Two-Sided Marketplace
Application Programming Interface

User Guide

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Referenced Documentation

This document, **TSMP API User Guide**, referrers to appendices presented in Document "UniTiAg User Guide Appendices". Each time you see a reference to an appendix in this guide, you can find the corresponding details in that document.

Appendix 1 contains a glossary, and a list of acronyms commonly used throughout the TSMP API User Guide.

1 General TSMP API Description

1. The outbound API calls (from the TSMP's perspective) use the REST HTTP POST method, with environment-specific URLs. UniTiAg's current implementation relies on AWS's RESTful API Gateway infrastructure.
2. TSMPs should interpret inbound calls as REST HTTP POST requests. At present, the only inbound call is the "Low OTRB Amount Warning."
3. TSMPs use this API to communicate with UniTiAg to manage Rider's OTRBs and to retrieve TA reconciliation data.
4. The actual reconciliation process is not within the scope of this API because reconciliation must be executed between the TSMP and its TAs according to the TSMP's policies and agreements with TAs as merchants.
5. All outbound calls are potentially idempotent. TSMPs can make the inbound calls idempotent if they follow recommendations provided in this Guide.

1.1 TSMP Outbound Calls – General Requirements

1.1.1 Request Headers

TSMP shall form the request headers as described below:

Header	Necessity	Meaning and Purpose
Content-Type	m	application/json
X-API-Key	m	Used for request authentication. Assigned for each API environments separately. This key is the same for all TSMPs
tsmpid	m	TSMP ID, a number assigned to the TSMP by UniTiAg. The header must present the TSMP ID as a sting (like '5').
tsmpkey	o	A key assigned to this TSMP, for each API environments separately.

All headers must be UTF-8-encoded strings within the ASCII range (not more than 1 byte per character).

1.1.2 Request Body

API call request 'body' is a string comprising call-specific JSON content. The body's JSON attributes may be presented as Strings and Numbers:

- "String" means a set of UTF-8 symbols encoded in the range of ASCII. UTF16 String means a set of UTF-8 symbols encoded in the range of UTF-16.
- "Number" means an integer or a floating-point number.

1.1.3 Request Path

The calls are to be https, sent to URI <URI Base><path>. The URI-base is environment-specific. The <path> component is call-specific, as described below.

1.1.4 Outbound Request Response Format

Name	Type	Meaning / Condition
HTTP Status Code	Number	• 200: UniTiAg fulfilled the request. • 201: UniTiAg already fulfilled the same request (idempotent case). The response body is the same as it would be with Status Code 200. • 202 – 299: request--specific, as described below. • 300 – 599: the call is rejected; the response body may contain a String with explanations of errors in the request.
HTTP Response Body	Request-specific	Request-specific

1.1.5 Outbound Call List.

The following outbound calls are supported by UniTiAg's TSMP API:

API Call Name	Description
Create OTRB	Request a new OTRB
Get OTRBs	Obtain all OTRBs associated with the given rider
Update OTRB amount	Increase or decrease OTRB amount
Update OTRB status	Cancel OTRB, put it on hold temporarily, pr re-activate an OTRB
Update OTRB active transit agencies	Change the list of TAs preconfigured as active
Update CRD Token	Remove or update the OTRB CRD Token
Update other OTRB parameters	Update other OTRB attributes
Get OTRB Report	Get the report of recent activities associated with this OTRB.
Get TA Activities Report	Download daily activities report of a specific TA.

1.2 TSMP Inbound Calls – General Requirements

The following inbound call is supported by UniTiAg's TSMP API:

API Call Name	Description
Low OTRB Amount Warning	UniTiAg informs the TSMP that a given OTRB amount is below the low amount threshold that the TSMP specified for this OTRB.

2 Outbound TSMP API Calls – Specific Requirements

2.1 Create OTRB

2.1.1 URI Path

/create-otrb

2.1.2 Purpose

The TSMP uses this call to create an OTRB when requested by the Rider.

2.1.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
riderId	String	m	<= 40 symbols. Must be unique per TSMP	Rider (shopper) identifier, assigned by the TSMP.
otrbAmount	Number	Ignored for compatibility with API v1.		Initial OTRB amount expressed in main units of otrbCurrency. To support idempotency, this parameter is removed. Instead, an additional call /**update-otrb-amount** should be made to setup this amount.
cardNumber	Depends on encryptionType	c	Required only for cEMV cards	UniTiAg will link this cEMV card to the OTRB. See TA API for the usage of this OTRB identifier. See Appendix 4.1 for further details.
encryptionType	Decimal	c, o	Used only with cEMV cards. If omitted – '0' is assumed	Identifies algorithm and cardNumber format used in this call.
otrbCurrency	String.	m	Only codes of currencies supported by UniTiAg are allowed. Presented as ISO 4217 alphabetic code. 3 char-long.	OTRB Currency. It cannot be changed later.
trustRate	Number	m	0:100	Trust Rate as set by TSMP.
lowAmount	Number	m	Must be an integer within the amount range set for this currency.	UniTiAg reports to the TSMP events when the running OTRB amount is decreased below this threshold. See call low-otrb-amount-warning.
otrbName	UTF-16 String	m	<= 60 UTF-16 symbols encoded within the UTF-16 range	A friendly name set by the Rider. E. g. "Daughter's OTRB", "Euro OTRB". Used in the Rider UIs in the TSMP and the TAs to point-out to this OTRB.

Name	Type	Necessity	Restrictions	Meaning
cardToken	Base64-encoded string	o	Required for non-cEMV CRDs	CRD Token as determined in the TSMP or app UI during the OTRB setup.

2.1.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response Body	String	New OTRB ID formed by UniTiAg, unique within UniTiAg.

The response statusCode can be 200 (accepted) or 201 (accepted, idempotent case).

2.1.5 UniTiAg Actions:

1. UniTiAg rejects an attempt to create an OTRB with non-unique Card Number or Card Token and returns responseCode 400 and the error description in the response body.
2. Otherwise, UniTiAg:
   2.1. Creates new OTRBs with otrbStatus ‘active’.
   2.2. Sets the OTRBs lastChangedTime to the current time.
   2.3. Sets the OTRB amount to 0.

2.1.6 TSMP Actions:

1. The TSMP should verify that its another Rider has not already have an OTRB associated with this CRD. In case of request decline with statusCode = 400, the TSMP should ask the Rider to use another CRD card to associate with the OTRB.
2. For non-cEMV cards, the TSMP must provide CRD Token in this call.
3. The TSMP must ensure that the CRD Token is unique in UniTiAg. The algorithm of CRD Token creation needs to be negotiated with a party that owns this specific CRD specificatins.
4. For non-cEMV CRDs, the TSMP should follow-up with the TSMP API call *Update Active Transit Agencies*. If the rider presents the CRD at a non-active TA for the first time, the Validator’s response can be longer, as UniTiAg has not yet placed the CRD Token in the regional targeted OTRB replica of this TA.
5. The TSMP is responsible for not including in the CRD Token any sensitive holder’s personal data or any data in the PCI DSS scope.

2.2 Get all OTRBs of the given Rider

2.2.1 URI Path

/get-otrbs

2.2.2 Purpose

The TSMP uses this call to obtain the up-to-date OTRB data, for a specific Rider.

2.2.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
riderId	String	m	<= 40 symbols	ID of the Rider assigned by the TSMP.

2.2.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response body	String	A stringified JSON array, with one item for each OTRB of the given Rider. See Appendix 3, Date Table OTRBs for the item content.

2.3 Update OTRB Amount

2.3.1 URI Path

/update-otrb-amount

2.3.2 Purpose

The TSMP uses this call to update the OTRB amount, either due to OTRB replenishment (e.g., in result of a payment or pre-authorization) or withdrawal (e.g., when the OTRB becomes dormant or is canceled). Replenishments may follow a pay-before or pay-later model, while withdrawals typically relate to account inactivity or closure.

2.3.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m		OTRB ID
amnt	Number	m	Negative amnt can only be if the OTRB status is not 'active', and if otrbAmount is not less than minus amnt. Positive amnt must be within the range configured by UniTiAg for this currency.	OTRB amount increment.
note	UTF-16 String	m	Up to 40 UTF-16 symbols. If this parameter is too long, UniTiAg truncates it.	As set by the TSMP.
requestId	String	m	Must be up to 40 characters. Otherwise, the API call will be rejected	A unique ID for this call. This is an idempotent key. If this call is a reaction on low-otrb-amount-warning, the TSMP should set requestId to requestId presented by

Name	Type	Necessity	Restrictions	Meaning
				UniTiAg in low-otrb-amount-warning call, to support idempotency.

2.3.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response Body	String	For statusCode = 200 or 201: An ID of the item in Move table created as a result of this request. statusCode = 201 means the idempotent case.

2.3.5 UniTiAg Behavior

1. UniTiAg ensures that tsmpId in the POST header belongs to the TSMP authorised to make this call, and that the OTRB referred in otrbId belongs to the same TSMP.
2. UniTiAg sets the otrb lastChangedTime to the current time.
3. UniTiAg checks the request parameters for uniqueness (idempotency feature), and if unique, creates an item in Move table. See description of Data Table Move in Appendix 3.2.

2.3.6 TSMP Behavior

1. If the TSMP makes this call as a follow-up to the inbound ***Low OTRB Amount Warning*** API Call, the TSMP should ensure idempotency, to avoid duplicate Rider charges by following these steps:
   1.1. Set requestId in this call request to match requestId obtained in the Low OTRB Amount Warning request.
   1.2. Ignore Low Amount Warning requests that have a duplicate requestId.

2.4 Update OTRB Status

2.4.1 URI path

/update-otrb-status

2.4.2 Purpose

TSMP shall use this call to request a change in the OTRB Status.

2.4.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m		OTRB ID
otrbStatus	String	m	Can be one of “active”, “onhold”, or “cancelled”	otrbStatus, to replace the current one.

2.4.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response Body	String	“ok”

2.4.5 TSMP Actions

1. A cancelled OTRB will not be reactivated by UniTiAg. The TSMP should use “onhold” flag to temporarily deactivate an OTRB.
2. The TSMP must set cancelledOtrbTtlDays to at least the max period for financial disputes and warn the rider about this. All cancelled OTRB’s data will be removed by UniTiAg after this TTL expires. The TSMP may wish to store this data earlier obtained via reports in its archives.

2.4.6 UniTiAg actions

1. UniTiAg ensures that tsmpId in the API call header belongs to the TSMP authorised to make this call, and that the OTRB referred in otrbId belongs to the same TSMP.
2. If the new otrbStatus value is to be set to “onhold” or “cancelled”, then UniTiAg sets OTRB effectiveStopTime to the current Unix time plus maxOtrbSyncDelay set in global UniTiAg settings. Otherwise, UniTiAg sets effectiveStopTime to 0.
3. UniTiAg users effectiveStopTime to allow fare activities before the OTRB status “onhold” or “cancelled” change is propagated to the TAs.
4. UniTiAg sets the OTRB’s lastChangedTime to the current Unix time.
5. If the current otrbStatus is the same as the requested one, UniTiAg identifies this case as idempotent.
6. OTRB cancellation is not reversible. If the current otrbStatus is ”cancelled” and the requested one is NOT “cancelled” UniTiAg rejects the call. Cancelling OTRB is final.
7. Cancelling OTRB is a time-consuming task as it requires updating all moves of this OTRB with a TTL timestamp. If the call fails it can be safely repeated.
8. UniTiAg will automatically remove the cancelled OTRB and its move items, as per the TSMP setting cancelledOtrbTtlDays or after 100 days from cancellation if cancelledOtrbTtlDays is not set.
9. UniTiAg still makes available cancelled OTRBs not yet expired to the active TAs via TANB API, with status=2 (cancelled).

2.5 Update OTRB Active Transit Agencies

2.5.1 URI path

/update-otrb-tas

2.5.2 Purpose

The TSMP uses this API call to update the list of active Transit Agencies.

- **Effect on Regional OTRB Replicas**: For cEMV cards, this update affects the regional targeted OTRB replicas only after the CRD Token is already set in this OTRB.

2.5.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m		OTRB ID
tas	Number, interpreted as a bitmask	m	UniTiAg allows only valid IDs of transit agencies to be present in this bitmask	A bit mask comprising bits = '1' in bitmask position of the given active TA ID. (TA's IDs are Numbers).

2.5.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response Body	String	"ok"

2.5.5 UniTiAg actions

1. UniTiAg ensures that the OTRB referred in otrbId and TAs specified in the bitmask belong to this TSMP. Otherwise, the call is rejected.
2. If the CRD Token (cardToken) is set in this OTRB, UniTiAg replicates this OTRB to all Regional UniTiAg Hosts where active TAs are registered.
3. UniTiAg forbids this action if the OTRB is cancelled.

2.6 Update Other OTRB Attributes

2.6.1 URI path

/update-otrb-etc

2.6.2 Purpose

The TSMP uses this call for any of the following purposes:

1. To update the min amount value threshold that will cause UniTiAg to send a low amount warning to the TSMP when the OTRB amount goes below this threshold.
2. To update the OTRB's Trust Rate

2.6.3 Call Parameters

At least one of the optional ('o') parameters below must be present in the request.

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m		OTRB ID
lowAmount	Number	o	Must be within the range set for the OTRB Currency, in UniTiAg settings	OTRB amount below this value will trigger Low Mount Warning inbound API call
trustRate	Number	o	0 - 100	Trust Rate

2.6.4 API Response

For non-rejected call

Name	Type	Meaning / Condition
Response Body	String	“ok”

2.6.5 UniTiAg Actions

1. UniTiAg ensures that tsmpId in the POST header belongs to the TSMP authorised to make this call, and that the OTRB referred in otrbId belongs to the same TSMP.
2. UniTiAg forbids this action if the OTRB is cancelled.
3. This call is idempotent, as it is safe to repeat the lost call.

2.7 Update CRD Token

2.7.1 URI path

/update-otrb-cardtoken

2.7.2 Purpose

If the rider receives a replacement for their cEMV card linked to an OTRB, and the card has the same card PAN, the rider must inform the TSMP, and the TSMP must remove the current cardToken of this OTRB, using this call with ‘remove’ value.

NOTE: if the rider uses a new device image of the same cEMV card, that is changes DPAN, this call must not be used. The TSMP must create a new OTRB associated with the new DPAN.

2.7.3 Call Parameters

At least one of the optional (‘o’) parameters below must be present in the request.

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m		OTRB ID
cardToken	String	o	Either: • A new value as a base64-encoded String, • Word “remove”	The new value of CRD Token. In case of “remove”, the existing CRD Token will be removed.

2.7.4 API Response

For non-rejected call

Name	Type	Meaning / Condition
Response Body	String	“ok”

2.7.5 UniTiAg Actions

1. UniTiAg ensures that the OTRB referred in otrbId belongs to the same TSMP.
2. UniTiAg treats an attempt to remove a non-existing CRD Token or update the existing CRD Token with the same value as an idempotent case. UniTiAg returns statusCode 201 and takes no action.
3. CRD Token format and algorithm are described in Appendix 4.1.
4. If CRD Token already exists and owned by another OTRB, UniTiAg rejects the call.
5. The OTRB status must be “onhold” and effectiveStopTime of this OTRB must expire before UniTiAg allows CRD Token update. This is necessary to give TAs some time to synchronize their OTRBs

2.7.6 TSMP Actions

The TSMP must not use this API call when a new DPAN is created for the same payment method. Instead, the TSMP must cancel the OTRB associated with the old DPAN and create a new OTRB associated with the new DPAN.

In case of cEMV card, the TSMP must ensure that the old CRD Token, the one either removed or replaced by this call, is not reused later. If there is an attempt to tap a cEMV card that produces the old CRD Token, the behavior at the validator is not consistent and depends on the TA implementation.

The TSMP must not remove the existing CRD Token associated with non-cEMV card. This action will make the OTRB useless until the TSMP restores the CRD Token.

The below is the recommended process flow for a typical use case of cEMV physical card replacement without the card PAN change.

a) The rider is issued with a cEMV card replacement where the new and old cards have the same PAN (these cards would produce different cardTokens and the card tap).
b) The rider attempts to update the TSMP payment method associated with this card.
c) The TSMP detects that the old payment method uses the same card PAN and is associated with an OTRB and requests that the rider puts this OTRB on hold and, a few minutes later (after maxOtrbSyncDelay expires), the rider updates the payment method.
d) The rider puts the OTRB on hold and updates the payment method.
e) The TSMP uses this API call to remove the cardToken.
f) The TSMP instructs the rider NEVER tap the old card again, as this action can invalidate both new and old cardTokens.
g) The rider re-activates the OTRB (changes its status from onhold to active) and starts using the new card.

Let's see what may happen if the rider taps the old card after that.

- The old cardToken can be in a TAs targeted replica for some time, with status 'onhold'. This depends on the TA implementation. In such a case the tap may be declined.
- If the old card is tapped before the new card is tapped for the first time, in some cases, the old cardToken can be "reinstated", and the replacement card becomes not usable in the UniTiAg realm. This would require that rider/TSMP repeat the process of cardToken removal.

2.8 Get OTRB Report

2.8.1 URI Path

/get-otrb-report

2.8.2 Purpose

The TSMP uses this call upon a Rider's request. Additionally, the TSMP can proactively use this call on a regular basis to calculate and replenish the OTR Balance.

2.8.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
otrbId	String	m	Must belong to this TSMP	OTRB ID
fromAtu	Number	o	Unix time to start report.	Default value – beginning of UTC day today.
toAtu	Number	o	Unix time to end report. If present, must be time greater than fromAtu	Default value – end of UTC day today.
itemsLimit	Number	o	Limit of reported items. If present must be below the global UniTiAg setting Otrb Report Items Limit.	Default value 100.

2.8.4 API Response

For non-rejected calls:

Name	Type	Meaning / Condition
Response	String	A stringified JSON array of Move items (see Appendix 3.2) within fromAtu and toAtu range but not more than the most recent itemsLimit items. All amounts are rounded to their OTRB currency's exponents. The items are sorted in descending order.

2.8.5 UniTiAg Actions

1. UniTiAg ensures that the OTRB ID belongs to the same TSMP.

2.8.6 TSMP Actions

1. Old OTRB activity is periodically archived by UniTiAg. It is recommended that the TSMP either warns the Rider that access to the old items is limited in time or stores them in its in the TSMP's database.
2. The TSMP should also store OTRB Order activities related to OTRB amount changes resulted from purchases and refunds. This report also has them but there will be mixed with fare or refund related activities originated by TAs.
3. The report may not present the most recent OTRB activities not yet reported to UniTiAg.

2.9 Get Activities Report

2.9.1 URI pat

/get-actvts-report

2.9.2 Purpose

The requested report can be later used for reconciliation with a given TA. The actual reconciliation process is not within the scope of this API. The reconciliation must be performed by the TSMP according to the TSMP's policies and agreements with TAs as merchants.

2.9.3 Call Parameters

Name	Type	Necessity	Restrictions	Meaning
taId	Number	m	Must be a TA registered with TSMP in UniTiAg.	TA ID
fromAtu	Number	m	Unix time for the earliest item in the report. Must be not earlier than 50 days ago and not later than 1 hour ago	Report period start.

2.9.4 API Response

For non-rejected calls: the body presents a CSV multi-line string.

The following headers are returned:

- 'Content-Type': 'application/octet-stream';
- 'Content-Disposition' : 'attachment; filename="activities_report_ta< taId>.csv';

Each line of the csv body corresponds to the structure of table Moves as described in Appendix 3.2. Attributes 'tsmpId and 'taId' are not present in the report.

The data elements are sorted by attribute 'atu' in ascending order.

The report comprises activities with atu within 24 hours since fromAtu

2.9.5 UniTiAg actions

1. UniTiAg ensures that the TA referred in taId belongs to the same TSMP.

2.9.6 TSMP actions

1. Old OTRB activity is periodically archived by UniTiAg. The TSMP should make this request within the last 50 days.
2. The TSMP should match this report with rider-centric OTRB reports using attribute ID for rider charges reconciliation.

3 Inbound TSMP Call – Specific Requirements

3.1 Low OTRB Amount Warning

The TSMP should expect this POST call from UniTiAg, when the latter detects that the OTRB amount goes below the lowAmount specified for this OTRB.

3.1.1 Call Parameters

The header is: **'Content-Type'**: **'application/x-www-form-urlencoded'**

All parameters are included in the POST form, as follows:

Name	Type	Necessity	Meaning (As in create-otrb call)
otrbid	String	m	OTRB ID
otrbname	String	m	OTRB friendly name
balance	Number	m	Current value of OTR Balance, expressed in OTRB Currency.
minamount	Number	m	lowAmount attribute in Data Table Otrbs (see Appendix 3.2)
currency	String	m	OTRB Currency
requestid	String	m	Unique key to support idempotency.
apikey	String	m	API Key assigned for this TSMP for this specific type of call.

3.1.2 UniTiAg Behavior

2. UniTiAg sends low-otrb-amount-warning only if OTRB Status is ‘active’ and when OTRB amount is being decremented as a result of reported fare (via TA API).

3.1.3 Expected TSMP Behavior

1. Validate the request and immediately respond with 200 OK. TSMP must respond before completing a rather lengthy process of reacting to this call, such as warning the rider, refilling OTRB and charging the rider.
2. Ignore the call with the same requestid as an idempotent case.
3. Warn the Rider.
4. Optionally (‘pay before’ policy), refill OTRB amount by:
   4.1. Charging a payment method associated with this OTRB.
   4.2. Placing an ***Update OTRB Amount*** TSMP API Call and use the requestid obtained in this ***Low OTRB Amount Warning*** call for idempotency purpose.
5. Check the consistency of OTRB lowAmount attribute and refill amount that TSMP maintains in its files, so that the refill caused by this call resolves the low amount issue.
6. Put the OTRB on hold via call update-otrb-status, if the refill is not possible.

