



GIEŁDA PAPIERÓW
WARTOŚCIOWYCH
w Warszawie

Technical Documentation – Document2

Description of WSE Services

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HISTORY OF CHANGES

Version #	Date	Author	Description of changes
1.0 draft	30.01.2012	RKU	Draft version
1.0	3.07.2012	RKU	Final version

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Warsaw Stock Exchange Disclaimer

This document is intended for general use only.

All descriptions, examples and calculations contained in this document contain only basic information on technical conditions for System access and cannot be treated as definitive.

Whilst reasonable care has been taken to ensure the details contained here are accurate, the WSE is not responsible for any errors or omissions contained in this document.

The WSE reserves the right to treat this document as subject to later change whenever required.

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I. INTRODUCTION

This document presents a general description of solutions which are available to WSE Clients by means of connection to the WSE IT system; the details are presented in individual technical appendices to the Access Rules.

I.1 General description

Trading System bases on UTP Cash implemented on NYSE Euronext, but with some functional changes specific for polish market:

- Short selling;
- IPO iTender Offer;
- IOI;
- BISO;
- Block Trade Reporting;
- Derivatives market;
- Mass quotes for all instruments allowed to cash market segment;

The architecture of the WSE's new trading system is a complete flexible solution and provides fast and secure access to all markets organised by the WSE.

The WSE offers a range of Services which enable Authorised Users:

- to use systems tailored to their individual requirements;
- to adapt them closely to their capacity requirements.

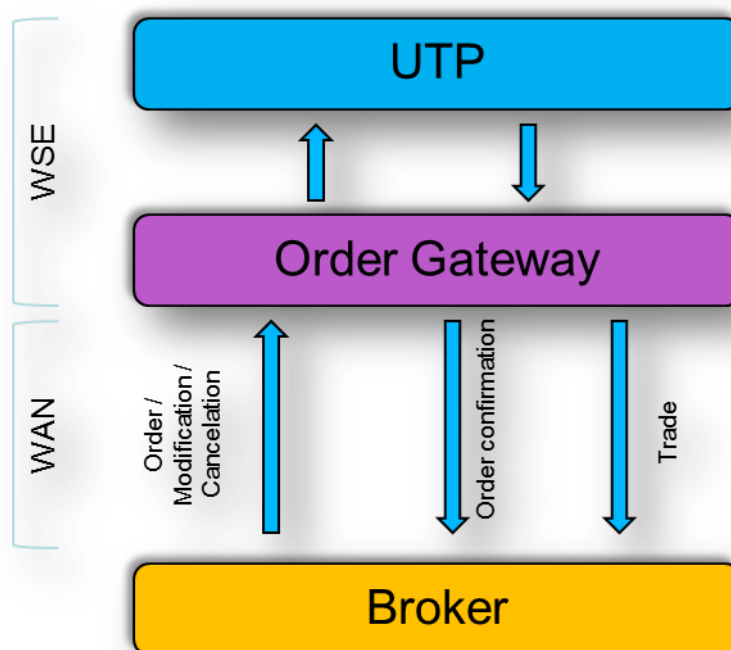
Communication between the WSE trading system and WSE Client systems uses the following protocols:

- processing orders:
 - standard FIX v.4.2 with elements of FIX v.4.4;
 - UTP Binary protocol;
- market data:
 - UTP MD binary protocol for the cash market.

II. ORDER GATEWAY SERVICE –PROCESSING ORDERS

This section presents general information on access to the WSE's new trading system granted in order to process private data, i.e., orders, modifications, cancellations, and related messages broadcast by the WSE.

II.1 Direct access of the WSE Member to the trading system: diagram



II.2 General description of the solution:

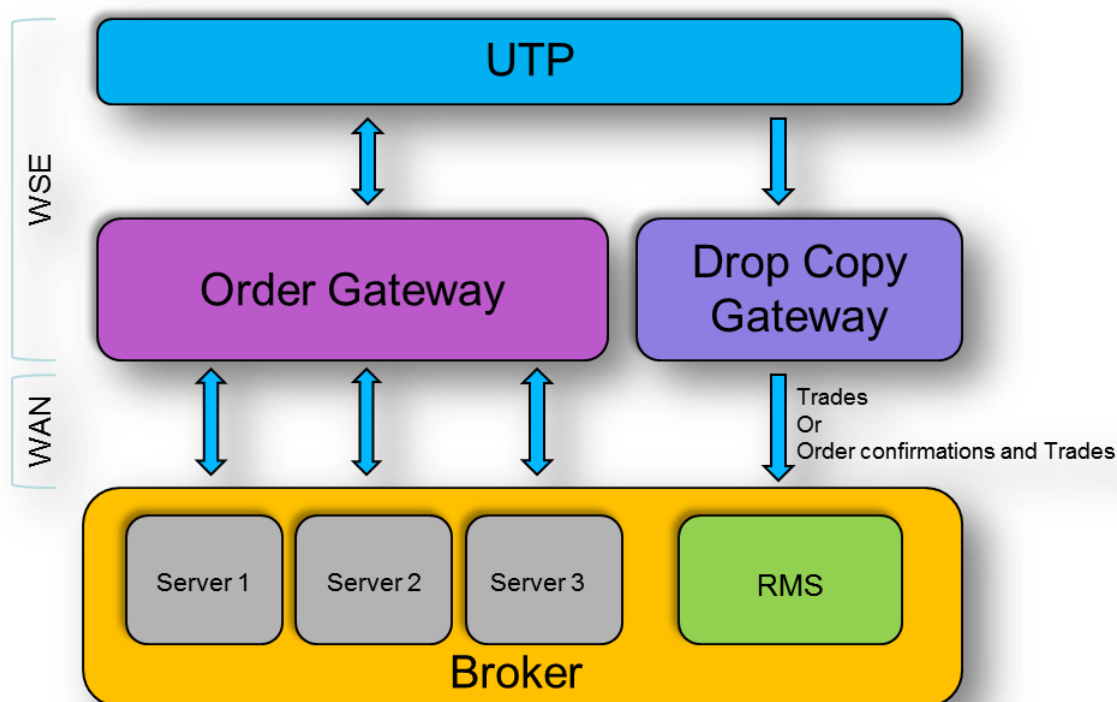
- Access to WSE Order Gateway Service is allowed only for Exchange Members;
- Access to WSE Order Gateway Service supports complete processing of orders / modifications / cancellations on the markets organised by the WSE, IPO, BISO, as well as receipt of trade acknowledgements relating to calls.
- WSE Member is responsible for designing and maintaining Order Gateway Service access architecture.

- Access architecture must conform to the WSE requirements set out in the General Terms and the Documentation.
- Access is provided by means of WAN solutions based on MPLS technology and telecommunication operators specified in the Documentation.
- Connection over two lines and at least two sessions, at least one for each of the WSE data centres (primary and back-up).
- The WSE Member must use software certified as compatible with UTP.
- The list of certified ISVs available on the website www.gpw.pl
- Access to WSE Order Gateway Service is provided with the following protocols: FIX v.4.2 with elements of FIX v.4.4 or binary protocol.
- The WSE Member selects the communication protocol for its connection to Order Gateway Service by means of the Form.
- ISV access to Drop Copy Gateway Service in the Development System is provided by means of VPN or WAN based on MPLS technology with mentioned above protocols.

III. DROP COPY GATEWAY SERVICE – DOWNLOADING COPIES OF ORDER AND TRADE ACKNOWLEDGEMENTS

This section presents general information on access to the WSE's new trading system granted in order to process copy of private data related to send in connection to WSE Order Gateway Service by Exchange Member:, orders, modifications, cancellations.

III.1 Direct access of WSE Member to the Drop Copy Gateway - diagram



* RMS – Risk Management System

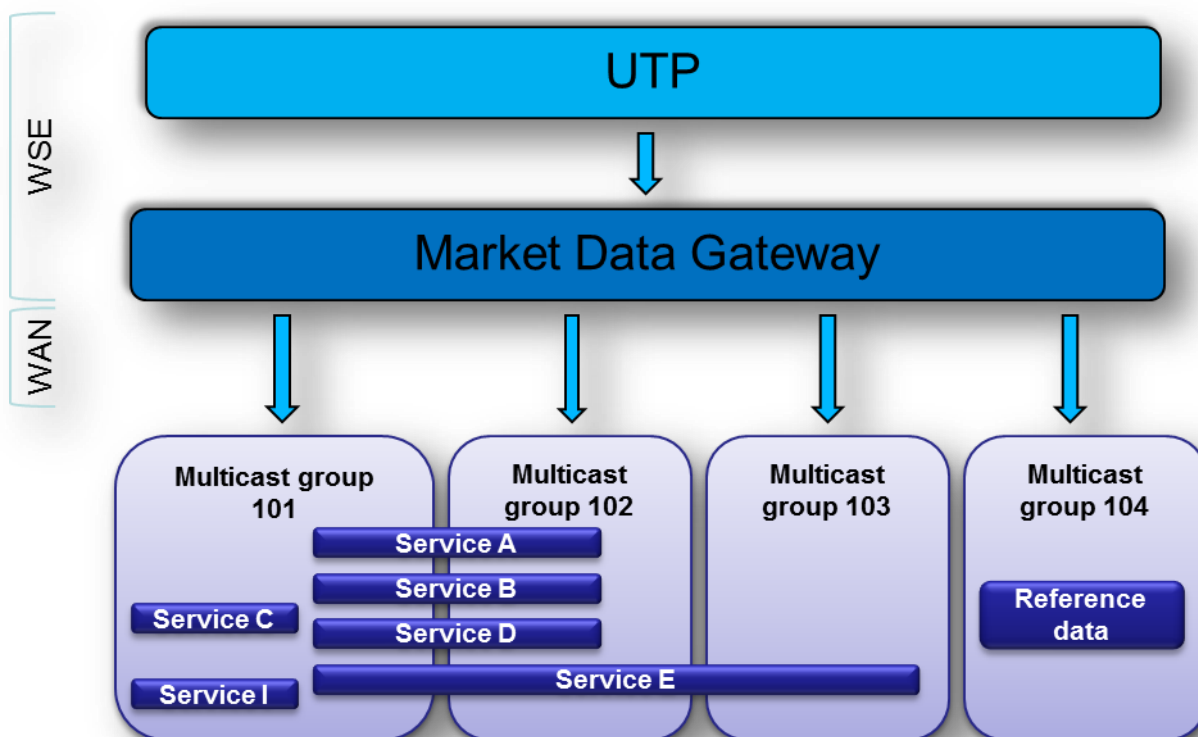
III.2 General description of the solution:

- Access to WSE Order Gateway Service is allowed only for Exchange Members;
- WSE Member is responsible for designing and maintaining Order Gateway Service access architecture.

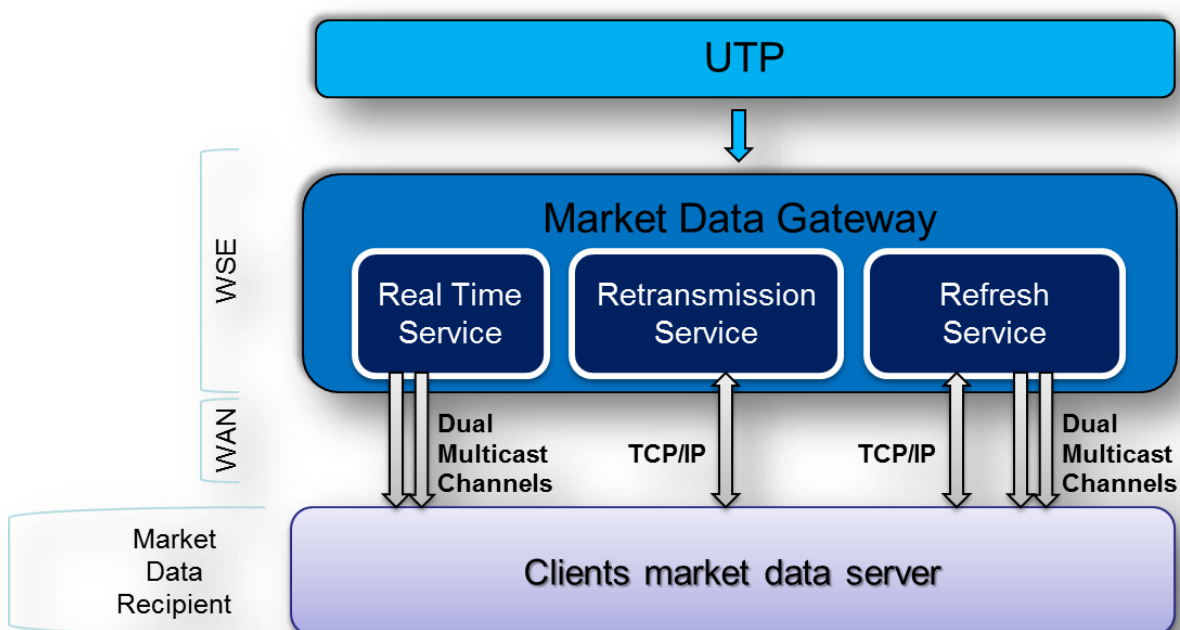
- The WSE Member is responsible for designing and maintaining Drop Copy Gateway Service access architecture.
- Access architecture must conform to the WSE requirements set out in the General Terms and the Documentation.
- Access to WSE Drop Copy Gateway Service in the System and the Test System is provided by means of WAN solutions based on MPLS technology and telecommunication operators specified in the Documentation.
- Connection over two lines and at least two sessions, at least one for each of the WSE data centres (primary and back-up).
- The WSE Member must use software certified as compatible with UTP. The list of certified ISVs is available on the website www.gpw.pl
- The WSE Client selects the scope of data downloaded via connection to Drop Copy Gateway Service by means of the Form including the following options:
 - Downloading copies of messages concerning one or more indicated connections to Order Gateway Service;
 - Downloading copies of messages with acknowledgement of sent orders / modifications / cancellations; or
 - Downloading copies of messages with acknowledgement of sent orders / modifications / cancellations and acknowledgement of closed trades.
- Access to WSE Drop Copy Gateway Service is provided with the following protocols:
 - FIX v.4.2 with elements of FIX v.4.4;
 - binary protocol.
- The solution enables on-line download of copies of acknowledgement of orders and/or trades sent over the order processing communication channel.
- Examples of Drop Copy applications: on-going monitoring of risk generated by a client who uses DMA; a broker sends orders from several physical locations (different access points), the head office receives acknowledgement of all trades / orders.
- ISV access to Drop Copy Gateway Service in the Development System is provided by means of VPN or WAN based on MPLS technology.

IV. MARKET DATA GATEWAY SERVICE – DOWNLOADING MARKET DATA

IV.1 Diagram of direct access to the Market Data Service - multicast



IV.2 Diagram of direct access to the Market Data Service - unicast



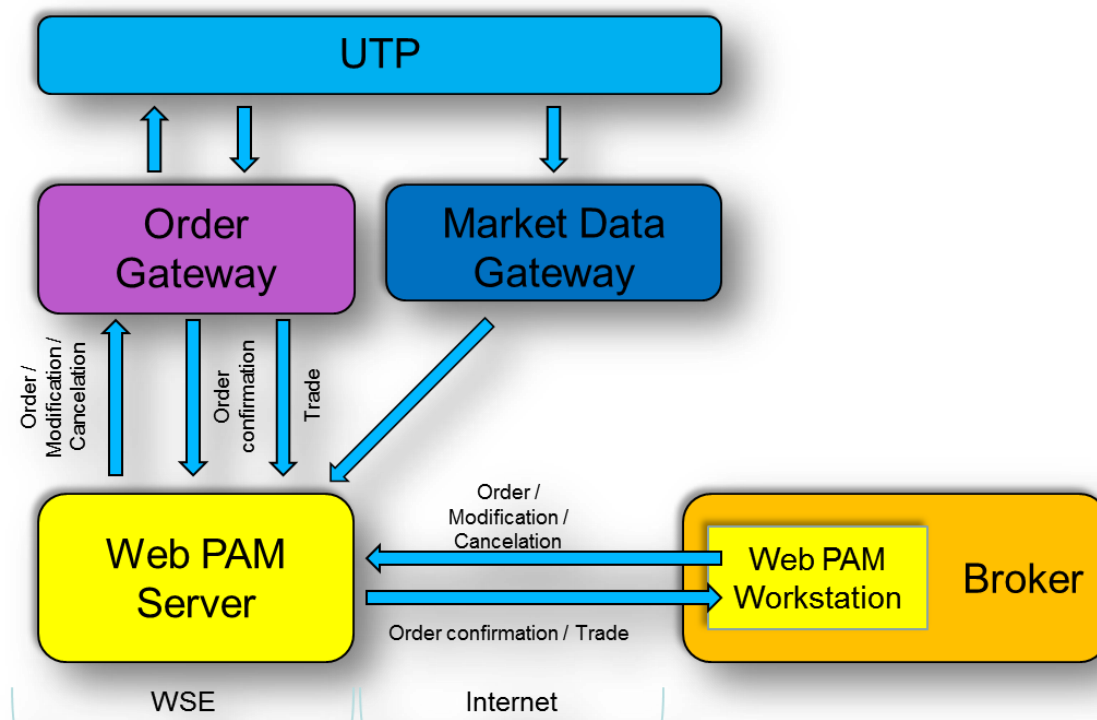
IV.3 Description of the solution:

- Access to WSE Market Data Gateway Service is allowed only for Exchange Members or Data Vendors;
- The WSE Member or Data Vendor is responsible for designing and maintaining Market Data Gateway Service access architecture.
- Access architecture must conform to the WSE requirements set out in the General Terms and the Documentation.
- Access to WSE Market Data Gateway Service in the System and the Test System is provided by means of WAN solutions based on MPLS technology and telecommunication operators specified in the Documentation.
- Connection over two lines and at least two sessions, at least one for each of the WSE data centres (primary and back-up).
- Access to WSE Market Data Gateway Service must be realized with using software certified as compatible with UTP
- The list of certified ISVs available on the website www.gpw.pl
- The WSE Client selects the scope of data downloaded via connection to Market Data Gateway Service by means of the Form.
- Access to WSE Market Data Gateway Service is provided with the XDP binary protocol.
- XDP Real Time interface – real-time market data download interface:
 - Full functionality by scope of information, just like now:
 - ☐ (101): all messages except message type „best limits”;
 - ☐ (102): only message type „best limits” (additional service available only with service 101);
 - ☐ (103): BondSpot data;
 - ☐ (104): referential data (technical service available for Refresh Service functionalities);
 - Physical interface – multicast download (UDP), information broadcast over several channels, scope similar to the current information service;

- XDP Retransmission interface – missing data retransmission interface:
 - Retransmission of lost messages (short interruptions, Real Time stream messages);
 - Physical interface – dedicated TCP/IP connection, only retransmission queries/replies.
- XDP Refresh interface – “market snapshot” interface after a longer interruption:
 - Market snapshot (referential data, last trade price, highest/lowest price, order book);
 - Physical interface – dedicated TCP/IP connection only for queries, multicast for refresh function replies.

V. WEB PAM SERVICE

V.1 Access to the trading system: processing orders and market data via the internet – diagram



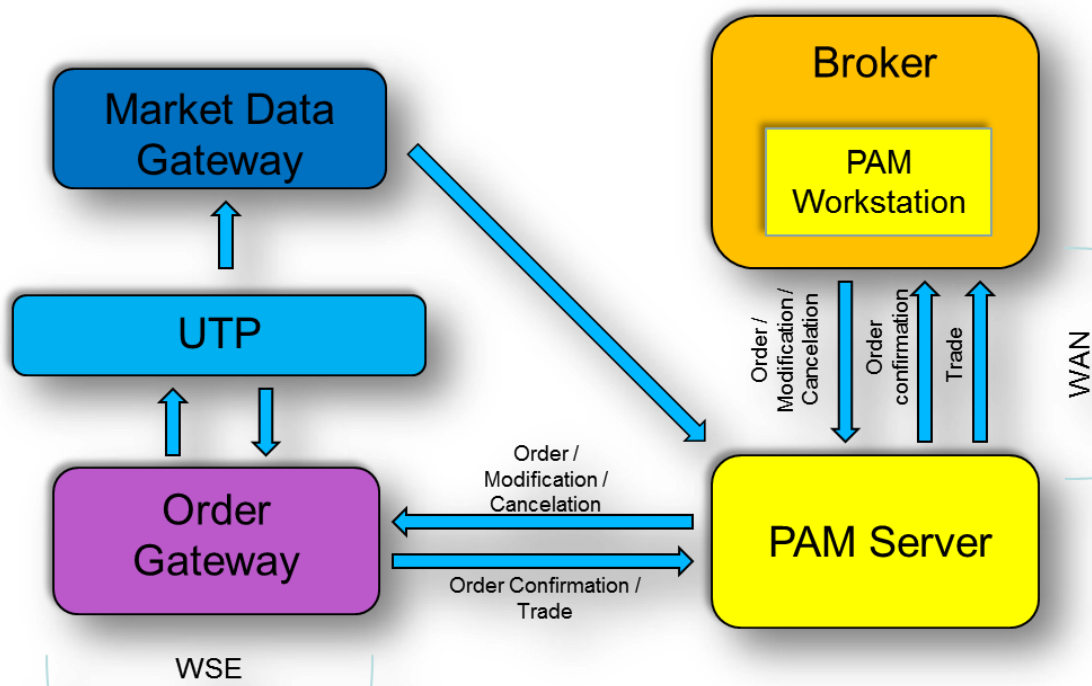
V.2 General description of the solution:

- A solution developed by NYSE Technologies, available only to WSE Members under a sub-licence.
- WSE have rights to sub-licencing the PAM Workstation software and granting rights to access UTP.
- The solution uses the internet, an internet browser and secure SSL protocol.
- Web PAM servers are installed at both WSE data centres, switching between the servers is not visible to the Authorised Users.
- Connections between the Web PAM Workstation initialised on the Authorised User's computer and the Web PAM Server located at the WSE use the secure protocol SSL.
- The solution supports the core functionalities necessary to process orders without having to develop advanced infrastructure, in particular:

- The solution allows to place orders without the functionality of block trades reporting.
 - The solution supports the core order management tools including search, filters, etc
- We do not recommend access to WSE Web Access Service for professional business, for instance market making.
 - A solution for WSE Members interested in back-up solutions or access to the WSE without having to pay an extra cost of infrastructure maintenance.
 - In addition to processing orders, as shown in the diagram, WebPAM Server and WebPAM Workstation also support online market data processing.
 - WEB PAM solution doesn't supports API communication with other IT systems.

VI. PAM WORKSTATION SERVICE –REMOTE WORK STATION

VI.1 Access to the trading system: processing orders and market data without advanced functionalities – diagram



VI.2 General description of the solution:

- A solution developed by NYSE Technologies, available only to WSE Members under a sub-licence.
- WSE have rights to sub-licencing the PAM Workstation software and granting rights to access UTP.
- The solution allows to place orders and block trades reporting.
- The solution supports the core order management tools including search, filters, etc.
- Web PAM servers are installed at both WSE data centres, switching between the servers is not visible to WSE Member.
- A solution for WSE Members planning to operate without using advanced functions which require the development of complex WSE Services access infrastructure.

- A solution for WSE Members planning to use a small number of work stations at the site (PAM Workstation).
- In addition to processing orders, as shown in the diagram, PAM Server and PAM Workstation also support online market data processing.
- PAM Workstation has more functionalities than WEB PAM.