BISTECH 3.0

Technical Information Document

June 2022

1. General

1.1 Scope

Apart from periodically implemented service releases, BISTECH 3.0 includes brand new architectural changes and performance improvements. These enhancements are mainly based on the partitioning logic of BISTECH trading system and renewal of technological infrastructure of order transmission gateways.

In the BISTECH system, instruments are currently traded according to two-partitioned structure. Partition methodology is performed by the processes of multiplexing for each partition.

In the brand new design process of the new partition layout, the message traffic loads of the existing partitions (i.e. normal/peak) were analyzed and a remodeling was performed for distribution of instruments into partitions. As a result of the partition setup updated with the modeling, it is decided to increase the number of partitions in the system. New architecture would also ensure improvements on the total order/transaction capacity and provide better performance impact.

Other significant changes within the BISTECH 3.0 scope are the transition of FIX/OUCH order transmission channels to partition-independent user structure and the replacement of FIXAPI Drop Copy (FIX DC) architecture of active/passive working mode with active/active working mode.

1.2 Business Rationale

Basic requirements of BISTECH 3.0 developments are listed below.

→ The upward trend occurring both in the type and number of traded instruments since the first launch of the BISTECH system[*],

→ The conditional increase in the number of investors and the order quantities as the markets deepen,

→ Order processing time differences among partitions which may occur especially at market openings, session transitions or during peak intervals,

→ Increase in the number of FIX and OUCH order transmission servers (Gateways [GW]) over time which caused excessive workload of connected users both in terms of members and the Exchange,

→ Minimizing the operational risks faced in extraordinary circumstances and preserving the continuity of the system by separating unrelated market and instrument groups as much as the system architecture allows.

1.3 Planned Developments/Adaptations and Expected Progress

Within the scope of BISTECH 3.0 project, the following steps will be implemented

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[*]**Phase–1|30.11.2015**: EQUITY = 1,591 instr.; **Phase–2|06.03.2017**: EQUITY+DERIVATIVES = 4,348 instr.; **Phase–2+|02.07.2018**: EQUITY+DERIVATIVES +FIXED INCOME+PRECIOUS METALS = 18,395 instr.

→ The number of partitions will be increased from 2 to 6 to provide similar load balancing between partitions. By this way, the trading system will proceed to function faster and more efficiently (low latency-high throughput),

→ The distribution of instruments within the partitions will be reorganized according to new partition structure[†] (see Figure-1),

→ FIX/OUCH Order Entry Gateway will be switched to multi-threaded structure, which will also enable them to work partition-free (like Trading Workstations-TWs). As the partition dependency will be eliminated in relevant API channels, each FIX/OUCH user will be able to send orders to all of the partitions,

→ Opening times of the markets in each partition will be shortened,

→ Partition-independent applications (Trading Workstations [TW, GIW], Pre-Trade Risk Management System [PTRM] and Data Dissemination System [GMI]) will continue to operate without being affected by the new structure.

1.4 Limitations

With BISTECH 3.0, being in the same partition constraint is going to be maintained by particular Derivatives Market (VIOP) functions of intermonth strategy order legs and stop orders condition instruments.

[†]Instrument partition matching information will continue to be sent over FIX RD

2. FIX/OUCH/ITCH User Amendments

2.1 Proposed Model

FIX/ITCH/OUCH user modifications, that will be implemented with BISTECH 3.0 are explained per each role as the following (see Figure-2).

2.1.1 FIX/OUCH Order Entry (OE)

Currently, being separately connected to Equity, Derivatives, Fixed Income and Precious Metals Markets, users are defined in the system for each partition of the relevant market. With the new structure, the practice of defining a separate user for each market will continue. But there will be no need to assign a separate user for each partition of the relevant market. Members can access to all partitions with assigned partition-free users. This general purpose user will be adequate for accessing to Equity, Derivatives or Fixed Income markets' instruments in all of the partitions. As stated in Figure-2, members will stop using one user in the current user pairs and continue to transmit orders with the remained user. There will be no change in Precious Metals market since all Precious Metal Market Instruments will be defined on the same partition.

2.1.2 FIX Reference Data (RD)

No changes will be made and existing partition independent market-based FIX RD users and they will continue to be used for all partitions as they are.

2.1.3 FIX Drop Copy (DC)

FIX Drop Copy users of Equity, Derivatives, Fixed Income and Precious Metals Markets will continue to work on partition basis.

Due to the increasing number of partitions, new composition of FIX DC users for a full market connection will change as follows;

- The number of partitions for Equity market will be increased from 2 to 4. Hence, 2 new additional FIX DC users will be provided for each currently used FIX DC pair. Connection to the Equity market will be provided with a total of 4 FIX DC users accordingly.
- The number of partitions for Derivatives market will be increased from 2 to 6. Hence, 4 new additional FIX DC users will be provided for each currently used FIX DC pair. Connection to the Derivatives market will be provided with a total of 6 FIX DC users accordingly.
- The number of partitions for Fixed Income market will be increased from 2 to 5. Hence, 3 new FIX DC users will be provided for each currently used FIX DC pair. Connection to the Fixed Income market will be provided with a total of 5 FIX DC users accordingly.
- Precious Metals market will continue within single partition, so there will be no change in the number of FIX DC users of Precious Metals market.

On the other hand, existing FIX Drop Copy servers (FIX DC Gateways) work in redundant (active/passive) mode. One user and port are assigned for each FIX DC connection in the system, but 2 different IPs are configured for active and passive servers. In case the DC server or application instance to which the user is connected is out of service, the connection is redirected to the backup server and operations can be continued over the same port. It is planned with BISTECH 3.0 deployment that FIX DC connections will switch to active/active operation. Accordingly, the backup server will also be ready to be activated as the main server. With this development, the system parameters will be amended and extra ports will be configured for the FIX DC connection on the backup servers. When a server or application-related problem is encountered in the main FIX DC connection, it will be possible to automatically access the active backup FIX DC server. Only one server can have an active connection simultaneously. The user will be able to connect to the backup server with the same user credentials and different IP/port information.

2.1.4 ITCH Mold (UDP) and ITCH Glimpse

ITCH Data Dissemination (ITCH MoldUDP) and ITCH Glimpse services will continue to work on partition basis. Additional IP and port configurations (see Figure-3) will be defined for each newly added partition in order to listen the ITCH data flow of Equity and Derivatives markets. However, there will be no need for new Glimpse user definitions, and ITCH snapshot data will be in service with existing Glimpse (Equity and Derivatives) user credentials.

3. Deployment Process

3.1 Tests

Development work is still ongoing in line with the project schedule. Pre-prod environment where our stakeholders can start beta tests will be revived soon in this manner. Upon completion of BISTECH 3.0 hardware/infrastructure work, a prod-like test environment will be activated afterwards, which will contain up-to-date configuration data where cutover/post-transition steps can be tested. Details regarding access to test environments and required member actions for the cutover will be announced later on.

3.2 Member User Changes

The details of notification procedures for members to declare their final BISTECH 3.0 valid user sets (indicating to be active and returned user sets) will be announced separately (in which allocation, pricing issues will also be included). Upon members' notifications, related configurations and updates will be performed in production configuration and "BISTConnect" platform respectively.

Login credentials of users that will continue to be used by members will not be affected.

3.3 Proofing Actions Before Cutover Date

→ User configurations including IP, port, capacity (throttling), FIX Drop Copy filters, ITCH multicast flow addresses, etc. will be updated by system administrators automatically in line with the new arrangement.

→ Returned users will be inactivated/suspended.

→ Members will need to reorganize PTRM risk groups (PTLG) by taking into account newly defined or returned users.

→ Subsequent to deployment, it is important for Derivatives members to control the accounts assigned to their users. If any change needed for assigned accounts (except the ones restricted for account assignment), members are expected to perform necessary steps via clearing workstation (CW) terminals.

→ Due to cutover activities on the last working day before transition:
   a- In the Precious Metals market, the session will be interrupted at 09:30 PM until starting at 08:00 AM on the next business day.
   b- In the Derivatives market, evening session will not be held and members' long orders (GTC, GTD and inactive stop orders) waiting in the system will be deleted by relevant end-of-day VIOP_GUNSONU session states. No orders will be restated to post-cutover next business day. Orders deleted by this procedure will also be exempt from Voluntary Order Cancellation Fee.

Further information regarding the cutover day activities including the member checklist will be announced separately.

4. Appendices

4.1 Support and Access

For all the questions and issues, please contact bistechsupport_autoticket@borsaistanbul.com

4.2 Figures and Diagrams

Figure-1 — BISTECH 3.0 Partition Build

Figure-2 — Proposed User Configuration
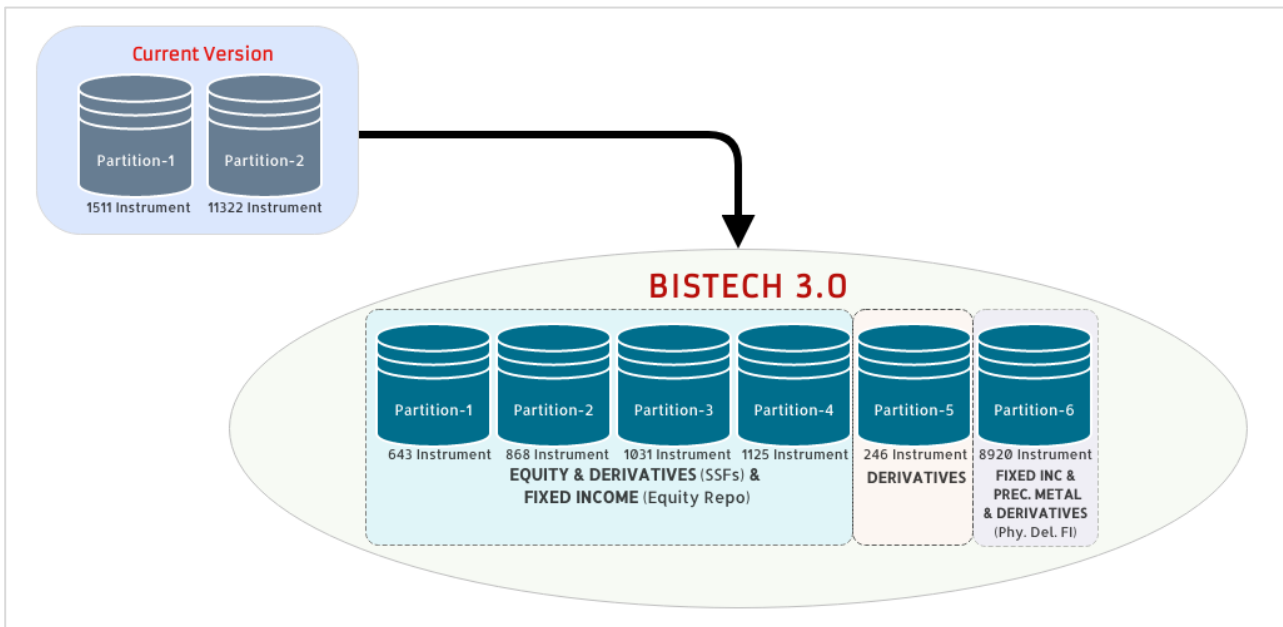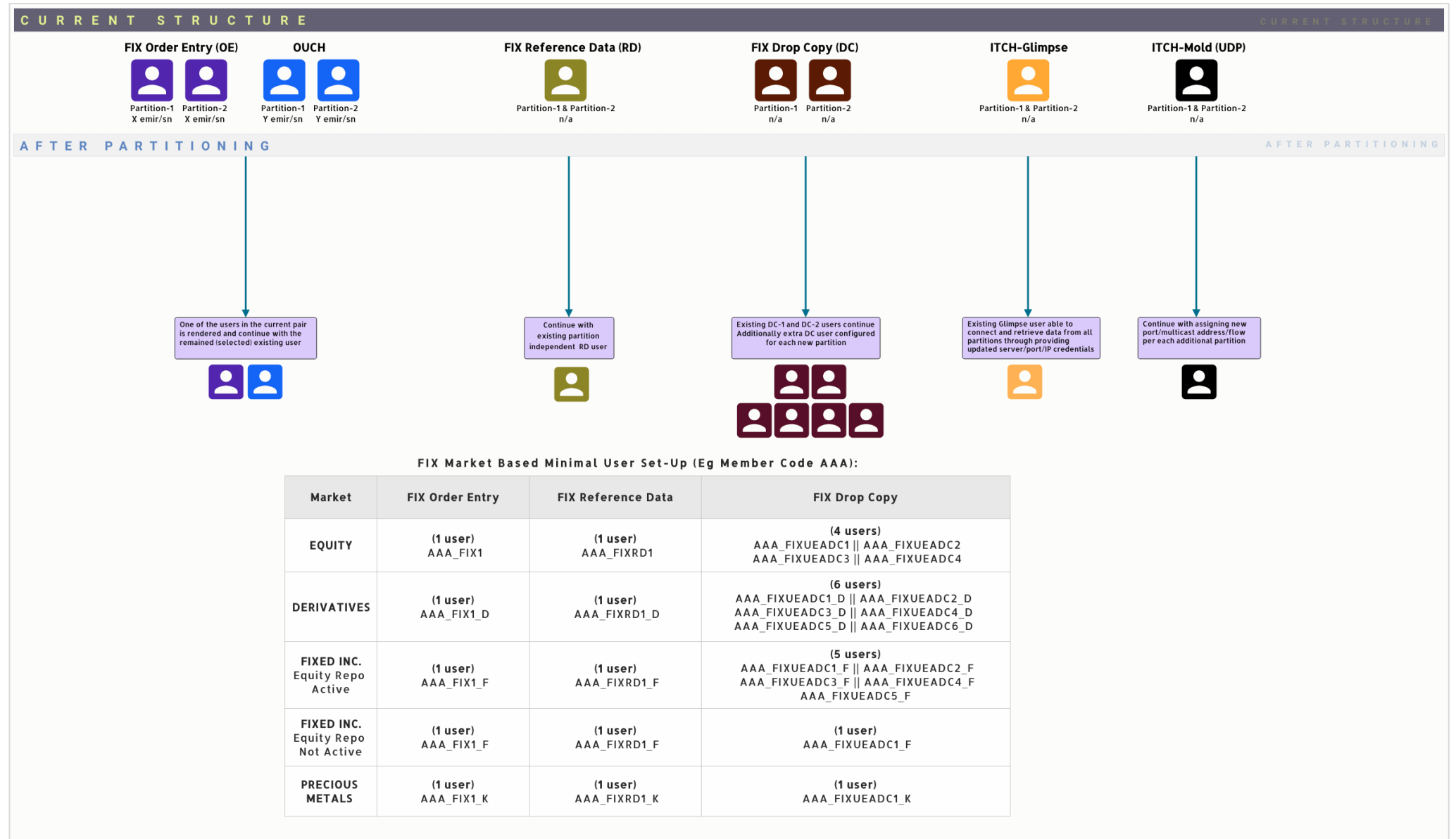

CURRENT STRUCTURE

FIX Order Entry (OE)	OUCH	FIX Reference Data (RD)	FIX Drop Copy (DC)	ITCH-Glimpse	ITCH-Mold (UDP)
Partition-1 X emir/sn · Partition-2 X emir/sn	Partition-1 Y emir/sn · Partition-2 Y emir/sn	Partition-1 & Partition-2 n/a	Partition-1 n/a · Partition-2 n/a	Partition-1 & Partition-2 n/a	Partition-1 & Partition-2 n/a

AFTER PARTITIONING

- One of the users in the current pair is rendered and continue with the remained (selected) existing user
- Continue with existing partition independent RD user
- Existing DC-1 and DC-2 users continue Additionally extra DC user configured for each new partition
- Existing Glimpse user able to connect and retrieve data from all partitions through providing updated server/port/IP credentials
- Continue with assigning new port/multicast address/flow per each additional partition

FIX Market Based Minimal User Set-Up (Eg Member Code AAA):

Market	FIX Order Entry	FIX Reference Data	FIX Drop Copy
EQUITY	(1 user) AAA_FIX1	(1 user) AAA_FIXRD1	(4 users) AAA_FIXUEADC1 || AAA_FIXUEADC2 AAA_FIXUEADC3 || AAA_FIXUEADC4
DERIVATIVES	(1 user) AAA_FIX1_D	(1 user) AAA_FIXRD1_D	(6 users) AAA_FIXUEADC1_D || AAA_FIXUEADC2_D AAA_FIXUEADC3_D || AAA_FIXUEADC4_D AAA_FIXUEADC5_D || AAA_FIXUEADC6_D
FIXED INC. Equity Repo Active	(1 user) AAA_FIX1_F	(1 user) AAA_FIXRD1_F	(5 users) AAA_FIXUEADC1_F || AAA_FIXUEADC2_F AAA_FIXUEADC3_F || AAA_FIXUEADC4_F AAA_FIXUEADC5_F
FIXED INC. Equity Repo Not Active	(1 user) AAA_FIX1_F	(1 user) AAA_FIXRD1_F	(1 user) AAA_FIXUEADC1_F
PRECIOUS METALS	(1 user) AAA_FIX1_K	(1 user) AAA_FIXRD1_K	(1 user) AAA_FIXUEADC1_K

Figure-3 — ITCH Mold/Glimpse IP-Port Credentials

Market	Process	Primary IP Address	P Port-1	P Port-2	P Port-3	P Port-4	P Port-5	P Port-6	Standby IP Address	S Port-1	S Port-2	S Port-3	S Port-4	S Port-5	S Port-6	Protocol
EQUITY	ITCHMOLD	233.113.216.51	21001	21002	Be configured	Be configured	—	—	233.113.216.52	21101	21102	Be configured	Be configured	—	—	moldudp
	ITCHRW	194.0.142.146	24001	24002	Be configured	Be configured	—	—	194.0.142.154	24001	24002	Be configured	Be configured	—	—	moldudp
	GLIMPSE_A	194.0.142.146	21801	21803	Be configured	Be configured	—	—	194.0.142.154	21801	21803	Be configured	Be configured	—	—	soupbintcp
	GLIMPSE_B	194.0.142.146	21802	21804	Be configured	Be configured	—	—	194.0.142.154	21802	21804	Be configured	Be configured	—	—	soupbintcp
DERIVATIVES	ITCHMOLD	233.113.216.53	21001	21002	Be configured	Be configured	Be configured	Be configured	233.113.216.54	21101	21102	Be configured	Be configured	Be configured	Be configured	moldudp
	ITCHRW	194.0.142.147	24001	24002	Be configured	Be configured	Be configured	Be configured	194.0.142.155	24001	24002	Be configured	Be configured	Be configured	Be configured	moldudp
	GLIMPSE_A	194.0.142.147	21801	21803	Be configured	Be configured	Be configured	Be configured	194.0.142.155	21801	21803	Be configured	Be configured	Be configured	Be configured	soupbintcp
	GLIMPSE_B	194.0.142.147	21802	21804	Be configured	Be configured	Be configured	Be configured	194.0.142.155	21802	21804	Be configured	Be configured	Be configured	Be configured	soupbintcp