

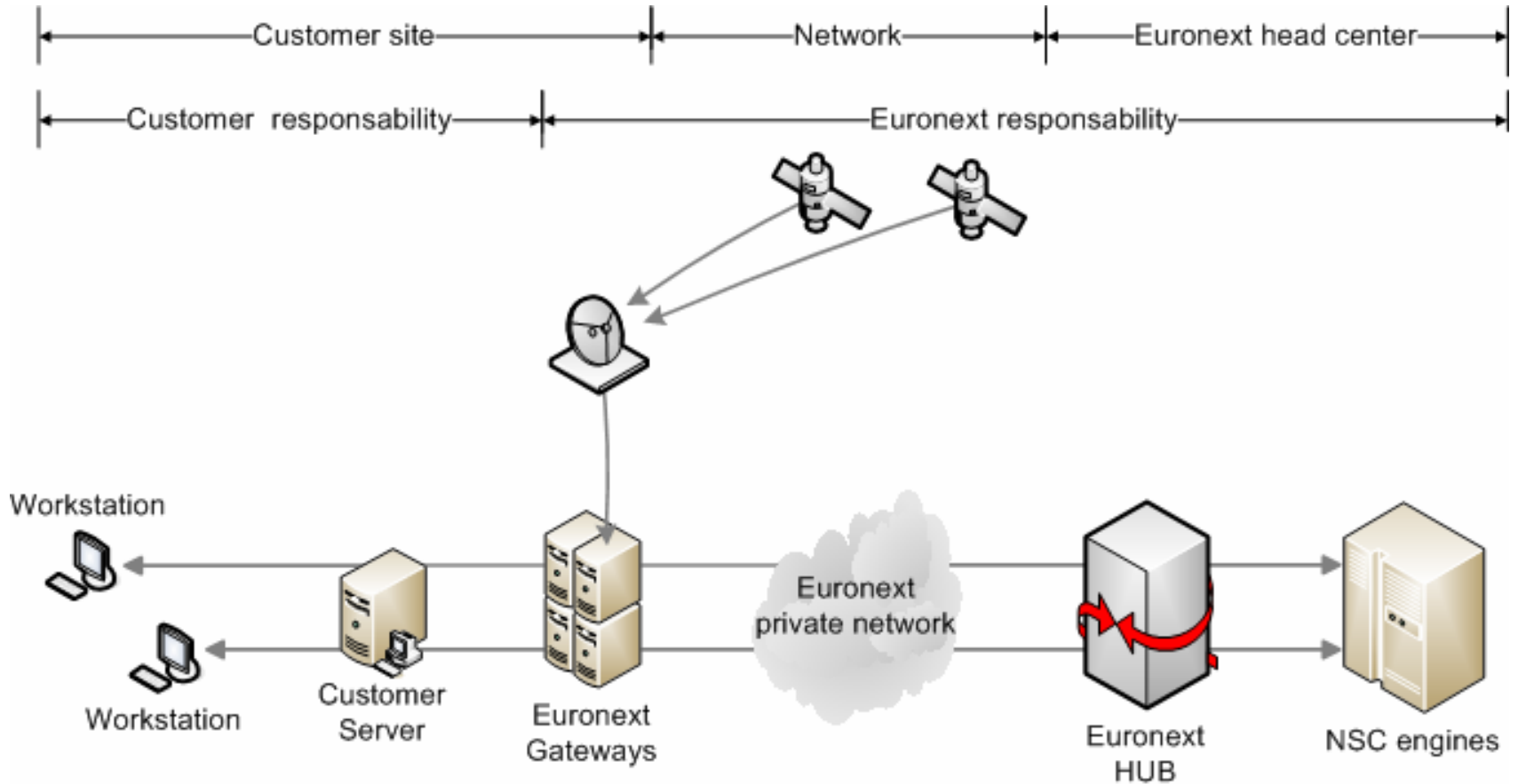
Euronext connection solution



(1) General information

- Connection to the Euronext central systems is based on a technical infrastructure installed on customers' premises.
- Several Euronext City Pops (local private network access) are available in order to reduce the distance between customers' sites and Euronext's private network.
- Connection of a customer's site(s) to the nearest City Pop requires the subscription of a leased line to a local operator selected by the customer.
- Euronext's private network is fully secured and constantly monitored by dedicated teams.
- The infrastructure installed on the customer's premises is monitored by Euronext's Customer Technical Support via remote tools.

(2) Global view



(3) Euronext infrastructure

/// **Satellite kit**

- /// 1 dish (2 heads)
- /// 2 demodulators
- /// 2 hubs (16 ports)

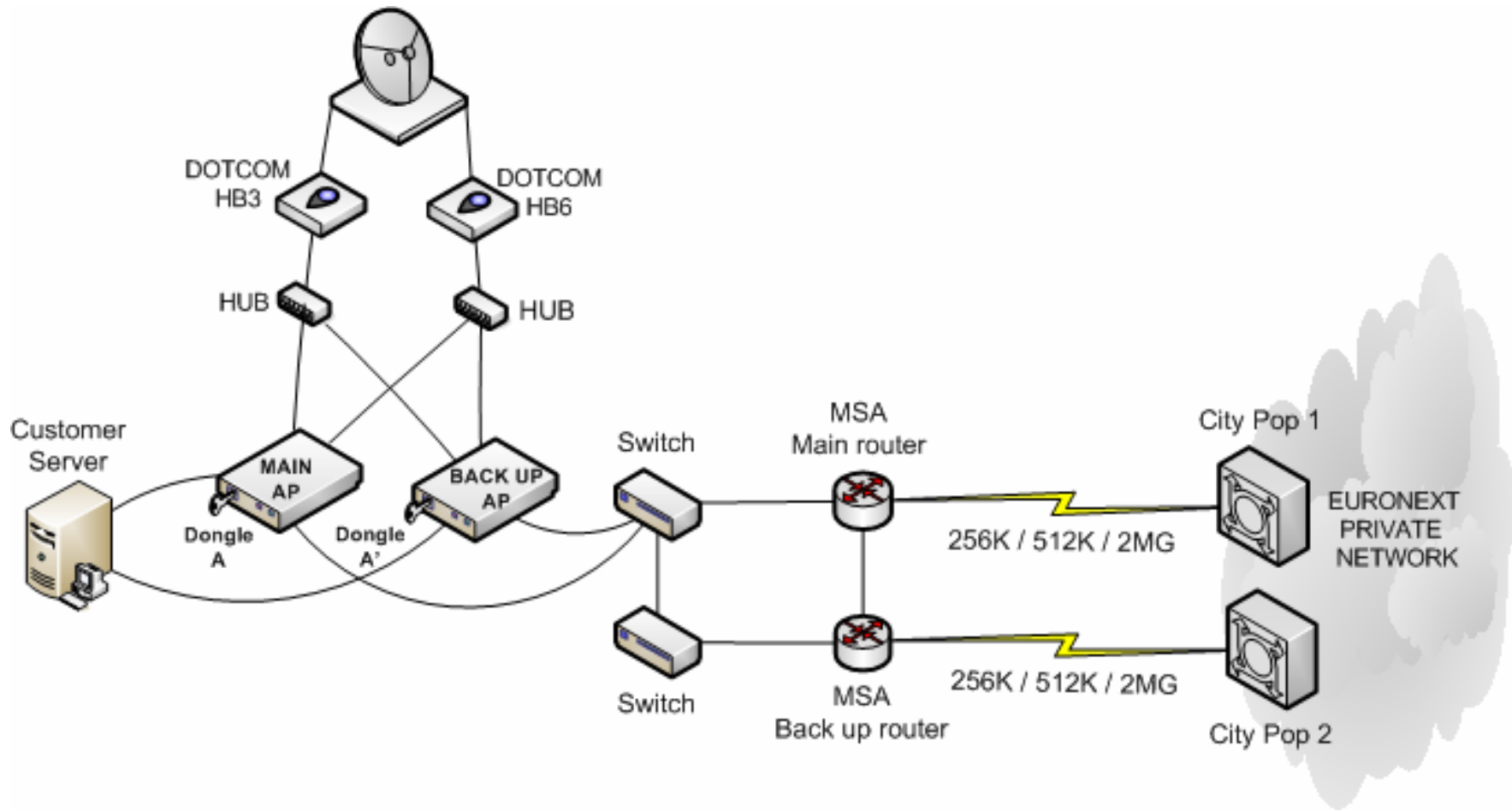
/// **Access point platform**

- /// Dell server(s)
- /// Windows 2003 server OS

/// **Network equipments**

- /// 1 or 2 circuit(s)
- /// 1 or 2 MSA (Multi Services Access) router(s)
- /// 1 or 2 switch(es)

(4) Secure solution



(5) Access point characteristics

An access point may be designed according to the following characteristics:

- Business (trading or market data feed vendors)
- Environment (live or test)
- Interface (cap or map)
- Protocol (mmtp or fix)
- Status (main or back up)

(5.1) Business

An access point is designed for a single **business**

≡ **Trading configuration allows:**

≡ **trading on all Euronext systems:**

- *NSC-VE (equities / bonds / certificates / trackers).*
- *NSC-VW (warrants).*
- *NSC-VL (lending & borrowing market).*
- *TCS (trade confirmation system).*

≡ **reception of the complete market data feed.**

≡ **Market data feed configuration allows reception of a filtered feed corresponding to **Data Vendors** activities.**

(5.2) Environment

An access point is designed for a single **environment**

⇒ **Live environment**

- ⇒ to trade on all Euronext systems.

⇒ **Test environment**

- ⇒ to validate a solution prior to starting activities on live environment.
- ⇒ to fix potential bugs on customer's market software.
- ⇒ to implement new functionalities.
- ⇒ to make training programs available for trader teams.

Euronext recommends using customers' own market software to implement a testing infrastructure.

(5.3) Interface

An access point is designed as a single **interface**

⇒ **Certified Access Point**

- ⇒ this solution allows trading under one membership code only.
- ⇒ all orders are certified as coming from the same membership code.

⇒ **Mutualized Access Point**

- ⇒ this solution allows trading under several membership codes.
- ⇒ MAP is designed for Independent Software Vendors activities.
- ⇒ a membership certification mechanism must be implemented by the ISV.

CAP & MAP softwares are running on the same hardware infrastructure.

Converting an access point from one interface to the other involves amendments in terms of protocol implementation for the customer market software.

(5.4) Protocol

An access point is designed for a single **protocol**

⇒ **Market Message Transfer Protocol**

⇒ **Financial Information eXchange**

These two protocols provide customers with two different options regarding the development approach.

There is no difference in terms of performance, functionality or reliability.

(5.5) Status

An access point is designed for a single **status**

⇒ **Main access points**

⇒ **Back up access point**

The notion of 'main access point' is used for configuration management only. Once the purposes of the solution are defined, the main access point can be configured. Then, the associated backup access points are set up by cloning process. Euronext recommends implementing a secure solution in order to reduce the risk of being impacted by access point failure.

(6) Access point subscriptions

An access point is the gateway for the following:

▤ private orders processes

- 5 subscribers can be equally connected either to the main access point or to the associated backup access point.
- A load balancing mechanism may be implemented.
- Each subscriber may be defined with a dedicated subscription.

▤ public messages delivery processes

- 5 connections may be simultaneously established to the main access point and to the associated backup.
- Only one data feed subscription is available for the 5 connections.

For both kinds of processes, it is crucial to accurately manage the performance aspect in accordance with the chosen infrastructure.

(7) Dongle

- ⚡ To make the access point operational, a dongle (hardware key) must be plugged into the access point.
- ⚡ The dongle certifies the origin of messages and the integrity of data.
- ⚡ The dongle also encrypts and decrypts all data conveyed through the access point.
- ⚡ The main access point and its backup are equipped with an identical dongle.
- ⚡ Once the dongle is delivered, the customer is responsible for its use. Any intervention made through it will be attributed to the member firm.

(8) Network

- Customer premises are linked up to the nearest Euronext City Pop through a leased line subscribed to a local carrier. This connection may be secured with a second leased line subscribed to another local carrier.
- For customer sites equipped with a redundant network solution, a HSRP mechanism is implemented in order to automatically switch from the main circuit to the back up one.
- The required bandwidth amounts to 3x64k channels per access point:
 - a 64k channel for market data,
 - a 64k channel for monitoring needs,
 - a 64k channel for administration (software upgrade & antivirus update).Accordingly, eight access points may be implemented on a 2Mg circuit.

Euronext recommends implementing a redundant solution in order to reduce the risk of being impacted by network issues.

(9) Contact

Euronext Customer Technical Support (CTS) is available to provide customers with any additional information or survey with regard to Euronext solutions.

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