Eurex Exchange’s T7

Disaster Recovery Concept

Interface Configuration Details

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Abstract

This document describes the general disaster recovery concept of Eurex Exchange's T7. All required IP addresses, multicast addresses and TCP/IP ports to be used for various interfaces in a DR scenario are listed.

1. Disaster recovery scenario

The following description is relevant for installations connecting via redundant line WAN connection (Ethernet, E1/T1) outside of the Equinix data center[1]. Customer installations inside Equinix are considered to be defunct in a disaster recovery (DR) scenario which results in a complete outage of the Equinix data center.

A total of three types of customer installations have to be considered for the Eurex T7 DR scenario:

- Customer installations in Equinix data center
- Customer installations connecting to the Frankfurt Access Point (customers in Germany)
- Customer installations connecting to remote Access Points (London, Paris, Amsterdam, Zurich, Chicago, etc.)

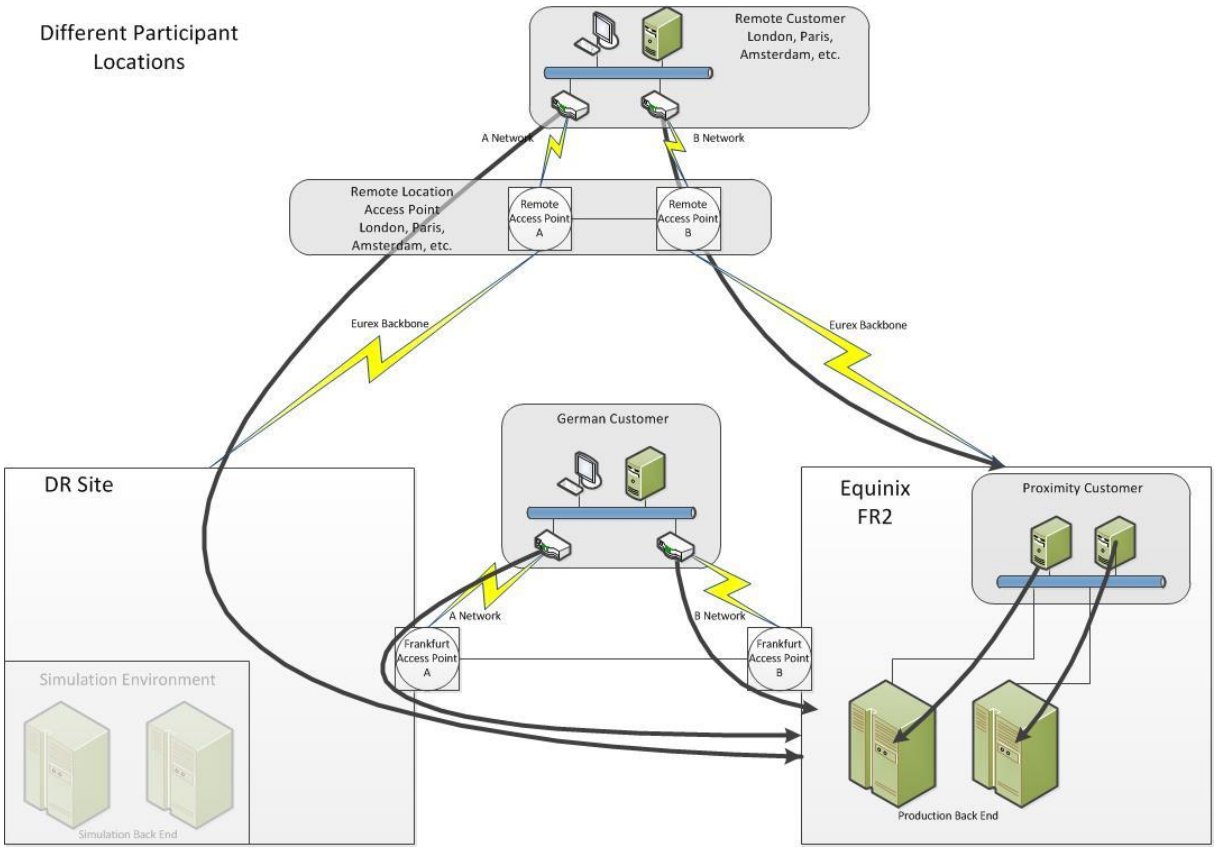


Figure 1, three location options for Eurex connectivity

Figure 1 depicts all three types of customer installations and their redundant connectivity to the Eurex production back end.

[1] Combined/iAccess is available in Hausen1 and Equinix, so it depends where the participant's tunnel is terminated as to whether he will still have connection. Tunnels in Equinix do not automatically move to Hau1.

Figure 2 displays the result of a DR scenario which renders the whole facility of Equinix data center FR2 in Frankfurt Kruppstrasse inaccessible.

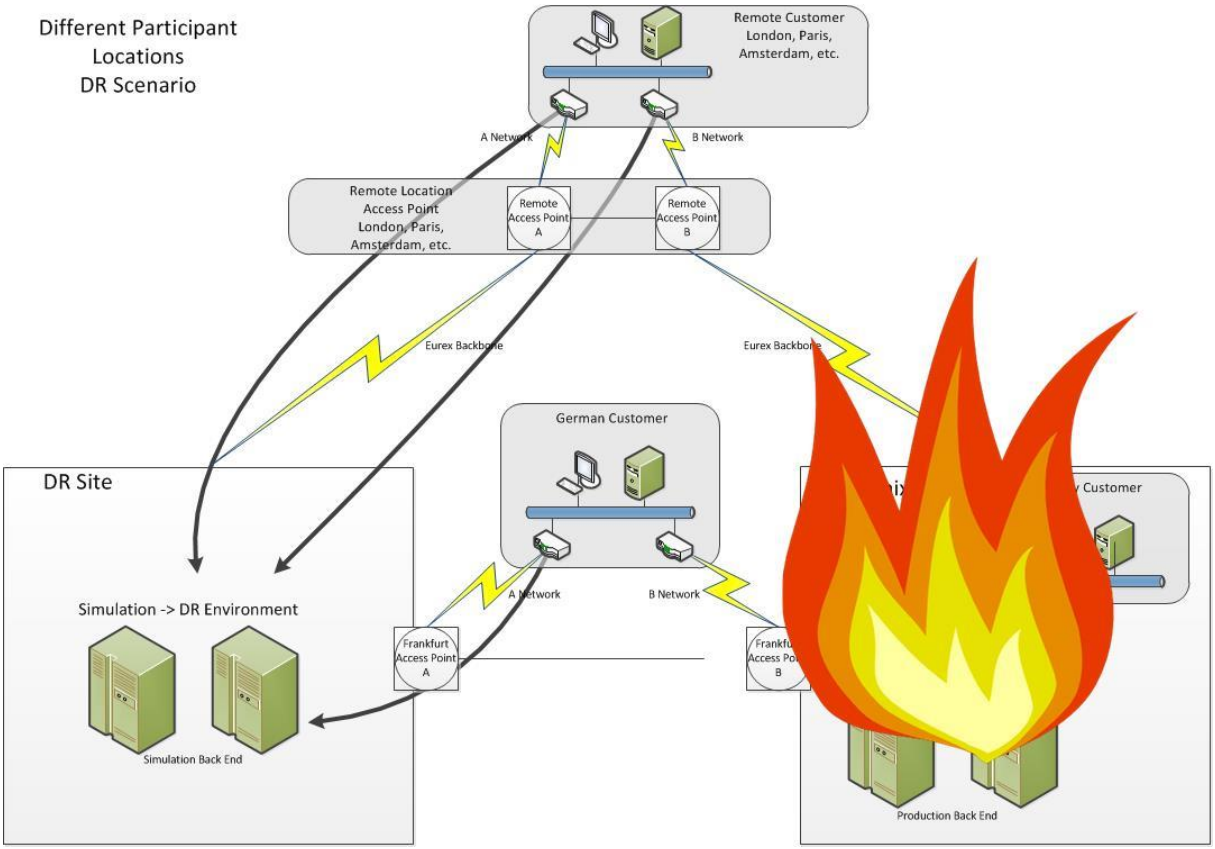


Figure 2, Disaster recovery scenario

In such a scenario customer installations connecting to remote access points (i.e. London, Paris, Amsterdam, Chicago, etc.) will continue to use both leased lines connecting them to the local access point. The local access point continues to use back bones lines to Frankfurt which are terminating in the DR data center.

Customer installations connecting to the Frankfurt access point will be able to continue to use a single leased line connecting to the access point half located in the DR data center.

Customer installations within the Equinix data center (FR2) are considered to be non functional in this DR scenario.

2. General considerations

In a disaster recovery scenario the Eurex T7 infrastructure regularly used for Eurex T7 simulation will be re-used to serve as disaster recovery production infrastructure.

The switch of the back end and the transfer of reference data will not be instantaneous, but is expected to take up to four hours.

While most Eurex T7 interfaces will be available in the disaster recovery scenario a number of conceptual differences to regular production exist and have to be accounted for.

2.1 Functional

- Order books will be empty after switch to the DR environment.
- All keys and sequence numbers are reset and starting from 1 again.
- Trades of the current business day will not be transferred to T7 DR System (but can still be inquired from the Eurex Clearing system).
- Only two partitions are running in the DR scenario (compared to ten partitions in the regular production environment).
- The original RDF file from the production environment for that day has to be used as initial RDF file. Further intra day updates will be published by the DR back end onto the Common Report Engine as usual into directory for environment 90 (prod).
- Eurex Extended Market Data Service will distribute ticker data, settlement prices and OTC market data provided the availability of the Eurex classic back end on regular IP production addresses.
- ETI sessions will have a throttle limit of 30 transactions per second in a DR scenario.

2.2 Network

- User IDs, ETI and FIX sessions will be used from production.
- All TCP and UDP Ports will be the same as for normal production.
- All Eurex A Stream MDI/EMDI/RDI multicast groups will be the same as for normal production.
- Eurex A Stream Rendezvous Point (RP) will be the same as for normal production.
- Eurex MDI/EMDI/RDI Source IP addresses will differ from regular production!
- Eurex ETI/Connection Gateway Subnets will differ from regular production!
- Eurex FIX Gateway A Side Subnet will be the same as for normal production.
- Eurex CRE A Side Subnet will be the same as for normal production.

See chapter 4 for full network details.

3. Disaster recovery test scope

Disaster recovery test exercises will be performed on weekends. Participation is optional but highly recommended for all trading and clearing participants to ensure easy transition in case of a real disaster.

Please note, this chapter describes the availability of interfaces during a test exercise. During the test exercise most, but not all interfaces are in scope of the test.

During a DR test exercise production reference data will be used, including User IDs, T7 GUI SSH keys and ETI & FIX sessions. Changes done to these reference data will not be copied back to production after the test. It is not advised to perform any changes to this data during the test exercise.

Order and quote entry will be possible via ETI.

Any order book or trading information created during the DR test exercise will not be transferred back to production.

The following Eurex Exchange's T7 interfaces will be available during the DR test exercise:

- Eurex T7 Trading- and Admin GUI
- Enhanced Transaction Solution (ETI)
- Eurex Market Data Service (MDI)
- Eurex Enhanced Market Data Service (EMDI)
- Reference Data Interface (RDI)
- Reference Data File (RDF) from production, no intra day updates during DR test scenario
- Common Report Engine (CRE)

Customers participating in the DR test exercise can expect to receive market data via MDI/EMDI, can read reference data via RDI or download RDF from the CRE.

The following Eurex Exchange's T7 interfaces will not be available during the DR test exercise:

- FIX Gateways
- Extended Market Data Service
- Enhanced Order Book Interface
- Eurex Market Signals

The Eurex legacy trading system and the Clearing system C7 are not participating in the DR test exercise. As a result some functions will not be available:

- Eurex Trade Entry Service, TES
- Underlying price information in the T7 trader GUI
- FIXML clearing interface
- WebTrading GUIs

4. Disaster recovery network details

Due to the nature of the distributed Eurex T7 architecture, different interfaces will be configured in varying ways.

Eurex T7 interfaces whose production infrastructure is solely located in the Equinix data center FR2 will switch to the simulation infrastructure and need to be accessed via simulation network addresses.

Other Eurex T7 interfaces whose production infrastructure is distributed across both data centers will be able to continue to use the existing production infrastructure in the DR data center.

In some cases further changes need to be done by Eurex for example to re-balance the number of ETI HF gateways with the number of ETI LF gateways, according to different requirements by a DR scenario compared to regular simulation.

The following table summarizes configuration details for all interfaces possibly affected in a disaster recovery scenario including those interfaces which are not part of the DR test exercises.

Interface	Connection option	URL / IP addresses		Ports	Protocol
GUI Landingpage	Internet	http://webgui.eurexchange.com/emergency/index.html		80	TCP/IP
	Leased line	http://193.29.93.173/emergency/index.html http://webgui.vpn.eurexchange.com/emergency/fqdn.html		80 / 8089	TCP/IP
Java WebStart	Internet	193.29.90.190	n/a	80 / (443)	TCP/IP
	Leased line	193.29.93.173	193.29.93.160/28	80 / (443)	TCP/IP
GUI (Crypto)Proxies	Internet	193.29.90.235 192.29.90.236	193.29.90.224/27	80	TCP/IP
	Leased line - side A	193.29.89.225	193.29.89.224/28	80 / 8089	TCP/IP
	Leased line - side B	193.29.95.225	193.29.95.224/28		
Eurex ETI	**Gateway type**	**IP subnets Side A**	**Side B**	**Ports**	**Protocol**
	HF trading gateways	193.29.89.129, 192.29.89.130	193.29.89.161, 193.29.89.162	19006	TCP/IP
	LF trading gateways	193.29.89.65, 193.29.89.66, 193.29.89.67, 193.29.89.68	193.29.89.97, 193.29.89.98, 193.29.89.99, 193.29.89.100		
	Connection gateways	193.29.89.65	193.29.89.97	19008	TCP/IP
Eurex FIX Gateway	**Connection option**	**IP addresses**	**IP subnets**	**Ports**	**Protocol**
	Leased line - side A	90.150.253.31	90.150.253.0/24	Individually assigned	TCP/IP

Table 1, Network details in DR scenario, part 1/3

Eurex MDI	**Description**	**Multicast groups Service A**	**Ports**	
			US-allowed products	**US-restricted products**
	Multicast groups	224.0.50.64 - 74	59000	59032
	Source networks	193.29.89.192/28	-	-
	Rendezvous point Service A only	193.29.91.252/32	-	-
	Technical heartbeat Service A only	-	59086	-
Eurex EMDI	**Description**	**Multicast groups Service A**	**Ports**	
			US-allowed products	**US-restricted products**
	Multicast groups	224.0.50.2 - 63	Snapshot: 59000 Incremental: 59001	Snapshot: 59032 Incremental: 59033
	Source networks	193.29.89.0/27	-	
Eurex RDI	**Description**	**Multicast groups Service A**	**Ports**	
	Multicast groups Snapshot data	224.0.50.0	59098	
	Multicast groups Incremental data	224.0.50.1	59099	
	Source networks	193.29.89.192/28	-	
Common Report Engine	**Connection option**	**Gateway IP addresses**	**IP subnets**	**Ports**
				Public / **Particip.**
	Internet	193.29.90.129	n/a	2221 / 2222
	Leased line - side A	193.29.90.65	193.29.90.64/27	
Eurex EOBI	**Connection option**	**IP addresses**	**IP subnets**	**Ports** / **Protocol**
	not available	none	none	none / -

Table 2, Network details in DR scenario, part 2/3

	Description	Multicast groups Service A	Ports	
			US-allowed products	US-restricted products
Eurex Market Signals	Reference Data	224.0.114.1	59000	-
	Eurex IOC liquidity Indicator for Options	224.0.114.128	59001	59033
	Intraday Volatility Forecast	224.0.114.132	59001	59033
	Risk Alerts	224.0.114.134	59001	59033
	Source networks	193.29.89.0/27	-	

	Description	Multicast groups Service A	Ports	
			US-allowed products	US-restricted products
Eurex Extended Market Data Service (EMDS)	Multicast group: Ticket Feed	224.0.50.75	59000 Replay: 59001	59032 Replay: 59033
	Multicast group: Eurex Off-book trade prices	224.0.50.76		
	Multicast group: Settlement prices	224.0.50.77		
	Multicast group: Intraday open interest data	224.0.50.78		
	Multicast group: on-exchange trade prices	224.0.50.79	Replay only: 59001	Replay only: 59033
	<Reserved for future usage>	224.0.29.64 - 71	-	
	Source networks	193.29.89.192 / 28	-	

	Description	Mutlicast groups service A	Ports
Eurex RDI	Multicast groups Snapshot data	224.0.50.0	59098
	Multicast groups Incremental data	224.0.50.1	59099
	Source networks	193.29.89.192 / 28	-

	Connection option	Gateway IP address	IP subnets	Ports	
				Public	Particip.
Common Report Engine	Internet	193.29.90.129	n/a	2221	2222
	Leased line - side A	193.29.90.65	193.29.90.64 / 27		

Table 3, Network details in DR scenario, part 3/3

5. Change log

The change log describes on a higher level, what changed in the latest version of the document over older versions.

No	Chapter, page	Date	Change
1.0.0		27 Sept 2013	Initial version the Eurex Exchange's T7 Disaster Recovery Concept
2.0.0	All	24 August 2016	Added EOBI, EMDS and Eurex Market Signals
2.0.1	3	10 October 2016	Removed reference to FIX order entry for DR test scenario