The 'payto' URI scheme for payments
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Abstract

   This document defines the 'payto' Uniform Resource Identifier (URI)
   scheme for designating targets for payments.

   A unified URI scheme for all payment target types allows applications
   to offer user interactions with URIs that represent payment targets,
   simplifying the introduction of new payment systems and applications.

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1. Introduction

    This document defines the 'payto' Uniform Resource Identifier (URI)
    [RFC3986] scheme for designating transfer form data for payments.

1.1. Objective

    A 'payto' URI always identifies the target of a payment. A 'payto'
    URI consists of a payment target type, a target identifier and
    optional parameters such as an amount or a payment reference.

    The interpretation of the target identifier is defined by the payment
    target type, and typically represents either a bank account or an
    (unsettled) transaction.

    A unified URI scheme for all payment target types allows applications
    to offer user interactions with URIs that represent payment targets,
    simplifying the introduction of new payment systems and applications.

1.2. Requirements Language

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
   "OPTIONAL" in this document are to be interpreted as described in BCP
   14 [RFC2119] [RFC8174] when, and only when, they appear in all
   capitals, as shown here.

2. Syntax of a 'payto' URI

   This document uses the Augmented Backus-Naur Form (ABNF) of
   [RFC5234].

```
     payto-URI = "payto://" authority path-abempty [ "?" opts ]
     opts = opt *( "&" opt )
     opt = (generic-opt / authority-specific-opt) "=" *pchar
     generic-opt = "amount" / "receiver-name" / "sender-name" /
                   "message" / "instruction"
     authority-specific-opt = ALPHA *( ALPHA / DIGIT / "-" / "." )
     authority = ALPHA *( ALPHA / DIGIT / "-" / "." )
```

   'path-abempty' is defined in [RFC3986] in Section 3.3. 'pchar' is
   defined in [RFC3986], Appendix A.

3. Semantics

   The authority component of a payment URI identifies the payment
   target type. The payment target types are defined in the "Payment
   Target Types" sub-registry, see Section 9.2. The path component of
   the URI identifies the target for a payment as interpreted by the
   respective payment target type. The query component of the URI can
   provide additional parameters for a payment. Every payment target
   type SHOULD accept the options defined in generic-opt. The default
   operation of applications that invoke a URI with the payto scheme
   MUST be to launch an application (if available) associated with the
   payment target type that can initiate a payment. If multiple
   handlers are registered for the same payment target type, the user
   SHOULD be able to choose which application to launch. This allows
   users with multiple bank accounts (each accessed the respective
   bank's banking application) to choose which account to pay with. An
   application SHOULD allow dereferencing a payto URI even if the
   payment target type of that URI is not registered in the "Payment
   Target Types" sub-registry. Details of the payment MUST be taken
   from the path and options given in the URI. The user SHOULD be
   allowed to modify these details before confirming a payment.

[4](#). **Examples**

        payto://iban/DE75512108001245126199?amount=EUR:200.0&message=hello

        INVALID (authority missing): payto:iban/12345

[5](#). **Generic Options**

   Applications MUST accept URIs with options in any order. The
   "amount" option MUST NOT occur more than once. Other options MAY be
   allowed multiple times, with further restrictions depending on the
   payment target type. The following options SHOULD be understood by
   every payment target type.

   amount: The amount to transfer. The format MUST be:

     amount = currency ":" unit ["." fraction]
     currency = 1*ALPHA
     unit = 1*(DIGIT / ",")
     fraction = 1*(DIGIT / ",")

   If a 3-letter 'currency' is used, it MUST be an [[ISO4217](#)] alphabetic
   code. A payment target type MAY define semantics beyond ISO 4217 for
   currency codes that are not 3 characters. The 'unit' value MUST be
   smaller than 2^53. If present, the 'fraction' MUST consist of no
   more than 8 decimal digits. The use of commas is optional for
   readability and they MUST be ignored.

   receiver-name: Name of the entity that receives the payment
   (creditor).

   sender-name: Name of the entity that makes the payment (debtor).

   message: A short message to identify the purpose of the payment,
   which MAY be subject to lossy conversions (for example, due to
   character set encoding limitations).

   instruction: A short message giving instructions to the recipient,
   which MUST NOT be subject to lossy conversions. Character set
   limitations allowed for such instructions depend on the payment
   target type.

6. **Internationalization and Character Encoding**

   Various payment systems use restricted character sets. An
   application that processes 'payto' URIs MUST convert characters that
   are not allowed by the respective payment systems into allowable
   character using either an encoding or a replacement table. This
   conversion process MAY be lossy, except for the instruction field.

   To avoid special encoding rules for the payment target identifier,
   the userinfo component [RFC3986] is disallowed in payto URIs.
   Instead, the payment target identifier is given as an option, where
   encoding rules are uniform for all options.

7. **Tracking Payment Target Types**

   A registry of Payment Target Types is described in Section 9.2. The
   registration policy for this registry is "First Come First Served",
   as described in [RFC8126]. When requesting new entries, careful
   consideration of the following criteria is strongly advised:

   1. The description clearly defines the syntax and semantics of the
       payment target and optional parameters if applicable.

   2. Relevant references are provided if they are available.

   3. The chosen name is appropriate for the payment target type, does
       not conflict with well-known payment systems, and avoids
       potential to confuse users.

   4. The payment system underlying the payment target type is not
       fundamentally incompatible with the general options (such as
       positive decimal amounts) in this specification.

   5. The payment target type is not a vendor-specific version of a
       payment target type that could be described more generally by a
       vendor-neutral payment target type.

   6. The specification of the new payment target type remains within
       the scope of payment transfer form data. In particular
       specifying complete invoices is not in scope. Neither are
       processing instructions to the payment processor or bank beyond a
       simple payment.

   7. The payment target and the options do not contain the payment
       sender's account details.

   Documents that support requests for new registry entries should
   provide the following information for each entry:

o Name: The name of the payment target type (case insensitive ASCII
   string, restricted to alphanumeric characters, dots and dashes)

o Description: A description of the payment target type, including
   the semantics of the path in the URI if applicable.

o Example: At least one example URI to illustrate the payment target
   type.

o Contact: The contact information of a person to contact for
   further information

o References: Optionally, references describing the payment target
   type (such as an RFC) and target-specific options, or references
   describing the payment system underlying the payment target type.

This document populates the registry with six entries as follows (see
also [Section 9.2](#)).

7.1. ACH Bank Account

o Name: ach

o Description: Automated Clearing House. The path consist of two
   components, the routing number and the account number.

o Example: payto://ach/122000661/1234

o Contact: N/A

o References: [NACHA], [this.I-D]

7.2. Business Identifier Code

o Name: bic

o Description: Business Identifier Code. The path consist of just a
   BIC. This is used for wire transfers between banks. The registry
   for BICs is provided by SWIFT. The path does not allow specifying
   a bank account number.

o Example: payto://bic/SOGEDEFFXXX

o Contact: N/A

o References: [BIC], [this.I-D]

7.3. International Bank Account Number

   o Name: iban

   o Description: International Bank Account Number (IBAN). Generally
      the IBAN allows to unambiguously derive the the associated
      Business Identifier Code (BIC). However, some legacy applications
      process payments to the same IBAN differently based on the
      specified BIC. Thus the path can either consist of a single
      component (the IBAN) or two components (BIC and IBAN).

   o Example: payto://iban/DE75512108001245126199
      payto://iban/SOGEDEFFXXX/DE75512108001245126199

   o Contact: N/A

   o References: [ISO20022], [this.I-D]

7.4. Unified Payments Interface

   o Name: upi

   o Description: Unified Payment Interface. The path is an account
      alias. The amount and receiver-name options are mandatory for
      this payment target.

   o Example: payto://upi/alice@example.com?receiver-
      name=Alice&amount=INR:200

   o Contact: N/A

   o References: [UPILinking], [this.I-D]

7.5. Bitcoin Address

   o Name: bitcoin

   o Description: Bitcoin protocol. The path is a "bitcoinaddress" as
      per [BIP0021].

   o Example: payto://bitcoin/12A1MyfXbW6RhdRAZEqofac5jCQQjwEPBu

   o Contact: N/A

   o References: [BIP0021], [this.I-D]

7.6. Interledger Protocol Address

   o Name: ilp

   o Description: Interledger protocol. The path is an ILP address as
      per [ILP-ADDR].

   o Example: payto://ilp/g.acme.bob

   o Contact: N/A

   o References: [ILP-ADDR], [this.I-D]

7.7. Void Payment Target

   o Name: void

   o Description: The "void" payment target type allows specifying the
      parameters of an out-of-band payment (such as cash or other types
      of in-person transactions). The path is optional and interpreted
      as a comment.

   o Example: payto://void/?amount=EUR:10.5

   o Contact: N/A

   o References: [this.I-D]

8. Security Considerations

   Interactive applications handling the payto URI scheme MUST NOT
   initiate any financial transactions without prior review and
   confirmation from the user, and MUST take measures to prevent
   clickjacking [HMW12].

   Unless a payto URI is received over a trusted, authenticated channel,
   a user might not be able to identify the target of a payment. In
   particular due to homographs [unicode-tr36], a payment target type
   SHOULD NOT use human-readable names in combination with unicode in
   the target account specification, as it could give the user the
   illusion of being able to identify the target account from the URI.

   To avoid unnecessary data collection, payment target types SHOULD NOT
   include personally identifying information about the sender of a
   payment that is not essential for an application to conduct a
   payment.

9. IANA Considerations

   IANA maintains a registry called the "Uniform Resource Identifier
   (URI) Schemes" registry.

9.1. URI Scheme Registration

   IANA maintains the "Uniform Resource Identifier (URI) Schemes"
   registry that contains an entry for the 'payto' URI scheme. IANA is
   requested to update that entry to reference this document when
   published as an RFC.

9.2. Payment Target Type Registry

   IANA maintains the "Uniform Resource Identifier (URI) Schemes"
   registry. IANA is requested to create a new subregistry for payment
   methods called the "Payment Target Types" registry.

   The subregistry shall record for each entry:

   o Name: The name of the payment target type (case insensitive ASCII
      string, restricted to alphanumeric characters, dots and dashes)

   o Contact: The contact information of a person to contact for
      further information

   o References: Optionally, references describing the payment target
      type (such as an RFC) and target-specific options, or references
      describing the payment system underlying the payment target type.

   The registration policy for this sub-registry is "First Come First
   Served", as described in [RFC8126].

   IANA is requested to populate this registry as follows:

```
       Name       | Contact                 | Reference
       ----------+-------------------------+------------
       ach        | N/A                     | [This.I-D]
       bic        | N/A                     | [This.I-D]
       iban       | N/A                     | [This.I-D]
       upi        | N/A                     | [This.I-D]
       bitcoin    | N/A                     | [This.I-D]
       ilp        | N/A                     | [This.I-D]
       void       | N/A                     | [This.I-D]
```

10. References

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