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Tækniforskrift - Innlendar greiðslur og
innlán

Technical Specification - Domestic
payments and deposits



ÍST TS 310:2022

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1st edition

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Foreword

This ÍST Technical Specification was developed in accordance with “ÍST Reglur um tækniforskriftir, tækniskýrslur og vinnustofusamþykktir” (e. IST rules on Technical Specifications, Technical Reports and Workshop Agreements). The TS (Technical specification) was prepared by the technical committee TN-FMP (The Technical Committee on Financial Services) that operates within FUT (Sector committee for ICT standardisation) following a public call for participation within TN-FMP. The final draft was sent to the TN-FMP on the 2022-01-XX and approved by correspondence on the 2022-03-XX. The text of ÍST TS-310 was submitted to IST for publication on 2022-03-YY.

The accompanying OpenAPI 3.0.1 definition “IOBWS3.0.yaml” located at <https://github.com/stadlar/IST-FUT-FMTH/tree/master/Deliverables>, should be viewed as an integral part of ÍST TS-310.

The document “ÍST TS 310_2022 Domestic payments and deposits.md” is the source of this rendition, and versions of that document will be used for future errata and clarifications per the procedures to be laid out in the workshop agreement ÍST WA-316, IOBWS 3.0 Technical Guidelines. The rules are outlined in the README.md accompanying the Github Git repository and are accepted by the participants in TN-FMP alongside this specification. These guidelines establish the workgroup TN-FMP-VH-7 as in charge of monitoring submitted issues and pull requests made to the repository when they fall outside the permit of other regular workgroups. TN-FMP-VH-7 will evaluate if changes are ready to be accepted into the repository, and when or if, they warrant patches or minor releases to the specification. Versioning will adhere to the Semantic Versioning[7] scheme and each minor release will require a Workgroup agreement under the “ÍST reglur” referenced above.

The work on the ÍST TS was primarily funded by Íslandsbanki, Arion Banki and Landsbankinn. It is the result the workgroup TN-FMP-VH-8. In parts the work is the earlier workshop agreement WA-310 authored by TN-FMP-VH-1 on Technical requirements and TN-FMP-VH-2 on Business requirements, with participation of an external consultant. WA-310 was approved within TN-FMP on the 2019-12-12. ÍST TS-310 should, however, not be viewed as a direct successor to that agreement, which focused on laying groundwork for PSD2 compliance. ÍST TS-310 is not related to PSD2 compliance, though it could optionally be used by participants as a foundation for their dedicated interface if so desired. Instead TS-310 is the next version of the Icelandic Online Banking Services, replacing TS 161:2013 *Greiðslur* and TS 164:2013 *Yfirlit bankareikninga*.

ÍST TS-310 is not subject to any patent rights. The underlying OpenAPI specification is derived from version 1.3.8 of the Berlin Group's NextGenPSD2 Framework , and therefore also distributed under a Creative Commons Attribution 4.0 International Public License (CC BY).

This means the YAML Specification for ÍST TS-310 can be copied and redistributed in any medium or format for any purpose, even commercially, but when shared appropriate credit must be given, a link to the license must be provided, and an indication given if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. In addition, if you remix, transform, or build upon the specification, you may not distribute the modified specification.

The Technical Committee's participants have made every effort to ensure the reliability and accuracy of the technical and non-technical content of ÍST TS-310, but this does not guarantee, either explicitly or implicitly, its correctness. Users of ÍST TS-310 should be aware that neither the TN-FMP nor ÍST can be held liable for damages or losses of any kind whatsoever which may arise from its application. Users of ÍST TS-310 do so on their own responsibility and at their own risk.

Introduction

This Technical Specification (TS) presents version 3.0 of the Icelandic Online Banking Services (IOBWS), for domestic payments and deposits.

Previous versions of IOBWS, released in 2007 and 2013 respectively, used the most recent OASIS SOAP standards at the time, to define common web service interfaces for the Icelandic commercial and savings banks. This enabled software vendors, enterprises and service providers to integrate their accounting, payment, and information systems with the bank's services, to act on behalf of the customers and with full access to their data.

Iceland, with its homogeneous financial infrastructure based on the centralized Banks' Data Centre (Reiknistofa bankanna, or RB), has enjoyed real-time gross settlements and instant credit transfers nationwide since 1987. Other universally accepted services count the common collection solution (Kröfupotturinn) for issuing and paying claims, topping up credit cards, or A/B Giro. All this functionality has been available through IOBWS v1 and v2, comparable to the functionality enjoyed by users of the online banking Web UIs.

When initiating work on the previous versions, the participants in the TN-FMP reviewed existing and emerging specifications in the global or mostly European financial industry. None were deemed a good fit at the time for local adaptation, as they reflected inherent the legacy in inter-bank communications outside of Iceland, even in the case of the other Nordic countries. Therefore, v1 and v2 of IOBWS were somewhat specific to the current functionality available in the underlying RB systems.

Meanwhile, the broader market especially in Europe has been catching up and the Icelandic banks have migrated to new core banking systems and with the Central Bank of Iceland, implemented new clearing and settlement mechanisms (CSM). One of the goals of IOBWS v3, set forward by TN-FMP, was to move closer to the standards used by those systems such as ISO 20022 [2], at least through the application of a comparable dictionary and data elements.

The Open Banking regulation in the UK and the PSD2 regulation issued by the European Parliament has triggered initiatives to standardize access to payment functionality and account information, on behalf of customers by third parties. One such effort, the NextGenPSD2 Framework developed by the Berlin Group [4], has met a broad acceptance in the EEA. The data model references ISO 20022 [2] and is close enough to the direction of the Icelandic market to make it relatively straightforward to adapt it as the new base for the IOBWS, instead of continuing to maintain an independent lineage of API specifications.

Another goal of the IOBWS version 3 charter set forth by TN-FMP and achieved by adopting the NextGenPSD2 Framework is the transition from SOAP to a REST-like API defined by a recent iteration of the Open API Specification [3]. Along with support for modern authentication and authorization standards, this should address some of the perceived complexity in adapting IOBWS to various use cases, platforms and programming languages that have come to the fore after the release of the previous IOBWS versions.

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1 Scope

ÍST TS-310 defines web application programming interfaces implemented by Icelandic commercial and savings banks to expose shared functionality and information for domestic payments and deposits, under the auspices of the Icelandic Online Banking Web Services (IOBWS).

Other ÍST Technical Specifications exist that address related but discrete units of the overall IOBWS framework, either as new additions or upgrades to the previous specifications. Some crosscutting guidelines and shared concerns are addressed in the workshop agreement ÍST WA-316. As the consumption and implementation of each part of IOBWS are optional, the documents aim to be independent of each other.

However, due to the origin of the underlying OpenAPI specification in the Berlin Group NextGenPSD2 Framework, ÍST TS-310 on Domestic Payments and Deposits, and ÍST TS-313 on Foreign Payments, overlap quite significantly. Both are based on the “IOBWS3.0.yaml” definition document, and share schema type and API service definitions. They will still be treated as separate entities but stakeholders are advised to reference the other document if more context is required.

The approach in ÍST TS-310 is to focus on the domestic adaptations to the relevant parts of the NextGenPSD2 framework, and the information needed to tie that to earlier IOBWS versions or other such implementations, and even the Core Banking systems involved.

The intended audience for the specification document ÍST TS-310 is the implementors of banking services as well as of those systems that will consume them as API clients. The reader is expected to have a basic understanding of the Icelandic financial products involved. Further documentation on business aspects of those products will be available from the banks in question as they can involve service agreements and the end customers’ contractual preferences and benefits.

The previous IOBWS technical specifications did out of necessity, largely consist of expressing the intent and actual content, otherwise found in the associated XML Schema and SOAP definitions, in a human-readable format. The expectation is that for ÍST TS-310, the technical service definitions and JSON data schemas in the accompanying OpenAPI specification can more readily be understood using one or more of the numerous utilities that can convert them into documentation or even navigatable UIs.

Consequently, the ÍST TS-310 specification avoids the unnecessary repetition of information found in the technical contract IOBWS3.0.yaml. Instead, the rest of the document focuses on the essential information needed to understand the domestic context of services, schema types and service flows in relation to the NextGenPSD2 framework, and what constitutes the common core required to implement ÍST TS-310.

2 Normative references, definitions and data elements

2.1 Normative references

The following documents are referred to in ÍST TS-310 as part of their content constitutes the requirements of this document. Only the edition cited applies if newer editions exist.

ISO 13616-1:2020. *Financial services - International bank account number (IBAN). Part 1: Structure of the IBAN.*

ISO 20022. *Financial services - universal financial industry message scheme.*

NextGenPSD2 v1.3.8. *The Berlin Group NextGenPSD2 Access to Account Framework.*

OpenAPI v3.0.1. The OpenAPI Specification (OAS) by the OpenAPI Initiative, a Linux Foundation Collaborative Project.

2.2 Terms and definitions

- **Berlin Group** is a pan-European payments interoperability standards and harmonisation initiative with the primary objective of defining open and common scheme- and processor-independent standards in the interbanking domain between Creditor Bank (Acquirer) and Debtor Bank (Issuer), complementing the work carried out by e.g. the European Payments Council. As such, the Berlin Group has been established as a pure technical standardisation body, focusing on detailed technical and organisational requirements to achieve this primary objective.
- **Clearing and Settlement Mechanisms (CMS)** refers to the processes or systems used in the exchange between two payment service providers. In Iceland, the Central Bank acts as the interbank mediator in this scope.
- **Core Banking Systems (CBS)** is the umbrella term for those systems handling payments and transaction accounts in relation to this specification.
- **Electronic IDentification, Authentication and trust Services (eIDAS)** refers to regulation 910/2014 [9], which replaced previous directive 1999/93/EC. It was introduced to Iceland law through act no. 2019/55 [6].
- **ISO 20022** is an ISO standard [2] for electronic data interchange between financial institutions.
- **Kennitala** (often abbreviated as **KT**) is the unique national identification number issued by the Registers Iceland (ic. Þjóðskrá Íslands) and used by governmental bodies and enterprises to identify individuals, and through a comparable schema under the Iceland Revenue and Customs (ic. ríkisskattstjóri), legal entities in Iceland.
- **Kröfupotturinn** (often identified as **IK**) is the domestic billing and claim system supported by all current financial institutions in Iceland. Through the system, claims can be issued against any *kennitala*, and the functionality is similar to the intended *request-to-pay* system in Europe, though services in IK extend beyond that scope.
- **NextGenPSD2 Access to Accounts Framework (NextGenPSD2 Framework or just NextGenPSD2)** is the framework established by *the Berlin Group* to define a common PSD2 compliance interface [4]. Since then parts of the framework have extended beyond compliance, into other Open Banking aspects.
- **The OpenAPI Specification (OAS)** defines a programming language-agnostic interface description for HTTP APIs, which allows both humans and computers to discover and understand the capabilities of a service without requiring access to source code, additional documentation, or inspection of network traffic.

2.3 Payment service directive terms

As the ÍST TS-310 owes much of its core to the NextGenPSD2 framework, the terms found in the OpenAPI specification and this document may reflect that background. Some of the main definitions are included here for context.

- **Payment Services Directive 2 (PSD2)** was instituted by the European Parliament as EU 2015/2366 [8] and meant to further open up payment services on the internal EEA market. It was introduced to Iceland law through act no.

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2021/114 [5]. PSD2 contains regulations of new services to be operated by so-called Third-Party Payment Service Providers on behalf of a Payment Service User, by leveraging Strong Customer Authentication. Due to the lineage connecting PSD2 with IOBWS v3.0, the main terms are described:

- **Account Information Service Provider (AISP)** are *TPPs* with permission to connect to a transaction account and use the information to provide a **Account Information Services (AIS)** as defined in article 67 of EU 2015/2366 [8].
- **Confirmation of the Availability of Funds Service** to be used by Payment Instrument Issuing Service Provider (PIISP) *TPP* as defined by article 65 of EU 2015/2366 [8].
- **Payment Initiation Service Provider (PISP)** can, given customers consent, initiate payments and transactions on their behalf, from their bank account, thereby providing **Payment Initiation Service (PIS)** as defined by article 66 of EU 2015/2366 [8].
- **Payment Service User (PSU)**. The end-user of payment services, and customer of the bank in the IOBWS context.
- **Strong Customer Authentication (SCA)**, refers in the scope of PSD2 to an authentication mechanism based on the use of two or more elements that are independent, so a breach of one does not compromise the others. The recognized elements or factors can be based on:
 - 1) Knowledge, something only the user knows e.g. a password.
 - 2) Possession, something only the user possesses e.g. a particular cell phone and number.
 - 3) Inherence, something the user is or has e.g. a fingerprint or iris pattern.
- **Third Party Provider (TPP)** is referenced in the OpenAPI specification reflecting the PSD2 background when the client system is initiating operations or requesting information on behalf of the end-consumer.

2.4 Data elements

The International Bank Account Number (IBAN) format for Icelandic accounts should follow the specification set forth in ISO 13616-1:2020 [1] as shown in the table ?? below. Description of the implementation of the checksum calculation is outside the scope of this document but should be discernable from the ISO standard and examples available online.

Table 2.1: Icelandic IBAN with example {#tbl:ice_iban}

| | Country Code | Check Digits | National Bank Code | Branch ID | Account type | Account Number | Account Holders Kennitala |
|-------------|--------------|--------------|--------------------|-----------|--------------|----------------|---------------------------|
| Description | IS | 2 digits | 2 digits | 2 digits | 2 digits | 6 digits | 10 digits |
| Example | IS | 14 | 01 | 59 | 26 | 007654 | 5510730339 |

The Unique Claim Identifier references the ID of a claim based on the collection solution Kröfupotturinn. To initiate a payment to settle a claim, or relate transaction information about a previous payment, the claim ID should be formatted as a BBAN, Basic Bank Account Number. The method is shown below in table 2.2. Claim Payments will therefore only include BBAN, not IBAN as a creditor account reference.

Table 2.2: Claim key transformed to BBAN with example

| | Claimant Id (kennitala) | National Bank Code | Branch ID | Fixed ledger Id | Account Number | Delimiter | Due Date |
|-------------|----------------------------|-----------------------|-----------|--------------------|-------------------|-----------|----------|
| Description | 10 digits | 2 digits | 2 digits | 2 digits | 6 digits | Plus sign | DDMMYY |
| Example | 5510730339 | 01 | 59 | 66 | 007654 | + | 311220 |

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3 Implementation

3.1 Service Overview

When the decision was made by TN-FMP-VH-1 on Business Requirments and TN-FMP-VH-2 on Technical Requirements, to adopt the NextGenPSD2 framework the intant was to stay as true to the original specification as possible.

However, not unlike other European adaptations of NextGenPSD2 for domestic use additional functionality was needed to support payment operations and account information expected by the Icelandic market. The original workgroup did so by extending existing schema types in the NextGenPSD2 OpenAPI contract while removing elements and services not directly applicable to IOBWS. The intention was to streamline the specification but developers with previous exposure to NextGenPSD2 found it challenging to understand the implications of the changes. Furthermore, the overall implementation details still remained opaque for those migrating from earlier IOBWS versions so more transparancy was needed.

Workgroup TN-FMP-VH-8 was therefore charged with revising the 3.0 version of IOBWS. The group tried to address two primary concerns: Clarify how the domestic payments and deposits products fit into NextGenPSD2 as well as simplifying comparison against later releases by the Berlin Group. The result should additionally make it straightforward to adapt future updates and consider replacing current domestic adaptations in the IOBWS with newer NextGenPSD2 data elements.

The decision made by the TN-FMP-VH-8 was therefore to keep most of the original NextGenPSD2 OpenAPI definition intact, even those services and types that are not currently applicable to the Icelandic context or intended uses of the IOBWS. The domestic payments and deposits products (see section 3.2.1 and table 3.2 below) are defined separately with applicable JSON schema types, leaving the original e.g. SEPA message types intact. They share the generic data elements along with the 'native' payment types, reusing the services, and operations for payments that are at the core of the NextGenPSD2 specification.

The table 3.1 below list the implications for the OpenAPI YAML contract. It contains the Constents and Signing Basket services, as removing or commenting those out would have had a high impact on the contract structure. They will, however, not be implemented as part of this specification, though this does not preclude their use in other contexts.

Table 3.1: Service support in ÍST TS-310.

| | |
|---|---|
| Payment Initiation Service (PIS) | Supported by all implementors of TS-310 in accordance with the specification (see later notes on Periodic Payments). |
| Account Information Service (AIS) | Supported by all implementors of TS-310 in accordance with the specification. |
| Confirmation of Funds Service (PIIS) | Supported by all implementors of TS-310, in accordance with the specification. |
| Consent Service | Explicitly not part of the TS-310 specification, but included for comparison and compatability with the NextGenPSD2 OpenAPI contract. |
| Signing Baskets Service (SBS) | Explicitly not part of the TS-310 specification, but included for comparison and compatability with the NextGenPSD2 OpenAPI contract. |

3.2 Payment Initiation Service

3.2.1 Overview

The domestic payments and deposits products supported by ÍST TS-310 are as shown in table 3.2 below. All those are defined as JSON objects, and other payment types are not supported by the specification.

What is usually classified as instant credit transfers are the only available payment type in Iceland for an account to account transfer between domestic banks. The reference to 'instant' does not preclude additional business rules applying within each bank for e.g. future payments or high-value payment processing, or variations in the payment lifecycle within e.g. the 'end-of-business-day' window. This could result in consumers of the IOBWS ÍST TS-310 services being exposed to intermediary transaction status codes during steps in the payment execution, some of which have not previously been visible or mapped in IOBWS return codes. Later changes in Core Banking Services and Clearing and Settlement Mechanisms might also affect statuses returned so consumers, so all of the available by the specification should be expected.

Table 3.2: Domestic payment products.

| | |
|------------------------------|--|
| Credit Transfers | Credit transfer of an amount between two accounts within the same bank or between two domestic banks. |
| Claim Payments | Make a withdrawal from an account to pay a claim (e.g. a bill). The claim can be created in any domestic bank. |
| Payment Card Deposits | Make a withdrawal from an account to pay onto the account behind a payment card, within the same bank or between two domestic banks. |

For each of the payment products, the support for payment services is given in table 3.3. Periodic payments are distinct from future dating a payment, which is supported in a similar manner to previous versions of IOBWS as part of creating a payment (see `requestedExecutionDate`). At this time, behaviour for periodic payments is not supported by the ÍST TS-310.

Table 3.3: Availability of payment service.

| | |
|--------------------------|---|
| payments | Supported by all implementors of TS-310 in accordance with the specification, for all domestic payment products. |
| bulk-payments | Supported by all implementors of TS-310 in accordance with the specification, for all payment products. |
| periodic-payments | Explicitly not part of the TS-310 specification, but included for comparison and compatability with the NextGenPSD2 OpenAPI contract. |

3.2.2 Domestic Payment Product Data Elements

The elements listed in table 3.4 are used in the domestic payment products under scope for ÍST TS-310. The schema type *paymentInitiationDomestic_json* should be used to define JSON data instances.

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Table 3.4: Data elements for domestic payments.

| Data Element | Credit Transfers | Claim Payments | Credit Card Deposits |
|--|-------------------------|-----------------------|-----------------------------|
| endToEndIdentification | Optional | Optional | Optional |
| instructionIdentification | Optional | Optional | Optional |
| debtorAccount | Mandatory | Mandatory | Mandatory |
| debtorId | Optional | Optional | Optional |
| chargesAccount | N/A | N/A | N/A |
| ultimateDebtor | Optional | Optional | Optional |
| ultimateDebtorId | Optional | Optional | Optional |
| instructedAmount | Mandatory | Mandatory | Mandatory |
| creditorAccount | Mandatory | Mandatory | Mandatory |
| creditorAgent | N/A | N/A | N/A |
| creditorAgentAddress | N/A | N/A | N/A |
| creditorName | N/A | N/A | N/A |
| creditorId | Optional | Optional | Optional |
| creditorAddress | N/A | N/A | N/A |
| ultimateCreditor | Optional | Optional | Optional |
| ultimateCreditorId | Optional | Optional | Optional |
| icelandicPurposeCode | Optional | Optional | Optional |
| chargeBearer | N/A | N/A | N/A |
| remittanceInformationUnstructured | Optional | Optional | Optional |
| remittanceInformationStructured | Optional | Optional | Optional |
| requestedExecutionDate | Optional | Optional | Optional |
| partialPayment | N/A. | Mandatory | N/A. |
| serviceLevel | N/A | N/A | N/A |
| centralBankPurposeCode | N/A | N/A | N/A |

To elaborate on the use of particular attributes the following table 3.5 contains additional information on top of the schema definitions. Notes on individual data elements or usage patterns follow in the subsections.

Table 3.5: Detailed description of ÍST TS-310 payments properties.

| Field | Description |
|----------------------------------|--|
| endToEndIdentification | Intended for ID, short message or description that will be communicated to the creditor, across different banks. It replaces the BillNumber or bill number field in previous IOBWS version (ic. <i>seðilnúmer</i> , TNUM_I/TNUM_U). While supporting 35 characters, only the first 7 chars can reliably flow between all possible CB systems, reports, and even client systems, due to legacy expectations and implementations. |
| instructionIdentification | Unique identification, assigned by the debtor to unambiguously identify the instruction and to be communicated for correlation in payment status information, though not available in later transaction details. This field therefore plays a similar role to BookingID in earlier IOBWS versions. |
| debtorAccount | Debtor account is the account money is being transfer from. |
| debtorId | For the domestic payment products, this element should contain the kennitala of the debtor, owner of the debtorAccount. |
| ultimateDebtor | Ultimate Debtor identifies the party that owes the cash to the creditor, e.g. as a result of receipt of goods or services. Used in those cases where it is different from the debtor/payor. |
| ultimateDebtorId | Ultimate Debtor identifies the party that owes the cash to the Creditor as a result of receipt of goods or services. Ultimate debtor kennitala is included when different from the debtor Id. |
| instructedAmount | Amount and currency to be transferred. |
| creditorAccount | Creditor account is the account used to transfer money to Beneficiary's account. In the case of a claim payment, this would be contain the claim key represented as a BBAN number. |
| creditorId | Used for the kennitala of the creditor, whose account is credited with the payment. As the kennitala is part of the Icelandic IBAN, and BBAN numbers, this is an optional field. |
| creditorName | The creditor name is optional and ignored when kennitala is part of the Icelandic IBAN, and BBAN numbers, or provided in creditorId. |
| creditorAddress | The creditor address is not needed in domestic payments where kennitala can be used as lookup key through the National Registry. |
| ultimateCreditor | The creditor (for example a finance company or an intermediary in a business transaction), may be different from the ultimate creditor. The debtor can enter who the final/real beneficiary of the payment is. In the case of Payment Card Deposit using masked PAN, ultimate Creditor contains the owner of the card. |

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| Field | Description |
|--|--|
| ultimateCreditorId | Contains the kennitala of the intended beneficiary of the payment. In the case of Payment Card Deposits using masked PAN the Ultimate Creditor ID contains kennitala of the card owner. |
| icelandicPurposeCode | The purpose is the equivalent of the category code (ic. <i>textalykill</i>) used to classify the transaction. Restricted to codes available in each originating bank. |
| remittanceInformationStructured | The debtors's information about the payment. An array of remittance elements but currently only used for the equivalent of the IOBWS 2.0 Out.Reference (ic. <i>tilvísun</i>). This single array element must be of type 'TILV_U' Previously the equivalent data element was mainly used for the kennitala of the creditor, now a separate parameter. It can however convey other information and therefore included. |
| remittanceInformationUnStructured | Is used for payment description visible for both parties. Only 16 characters can currently be expected to reliably flow between all systems, even if the field accepts 140 characters. Replaces Description in previous IOBWS SOAP schema. |
| requestedExecutionDate | Execution date if in the future, fully equivalent to the IOBWS v2.0 requestedExecutionDate for future payments (ic. <i>framvirk greiðsla</i>). |
| partialPayment | Applies to Claim Payments when the debtor intends to only pay part of the amount owed, towards an existing claim. The claim needs to allow partial payment, else an error occurs. |

The remittanceInformationStructured mentioned in table 3.5 is only used currently to carry the debtor's payment reference. For identification the **type** is set to TILV_U, which helps clearly identify this information.

Listing 3.1: Example of the *remittanceInformationStructured* data element.

```
1 remittanceInformationStructured: [  
2   {  
3     reference: "Maximum 16 chars"  
4     type: "TILV_U"  
5   }  
6 ]
```

3.3 Bulk Payments

Bulk payments are supported for all ÍST TS-310 payment types. For a bulk payment all collected payments shall be based on the same payment product, consistent with the approach of the NextGenPSD2 framework. The *bulkPaymentInitiationDomestic_json* schema type should be used for the top level bulk initiation according to ÍST TS-310 and the *paymentInitiationBulkElementDomestic_json* type for the child payments contained in an array on the parent.

The domestic bulk types allow for specifying separate debtor accounts on child payment elements, when *batchBookingPreferred* is false on the parent and the *debtorAccount* consequently not included on the bulk initiation top element. When the

batchBookingPreferred element is set to true, the *debtorAccount* must be either not included on the child payments or set to the exact same account as on the *bulkPaymentInitiationDomestic_json* instance, or an error will be returned.

Table 3.6: Description of domestic bulk payment main body.

| Data Element | Type | Condition | Description |
|-------------------------------|-------------------|-----------|--|
| batchBookingPreferred | Boolean | Optional | When the element is included and set to true, the debtor prefers only one booking entry, and debtorAccount must be included. If this element equals false, or is not included, the debtor prefers individual booking of payments, and each must include debtorAccount. supplied here but preferably not on the individual payments in the child collection. |
| paymentInformationId | Max35Text | Optional | Unique identification assigned by the sending party to unambiguously identify this bulk. Replaces NameOfBatch in IOBWS 2.0 and 3.0, as well as PaymentsID that was generated by the receiving bank. Note: This attribute might be considered mandatory in future versions of the specification. |
| requestedExecutionDate | ISODate | Optional | Determines if the payments contained in the bulk will be executed at the given, later date. |
| payments | Bulk Entry | Mandatory | The Bulk Entry is a JSON Type which mirrors the supported domestic payment products for single payments, excluding the data element requestedExecutionDate. DebtorAccount should also be excluded if batch booking is preferred, but mandatory if either batchBookingPreferred is 'false' or the element missing. |
| chargesAccount | Account Reference | N/A | |

3.4 Payment Bulk Errors

The NextGenPSD2 framework [4] has a structured approach to messages that convey information related to specific HTTP return codes. These should be largely transparent to consumer of ÍST TS-310 services implementations. The domestic adaptation, however, defines comparable message properties on the status response for bulk payment data elements in *bulkPaymentInitiationElementDomesticWithStatus*. The listing in 3.2 shows an example of such a response.

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Listing 3.2: Example of bulk status response with errors on sub-elements.

```
1 {
2   "batchBookingPreferred": false,
3   "paymentInformationId": "75BA1A88418445C0BE88AABFBEEEE230",
4   "requestedExecutionDate": "2020-08-01",
5   "payments": [
6     {
7       "endToEndIdentification": "Short description",
8       "instructionIdentification": "my_payment_1",
9       "resourceId": "my_payment_1_uid",
10      "debtorId": "0208714669",
11      "debtorAccount": {
12        "iban": "IS40100100103307118608"
13      },
14      "instructedAmount": {
15        "currency": "ISK",
16        "amount": "1235"
17      },
18      "creditorId": "0208714669",
19      "creditorAccount": {
20        "bban": "030013000001"
21      },
22      "icelandicPurposeCode": "87",
23      "remittanceInformationUnstructured": "My description"
24    },
25    {
26      "endToEndIdentification": "Short description",
27      "instructionIdentification": "my_payment_2",
28      "debtorId": "0208714669",
29      "debtorAccount": {
30        "iban": "IS40100100103307118608"
31      },
32      "instructedAmount": {
33        "currency": "ISK",
34        "amount": "1235"
35      },
36      "creditorId": "0208714669",
37      "creditorAccount": {
38        "bban": "045126123456"
39      },
40      "icelandicPurposeCode": "87",
41      "remittanceInformationUnstructured": "My description",
42      "errors": {
43        "tppMessages": [
44          {
45            "category": "ERROR",
46            "code": "DEBTOR_ACCOUNT_NOT_FOUND",
47            "path": "https://github.com/stadlar/IST-FUT-FMTH/PIS/ErrorCodes",
48            "text": "Úttektarreiðingur ekki til"
49          },
50          {
51            "category": "ERROR",
52            "code": "FORMAT_ERROR",
53            "path": "https://github.com/stadlar/IST-FUT-FMTH/PIS/ErrorCodes",
54            "text": "Eigin villa banka"
55          }
56        ],
57        "_links": {
58          "self": {
59            "href": "/v1/payments/credit-transfers/1234-wertiq-983"
60          }
61        }
62      }
63    },
64  ],
65   "transactionStatus": "ACTC"
66 }
```


4 Accounts Service

The way account transaction information is retrieved bears strong similarities to the previous versions of IOBWS while adapted from the Berlin Group NextGenPSD2 framework.

When querying information about domestic accounts, there exists an option to additionally request information on the allowed credit limit (*withCreditLimitQuery* data element). This matches what Icelandic banks offer as “yfirdráttarheimild”, which refers to an applied overdraft limit. The returned data element is named *creditLimit*, to avoid confusion associated the simply named “Overdraft” used in previous IOBWS versions.

Listing 4.1: Example of information about an account with credit limit

```

1  {
2    "balances":[
3      {
4        "balanceAmount":{"currency":"ISK", "amount": "1000.00"},
5        "balanceType":"interimBooked"
6      },
7      {
8        "balanceAmount":{"currency": "ISK", "amount": "300.00"},
9        "balanceType":"interimAvailable"
10     },
11     {
12       "balanceAmount":{"currency":"ISK", "amount": "5300.00"},
13       "balanceType": "interimAvailable",
14       "creditLimitIncluded": true
15     }
16   ]
17 }
```

The definition of the transaction details returned as a list, includes elements that are applicable to the relatively broad range of use cases the NextGenPSD2 covers. In table 4.1 the elements that are applicable to the domestic context and might need further explanation are given further description.

Table 4.1: Description of transaction details.

| Field | Rule | Description |
|--------------------------|-----------|---|
| transactionId | Mandatory | Unique identifier for this record. |
| entryReference | Mandatory | Payment Correlation ID. |
| endToEndId | Optional | Short description. |
| currencyExchange | Optional | Returned when the transaction relates to any currency exchange. |
| bookingDate | Optional | The date when the entry was booked. |
| valueDate | Mandatory | The date at which assets became available. |
| transactionAmount | Mandatory | Amount and currency of this record. |
| creditorId | Optional | Creditor ID, or kennitala. |
| creditorName | Optional | Creditor name. |
| creditorAccount | Optional | Creditor account. |

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| Field | Rule | Description |
|--|-----------|--|
| creditorAgent | Optional | The BICFI, Business Identifier Code of the financial institution, or other organization identification. |
| ultimateCreditor | Optional | Ultimate creditor. |
| debtorName | Optional | Debtor name. |
| debtorAccount | Optional | Debtor account. |
| debtorAgent | Optional | The BICFI, Business Identifier Code of the financial institution. |
| ultimateDebtor | Optional | Ultimate debtor. |
| remittanceInformationUnstructured | Optional | Payment description visible for both parties. |
| remittanceInformationStructured | Optional | Array of remittance, though only used currently for the 16 character debtor reference. |
| additionalInformation | Optional | Additional transaction related information. |
| purposeCode | N/A | Not returned as these codes have currently not been adapted to the uses that the Icelandic purpose code covers. Future Core Banking or Clearing changes might affect this. |
| bankTransactionCode | N/A | Not used currently for similar reasons as purposeCode. |
| proprietaryBankTransactionCode | N/A | Not used currently, similar to the previous purposeCode and bankTransactionCode. |
| balanceAfterTransaction | Optional | Balance after the transaction has been performed |
| _links | Optional | Link to transaction details |
| transactionTimestamp | Mandatory | Execution datetime of the record. |
| ultimateCreditorId | Optional | Ultimate creditor kennitala as applicable. |
| debtorId | Optional | Debtor kennitala. |
| ultimateDebtorId | Optional | Ultimate debtor kennitala. |
| icelandicPurpose | Optional | Returns the text codes used as simple transaction categorization, (ic. <i>textalykill</i>), with description. |

An example of how this would look for a domestic account is provided in listing 4.2. For other examples please refer to the IOBWS YAML schema.

Listing 4.2: Example result of a transaction detail query.

```

1  {
2    "account": {"iban": "IS060537260002062306671449" },
3    "transactions":
4      {
5        "booked":
6          [{
7            "transactionId": "1234567",
8            "creditorName": "Jón Jónsson",
9            "creditorAccount": {"iban": "IS67100100101306118605"},
10           "transactionAmount": {"currency": "ISK", "amount": "256.67"},
11           "bookingDate": "2017-10-25",
12           "valueDate": "2017-10-26",
13           "remittanceInformationUnstructured": "Example 1"
14         },{
15           "transactionId": "1234568",
16           "debtorName": "LiljaPÍ Kristjánsdóttir",
17           "debtorAccount": {"iban": "IS620511040000171105551489"},
18           "transactionAmount": {"currency": "ISK", "amount": "343.01"},
19           "bookingDate": "2017-10-25",
20           "valueDate": "2017-10-26",
21           "remittanceInformationUnstructured": "Example 2"
22         }],
23       "pending":
24         [{
25           "transactionId": "1234569",
26           "debtorName": "LiljaPÍ Kristjánsdóttir",
27           "debtorAccount": {"iban": "IS620511040000171105551489"},
28           "transactionAmount": {"currency": "ISK", "amount": "-100.03"},
29           "valueDate": "2017-10-26",
30           "remittanceInformationUnstructured": "Example 3"
31         }],
32       "_links": {"account": {"href": "/v1/accounts/3dc3d5b3-7023-4848-9853-f5400a64e80f"}}
33     }
34   }

```

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5 Confirmation of Funds

The service offers functionality to check if funds up to a certain amount are available on a payment account. This can be useful when such a check is desired before initiating a payment or account transfer with all the associated processing overhead.

Table 5.1: Description of confirmation of funds payload.

| Field | Rule | Description |
|-------------------------|-----------|---|
| account | Mandatory | The account number of the creditor. |
| instructedAmount | Mandatory | Transaction amount to be checked, as determined to be available by the applicable business rules. |

ÍST TS-310 only supports the elements shown in table 5.1 for confirmation of funds request and consequently applies only to payment accounts. Card accounts are currently not supported and are only included in the OpenAPI schema for compatibility with the source framework. Further business rules on what constitutes availability of funds might apply per financial institutions for particular account types. An example of a request for confirmation of funds is shown below.

Listing 5.1: Example result of a confirmation of funds query. TODO: Verify

```
1 {
2   "account": {"iban": "IS060537260002062306671449"},
3   "instructedAmount": {"currency": "ISK", "amount": "1234"}
4 }
```

The answer consists of a boolean value and is only valid at the particular point in time it is returned. A positive answer does not imply or include any reservation of said amount.

Listing 5.2: Example result of a confirmation of funds response.

```
1 {
2   "fundsAvailable": "true"
3 }
```

6 Payment processing flow

The NextGenPSD2 framework [4] includes a handful of authentication methods that can be combined into authorisation flow mostly geared towards intermediary service providers acting on behalf of end-users. ÍST TS-310 addresses the needs of IOBWS by adding an “IOBWS” method for confirming authorisation and defining that as the only supported transaction flow when authorising payments. It deviates from what was supported in the previous IOBWS standards by separating payment initiation and authorisation. This makes it possible for consumers of IOBWS version 3 to implement variations in their business logic through a two-step process. No payments created with an initiation request will be automatically authorised and processed without an explicit confirmation in a later step. The main scenarios supported are e.g. an immediate authorisation after initiation which will be executed using straight-through processing (STP), as well as a variation of the decoupled flow where the authorisation takes place in the UI of the mobile app or online banking Web interface offered by the bank.

To simplify the usage of the APIs and to distinguish the IOBWS approach from e.g. the NextGenPSD2 Decoupled transaction flow, ÍST TS-310 considers the authorisation resources associated with a payment initiation to be implicitly created at the time of the original initiation request. This means payments can be directly confirmed without an intermediary step to create an authorisation resource, which would then trigger straight-through processing for an initiated payment. ÍST TS-310 does not include specific authorisation for cancelling payments.

In decoupled IOBWS scenarios, payments would be available for confirmation in the appropriate user interface immediately after initiation. This matches the decoupled SCA method in the NextGenPSD2 framework but without having to explicitly create the authorisation resources. The end result also closely aligns with how most banks handle similar cases in support of earlier IOBWS versions.

In fig. 6.1 an example of accounting system is shown using the IOBWS flow. The system would use OAuth 2.0 Client Credentials Grant Flow and authenticate itself over the transport using mutual TLS (mTLS) with an eIDAS compliant certificate, identifying the legal entity or person the system it is representing. Certificates issued by Auðkenni ehf. under the “Traustur búnaður” intermediary are the common denominator supported by all IOBWS service providers.

The first initiation would receive a response in line with the one below, and the header ASPSP-SCA-Approach contains the method “IOBWS”.

Listing 6.1: Example of a response containing a link to the confirmation resource.

```

1  {
2    "transactionStatus": "RCVD",
3    "paymentId": "1234-b2b-983",
4    "_links":
5      {
6        "self": {"href": "/v1/payments/claim-payments/1234-b2b-983"},
7        "status": {"href": "/v1/payments/1234-b2b-983/status"},
8        "scaStatus": {"href": "/v1/payments/1234-b2b-983/authorisations/123auth456"},
9        "confirmIobwsStraightThroughProcessingAuthorisation": {"href": "/v1/payments/1234-b2b-983/authorisations/123auth456"}
10     }
11  }
```

The confirmation of the payment initiation takes the form a PUT update to the authorisation resource, using the “iobwsAuthorisationConfirmation” type. The confirmation message is an optional description that might potentially be used by service implementors for display in a UI available to users e.g. for decoupled authorisations, to communicate the method used to approve these payments.

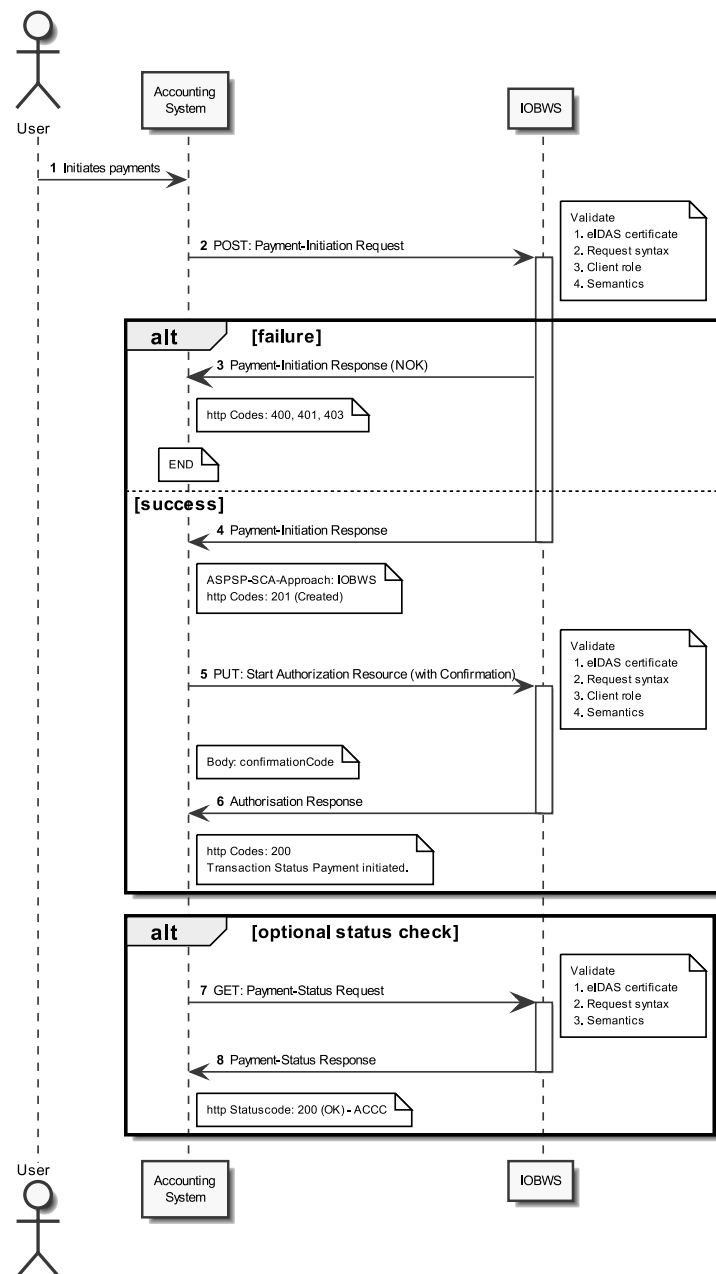


Figure 6.1: IOBWS authorisation flow with confirmation

Listing 6.2: Example of an IOBWS authorisation confirmation,

```
1 {  
2   "confirmationMessage": "Confirmed by the automatic ERP system."  
3 }
```

The response to the confirmation is shown below:

Listing 6.3: Example of authorisation confirmation return.

```
1 {  
2   "scaStatus": "finalised",  
3   "_links": {  
4     "status": { "href": "/v1/payments/claim-payments/1234-b2b-983/status" }  
5   }  
6 }
```

Optionally the links given can be used to check the status of payments, resulting in the response below. The transaction status “ACCC” stands for “AcceptedSettlementCompleted” in the case when both debtor and creditor accounts have been settled. However, as mentioned before the full range of codes are available and could potentially apply.

Listing 6.4: Example of a payment status query response.

```
1 {  
2   "transactionStatus": "ACCC"  
3 }
```

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7 Appendix

7.1 Mapping from older implementations

The ISO 20022 data model uses different terms than the previous versions of IOBWS. Included here is a non-authoritative guide to mapping older implementations over the version 3.0. An overview of the mapping from the previous entities and data elements, over to the new implementation

7.1.1 Payments

Payments is the IOBWS 2.0 bulk entity, containing the same child *Payment* data entities that can be used to issue individual payments.

| Entity/Element | Equivalent data element | Comment |
|----------------------|-------------------------|---|
| RollbackOnError | <i>No equivalent.</i> | Bulks are executed as a whole and not rolled back, but individual errors reported on each payment in the results. |
| IsOneToMany | batchBookingPreferred | |
| DateOfForwardPayment | requestedExecutionDate | |
| NameOfBatch | paymentInformationId | |

7.1.2 Payments Out

Encapsulates the debtor side of the payment transfer, for a single payment or child-payment in a bulk.

| Entity/Element | Equivalent data element | Comment |
|----------------|---------------------------------|--|
| Account | debtorAccount > iban | The withdrawal should reference the iban number of the debtor account owner. |
| AccountOwnerID | debtorId | |
| CategoryCode | icelandicPurposeCode | |
| Reference | remittanceInformationStructured | |
| BillNumber | endToEndIdentification | |
| Receipt | <i>No equivalent.</i> | |
| SecurityCode | <i>No equivalent.</i> | Strong authentication replaces this as a security mechanism. |

7.1.3 Payments In

Encapsulates the credit side of the payment transfer.

| Entity/Element | Equivalent data element | Comment |
|-------------------|-----------------------------------|-----------------------|
| ABGiro | | See subsection 7.1.4. |
| CGiro | | See subsection 7.1.5. |
| Claim | | See subsection 7.1.6. |
| Transfer | | See subsection 7.1.8. |
| Amount | instructedAmount | |
| Receipt | <i>No equivalent</i> | |
| Description (sic) | remittanceInformationUnStructured | |
| BookingID | instructionIdentification | |

7.1.4 ABGiro

When paying an AB Giró use the following pattern.

| Entity/Element | Equivalent data element | Comment |
|----------------|-------------------------|--|
| Account | creditorAccount > bban | As in the older schemas, AB Giro is identified with a bban number. |
| Reference | <i>No equivalent</i> | Usually used for debtorId, which now is a separate field. |
| BillNumber | endToEndIdentification | |
| CategoryCode | icelandicPurposeCode | |

7.1.5 CGiro

When paying C-Giro, use the following pattern.

| Entity/Element | Equivalent data element | Comment |
|----------------|-------------------------|--|
| Account | creditorAccount > bban | As in the older schemas, AB Giro is identified with a bban compliant number. |
| AccountOwnerID | creditorId | |
| BillNumber | endToEndIdentification | |
| CategoryCode | icelandicPurposeCode | |

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7.1.6 Claim

The format for claim is *Claim* inniheldur upplýsingar um innheimtukröfu.

| Entity/Element | Equivalent data element | Comment |
|----------------|-------------------------|--|
| Account | | See data element table 2.2. |
| Claimant | | table 2.2 |
| PayorID | ultimateCreditorId | The creditor could potentially be another party than the <i>kröfugreiðandi</i> entity whose <i>kennitala</i> is sometimes used as part of the claim key. |
| DueDate | | table 2.2 |
| IsDeposit | partialPayment | |

7.1.7 Bond

Klasinn *Bond* inniheldur upplýsingar um skuldabréf/víxil.

| Entity/Element | Equivalent data element | Comment |
|----------------|-------------------------|---|
| Account | creditorAccount > bban | As in the older schemas, bonds are identified with a bban compliant number. |
| PayorID | ultimateCreditorId | The creditor could potentially be another party than the <i>kennitala</i> set as the payee of the bond. |
| DueDate | <i>No equivalent.</i> | |

7.1.8 Transfer

Klasinn *Transfer* inniheldur upplýsingar um millifærslu.

| Entity/Element | Equivalent data element | Comment |
|----------------|-------------------------|---|
| Account | creditorAccount > bban | The target account can be identified with a bban compliant number or full iban. |
| AccountOwnerID | creditorId | |
| CategoryCode | icelandicPurposeCode | |
| Reference | <i>No equivalent</i> | Usually used for debtorId, which now is a separate field |
| BillNumber | endToEndIdentification | |

7.2 Domestic adaptations of the NextGenAPI framework

As mentioned, one of the guiding principles for ÍST TS-310 was to make the specification for domestic payments and accounts easy to compare against the original Berlin Group NextGenPSD2 document, and its future versions. In the first iteration of version 3.0, the OpenAPI definition however involved cards and currencies, making the overall contract even more complex than the original. The base was then referencing NextGenPSD2 version 1.3.6 but though upgrading to 1.3.8 was desired, it had turned out to be a considerable task. To facilitate maintenance of the specification throughout minor version updates, as well as simplifying implementations of IOBWS, the cards and currencies APIs were split into their own separate contracts, and the domestic adaptations reworked on top of an intact version 1.3.6. This approach was then validated, by upgrading to NextGenPSD2 version 1.3.8 without undue roadblocks.

To make it even easier to do see the deltas in e.g. text comparison tools, localized version of the source NextGenPSD2 API specifications are stored in appropriate “Stuðningsefni/Berlin-group/v.1.3.8” folder. Alongside that document, there was created an intermediary document with some of the most common and repeated adaptations. The relationship between these documents looks like the following, though the actual filenames are longer:

```
psd2-api 1.3.8 <|-- psd2-api 1.3.8 localized <|-- IOBWS3.0.yaml
```

The ‘localized’ document makes comparison in the final IOBWS3.0.yaml more transparent but in the following sections we further breakdown *all adaptations* made for Icelandic payments and accounts:

7.2.1 The localized file

Changes between “psd2-api 1.3.8 2020-12-14v2.yaml” and “psd2-api 1.3.8 2020-12-14v2-localized.yaml” (see Stuðningsefni/Berlin-group/v.1.3.8) . - Tag “Common Services” was removed completely, both the definition and all usage in Tags. - Tags on Consents services changed from “Account Information Service (AIS)” to “Consent Service” - “Signing Baskets (SBS)” Tag renamed to “Signing Baskets Service (SBS)”

The IOBWS3.0 specification document

Changes between “psd2-api 1.3.8 2020-12-14v2-localized.yaml” and “IOBWS3.0.yaml” (see final in /Deliverables).

Services:

- Path: “/v1/accounts”
 - Query Parameter: WithCreditLimitQuery - added
 - Header Parameter: ConsentId changed from Required to Optional
 - Path: “/v1/accounts/{account-id}”
 - Query Parameter: WithCreditLimitQuery - added
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/accounts/{account-id}/balances”
 - Header Parameter: ConsentId changed from Required to Optional
 - Path: “/v1/accounts/{account-id}/transactions”
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/accounts/{account-id}/transactions/{transactionId}”
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/card-accounts”
 - Query Parameter: WithCreditLimitQuery - added

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- Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/card-accounts/{account-id}”
 - Query Parameter: WithCreditLimitQuery - added
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/card-accounts/{account-id}/balances”
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/card-accounts/{account-id}/transactions”
 - Header Parameter: ConsentId changed from Required to Optional
- Path: “/v1/{payment-service}/{payment-product}”
 - Only json, domestic types listed as ‘oneOf’ the accepted products
 - Header Parameter: Idempotency-Key - added

Components:

- paymentInitiation:
 - oneOf:
 - * #/components/schemas/paymentInitiationDomestic_json - Added
 - * #/components/schemas/periodicPaymentInitiationDomestic_json - Added
 - * #/components/schemas/bulkPaymentInitiationDomestic_json - Added
- accountDetails
 - creditLimit - added
- transactions:
 - transactionTimestamp - added
 - description - added
 - ultimateCreditorId - added
 - debtorId - added
 - ultimateDebtorId - added
 - icelandicPurpose - added
- cardTransaction:
 - posEntryMode - added

Schema types added for domestic payments and account information: - ultimateDebtorId - ultimateCreditorId - partial-Payment - posEntryMode - bank - transactionFeesList - transactionFeesDetail - icelandicPurpose - centralBankPurpose - bicfiOrIdentification

Request bodies added for Domestic objects: - paymentInitiationDomestic_json - periodicPaymentInitiationDomestic_json - bulkPaymentInitiationDomestic_json - paymentInitiationBulkElementDomestic_jsonResponse added - paymentInitiationPaymentIdResponse-200_json

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