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# Kraken Websockets API 1.9.1

## Overview

WebSockets API offers real-time market data updates. WebSockets is a bidirectional protocol offering fastest real-time data, helping you build real-time applications. The public message types presented below do not require authentication. Private-data messages can be subscribed on a separate authenticated endpoint.

Your use of the Kraken WebSockets API is subject to the [Kraken Terms & Conditions](#), [Privacy Notice](#), as well as all other applicable terms and disclosures made available on [www.kraken.com](https://www.kraken.com).

## General Considerations

- TLS with SNI (Server Name Indication) is required in order to establish a Kraken WebSockets API connection. See Cloudflare's "[What is SNI?](#)" guide for more details.
- All messages sent and received via WebSockets are encoded in JSON format
- All decimal fields (including timestamps) are quoted to preserve precision.
- Timestamps should not be considered unique and not be considered as aliases for transaction IDs. Also, the granularity of timestamps is not representative of transaction rates.
- At least one private message should be subscribed to keep the authenticated client connection open.
- Please use REST API endpoint [AssetPairs](#) to fetch the list of pairs which can be subscribed via WebSockets API. For example, field 'wsname' gives the supported pairs name which can be used to subscribe.
- Cloudflare imposes a connection/re-connection rate limit (per IP address) of approximately 150 attempts per rolling 10 minutes. If this is exceeded, the **IP is banned for 10 minutes**.
- **Recommended reconnection behaviour** is to (1) attempt reconnection instantly up to a handful of times if the websocket is dropped randomly during normal operation but (2) after maintenance or extended downtime, attempt to reconnect no more quickly than once every 5 seconds. There is no advantage to reconnecting more rapidly after maintenance during `cancel_only` mode.

## Connection details

### Connection details for production environment:

URL	Scheme	Description
ws.kraken.com	wss	Once the socket is open you can subscribe to a public channel by sending a subscribe request message.

### Connection details for authenticated production access:

URL	Scheme	Description
ws-auth.kraken.com	wss	Once the socket is open you can subscribe to private-data channels by sending an authenticated subscribe request message.

### Connection details for Beta environment:

URL	Scheme	Description
beta-ws.kraken.com	wss	Once the socket is open you can subscribe to a public channel by sending a subscribe request message. <a href="#">Websockets Beta Documentation</a>

### Connection details for authenticated Beta access:

URL	Scheme	Description
beta-ws-auth.kraken.com	wss	Once the socket is open you can subscribe to private-data channels by sending an authenticated subscribe request message. <a href="#">Websockets Beta Documentation</a>

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## Authentication

The API client must request an authentication "token" via the following REST API endpoint "GetWebSocketsToken" to connect to WebSockets Private endpoints. The token should be used within 15 minutes of creation. The token does not expire once a connection to a WebSockets API private message (openOrders or ownTrades) is maintained.

Endpoint URL: <https://api.kraken.com/0/private/GetWebSocketsToken>

The resulting token must be provided in the "token" field of any new private WebSocket feed subscription:

```
{
  "event": "subscribe",
  "subscription": {
    "name": "ownTrades",
    "token": "W91ciBhdXRoZW50aWNhdG1vbiB0b2tlbiBnb2VzIGh1cmUu"
  }
}
```

## Book Checksum

Each book update message will have a checksum value appended. The checksum is a CRC32 value based on the top 10 bids and 10 asks, and you can use it to verify that your data is correct and up to date by calculating the checksum independently and comparing it against the value provided.

Checksums will not be sent in book snapshot messages, but rather only in book update messages. In the following sample book update messages, note the checksum field appears in the last bid or ask map structure in the message.

Sample with asks only:

```
[
  0,
  {
    "a": [
      ["0.05120", "0.00000500", "1582905486.493008"],
      ["0.05275", "0.00000500", "1582905486.493034"]
    ],
    "c": "974947235" <-- CRC32 checksum is here.
  },
  "book-1000",
  "XBT/USD"
]
```

## General Messages

ping  
pong  
heartbeat  
systemStatus  
subscribe  
unsubscribe  
subscriptionStatus

## Public Messages

ticker  
ohlc  
trade  
spread  
book

Sample with bids only:

```
[
  0,
  {
    "b": [
      ["0.04765", "0.00000500", "1582905486.493008"],
      ["0.04940", "0.00000500", "1582905486.493034"]
    ],
    "c": "974947235" <-- CRC32 checksum is here.
  },
  "book-1000",
  "XBT/USD"
]
```

## Private Messages

ownTrades  
openOrders  
addOrder  
editOrder  
cancelOrder  
cancelAll  
cancelAllOrdersAfter

Sample with both bids and asks:

```
[
  0,
  {
    "a": [
      ["0.05120", "0.00000500", "1582905486.493008"],
      ["0.05275", "0.00000500", "1582905486.493034"]
    ]
  },
  {
    "b": [
      ["0.04765", "0.00000500", "1582905486.493008],
      ["0.04940", "0.00000500", "1582905486.493034"]
    ],
    "c": "974947235" <-- CRC32 checksum is here.
  },
  "book-1000",
  "XBT/USD"
]
```

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### Private Messages

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[openOrders](#)
[addOrder](#)
[editOrder](#)
[cancelOrder](#)
[cancelAll](#)
[cancelAllOrdersAfter](#)

```
"b": [
    ["0.04765", "0.00000500", "1582905486.493008"],
    ["0.04940", "0.00000500", "1582905486.493034"]
],
"c": "974947235" <-- CRC32 checksum is here.
},
"book-1000",
"XBT/USD"
]
```

### Book Checksum Calculation

The checksum is computed by concatenating the top 10 bids and asks in the current book in a particular format and then taking the CRC32 checksum of that string. The price and volume values should be treated as a string and formatted and concatenated as follows.

**Note:** Processing order is important. First, the top ten ask price levels should be processed, sorted by price from low to high. Then, the top ten bid price levels should be processed, sorted by price from high to low.

Consider you are subscribed at depth = 100 on the "book" channel and you receive the following book update message:

```
[ "0.05000", "0.0000304", "1582905487.439814" ]
```

This update should be processed as follows:

1. Apply the update to your local copy of the book.
2. For each of the top ten ask price levels, sorted by price from low to high:
  - a. Remove the decimal character, '.', from the price, i.e. "0.05000" -> "005000".
  - b. Remove all leading zero characters from the price. i.e. "005000" -> "5000".
  - c. Add the formatted price string to the concatenation.
  - d. Repeat steps a-c above but for the volume.

For example, the price level corresponding to the sample update above would be formatted as "5000304". Note the timestamp values are not used in this calculation.

3. Repeat the above steps for the top ten bids, sorted by price from high to low.
4. Feed the concatenated string as input to a CRC32 checksum function, storing the result.
5. Cast the result (comprising 32 bits) as an unsigned 32-bit integer. This value can now be compared to the checksum received to ensure your local book is accurate.

For example, given the following book state:

```
{
  "as": [
    [ "0.05005", "0.00000500", "1582905487.684110" ],
    [ "0.05010", "0.00000500", "1582905486.187983" ],
    [ "0.05015", "0.00000500", "1582905484.480241" ],
    [ "0.05020", "0.00000500", "1582905486.645658" ],
    [ "0.05025", "0.00000500", "1582905486.859009" ],
    [ "0.05030", "0.00000500", "1582905488.601486" ],
    [ "0.05035", "0.00000500", "1582905488.357312" ],
    [ "0.05040", "0.00000500", "1582905488.785484" ],
    [ "0.05045", "0.00000500", "1582905485.302661" ],
    [ "0.05050", "0.00000500", "1582905486.157467" ]
  ],
  "bs": [
    [ "0.05000", "0.00000500", "1582905487.439814" ],
    [ "0.04995", "0.00000500", "1582905485.119396" ],
    [ "0.04990", "0.00000500", "1582905486.432052" ],
    [ "0.04980", "0.00000500", "1582905480.609351" ],
    [ "0.04975", "0.00000500", "1582905476.793880" ],
    [ "0.04970", "0.00000500", "1582905486.767461" ],
    [ "0.04965", "0.00000500", "1582905481.767528" ],
    [ "0.04960", "0.00000500", "1582905487.378907" ],
    [ "0.04955", "0.00000500", "1582905483.626664" ],
    [ "0.04950", "0.00000500", "1582905488.509872" ]
  ]
}
```

The checksum input should be as follows (newlines appear here for convenience only and should not be included):

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```
"50055005010500501550050205005025500
50305005035005040500504550050500
50005004995500499050049805004975500
49705004965500496050049555004950500"
```

The final unsigned CRC32 checksum value will then be "974947235".

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addOrder

editOrder

cancelOrder

cancelAll

cancelAllOrdersAfter

**Sequence Numbers**

The private feeds "openOrders" and "ownTrades" both contain sequence numbers ("sequence") in their messages. These numbers are monotonically increasing integers, beginning at 1, that operate on a per-connection and per-feed basis. These are meant to help clients identify if they are, for any reason, dropping messages or receiving/processing messages in a different order than they were sent from our servers. Example payloads can be seen in the [openOrders](#) and [ownTrades](#) sections below.

**Error Types**

The following error messages are thrown as part of subscriptionStatus message.

The following error messages may be thrown for public data requests.

- Already subscribed
- Currency pair not in ISO 4217-A3 format
- Malformed request
- Pair field must be an array
- Pair field unsupported for this subscription type
- Pair(s) not found
- Subscription book depth must be an integer
- Subscription depth not supported
- Subscription field must be an object
- Subscription name invalid
- Subscription object unsupported field
- Subscription ohlc interval must be an integer
- Subscription ohlc interval not supported
- Subscription ohlc requires interval

The following error messages may be thrown for private data requests. Segments in brackets ([]) indicate additional information that may or not be present in the error message.

- EAccount:Invalid permissions
- EAAuth:Account temporary disabled
- EAAuth:Account unconfirmed
- EAAuth:Rate limit exceeded
- EAAuth:Too many requests
- EDatabase: Internal error (to be deprecated)
- EGeneral:Internal error[:<code>]
- EGeneral:Invalid arguments
- EOrder:Cannot open opposing position
- EOrder:Cannot open position
- EOrder:Insufficient funds (insufficient user funds)
- EOrder:Insufficient margin (exchange does not have sufficient funds to allow margin trading)
- EOrder:Invalid price
- EOrder:Margin allowance exceeded
- EOrder:Margin level too low
- EOrder:Margin position size exceeded (client would exceed the maximum position size for this pair)
- EOrder:Order minimum not met (volume too low)
- EOrder:Orders limit exceeded
- EOrder:Positions limit exceeded
- EOrder:Rate limit exceeded
- EOrder:Scheduled orders limit exceeded
- EOrder:Unknown position
- EService:Deadline elapsed
- EService:Market in cancel\_only mode
- EService:Market in limit\_only mode
- EService:Market in post\_only mode
- EService:Unavailable
- ETrade:Invalid request

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General error messages will have the following structure. However, error responses related to particular requests such as subscriptionStatus, addOrder, cancelOrder may be returned in the appropriate response message type:

- subscriptionStatus for subscribe and unsubscribe requests,
- addOrderStatus for addOrder requests, and
- cancelOrderStatus for cancelOrder requests

Name	Type	Description
event	string	error
errorMessage	string	Error detail message.
reqid	integer	Optional - client originated ID reflected in response message

### Examples of payload

```
{
  "errorMessage": "Malformed request",
  "event": "error"
}

{
  "errorMessage": "Exceeded msg rate",
  "event": "error",
  "reqid": 42
}
```

### Example API Clients

Below is sample code that can be referenced when writing your own API client. Please keep in mind that Payward nor the third party authors are responsible for losses due to bugs or improper use of the APIs. Payward has performed an initial review of the safety of the third party code before listing them but cannot vouch for any changes added since then. If you have concerns, [please contact support](#).

- **Go**  
[jurijbajzelj/kraken\\_ws\\_orderbook](#)
- **Python**  
[krakenfx/kraken-wsclient-py](#)

### Changelog

**2023-03-02**

- Websockets 1.9.1 released
- Added contingent field on private open order feed
- On public instances during trading engine maintenance we are going to keep clients connected and disconnect them once when we can process trading engine updates.

**2022-03-22**

- Websockets 1.9.0 released
- Support for editOrder added

**2021-03-31**

- Websockets 1.8.3 released
- Support for addOrder "deadline" added

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**2021-02-25**

- Websockets 1.8.0 released
- Support for "timeinforce" and Immediate-or-Cancel (IOC) added

**2021-02-04**

- Websockets 1.7.2 released
- Improve public market data snapshot performance
- Change close code to 1008 (Policy Violation) from 1013 for maximum number of connections, message rate limit, and slow websocket consumption
- Add a policy rule for the maximum rate of subscriptions
- Add a new generic error type with (optional) internal error codes, EGeneral:Internal Error[:<code>]

**2021-01-30**

Add:

- Websockets 1.7.0 released
- Userref field added in openOrders, ownTrades update messages

**2021-01-13**

Add:

- Dead man's switch (cancelAllOrdersAfter) REST endpoint added

Fix:

- Intermittent public data websocket feed latency and connection instability issue resolved

**2020-12-21**

Add:

- Websockets 1.6.0 released
- Dead man's switch (cancelAllOrdersAfter) functionality
- Post\_only trading mode introduced for maintenance procedure (systemStatus)

**2020-12-05**

Add:

- Websockets 1.5.0 released
- Optional boolean `ratecounter` argument for openOrders subscription
- `maxratecount` and current `ratecount` reporting on openOrders feed
- Cancel\_only trading mode introduced and reflected via `systemStatus` updates
- SystemStatus REST endpoint added

Change:

- Relaxed slow-consumer constraint on WS affecting some java client libraries

Fix:

- Maintain private WS connections during maintenance
- Public market data snapshot/stream synchronisation improvements
- Inactive/unimplemented order types removed from REST docs

**2020-11-18**

Add:

- CancelAll REST endpoint added

**2020-11-02**

Add:

- Websockets 1.4.0 released
- 'cancelAll' trading request functionality

Change:

- Performance upgrade to cancelOrder request handling

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- Improve messages and close codes when killing WS connections

Fix:

- Return correct error for addOrder with invalid pair

**2020-10-27**

Add:

- Websockets 1.3.0 released
- Sequence numbers added on private (openOrders, ownTrades) feeds

**2020-10-12**

Change:

- Eliminated trading rate limit penalty for filled orders
- Performance improvement for REST real-time and historical market data endpoints

Fix:

- Reject 'market' conditional close orders
- Intermittent bug affecting Ticker REST endpoint resolved

**2020-08-31**

Add:

- Websockets 1.2.0 released
- cancel\_reason added to openOrders stream
- Optional boolean parameter "snapshot" added for ownTrades feed

**2020-08-04**

Change:

- Minimum order sizes updated for 8 assets / 30 pairs

**2020-07-16**

Add:

- Add 'maintenance' as possible systemStatus message

Fix:

- Connection stability improvements

**2020-06-22**

Add:

- Public Websockets 1.1.0 released
- Order book 'checksum' added

**2020-03-18**

Fix:

- Reject 'viqc' order flag
- Handle 'validate' field appropriately
- Include 'reqid' with all error responses
- Stability improvements

**2020-02-18**

Add:

- Private websockets 1.0.0 released to production
- addOrder, cancelOrder trading requests introduced

**2019-10-01**

Add:

- Private websockets 0.3.0 in beta

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### 2019-02-04

Change:

- openOrders, ownTrades streams introduced

Fix:

- Fix publishing of deleted price levels

### 2019-01-23

Add:

- Websockets public market data sandbox 0.1.1 released
- connectionID field added to systemStatus message

### 2019-01-18

Add:

- Websockets public market data sandbox 0.0.6 released
- 'open' prices on ohlc include 24-hour values

Change:

- Timestamp precision increased to microseconds for ohlc, spread, book, trade
- Sandbox URL change

### 2018-12-24

Change:

- Websockets public market data sandbox 0.0.5 released
- Timestamp field changed to string type

### 2018-12-07

Add:

- Websockets public market data sandbox 0.0.4 released

Change:

- Timestamp precision changed to milliseconds for ohlc, trade, spread, book feeds

### 2018-11-28

Add:

- Websockets public market data sandbox 0.0.3 released

## Messages

### ping

**Request.** Client can ping server to determine whether connection is alive, server responds with pong. This is an application level ping as opposed to default ping in websockets standard which is server initiated

#### Payload

Name	Type	Description
event	string	
reqid	integer	Optional - client originated ID reflected in response message

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#### Example of payload

```
{
  "event": "ping",
  "reqid": 42
}
```

#### pong

**Response.** Server pong response to a ping to determine whether connection is alive. This is an application level pong as opposed to default pong in websockets standard which is sent by client in response to a ping

#### Payload

Name	Type	Description
event	string	
reqid	integer	Optional - matching client originated request ID

#### Example of payload

```
{
  "event": "pong",
  "reqid": 42
}
```

#### heartbeat

**Publication:** Server heartbeat sent if no subscription traffic within 1 second (approximately)

#### Payload

Name	Type	Description
event	string	

#### Example of payload

```
{
  "event": "heartbeat"
}
```

#### systemStatus

**Publication:** Status sent on connection or system status changes.

#### Payload

Name	Type	Description
connectionID	integer	Optional - Connection ID (will appear only in initial connection status message)
event	string	systemStatus
status	string	online maintenance cancel_only limit_only post_only
version	string	

#### Example of payload

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```
{
  "connectionID": 8628615390848610000,
  "event": "systemStatus",
  "status": "online",
  "version": "1.0.0"
}
```

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## subscribe

**Request.** Subscribe to a topic on a single or multiple currency pairs.

### Payload

Name	Type	Description
event	string	subscribe
<i>reqid</i>	integer	Optional - client originated ID reflected in response message
<i>pair</i>	array	Optional - Array of currency pairs. Format of each pair is "A/B", where A and B are ISO 4217-A3 for standardized assets and popular unique symbol if not standardized.
<i>subscription</i>	object	
└ <i>depth</i>	integer	Optional - depth associated with book subscription in number of levels each side, default 10. Valid Options are: 10, 25, 100, 500, 1000
└ <i>interval</i>	integer	Optional - Time interval associated with ohlc subscription in minutes. Default 1. Valid Interval values: 1 5 15 30 60 240 1440 10080 21600
└ <i>name</i>	string	book ohlc openOrders ownTrades spread ticker trade *, * for all available channels depending on the connected environment
└ <i>ratecounter</i>	boolean	Optional - whether to send rate-limit counter in updates (supported only for openOrders subscriptions; default = false)
└ <i>snapshot</i>	boolean	Optional - whether to send historical feed data snapshot upon subscription (supported only for ownTrades subscriptions; default = true)
└ <i>token</i>	string	Optional - base64-encoded authentication token for private-data endpoints
└ <i>consolidate_taker</i>	boolean	Optional - for ownTrades, whether to consolidate order fills by root taker trade(s), default = true. If false, all order fills will show separately.

### Example of payload

```
{
  "event": "subscribe",
  "pair": [
    "XBT/USD",
    "XBT/EUR"
  ],
  "subscription": {
    "name": "ticker"
  }
}

{
  "event": "subscribe",
  "pair": [
    "XBT/EUR"
  ]
}
```

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```
[
  "subscription": {
    "interval": 5,
    "name": "ohlc"
  }
}

{
  "event": "subscribe",
  "subscription": {
    "name": "ownTrades",
    "token": "WW91ciBhdXRoZW50aWNhdGlvbiB0b2tlbiBnb2VzIGh1cmUu"
  }
}
```

### unsubscribe

**Request.** Unsubscribe, can specify a channelID or multiple currency pairs.

#### Payload

Name	Type	Description
event	string	subscribe
reqid	integer	Optional - client originated ID reflected in response message
pair	array	Optional - Array of currency pairs. Format of each pair is "A/B", where A and B are ISO 4217-A3 for standardized assets and popular unique symbol if not standardized.
subscription	object	
└ depth	integer	Optional - depth associated with book subscription in number of levels each side, default 10. Valid Options are: 10, 25, 100, 500, 1000
└ interval	integer	Optional - Time interval associated with ohlc subscription in minutes. Default 1. Valid Interval values: 1 5 15 30 60 240 1440 10080 21600
└ name	string	book ohlc openOrders ownTrades spread ticker trade *, * for all available channels depending on the connected environment
└ token	string	Optional - base64-encoded authentication token for private-data endpoints

#### Example of payload

```
{
  "event": "unsubscribe",
  "pair": [
    "XBT/EUR",
    "XBT/USD"
  ],
  "subscription": {
    "name": "ticker"
  }
}

{
  "channelID": 10001,
  "event": "unsubscribe"
}

{
  "event": "unsubscribe",
```

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```
"subscription": {
    "name": "ownTrades",
    "token": "WW91ciBhdXR0ZW50aWNhdGlvbiB0b2t1biBnb2VzIGh1cmUu"
}
```

**subscriptionStatus****Response.** Subscription status response to subscribe, unsubscribe or exchange initiated unsubscribe.**Payload**

Name	Type	Description
channelName	string	Channel Name on successful subscription. For payloads 'ohlc' and 'book', respective interval or depth will be added as suffix.
event	string	
<i>reqid</i>	integer	Optional - matching client originated request ID
<i>pair</i>	string	Optional - Currency pair, applicable to public messages only
status	string	Status of subscription
subscription	object	
└ <i>depth</i>	integer	Optional - depth associated with book subscription in number of levels each side, default 10. Valid Options are: 10, 25, 100, 500, 1000
└ <i>interval</i>	integer	Optional - Time interval associated with ohlc subscription in minutes. Default 1. Valid Interval values: 1 5 15 30 60 240 1440 10080 21600
└ <i>maxratecount</i>	integer	Optional - max rate-limit budget. Compare to the ratecounter field in the openOrders updates to check whether you are approaching the rate limit.
└ <i>name</i>	string	book ohlc openOrders ownTrades spread ticker trade *, * for all available channels depending on the connected environment
└ <i>token</i>	string	Optional - base64-encoded authentication token for private-data endpoints
OneOf	oneOf	
└ errorMessage	string	Error message
└ channelID	integer	Channel ID on successful subscription, applicable to public messages only - deprecated, use channelName and pair

**Example of payload**

```
{
  "channelID": 10001,
  "channelName": "ticker",
  "event": "subscriptionStatus",
  "pair": "XBT/EUR",
  "status": "subscribed",
  "subscription": {
    "name": "ticker"
  }
}

{
  "channelID": 10001,
  "channelName": "ohlc-5",
```

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```

"event": "subscriptionStatus",
"pair": "XBT/EUR",
"reqid": 42,
"status": "unsubscribed",
"subscription": {
  "interval": 5,
  "name": "ohlc"
}

{

  "channelName": "ownTrades",
  "event": "subscriptionStatus",
  "status": "subscribed",
  "subscription": {
    "name": "ownTrades"
  }
}

{

  "errorMessage": "Subscription depth not supported",
  "event": "subscriptionStatus",
  "pair": "XBT/USD",
  "status": "error",
  "subscription": {
    "depth": 42,
    "name": "book"
  }
}

```

### **ticker**

**Publication:** Ticker information on currency pair.

#### **Payload**

Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
(Anonymous)	object	
└ a	array	Ask
└ price	decimal	Best ask price
└ wholeLotVolume	integer	Whole lot volume
└ lotVolume	decimal	Lot volume
└ b	array	Bid
└ price	decimal	Best bid price
└ wholeLotVolume	integer	Whole lot volume
└ lotVolume	decimal	Lot volume
└ c	array	Close
└ price	decimal	Price
└ lotVolume	decimal	Lot volume
└ v	array	Volume
└ today	decimal	Value today
└ last24Hours	decimal	Value over last 24 hours
└ p	array	Volume weighted average price
└ today	decimal	Value today

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Name	Type	Description
↳ last24Hours	decimal	Value over last 24 hours
↳ t	array	Number of trades
↳ today	integer	Value today
↳ last24Hours	integer	Value over last 24 hours
↳ l	array	Low price
↳ today	decimal	Value today
↳ last24Hours	decimal	Value over last 24 hours
↳ h	array	High price
↳ today	decimal	Value today
↳ last24Hours	decimal	Value over last 24 hours
↳ o	array	Open Price
↳ today	decimal	Value today
↳ last24Hours	decimal	Value over last 24 hours
channelName	string	Channel Name of subscription
pair	string	Asset pair

### Example of payload

```
[  
  0,  
  {  
    "a": [  
      "5525.40000",  
      1,  
      "1.000"  
    ],  
    "b": [  
      "5525.10000",  
      1,  
      "1.000"  
    ],  
    "c": [  
      "5525.10000",  
      "0.00398963"  
    ],  
    "h": [  
      "5783.00000",  
      "5783.00000"  
    ],  
    "l": [  
      "5505.00000",  
      "5505.00000"  
    ],  
    "o": [  
      "5760.70000",  
      "5763.40000"  
    ],  
    "p": [  
      "5631.44067",  
      "5653.78939"  
    ],  
    "t": [  
      11493,  
      16267  
    ],  
    "v": [  
      "2634.11501494",  
      "3591.17907851"  
    ]  
}
```

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```
},
"ticker",
"XBT/USD"
]
```

### ohlc

**Publication:** Open High Low Close (Candle) feed for a currency pair and interval period.**Description:** When subscribed for OHLC, a snapshot of the last valid candle (irrespective of the endtime) will be sent, followed by updates to the running candle. For example, if a subscription is made to 1 min candle and there have been no trades for 5 mins, a snapshot of the last 1 min candle from 5 mins ago will be published. The endtime can be used to determine that it is an old candle.

### Payload

Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
Array	array	
└ time	decimal	Candle last update time, in seconds since epoch
└ etime	decimal	End time of interval, in seconds since epoch
└ open	decimal	Open price of interval
└ high	decimal	High price within interval
└ low	decimal	Low price within interval
└ close	decimal	Close price of interval
└ vwap	decimal	Volume weighted average price within interval
└ volume	decimal	Accumulated volume within interval
└ count	integer	Number of trades within interval
channelName	string	Channel Name of subscription
pair	string	Asset pair

### Example of payload

```
[
  42,
  [
    "1542057314.748456",
    "1542057360.435743",
    "3586.70000",
    "3586.70000",
    "3586.60000",
    "3586.60000",
    "3586.68894",
    "0.03373000",
    2
  ],
  "ohlc-5",
  "XBT/USD"
]
```

### trade

**Publication:** Trade feed for a currency pair.

### Payload

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Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
Array	array	
└ Array	array	
└ price	decimal	Price
└ volume	decimal	Volume
└ time	decimal	Time, seconds since epoch
└ side	string	Triggering order side, buy/sell
└ orderType	string	Triggering order type market/limit
└ misc	string	Miscellaneous
channelName	string	Channel Name of subscription
pair	string	Asset pair

### Example of payload

```
[
  0,
  [
    [
      [
        "5541.2000",
        "0.15850568",
        "1534614057.321597",
        "s",
        "1",
        ""
      ],
      [
        "6060.0000",
        "0.02455000",
        "1534614057.324998",
        "b",
        "1",
        ""
      ]
    ],
    "trade",
    "XBT/USD"
  ]
]
```

### spread

**Publication:** Spread feed for a currency pair.

### Payload

Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
Array	array	
└ bid	decimal	Bid price
└ ask	decimal	Ask price
└ timestamp	decimal	Time, seconds since epoch
└ bidVolume	decimal	Bid Volume
└ askVolume	decimal	Ask Volume

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### Example of payload

```
[
  0,
  [
    "5698.40000",
    "5700.00000",
    "1542057299.545897",
    "1.01234567",
    "0.98765432"
  ],
  "spread",
  "XBT/USD"
]
```

### book

**Publication:** Order book levels. On subscription, a snapshot will be published at the specified depth, following the snapshot, level updates will be published

### Snapshot payload

Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
(Anonymous)	object	
└ as	array	Array of price levels, ascending from best ask
└ Array	array	Anonymous array of level values
└ price	decimal	Price level
└ volume	decimal	Price level volume, for updates volume = 0 for level removal/deletion
└ timestamp	decimal	Price level last updated, seconds since epoch
└ bs	array	Array of price levels, descending from best bid
└ Array	array	Anonymous array of level values
└ price	decimal	Price level
└ volume	decimal	Price level volume, for updates volume = 0 for level removal/deletion
└ timestamp	decimal	Price level last updated, seconds since epoch
channelName	string	Channel Name of subscription
pair	string	Asset pair

### Example of snapshot payload

```
[
  0,
  {
    "as": [
      [
        "5541.30000",
        "2.50700000",
        "1534614248.123678"
      ],

```

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```
[  
    "5541.80000",  
    "0.33000000",  
    "1534614098.345543"  
,  
[  
    "5542.70000",  
    "0.64700000",  
    "1534614244.654432"  
,  
]  
,  
"bs": [  
    [  
        "5541.20000",  
        "1.52900000",  
        "1534614248.765567"  
,  
    [  
        "5539.90000",  
        "0.30000000",  
        "1534614241.769870"  
,  
    [  
        "5539.50000",  
        "5.00000000",  
        "1534613831.243486"  
,  
    ]  
,  
    "book-100",  
    "XBT/USD"  
]
```

### Update payload

Name	Type	Description
channelID	integer	Channel ID of subscription - deprecated, use channelName and pair
AnyOf	anyOf	
(Anonymous)	object	Container for ask updates
a	array	Ask array of level updates
(Anonymous)	array	Anonymous array of level values
price	decimal	Price level
volume	decimal	Price level volume, for updates volume = 0 for level removal/deletion
timestamp	decimal	Price level last updated, seconds since epoch
updateType	string	Optional - "r" in case update is a republished update
c	string	Optional - Book checksum as a quoted unsigned 32-bit integer, present only within the last update container in the message. <a href="#">See calculation details.</a>
(Anonymous)	object	Container for bid updates
b	array	Bid array of level updates
(Anonymous)	array	Anonymous array of level values
price	decimal	Price level
volume	decimal	Price level volume, for updates volume = 0 for level removal/deletion

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Name	Type	Description
└ timestamp	decimal	Price level last updated, seconds since epoch
└ updateType	string	Optional - "r" in case update is a republished update
└ c	string	Optional - Book checksum as a quoted unsigned 32-bit integer, present only within the last update container in the message. <a href="#">See calculation details.</a>
channelName	string	Channel Name of subscription
pair	string	Asset pair

### Example of update payload

```
[
  1234,
  {
    "a": [
      [
        "5541.30000",
        "2.50700000",
        "1534614248.456738"
      ],
      [
        "5542.50000",
        "0.40100000",
        "1534614248.456738"
      ],
      [
        "c": "974942666"
      ],
      "book-10",
      "XBT/USD"
    ]
  ],
  [
    1234,
    {
      "b": [
        [
          "5541.30000",
          "0.00000000",
          "1534614335.345903"
        ]
      ],
      [
        "c": "974942666"
      ],
      "book-10",
      "XBT/USD"
    ]
  ],
  [
    1234,
    {
      "a": [
        [
          "5541.30000",
          "2.50700000",
          "1534614248.456738"
        ],
        [
          "5542.50000",
          "0.40100000",
          "1534614248.456738"
        ]
      ]
    }
  ]
]
```

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```
{
  "b": [
    [
      "5541.30000",
      "0.0000000",
      "1534614335.345903"
    ],
    "c": "974942666"
  ],
  "book-10",
  "XBT/USD"
}
```

### Example of republish payload

```
[
  1234,
  {
    "a": [
      [
        "5541.30000",
        "2.5070000",
        "1534614248.456738",
        "r"
      ],
      [
        "5542.50000",
        "0.4010000",
        "1534614248.456738",
        "r"
      ]
    ],
    "c": "974942666"
  },
  "book-25",
  "XBT/USD"
]
```

### ownTrades

**Publication:** Own trades. On subscription last 50 trades for the user will be sent, followed by new trades.

#### Payload

Name	Type	Description
(Dictionary)	object	
└ tradeid	object	Trade object
└ ordertxid	string	order responsible for execution of trade
└ postxid	string	Position trade id
└ pair	string	Asset pair
└ time	decimal	unix timestamp of trade
└ type	string	type of order (buy/sell)
└ ordertype	string	order type
└ price	decimal	average price order was executed at (quote currency)
└ cost	decimal	total cost of order (quote currency)
└ fee	decimal	total fee (quote currency)
└ vol	decimal	volume (base currency)
└ margin	decimal	initial margin (quote currency)

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Name	Type	Description
userref	integer	user reference ID
channelName	string	Channel Name of subscription
(Anonymous)	object	
sequence	integer	sequence number for ownTrades subscription

### Example of payload

```
[
  [
    {
      "TDLH43-DVQXD-2KHVYY": {
        "cost": "1000000.0000",
        "fee": "1600.0000",
        "margin": "0.0000",
        "ordertxid": "TDLH43-DVQXD-2KHVYY",
        "ordertype": "limit",
        "pair": "XBT/EUR",
        "postxid": "OGTT3Y-C6I3P-XRI6HX",
        "price": "100000.0000",
        "time": "1560516023.070651",
        "type": "sell",
        "vol": "1000000000.0000000"
      }
    },
    {
      "TDLH43-DVQXD-2KHVYY": {
        "cost": "1000000.0000",
        "fee": "600.0000",
        "margin": "0.0000",
        "ordertxid": "TDLH43-DVQXD-2KHVYY",
        "ordertype": "limit",
        "pair": "XBT/EUR",
        "postxid": "OGTT3Y-C6I3P-XRI6HX",
        "price": "100000.0000",
        "time": "1560516023.070658",
        "type": "buy",
        "vol": "1000000000.0000000"
      }
    },
    {
      "TDLH43-DVQXD-2KHVYY": {
        "cost": "1000000.0000",
        "fee": "1600.0000",
        "margin": "0.0000",
        "ordertxid": "TDLH43-DVQXD-2KHVYY",
        "ordertype": "limit",
        "pair": "XBT/EUR",
        "postxid": "OGTT3Y-C6I3P-XRI6HX",
        "price": "100000.0000",
        "time": "1560520332.914657",
        "type": "sell",
        "vol": "1000000000.0000000"
      }
    },
    {
      "TDLH43-DVQXD-2KHVYY": {
        "cost": "1000000.0000",
        "fee": "600.0000",
        "margin": "0.0000",
        "ordertxid": "TDLH43-DVQXD-2KHVYY",
        "ordertype": "limit",
        "pair": "XBT/EUR",
        "postxid": "OGTT3Y-C6I3P-XRI6HX",
        "price": "100000.0000",
        "time": "1560520332.914664",
        "type": "buy",
        "vol": "1000000000.0000000"
      }
    }
  ]
]
```

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```

        "vol": "1000000000.00000000"
    }
]
"ownTrades",
{
    "sequence": 2948
}
]
```

### openOrders

**Publication:** Open orders. Feed to show all the open orders belonging to the authenticated user. Initial snapshot will provide list of all open orders and then any updates to the open orders list will be sent. For status change updates, such as 'closed', the fields `orderid` and `status` will be present in the payload.

#### Payload

Name	Type	Description
(Dictionary)	object	
└ <code>orderid</code>	object	Order object
└ <code>refid</code>	string	Referral order transaction id that created this order
└ <code>userref</code>	integer	user reference ID
└ <code>status</code>	string	status of order
└ <code>opentm</code>	decimal	unix timestamp of when order was placed
└ <code>starttm</code>	decimal	unix timestamp of order start time (if set)
└ <code>display_volume</code>	decimal	Optional dependent on whether order type is iceberg - the visible quantity for iceberg order types
└ <code>display_volume_remain</code>	decimal	Optional dependent on whether order type is iceberg - the visible quantity remaining in the order for iceberg order types
└ <code>expiretm</code>	string	unix timestamp of order end time (if set)
└ <code>contingent</code>	object	conditional close order info (if conditional close set)
└ <code>ordertype</code>	string	conditional close order type
└ <code>price</code>	decimal	primary price of the conditional close order
└ <code>price2</code>	decimal	secondary price of the conditional close order
└ <code>oflags</code>	string	Optional - comma delimited list of order flags, of the conditional close order viqc = volume in quote currency (not currently available), fcib = prefer fee in base currency, fc iq = prefer fee in quote currency, nompp = no market price protection, post = post only order (available when ordertype = limit)
└ <code>descr</code>	object	order description info
└ <code>pair</code>	string	asset pair
└ <code>position</code>	string	Optional - position ID (if applicable)
└ <code>type</code>	string	type of order (buy/sell)
└ <code>ordertype</code>	string	order type
└ <code>price</code>	decimal	primary price
└ <code>price2</code>	decimal	secondary price
└ <code>leverage</code>	decimal	amount of leverage

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Name	Type	Description
└ order	string	order description
└ close	string	conditional close order description (if conditional close set)
└ lastupdated	decimal	unix timestamp of last change (for updates)
└ vol	decimal	volume of order (base currency unless viqc set in oflags)
└ vol_exec	decimal	total volume executed so far (base currency unless viqc set in oflags)
└ cost	decimal	total cost (quote currency unless viqc set in oflags)
└ fee	decimal	total fee (quote currency)
└ avg_price	decimal	average price (cumulative; quote currency unless viqc set in oflags)
└ stopprice	decimal	stop price (quote currency, for trailing stops)
└ limitprice	decimal	triggered limit price (quote currency, when limit based order type triggered)
└ misc	string	comma delimited list of miscellaneous info: stopped=triggered by stop price, touched=triggered by touch price, liquidation=liquidation, partial=partial fill
└ oflags	string	Optional - comma delimited list of order flags. viqc = volume in quote currency (not currently available), fcib = prefer fee in base currency, fciq = prefer fee in quote currency, nompp = no market price protection, post = post only order (available when ordertype = limit)
└ timeinforce	string	Optional - time in force.
└ cancel_reason	string	Optional - cancel reason, present for all cancellation updates (status="canceled") and for some close updates (status="closed")
└ ratecount	integer	Optional - rate-limit counter, present if requested in subscription request. See <a href="#">Trading Rate Limits</a> .
channelName	string	Channel Name of subscription
(Anonymous)	object	
└ sequence	integer	sequence number for openOrders subscription

### Example of payload

```
[
  [
    {
      "0GTT3Y-C6I3P-XRI6HX": {
        "avg_price": "34.50000",
        "cost": "0.00000",
        "descr": {
          "close": "",
          "leverage": "0:1",
          "order": "sell 10.00345345 XBT/EUR @ limit 34.50000 with 0:1 leverage",
          "ordertype": "limit",
          "pair": "XBT/EUR",
          "price": "34.50000",
          "price2": "0.00000",
          "type": "sell"
        },
        "expiretm": "0.000000",
        "fee": "0.00000",
        "limitprice": "34.50000",
        "vol": "10.00345345"
      }
    }
  ]
]
```

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```

    "misc": "",
    "oflags": "fcib",
    "opentm": "0.00000",
    "refid": "OKIVMP-5GVZN-Z2D2UA",
    "starttm": "0.00000",
    "status": "open",
    "stopprice": "0.00000",
    "userref": 0,
    "vol": "10.00345345",
    "vol_exec": "0.00000000"
  }
},
{
  "0GTT3Y-C6I3P-XRI6HX": {
    "avg_price": "5334.60000",
    "cost": "0.00000",
    "descr": {
      "close": "",
      "leverage": "0:1",
      "order": "sell 0.0000010 XBT/EUR @ limit 5334.60000 with 0:1 leverage",
      "ordertype": "limit",
      "pair": "XBT/EUR",
      "price": "5334.60000",
      "price2": "0.00000",
      "type": "sell"
    },
    "expiretm": "0.000000",
    "fee": "0.00000",
    "limitprice": "5334.60000",
    "misc": "",
    "oflags": "fcib",
    "opentm": "0.00000",
    "refid": "OKIVMP-5GVZN-Z2D2UA",
    "starttm": "0.00000",
    "status": "open",
    "stopprice": "0.00000",
    "userref": 0,
    "vol": "0.0000010",
    "vol_exec": "0.00000000"
  }
},
{
  "0GTT3Y-C6I3P-XRI6HX": {
    "avg_price": "90.40000",
    "cost": "0.00000",
    "descr": {
      "close": "",
      "leverage": "0:1",
      "order": "sell 0.0000100 XBT/EUR @ limit 90.40000 with 0:1 leverage",
      "ordertype": "limit",
      "pair": "XBT/EUR",
      "price": "90.40000",
      "price2": "0.00000",
      "type": "sell"
    },
    "expiretm": "0.000000",
    "fee": "0.00000",
    "limitprice": "90.40000",
    "misc": "",
    "oflags": "fcib",
    "opentm": "0.00000",
    "refid": "OKIVMP-5GVZN-Z2D2UA",
    "starttm": "0.00000",
    "status": "open",
    "stopprice": "0.00000",
    "userref": 0,
    "vol": "0.0000100",
    "vol_exec": "0.00000000"
  }
},
{
  "0GTT3Y-C6I3P-XRI6HX": {
    "avg_price": "90.40000",
    "cost": "0.00000",
    "descr": {
      "close": "",
      "leverage": "0:1",
      "order": "sell 0.00000100 XBT/EUR @ limit 90.40000 with 0:1 leverage",
      "ordertype": "limit",
      "pair": "XBT/EUR",
      "price": "90.40000",
      "price2": "0.00000",
      "type": "sell"
    },
    "expiretm": "0.000000",
    "fee": "0.00000",
    "limitprice": "90.40000",
    "misc": "",
    "oflags": "fcib",
    "opentm": "0.00000",
    "refid": "OKIVMP-5GVZN-Z2D2UA",
    "starttm": "0.00000",
    "status": "open",
    "stopprice": "0.00000",
    "userref": 0,
    "vol": "0.00000100",
    "vol_exec": "0.00000000"
  }
}

```

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```
{
    "0GTT3Y-C6I3P-XRI6HX": {
        "avg_price": "9.00000",
        "cost": "0.00000",
        "descr": {
            "close": "",
            "leverage": "0:1",
            "order": "sell 0.00001000 XBT/EUR @ limit 9.00000 with 0:1 leverage",
            "ordertype": "limit",
            "pair": "XBT/EUR",
            "price": "9.00000",
            "price2": "0.00000",
            "type": "sell"
        },
        "expiretm": "0.000000",
        "fee": "0.00000",
        "limitprice": "9.00000",
        "misc": "",
        "oflags": "fcib",
        "opentm": "0.000000",
        "refid": "OKIVMP-5GVZN-Z2D2UA",
        "starttm": "0.000000",
        "status": "open",
        "stopprice": "0.000000",
        "userref": 0,
        "vol": "0.00001000",
        "vol_exec": "0.00000000"
    }
},
],
"openOrders",
{
    "sequence": 234
}
]
```

#### Example of status-change payload

```
[
    [
        [
            {
                "0GTT3Y-C6I3P-XRI6HX": {
                    "status": "closed"
                }
            },
            {
                "0GTT3Y-C6I3P-XRI6HX": {
                    "status": "closed"
                }
            }
        ],
        "openOrders",
        {
            "sequence": 59342
        }
    ]
]
```

#### addOrder

**Request.** Add new order.

#### Payload

Name	Type	Description
event	string	addOrder
token	string	Session token string





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Name	Type	Description
price2	decimal	Optional dependent on order type - order secondary price
volume	decimal	Order volume in base currency
oflags	string	Optional - comma delimited list of order flags. post = post only order (available when ordertype = limit)
newuserref	string	Optional - user reference ID for new order (should be an integer in quotes)
validate	string	Optional - validate inputs only; do not submit order

#### Example of payload

```
{
  "event": "editOrder",
  "newuserref": "666",
  "oflags": "",
  "orderid": "026VH7-COEPR-YFYXLK",
  "pair": "XBT/USD",
  "price": "9000",
  "reqid": 3,
  "token": "000000000000000000000000000000000000000000000000000000000000000"
}
```

#### Response payload

Name	Type	Description
event	string	editOrderStatus
txid	string	order ID (if successful)
originaltxid	string	order ID (if successful)
reqid	integer	Optional - client originated requestId sent as acknowledgment in the message response
status	string	Status. "ok" or "error"
descr	string	order description info (if successful)
errorMessage	string	error message (if unsuccessful)

#### Example of payload

```
{
  "descr": "order edited price = 9000.0000000",
  "event": "editOrderStatus",
  "originaltxid": "065KZW-J4AW3-VFS74A",
  "reqid": 3,
  "status": "ok",
  "txid": "OTI672-HJFAO-XOIPPK"
}
```

#### cancelOrder

**Request.** Cancel order or list of orders.

For every cancelOrder message, an update message 'cancelOrderStatus' is sent. For multiple orderid in cancelOrder, multiple update messages for 'cancelOrderStatus' will be sent.

For example, if a cancelOrder request is sent for cancelling three orders [A, B, C], then if two update messages for 'cancelOrderStatus' are received along with an error such as 'EOrder: Unknown order', then it would imply



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### Example of payload

```
{
  "event": "cancelAll",
  "token": "000000000000000000000000000000000000000000000000000000000000000"
}
```

### Response payload

Name	Type	Description
event	string	cancelAllStatus
reqid	integer	Optional - client originated requestID sent as acknowledgment in the message response
count	integer	Number of orders cancelled.
status	string	Status. "ok" or "error"
errorMessage	string	error message (if unsuccessful)

### Example of payload

```
{
  "count": 2,
  "event": "cancelAllStatus",
  "status": "ok"
}
```

### cancelAllOrdersAfter

#### Request.

cancelAllOrdersAfter provides a "Dead Man's Switch" mechanism to protect the client from network malfunction, extreme latency or unexpected matching engine downtime. The client can send a request with a timeout (in seconds), that will start a countdown timer which will cancel \*all\* client orders when the timer expires. The client has to keep sending new requests to push back the trigger time, or deactivate the mechanism by specifying a timeout of 0. If the timer expires, all orders are cancelled and then the timer remains disabled until the client provides a new (non-zero) timeout.

The recommended use is to make a call every 15 to 30 seconds, providing a timeout of 60 seconds. This allows the client to keep the orders in place in case of a brief disconnection or transient delay, while keeping them safe in case of a network breakdown. It is also recommended to disable the timer ahead of regularly scheduled trading engine maintenance (*if the timer is enabled, all orders will be cancelled when the trading engine comes back from downtime - planned or otherwise*).

#### Payload

Name	Type	Description
event	string	cancelAllOrdersAfter
token	string	Session token string
reqid	integer	Optional - client originated requestID sent as acknowledgment in the message response
timeout	integer	Timeout specified in seconds. 0 to disable the timer.

