



Open Day – Deutsche Börse IT conference 2011 Xetra[®] and Eurex[®] roadmap and news

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Eschborn, 5 October 2011

Agenda



§ Achievements

§ Technology roadmap

§ Interface roadmap

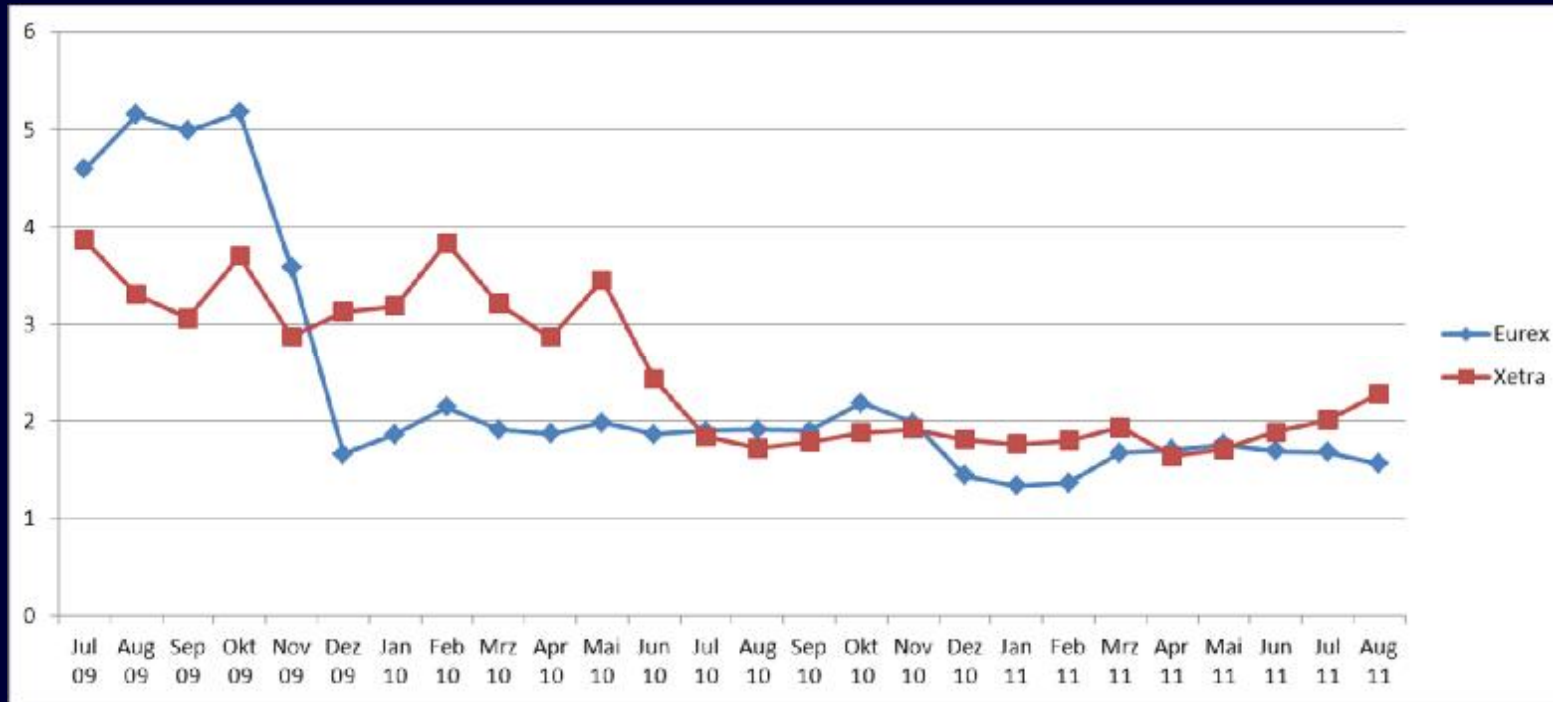
§ Infrastructure roadmap

§ Transparency roadmap

§ Outlook

Order round-trip times

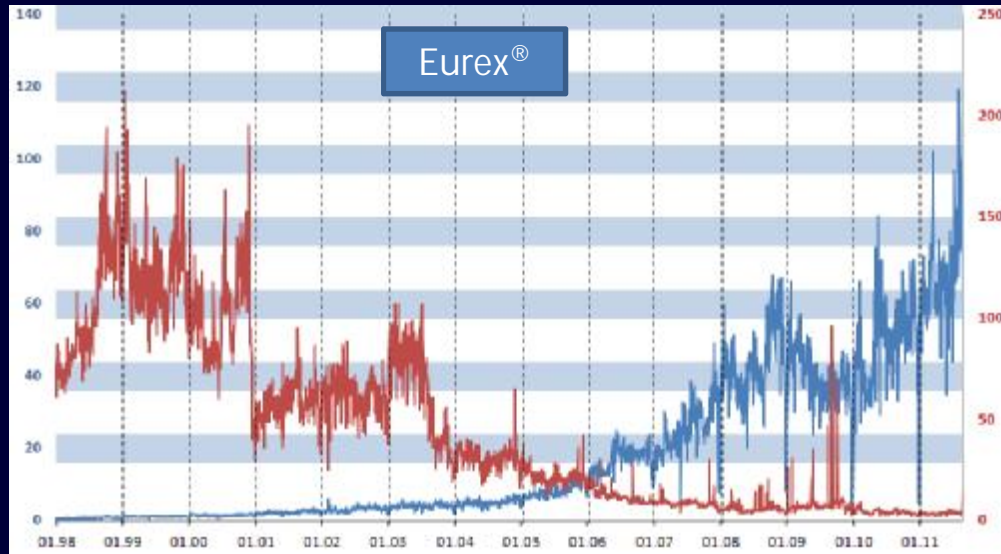
Development July 2009 – August 2011



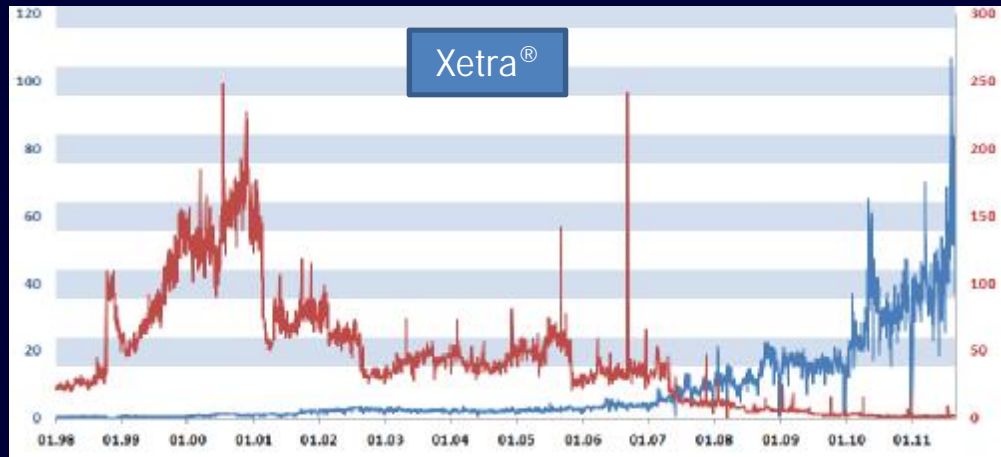
The diagram shows monthly averages (in ms) of the Enhanced Transaction Solution round-trip times of futures order add transactions (Eurex) and all order /quote transactions (Xetra).

Futures order add latency in Eurex® and order / quote processing time in Xetra® have been significantly reduced over the last years. In particular during periods with high trading activity the processing times have been stable.

Processed transactions and response times



Over the last almost 13 years, Xetra and Eurex have continuously invested in their trading systems and have been able to reduce the processing time of technical transactions significantly although the daily load on the systems has grown enormously.



The diagrams show the host processing times (red) in ms versus the daily number of technical transactions (blue) in millions.

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Technology roadmap



In 2006 Xetra and Eurex Group initiated their technology roadmaps to deliver superior technology solutions.

The initiatives included:

- § provision of different interfaces that meet the needs of different user groups
- § high throughput and low latency of the trading system
- § exceptional level of transparency and customer service

Xetra and Eurex are very committed to these goals and are constantly improving their technical offering.

Next steps of the technology roadmaps will be implemented within the course of 2011.

This includes the introduction of new dedicated trading interfaces as well as specific clearing interfaces.

Please note that – as part of Deutsche Börse Group's strategy – Xetra and Eurex will phase out VALUES API for trading and clearing in the mid-term.

Technology roadmap



Eurex has already published the following decommissioning schedule:

VALUES API Decommissioning	Q4/ 2011	Q1/ 2012	Q2/ 2012	Q3/ 2012	Q4/ 2012	Q1/ 2013	Q2/ 2013
Phase 1 – Decommissioning of ...							
... the Quote Confirmation Broadcast on single-leg quote entry/ deletion for options and price-time futures.	●						
... quote maintenance functionality.		●					
Phase 2 – Decommissioning of ...							
... Intra-day risk report distribution (i.e. RPTCI042).			●				
... the VALUES API-based interface for risk management and collateral management related VALUES API requests.			●				
... further trading functionality (e.g. Order Maintenance).					●		
... trading and clearing report distribution via the MISS.					●		
Phase 3 – Full decommissioning of ...							
... VALUES API trading, clearing and administration functionality.							●
... the MISS infrastructure.							●

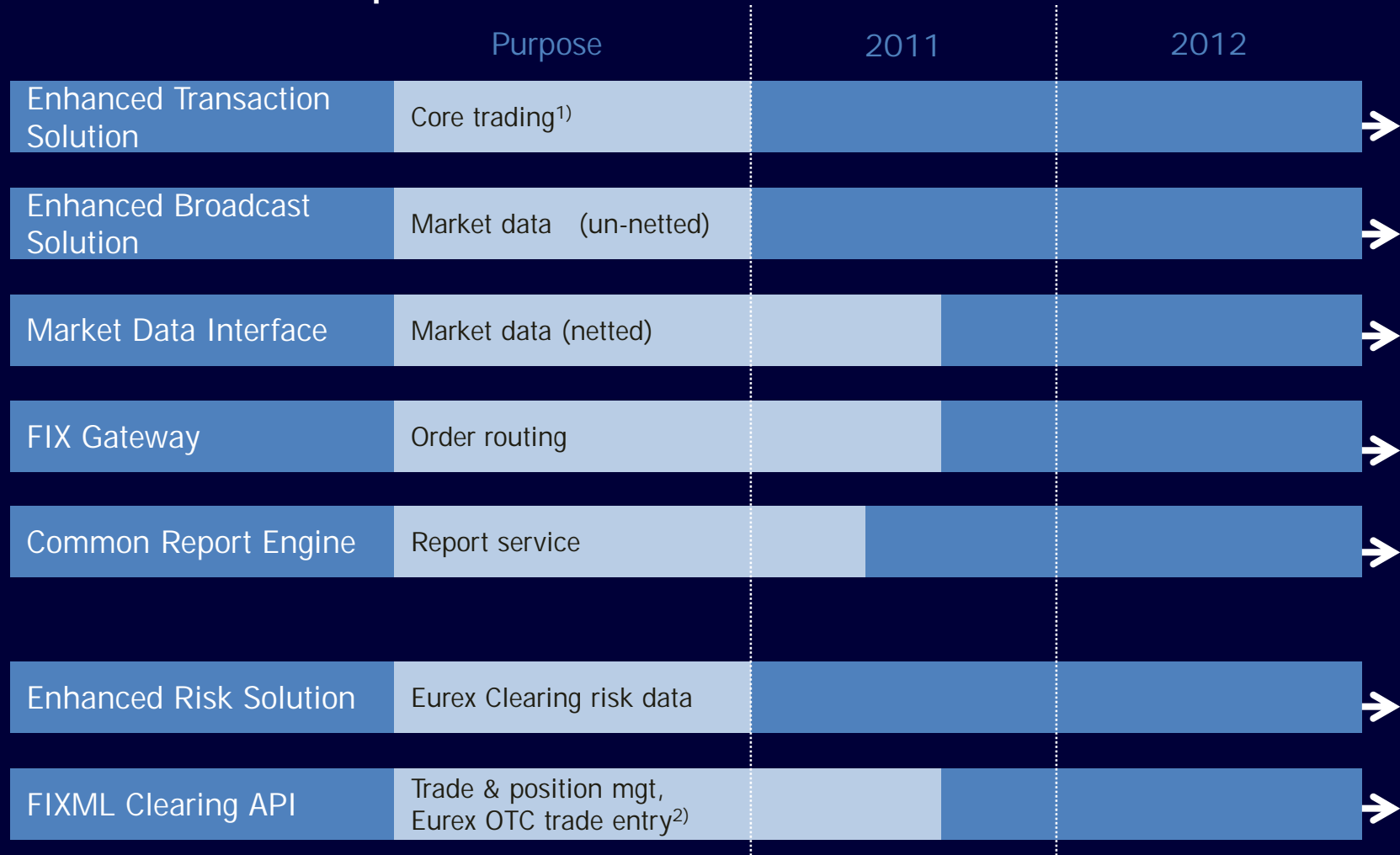
For further details please see Eurex circular 183/2011.

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Interface roadmap



1) Core trading contains OTC trade entry for Xetra 12.0 but not for Eurex.

2) Functionality will be made available in several steps (for details see the respective Eurex circular)

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Infrastructure roadmap



In 2011 Xetra and Eurex have initiated several infrastructure improvements:

- § Upgrade of Enhanced Transaction Solution gateway servers (implemented in June 2011)
- § Matching engine relocation to the Equinix data centre in Frankfurt (implemented in July 2011 for Xetra[®]; to be implemented in October 2011 for Eurex[®])
- § Upgrade of matching engine servers (implemented in July 2011 for Xetra; to be implemented in October 2011 for Eurex)
- § Introduction of 10 Gbit / sec network connectivity in the Equinix data centre (to be implemented in December 2011)

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Transparency roadmap



Xetra® and Eurex® already provide good transparency with respect to the monitoring needs members have and provide the following services:

- § Connection monitor for MISSs, trading and broadcast sessions
- § Enhanced Broadcast Solution latency reports
- § Round-trip monitor for VALUES API and Enhanced Transaction Solution
- § TCP / IP round-trip times of Enhanced Transaction Solution
- § Detailed list of 1,000 slowest orders / quotes and well as daily processing times for top ten futures products (Eurex only).

Furthermore, Xetra and Eurex provide insights into how the trading systems work internally.

Transparency roadmap – new data



For the top ten futures products daily statistics about the matching engine processing times as well as for the Enhanced Transaction Solution gateway processing times are provided via Eurex's member section website.

Sample: August 8, 2011; 08:00–22:00 (CET)

Product	Product ID	Matching Engine Round-trip times (t ₆ –t ₅)			Enhanced Transaction Solution Round-trip times (t ₄ –t ₃)		
		Average	Median	99th percent	Average	Median	99th percent
EURO STOXX 50® Index Futures	FESX	0.759	0.360	5.156	1.305	0.766	7.078
DAX® Futures	FDAX®	0.622	0.341	4.317	1.149	0.766	5.990
SMI® Futures	FSMI	0.608	0.328	4.473	1.031	0.734	5.202
STOXX Europe 50® Index Futures	FSTX	0.490	0.375	2.932	0.945	0.817	3.450
MDAX® Futures	F2MX	0.565	0.410	3.809	0.960	0.808	4.317
Euro-Buxl® Futures	FGBX	0.578	0.410	3.577	1.027	0.861	4.166
Euro-Bund Futures	FGBL	0.987	0.476	6.657	1.606	0.936	8.729
Euro-Bobl Futures	FGBM	0.776	0.426	5.682	1.383	0.908	7.658
Euro-Schatz Futures	FGBS	0.436	0.276	2.008	0.988	0.775	3.642
Long-Term Euro-BTP Futures	FBTP	0.460	0.405	1.453	0.906	0.852	1.990

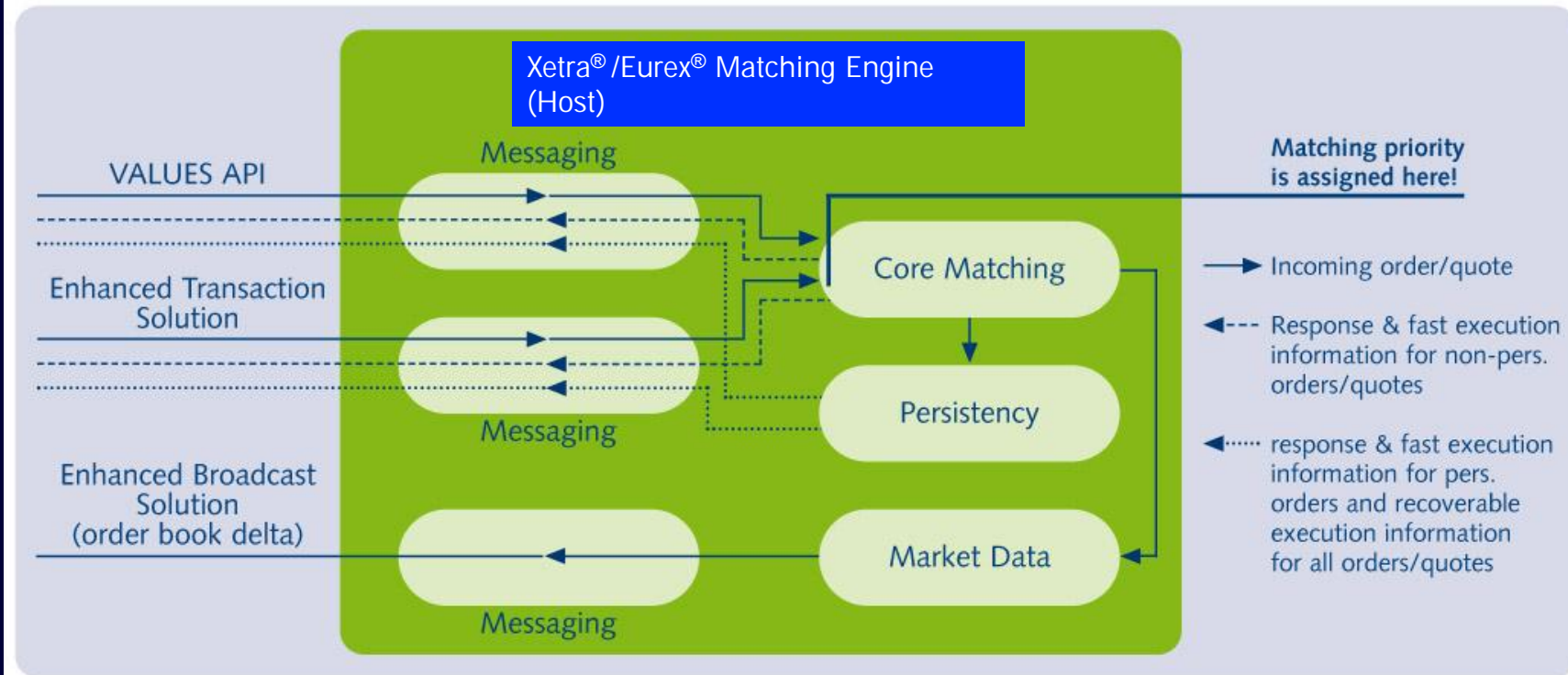
Please note that the statistical data set is the set of all non-error, non-persistent order and quote-related transactions for the respective Eurex® product sent via an Enhanced Transaction Solution session using an Equinix gateway.

Transparency roadmap

Inside the Matching Engine



Inside the matching engine – overview



For further details see the Eurex presentation "Eurex Exchange's Trading System: Some insights into the details that matter for high frequency trading!" (http://www.eurexchange.com/download/documents/publications/eurex_trading_system.pdf).

Inside the Matching Engine (I)



- § Orders / quotes are sent by the gateway / communication server to the respective matching engine.
- § Here they are forwarded by two messaging components (for orders / quotes entered via VALUES API and via Enhanced Transaction Solution) to the core matching component.
- § Time priority is assigned when the orders / quotes are handed over to the core matching component.
- § Statistically most "delays" in the Xetra® or Eurex® systems happen in the core matching component during high load situations.

Inside the Matching Engine (II)



The core matching component works as follows:

- § When an order / quote arrives, it is functionally processed (e.g. put in the book).
- § Resulting messages for non-persistent orders / quotes are sent out in the following order:
 - § direct response to the order / quote entered
 - § fast execution information for booked orders and the aggressing order / quote
- § Data are handed over to the market data component which sends out an order book delta message (Eurex® and Xetra®) and trade messages in case of a match (Eurex only).
- § Resulting messages for persistent orders and executions are sent to the persistency layer.
- § After persistence, the resulting messages for persistent orders and executions are sent out. These are: the response and fast execution information for persistent orders as well as recoverable execution information for all orders.

Inside the Matching Engine (III)



In case that during this phase several new orders / quotes transactions arrive at the core matching component:

- § The core matching component will batch these orders / quotes and treat them in one atomic unit (direct responses and fast execution information will be sent out one-by-one for non-persistent orders / quotes as soon as the core matching component has worked out the details).
- § At the end of the atomic unit all trade prices and the final order book will be handed over to the market data component and published.
- § Data will be handed over to the persistency layer and the resulting messages for persistent orders and executions are sent out. These are: the response and fast execution information for persistent orders as well as the recoverable execution information for all orders.

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Outlook



Xetra and Eurex are working on further possible technological improvements.

Xetra[®] Release 12.0 and Eurex Release[®] 14.0 will ...

- § provide a new interface for
 - § trading (FIX Gateway)
 - § for market data (Market Data Interface)
 - § for clearing (FIXML Clearing API)
- § improve the performance for order / quote processing
- § improve the
 - § Enhanced Transaction Solution interface
 - § Enhanced Broadcast Solution interface
- § We will continue to investigate possibilities of extending the transparency with respect to latency figures. In case you have any suggestion – please, do not hesitate to get in touch with us.
- § Don't forget: For Eurex, 2012 will be the year to leave the MISS / VALUES API architecture behind.



Thank you for your attention!



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