```
BIP: 171
Layer: Applications
Title: Currency/exchange rate information API
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```

Abstract

A common interface for requesting currency exchange rate information from a server.

Copyright

Specification

Four requests are defined, which are all made by a GET request to a common URI with parameters encoded in application/x-www-form-urlencoded format. All matching parameters may be specified with multiple comma-separated values, which are to be interpreted as "any of these". Each result is always in JSON format, with a line-feed (never a carriage-return) separating multiple results.

Authentication for subscription-based services MAY be supported using standard HTTP authentication. It is recommended to use TLS (HTTPS) and/or Linked Data Signatures, so that MITM attackers cannot deceive the client.

To be BIP 171 compatible, servers MUST support at least one currency-pair compared to XBT. All inquiries for bitcoin amounts MUST be specified in XBT, even if the presentation to the end user is in another unit. (FIXME: or should this be satoshis?)

Currency-pair tokens are arbitrary Strings no longer than 255 characters, which may include any ASCII RFC 3986 unreserved characters (ie, alphanumerics and the hyphen, underscore, period, and tilde symbols).

Currency code(s) used herein are defined as such:

- All ISO 4217 codes are valid currency codes.
- XBT is defined as 100000000 satoshis (commonly known as 1 BTC).
- Strings longer than 3 characters may be used for currencies without an applicable code. (If a shorter code is desired despite this, it may be padded with space(s) to the left until it is 4 characters. Software MAY strip these spaces.)

Rate is defined as the amount of quote-currency to be exchanged for one unit of the base-currency. In other words, `1 baseCurrency = rate quoteCurrency`.

Enumerating supported currency-pair tokens

Parameters:

- *mode* - Always "list" for this request.
- *quote* - If provided, the server MAY limit the results to only currency-pairs describing a currency with the given currency code(s).
- *base* - If provided, the server MAY limit the results to only currency-pairs describing currency rates compared to the given currency code(s).
- *locale* - If provided, the server MAY limit the results to only currency-pairs supporting the given Unicode CLDR locale(s).

Each currency-pair will receive a separate result, a JSON Object, with the following information:

- *cp* - The currency-pair token.
- *quote* - The currency code for the quote currency.
- *base* - The currency code for the base currency.
- *locale* - If provided, a String with the applicable Unicode CLDR locale.
- *desc* - Optional description. For example, it could be "Based on Florida BTM prices." or any other short String that provides information useful to the user. SHOULD be shorter than 45 characters.
- *signature* - Optional. May be used for Linked Data Signatures.

Example:

```
   Request: http://api.example.tld/?mode=list&quote=USD&base=XBT&locale=en_US,en_GB
Result:
{"cp":"XBTUSD-ver4", "quote":"USD", "base": "XBT", "locale": "en_US", "desc": "Smoothed aver
{"cp":"2", "quote":"USD", "base": "XBT", "locale": "en_US", "desc": "Updated per-trade"}
{"cp":"XBTUSD-european", "quote":"USD", "base": "XBT", "locale": "en_GB"}
```

Currency-pair information

Parameters:

- *mode* - Always "info" for this request.
- *cp* - Currency pair(s) for which information is requested.

Each currency-pair will receive a separate result, a JSON Object, with the following information:

- *cp* - The currency-pair token.
- *quote* - The currency code for the quote currency.
- *base* - The currency code for the base currency.
- *locale* - If provided, a String with the applicable Unicode CLDR locale.

- *desc* - Optional description. For example, it could be "Based on Florida BTM prices." or any other short String that provides information useful to the user. SHOULD be shorter than 45 characters.
- *longdesc* - Optional description, but may be longer and include newlines.
- *symbol* - An Array of prefix and suffix for the quote currency. Each may be either a fixed String, an Array of two Strings (negative and positive), or null. Any positive or negative symbols must be included in this prefix/suffix; it MUST NOT be implied otherwise.
- *digits* - The type of digits to use for the quote currency's numbers. "arabic" should be used for common 0-9 digits.
- *grouping* - An Array alternating between Numbers representing a series of digits, and Strings used as delimiters. If terminated by a zero, the final grouping is to be repeated continually. For example, the common US locale thousands grouping would be `[3, ",", 0]`
- *fraction_sep* - A String to be placed between whole numbers and a fractional amount.
- *fraction_digits* - Array of absolute minimum (even for whole numbers) number of fractional digits, minimum fractional digits when a fraction exists, and maximum number of fractional digits when absolute precision is not demanded (below which is to be rounded in an implementation-dependent manner).
- *minpoll* - A Number of seconds indicating a minimum time between polls to the server. Clients should be prudent about not polling too often, even if this number is low.
- *longpoll* - If provided and true, indicates longpolling is supported by the server.
- *history* - If provided, indicates the server has historical records going back no earlier than the POSIX timestamp provided as a value.
- *archive* - If provided, indicates the server no longer has current rates, and has no historical rates more recent than the POSIX timestamp provided as a value.
- *signature* - Optional. May be used for Linked Data Signatures.

Example:

```
   Request: http://api.example.tld/?mode=info&cp=XBTUSD-ver4,2
Result:
{"cp":"XBTUSD-ver4", "quote":"USD", "base": "XBT", "locale": "en_US", "desc": "Smoothed aver
{"cp":"2", "quote":"USD", "base": "XBT", "locale": "en_US", "desc": "Updated per-trade", "lo
```

Current exchange rate

Parameters:

- *mode* - Always "rate" for this request.
- *cp* - Currency pair(s) for which rate is requested.
- *type* - Type of exchange rate data being requested. May be "high", "low",

"average", "typical", or any other arbitrary name. If omitted, the server may provide any rates it deems appropriate.
- *minrate*, *maxrate* - If specified, indicates this request is a longpoll. The server should not send a response until the rate(s) fall below or above (respectively) the provided value.
- *nonce* - If specified, the server SHOULD return it in each result.

Each currency-pair receives a separate result (a JSON Object) with all requested rate types:

- *cp* - The currency-pair token.
- *time* - The time (as a POSIX timestamp) the rate information is applicable to (should be approximately the request time).
- *rates* - A JSON Object with each rate type provided as a key, and a Number as the value specifying the rate.
- *nonce* - Only if the request specified a nonce, the server SHOULD include it here as a JSON String.
- *signature* - Optional. May be used for Linked Data Signatures.

Example:

```
   Request: http://api.example.tld/?mode=rate&cp=XBTUSD-ver4,2&type=typical,high
Result:
{"cp":"XBTUSD-ver4", "time": 1488767410.5463133, "rates": {"typical": 1349.332215, "high": 1
{"cp":"2", "time": 1488767410, "rates": {"typical": 1350.111332}}
```

Historical exchange rates

Parameters:

- *mode* - Always "history" for this request.
- *cp* - Currency pair(s) for which rate is requested.
- *type* - Type of exchange rate data being requested. May be "high", "low", "average", "typical", or any other arbitrary name. If omitted, the server may provide any rates it deems appropriate.
- *from* - POSIX timestamp the results should begin with.
- *to* - POSIX timestamp the results should end with. If omitted, the present time shall be used.
- *nearest* - If provided and true, indicates that only the nearest timestamp to "from" must be returned, and a range is not desired. ("to" should be omitted in this case.)
- *ratedelta*, *timedelta* - If specified, the server may omit data where the rate or time has not changed since the last provided rate and time. If both are provided, either a significant rate change OR time change should trigger a new record in the results.

A result is provided for each currency-pair and timestamp record, in the same format as the current exchange rate request. Records MUST be provided in chronological order, but only within the scope of the applicable currency-pair

(ie, it is okay to send the full history for one currency-pair, and then the full history for the next; or to intermix them out of any given order).

If there is no exact record for the times specified by "from" and/or "to", a single record before "from" and/or after "to" should also be included. This is not necessary when only the nearest record is requested, or when "to" is omitted (ie, ending at the most recent record).

Example:

```
   Request: http://api.example.tld/?mode=history&cp=XBTUSD-ver4,2&type=typical&ratedelta=0.1
Result:
{"cp":"XBTUSD-ver4", "time": 1488760000, "rates": {"typical": 1300}}
{"cp":"XBTUSD-ver4", "time": 1488760010, "rates": {"typical": 1301.1}}
{"cp":"XBTUSD-ver4", "time": 1488760020, "rates": {"typical": 1320}}
{"cp":"XBTUSD-ver4", "time": 1488760030, "rates": {"typical": 1305}}
{"cp":"2", "time": 1488760000.1, "rates": {"typical": 1300}}
{"cp":"2", "time": 1488760010.2, "rates": {"typical": 1301.1}}
{"cp":"2", "time": 1488760020.2, "rates": {"typical": 1320.111332}}
{"cp":"2", "time": 1488760031, "rates": {"typical": 1305.222311}}
{"cp":"XBTUSD-ver4", "time": 1488760040, "rates": {"typical": 1303.33}}
{"cp":"2", "time": 1488760042, "rates": {"typical": 1303.33}}
{"cp":"XBTUSD-ver4", "time": 1488760050, "rates": {"typical": 1305}}
{"cp":"2", "time": 1488760052, "rates": {"typical": 1307}}
{"cp":"XBTUSD-ver4", "time": 1488760060, "rates": {"typical": 1309}}
{"cp":"XBTUSD-ver4", "time": 1488760072, "rates": {"typical": 1308}}
{"cp":"2", "time": 1488760062, "rates": {"typical": 1309.55555555}}
{"cp":"2", "time": 1488760072, "rates": {"typical": 1308}}
{"cp":"XBTUSD-ver4", "time": 1488760082, "rates": {"typical": 1309}}
{"cp":"2", "time": 1488760082, "rates": {"typical": 1309.1}}
```

Motivation

End users often desire to see fiat currency information in their Bitcoin wallet software. Due to the nature of Bitcoin, there is inherently no authoritative source for exchange rates. There are many independent providers of such information, but they all use different formats for providing it, so wallet software is currently forced to implement dedicated code for each provider.

By providing a standard interface for retrieving this information, wallets (and other software) and service providers can implement it once, and become immediately interoperable with all other compatible implementations.

Rationale

Why are multiple results separated by a line-feed rather than using a JSON Array?

- Clients ought to cache historical data, and using a line-feed format allows them to simply append to a cache file.
- Parsing JSON typically requires the entire data parsed together as a single memory object. Using simple lines to separate results, however, allows parsing a single result at a time.

What if long descriptions require line and paragraph breaks?

- Clients should word-wrap long lines, and JSON escapes newlines as "\n" which can be used doubly ("\n\n") for paragraph breaks.

Backwards compatibility

While this new standard is adopted, software and providers can continue to use and provide their current formats until they are no longer needed.

Reference implementation

TODO

See also

- Draft W3c Linked Data Signatures specification