



BSP - Implementation Guide

Fifty Nordic MMS - FCR capacity market

Business process: FCR capacity market

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Revision History

Version	Release	Date	Changed by	Comments
1	Release	30.06.2023	Johan Tufvesson Bent Atle Bjørtomt Per Otto Garsjø	FCR Guide for BSPs
1	1	04.07.2023	Jan Owe	Correction according to review.
1	2	11.07.2023	Bent Atle Bjørtomt	<p>According to feedback:</p> <p>Sequence diagram updated, acknowledge ar only sent for Bids (offers and repurchase).</p> <p>In future domain will support bidding zone (noted some places in doc.).</p> <p>EDX Service name updated, the service is not ready at the moment.</p> <p>Repurchase is just Bids sent with negative quantity, som clarifications are done in doc.</p> <p>Removed code for first/second auction support in marketAgreement.type</p>

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1 Introduction

1.1 Background

1. Frequency Containment reserves (FCR) is one of several different types of Balancing Services that TSOs use for balancing of the Nordic synchronous area.
2. The Nordic MMS, developed by the Nordic TSOs, has been enhanced by Svenska Krafttät and Statnett to allow a procurement of FCR balancing capacity before and after the day ahead market runs.

1.2 Scope

This document covers the technical implementation details when integrating with Nordic MMS and provides information about the processes required to interact with a FCR capacity market. Both functional and technical aspects are covered. The intended users of this document are the participating BSPs.

The main processes described are:

- Bid handling process
- Market clearing process

If there are deviation between market regulations published by the TSO and this guide, market regulation take precedence.

1.3 Terms and definitions

Acronym	Term	Definition
ACE	Area Control Error	
BSP	Balancing Services Provider	<i>A market participant with reserve-providing units or reserve-providing groups able to provide balancing services to TSOs</i>
ECP	Energy Communication Platform	<i>Reference implementation of MADES standard</i>
FCR	Frequency Containment reserves	<i>The FCR that can be activated by an automatic control device designed to reduce the FRCE/ACE</i>
FCR-N	Frequency Containment Reserve for Normal operation	<i>FCR-N, in the range of 49.9 – 50.1 Hz</i>
FCR-D	Frequency Containment Reserve for Disturbances	<i>FCR-D Up, upwards, in the range of 49.9 – 49.5 Hz FCR-D Down, downwards, in the range of 50.1 – 50.5 Hz</i>
FRCE	Frequency Restoration Control Error	
MADES	Market Data Exchange Standard	<i>Communication IEC standard designed by ENTSO-E</i>
MOL	Merit Order List	<i>A list of Balancing Energy bids sorted in order of their bid prices, used for the activation of Balancing Energy bids within a Coordinated Balancing Area.</i>
NOIS	Nordic Operational Information System	
TSO	Transmission System Operator	<i>A party that is responsible for a stable power system operation (including the organisation of physical balance) through a transmission grid in a geographical area. In the Nordic synchronous area, there are four TSOs: Svenska kraftnät, Fingrid, Energinet.dk and Statnett.</i>
	connecting TSO	<i>the TSO that operates the scheduling area in which balancing service providers and balance responsible parties shall be compliant with the terms and conditions related to balancing;</i>

1.4 References

- Ref [1] IEC 62325-451-1, *Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market*
- Ref [2] Use local Market Rules defined by TSO. Statnett, please see [here](#). For Svenska Kraftnät, please see here [Svenska kraftnät/ Energinet](#) and [Balansansvarsavtalet | Svenska kraftnät \(svk.se\)](#).

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- Ref [3] [ENTSO-E Reserve Bid document – UML model and schema](#)
- Ref [4] [ENTSO-E Balancing Document – UML model and schema](#)
- Ref [5] [ENTSO-E Reserve Allocation Result document – UML model and schema](#)
- Ref [6] [ENTSO-E Acknowledgement document](#)

2 Business context

The Frequency activated reserves (FCR) are divided into Frequency Containment Reserves, for Disturbance (FCR-D Up and FCR-D Down) and Normal (FCR-N).

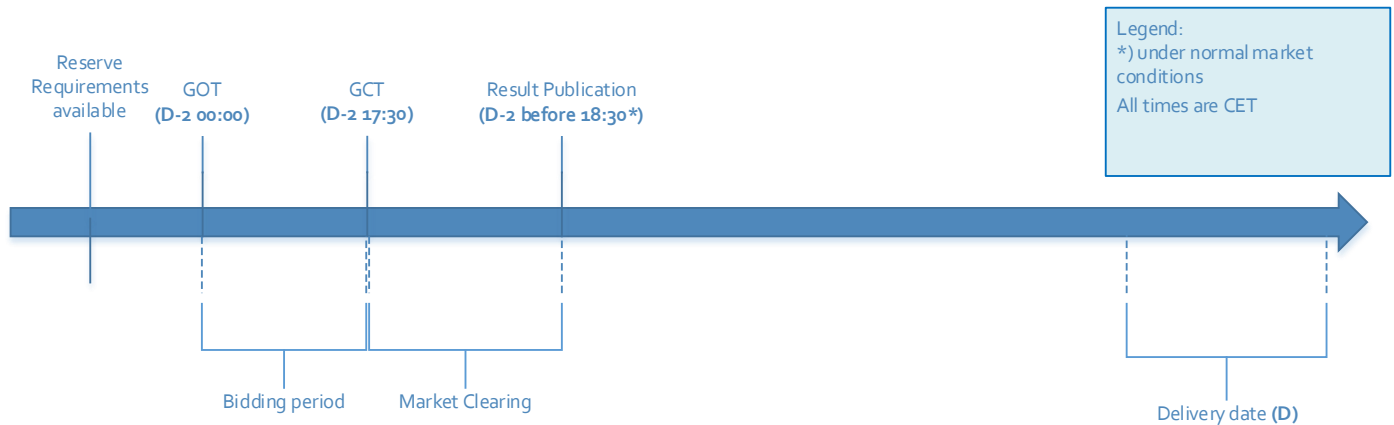
2.1 Timeline

The FCR Capacity Market involves several operational phases. The diagram below shows the timelines for the FCR capacity market.

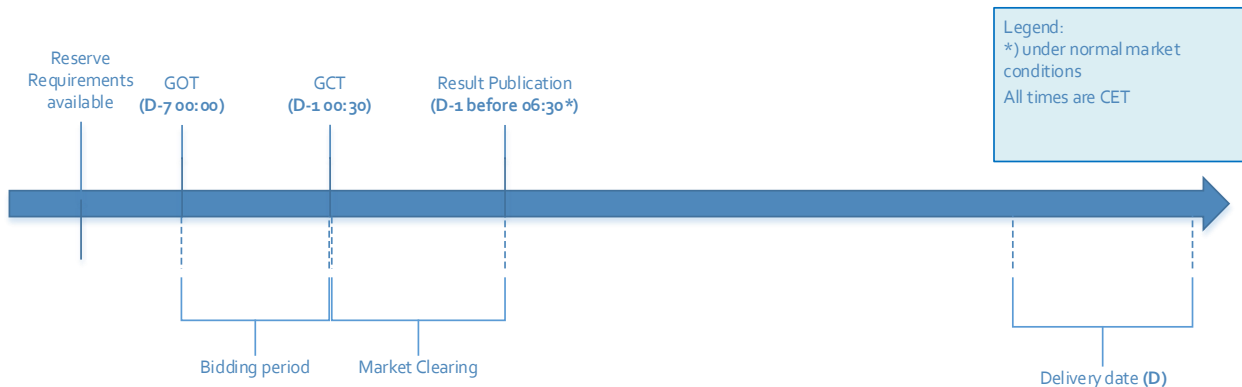
There are some local variations for the FCR Capacity market timelines. It consist of three auctions, but there are different opening, closing and publication times.

Section below will indicate which country the different timeline belongs to: Denmark (DK2 only), Finland (FI), Norway (NO) and Sweden (SE).

Timeline for NO: First auction

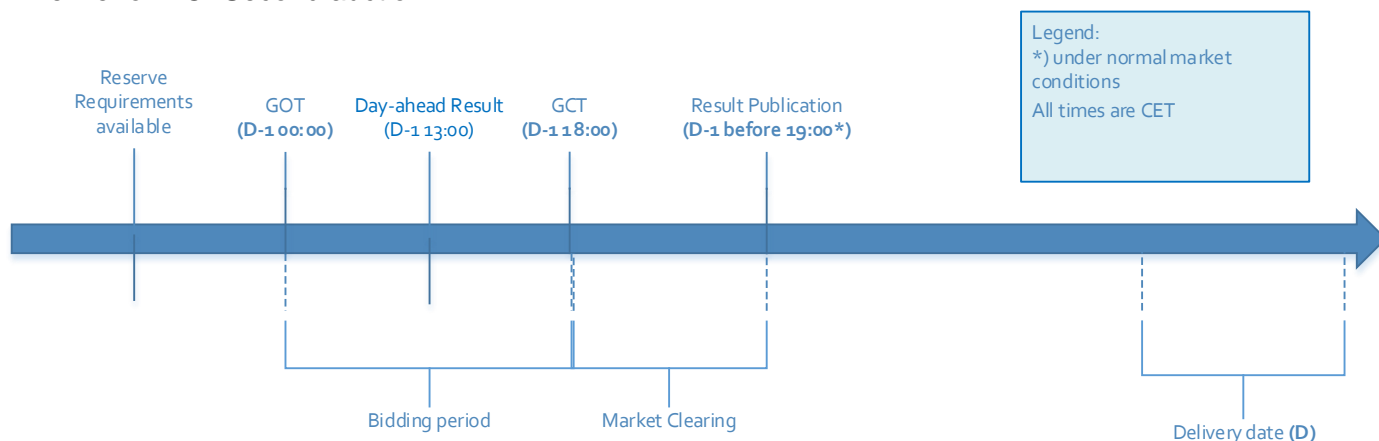


Timeline for SE and DK2: First auction

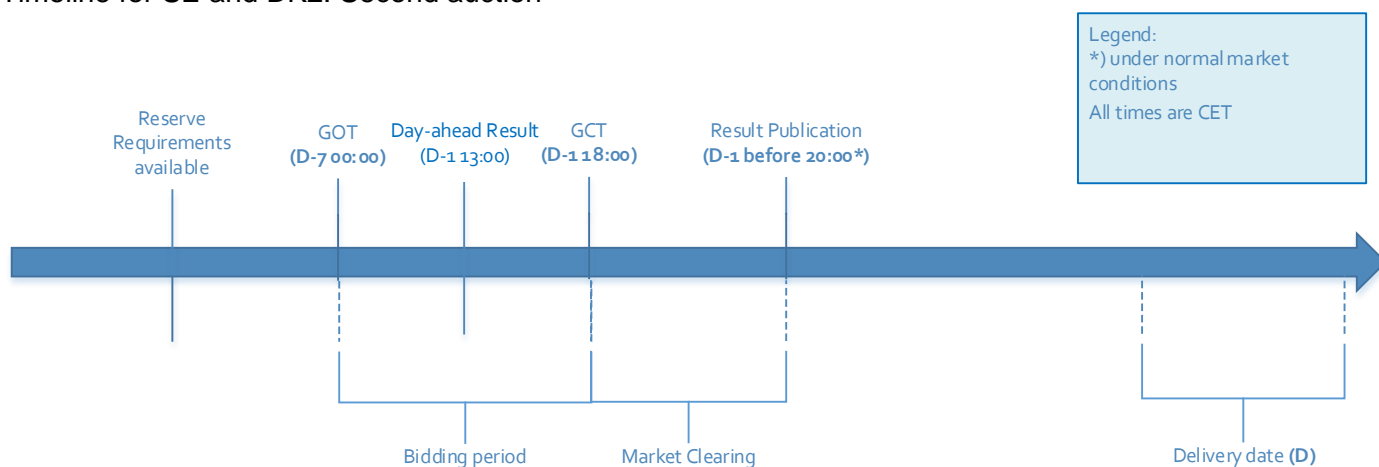


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Timeline for NO: Second auction



Timeline for SE and DK2: Second auction



- Reserve requirements are published in regular intervals on the TSOs websites and visible in Nordic MMS.
- Between the FCR capacity market Gate Opening Time (GOT) and the FCR capacity market Gate Closure Time (GCT), the BSPs can submit and update their bids (Bidding period).
- BSPs are allowed to transfer its obligations to provide balancing capacity and/or repurchase its obligation to provide balancing capacity from the first auction in the second auction pursuant to Ref [2].
- After gate closure, the "Market Clearing" runs. The Bid Selection Optimisation is executed, and the market results are published to BSPs and TSOs. The TSOs have the possibility to extend the bidding period.

2.2 System context

The diagram below shows the system context for the FCR capacity market. It shows the internal processes required in the Nordic MMS system and how Nordic MMS integrates with the BSPs and other participating systems. It also shows how a BSP can use the web frontend of Nordic MMS to enter bids and retrieve information.

This document provides detailed information about the message exchanges between Nordic MMS and the BSP. The other exchanges are shown for information purposes only and are outside the scope of this document.

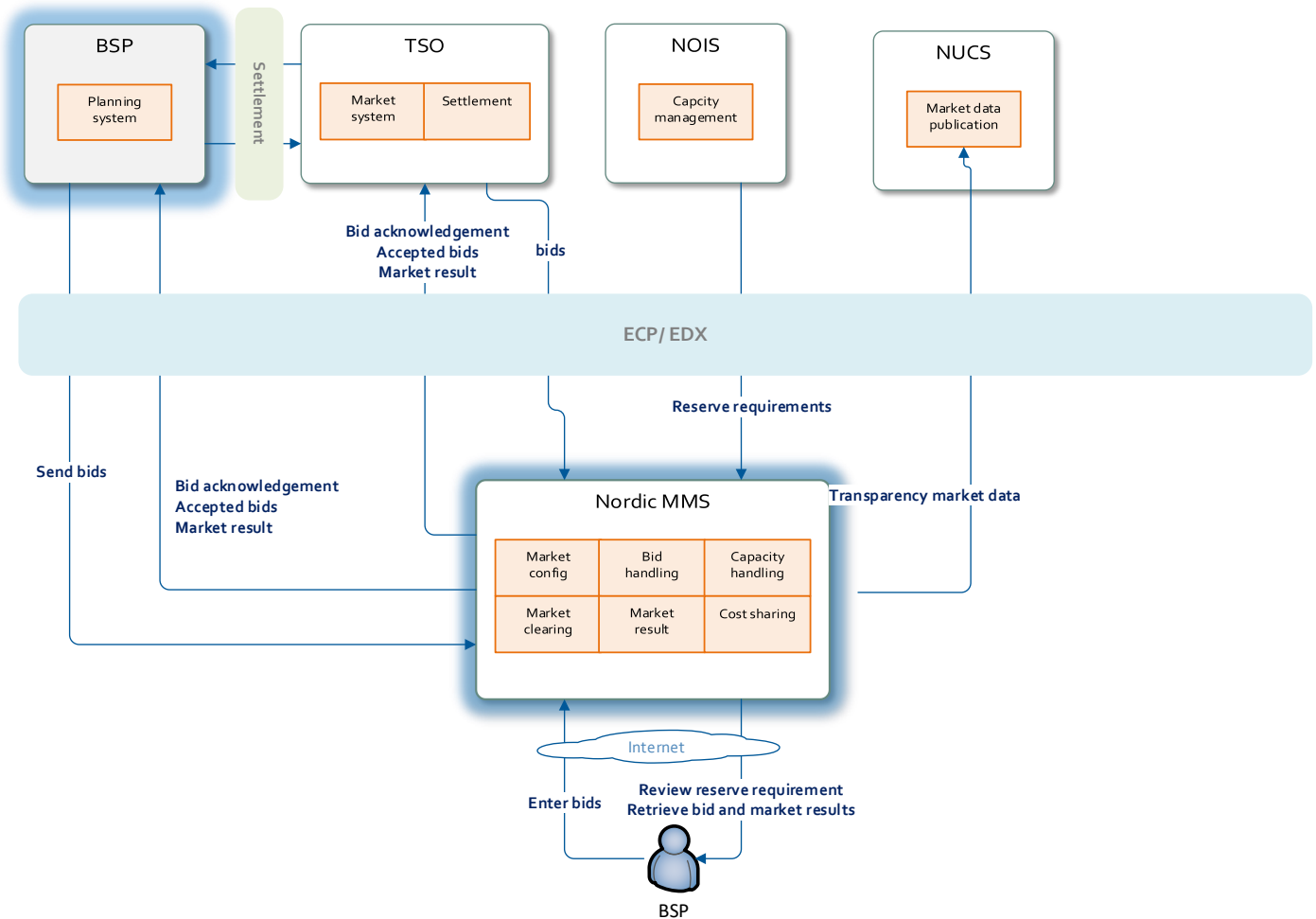


Figure 1 System context diagram

2.2.1 Interface description

The table below provide an overview of the flows between Nordic MMS and the BSPs. The tables show that IEC CIM is used as data exchange format and ECP/ EDX is used as communication platform. Please refer to chapter 4.2 for more details related to ECP/EDX.

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Note: Be aware of that the following schema versions are subject for change.

Sender	Receiver	Data	Channel	Document
BSP	Nordic MMS	Bids	ECP/ EDX	iec62325-451-7-reservebiddocument.xsd – version 7.1
Nordic MMS	BSP	Acknowledgement	ECP/ EDX	iec62325-451-1-acknowledgementdocument.xsd – version 8.0
Nordic MMS	BSP	Accepted bids	ECP/ EDX	iec62325-451-7-reserveallocationresult-version 6.0
Nordic MMS	BSP	Market result	ECP/ EDX	iec62325-451-6-balancing-version 4.2

Table 1 Flow between Nordic MMS and BSP

2.3 General rules

The FCR business process flows assume certain basic rules. These rules are described below.

2.3.1 Date and time

Date and time are expressed using the standard XML format for date and time: YYYY-MM-DDTHH:MM:ssZ, formatted using the universal time standard **UTC** by adding a 'Z' behind the time - like this: 2023-06-14T22:00:00Z

Document coverage

The beginning and ending date and time of the period covered by the document shall cover just one CET/CEST day.

Daylight saving time

- In **winter** the period is from 23:00 UTC to 23:00 UTC
- In **summer** the period is from 22:00 UTC to 22:00 UTC
- On the date of the change from winter to summertime, the period is from 23:00 UTC to 22:00 UTC. This change occurs on the last Sunday in March at 01:00 UTC
- On the date of the change from summer to wintertime, the period is from 22:00 UTC to 23:00 UTC. This change occurs on the last Sunday in October at 01:00 UTC

2.3.2 Document identification and revision number

The document identification must be unique over time for the sender in question. Furthermore, the document identification itself should not have any significant meaning. The revision number is not used and shall always be equal to '1'.

2.3.3 Update/cancel principles

In general, a new received document will always completely replace a previous received document. **Update** of any time series is done by sending a new document honouring these rules

- A new document mRID (document identification)
- The same revision number (always equal to '1')
- A newer created date-time

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- The same *period/day, domain (future extension: or bidding zone), auction.mRID and subject market participant* (for bids) as for the data being updated

I.e. to **cancel** one or more time series, a new document is submitted honouring the above rules, omitting the bids that should be cancelled.

Cancel all bids

In order to cancel all bids by a given sender, day, and control area (Domain) or bidding zone, a new document should be submitted with a dummy Bid_TimeSeries with element status and value A09 = cancelled.

The day is specified as normal using the reserveBid_Period.timeInterval element, and the control area is specified using the domain.mRID element, see details in 4.1.4: "Dependencies governing the ReserveBid_MarketDocument".

The dummy timeseries must include the status element and a reference to the market using element auction.mRID. Except for that, the content of the timeseries can be any values as long as they validate according to the XSD schema, see Ref [5].

Working example:

```
<ReserveBid_MarketDocument>
...
<Bid_TimeSeries>
  <mRID>DUMMY-VALUE</mRID>
  <auction.mRID> FCR_CAPACITY_MARKET_2ND_COMMON</auction.mRID>
  <businessType>C26</businessType>
  <acquiring_Domain.mRID codingScheme="A01">DUMMY-VALUE</acquiring_Domain.mRID>
  <connecting_Domain.mRID codingScheme="A01">DUMMY-VALUE</connecting_Domain.mRID>
  <quantity_Measure_Unit.name>MAW</quantity_Measure_Unit.name>
  <currency_Unit.name>EUR</currency_Unit.name>
  <price_Measure_Unit.name>MAW</price_Measure_Unit.name>
  <divisible>A02</divisible>
  <blockBid>A02</blockBid>
  <status>
    <value>A09</value>
  </status>
  <flowDirection.direction>A03</flowDirection.direction>
  <Period>
    <timeInterval>
      <start>2023-01-01T00:00Z</start>
      <end>2023-01-01T00:00Z</end>
    </timeInterval>
    <resolution>PT60M</resolution>
    <Point>
      <position>1</position>
      <quantity.quantity>0</quantity.quantity>
      <price.amount>0</price.amount>
    </Point>
  </Period>
</Bid_TimeSeries>
</ReserveBid_MarketDocument>
```

2.3.4 Acknowledgement

For the bid submission process, an acknowledgement document, as defined in Ref [6] is generated as response, either completely accepting the received document or rejecting it completely. Partly accept is not used. The codes and values used in this document are provided in chapter 4.1.6

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The acknowledgement will always contain a document level Reason, with either code A01 (Message fully accepted) or A02 (Message fully rejected).

The acknowledgement may also contain further document level Reason(s), explaining document level errors.

The acknowledgement may also contain one or more Rejected_Timeseries, with one or more timeseries level Reason(s).

The acknowledgement may also contain one or more InError_Period within the Rejected_Timeseries, with one or more Reason(s) for a given time interval.

See XML example below:

<Acknowledgement_MarketDocument>

...

<Rejected_TimeSeries>

<mRID>4CDF6AAA-4C0D-98DB-94CDE58FB4B5</mRID>

<InError_Period>

<timeInterval>

<start>2023-01-07T00:00Z</start>

<end>2023-01-07T01:00Z</end>

</timeInterval>

<Reason>

<code>A59</code>

<text>All quantities of block bid must be equal.</text>

</Reason>

</InError_Period>

<Reason>

<code>A22</code>

<text>Invalid BSP</text>

</Reason>

</Rejected_TimeSeries>

<Reason>

<code>A02</code>

<text>Document fully rejected.</text>

</Reason>

<Reason>

<code>A51</code>

<text>The attribute createdDateTime cannot be in the future.</text>

</Reason>

<Acknowledgement_MarketDocument>

2.3.5 Time series period

Within a time series, the position must always begin with '1' and be incremented by '1' for each subsequent position, forming a series of contiguous numbers covering the complete range of the period. Furthermore, *gaps* in the time series are allowed. In this case, the time series will comprise of several periods to indicate the gaps. See code snippet below.

<Bid_TimeSeries>

...

```

<Period>
  <timeInterval>
    <start>2018-09-17T03:00Z</start>
    <end>2018-09-17T05:00Z</end>
  </timeInterval>
  <resolution>PT60M</resolution>
  <Point>
    <position>1</position>
    <quantity.quantity>100</quantity.quantity>
    <minimum_Quantity.quantity>100</minimum_Quantity.quantity>
    <price.amount>25.20</price.amount>
  </Point>
  <Point>
    <position>2</position>
    <quantity.quantity>100</quantity.quantity>
    <minimum_Quantity.quantity>100</minimum_Quantity.quantity>
    <price.amount>25.20</price.amount>
  </Point>
</Period>
<Period>
  <timeInterval>
    <start>2018-09-17T15:00Z</start>
    <end>2018-09-17T17:00Z</end>
  </timeInterval>
  <resolution>PT60M</resolution>
  <Point>
    <position>1</position>
    <quantity.quantity>100</quantity.quantity>
    <minimum_Quantity.quantity>100</minimum_Quantity.quantity>
    <price.amount>25.20</price.amount>
  </Point>
  <Point>
    <position>2</position>
    <quantity.quantity>100</quantity.quantity>
    <minimum_Quantity.quantity>100</minimum_Quantity.quantity>
    <price.amount>25.20</price.amount>
  </Point>
</Period>
</Bid_TimeSeries>

```

3 Business process

The market rules and the market definitions for the FCR capacity market are described in Ref [2]. This chapter provides information related to the business rules that apply.

3.1 The FCR capacity market sequence diagram

The sequence diagram for the FCR capacity market is depicted below. Note that the last two shown exchanges are provided for information only and are outside the scope of this document. Please refer to local user guides for further details.

Following sequence diagram is for NO:

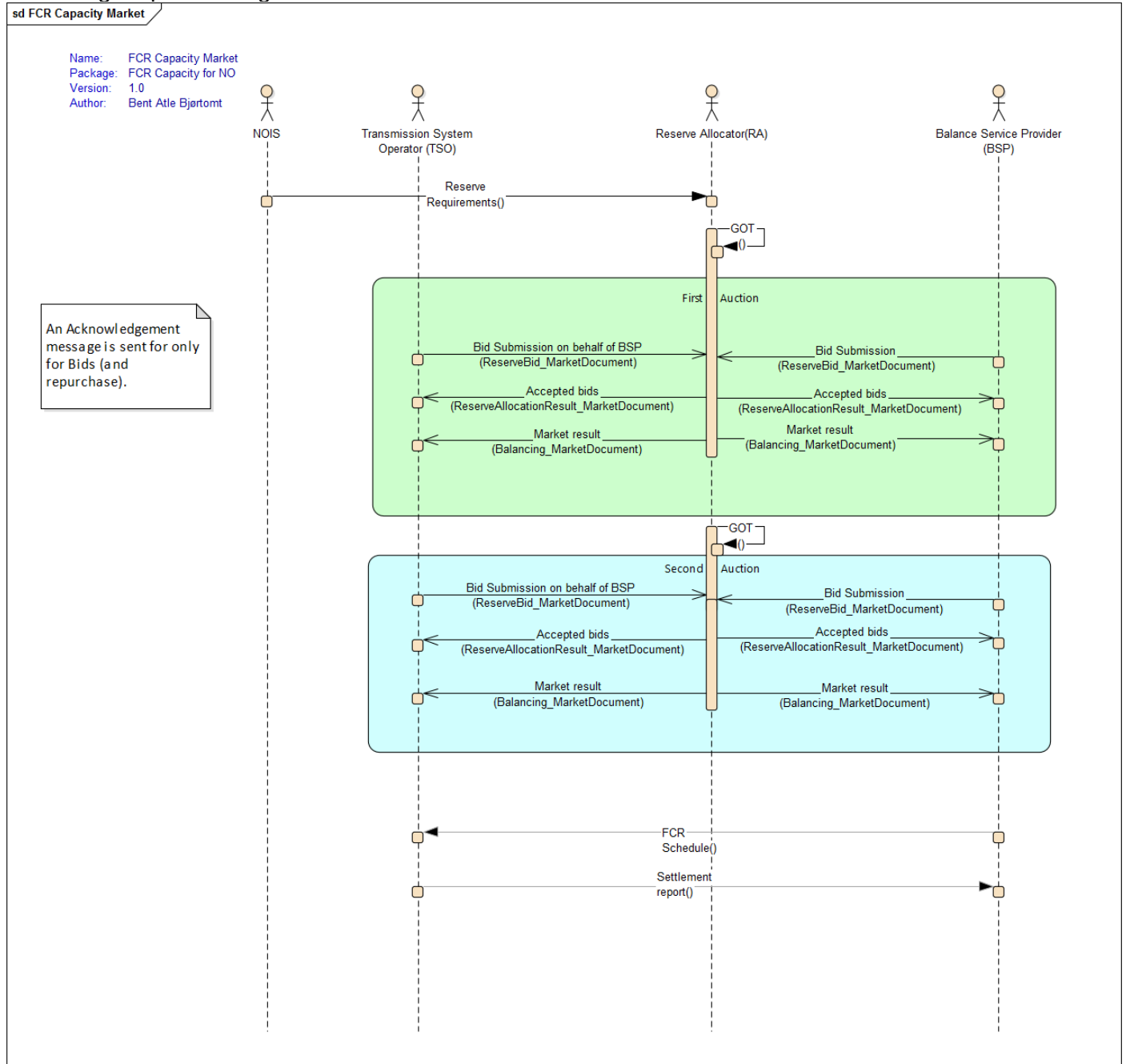


Figure 2 Sequence diagram for the FCR capacity market, NO.

Following sequence diagram is for SE and DK2:

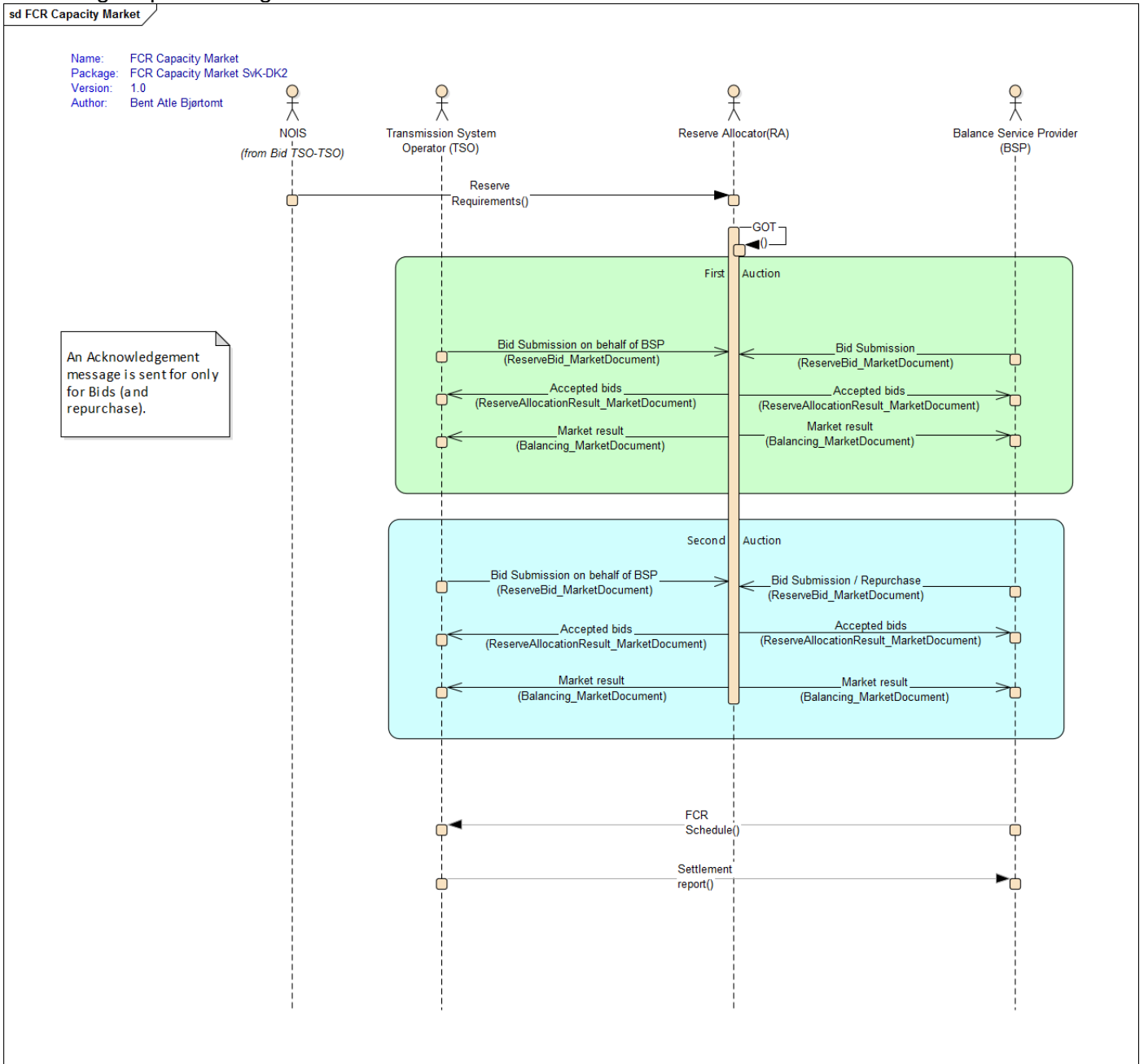


Figure 3 Sequence diagram for the FCR capacity market, SE and DK2

3.2 Bid submission

During the bidding phase, the participating BSPs provide all information related to offers for the FCR capacity market. The *ReserveBid_MarketDocument* is used to provide this information. Alternatively, bids can be submitted via the Nordic MMS web user interface. The same business rules apply for both alternatives. For a general description of the *ReserveBid_MarketDocument* schema, please refer to Ref [3]. The codes and values to be used in this document are provided in chapter 4.1.4.

3.2.1 Business rules

The following business rules apply to the bid submission process

General

- A Reserve Bid Document contains a set of bids (a bid is represented by a time series)
- A Reserve Bid Document shall be for only one *subject party*
- The ECP endpoint used to send the data must be associated with the subject party either by:
 - The subject party being the same as the sender and being directly associated with endpoint used
 - The subject party having an active agent-principal(BSP) relationship with the agent identified in the sender market participant (logical sender) and by the sender ecp end point (physical sender)
- The delivery period for a bid must belong to the same tender period for all bids in a Reserve Bid Document
- Bids are sent per bidding zone
- The number of bids submitted may not exceed the maximum number of bids set per portfolio

Bid quantity

- Bid quantity may vary for all hours in the time series
- Bid quantity (and minimum bid quantity) must be in the interval [*min quantity*, *max quantity*], given by the Market parameters for the auction
- Bid quantity (and minimum bid quantity) must be a multiple of the quantity factor, given by the Market parameters for the auction
- Bid quantity may not exceed the BSP portfolios qualified max quantity per regulation direction and bidding zone

Resource FCR product type (SE/DK2)

- If product type is Static use Code Z03 otherwise Dynamic (Z02) will be set by default

Bid price

- Bid price must be present and have the same value for all positions in a time series

Bid price must be in the interval [*min price*, *max price*], given by the Market parameters for the auction
Bid price must be a multiple of the price factor, given by the Market parameters for the auction

Minimum duration (Only relevant for SE) and block bids

- Minimum duration is used to determining block bid length
- All quantities of a block bid must be equal and represent a continuous interval of hours of at least the same length as the minimum duration
- The maximum length of the Minimum duration for the first auction is PT6H, and PT3H for the second auction.

Repurchase of FCR balancing capacity (SE only)

Each BSP is allowed to Repurchase its obligations, by using the *ReserveBid_MarketDocument* . This can only be done in the second auction. Please see Ref [2] for more details.

- Bid volume, quantity, is set to a negative value
- Affected bidding zone.
- Same direction
- Same product (FCR-N, FCR-D Up/Down)
- Price is set to zero ("0")

3.3 Market result publishing

When the bid selection optimization process is completed, and the result from the auction is ready, the following information is published from the Nordic MMS system:

Information		Sent to BSP?
Accepted bids <i>ReserveAllocationResult_MarketDocument</i>		Yes - own bids, both procured and offered
Market result <i>Balancing_MarketDocument</i>	Volumes	Yes
	Prices	Yes - market price only

For a general description of the *ReserveAllocationResult_MarketDocument* schema, please refer to Ref [5]
For a general description of the *Balancing_MarketDocument* schema, please refer to Ref [4]

Settlement of accepted bids will use the pay-as-cleared pricing methodology, meaning that the market result will include clearing prices pr. bidding zone, market time unit and regulation direction with the settlement price being included both in the balancing market document and the reserve allocation result market document.

3.3.1 Accepted bids

- The *ReserveAllocationResult_MarketDocument* as defined in 4.1.5 is used to provide a status the of the bids that was submitted to the auction. The BSPs receive information about their *own* bids, and one of the following reasons are used to indicate the status:
 - bid is accepted (**A73**)
 - bid is not accepted (**B09**)
 - bid has been divided to permit acceptance (**A72**)
 - Tender unavailable in MOL list (the bid is rejected by TSO) (**B16**)

Nordic MMS distributes one *ReserveAllocationResult_MarketDocument* per BSP, control area / TSO and market result publication run. BSPs which did not enter bids into an auction do not receive market result messages.

Agents will receive accepted bids in separate messages per principal BSP.

3.3.2 Volumes and prices

The *Balancing_MarketDocument* as defined in 0 is used to provide information about the market prices and the total volume per hour and direction. The codes and values to be used in this document are provided in chapter 0. Nordic MMS distributes one *Balancing_MarketDocument* message per BSP and market result publication run. BSPs which did not enter bids into an auction do not receive market result messages.

3.3.3 Republishing of market results

Nordic MMS can republish the market results multiple times due to different reasons:

- If the auction result is valid but cannot be processed by recipients due to inconsistencies in party identifiers. In this case, master data in the local MMS or in Nordic MMS requires to be updated before the market result is republished.
- Republishing can also be initiated when communication with some or all recipient endpoints has previously failed.

To support the update/cancel principle described in 2.3.3 and ensuring that the new market result replaces any earlier received market results, all documents that are sent will have new document mRID and updated createdDateTime.

3.3.4 Withdrawal of market results

Nordic MMS can withdraw the market result because of an invalid clearing result. As part of a withdrawal process, Nordic MMS will send out new market result messages with the following changes:

- Any previously accepted or partially accepted bids are changed to not accepted, which means the reason code is set to B09 - Bid not accepted
- All accepted volumes in the total market results are set to 0
- The price element is not included

Nordic MMS allows auction results to be published and withdrawn multiple times for one auction run.

3.3.5 Finish with Non-Purchase

Finish with non-purchase is a special market result, where:

- All reason codes in the accepted bids message are set to **B09** - Bid not accepted
- All accepted volumes in the total market results are set to 0

There are three possible scenarios for such zero results to be distributed:

- There are no reserve requirements
- No auction result has been published within the final publication deadline
- The auction has been cancelled because of extraordinary market conditions or a permanent failure during market clearing

Non-purchase market results completely replace and invalidate earlier published results.

3.3.6 Transfer of FCR Capacity

Each BSP is allowed to transfer its obligations to provide balancing capacity. Please see Ref [2] for more details.

There is currently no support for data exchange for this purpose.

4 Annex

4.1 Dependency matrices

This chapter provides the dependencies for the documents used to support the FCR capacity market

4.1.1 Classification

The dependency matrices describe the classification of the attributes. The following are classifications are used:

- M – The information is mandatory, i.e. the element is mandatory in the XSD schema
- R – The information is required, i.e. the element is not mandatory in the XSD schema but is required by the business process
- D – The information is dependent, i.e. the presence depends on certain condition(s)

4.1.2 Coding Schemes

When communication with the FCR capacity market platform, the coding scheme to identify senders and receivers can vary by TSO. The local TSO defines which coding scheme and party code to use for the market participants it is responsible for.

Some sender / receiver systems like Nordic MMS use fixed codes and coding scheme A01.

Code	Coding Scheme	Description and reference
A01	EIC	Energy Identification Codes: https://www.entsoe.eu/data/energy-identification-codes-eic/
A10	GS1/ GLN	Global Location Number, provided by GS1: https://gepir.gs1.org/index.php/search-by-gln
NSE	Swedish national	
NFI	Finnish national	
NDK	Danish national	
NNO	Norwegian national	

4.1.3 Bidding zones

The FCR capacity market consists of the following bidding zones:

Name	TSO	mRID	Coding scheme
DK2	Energinet	10YDK-2-----M	EIC
FI	Fingrid	10YFI-1-----U	EIC
NO1	Statnett	10YNO-1-----2	EIC
NO2	Statnett	10YNO-2-----T	EIC
NO3	Statnett	10YNO-3-----J	EIC
NO4	Statnett	10YNO-4-----9	EIC
NO5	Statnett	10Y1001A1001A48H	EIC
SE1	Svenska kraftnät	10Y1001A1001A44P	EIC
SE2	Svenska kraftnät	10Y1001A1001A45N	EIC

SE3 Svenska kraftnät 10Y1001A1001A46L EIC
 SE4 Svenska kraftnät 10Y1001A1001A47J EIC

4.1.4 Dependencies governing the ReserveBid_MarketDocument

ReserveBid_MarketDocument		iec62325-451-7-reservebiddocument.xsd – version 7.1
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
type	M	B40 – Complete set of bids
process.processType	R	A52 - Frequency containment reserve
sender_MarketParticipant.mRID	M	Identification of the party sending the document <hr/> Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
sender_MarketParticipant.marketRole.type	M	A46 – Balancing Service Provider (BSP) A39 – Data Provider Agents sending on behalf of BSPs must use market role A39 when submitting bids. See chapter 4.3: "Agents and Data Providers acting on behalf of BSPs"
receiver_MarketParticipant.mRID	M	10V1001C--000284 (Nordic MMS) <hr/> A01 - EIC coding scheme
receiver_MarketParticipant.marketRole.type	M	A34 – Reserve Allocator
createdDateTime	M	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
reserveBid_Period.timeInterval	M	The period covered by the document (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ Start and end interval must define an entire CET Day

domain.mRID	M	<p>EIC identification of the TSOs Control Area</p> <p>Denmark: 10Y1001A1001A796</p> <p>Finland: 10YFI-1-----U</p> <p>Norway: 10YNO-0-----C</p> <p>Sweden: 10YSE-1-----K</p> <p>(In future, support for bidding zone)</p> <hr/> <p>A01 – EIC coding scheme</p>
subject_MarketParticipant.mRID	M	<p>Identification of the party responsible for the bid</p> <hr/> <p>Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"</p>
subject_MarketParticipant.marketRole.type	M	A46 – Balancing Service Provider (BSP)

Bid_TimeSeries		
mRID	M	Unique identification of the time series
auction.mRID	M	<p>One of the following values:</p> <p>"FCR_CAPACITY_MARKET_1ST_SE_DK"</p> <p>"FCR_CAPACITY_MARKET_1ST_NO"</p> <p>"FCR_CAPACITY_MARKET_2ND_COMMON"</p>
businessType	M	<p>C26 - Frequency Containment Reserve - Normal(FCR-N)</p> <p>C27 - Frequency Containment Reserve - Disturbance (FCR-D)</p>
acquiring_Domain.mRID	M	<p>10Y1001A1001A91G (Nordic Market Area)</p> <hr/> <p>A01 - EIC coding scheme</p>
connecting_Domain.mRID	M	<p>The EIC identification of the bidding zone where the bids are placed. See chapter: 4.1.3: "Bidding zones".</p> <hr/> <p>A01 - EIC coding scheme</p>
quantity_Measure_Unit.name	M	MAW – megawatt
currency_Unit.name	R	EUR – euro
price_Measure_Unit.name	R	MAW - megawatt

divisible	M	A02 = No - no reduction possible on the quantity
blockBid	D	A01 – Yes, and use attribute <code>minimum_ConstraintDuration</code> A02 – No If the element is not present, it is considered as A02
flowDirection.direction	M	A01 – Up (FCR-D) A02 - Down (FCR-D) A03 – UP and DOWN (Symmetric – FCR-N)
marketAgreement.type	O	A01 – daily
minimum_ConstraintDuration.duration Duration	D	The duration of the constraint. This is used for Block bids: For first auction a bid <code>minimum_ConstraintDuration</code> can be given values between PT2H-PT6H For second auction a bid <code>minimum_ConstraintDuration</code> can be given values be between PT2H-PT3H When it is not a Block bid, then PT1H is valid.
standard_MarketProduct.marketProductType	D	Only relevant for FCR-D Z02 - Dynamic product Z03 - Static product If the element is not present, it is considered as Z02.
Period		
timeInterval	M	Period covered (in ISO 8601 UTC format)
resolution	M	PT60M – the precision of the interval that the different points within the time series cover is <i>one hour</i>
Point		
position	M	Position within the time interval. Sequential value beginning with 1

quantity.quantity	M	Bids will have positive values and repurchase will have negative values. Offered quantity with an minimum increment of 0.1 MW.
price.amount	R	The price of the product offered

4.1.5 Dependencies governing the ReserveAllocationResult_MarketDocument

ReserveAllocationResult_MarketDocument		iec62325-451-7-reserveallocationresult.xsd – version 6.0
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
type	M	A38 - Reserve allocation result document
process.processType	R	A52 - Frequency containment reserve
sender_MarketParticipant.mRID	M	10V1001C--000284 A01 - EIC coding scheme
sender_MarketParticipant.marketRole.type	M	A34 – Reserve Allocator
receiver_MarketParticipant.mRID	M	Identification of the party receiving the document Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
receiver_MarketParticipant.marketRole.type	M	A46 – Balancing Service Provider (BSP) A39 – Data Provider, see chapter 4.3: "Agents and Data Providers acting on behalf of BSPs"
createdDateTime	M	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
reserveBid_Period.timeInterval	M	Period covered (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ
domain.mRID	M	EIC of the TSOs Control Area Denmark: 10Y1001A1001A796 Finland: 10YFI-1-----U Norway: 10YNO-0-----C

		Sweden: 10YSE-1-----K (In future, support for bidding zone) <hr/> A01 - EIC coding scheme
TimeSeries		
mRID	M	An identification that uniquely identified the time series
bid_Original_MarketDocument.mRID	M	Constant value of " NA "
bid_Original_MarketDocument.revisionNumber	M	Constant value of " 1 "
bid_Original_MarketDocument.bid_TimeSeries.mRID	M	The identification of the time series that was used in the original tender - the reference to the bid
bid_Original_MarketDocument.tendering_MarketParticipant.mRID	M	The ID of the tendering party <hr/> Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
auction.mRID	M	One of the following values: "FCR_CAPACITY_MARKET_1ST_SE_DK" "FCR_CAPACITY_MARKET_1ST_NO" "FCR_CAPACITY_MARKET_2ND_COMMON"
businessType	M	C26 - Frequency Containment Reserve - Normal(FCR-N) C27 - Frequency Containment Reserve - Disturbance (FCR-D)
acquiring_Domain.mRID	M	10Y1001A1001A91G (Nordic Market Area) <hr/> A01 - EIC coding scheme
connecting_Domain.mRID	M	The EIC identification of the bidding zone where the bids were placed. See chapter: 4.1.3: "Bidding zones". <hr/> A01 - EIC coding scheme
marketAgreement.type	M	A01 – daily
marketAgreement.mRID	M	Constant value of " NA "
quantity_Measure_Unit.name	M	MAW – megawatt

currency_Unit.name	R	EUR – euro
price_Measure_Unit.name	R	MAW - megawatt

flowDirection.direction	M	A01 – Up (FCR-D) A02 - Down (FCR-D) A03 – UP and DOWN (Symmetric)
Reason (within Time Series)		
code	M	One of these codes will be provided: A72 - The original bid quantity has been divided to enable it to be accepted. A73 - Tender in question has been accepted B09 - Bid not accepted B16 – Tender unavailable in MOL list (the bid is rejected by TSO)
text	D	A reason for rejection can be specified by the TSO and will be included here. Only present if reason code = B16

Period		
timeInterval	M	Period covered (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ
resolution	M	PT60M – the precision of the interval that the different points within the time series cover is <i>one hour</i>
Point		
position	M	Position within the time interval. Sequential value beginning with 1
quantity	M	The accepted quantity identified for a point For ReasonCode A73: quantity is $\neq 0$ For ReasonCode A72: quantity is ≤ 0 For ReasonCode B09 and B16: quantity is = 0
price.amount	D	The accepted price identified for a point For ReasonCode A73 and A72: price.amount is present For ReasonCode B09 and B16: price.amount is not present

		The accepted price can be different from the original offered price
bid_Price.amount	R	The offered price identified for a point For all supported ReasonCodes: bid_Price.amount is present

Dependencies governing the Balancing_MarketDocument

Balancing_MarketDocument		iec62325-451-6-balancing.xsd – version 4.2
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
type	M	B34 – Market result document
process.processType	R	A52 - Frequency containment reserve
sender_MarketParticipant.mRID	M	10V1001C--000284 ----- A01 - EIC coding scheme
sender_MarketParticipant.marketRole.type	M	A34 – Reserve Allocator
receiver_MarketParticipant.mRID	M	Identification of the BSP receiving the document ----- Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
receiver_MarketParticipant.marketRole.type	M	A46 - Balancing Service Provider (BSP) A39 – Data Provider, see chapter 4.3: "Agents and Data Providers acting on behalf of BSPs"
createdDateTime	M	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
area_Domain.mRID	R	10Y1001A1001A91G (Nordic Market Area) A01 - EIC coding scheme
period.timeInterval	M	The period covered by the document (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ

TimeSeries		
mRID	M	An identification that uniquely identifies the time series
businessType	M	C26 - Frequency Containment Reserve - Normal(FCR-N) C27 - Frequency Containment Reserve - Disturbance (FCR-D)
acquiring_Domain.mRID	M	10Y1001A1001A91G (Nordic Market Area) A01 - EIC coding scheme
connecting_Domain.mRID	M	The EIC identification of the bidding zone. See chapter: 4.1.3: "Bidding zones". A01 – EIC coding scheme
type_marketAgreement.type	R	A01 – daily
flowDirection.direction	R	A01 – Up (FCR-D) A02 – Down (FCR-D) A03 – UP and DOWN (Symmetric)
currency_Unit.name	R	EUR – euro
quantity_Measure_Unit.name	M	MAW – megawatt
price_Measure_Unit.name	R	MAW - megawatt
auction.mRID	R	One of the following values: "FCR_CAPACITY_MARKET_1ST_SE_DK" "FCR_CAPACITY_MARKET_1ST_NO" "FCR_CAPACITY_MARKET_2ND_COMMON"
Period		
timeInterval	M	Period covered (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ
Resolution	M	PT60M – the precision of the interval that the different points within the time series cover is one hour
Point		
Position	M	Position within the time interval. Sequential value beginning with 1

Quantity	R	Total volume procured
procurement_Price.amount	R	Market price

4.1.6 Dependencies governing the Acknowledgement_MarketDocument

Acknowledgement_MarketDocument		iec62325-451-1-acknowledgement.xsd – version 8.0
mRID	M	Unique identification of the document
createdDateTime	M	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
sender_MarketParticipant.mRID	M	10V1001C--000284 A01 - EIC coding scheme
sender_MarketParticipant.marketRole.type	M	A34 – Reserve Allocator
receiver_MarketParticipant.mRID	M	Identification of the BSP receiving the acknowledgement Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
receiver_MarketParticipant.marketRole.type	R	A46 - Balancing Service Provider (BSP) A39 – Data Provider, see chapter 4.3: "Agents and Data Providers acting on behalf of BSPs"
received_MarketDocument.mRID	R	Information extracted from the bid document
received_MarketDocument.revisionNumber	R	Information extracted from the bid document
received_MarketDocument.createdDateTime	R	Information extracted from the bid document
Rejected_TimeSeries		
mRID	D	Identification of the rejected time series
Reason	D	One or more of the reasons described below
InError_Period	D	One or more of the periods with error described below
InError_Period		
timeInterval	M	Period covered (in ISO 8601 UTC format)

Reason	M	One or more of the reasons described below
Reason		
code	M	<p>A01- Message fully accepted A02- Message fully rejected A05 – Sender without valid contract. Used if the BSP is not eligible for FCR in the current bid area A57 - Deadline limit exceeded/Gate not open A59 – Not compliant to local market rules</p> <p>Other reason codes may also be used.</p>
text	R	<p>A specific reason for the rejection can be specified and included here. E.g.</p> <p>«Time series ID»: The exclusive group must contain at least two bids</p>

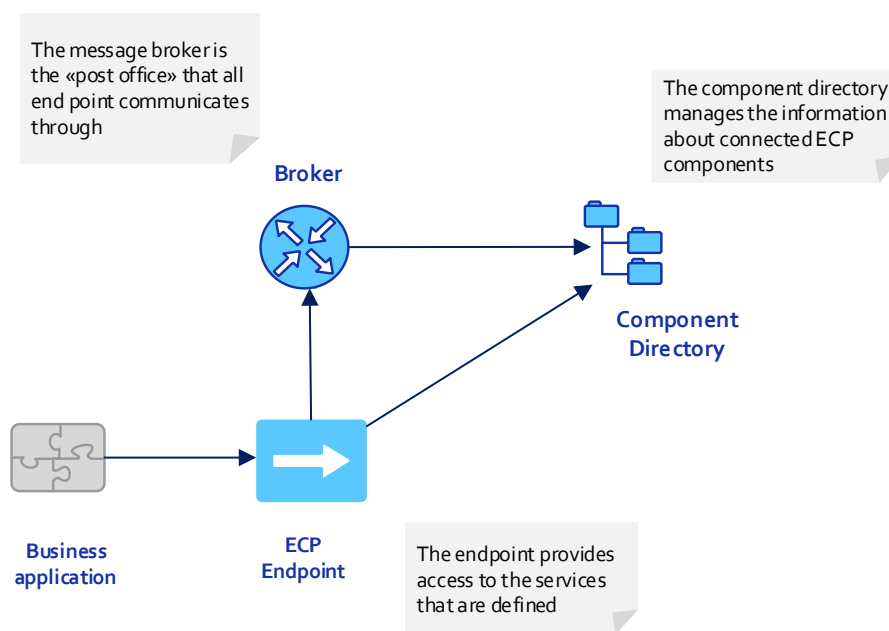
4.2 ECP

ECP is the integration channel that is supported for communication with the FCR capacity market platform and will be used for

- submitting bids to the platform
- receiving acknowledgment documents from the platform
- receiving accepted bids and market prices and volumes from platform

4.2.1 How it Works

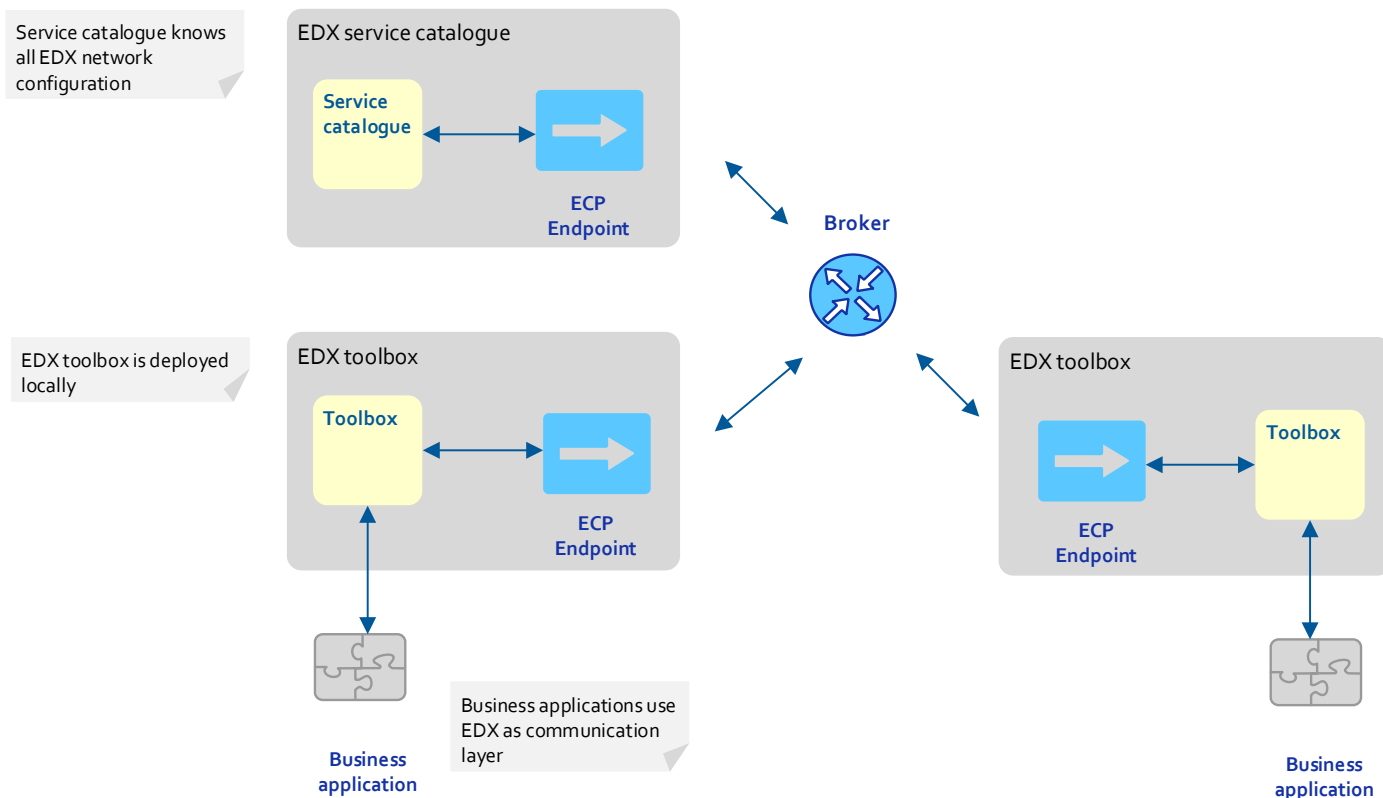
ECP delivers messages from the sender to a recipient within single ECP Network. Messages transported through the ECP Network can be any text or binary data. For FCR, IEC CIM is used as data exchange format. Alongside with the message, ECP transfers also message metadata. These are (among others) information about sender and recipient. The former is used by platform to authenticate the message sender. ECP consists of three main components: *endpoint*, *component directory* and *broker*. See figure below:



Figur 4 ECP Main Components

4.2.2 EDX

EDX is an extension to ECP, and is used to define the network configuration, and introduces the concept of services, service providers and consumers. The two central parts of the EDX network is the service catalogue and the toolbox. An EDX network consists of multiple toolboxes and a single service catalogue. These components communicates via ECP and is responsible for distribution of the network configuration. Messaging occurs directly between the toolboxes. See figure below for EDX network overview:



4.2.3 How to connect

Please refer to the installation package and documentation provided by your local TSO.

4.2.4 ECP/EDX for FCR Capacity Market

Which message types to use

The table below shows the ECP message types used for the FCR Capacity Market:

Process	Sender	Format	ECP message type
Bid/Repurchase	BSP	iec62325-451-7-reservebiddocument.xsd	MO-MCC-BIDS
Bid acknowledgement	Nordic MMS	iec62325-451-1-acknowledgement.xsd	MO-MCC-BIDS-ACK
Accepted bids	Nordic MMS	iec62325-451-7-reserveallocationresult.xsd	MO-MCC-ACCEPTED-BIDS-BSP
Market Result	Nordic MMS	iec62325-451-6-balancing.xsd	MO-MCC-MARKET-RESULTS

Which service to use

The addressing convention used for communicating in the ECP network is *SERVICE-<service code>*. For FCR Capacity Market the service code is NO-FCRCAP. Hence, addressing in FCR Capacity Market is **SERVICE-NO-FCRCAP**.

4.3 Agents and Data Providers acting on behalf of BSPs

Nordic MMS supports authorizing third parties (agents) and their users to bid and receive market results on behalf of one or more principal BSPs (the party delegating the right to bid and receive market results).

The authorized parties can, but do not have to have own portfolios in Nordic MMS.

The authorization scheme allows the agent's ECP end point to be used to send bids and receive market results for one or more subject party (principal BSP).

For this purpose the endpoint must belong to and identify the agent acting as a data provider on behalf of the principal BSPs. The agent's party code must be set as the sender_MarketParticipant.mRID in the message and its sender_MarketParticipant.marketRole.type needs to be set to A39 – data provider.

To authorize an agent, the principal BSP needs to request an authorization for the agent party from its responsible TSO. The BSP needs to provide both the agent's party code and ECP endpoint. An agent can only be authorized for all or none of the principal BSPs bidding zones.

Once the association between the agent and the principal BSP is defined, the agent's users will have access to the bids and market results of the principal BSP. The agent's ECP endpoint will be allowed to submit bids and receive market results on behalf of the principal BSP.

4.4 Possible changes

The following section contain possible changes. Will be clarified well in advance of go live.

- Use of codes in auction.mRid.
- EDX service naming.
- Need for more EDX Service(s). It consist of 3 Auctions with 3 different GCTs.
- Future support of Bidding zone in domain.mRID.
- XSD version, common effort to upgrade Fifty Nordic MMS to new version.
- GOT times and different publication times.