

PR-zero Payment Request Documents

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2022-09-16

Overview

This document specifies the **PR-zero** document format for payment requests.

PR-zero is a machine-readable format for Swaptacular payment requests, which has been specifically designed to be very compact, so that payment requests in this format can be presented as QR Codes, and scanned by the payer at the point-of-sale.

Note: The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

PR-zero Documents Structure

PR-zero documents are UTF-8 encoded text documents, which match the regular expression specified below. Whitespaces and comments have been added for readability:

```
^PRO\r?\n                # PRO header
(?:<crc32>(?:[0-9a-f]{8})?)\r?\n # optional CRC-32 value
(?:<accountUri>.{0,200})\r?\n # payee's account
(?:<payeeName>.{0,200})\r?\n # payee name
(?:<amount>\d{1,20})(?:\r?\n # requested amount
(?:<deadline>.{0,200})(?:\r?\n # payment deadline
(?:<payeeReference>.{0,200})(?:\r?\n # payee reference
(?:<reasonFormat>[0-9A-Za-z.-]{0,8})(?:\r?\n # reason format
(?:<reason>[\s\S]{0,3000}) # reason for the payment
)?)?)?)?$
```

As can be seen, the basic structure of **PR-zero** documents is such that each line contains different kind of information about the payment request (a different "data field"), as follows:

Optional CRC-32 value

When reading a PR-zero document, if the "optional CRC-32 value" line is not empty, the contained value MUST be compared to the CRC-32 (Cyclic Redundancy Check) value calculated for the document. If the two values differ, the document MUST be treated as invalid.

The CRC-32 value for the document is calculated as follows:

1. The textual content of the document is UTF-8 encoded.
2. The first two lines of the document are removed. That is: the "PR0 header" line, and the "optional CRC-32 value" line.
3. The CRC-32 algorithm is executed on the remaining bytes, producing a 32-bit number.
4. The produced 32-bit number is formatted as a lowercase hexadecimal number, which contains exactly 8 characters. If necessary, leading zeros are added.

Payee's account

The "payee's account" line MUST contain an `swpt`¹ URI, which uniquely identifies the payee's account.

Payee name

The "payee name" line contains the name of the payee. This MAY be an empty string.

Requested amount

The "requested amount" line MUST contain an integer number between 0 and 9223372036854775807 ($2^{63} - 1$), which represents the requested amount in *raw currency tokens*².

Payment deadline

The "payment deadline" line MUST contain either an empty string, or the deadline for the requested payment, formatted as an ISO 8601 timestamp.

Payee reference

The "payee reference" line contains a short string that the payer should include in the transfer note for the payment, so that the payee can match the incoming

¹The `swpt` URI scheme is defined in a separate document.

²"Raw currency tokens" are the 64-bit numbers that the Swaptacular Messaging Protocol uses to represent currency amounts. Usually, before being shown to the user, these raw numbers will be divided by some (usually big) number. For example, the raw number 2500 could be shown to the user as "25 USD".

transfer with the corresponding payment request. For example, this could be an invoice number. The payee reference MAY be an empty string.

Reason format

The "reason format" line contains a short string that indicates how the remaining document content (the "reason for the payment" field) should be interpreted. The reason format MAY be an empty string, which indicates "plain text".

Important note: All standard *transfer note formats*³ can be used as "reason format"s too. That is: the same format names correspond to the same formats.

Reason for the payment

The "reason for the payment" field may contain multiple lines, which can be used to describe the reason for the payment. The manner in which this field will be interpreted depends on the specified "reason format" (see above).

This MAY be an empty string.

An Example PR-zero Document

PR0

```
swpt:112233445566778899/998877665544332211
Payee Name
1000
2021-07-30T16:00:00Z
payee-reference-12345
```

This is a description of the reason for the payment. It may contain multiple lines. Everything until the end of the file will be considered as part of the description.

Size of PR-zero Documents

Because PR-zero documents are designed to be presented as QR Codes, there are severe practical limitations on their size. Also, for the convenience of the users, some *Currency Holder UI* implementations will try to include all the available information from the payment request, in the *transfer note* for the

³In Swaptacular, every transfer can have a *transfer note*. The "transfer note" is a textual message that contains information which the sender wants the recipient of the transfer to see. In addition to the transfer note, the sender can specify a *transfer note format*, which is a short string that indicates how the content of the corresponding transfer note should be interpreted. The sender of each transfer can choose among a multitude of standard *transfer note formats*. Every transfer note format is identified by a short string — the format's name. Transfer note format names match the regular expression: `^[0-9A-Za-z.-]{0,8}$`

payment. Because of this, the combined byte-length of the "payee name", "payee reference", "reason format", and "reason for the payment" fields SHOULD be at least 50 bytes smaller than the maximum byte-length for transfer notes.

Note: The maximum byte-length for transfer notes may vary from currency to currency.⁴

MIME Type

Over HTTP connections, PR-zero documents MUST be transferred with the `application/vnd.swaptacular.pr0` MIME type.

⁴The maximum byte-length for transfer notes in a given currency, will be determined by the value of the `transfer_note_max_bytes` field in Swaptacular Messaging Protocol's `AccountUpdate` messages.