BME Co-Location

1. Introduction

The aim of this document is to describe the BME Co-Location service for accessing BME Cash and Derivatives platforms as well as BME market data feeds.

The BME Co-Location service provides the space and the network infrastructure, required by the entities to install their trading software and hardware to be connected to the cash and derivatives markets.

BME Co-Location service is offered in the same BME Data Center where the Cash and Derivatives markets matching engines are located. The technical infrastructure in place guarantees the same quality of access for all entities.

The BME Data Center meets the highest standards of safety and reliability. Redundancy is provided with generators, UPS rooms, electrical panels, air conditioning, etc.

The electrical system has been implemented as follows:

- Backup generators: Power line supported by two sets of 800 Kvas each.
- Electrical Distribution: there are 2 independent UPS rooms consisting of three units per room. Each unit has an output of 250 Kvas (total 750 Kvas per room). The Data Center has four electrical panels, two of which feed on the first UPS room and the remaining two on the second one.

The cooling system is made up of 10 units backed by emergency generators.

- Environmental levels of temperature: 24 ± 2 ° C
- Relative humidity: Between 40% and 60%.

BME Co-Location is a solution optimized for collocating trading applications, built and managed by BME.

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2. BME Co-Location Service Features

The Service is aimed at the following entities (hereinafter "Entities"):

A. Member of a Spanish Stock Exchange.

B. Member of the Official Secondary Market for Futures and Options (MEFF).

C. Certified external application, providing access to the Stock Exchange Interconnection System (SIBE).

D. Application Service Provider for access to the MEFF trading system.

E. A Client of BME Market Data.

F. A Client of a Member of a Spanish Stock Exchange which has been authorized to receive a sponsored access service ("SpA") from said Member.

The Entities shall be able to install their own infrastructure, or their Clients' equipment, in their racks. In this last case, BME shall consider the Clients' equipment as if they belonged to the contracting Entity. The Entities may not rent the contracted racks to third parties.

- Platforms to which access is provided from the BME Co-Location:
    - SIBE (Equities, ETFs, Warrants)
    - MEFF (Derivatives)
    - Market Data (BME Market Data)
- Messaging type
    - BME Gate Servers (FIX protocol).
    - BME Multicast Binary Feed.
- On a first stage, each Entity shall be offered up to 2 racks. Once the requested racks have been provided, space will be assigned on a first-come-first-serve basis until the available space is full.
- The racks in which the Entities install their equipment belong to BME. The following options are available:
    - Full Rack, 60 x 120 cm, 42 Us; 2 PDUs x 32A / 220V
    - $^1/_2$ Rack 60 x 120 cm, 21 Us; 2 PDUs x32A / 220V (shared)

  The installation of the equipment is carried out either by BME staff, by the Entity's own staff, or by its hardware provider, subject to the prior approval of BME. Exceptionally, access of Certifying Entities authorized by BME shall be permitted to confirm the terms in which the installation has been performed.
- The BME Co-Location service provides connectivity exclusively to markets at BME main Data Centre; that is, connectivity to Disaster Recovery site is not offered.
- Available latencies

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The connection to the market is presented in two different bandwidths, 1Gbps and 10 Gbps. The length of the cable is equal for every client. Latencies provided by all servers based in BME Co-Location are equal, assuming some discrepancies on its value due to the bandwidth selected or when the servers are outside this service.

- Cross-Connects

The Entity is allowed to connect its infrastructure with that belonging to other Entities. Every cross-connect need first to be evaluated and authorized by BME.

3. BME Markets and Services

• BME Gate Servers (FIX protocol): a dedicated server, which is individually connected to each market segment.

A connection (FIX session) per segment (SIBE, MEFF, etc.) will need to be established. Each session will require Member ID + Operator Code.

	Connection to:	Required for the Entity:
MEFF (Order entry)	MEFF Gate Servers	Credentials (Member, Operator and IPs target)
SIBE (Order entry)	SIBE Gate Servers	Credentials (Member, Operator and IPs target)
BME Market Data	BME Gate Servers	Credentials (Member, Operator and IPs target)
	BME Multicast Binary Feed	Credentials (User, Password and IPs target) Replay & Recovery

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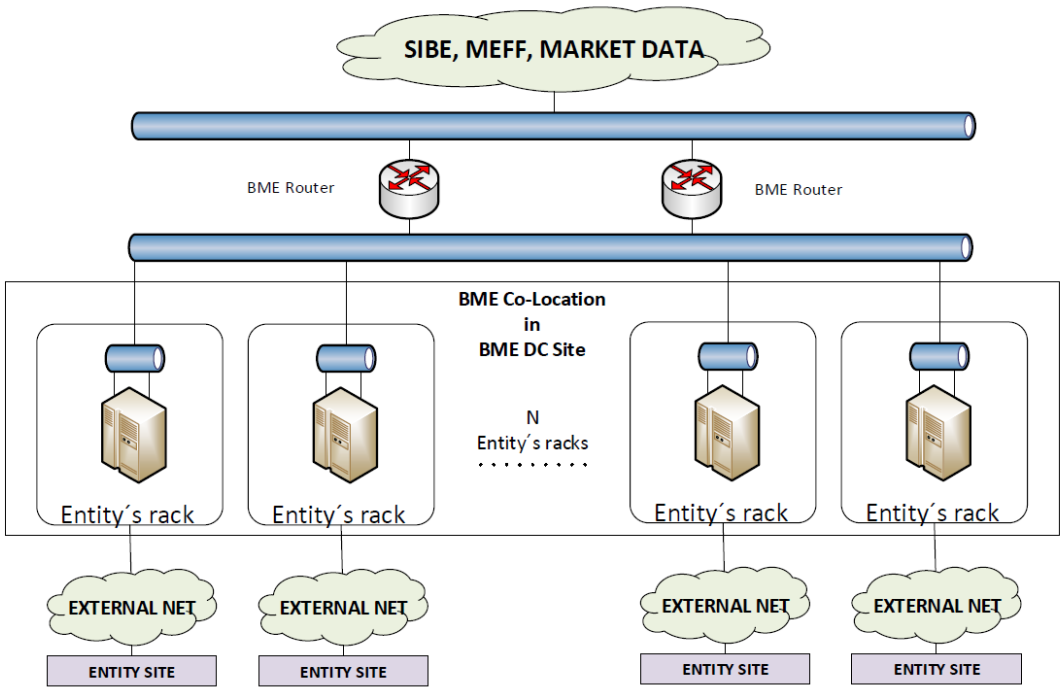
4. Overview



- As per the diagram above, BME Data Center is divided in two different areas: The upper area for BME Cash, Derivatives and Market Data platforms (BME Systems), and the lower area for the racks allocated to Entities.

- BME network links both areas, connecting the Entity's equipment with BME main network hardware.
- All network hardware and electric power supply is redundant.

- The Entity's equipment is connected to BME Main Routers.

- Racks connection with BME Systems:

    - Is performed by means of same-length cables to ensure the same physical distance to BME infrastructure for all Entities.

    - Basic bandwidth: 1 Gbps (copper). Upgraded bandwidth: 10 Gbps (fiber).

- Remote Access:

    - The Entity is responsible for managing its own applications installed at the BME Co-Location. In addition, circuits enabling the Entity to have remote access to its infrastructure are the sole responsibility of the Entity.

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5. Installation procedure

The Entity is responsible for the shipment of its infrastructure to the site indicated by BME. In case the Entity appoints BME staff for the installation of its equipment, it will need to provide detailed rack layout and instructions to achieve the correct installation of the different devices. Access to the Data Centre is exclusively allowed to the Entity's authorized persons or hardware provider subject to BME's prior authorization.

Equipment Installation: Phases

- Phase 1
    - Once the BME Colocation Agreement has been signed, BME will notify the Entity of the date in which the rack will be provisioned with the requested technical features.
    - Once the rack is available, the Entity shall notify with sufficient time in advance the delivery of its equipment. BME will manage the reception and transfer of the delivery to the BME Co-Location area.
    - In case the Entity has requested BME to install its equipment, BME engineers will install the equipment in the rack allocated following the instructions provided by the Entity. Alternatively, BME will accompany the authorized Entity representative who will undertake the installation.
    - The Entity is responsible for ordering the circuits that it may need for the remote access to its infrastructure installed at the BME Co-Location. BME assists the carrier in the installation process of these lines and will install the corresponding cables up to the Entity patch panel.

Phase 1 will come to an end once the Entity has achieved remote access to its equipment. The same procedure is followed in case the equipment needs to be replaced or upgraded.

- Phase 2
    - In Phase 2 internal connectivity services from the Entity equipment will be performed based on the service which the Entity is requesting (access to the market, information services, cross-connect with another Entity).
    - Once the services have been set up, a test will be performed so as to confirm that the Entity achieves access to the contracted service, in which case Phase 2 shall come to an end.

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6. Maintenance and Support

The basic “Hands and Eyes” operations that BME has undertaken to carry out are as follows:

- Physical activation/power down the equipment.
- External verification and checking of the Entity’s equipment as well as of network devices, LEDs, display messages, etc.
- Manage the access to the Data Centre of the Authorised Individuals when required.
- Review and verification of network cabling.

The service shall include 20 hours of basic operations per year for each Entity. Unused basic operations serviced hours in any year shall not be carried forward to future years.

H&E team is available from 07:00 until 23:00 (local time) on working days. During this timeframe, emergency work orders will be received by telephone or by e-mail.

The installation of the equipment (excluding connectivity services to BME) can be carried out between 17:30 and 23:00 on working days, subject to prior notification. Connectivity services to BME Systems is performed on Wednesdays between 22:00 and 23:00.

Exceptionally, the possibility of working at our DPC from 23:00 to 7:00 of the following day from Monday to Thursday could be offered. Friday evening availability will end at 23:00.

Basic operations different from those indicated above, or to be performed outside the timeframe indicated, need to be booked at least 48 hours in advance and are subject to availability of BME staff. Any activities carried out at weekends or on public holidays shall be authorized and planned at least one week in advance.

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