

Flex trading with Capacity Limiting Contracts using UFTP messages

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GOPACS supports flex trading with Capacity Limiting Contracts (CLC or **CBC**, *Capaciteitsbeperkingcontract*) and alternative non-firm transport rights such as **TDTR/NFA** through the exchange of Shapeshifter UFTP messages.

The implementation must be compliant to the [Shapeshifter UFTP specification](#) version **3.0.0** (for TDTR, **3.1.0** is required), with some restrictions which are described separately in this document.

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CLC message flow

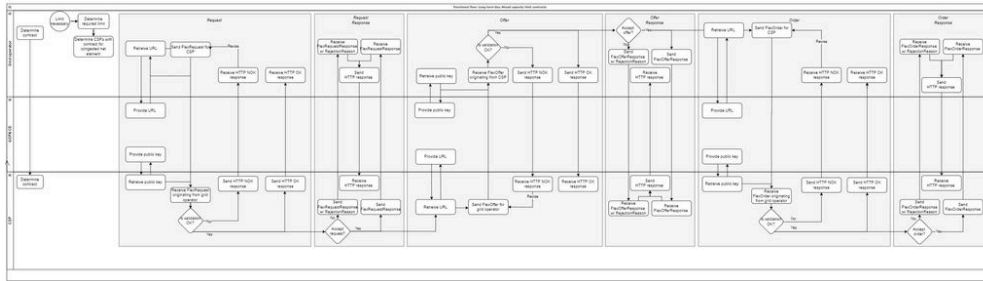
This requires minimum version 3.0.0, but some improvements are made in 3.1.0. Implementations should adopt version 3.1.0 as soon as possible. 

Overview of the GOPACS and UFTP message exchange for CLC contracts. The part where the URL and the public key is retrieved, is GOPACS specific.

Currently, a CLC call (*CBC-afroep*) uses the following message flow:

1. Grid operator calculates prognosis, expects flexibility is needed and initiates a call (*afroep*).
2. `FlexRequest` message is sent by the grid operator to the trading company, requesting a certain amount of flexibility.
3. `FlexRequestResponse` message is sent by the trading company to the grid operator, acknowledging the receipt of the request.
4. Trading company determines what flexibility is available.
5. `FlexOffer` message is sent by the trading company to the grid operator, indicating what flexibility is available.
6. `FlexOfferResponse` message is sent by the grid operator to the trading company, acknowledging the receipt of the offer.
7. Grid operator recalculates and chooses which flexibility to procure.

8. `FlexOrder` message is sent by the grid operator to the trading company, to procure the flexibility.
9. `FlexOrderResponse` message is sent by the trading company to the grid operator, acknowledging the receive of the order.
10. The call (*afroep*) is now completed.



For a readable version of the above diagram, please check the support documents sections.

TDTR/NFA message flow [🔗](#)

This requires version 3.1.0. [🔗](#)

Currently, a call (*afroep*) of TDTR/NFA contracts uses the following message flow:

1. Grid operator calculates prognosis, expects flexibility is needed and initiates a call (*afroep*).
2. `FlexOrder` message is sent by the grid operator to the trading company, to procure the flexibility.
3. `FlexOrderResponse` message is sent by the trading company to the grid operator, acknowledging the receive of the order.
4. The call (*afroep*) is now completed.

There is no negotiation phase where a `FlexRequest` and `FlexOffer` are exchanged.

Message broker [🔗](#)

The UFTP protocol allows direct communication between grid operators and trading companies. However, for the sake of monitoring and reporting, UFTP messages should be communicated via the GOPACS UFTP Message Broker. The message broker will forward the messages to the specified UFTP recipient.



Open source library [🔗](#)

To aid in building a compliant implementation GOPACS has built an open source library: <https://github.com/shapeshifter/shapeshifter-library>

When implementing the protocol, make sure the implementation is compliant to the GOPACS specifications as described in this document. All UFTP traffic must be uniform in order to make sure that every participant is able to communicate with each other.

GOPACS uses (in this documentation) the term Trading Company for every participant that has a contract with the Grid Company. In the UFTP specification the term AGR (aggregator) is used, and in some Capacity Limit Contracts the term CSP is used.

GOPACS environments [🔗](#)

Environment	ACC (suggested for testing integrations)	PRD
GOPACS UI	https://app.acc.gopacs.eu	https://app.gopacs.eu
UFTP endpoint This is where you send your messages to	https://clc-message-broker.acc.gopacs-services.eu/shapeshifter/api/v3/message	https://clc-message-broker.gopacs-services.eu/shapeshifter/api/v3/message
Participant API (address book)	https://clc-message-broker.acc.gopacs-services.eu/v2/participants/	https://clc-message-broker.gopacs-services.eu/v2/participants/
API documentation	 Swagger UI	 Swagger UI
Public IPs of GOPACS (for IP whitelisting)	3.75.32.104 3.77.164.86 35.158.231.79	3.121.132.49 3.76.130.111 3.78.82.175
Sign-up link for new CSPs	Sign-up for GOPACS	Sign-up for GOPACS

OAuth2 token endpoint	https://auth.acc.gopacs-services.eu/realms/gopacs/protocol/openid-connect/token	https://auth.gopacs-services.eu/realms/gopacs/protocol/openid-connect/token
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Getting started [🔗](#)

Account Setup for the GOPACS Application [🔗](#)

For New CSPs or Affiliates [🔗](#)

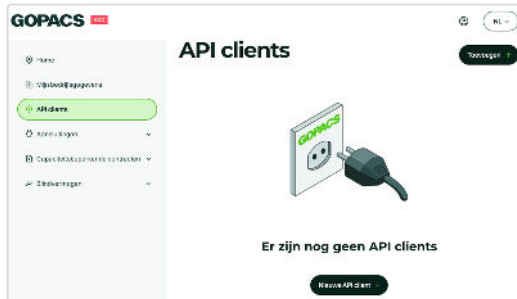
If you are a **new** CSP or affiliate (*aangeslotene*), you can create an account yourself if you don't already have one. Please note that each environment requires a **separate account**—accounts are not shared across environments.

After completing the sign-up form and accepting the terms, your request will be sent to a grid operator for approval. Once approved, you will receive an email with instructions to finalize your account setup. Only then will you be able to log in to the GOPACS application.

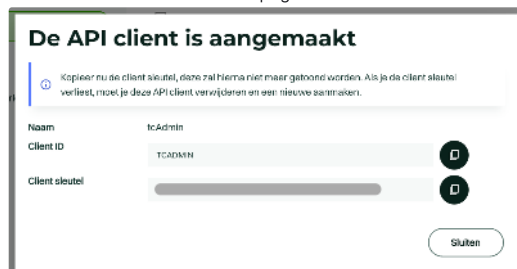
Set up an API client [🔗](#)

After signing up to GOPACS, you need to create at least one **API client** to authenticate your company on API requests:

1. Log in to the GOPACS GUI as company admin
2. Navigate to 'API clients' ACC: <https://app.acc.gopacs.eu/api-clients> or PRD: <https://app.gopacs.eu/api-clients>



3. Create a new API client on this page



4. Store the **client ID** and **client secret** somewhere secure (e.g. secrets manager software). Note that the client secret cannot be viewed again.

Enter your company details for UFTP and OAuth2.0 [🔗](#)

Please refer to the manual **Company settings for participating in CLC (Capacity Limiting Contracts)** on [Documents and manuals - GOPACS](#)

Obtaining a Bearer token [🔗](#)

Use the [OAuth2 client credentials flow](#) to obtain a Bearer token:

1. Configure an OAuth2 client to use the GOPACS OAuth2 token endpoint (see the table above)
2. Configure the client ID and client secret of the API client created via the GOPACS GUI
3. Perform the **OAuth2 client credentials flow**
4. A Bearer token will be returned (access token) which will be valid for a limited time (usually 5 minutes)
5. Include the Bearer token in each HTTP request to the GOPACS API
6. Refresh the Bearer token in time by performing the same flow again

Implement UFTP endpoint [🔗](#)

As a Trading Company you need to have an implementation of the UFTP protocol for sending and receiving messages to and from grid operators. To receive UFTP messages you need to expose an endpoint compliant to the Shapeshifter UFTP specification, that is ready to accept UFTP messages from GOPACS.

i NB. It is also possible to make use of the GOPACS UI to send and receive UFTP Flex messages.

Participant API ('Address book') [↗](#)

DNS discovery as described in the UFTP specification is currently not supported by GOPACS.

GOPACS provides an alternative API for discovery of UFTP participant information: the Participant API.

There are currently two endpoints for the discovery of UFTP Participant information; 1) Search on EAN and UFTP Role and 2) Search on Domain Name and UFTP Role

Search on EAN and UFTP Role [↗](#)

You can retrieve the participant information by searching on the EAN of the contracted grid connection and the UFTP role of the participant (DSO or AGR). As there may be multiple trading companies/aggregators on one grid connection, the response is a list of participants.

Example Participant API request:

```
1 GET /v2/participants/DSO?contractedEan=123456789012345678 HTTP/1.1
2 Accept: application/json
```

Example Participant API response:

```
1 HTTP/1.1 200 OK
2 Content-Type: application/json
3
4 [
5   {
6     "domain": "example.com",
7     "publicKey": "VFHpQ4B71g0KrVJAG+HK1zQctr1J3zjkK4BYGK79E+c=",
8     "endpoint": "https://clc-message-broker.gopacs-services.eu/shapeshifter/api/v3/message"
9   }
10 ]
```

NB! Since we actively encourage to let all UFTP message go through the CLC Message Broker for reporting purposes, the returned participant 'endpoint' is always the CLC Message Broker endpoint.

Response Status

HTTP status	Possible cause
200	ok (note: if no participants could be found, an empty list is returned with HTTP Status 200)
400	EAN is not 18 characters wide, or <code>uftpRole</code> is not <code>AGR</code> or <code>DSO</code> (<code>CR0</code> is not supported)

Search on Domain Name and UFTP Role [↗](#)

This is typically used to verify and decrypt the payload when receiving a message.

i GOPACS also provides a `v1/participants` endpoint, but this API endpoint has been marked as deprecated, and will be removed in a future release; we strongly advise you stop using this endpoint, and instead use the v2 endpoint instead.

Example Participant API request:

```
1 GET /v2/participants/DSO/example.com HTTP/1.1
2 Accept: application/json
```

Example Participant API response:

```
1 HTTP/1.1 200 OK
2 Content-Type: application/json
3
4 {
5   "domain": "example.com",
6   "publicKey": "VFHpQ4B71g0KrVJAG+HK1zQctr1J3zjkK4BYGK79E+c=",
7   "endpoint": "https://uftp.example.com/shapeshifter/v3/message"
8 }
```

Response statuses [↗](#)

HTTP status	Possible cause
200	ok

400	uftpRole is not AGR or DSO (CR0 is not supported)
404	Participant not found for role + domain name.

GOPACS on behalf of a Grid Company or Trading Company [↗](#)

If a Grid Company or Trading Company doesn't have their own UFTP API, they can use the GOPACS platform (<https://gopacs.eu/>) to send and receive messages on their behalf. In this case, the UFTP messages are delivered to a GOPACS endpoint and GOPACS responds on behalf of that participant.

If GOPACS sends a message on behalf of a participant, the SenderDomain is always the UFTP domain of the actual (original) Grid Company or Trading Company, not GOPACS.

ISPs [↗](#)

Certain message types such as FlexRequest, FlexOffer and FlexOrder contain ISPs: Imbalance Settlement Periods.

While the Shapeshifter UFTP specification allows to include not only the ISPs that are requested (limited or steered), but also those that are available (not limited or steered), GOPACS currently only expects the ISPs that are to be limited under the contract.

ISP Duration [↗](#)

Currently the ISP duration supported is always 15 minutes.

ISP-Duration	Required. Must be PT15M
--------------	-------------------------

ISP Start [↗](#)

First ISP of the day is 1. 00:00:00 (inclusive) until 00:15:00 (exclusive)

Second ISP of the day is 2. 00:15:00 (inclusive) until 00:30:00 (exclusive)

Last ISP of the day is 96 or 100 or 92. 23:45:00 (inclusive) until 00:00:00 the next day (exclusive)

ISPs and Daylight Saving time [↗](#)

ISPs with respect to Daylight Saving Time (DST), assuming Europe/Amsterdam and a 15 minute ISP duration:

- On the last Sunday of March when the clock goes from CET (standard) to CEST (summer), the number of ISPs will be 92:
 - ISP 1: 00:00-00:15
 - ISP 2: 00:15-00:30
 - ISP 3: 00:30-00:45
 - ISP 4: 00:45-01:00
 - ISP 5: 01:00-01:15
 - ISP 6: 01:15-01:30
 - ISP 7: 01:30-01:45
 - ISP 8: 01:45-**03:00**
 - ISP 9: **03:00**-03:15
 - etc.
 - ISP 92: 23:45-00:00
- On the last Sunday of October when the clock goes from CEST (summer) to CET (standard), the number of ISPs will be 100.
 - ISP 1: 00:00-00:15
 - ISP 2: 00:15-00:30
 - ISP 3: 00:30-00:45
 - ISP 4: 00:45-01:00
 - ISP 5: 01:00-01:15
 - ISP 6: 01:15-01:30
 - ISP 7: 01:30-01:45
 - ISP 8: 01:45-02:00
 - ISP 9: 02:00-02:15
 - ISP 10: 02:15-02:30
 - ISP 11: 02:30-02:45
 - ISP 12: 02:45-**02:00**
 - ISP 13: **02:00**-02:15
 - etc.
 - ISP 100: 23:45-00:00
- On any other day, the number of ISPs will be 96.

ISP (Min, Max) Power [↗](#)



⚠ This is the **absolute** capacity in watts, not the deviation as stated in the Shapeshifter specification. This might change when V4.x of the Shapeshifter specification is implemented.

- The GUI shows the power values in MW
- In the UFTP messages, power values are in W

Depending on the capacity limiting direction:

- When limiting **feed-in**:
 - `MaxPower` = 0
 - `MinPower` is the maximum allowed feed in as a negative number. E.g. when limiting the feed in to 3 MW, `MinPower` = -3000000.
If no feed in is allowed at all, `MinPower` = 0
 - `MinPower` must be a multiple of -1000W (in other words, the limitation is specified in steps of 1kW) and must also match the steps defined in the contract.
- When limiting **offtake**:
 - `MinPower` = 0
 - `MaxPower` is a positive number specifying the maximum allowed power offtake in Watts.
 - `MaxPower` must be a multiple of 1000W.

Baseline [🔗](#)

This is a proposal and is not supported yet.

ISP.DefaultBaseline Not supported yet 🔗	Capacity in the default situation that would occur if no flexibility were activated. This is usually equal to the contracted transport capacity (GTV). Example: the GTV is 100 MW. No flexibility is activated yet: the <code>DefaultBaseline</code> is 100 MW. If 25 MW of flexibility was already activated: the <code>DefaultBaseline</code> is still 100 MW. This is a proposal and is not supported yet.
ISP.Baseline Not supported yet 🔗	Capacity baseline before this flexibility was requested. If flex capacity was activated earlier, in a different conversation, then this is the capacity with the deviation applied. Example: the <code>DefaultBaseline</code> is 100 MW. An earlier conversation has activated 25 MW of flexibility. When this <code>FlexRequest</code> is sent to request the activation of another 20 MW of flexibility, the <code>Baseline</code> would be 75 MW and the <code>MaxPower</code> would be 55 MW. This is a proposal and is not supported yet.

SignedMessage [🔗](#)

Example of a SignedMessage HTTP request (some headers omitted for clarity):

```
1 POST /shapeshifter/api/v3/message HTTP/1.1
2 Accept: application/json (or */* or omit)
3 Authorization: Bearer ...
4 Content-Type: text/xml
5
6 <?xml version="1.0" encoding="UTF-8" standalone="yes">
7 <SignedMessage
8   SenderDomain="dso.nl"
9   SenderRole="DSO"
10  Body="..." />
```

Attribute	GOPACS expectation
SenderDomain	Grid Company must log in to the GOPACS UI and configure UFTP domain, public key and endpoint in GOPACS, prior to receiving or sending messages. When GOPACS is sending messages on behalf of Grid Company or Trading Company, then the SenderDomain is equal to the domain of actual UFTP participant.
SenderRole	Must be <code>DSO</code> for a Grid Company. Must be <code>AGR</code> for a Trading Company. Other values are not supported. GOPACS is not considered a 'party' in the UFTP exchange and therefore does not have a 'role'.


```

9 ogICAgICAgIFRpbWVab25lPSJFdXJvcGUvGUV1zd6VYzG6tIg0KICAgICAgICBQZXJpb2Q9IjIwMjEtMTAt
10 MzAiQDQogICAgICAgIEVnbYnRyYWN0SUQ9IktEQUtEQS0xMjM0NSINCiAgICAgICAgQ29uZ2Vzd6lVb1bVbAeW
11 50PSJlYW4uMjY0TG1M2TgYnA3MzIyOTUxIg0KICAgICAgICBSZXZpc2lVbj0iMSINCiAgICAgICAgR3hw
12 aXJhd6lVb1bRhd6UaWU1lPSjYIMDIxLTl5VDIyOjE0jAeLjAeMDBAj4NCiAgICAgICAgICBSVnQIERpc3Bvc2
13 l0aW9uPSJSZXF1ZXN0ZWQieIE1pb1bVd2VyPSiWiIBNYXhqb3d1cjd0iNTAwMDAwMDAiIFN0YXJ0PSi00CIg
14 RHVyYXRpb249IjEiLz4NCiAgICAgICAgICBSVnQIERpc3Bvc2l0aW9uPSJSZXF1ZXN0ZWQieIE1pb1bVd2VyPSiWiI
15 BNyXhqb3d1cjd0iNTAwMDAwMDAiIFN0YXJ0PSi00SIgRHVyYXRpb249IjEiLz4NCiAgICAgICAgICBSVnQIERpc3Bv
16 c2l0aW9uPSJSZXF1ZXN0ZWQieIE1pb1bVd2VyPSiWiIBNYXhqb3d1cjd0iNTAwMDAwMDAiIFN0YXJ0PSi1MC
17 IGRHvyYXRpb249IjEiLz4NCiAgICAgICAgICBSVnQIERpc3Bvc2l0aW9uPSJSZXF1ZXN0ZWQieIE1pb1bVd2VyPSiWi
18 IiBNYXhqb3d1cjd0iNTAwMDAwMDAiIFN0YXJ0PSi1MSIiGRHvyYXRpb249IjEiLz4NCiJwRmx1eFlJlXVl3c3Q+"/>

```

All the validations from the UFTP specification apply. On top of that GOPACS has some additional restrictions with respect to the usage of UFTP message for CLC:

Attribute/Element	GOPACS additional restrictions				
Version	Must be 3.0.0 (currently).				
SenderDomain	Grid Company must log in to the GOPACS UI and configure UFTP domain, public key and endpoint in GOPACS, prior to receiving or sending messages.				
RecipientDomain	Trading Company must log in to the GOPACS UI and configure UFTP domain, public key and endpoint in GOPACS, prior to receiving or sending messages.				
TimeStamp	<p>Parsing supports different offsets and handles accordingly. The offset can be either in "+HH:mm:ss" format or "Z".</p> <p>GOPACS ignores the milliseconds part when parsing.</p> <p>GOPACS always sends either a UTC timestamp (no offset and "Z" suffix) or a timestamp in the Europe/Amsterdam timezone (offset +01:00 or +02:00 depending on DST).</p> <p>The milliseconds part can be between 0 and 9 digits where the omitted digits are implied to be zero.</p>				
Revision	Required. Must be 1. Revisions are currently not supported yet.				
ServiceType	<p>The ServiceType specifies which type of flexibility is being requested.</p> <table><tr><td>ServiceType</td><td></td></tr><tr><td>CBC</td><td>Capacity Limiting Contract (<i>Capaciteitsbeperkingscontract</i>)</td></tr></table>	ServiceType		CBC	Capacity Limiting Contract (<i>Capaciteitsbeperkingscontract</i>)
ServiceType					
CBC	Capacity Limiting Contract (<i>Capaciteitsbeperkingscontract</i>)				
ISP-Duration	Required. See ISPs .				
TimeZone	Required. Must be Europe/Amsterdam				
Period	<p>Required. ⚠ The day of congestion. Format: YYYY-MM-DD always interpreted in Europe/Amsterdam time zone. <u>Any offset is ignored</u>.</p> <p>The message must be sent before 12:00:00 the day before Period.</p> <p>Examples:</p> <ul style="list-style-type: none">• If the message is received before 12:00:00, then the Period may be tomorrow or later.• If the message is received after 12:00:00, then the Period must be the day after tomorrow or later.				
ExpirationDateTime	⚠ The expiration date time must be no later than 12:00:00 the day before the day of congestion (Period).				
ContractID	<p>Functional required. Typical format: A-AA-A-12345</p> <p>Trading Company must log in to the GOPACS UI and register the CLC contract, prior to receiving or sending messages.</p>				
CongestionPoint	<p>ean.[0-9]{18}</p> <p>Must be a known EAN of a preregistered CLC contract in GOPACS.</p> <p>Does not have to be known as Grid Connection in GOPACS.</p>				
ISP	Required. See ISPs .				
ISP.Start	Required. See ISPs .				
ISP.Duration					
ISP.Disposition	Must be Requested See ISPs .				
ISP.MinPower	See ISPs .				
ISP.MaxPower					

Example FlexRequestResponse:

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexRequestResponse
3   Version="3.0.0"
4   SenderDomain="agr.nl"
5   RecipientDomain="dso.nl"
6   TimeStamp="2021-10-29T06:54:36.4473962Z"
7   MessageID="7f0f4e68-f842-4b92-911e-b26f85525067"
8   ConversationID="48cdc3d2-56c0-436c-8d5a-6f6cc3dc538d"
9   Result="Accepted"
10 FlexRequestMessageID="d3ae4836-55b1-4084-b54e-34107b22648c"/>
```

Example of the same FlexRequestResponse message signed with the ACC key:

```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <SignedMessage SenderDomain="agr.nl" SenderRole="AGR"
3     Body="3fD4Ie5Jk6h7k6TQaEsJ4Vego1CXpA/1ztX1yaej1db0SnufscFZZy630EsUJFVM3Ihy0+3
4     V9WdcW0RSldnJATx6b6V4UmVxdWVZdFnc13BvbnNlDQogICAgICAgVzIcnNpb249IjMuKC4wIG9K
5     ICAGICAgICBTZW5kZXZJZmU2bWVudFJlci51bCINCiAgICAGICAgUmVjaXBpZW50R69tYWUwLWU5JGk
6     28ubmwiDQogICAgICAgIFRpbWVdTGFtcD0iMjAyMS0xMC0yOVQwNj0iND0zNi40NDM30TYyWiINCi
7     AgICAgICAgTWFzc2F2ZnU1EUPS13ZjBmNGU20C1m0DQyLlRlOi0tOTExZS1iMjZm0DU1MjUwNjc1dDQo
8     gICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
9     0GQIDQogICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC
10    ULEPSJKM2F1NDgzNi01NWlXICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgIC

```

Or when it is rejected:

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexRequestResponse
3   Version="3.0.0"
4   SenderDomain="aggregator.org"
5   RecipientDomain="uftp.dso.nl"
6   TimeStamp="2021-10-29T06:54:36.4437962Z"
7   MessageID="7f0f4e68-f842-4b92-911e-b26f85525067"
8   ConversationID="48cdc3d2-56c0-436c-8d5a-6f66c3dc538d"
9   Result="Rejected"
10  RejectionReason="Reference Period mismatch"
11  FlexRequestMessageID="d3ae4836-55b1-4084-b54e-34107b22648c"/>
```

Example of the same FlexRequestResponse message signed with the ACC key:

[illegible]

Sent by the Trading Company to the Grid Company as answer to a FlexRequest.

Example of a FlexOffer message for a CBC contract:

```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexOffer
3   Version="3.0.0"
4   SenderDomain="agr.nl"
5   RecipientDomain="dso.nl"
6   TimeStamp="2021-10-29T06:54:36.8868538Z"
7   MessageID="338ed243-5517-4400-962e-2b7b812c468c"
8   ConversationID="48cdc3d2-56c0-436c-8d5a-6f6cc3dc538d"
9   ServiceType="CBC"
10  ISP-Duration="PT15M"
11  TimeZone="Europe/Amsterdam"
12  Period="2021-10-30"
13  CongestionPoint="ean.265987182507322951"


```


```
14 ExpirationDateTime="2021-10-29T10:30:00Z"
15 FlexRequestMessageID="d3ae4836-55b1-4084-b54e-34107b22648c"
16 ContractID="A-AA-A-12345"
17 BaselineReference=""
18 Currency="EUR">
19 <OfferOption OptionReference="ba40a5f8-849b-4fe6-958f-e628a1653558"
20   Price="0.00">
21   <ISP Start="58" Duration="1" Power="50000000"/>
22   <ISP Start="59" Duration="1" Power="50000000"/>
23   <ISP Start="60" Duration="1" Power="50000000"/>
24   <ISP Start="61" Duration="1" Power="50000000"/>
25 </OfferOption>
26 </FlexOffer>
```

Example of the same FlexOffer message signed with the ACC key:

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <SignedMessage SenderDomain="agr.nl" SenderRole="AGR"
3   Body="whfSzCmP90m12y/61fz/7a6hRvz7Am5waAwmtKT52kbEG90hqHTj4DisCRNnmGHmDjAsq6AyNB/YG+gDnZ5Bjx6bGV4T2ZmZXINCiAgICAgICAgVmVyc2lrbj0iMy4w"
```

 Unsolicited FlexOffer messages are rejected by GOPACS. There must always be a preceding FlexRequest.

 At most 1 FlexOffer message may be sent as part of a conversation. All successive FlexOffer messages will be rejected by GOPACS.

Attribute/Element	
D-PrognosisMessageID	Ignored.
BaselineReference	Ignored.
Currency	Must be <code>EUR</code> .
Price	Must be <code>0.00</code> (for now). Must comply with ISO 4217 . <code>0.00</code> , <code>0.0</code> and <code>0</code> are all allowed and considered equal in the GOPACS implementation.
OfferOption	 Exactly 1 OfferOption element is expected.
OfferOption.MinActivationFactor	Optional. Ignored.
ISP.Power	Depending on the contractual agreements between AGR and DSO the <code>Power</code> either is equal to what has been requested in the <code>FlexRequest</code> or it can deviate. In the case of a limitation on production, <code>Power</code> refers to the <code>MinPower</code> attribute of the <code>ISP</code> . In case the consumption is limited, <code>Power</code> refers to the <code>MaxPower</code> attribute. See ISPs . It is allowed to send an offer on a subset of the requested ISPs.

Other attributes like Period, CongestionPoint, ContractID, etc. must be equal to the original FlexRequest.

FlexOfferResponse

Example FlexOfferResponse:


```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexOfferResponse
3   Version="3.0.0"
4   SenderDomain="dso.nl"
5   RecipientDomain="arg.nl"
6   TimeStamp="2021-10-29T06:54:36.4437962Z"
7   MessageID = UUID
8   ConversationID = UUID
9   FlexOfferMessageID = UUID
10  Result = ("Accepted" | "Rejected")
11  RejectionReason = String (Only if Result = "Rejected")
12 />
```

FlexOrder (for CLC)


Example of a FlexOrder message for a CLC contract, where the off-take transport capacity is limited to 50 MW (the original contracted transport capacity is 100 MW):

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexOrder
3   Version="3.0.0"
```

```
4 SenderDomain="dso.nl"
5 RecipientDomain="agr.nl"
6 TimeStamp="2021-10-29T06:55:36.518Z"
7 MessageID="dc0f19c4-3835-4753-8f0c-0319d6642fbb"
8 ConversationID="48cdc3d2-56c0-436c-8d5a-6f6cc3dc538d"
9 ServiceType="CBC"
10 ISP-Duration="PT15M"
11 TimeZone="Europe/Amsterdam"
12 Period="2021-10-30"
13 CongestionPoint="ean.265987182507322951"
14 FlexOfferMessageID="338ed243-5517-4400-962e-2b7b812c468c"
15 ContractID="A-AA-A-12345"
16 Price="0.00"
17 Currency="EUR"
18 OrderReference="None">
19 <ISP Start="58" Duration="1" Power="50000000"/>
20 <ISP Start="59" Duration="1" Power="50000000" />
21 <ISP Start="60" Duration="1" Power="50000000" />
22 <ISP Start="61" Duration="1" Power="50000000" />
23 </FlexOrder>
```

Attribute/Element	
ServiceType	CBC
Currency	Must be <code>EUR</code> .
Price	Must equal the Price in the FlexOffer.
OrderReference	May be filled by the calling grid company for settlement process. If the grid operator is using GOPACS for UFTP, and they start a request from the GUI, this field is filled with a generated UUID.
ISP	 Currently GOPACS orders exactly what was offered (if on behalf of a Grid Company) - including ISPs and min activation factor.
ISP.Power	Depending on the contractual agreements between AGR and DSO the <code>Power</code> either is equal to what has been requested in the <code>FlexRequest</code> or it can deviate. In the case of a limitation on production, power refers to the <code>MinPower</code> attribute of the <code>FlexRequest</code> . In case the consumption is limited, power refers to the <code>MaxPower</code> attribute. See ISPs .

FlexOrder (for TDTR)

This requires version 3.1.0. 

Example of a FlexOrder message for a TDTR contract, where the transport capacity is limited to 50 MW (the original contracted transport capacity is 70 MW):

```
1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <FlexOrder
3   Version="3.1.0"
4   SenderDomain="dso.nl"
5   RecipientDomain="agr.nl"
6   TimeStamp="2021-10-29T06:55:36.518Z"
7   MessageID="dc0f19c4-3835-4753-8f0c-0319d6642fbb"
8   ConversationID="48cdc3d2-56c0-436c-8d5a-6f6cc3dc538d"
9   ServiceType="TDTR"
10  ISP-Duration="PT15M"
11  TimeZone="Europe/Amsterdam"
12  Period="2021-10-30"
13  CongestionPoint="ean.265987182507322951"
14  ContractID="0000001"
15  Price="0.00"
16  Currency="EUR"
17  OrderReference="None">
18  <ISP Start="58" Duration="1" Power="50000000"/>
19  <ISP Start="59" Duration="1" Power="50000000" />
20  <ISP Start="60" Duration="1" Power="50000000" />
21  <ISP Start="61" Duration="1" Power="50000000" />
22 </FlexOrder>
```

Attribute/Element	
Version	Must be <code>3.1.0</code> for ATR.
ServiceType	Type of ATR contract.

	ServiceType	
	TDTR	Time-bounded transport right (<i>tijdsduurgebonden transportright</i>)
	NFA	Non firm transport right (<i>non-firm ATO</i>)
ContractID	Unique number of the ATR contract.	
Currency	Must be <code>EUR</code> .	
Price	Must be <code>0.00</code> . But is ignored for now.	
OrderReference	May be filled by the calling grid company for settlement process.	
ISP	ISPs that are to be limited under the contract. See ISPs of <code>FlexRequest</code> .	
ISP.Power	See ISPs .	

FlexOrderResponse [↗](#)

i An "Accepted" response from the Trading Company means that there is a binding agreement.

Example FlexOrderResponse:

```

1  <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2  <FlexOrderResponse
3    Version           = "3.0.0"
4    SenderDomain      = "dso.nl"
5    RecipientDomain   = "arg.nl"
6    TimeStamp         = "2021-10-29T06:54:36.4437962Z"
7    MessageID         = UUID
8    ConversationID     = UUID
9    FlexOrderMessageID = UUID
10   Result             = ("Accepted" | "Rejected")
11   RejectionReason    = String (Only if Result = "Rejected")
12 />
```

Must Run / CSC [↗](#)

i Proposed, not decided yet.

Contracts [↗](#)

Contracts must be registered in GOPACS before calling them. The ContractID is the identifying attribute e.g. T-CA-I-12345.

Note: If a connection has both a CBC and a Must Run contract then both must have a unique ContractID.

MVP: leave fees empty (or 0) as currently only 'limitation' fees can be registered.

Differences in contract registration compared to CBC:

- Change terminology e.g. 'minimum transport capacity' to be more correct for both CBC and CSC contracts: 'steerable capacity' We must avoid the terms minimum and maximum because they differ per context.
- Max #calls/hours/MWh per time unit
 - **?** Do we need to account these hours similar to ATR?

UFTP messages [↗](#)

Grid operator may send a periodic message to indicate the need for must run for the next day. Proposal: to also use `FlexRequest` for this. **?** This could also be done with the (not yet used) `FlexReservationUpdate` ?

Must-Run **consumption** contract:

- FlexRequest
 - ServiceType: CSC? tbd MVP: allowed to be left empty
 - Period

- ExpirationDateTime: tbd
- ISP:
 - Disposition: REQUESTED
 - MinPower: Positive value, the “at least” limit, may be 0 to indicate there is no must run expected
 - MaxPower: Positive value, usually the original contracted transport capacity
- FlexRequestResponse
- FlexOffer:
 - ISP:
 - Power: Value between MinPower and MaxPower from the FlexRequest. This means the plant CAN take at least Power from the grid.
- FlexOfferResponse
- FlexOrder:
 - ServiceType: same as in FlexRequest, only if AGR supports 3.1.0 or later
 - ISP:
 - Power: MinPower from FlexRequest. This means the plant MUST take at least Power from the grid.
- FlexOrderResponse: agreement is reached

Must-Run **production** contract:

- FlexRequest, same as above, except:
 - ISP:
 - MinPower: Negative value, usually the original contracted transport capacity
 - MaxPower: Negative value, the “at least” limit, may be 0 to indicate there is no must run expected
- FlexRequestResponse, same as above
- FlexOffer:
 - Power: Value between MinPower and MaxPower from the FlexRequest. This means the plant CAN feed at least Power into the grid.
- FlexOfferResponse, same as above
- FlexOrder:
 - ServiceType: same as in FlexRequest, only if AGR supports 3.1.0 or later
 - ISP:
 - Power: = MaxPower from FlexRequest. This means the plant MUST feed at least Power into the grid.
- FlexOrderResponse: same as above

Validations [🔗](#)

Because steering needs more variables and has more considerations as compared to limitation, we need to validate more constraints when calling: e.g. time between calls, minimum length.

? Is GOPACS going to be the ‘gate keeper’? If so, we need to have a technical way of validating and also reporting validation errors back to the grid operator. Currently Shapeshifter may or may not support this correctly. Also it brings more responsibility to GOPACS: can and will GOPACS do this. Any validations need to be aligned across grid operators. Any changes need to be coordinated. GOPACS could provide all the necessary data for validation, but leave the responsibility at the grid operator.

Testing receiving and sending flex messages [🔗](#)

Acceptance environment [🔗](#)

On the acceptance environment only, we have created a testing option to test whether your UFTP implementation can receive and send flex messages. With your trading company account you can trigger a flex request, which will be sent to your endpoint. Please refer to the manual **Testing receiving and sending flex messages by UFTP API** on [Documents and manuals - GOPACS](#).

Production environment [🔗](#)

After you have completed your testing on the Acceptance environment successfully, you might want to check your environment specific UFTP settings for the Production environment. The UFTP protocol provides the `TestMessage` and `TestMessageResponse` message types for testing purposes. Both are Supported by the clc-message-broker. They can be used to test your UFTP settings on the Production environment

Testing sending messages and receiving a response message [🔗](#)

If a `TestMessage` is sent to the clc-message-broker with a recipient that is using GOPACS for UFTP, a `TestMessageResponse` will be sent back automatically.

Test receiving messages and responding with a response message [🔗](#)

To test receiving a TestMessage and responding with a TestMessageResponse you can ask your grid company to send a TestMessage with your uftp implementation as recipient. The clc-message-broker will then forward this test message to your uftp implementation.

GOPACS implementation specifics [🔗](#)

- ❌ FlexOfferRevocation not supported yet
- ❌ FlexRequest revisions not supported yet
- ❌ Other message types are not supported yet

⚠️ A duplicate MessageID is immediately responded to with a 400 Bad Request and **not** a 200 OK followed by "Rejected" response as described in the specification!

⚠️ MinPower, MaxPower and Power are implemented as absolute values.

ℹ️ After a 200 OK is returned, a received message is immediately processed by GOPACS. An accepted or rejected response is sent back almost instantaneously.

ℹ️ The user receives realtime email notifications when a FlexRequest, FlexOffer or FlexOrder is received, rejected or failed to deliver.

ℹ️ An outgoing UFTP message is retried every 3 minutes for a maximum of 5 tries. After that, the user and GOPACS DevOps team are notified of a failure to deliver. Specifically on a 400 Bad Request, a message is not retried.

ℹ️ Typically there will be at most 15 mins between FlexRequest and FlexOrder.