

# BSP - Implementation Guide

## Nordic MMS - mFRR capacity market

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Business process: mFRR capacity market

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## Revision History

Version	Release	Date	Changed by	Comments
1.0	Initial version	15.06.22	Jan Möhr / Bent Atle Bjørtomt	First released version
1.1		15.09.23	Bent Atle Bjørtomt/Øystein Vatland/Fredrik Laane	<ul style="list-style-type: none"> <li>• Corrected misleading sequence diagram, Acknowledge message is only sent as response to a bid submission.</li> <li>• ECP service code has been changed from "MFRRCAP" to "NO-MFRRCAP"</li> <li>• It is now supported to send bids per bidding zone instead of control area to allow independent planning and bid submission processes per bidding zone. This is done by specifying bidding zones in the document domain.mRID element.</li> <li>• A BSP can now be configured in NMMS to receive market result messages, even if the BSP did not submit any bids for the auction.</li> <li>• Added missing description of attribute <i>auction.mRID</i> in <i>Balancing_MarketDocument</i></li> <li>• Added comment for which coding scheme to use for <i>registeredResource.mRID</i></li> </ul>
1.2		19.10.2023	Øystein Vatland	<ul style="list-style-type: none"> <li>• Removed "DUMMY_VALUE" in example xml for cancelling bids.</li> <li>• Description for how location (registeredResource.mRID) is used for bids in the Finnish market in Chapter 4.1.5</li> <li>• Description of minimum and maximum bid filtering in Chapter 3.3.1.9, and related elements in the accepted bid file – Chapter 4.1.6</li> <li>• NMMS will send updated xml-versions of some files, but still send the existing versions, as described in Chapter 4.3</li> </ul>

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# 1 Introduction

## 1.0 Background

1. Manual frequency restoration reserves (mFRR) are one of several different types of Balancing Services that TSOs use for balancing of the Nordic transmission grid.
2. Nordic MMS has been developed by the Nordic TSOs to allow a joint procurement of mFRR balancing capacity in the Nordic market area before the day ahead market runs.
3. In the mFRR capacity market, the Nordic TSOs procure an obligation to bid into mFRR energy activation market from the BSPs whose bids are accepted during market clearing.
4. NMMS allows the consideration of geographical distribution of reserve requirements, offers and network constraints in the market clearing using its CZC reservation methodology.
5. The selection of bids and reservation of Cross-Zonal Capacity are done in an optimisation function maximizing socioeconomic benefit by weighing savings in reserve procurement through exchange of balancing capacity against the socio economic cost incurred by reserving CZC from the day ahead electricity market.

## 1.1 Scope

This document covers the technical implementation details on the BSP side, when integrating with Nordic MMS (NMMS) by describing the processes required to interact with the mFRR capacity market. Both functional and technical aspects are covered. The intended audience of this document are the participating BSPs. In control areas where the BSP role has not been separated from the BRP role, the target audience for this document are the BRPs providing balancing services to the respective TSOs. Thus the acronym BSP can be looked as synonymous to BRP in these cases.

The main processes described are:

- Reserve requirement publication process
- Bid submission process
- Market result publishing process

## 1.2 Terms and definitions

Acronym	Term	Definition
<b>aFRR</b>	<i>Automatic frequency restoration reserves</i>	<i>The FRR that can be activated by an automatic control device designed to reduce the FRCE/ACE to zero</i>
<b>BRP</b>	<i>Balance Responsible Party</i>	<i>A market participant or its chosen representative responsible for its imbalances</i>
<b>BSP</b>	<i>Balancing Services Provider</i>	<i>A market participant with reserve-providing units or reserve-providing groups able to provide balancing services to TSOs</i>
<b>CCC</b>	<i>Coordinated Capacity Calculation</i>	<i>The Nordic RSC's is responsible to calculate cross-border transmission capacities to maximise the transmission capacity offered to the day-ahead market.</i>
<b>CIM</b>	<i>IEC Common Information Model</i>	
<b>CZC</b>	<i>Cross Zonal Capacity</i>	<i>The cross-zonal transmission capacity between two bidding zones</i>
<b>ECP</b>	<i>Energy Communication Platform</i>	<i>Reference implementation of MADES standard</i>
<b>MADES</b>	<i>Market Data Exchange Standard</i>	<i>Communication IEC standard designed by ENTSO-E</i>
<b>mFRR</b>	<i>Manual frequency restoration reserves</i>	<i>Manual frequency restoration reserves: active power reserves that may be manually activated, available to restore system frequency to the nominal frequency and, for a synchronous area consisting of more than one LFC area, to restore power balance to the scheduled value</i>
<b>mFRR CM</b>	<i>mFRR Capacity Market</i>	<i>The mFRR capacity market's role in the balancing / ancillary service process is to procure obligations on behalf of the TSOs from the BSPs, in which the BSPs commit to offering the allocated amount of balancing energy bids in the mFRR activation market.</i>
<b>MOL</b>	<i>Merit Order List</i>	
<b>MTU</b>	<i>Market Time Unit</i>	<i>The period for which the market price is established or the shortest possible common time period for the two bidding zones, if their market time units are different.</i>
<b>TSO</b>	<i>Transmission System Operator</i>	<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>
	<i>connecting TSO</i>	<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>

## 1.3 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] Market terms and conditions published by each of the Nordic TSOs (To be published)
- 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

### 2.0 Timeline

The mFRR capacity market involves several operational phases. The diagram below shows the timeline for the mFRR capacity market.

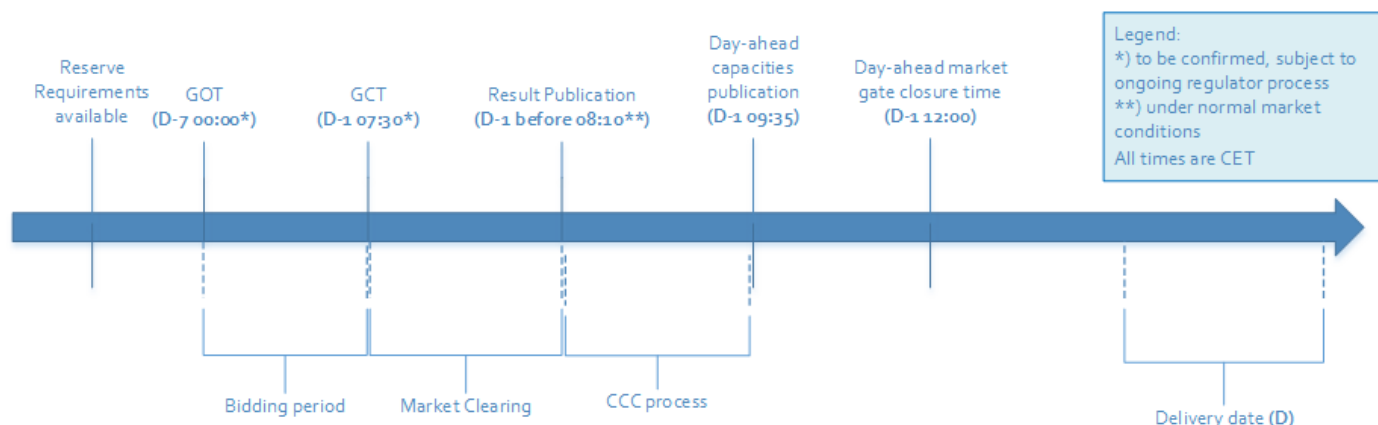


Figure 1 timeline

- Long term reserve requirements are published in regular intervals on the TSOs websites and visible in Nordic MMS.
- Between the mFRR capacity market Gate Opening Time (GOT) and the mFRR capacity market Gate Closure Time (GCT), the BSPs can submit and update their bids (Bidding period).
- Based on whether or not reserve requirements are updated after gate opening, the TSOs can choose to have NMMS publish reserve requirements through the described reserve requirement publishing process.
- 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 or reopen the bidding gate after gate closure.
- Day-ahead capacities publication: At 09:35 CET available capacities on interconnectors and in the grid are published to the NEMOs by the RSC for the single day ahead market coupling
- Day-ahead market gate closing time: Buyers and sellers have until 12:00 CET to submit their bids to the day ahead market for the single day-ahead coupling.

## 2.1 System context

The diagram below shows the system context for the mFRR 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 like reserve requirements and market results.

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

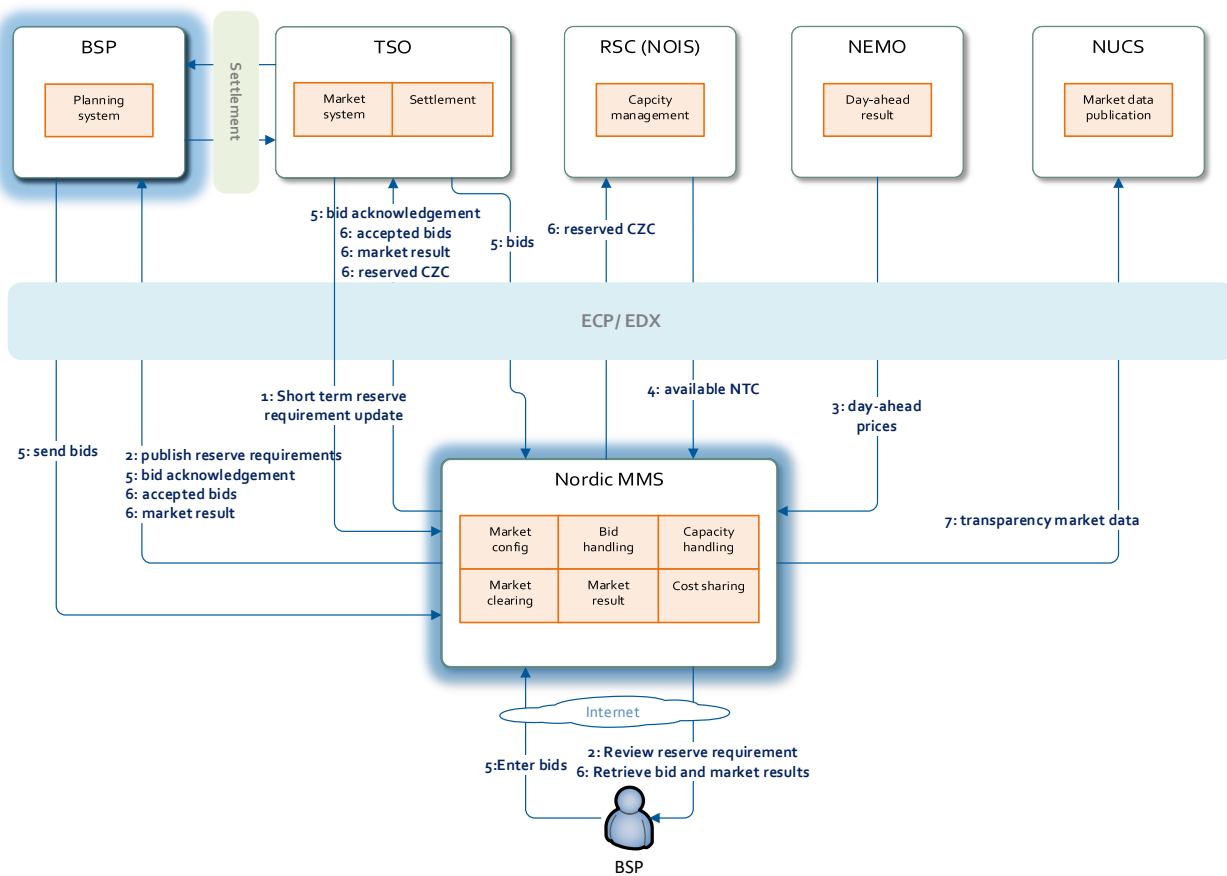


Figure 2 System context diagram

### 2.1.1 Interface description

The table below provides an overview of the flows between Nordic MMS and the BSPs. The table shows 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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Sender	Receiver	Data	Channel	Document
Nordic MMS	BSP	Publish Reserve Requirements	ECP/ EDX	iec62325-451-7-reservebiddocument_v7_1.xsd
BSP	Nordic MMS	Bid Submission	ECP/ EDX	iec62325-451-7-reservebiddocument.xsd – version 7.1
Nordic MMS	BSP	Bid Acknowledgement	ECP/ EDX	iec62325-451-1-acknowledgementdocument.xsd – version 8.0
Nordic MMS	BSP	Accepted bids	ECP/ EDX	iec62325-451-7-reserveallocationresult.xsd – version 6.0
Nordic MMS	BSP	Market result	ECP/ EDX	iec62325-451-6-balancing.xsd – version 4.2

Table 1 Flow between Nordic MMS and BSP

## 2.2 General rules

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

### 2.2.1 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: 2022-06-14T22:00:00Z

#### 2.2.1.1 Document coverage

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

#### 2.2.1.2 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 summer time, 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 winter time, the period is from 22:00 UTC to 23:00 UTC. This change occurs on the last Sunday in October at 01:00 UTC

### 2.2.2 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'.

### 2.2.3 Update/cancel principles

In general, a new received document will always completely replace a previously 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')

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- A newer created date-time
- The same *period/day, domain, 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.

## 2.2.3.1 Cancel all bids

In order to cancel all bids by a given sender, day, and control area, a new document should be submitted with a dummy `Bid_TimeSeries` using element "status" and value A09 = cancelled.

The document period is specified as usual using the `reserveBid_Period.timeInterval` element.

The document's scope (control area) is specified using the `domain.mRID` element, see details in 4.1.4

The dummy timeseries must include the status element and a reference to the market using element `auction.mRID`.

The content of the other mandatory timeseries elements is ignored.

Working example:

```
<ReserveBid_MarketDocument>
...
  <Bid_TimeSeries>
    <mRID>8c520815945a43e88e1fb72e9ad05507</mRID>
    <auction.mRID>MFRR_CAPACITY_MARKET</auction.mRID>
    <businessType>B74</businessType>
    <acquiring_Domain.mRID codingScheme="A01">10Y1001A1001A91G</acquiring_Domain.mRID>
    <connecting_Domain.mRID codingScheme="A01">10YNO-3-----
  </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>A01</flowDirection.direction>
    <marketAgreement.type>A01</marketAgreement.type>
    <Period>
      <timeInterval>
        <start>2000-01-01T00:00Z</start>
        <end>2000-01-01T00:00Z</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>
```

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## 2.2.4 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. Partial accept of documents is not used. The codes and values used in this document are provided in chapter 4.1.8

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 example code snippet below:

```
<Acknowledgement_MarketDocument>
```

```
...
```

```
<Rejected_TimeSeries>
```

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

```
<InError_Period>
```

```
<timeInterval>
```

```
<start>2021-01-07T00:00Z</start>
```

```
<end>2021-01-07T01:00Z</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>
```

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## 2.2.5 Time series period

Within a time series period, 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 mFRR capacity market are described in Ref [2]

This chapter provides information related to the business rules that apply.

#### 3.1 The mFRR capacity market sequence diagram

The sequence diagram for the mFRR 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.

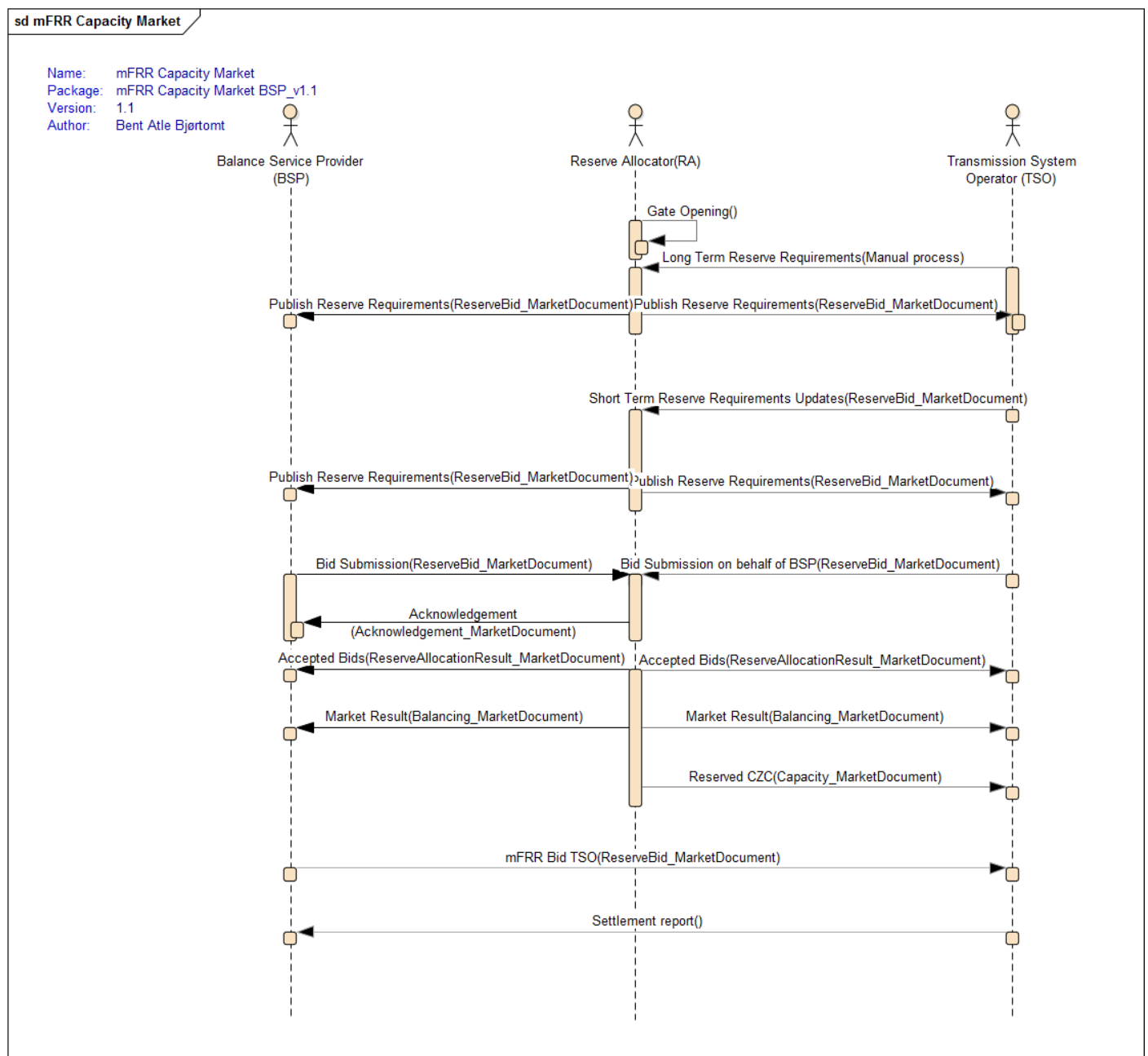


Figure 3 Sequence diagram for the mFRR capacity market

## 3.2 Publish Reserve Requirements

The Publish Reserve Requirements are maintained by the MO (market operator) as long-term requirements in NMMS directly.

NMMS publishes reserve requirements as CIM xml messages at gate opening to inform the BSPs and TSOs about the reserve requirements known at the moment when the auction is being opened.

The source of this first publishing are the long-term reserve requirements in NMMS, which can then be amended for the auction's delivery day, up until auction clearing.

TSOs can update daily reserve requirements before auction clearing, and NMMS will then publish the updated reserve requirements to all TSOs and BSPs.

In case that there are no reserve requirements defined for an auction, the (zero) reserve requirement information will be published at auction creation.

In NMMS geographic areas that can carry reserve requirements can be bidding zones and / or macro areas.

Macro areas are sets of one or more bidding zones. The minimum regulation that is defined as a part of the reserve requirements definition on a macro area, can work either as a localization constraint or a demand, depending on the market configuration.

As a localization constraint, the minimum regulation sets a minimum limit on how much of the bid volume can be selected in the macro area's set of bidding zones against the demand in the market's bidding zones. This can result in forcing or limiting exchange between bidding zones. This type of constraint can only be used in markets with exchange between bidding zones.

The macro area minimum regulation can also function as a demand in markets without exchange between bidding zones. In this case the bid selection will try to select bids to satisfy the minimum regulation amount from the bids in the set of bidding zones in the macro area.

Even if this may appear complex, the impact for the BSPs receiving reserve requirement messages as CIM xml is in fact very limited.

The to be procured amount will always be communicated as **need** in the CIM messages published, but can originate from the macro area or the bidding zone configuration in NMMS, depending on which geographic resolution the reserve requirement is defined for.

In the NMMS frontend the demand / amount to be procured will be shown as the minimum regulation in markets that procure against a demand on the macro area level. In markets with exchange between bidding zones, the demand will be set as requirement on the bidding zone level.

In CIM messages, minimum and maximum regulations that function as localization constraint in addition to the need, will appear in additional timeseries with their respective business types.

### 3.2.1 Publish Reserve Requirements

This process is used for the distribution of the reserve requirements (demand, minimum regulation and maximum regulation) of bidding zones and macro areas towards BSPs or TSOs. The provided data is considered public information and TSO and BSP parties receive the same document.

Markets in NMMS can be configured to send out reserve requirement changes if the requirements change frequently. Depending on the market setup and the granularity of reserve requirements used, NMMS can publish

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just bidding zone requirements or macro area requirements, or it can publish both bidding zone and macro area requirements together.

The published reserve requirements are daily data in hourly resolution. They apply to a single auction and delivery day only.

Reserve Requirements are published shortly after gate opening. They are also sent out as result of being updated after they have been initially published, which allows TSOs to make and inform about changes even after the bidding gate has been opened.

### 3.3 Bid Submission

During the bidding phase, the participating BSPs provide all information related to offers for the mFRR 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.

In order to be able to submit bids to NMMS, the BSP needs to have a valid **Portfolio** in the market and bidding zone to bid in. A portfolio represents that the BSP has prequalified resources to provide the required type of balancing services in a certain bidding zone and an agreement with the responsible TSO to participate in the market.

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.

#### 3.3.1 Business rules

The following business rules apply to the Bid Submission process

##### 3.3.1.1 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 given per bidding zone, that means as portfolio-bids, unless the TSO requires the BSPs to provide further location information on the bid using registered resource identifiers
- One Reserve Bid Document can be sent per control area, which includes all bids for all bidding zones the BSP has a portfolio in. It is also possible to send Reserve Bid Document per bidding zone. The document scope (control area or bidding zone) defines the set of bids replaced by the new document sent in. The number of bids submitted may not exceed the maximum number of bids set per portfolio

##### 3.3.1.2 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

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### 3.3.1.3 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

### 3.3.1.4 Block bids

- All quantities of a block bid must be equal and represent a continuous interval of market time units (MTUs)
- A block bid cannot be part of an exclusive group

### 3.3.1.5 Linked Up/Down bids

With up/down linking, only one up and one down bid in the same bidding zone can be linked into the linked group.

- The bid price of both linked bids must be equal
- A block bid cannot be linked together with a non-block bid

As described in ACER Decision 19-2020 on the Nordic aBCM A33 - Annex I, Article 4(3), the use of linked up/down bids is subject to exemption from Article 32(3) of the EB Regulation which is yet to be granted by the national regulatory authorities of the Nordic countries.

In earlier versions of the NMMS implementation guides for the aFRR capacity market, the `linkedBidsIdentification` element was intended to be used for up / down linking of bids.

Until exemption is granted by all Nordic NRAs, NMMS will not support linked up/down bids and the `linkedBidsIdentification` is repurposed (in accordance with the MARI implementation guides) for technical linking of bids instead (see 3.3.1.6).

Once exemption is granted the feature is intended to be reintroduced using the new inclusive linked bid identification element, supported under a new (yet to be published) bid document schema version.

### 3.3.1.6 Exclusive linked bids

Exclusive linking allows the linking of one or more bid timeseries with an exclusivity constraint, so that the bid selection can only select bids from one of the exclusively linked bid timeseries in the same market time unit.

NMMS supports exclusive linking of bids between markets in the same market clearing group.

Markets in the same clearing group are initially cleared in a specific clearing order. (e.g. aFRR CM before mFRR CM). Bids within in the same exclusive group across markets, that are selected in one market will not be offered to the bid selection of the other market and can thus not be selected there in the same market time unit.

- Bids in the same exclusive group must belong to the same bidding zone (`connecting_Domain.mRID`)
- An exclusive group must contain at least two bids
- Exclusive linking of up and down bids is currently disallowed due to missing exemption from Article 32(3) of the EB Regulation.

### 3.3.1.7 Technical linking and quality limitations

For the mFRR capacity market, NMMS allows to specify the following quality limitations on bids:



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- Resting time
- Maximum activation duration

It is up to the BSPs responsible TSO to decide whether these bid attributes can be provided or not.

Bid timeseries with common resting-time and activation duration limitations need to be specified with a common technical linked group identification in the linkedBidsIdentification element. These bids are then chosen only in MTUs where the bids are available for activation.

The bid selection will not select such bids in market time units where they can be unavailable due to selections in other MTUs of the same or other timeseries with the same linkedBidsIdentification.

### 3.3.1.8 Registered-Resource ID

NMMS allows specifying registered resource identifiers on the bids if the responsible TSO requires that information and has configured NMMS with the allowed resource data for its BSPs. Please refer to local market terms and conditions to see whether this information is required or not.

### 3.3.1.9 Bottlenecks

In a market with resource data enabled, it is possible to define bottlenecks where a minimum and or maximum quantity can be configured based on the resource data which forces the acceptance or rejection of the bid completely or partially regardless of the bid price.

Bids with resource data that are part of the bottleneck and forcibly accepted and or rejected solely due to the bottlenecks constraints are settled in a pay as bid structure between the TSO and BSP.

Bids that are accepted or rejected due to a bottleneck will have a specific reason code in the accepted bids-file sent to the BSPs.

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3.3.2 Allowed bid type combinations

Bids can be either divisible or indivisible ("D"), and be linked in time (Blockbids: "B") regulation direction (linked up/down "L") or mutually exclusive (exclusive bids "E").

The table below describes each of these bid properties, and every allowed combination of these properties.

Case	Divisibility	Block (B)	Joint linked up-and-down (L)	Exclusive (E)	Technical linking and Quality limitations	Description
I	Indivisible	No	No	No	Technical linking / QL available	single bid – Indivisible, non-block bid can span one or more hours (discontinuous interval is allowed). Each hour is cleared separately, i.e. the bid can be accepted or rejected separately hour by hour. The accepted quantity must either be equal to the offered quantity or zero. The result can be different in every hour of the bid.
D	Divisible	No	No	No	Technical linking / QL available	single bid – varying quantity – Divisible, non-block bid has the same rules as described in case o with the difference that it can be accepted in the range between minimum and offered quantity. The divisibility is expressed by the presence of the minimum quantity. The minimum quantity can be also zero. The result can be different for every hour of the bid.
IB	Indivisible	Yes	No	No	Technical linking / QL not available	Indivisible block bid spans multiple consecutive hours (discontinuous interval is not allowed) with the same quantities per hour. In all hours, the bid must be either fully accepted or rejected.
DB	Divisible	Yes	No	No	Technical linking / QL not available	Divisible block (between minimum and offered quantity) bid spans multiple consecutive hours (discontinuous interval is not allowed) with the same quantities per hour. In all hours, the bid must be either accepted (between minimum and offered quantity) or rejected. I.e. it is not possible to accept the bid in one hour and reject it in another hour.

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<b>IE</b>	Indivisible	No	No	Yes	Technical linking / QL available	Exclusive bids in the same group (they have the same exclusive group id) are mutually exclusive for the same hour (block bids cannot be part of the exclusive bid group). The bid can be accepted in the given hour only if all other bids in the group are rejected. Bids can be exclusively linked across markets in the same market clearing group. Markets in the same market clearing group are cleared in a specific initial clearing order.
<b>DE</b>	Divisible	No	No	Yes	Technical linking / QL available	The same case as IE with the difference that the bid can be accepted also partially (between minimum and offered quantity). Please note that the exclusive group can contain both divisible and indivisible bids. Bids can be exclusively linked across markets in the same market clearing group. Markets in the same market clearing group are cleared in a specific initial clearing order. Bids selected in one market can not be selected in the other market in the same market time unit.

3.3.3 Invalid bid type combinations

Bid type combinations currently disabled due to missing exemption from Article 32(3) of the EB Regulation

Case	Divisible (D)	Block (B)	Joint linked up-and-down (L)	Exclusive (E)	Technical linking and Quality limitations	Description
<b>IL</b>	Indivisible	No	Yes	No	Technical linking / QL available	Joint linked up-and-down bids consist of two linked bids for different directions with the same price and hour(s). Both linked bids must have the same price and both must be either accepted or rejected; the offered quantity can be, however, different hour by hour. There are no links in time. The partial acceptance of the bid is not allowed.

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<b>DL</b>	Yes	No	Yes	No	Technical linking / QL available	The same as case <b>IL</b> with the exception that, for each hour, the bid can be accepted also partially – between minimum and offered quantity. If the minimum quantity of one of two linked bids is equal to zero, it is allowed to fully reject that bid and at the same time accept the other linked bid – this specific situation does not violate the rules for bids linking. Please note that it is possible to link together one divisible and one indivisible bid.
<b>BL</b>	NO	Yes	Yes	No	Technical linking / QL not available	The same as case <b>IL</b> with the exception that both bids must be either fully accepted in all hours or fully rejected in all hours. It is not allowed to link one block and one non-block bid.
<b>DBL</b>	Yes	Yes	Yes	No	Technical linking / QL not available	Combination of cases <b>DL</b> and <b>BL</b> : both bids must be either accepted in all hours or rejected in all hours, but the accepted quantity can be between minimum and offered quantity.
<b>LE</b>	No	No	Yes	Yes	Technical linking / QL available	If joint linked up-and-down bid is part of the exclusive group (see case <b>E</b> ), both corresponding linked bids must be part of the exclusive group and they both must either be accepted or rejected together, i.e. they are not considered as mutually exclusive. Both linked bids must have the same price.  Bids can be exclusively linked across markets in the same market clearing group. Markets in the same market clearing group are cleared in a specific initial clearing order. Bids selected in one market cannot be selected in the other market in the same market time unit.
<b>DLE</b>	Yes	No	Yes	Yes	Technical linking / QL available	This is the combination of the cases <b>DE</b> and <b>LE</b> : if the bid is accepted, the second linked bid must be also accepted and all other bids in the exclusive group must be rejected. In contrast to the case <b>LE</b> , the bid can be accepted also partially (between minimum and offered quantity).  Bids can be exclusively linked across markets in the same market clearing group. Markets in the same market clearing group are cleared in a specific initial clearing order. Bids selected in one market cannot be selected in the other market in the same market time unit.

None of the combinations of block bids and exclusive linking are supported.

Case	Divisible (D)	Block (B)	Joint linked up-and-down (L)	Exclusive (E)	Description
<b>BE</b>	No	Yes	No	Yes	Block bid cannot be part of the exclusive group.

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<b>DBE</b>	Yes	Yes	No	Yes	Block bid cannot be part of the exclusive group.
<b>BLE</b>	No	Yes	Yes	Yes	Block bid cannot be part of the exclusive group.
<b>DBLE</b>	Yes	Yes	Yes	Yes	Block bid cannot be part of the exclusive group.

### 3.4 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	
<b>Accepted bids</b> <i>ReserveAllocationResult_MarketDocument</i>	
<b>Market result</b> <i>Balancing_MarketDocument</i>	Volumes
	Prices

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 methodology, meaning that the market result will include clearing prices pr. bidding zone, market time unit and regulation direction with the price being included both in the balancing market document and the reserve allocation result market document.

#### 3.4.1 Accepted bids

- The *ReserveAllocationResult\_MarketDocument* as defined in 4.1.6 is used to provide a status of the bids that submitted to the auction. The BSPs receive information about their *own* bids, and one of the following reasons is 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.

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

#### 3.4.2 Market results - Volumes and prices

The *Balancing\_MarketDocument* as defined in 4.1.7 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 4.1.7. 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 by default receive market result messages. A BSP can however be flagged in Nordic MMS to receive the market results messages even if the BSP does not enter bids into an auction. To enable this the BSP should contact their local TSO

#### 3.4.3 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 2.2.3 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.

#### 3.4.4 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.

#### 3.4.5 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.

### 3.5 Open questions and clarifications

The following issues are outstanding clarifications necessary for publishing of version 1.1 of this guide.

1. The process type A47 used for the mFRR CM related documents still needs to be confirmed. There is a possible conflict with the mFRR EAM related process types. The TSOs consider using process type A58 instead.
2. Local market terms and conditions for the TSOs are not yet published. This document should not be read without also referring to the market terms and conditions published by the respective TSOs. Until these documents have finalized their hearing and approval processes, this implementation guide may still change to reflect changes in market terms and conditions

## 4 Annex

### 4.1 Dependency matrices

This chapter provides the dependencies for the documents used to support the mFRR 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 mFRR 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 NMMS use fixed codes and codingscheme A01.

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

#### 4.1.3 Bidding zones

The mFRR capacity market consists of the following bidding zones:

Name	TSO	mRID	Coding scheme
DK1	Energinet	10YDK-1-----W	EIC
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 Publish Reserve Requirements using the ReserveBid\_MarketDocument

<b>ReserveBid_MarketDocument</b>		iec62325-451-7-reservebiddocument.xsd - version 7.1
mRID	M	Unique identification of the document.
revisionNumber	M	Constant value of <b>1</b>
Type	M	<b>B21</b> – Reserve need document
process.processType	M	<b>A47</b> = Manual frequency restoration reserve
sender_MarketParticipant.mRID	M	<b>10V1001C--000284</b> (Nordic MMS)
sender_MarketParticipant.marketRole.type	M	<b>A34</b> = 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	<b>A46</b> – Balancing Service Provider (BSP)
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) Start: YYYY-MM-DDTHH:MMZ End: YYYY-MM-DDTHH:MMZ
domain.mRID	M	EIC identification of the document scope: Either control area : Denmark: <b>10Y1001A1001A796</b> Finland: <b>10YFI-1-----U</b> Norway: <b>10YNO-0-----C</b> Sweden: <b>10YSE-1-----K</b>  or bidding zone mRID ----- <b>A01</b> - EIC coding scheme
subject_MarketParticipant.mRID	M	<b>10V1001C--000284</b>
subject_MarketParticipant.marketRole.type	M	<b>A34</b> = Reserve Allocator
<b>BidTimeSeries</b>		

mRID	M	Unique identification of the need timeseries.
auction.mRID	M	Constant value: <b>MFRR_CAPACITY_MARKET</b>
businessType	M	<p><b>B75 (Need) – for reserve requirements:</b> if the acquiring domain is a bidding zone NMMS sends the demand as B75.</p> <p>If the market is configured to allow demand on the macro area* level this business type can also be sent on timeseries with an acquiring domain that is a macro area* or a bidding zone with a macro area* role.</p> <p><b>A6o – (Minimum possible), for minimum regulation:</b> A localization constraint for the procurement of balancing capacity, forcing the market to procure the given minimum of reserves in the specified geographic area.</p> <p>Relevant for a bidding zones and macro areas* in the acquiring domain.</p> <p><b>A61 – (Maximum available), for maximum regulation:</b> A localization constraint for the procurement of balancing capacity, forcing the market to procure reserves exceeding the maximum regulation outside of the given geographic area.</p> <p>Relevant for bidding zones and macro areas* in the acquiring domain.</p> <p>*A macro area is a set of bidding zones</p>
acquiring_Domain.mRID	M	<p>The identification of the area with the reserve requirement or localization constraint.</p> <p>This can be a bidding zone or a macro area identification.</p> <hr/> <p><b>A01</b> - EIC coding scheme</p>
connecting_Domain.mRID	M	<p>10Y1001A1001A91G (Nordic Market Area)</p> <p>The EIC identification of the bidding zone where the resources bidding against the reserve requirement are located. This will be set as the Nordic market area in anticipation of a Nordic exchange of mFRR balancing capacity.</p> <hr/> <p><b>A01</b> - EIC coding scheme</p>
quantity_Measure_Unit.name	M	<b>MAW</b> – megawatt
Divisible	M	<b>A01</b> = Yes
flowDirection.direction	M	<b>A01</b> - Up

		<b>A02</b> - Down
<b>Series_Period –</b>		
timeInterval	M	Period covered (in ISO 8601 UTC format). Start: YYYY-MM-DDTHH:MMZ End: YYYY-MM-DDTHH:MMZ
Resolution	M	<b>PT60M</b> – the time resolution. Must equal the duration of the timeInterval.
<b>Point</b>		
Position	M	Sequential value beginning with 1.
quantity.quantity	M	<b>For business type B75:</b> Auction / Reserve requirements per bidding zone <b>For business type A60:</b> Auction / Minimum reserve regulation per bidding zone or Minimum reserve regulation per macro area (depending on the acquiring domain) <b>For business type A61:</b> Auction / Maximum reserve regulation per bidding zone or Maximum reserve regulation per macro area (depending on the acquiring domain)

#### 4.1.5 Dependencies governing Bid Submission using the ReserveBid\_MarketDocument

<b>ReserveBid_MarketDocument</b>		iec62325-451-7-reservebiddocument.xsd - version 7.1
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
Type	M	<b>B40</b> – Complete Reserve Bid Document
process.processType	M	<b>A47</b> - Manual frequency restoration reserve
sender_MarketParticipant.mRID	M	Identification of the party sending the document Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
sender_MarketParticipant.marketRole.type	M	<b>A46</b> – Balancing Service Provider (BSP) <b>A39</b> – Data Provider Agents sending on behalf of BSPs must use market role <b>A39</b> when submitting bids. See chapter 4.4: "Agents and Data Providers acting on behalf of BSPs"
receiver_MarketParticipant.mRID	M	<b>10v1001C--000284</b> (Nordic MMS) <b>A01</b> - EIC coding scheme

receiver_MarketParticipant.marketRole.type	M	<b>A34</b> – 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	EIC identification of the TSOs Control Area Denmark: <b>10Y1001A1001A796</b> Finland: <b>10YFI-1-----U</b> Norway: <b>10YNO-0-----C</b> Sweden: <b>10YSE-1-----K</b>  <b>A01</b> - EIC coding scheme
subject_MarketParticipant.mRID	M	Identification of the party responsible for the bid  Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
subject_MarketParticipant.marketRole.type	M	<b>A46</b> – Balancing Service Provider (BSP)

<b>Bid_TimeSeries</b>		
mRID	M	Unique identification of the time series
auction.mRID	M	Constant value of " <b>MFRR_CAPACITY_MARKET</b> "
businessType	M	<b>B74</b> – The time series provides an offer to provide reserves.
acquiring_Domain.mRID	M	<b>10Y1001A1001A91G</b> (Nordic Market Area)  <b>A01</b> - EIC coding scheme
connecting_Domain.mRID	M	The EIC identification of the bidding zone where the bids are placed. See chapter: 4.1.3: "Bidding zones".  <b>A01</b> - EIC coding scheme

quantity_Measure_Unit.name	M	<b>MAW</b> – megawatt
currency_Unit.name	R	<b>EUR</b> – euro
price_Measure_Unit.name	R	<b>MAW</b> - megawatt
divisible	M	<b>A01</b> = Yes - quantity may be reduced stepwise down to the minimum quantity <b>A02</b> = No - no reduction possible on the quantity
linkedBidsIdentification	D	Used for technical linking of bids by providing a technical linked group identification.  Bid timeseries with common resting-time and activation duration limitations need to be specified with a common technical linked group identification in the linkedBidsIdentification element such that these bids are chosen in market time units where the bids are available for activation.  The bid selection will not select such bids in market time units where they can be unavailable due to selections in other market time units of the same or other timeseries with the same linkedBidsIdentification.  Not used if the bid is not linked or does not have quality limitations.  Quality limitations and thus technical linking, cannot be combined with block bids.
exclusiveBidsIdentification	D	The identification used to associate bids that are to be linked together. If one bid is selected then all others with the same exclusiveBidsID cannot be selected.  Apart from exclusive bid groups within a market and bidding zone, it allows the exclusive cross-linking of bids between markets, to be able to offer a resources flexibility in two markets with simultaneous gate closure without risking double acceptances.  Not used if the bid is not part of an exclusive group
blockBid	O	<b>A01</b> - Yes - all quantities within the time interval must be selected <b>A02</b> – No  Indicator of the block bid. In all MTUs, the block bid must be either accepted (between minimum and offered quantity or fully - depending on the divisible

		<p>flag) or rejected. I. e. it is not possible to accept the bid in one MTU and reject it in another MTU.</p> <p>If the element is not present, the bid is considered as non-block.</p>
<p>status</p>	<p>○</p>	<p>The information about the status of the bid.</p> <p>The element is optional. If the element is present, it must contain the value <b>A09</b> (Cancelled) and is used for being able to cancel all bids for a given delivery date and market. In that case, the content of the time series is ignored.</p> <p>If a time series with such a status is part of the document, it must be the only time series in the document. The time series is present only for the purpose of the identification of the market (which is part of the document scope).</p>
<p>registeredResource.mRID</p>	<p>○</p>	<p>Location of the bid. It must be the valid location (master data entity Location) assigned to the same BSP and bidding zone as the bid itself.</p> <p>In other contexts this is also called "Resouce identifier", "Location id" and "Stasjonsgruppe id"</p> <p>The element may be either mandatory, optional or disabled for the given market and control area, depending on the configuration of the market. The rule is configured as the business validation rule.</p> <p>If the element is not present and the attribute is set as optional, the empty value is written to the corresponding bid attribute.</p> <p>If the element is not present and the attribute is set as mandatory, it is considered as an error :</p> <p>/ A59_RESOURCE / Invalid location information.</p> <p>Coding scheme:</p> <ul style="list-style-type: none"> <li>• "NNO" : Norwegian national</li> <li>• "NSE" : Sweden national</li> </ul> <p>Please note that for Finland this identifier is mandatory, and used to indicate the area location of the bid. The coding scheme used is EIC , and the value must be one of these:</p>

		<ul style="list-style-type: none"> <li>"10YFI-0-----3" for North Finland</li> <li>"10YFI-2-----K" for South Finland</li> <li>"10YFI-3-----9R" for Central Finland</li> </ul> <p>Example: <code>&lt;registeredResource.mRID codingScheme="A01"&gt;10YFI-0-----3&lt;/registeredResource.mRID&gt;</code></p>
flowDirection.direction	M	<b>A01</b> - Up <b>A02</b> - Down
marketAgreement.type	O	<b>A01</b> – daily
resting_ConstraintDuration.duration	O	<p>The standard ISO 8601 is used for duration. The allowed form in this context is PTnH, where n is the number of hours. Leading zeros are allowed.</p> <p>The element is optional. If the element is not present, the empty value is written to the corresponding bid attribute.</p>
maximum_ConstraintDuration.duration	O	<p>The maximum duration that a regulation has to be up once the bid is activated.</p> <p>The standard ISO 8601 is used for duration. The allowed form in this context is PTnH, where n is the number of hours. Leading zeros are allowed.</p> <p>The element is optional. If the element is not present, the empty value is written to the corresponding bid attribute.</p>
<b>Period</b>		
timeInterval	M	Period covered (in ISO 8601 UTC format)
resolution	M	<b>PT60M</b> – the precision of the interval that the different points within the time series cover is <i>one hour</i>
<b>Point</b>		
position	M	Position within the time interval. Sequential value beginning with <b>1</b>
quantity.quantity	M	Offered quantity
price.amount	M	The price of the product offered

minimum_Quantity.quantity	D	<p>The minimum quantity must be present if bid is marked as divisible (A01) and must not be present when the bid is market as indivisible (A02).</p> <p>Must be specified as the same value across all points across all periods of the bid.</p>
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#### 4.1.6 Dependencies governing Accepted Bids using the ReserveAllocationResult\_MarketDocument

<b>ReserveAllocationResult_MarketDocument</b>		iec62325-451-7-reserveallocationresult.xsd - version 6.0
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
type	M	<b>A38</b> - Reserve allocation result document
process.processType	M	<b>A47</b> - Manual frequency restoration reserve
sender_MarketParticipant.mRID	M	<p><b>10V1001C--000284</b> (Nordic MMS)</p> <hr/> <p><b>A01</b> - EIC coding scheme</p>
sender_MarketParticipant.marketRole.type	M	<b>A34</b> – Reserve Allocator
receiver_MarketParticipant.mRID	M	<p>Identification of the party receiving the document</p> <hr/> <p>Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"</p>
receiver_MarketParticipant.marketRole.type	M	<p><b>A46</b> – Balancing Service Provider (BSP)</p> <p><b>A39</b> – Data Provider, see chapter 4.4: "Agents and Data Providers acting on behalf of BSPs"</p>
createdDateTime	M	<p>Date and time of document creation (in ISO 8601 UTC format)</p> <p>YYYY-MM-DDTHH:MM:SSZ</p>
reserveBid_Period.timeInterval	M	<p>Period covered (in ISO 8601 UTC format)</p> <p>YYYY-MM-DDTHH:MMZ</p>
domain.mRID	M	<p>EIC of the TSOs Control Area</p> <p>Denmark: <b>10Y1001A1001A796</b></p> <p>Finland: <b>10YFI-1-----U</b></p>



		Norway: <b>10YNO-0-----C</b> Sweden: <b>10YSE-1-----K</b>
		<b>A01</b> - EIC coding scheme
<b>TimeSeries</b>		
mRID	M	An identification that uniquely identified the time series
bid_Original_MarketDocument.mRID	M	Constant value of " <b>NA</b> "
bid_Original_MarketDocument.revisionNumber	M	Constant value of " <b>1</b> "
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 Identification is supported by several coding schemes. See chapter 4.1.2: "Coding Schemes"
auction.mRID	M	Constant value of " <b>MFRR_CAPACITY_MARKET</b> "
businessType	M	<b>B95</b> – Procured capacity
acquiring_Domain.mRID	M	<b>10Y1001A1001A91G</b> (Nordic Market Area) <b>A01</b> - 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". <b>A01</b> - EIC coding scheme
marketAgreement.type	M	<b>A01</b> – daily
marketAgreement.mRID	M	Constant value of " <b>NA</b> "
quantity_Measure_Unit.name	M	<b>MAW</b> – megawatt
currency_Unit.name	M	<b>EUR</b> – euro
price_Measure_Unit.name	M	<b>MAW</b> - megawatt
flowDirection.direction	M	<b>A01</b> - Up <b>A02</b> - Down
registeredResource.mRID	O	The identification of a resource associated with a bid.

		If the bid does not carry registered resource information, the element is omitted.
resting_ConstraintDuration.duration	O	The delay to be respected between the end of activation and the start of the next activation.  The standard ISO 8601 is used. The number of hours stored in the time series is converted to the format PTnH, where n is the number of hours.  If the value of the time series is empty, the element is omitted.
maximum_ConstraintDuration.duration	O	The maximum duration that a regulation has to be up once the bid is activated.  The standard ISO 8601 is used. The number of hours stored in the time series is converted to the format PTnH, where n is the number of hours.  If the value of the time series is empty, the element is omitted.
<b>Reason (within Time Series)</b>		
code	O	Information whether the bid has been accepted/rejected in a standard way or due to the bottleneck  <b>B49</b> - standard time series of the bid <b>B42</b> - bottleneck time series of the bid
code	M	One of these codes will be provided: <b>A72</b> - The original bid quantity has been divided to enable it to be accepted. <b>A73</b> - Tender in question has been accepted <b>B09</b> - Bid not accepted <b>B16</b> – 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	<b>PT60M</b> – the precision of the interval that the different points within the time series cover is <i>one hour</i>
<b>Point</b>		
position	M	Position within the time interval. Sequential value beginning with <b>1</b>
quantity	M	The <b>accepted quantity</b> identified for a point (For a bottleneck time series : the forcibly accepted quantity) For ReasonCode A73: quantity is > 0 For ReasonCode A72: quantity is ≥ 0 For ReasonCode B09 and B16: quantity is = 0
price.amount	D	The <b>accepted price</b> identified for a point (For bottleneck time series or if Pay as bid method is active on the given market: Bid-price. The price is constant for all points in the time series, price is equal to the offered price. ) 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
secondaryQuantity	R	The <b>offered quantity</b> identified for a point For all supported ReasonCodes: secondaryQuantity is present
bid_Price.amount	R	The <b>offered price</b> identified for a point For all supported ReasonCodes: bid_Price.amount is present

## 4.1.7 Dependencies governing Market Result using the Balancing\_MarketDocument

<b>Balancing_MarketDocument</b>		iec62325-451-6-balancing.xsd - version 4.2
mRID	M	Unique identification of the document
revisionNumber	M	Constant value of "1"
type	M	<b>B34</b> – Market result document
process.processType	M	<b>A47</b> - Manual frequency restoration reserve
sender_MarketParticipant.mRID	M	<b>10V1001C--000284</b> ----- <b>A01</b> - EIC coding scheme
sender_MarketParticipant.marketRole.type	M	<b>A34</b> – 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	<b>A46</b> – Balancing Service Provider (BSP) <b>A39</b> – Data Provider, see chapter 4.4: "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	M	<b>10Y1001A1001A91G</b> (Nordic Market Area) <b>A01</b> - EIC coding scheme
period.timeInterval	M	The period covered by the document (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ
<b>TimeSeries</b>		
mRID	M	An identification that uniquely identifies the time series
businessType	M	<b>C17</b> – Market price and volume
acquiring_Domain.mRID	M	<b>10Y1001A1001A91G</b> (Nordic Market Area) ----- <b>A01</b> - EIC coding scheme

connecting_Domain.mRID	M	The EIC identification of the bidding zone. See chapter: 4.1.3: "Bidding zones". <hr/> <b>A01</b> - EIC coding scheme
marketAgreement.type	M	<b>A01</b> – daily
flowDirection.direction	M	<b>A01</b> - Up <b>A02</b> - Down
currency_Unit.name	M	<b>EUR</b> – euro
quantity_Measure_Unit.name	M	<b>MAW</b> – megawatt
price_Measure_Unit.name	M	<b>MAW</b> - megawatt
auction.mRID	R	Constant value of " <b>MFRR_CAPACITY_MARKET</b> "
<b>Period</b>		
timeInterval	M	Period covered (in ISO 8601 UTC format) YYYY-MM-DDTHH:MMZ
Resolution	M	<b>PT60M</b> – the precision of the interval that the different points within the time series cover is one hour
<b>Point</b>		
Position	M	Position within the time interval. Sequential value beginning with <b>1</b>
Quantity	M	Total volume procured
procurement_Price.amount	M	Market price

#### 4.1.8 Dependencies governing the Acknowledgement\_MarketDocument

<b>Acknowledgement_MarketDocument</b>		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	<b>10V1001C--000284</b> ----- <b>A01</b> - EIC coding scheme
sender_MarketParticipant.marketRole.type	M	<b>A34</b> – 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	M	<b>A46</b> – Balancing Service Provider (BSP) <b>A39</b> – Data Provider, see chapter 4.4: "Agents and Data Providers acting on behalf of BSPs"
received_MarketDocument.mRID	M	Information extracted from the bid document
received_MarketDocument.revisionNumber	M	Information extracted from the bid document
received_MarketDocument.createdDateTime	M	Information extracted from the bid document
<b>Rejected_TimeSeries</b>		
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
<b>InError_Period</b>		
timeInterval	M	Period covered (in ISO 8601 UTC format)
Reason	M	One or more of the reasons described below
<b>Reason</b>		

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

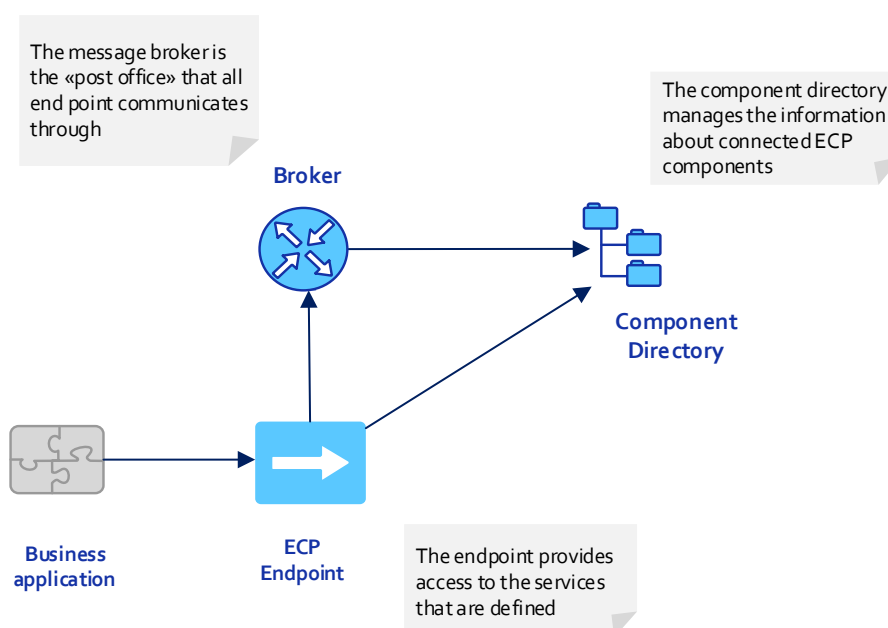
## 4.2 ECP

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

- receiving reserve requirements from the platform
- 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. 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:

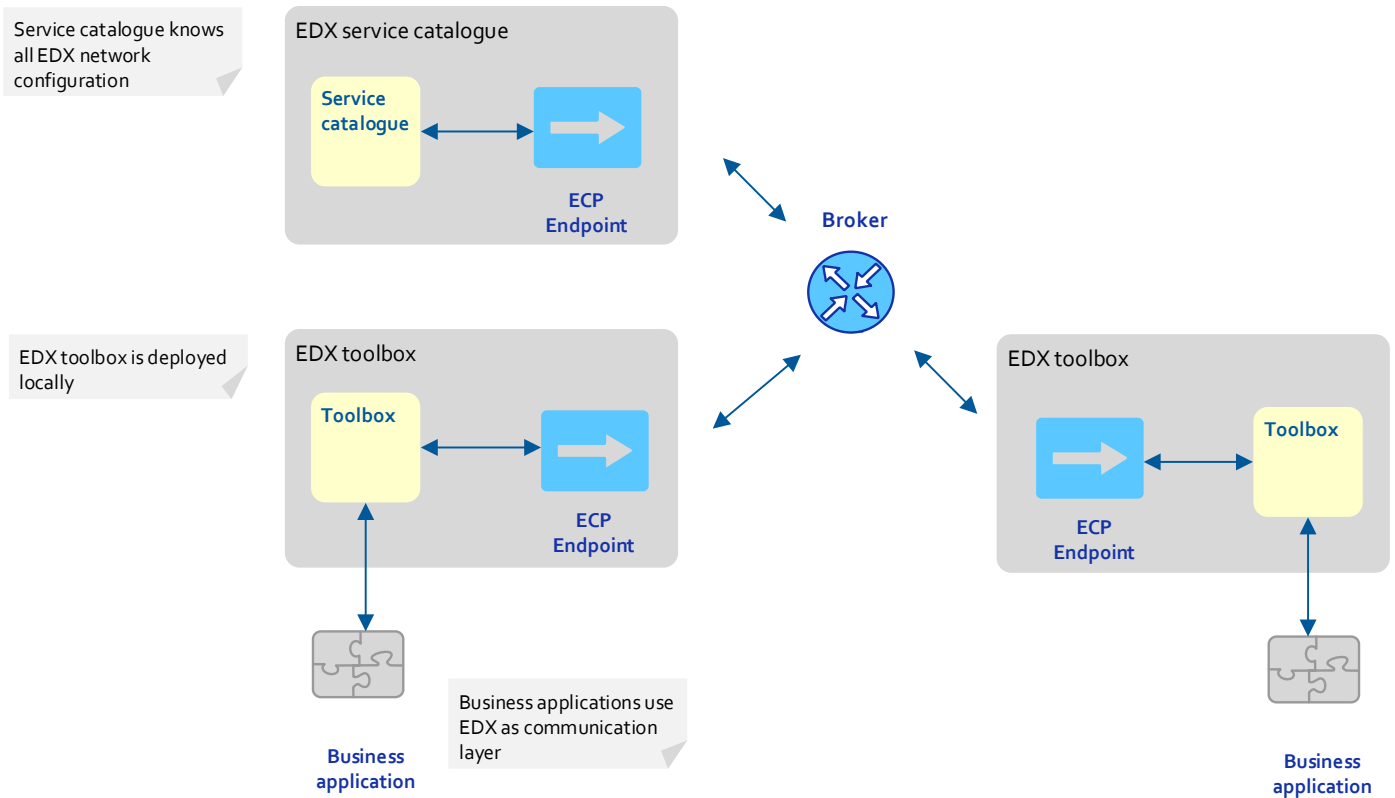


Figur 4 ECP Main Components



#### 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 mFRR Capacity Market

#### 4.2.4.1 Which message types to use

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

Process	Sender	Format	ECP message type
Publishing Reserve Requirements	Nordic MMS	iec62325-451-7-reservebiddocument_v7_1.xsd	MO-MCC-RESERVE-REQUIREMENTS
Bid Submission	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

#### 4.2.4.2 Which service to use

The addressing convention used for communicating in the ECP network is *SERVICE-service.code*. For mFRR Capacity Market the service code is NO-MFRRCAP. Hence, addressing in mFRR Capacity Market is **SERVICE-NO-MFRRCAP**.

## 4.3 New interface versions

Please note that the schema-versions of the IEC CIM xml-files used will be upgraded over time. This may be caused by new attributes being added that are only supported in the new versions, or the need to replace old legacy versions that supporting systems, editors or other tools may not support any more.

The BSPs will need some time to adapt their systems to the new versions. NMMS will therefore in an intermediate period send both versions of these files, called "legacy" and "new". The "new" files will be sent using new ECP message types. When this period starts the legacy files will be received as before, but the BSPs systems may not recognize the new files, and this may cause errors like "unknown file received".

The BSPs will be informed in good time before these type of changes, and new versions of the Implementation guides will be released. After some time NMMS will stop sending the "legacy" files, but this will not be done until we have verified that all recipients have made the switch to the new versions.

The current ("legacy") files are :

Data	Document	ECP message type
Accepted bids	iec62325-451-7-reserveallocationresult.xsd – version 6.0	MO-MCC-ACCEPTED-BIDS-BSP
Market result	iec62325-451-6-balancing.xsd – version 4.2	MO-MCC-MARKET-RESULTS
Reserve requirements	iec62325-451-7-reservebiddocument.xsd – version 7.1	MO-MCC-RESERVE-REQUIREMENTS

The new files are :

<b>Data</b>	<b>Document</b>	<b>ECP message type</b>
Accepted bids	iec62325-451-7-reserveallocationresult.xsd – version 6.4	MO-MCC-ACCEPTED-BIDS-BSP-V6-4
Market result	iec62325-451-6-balancing.xsd – version 4.5	MO-MCC-MARKET-RESULTS-V4-5
Reserve requirements	iec62325-451-7-reservebiddocument.xsd – version 7.4	MO-MCC-RESERVE-REQUIREMENTS-V7-4

See References for link to documentation.

#### 4.4 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 has to be set as the sender\_MarketParticipant.mRID in the message and its sender\_MarketParticipant.marketRole.type needs to be set to A39 – data provider.

In order to authorize an agent, the principal BSP needs to request an authorization for the agent party from its responsible TSO. itsBSP 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.