Position	14
2.5 Low and Normal Watermarks	16
3 RECONCILIATION	20
3.1 Reconciliation Windows	20
3.2 Reconciliation Window IDs	20
3.3 Cutover and Reconciliation Reports	21
3.4 Funding Participant Reconciliation	24
3.5 Automated Reconciliation Process Requirements and Considerations.....	24
APPENDIX A - GLOSSARY	27

1 INTRODUCTION

The Clearing House Payments Company LLC (TCH) offers U.S. depository institutions the opportunity to participate in the RTP® System (Participants) 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 and 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 Participants, how it is used for Settlement finality, how Funding Participants may manage their ledger position within the system, and important considerations for Funding Participants in designing and developing reconciliation procedures.

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

1.1 Intended Audience

This document is intended as a reference for employees and agents of financial institutions (FIs) that intend to become Funding Participants in the RTP System. Third-Party Service Providers (TPSP) that provide services to 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.

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

Note: Any reference to Financial Institution (FI) systems in this document includes both an FI's own in-house system and any TPSP system that is provided to an FI.

1.2 Related Documentation

To gain a full understanding of the RTP System, it is suggested that members of individual teams should use the table below to find relevant documents which should be read in conjunction with this *RTP® Prefunded Settlement Model and Reconciliation for Funding Participants* document.

Documents	FIs and TPSP					End-Users
	Dev	Ops	Prod	Legal	Risk	
<i>Introduction to the RTP® System</i>	•	•	•	•	•	•
<i>Business Principles for the RTP® Network</i>	•	•	•	•	•	•
<i>RTP® Operating Rules</i>		•	•	•	•	•
<i>RTP® Participation Rules</i>		•		•	•	
<i>SYSTEM INTERFACE GUIDE</i>	•	•				
<i>RTP® Message Specifications</i>	•	•				
<i>Remittance Advice Specification (remt.001)</i>	•	•				
<i>RTP® Reports Specification</i>	•	•	•			
<i>RTP® Customer Display Guidelines</i>	•	•	•			
<i>RTP® SYSTEM MESSAGE FLOWS</i>	•	•	•			
<i>RTP® Prefunded Settlement Model and Reconciliation for Funding Participants (this document)</i>	•	•	•			
<i>RTP® Prefunded Settlement Model and Reconciliation for Funding Agents and Non-funding Participants</i>	•	•	•			
<i>RTP® Prefunded Requirement for Sending Participants</i>	•	•	•			
<i>Information Security Standards and Requirements</i>	•	•		•	•	
<i>RTP Continuous Operations Documentation</i>	•	•				•
<i>RTP Operator – Customer Information Security Standards</i>		•		•	•	
<i>Risk Management and Fraud Control Requirements</i>	•	•				•
<i>RTP Client Fedwire Interface Instructions</i>						
<i>Requirements for Request for Payment Customers</i>		•		•	•	
<i>PSP Compliance Criteria</i>	•	•	•	•	•	
<i>Application of Key UCC 4A Concepts and Terms to the Real-Time Payment System</i>				•	•	
<i>Minimum Requirements for Directory Service Providers</i>		•		•	•	

Table 1. System Documentation Inventory and Intended Audiences.

1.3 RTP Payment Message Flows

The RTP System provides final settlement for all successfully completed Payment Transactions in real time. As a result, Participants may make funds immediately available to their Customers (Receivers) without any interbank settlement risk. The RTP Systems uses a prefunded, real-time gross settlement model to accomplish this.

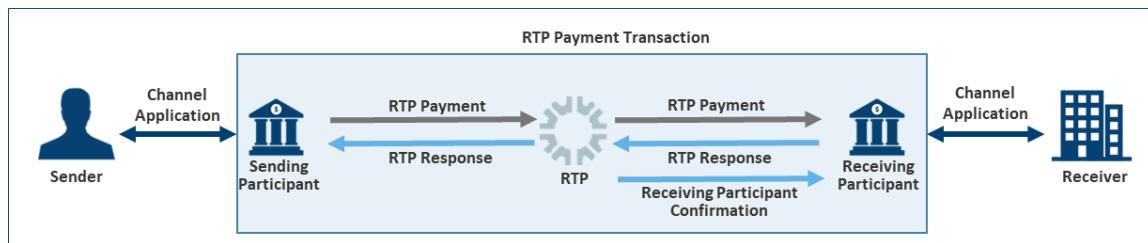


Figure 1. The RTP System's End-to-End Message Flow for Payment Messages.

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 network routing and Message content validation.

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 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.

1.4 Terms and Acronyms

Throughout this document and other RTP documentation, the terminology used to describe the flow of Payments, the settlement between Participants and the management of funds in the Prefunded Balance Account will be important to understand. These terms and are defined or described in the RTP Operating Rules. For convenience, certain definitions and descriptions from the RTP Operating Rules and included in the table below and the Glossary in Appendix A at the end of this document.

1.4.1 Key Terms Used in This Document

Term	Definition
Current Prefunded Position (CPP)	The RTP System shall continuously record a Current Prefunded Position for each Participant. A Participant's Current Prefunded Position is the sum of a Participant's Net Position (whether positive or negative) and its Opening Prefunded Position.
Disbursement	A Participant may request that TCH, as the agent for all Funding Participants, transfer funds from the Prefunded Balance Account to that Participant in an amount up to the amount of any Excess Liquidity. Upon request, the RTP System will validate that the Participant has Excess Liquidity and, if so, create a Fedwire payment to disburse the requested amount to the Participant.
Low and Normal Watermarks	A Participant may establish a low watermark value for its Current Prefunded Position that will trigger an alert from the RTP System when the Participant's Current Prefunded Position falls to or below the value. Once the system sends a low watermark alert, it will not send any further low watermark alerts until (i) Participant's Current Prefunded Position increases to a normal watermark value that the Participant has established and (ii) the Current Prefunded Position again falls below the low watermark value. The definition above is simplified from the RTP Operating Rules. Refer to the Real-Time Payments Operating Rules for the complete definition.
Net Position	A Participant's "Net Position" starts at zero at the beginning of each Reconciliation Window. Throughout the Reconciliation Window timeframe, it is the net dollar amount of all increases and decreases from the Participant's Supplemental Funding, RTP Payments, and Disbursements during that Reconciliation Window.
Opening Prefunded Position	A Participant's new Opening Prefunded Position is the Participant's Current Prefunded Position at the opening of a new Reconciliation Window. Once a Participant's 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.
Supplemental Funding	A Sending Participant 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 Current Prefunded Position in the amount of the transfer.

Table 2. Key Terms and Definitions.

2 THE PREFUNDED SETTLEMENT MODEL

All RTP Payments that are Accepted or Accepted without Posting by the Receiving Participant are immediately and settled in real-time with finality on an individual (rather than net) 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 Participants.² 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 RTP. 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 CPPs 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.

2.1 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 3 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 can range from \$25,000 in the lowest prefunded balance amount tier (tier 10) and up to \$10 million in the highest prefunded balance amount tier (Tier 1). See table below for additional details. .

² The RTP System also maintains CPPs for Non-funding Participants. However, TCH expects to change the functionality of the RTP System and the RTP Operating Rules to enable a kind of Funding Agent, a Funding Provider that will provide funding for the use of a group of Non-Funding Participants. Under this arrangement the Funding Provider, rather than the Non-Funding Participants, has a Current Prefunded Position. See *RTP® Prefunded Settlement Model for Funding Agents and Non-Funding Participants* for more information.

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

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

2.2 Immediate Settlement – How the Prefunded Settlement Model Works

A Sending Participant's CPP is its liquidity in the RTP System which 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 2020)	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 4. There are two types of Payment Messages.

Upon receipt of the Payment Message, a Receiving Participant must reply 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 CPP. The increase to the Receiving Participant's Net Position results in a corresponding increase to the Receiving Participant's CPP. This Settlement for accepted Payments is final and irrevocable. See Figure 2.

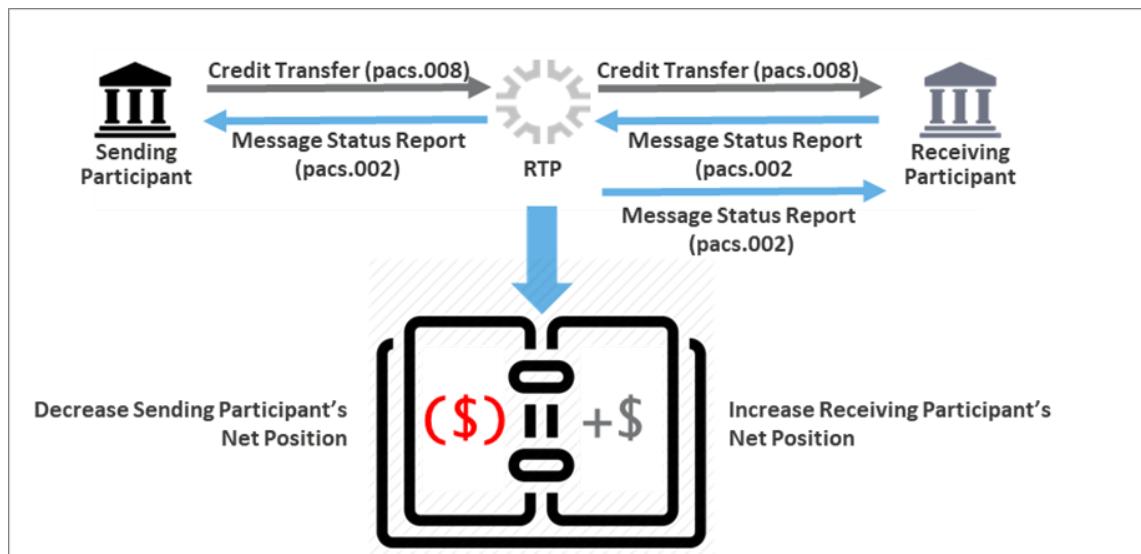


Figure 2. How an "Accepted" Credit Transfer Impacts the Net Positions of Sending and Receiving Participants.

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.

If a Payment is rejected for any reason by either the RTP System or the Receiving Participant, the RTP System will not settle it.

2.3 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.

If a Sending Participant is running low on liquidity in the RTP System (i.e., its CPP is low), it may provide Supplemental Funding into the Prefunded Balance Account and thereby increase its CPP.

Similarly, a Participant may 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.

2.3.1 Adding Supplemental Funds

- A Sending 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 System Notification Message (SNM) to the Sending Participant, confirming that the Supplemental Funding has been received and applied to the Sending Participant's CPP.

2.3.2 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:
 - 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 Fed and marks the request as "Completed".

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

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.

- If the Fedwire 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 an SNM.

2.4 How Daily Payment Activity Impacts Current Prefunded Position

At the beginning of each Reconciliation Window, a Sending 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.

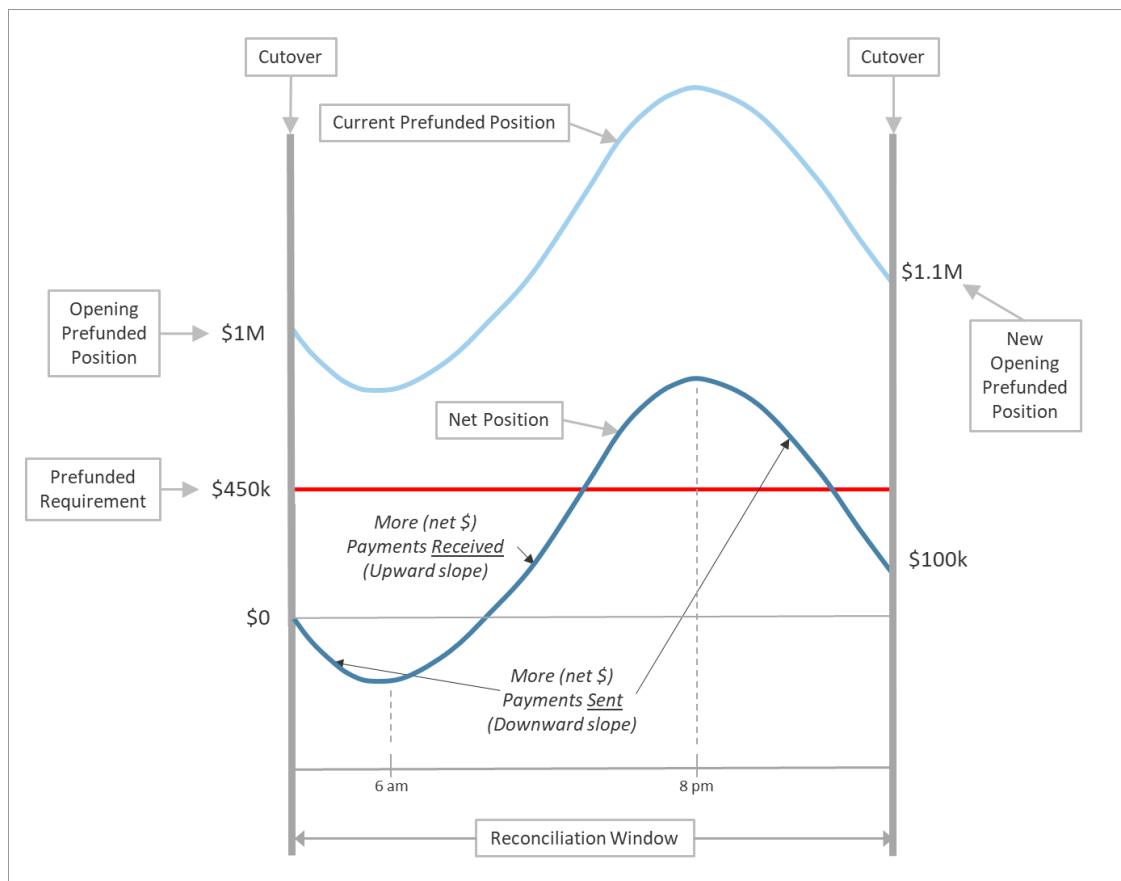


Figure 3. Definition of Current Prefunded Position

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.

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 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.

Current Prefunded Position =
***Opening Prefunded Position
+ Net Position***

A Sending Participant's CPP may go below its Prefunded Requirement at certain times due to its current Payment activity. If that were to occur, the Sending Participant is 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 Prefunding 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 Prefunding Requirement.

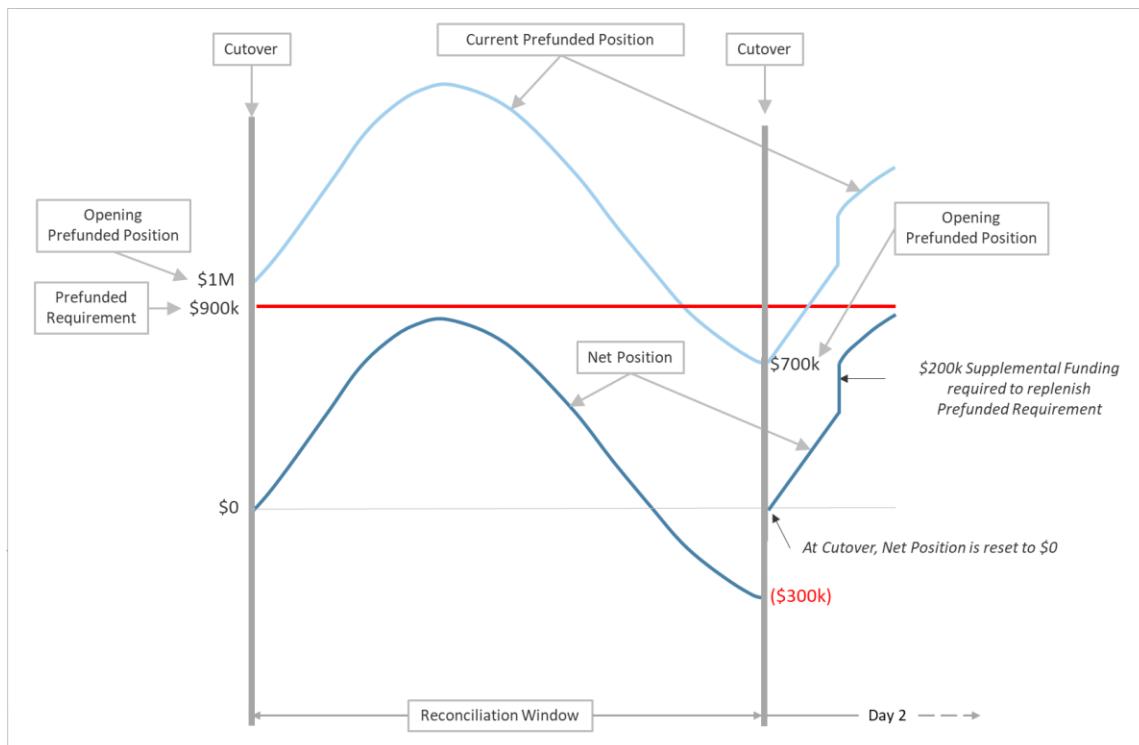


Figure 4. Example of when Supplemental Funding is required at the start of a new Reconciliation Window.

2.5 Low and Normal Watermarks

To assist Funding Participants in managing their CPPs, the RTP System provides the feature of low watermarks and normal (sometimes called “high”) watermarks for the CPP. 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 Sending Participants via the RTP Management Portal thereafter.

The low watermark is the value at which the Funding Participant will receive a notification via a System Notification Message (SNM) that its CPP is low and requires attention. The normal watermark serves as a reset for the low watermark to prevent receiving repetitive low watermark SNMs in a condensed period of time. If the CPP rises above the low watermark and then falls below it again, a second low watermark SNM will not be received until its CPP rises above the normal watermark value. 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 5), a Funding Participant may determine to set its low watermark to be an amount that is slightly above its Prefunded Requirement. The RTP System will send an SNM to the Funding Participant if the CPP falls below the low watermark value. The low watermark SNM warns the Funding Participant that it may need to add Supplemental Funds to the Prefunded Balance Account in order to increase the CPP back to a normal level. Thus, this feature provides a buffer to decrease the probability that a Funding Participant’s CPP will fall below their Prefunded Requirement and approach zero.

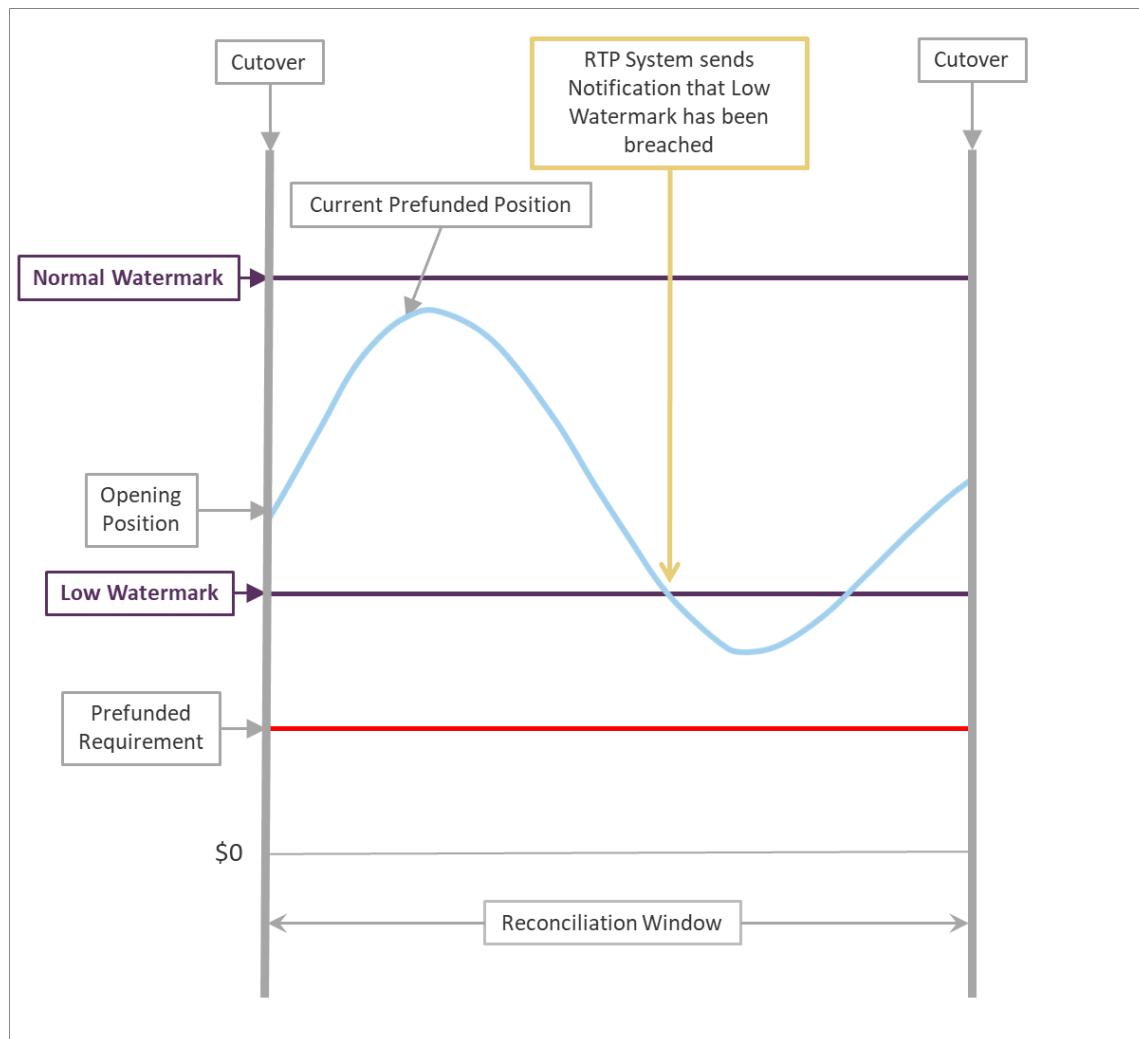


Figure 5. CPP falls below a Low Watermark set by the Funding Participant or Funding Agent.

Depending upon what the Funding Participant sets as its low watermark, if its CPP falls below its low watermark, it may need to add Supplemental Funds for an amount that will increase its CPP above its normal watermark.⁷ See Figure 6. When a Funding Participant's CPP reaches its normal watermark following a low watermark SNM, another SNM is sent to the Funding Participant, which will serve as an indicator that the CPP has returned to a normal level. In addition, the RTP System will reset its low watermark notifications so that the system will issue a new low watermark SNM if the CPP falls below the low watermark again.

⁷ Note that a Sending Participant's CPP will also be increased if the Participant receives more Payments than it sends.

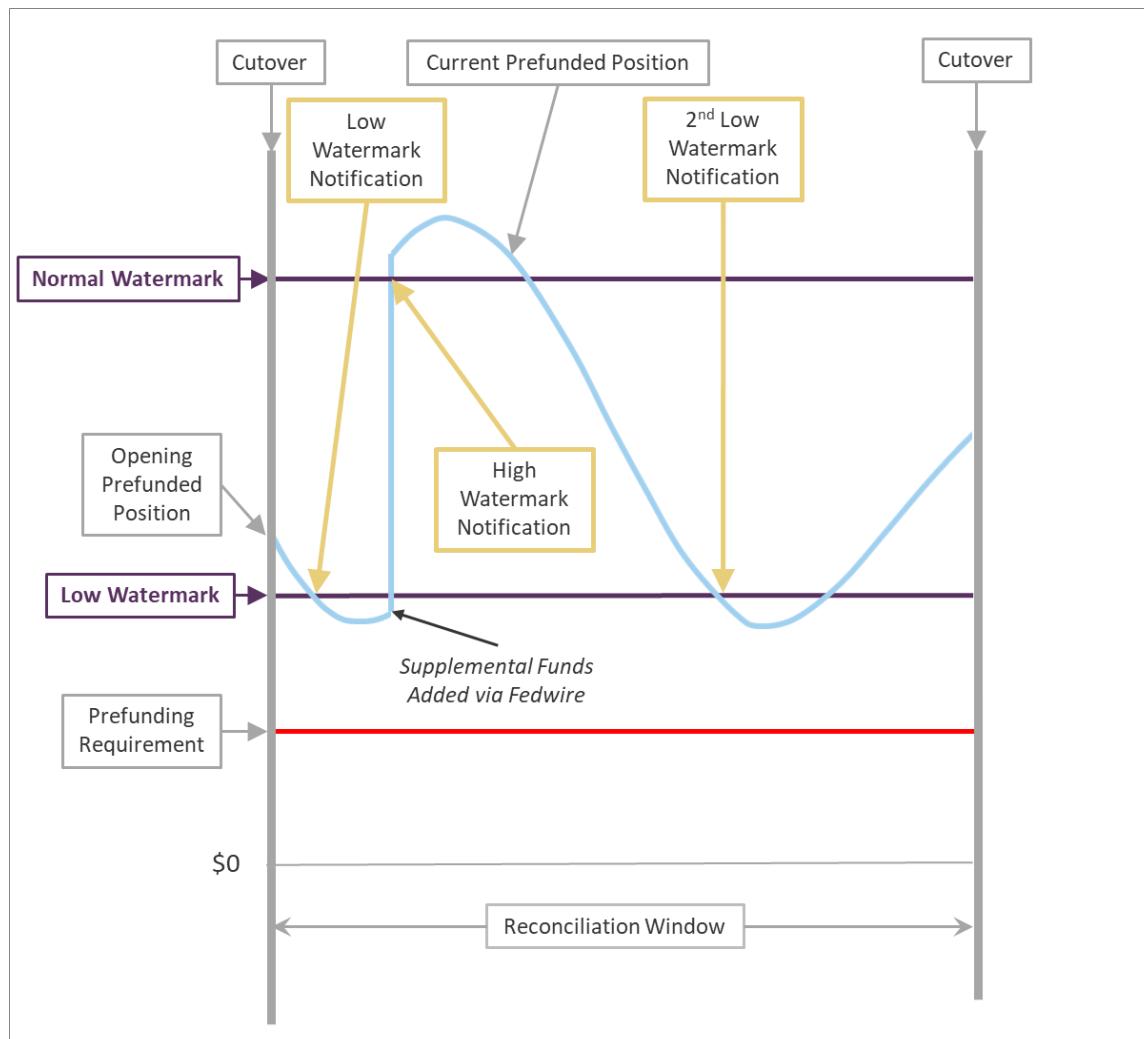


Figure 6. How low and normal watermarks are properly managed with the use of Notifications (SNMs).

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 7.

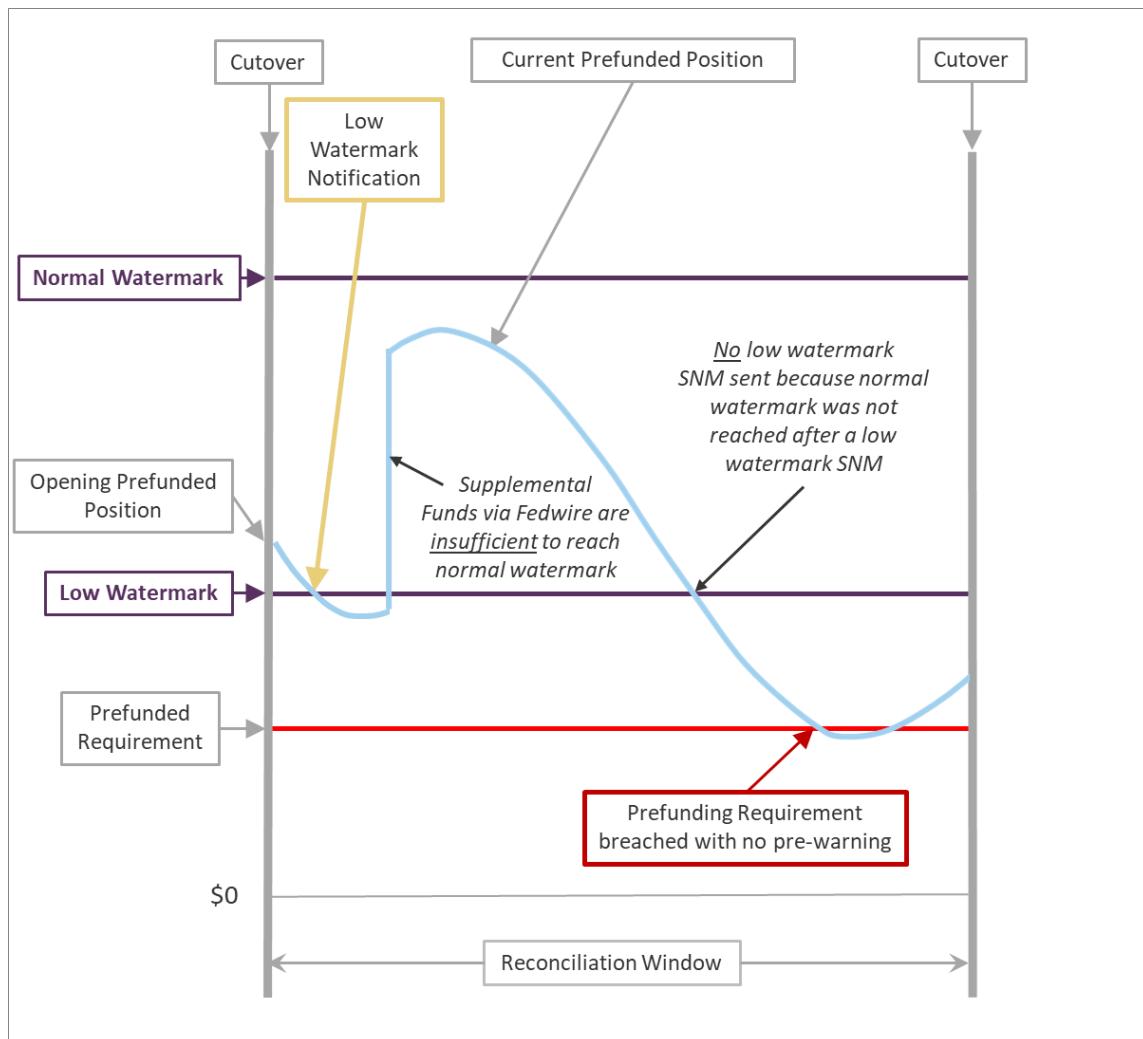


Figure 7. Supplemental Funding should be managed to take advantage of the RTP System's Notifications.

3 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. As mentioned in Section 2.2, all RTP Payment Transactions settle immediately. While most payment networks have the concept of a “settlement day”, since RTP settlement occurs in real-time, the cutover event is for reporting purposes only. This section provides additional information that will be necessary in designing and implementing a Funding Participant’s reconciliation processes and procedures for RTP activity.

3.1 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, RTP specifies the Reconciliation Window in which the activity will be reported to the Participant (see 3.2 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.

3.2 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.

3.2.1 Payment Messages and Reconciliation Window IDs

TCH defines the usage of the Reconciliation Window Date within RTP Credit Transfer 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.

3.2.2 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.

3.3 Cutover and Reconciliation Reports

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 in the future implement as a standard multiple Reconciliation Window cutovers per calendar day. Before making a change to the calendar, TCH will provide reasonable notice to Funding Participants.

Further, TCH may delay the completion of a planned Reconciliation Window cutover or 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.

The cutover event triggers the RTP System’s Reconciliation process. During cutover, the following steps are performed:

- The Funding Participant’s Opening Prefunded Position for the new Reconciliation 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”); also, the Funding Participant’s Net Position for the new Reconciliation Window is set to \$0;
- The RTP System sends individual Reconciliation Status Notifications as SNM’s to each Funding Participant;
- Reconciliation Reports are generated by the RTP System and made available on the RTP Management Portal for each Funding Participant so they may compare their system records with the activity that occurred within the RTP system.

3.3.1 Opening Prefunded Position and Net Position Reset

At any given time during a Reconciliation Window, a Funding Participant’s CPP may be calculated as the Participant’s Opening Prefunded Position plus its Net Position. Reconciling a Funding Participant’s CPP therefore requires the Opening Prefunded Position to be set at the

beginning of a new Reconciliation Window to the Current Prefunded Position at the end of the prior Reconciliation Window. This allows for incremental reconciliation from cutover to cutover, avoiding the need to go back to the Funding 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 Participant's system logs.

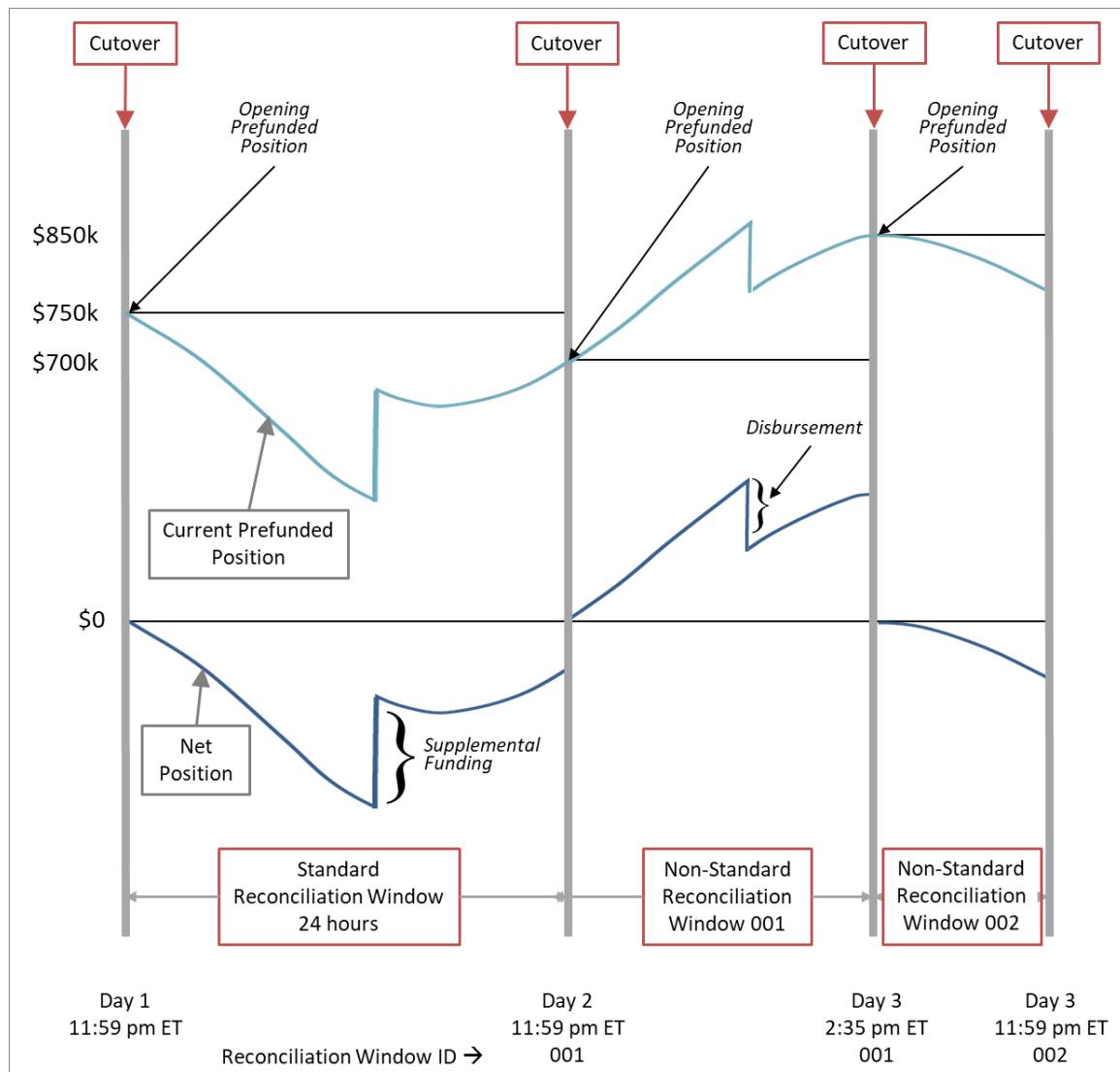


Figure 8. The Funding Participant's Opening Prefunded Position is set to the prior Window's ending CPP.

3.3.2 Reconciliation Reports

As part of the RTP cutover process, the RTP System generates a number of reports (see the document *RTP Reports Specification* for complete information on all RTP reports). Two reports in particular are designed for the purpose of allowing Funding Participants the ability to reconcile the RTP payment activity against its own internally logged transactions.

The Participant Reconciliation Report and the Detailed Payment Reconciliation Report are published on the RTP Management Portal shortly after the close of each reconciliation window.

Both reports are provided in CSV and XML to facilitate the needs of the Funding Participant's system performing the reconciliation.

3.3.2.1 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)

3.3.2.2 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.

3.3.3 Reconciliation Status Notification

At cutover, the Funding Participant will receive an SNM with an Event Code of 999. 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.

3.4 Funding Participant Reconciliation

Funding Participants or TPSPs 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 Funding Participant should ensure that the:

- Opening Prefunded Position,
- Net Position, and
- Closing Prefunded Position (same as the Opening Prefunded Position for the following Reconciliation Window)

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 Payment Transactions in the event that 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 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 processed by the Funding Participant's system, resulting in a logging error in the Participant's system.
- RTP Reconciliation report does not include a Payment, supplemental funding or disbursement that the 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.

3.5 Automated Reconciliation Process Requirements and Considerations

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 Payment Transactions are settled and final at the exact time they are processed and as the RTP Operating Rules require a Receiving Participant to provide immediate funds availability to the Receiver, posting to Customer accounts should 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 the Reconciliation Cutover SNM, both reconciliation reports, and the Clearing System Reference field included within each Payment Message (pacs.008) processed through the RTP System;

- Cutover is a process that includes a number of steps internal to the RTP system. The completion of the cutover process (and therefore the availability of 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 set once all transactions that are in-flight at the start of the cutover process complete. 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 Funding Participant on Day 1 just prior to cutover but the Response Message is received just after the cutover process to Day 2 initiates, 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. Even though these Payment Messages will complete and settle on Day 1, they will have an Interbank Settlement Date of Day 2 within the Payment Message and Response Message. Further, these Payment Messages will appear in Day 2 Reconciliation reports even though the Funding Participant's system logs may show the payment was processed on the prior calendar day.
- In rare incidents when Payments are not properly recorded to the RTP system logs, RTP Reconciliation reports will not include any improperly logged Payment for that Reconciliation Window even though the Payment is settled and final. This type of condition will cause the completion of the cutover process to be delayed while TCH Support takes corrective measures. This will result in the 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 when the Transaction will be reported	✗ Rely on the Creation Date and Time in a Payment Message to determine when the Transaction will be reported
✓ Ensure your reconciliation process is flexible enough to handle delays in the completion of the Cutover process	✗ Hardcode the Reconciliation Window Cutover time as 11:59 PM ET
✓ Anticipate non-standard Reconciliation Window Cutovers	✗ Rely on difficult manual processes in non-standard Reconciliation Window Cutover scenarios
✓ Post Payments and make funds immediately available in accordance with RTP Operating Rules	✗ Hold funds availability until RTP Reconciliation Reports are available or remove funds availability should RTP Reconciliation Report availability be delayed

Table 5. Recommendations to follow when creating an automated reconciliation process.

APPENDIX A - GLOSSARY

The following table contains additional definitions of some common RTP System terms and acronyms used in this document and other RTP System documents.⁸

Term	Definition
Account	An account held by a Participant for a Customer to or from which a Payment is received or sent.
Credit Transfer	The basic multi-purpose Payment Message, including remittance information.
Current Prefunded Position	The RTP System shall continuously record a Current Prefunded Position for each Participant. A Participant's Current Prefunded Position is the sum of a Participant's Net Position (whether positive or negative) and its Opening Prefunded Position.
Customer	A Sender, Receiver, or a Person that initiates or receives a Payment Message.
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 may request that TCH, as the agent for all Funding Participants, transfer funds from the Prefunded Balance Account to that Participant in an amount up to the amount of any Excess Liquidity. Upon request, the RTP System will validate that the Participant has Excess Liquidity and, if so, create a Fedwire payment to disburse the requested amount to the Participant.
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.
FI	A depository financial institution.
FRBNY	The Federal Reserve Bank of New York, which holds the Prefunded Balance Account.
Funding Agent	A depository institution that has become a party to the Prefunded Balance Account Agreement and is either a Funding Manager or a Funding Provider.

⁸ 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 (i) requests and receives disbursements from the Prefunded Balance Account, as permitted by these RTP Operating Rules, to its Federal Reserve account and (ii) if the Participant is a Sending Participant, prefunds for itself in accordance with the RTP Participation Rules and these RTP Operating Rules.
Low and Normal Watermarks	A Participant may establish a low watermark value for its Current Prefunded Position that will trigger an alert from the RTP System when the Participant's Current Prefunded Position falls to or below the value. Once the system sends a low watermark alert, it will not send any further low watermark alerts until (i) Participant's Current Prefunded Position increases to a normal watermark value that the Participant has established and (ii) the Current Prefunded Position again falls below the low watermark value. The definition above is simplified from the RTP Operating Rules. Refer to the Real-Time Payments Operating Rules for the complete definition.
Message	A transmission of a Request or of a Response from one Participant to another Participant through the RTP System.
Net Position	A Participant's "Net Position" starts at zero at the beginning of each Reconciliation Window, and is the net dollar amount of all increases and decreases from the Participant's Supplemental Funding, RTP Payments and Disbursements during that Reconciliation Window.
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 under the RTP Participation Rules and these RTP Operating Rules or (ii) a Funding Provider to be a Non-funding Group Member.
Opening Prefunded Position	A Participant's new Opening Prefunded Position is the Participant's Current Prefunded Position at the opening of a new Reconciliation Window. Once a Participant's 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.
Payment	A transfer of value from a Sender to a Receiver through the RTP System pursuant to a Payment Message.
Payment Message	A Credit Transfer Message or an FI-to-FI Message

Term	Definition
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, as further described in Rule VI . 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.)
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 Management Portal	A browser based administrative portal provided by TCH that is accessed over the internet using a secure VPN.
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.

Term	Definition
Sending Participant	The Participant that holds the Sender's Account and initiates an RTP Payment.
Supplemental Funding	A Sending Participant 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 Current Prefunded Position in the amount of the transfer.
System Notification Message (SNM)	Used by the RTP System to notify the Participants, either individually or as a group, of significant events or information.
TCH	The Clearing House Payments Company L.L.C.
Third Party Service Provide (TPSP)	A commercial data processing service organization, 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.
Transaction	An individual transaction processed by the RTP System, it consists of both a Request Message and a Response Message.

Table 6. RTP System terms and acronyms defined.