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USAID FINANCIAL SECTOR TRANSFORMATION PROJECT

REPORT ON ESTABLISHING A TRADE REPOSITORY IN UKRAINE

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WE ARE THE 2 IN B2B

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- Market team: The third sub-team usually consisted of people dealing with the market and with users, including the commercial side, so marketing & PR, client engagement, legal (for TR user contracts), support. During the build phase, this team would mostly engage with pilot users, answer questions from prospective users, and try to build the user base for the launch. Over time, this team morphs into the main operations team. Again, most of these client facing functions already exist in an existing organization like a venue or TR, so most senior experts would spend only a portion of their time on the TR launch. The helpdesk function was more usually full-time. Overall, this team could be 6 to 8 people, but closer to 3-6 when measured in FTE
- Whether a TR operator had the luxury to approach the TR build in distinct phases depended on the timeframe available between project start and launch of reporting. As these timeframes were generally very short, some of the phases had to overlap. Apart from that, it is hard to generalize across TR with or without a market surveillance module, and between in-house build and outsourced approach.
- For projects without a market surveillance module, a total run-time of 12 to 16 months between rough functional specification and launch seems necessary. If this time frame is shortened, the implementation team needs to be kept on hand for an additional time period until the system is bedded down. In other words, a shorter timeframe than 12 to 16 months is achievable only at the cost of launching a premature and faulty system, which then has to be fixed under live operating conditions.
- Having a market surveillance module in the build, the total run-time is typically longer by an additional 12 months. The market surveillance module might be operational before that, but it will give so many false alerts as to be unusable. If the data quality is not in reasonable shape by the beginning of the implementation of the market surveillance module, this timeframe is lengthened further still. In such cases, the market surveillance module acts as a very expensive data quality checker. In other words, introducing the market surveillance module in parallel to data collection and data validation modules does not offer time savings, when the real operational readiness and usefulness of the market surveillance module is considered.
- After launch and during operations, the team compositions typically changed:
 - Tech Team: After an initial hot fix period after the launch, the core tech team would typically disband. At any rate it is difficult to tether good tech people to operations, once the excitement of the launch has gone. The best that can be achieved is to involve the key architect in evolving needs and documentation, so that a project memory is maintained. The infrastructure personnel typically remained the same, but as these should be drawn from cross-project responsibilities, the actual time spent on the TR would go down. Thus, the technical team size during operations would go down to about 2-3 FTE.
 - Legal & Compliance team: For an inhouse build at an NRA, it is hard to differentiate between the support of the TR and the day-to-day business of enforcement against market participants. For commercial TR, the non-technical sub-team dealing with legal, compliance, regulatory and

public relations typically maintains their size in terms of people, but the dedication of time to the TR goes down, maybe to 2-4 when measured in FTE.

- Market team: This sub-team tends to grow during operations, as it faces questions not just from pilot users, but from all users. Documentation, FAQs, brochures, how-to web videos – none of these were a priority during the hectic launch, and now need to be expanded and developed to drive down the effort in supporting users, and to convince potential TR users to join. In the case of just one TR (like ACER), convincing users to join is not the point, but with 15.000 companies across Europe as registered users, investments into self-service make eminent sense. Overall, this team could scale up to 10 or 20 people, depending on the market served.
- Data quality is hard to measure in totality, because it requires access to source systems and books at market participants. Because such access is costly, requires experts and legal foundation, only spot checks can be performed realistically. Checking reports of venues is easier, as they also report trading volumes and other key figures, which should be roughly identical to the totality of the line item trade reports from these venues.
- Even so, the distributed nature of TRs under EMIR and MiFID II in Western Europe makes for an ideal laboratory for data quality: If two counterparties report the same trade (or position), their reports should be identified as being two sides of one trade, and then be identical, save for the sender identity. Sadly, the TR system in Western Europe already fails the first test, even if both sides of the report are made to the same TR. This is partly because the UTI system of identifying trades has turned out to be less than optimal. Even if both sides report with the same UTI, the contents of the report are oftentimes out of synch. This is almost never due to malice, but to technical issues with encoding, master data and modelling of complex trades and lifecycle events.
- In its 2017 report on transfer of data between TR and intra-TR reconciliation (ESMA70-151-552), ESMA made a number of recommendations to solve these problems arising from multiple TRs, and from the withdrawal of TRs from the business. It is planned to implement some of these recommendations in the EMIR Refit.
- All TR operators – commercial or NRA - perform some pro-active monitoring of reporting obligations, either to have basic checks for market participants fulfilling their obligations for providing complete, accurate and timely submissions, if only to check their own systems.
 - Complete reporting is hard to check, see above on source systems. Even so, if large market participants or venues have predictable volumes with some fluctuations, a sudden drop might be cause for further investigation. Statistical measures such as these are relatively easy to set up with a proper BI tool in place. Investigating a single MP requires different tools though.
 - Accurate reporting is hardest of all to check. Even aligning all reports with counterparty or venue reports during a given timeframe requires manual labor. Ultimately, a look at the books of the MP in question is necessary. This dimension of reporting cannot be checked automatically with sufficient reliability. For NRAs in smaller markets, having officers who are

familiar with the business of the biggest market participants is feasible. In such cases, having a long institutional memory and little fluctuation is an asset to the NRA.

- Timely reporting is the easiest to check: In theory, the difference between trading timestamp and report submission is all it takes. There are some issues around the correct determination of trading times, but in general this is the least problematic category once all systems are set-up. Where manual submissions are used, this point depends on the diligence and training of staff at market participants, so is more variable
- The practical value of Market Monitoring in terms of generating meaningful STORs is yet to be determined. Its main value might well be in other areas: As a whip to drive data quality, which also serves other purposes, and as a deterrent to market participants, who are left to wonder how powerful this tool really is. All NRAs operating TRs have introduced powerful Market Monitoring systems, as have one out of the three commercial TRs being interviewed.
- The key question on generating meaningful STORs is whether any of the abuse cases being published by the FCA, by ACER, or other regulatory agencies were actually triggered by automatic alerts from their Market Monitoring systems. We do not claim to have perfect knowledge here, most of these cases are shrouded in secrecy as far as their origins go. But anecdotally, most cases seem to be opened upon internal sources (whistle blowers), private sources (estranged spouses), routine checks in other areas of the business, or by venue operators (exchanges, brokers) raising the initial STOR.
- The high cost of introducing a Market Monitoring system does not wholly stem from license cost or external service providers. In the longer run, the internal cost of having to calibrate abuse pattern detection algorithms, and follow up on the multitude of alerts generated is the biggest cost driver.
- For the commercial TRs, the TR business has so far not been a commercial success. The exodus of CME and Abide in 2020 is proof that competition for reporting business tied to other exchanges is very hard, and that fixed cost is too high to maintain even a few viable TRs in Western Europe.

REQUIREMENTS FOR UKRAINIAN TR

Assumptions

The requirements for the Ukrainian TR are based on our recommendations as outlined in the summary of this report, and as they apply to the system design. Thus, the requirements follow the following assumptions:

1. Focus on semi-manual data collection through web forms, with the forms generating XML files to be processed downstream (REC-1)
2. Upload mechanisms for XML files to be generated and modified by market participants (REC-1)
3. Data collection through automatic system-to-system interfaces is not a priority (REC-1)
4. Focus on data validation through application of semantic checks and business rules as far out from the core TR as possibly (REC-2)
5. Unitary TR for the financial markets, no competition of TRs (REC-3)
6. Make aggregate and anonymized data available to all market participants (REC-4)
7. Copy existing data formats, data structures and channels for data collection from Western Europe verbatim wherever possible (REC-5)
8. Delay the introduction of automated market surveillance, do not commit to any specific system yet (REC-6)
9. TR needs to be used by multiple agencies, which impacts e.g. user rights, security and access channels (REC-7)
10. TR needs to accommodate multiple commodities and deal types beyond current scope of Capital Markets Reform act (REC-7)
11. TR needs to be designed to make use of synergies between regulatory agencies in financial markets and energy (REC-7)

In addition to the assumptions derived from our recommendations, we make use of the following assumptions from our interviews with Ukrainian stakeholders and general market information:

12. The financial markets in Ukraine have a lot of room to grow, both in terms of volume and in terms of level of automation and the professionalism attained by larger operations and staff. Therefore, focus is on designing a modular system which can grow, which can be adapted, and which can scale.
13. Since the volumes are so low in comparison to Western Europe, the only way to achieve a reasonably affordable reporting solution is to keep it simple.
14. Combining the need for change in the future with the constraints of cost, using local resources and ingenuity is key, combined with a leavening of some experience in Western Europe.

Use Cases

1. Register with TR – this does not include the registration of an LEI or Pseudo-ACER code, which need to be obtained from the relevant code registration authority
 - a. Register as market participant, using manual interfaces only
 - b. Register as market participant, using manual and system-to-system interfaces
 - c. Register as venue, OTF, or system provider, using manual and/or system-to-system interfaces
2. Update registration record with TR
3. Terminate registration record with TR
4. Connect to TR – in the case of system-to-system interfaces, perform connectivity and resiliency checks for the subscribed interfaces and channels
5. Configure reporting account – this may include setting up authorized persons and requests for confirmation of Reporting-on-Behalf-of entities
6. Input and validation of master data – input of static data for the reporting organization, and if permissible for the organizations to be reported on behalf of
7. Perform simple data upload – perform basic upload of data based on a prescribed data set through the subscribed interfaces, but restricted to typical standard deal types and asset classes
8. Perform complex data upload – perform complex upload of data based on the full range of reporting data through the subscribed interfaces, including more exotic, rare or structured deal types or asset classes
9. Receive cancellation of data upload (technical cancellation)
10. Receive modification of data upload (business modification)
11. Validate data upload – technical validation (first level), authentication of sender, validation of content against XSD files and similar mechanisms for validation without taking recourse to external data sources
12. Validate data upload – business validation (second level) against business rules beyond simple XSD validation, validation against codes and permission levels (e.g. valid LEI codes, valid relations for reporting on behalf of). The confirmation of valid data upload in the second level is equivalent to a Data Receipt message, which has a timestamp and proves the timely receipt of the regulatory report.
13. Provide feedback to the uploader of data (first and second level), this feedback should cover both the first (technical) and second (business) level. In principle, feedback should be given immediately, or upon the first failure of validation. Feedback should always be via the same channel as the upload, so via a web interface if per web or via sftp if the data was uploaded via sftp. When the upload was performed manually (via web), feedback should be sent to an administrative e-mail address of the uploader in addition.

14. Perform simple data download – perform basic download of list of data receipts based on a prescribed data set through the subscribed interfaces, limited to trade and order UTIs with timestamps and counterparty identifiers and key deal characteristic in a machine-readable format sufficient for bulk reconciliation
15. Perform complex data download – perform complex download of reported data on a bulk basis to accommodate inter agency cooperation as described in Assumption 11. This data would need to be both in the extracted format, and in the original submission, and would allow for import and analysis in other systems
16. Keep the system available – the data collection module needs to be available 24 x 7 x 365, with planned downtime limited to such durations that internal buffering prevents loss of data already submitted. This includes automatic monitoring of all vital system components across all components, with automatic alert functions.
17. Store the validated data – store the reports for as long as the statute of limitation applies. Archiving is not a focus, but data should be bucketed by year of submission to allow for easy purging later
18. Make stored data available for BI tools – through sufficiently exposed interfaces and key data
19. Analyze data - prepare reports based on stored data either on an ad-hoc or regular basis using a BI tool.
20. Generate aggregate and anonymized reports and make them available to all market participants via web publication (static format like Excel or PDF is sufficient)

Input formats

In selecting suitable input formats and coding schemes, we try to follow the approach of the Swiss energy NRA, expressed in assumption 7 (Copy existing data formats and structures). We focus on the core format of trade reports and receipts in the following, that is to say XML files adhering to XSD schemata. This is the most prevalent technical means for a rich description of mandatory and optional fields, for repeating fields and sub-structures, and for the field content (semantic validity). As such, XML is the common denominator of regulatory reporting in Western Europe, both in financial and energy markets. Where other formats are supported (e.g. web entry, REST API, JSON), they should be mapped into the core format immediately to allow for a more efficient and uniform processing downstream. (See section “Input channels”)

FORMAT OF TRADE REPORTS IN FINANCIAL MARKETS

When regulatory reporting was introduced in Western Europe with EMIR, trade reporting commenced after the requisite secondary legislation, RTS and licensing of TRs was in place. Reporting of OTC and ETD contracts to TRs started in February 2014, and collateral and valuation reporting in August 2014. At the time, there was no common and mandated technical description of the reporting format with all requisite detail. What was available were the Table 1 (Counterparty Data, 26 fields) and Table 2 (Common Data, 59 fields) in the annex of the Commission Implementing Regulation (EU) No 1247/2012 of 19 December 2012. These tables had three

to four columns, with an entry number, field name, format and in the case of table 2 notes on applicable types of derivative contract.

This description left a lot to the imagination, starting from capitalization and blanks in the field names, unclear information on cardinality and dependencies between fields, lack of naming convention for data types and other issues. The TRs responded by interpreting the instructions as best as they could, sometimes with a view to make them fit with systems already in place at the respective TR. Where legacy systems or split development teams were involved, some TRs came up with differing input formats depending on the asset class. This resulted in incompatible reporting formats between different TRs, making changing the TR difficult from an MP perspective. At the same time, the seed for the inability for reconciliation between TRs had been sown.

These standards were slightly revised in 2017 by the commission implementing regulation (EU) 2017/105 of 19 October 2016, e.g. by removing BIC as an entity identifier for parties, as this had led to misunderstandings where non-bank parties submitted the BIC of their bank, or by introducing some typing of IDs in separate fields. More details on business rules were published in the form of an elaborate Excel file, giving instructions on how each field in Table 1 and 2 was to be interpreted and parsed depending on the asset class and trade or position level. But the different reporting formats between TRs had by now been entrenched, and no interoperability of reporting formats has been achieved.

In the EMIR Refit initiative, ESMA has gone back to the drawing board. On 27 March 2020, the formal consultation has been started, which concluded 3 July 2020. ESMA notes that the current rules

“have proved to be not sufficiently precise and [...] fail [...] to cover some technical details. As a result, the harmonization of the entire reporting system was not achieved since the TRs implemented the reporting requirements inconsistently, e.g. by developing different report structures or by using different data element names. This resulted in inconsistencies in the information reported by the counterparties as well as in varying practices across the TRs, thereby hampering the access to data and the correct aggregation and comparison of data across TRs.”

To address these deficiencies, ESMA has proposed the provision of details of the derivative contracts in an XML format, using a template developed in accordance with ISO 20022 methodology. This approach is already in use in other regulatory arenas, namely in the reporting of EMIR data from TRs to NCAs, MiFIR transaction and reference data reporting and reporting under SFTR. The templates proposed by ESMA should specify the information reported from submitting MPs to the TRs, but critically also the feedback from the TRs back to submitting MPs. The latter part had been left out completely in 2012/2014, leaving the inbound direction integration (from the perspective of a MP) to the design of each TR.

In a scenario where a Ukrainian TR exchanges regulatory information with ESMA or – for reconciliation purposes – with another TR in Western Europe, adherence to this new standard would be mandatory. In addition, with the implementation of the ISO 20022 templates between submitting MPs and their TRs in Western Europe, tools, mappings in standard software and methods and experience by service providers will increasingly become the norm.

The differences between the “legacy” EMIR and the Refit proposal are significant:

- Number of relevant fields to be reported increases from 129 fields currently to 203 fields in the Refit version
- Of the 129 fields currently existing, 67 are redesigned or otherwise changed or specified differently
- Much more detailed handling of lifecycle events, with references
- Mandatory delegation of reporting by small non-financial counterparties (NFC-) to their FC counterparties is already in place since 18 June 2020
- Clearing threshold now needs to be calculated once per year only, applied since 17 June 2019
- Intercompany reporting has been stopped since 17 June 2019 as well

The results of the ESMA consultation on EMIR Refit including the final Technical Standards are expected in Q4 of 2020. Hence, the regulatory technical standards (RTS) and implementing technical standards (ITS) on standards, formats, frequency and arrangements for reporting to TRs under EMIR are expected to be submitted to the European Commission in 2020. These regulations will come into force 18 months after having been formally adopted, leading to a start of regulatory reporting under the new standards Q3/Q4 2022.

Supporting both the legacy version and the Refit version in one common system would be so complex and costly as to be untenable. Therefore, the only option for supporting the old version would require a major redesign of most parts of the TR system very shortly after launch of the refit version.

For these reasons, we advise the Ukrainian regulator and TR to “leapfrog” the legacy formats and table definitions from EMIR 2012/14 and its revision in 2016/17, and to adopt the new standards proposed by EMIR Refit from the start. In the context, “start” does not mean the time when EMIR Refit reporting comes into force legally, but the time that the following documents are released and binding:

- RTS on details of the reports to be reported to TRs under EMIR (currently in draft as Annex IV of the ESMA consultation paper published 26 March 2020, reference ESMA74-362-47)
- ITS on standards, formats, frequency and methods and arrangements for reporting to TRs under EMIR (currently in draft as Annex V of the ESMA consultation paper published 26 March 2020, reference ESMA74-362-47)
- RTS on procedures for ensuring data quality (currently in draft as Annex VIII of the ESMA consultation paper published 26 March 2020, reference ESMA74-362-47)
- RTS on operational standards for aggregation and comparison of data and on terms and conditions for granting access to data (currently in draft as Annex IX of the ESMA consultation paper published 26 March 2020, reference ESMA74-362-47)
- XML Schema set for Counterparty and TR data exchange under EMIR, which contains a PDF, an XSD and an Excel file for each message type and sub-type (See example for SFTR reporting: <https://www.esma.europa.eu/policy-activities/post-trading/sftr-reporting>, under the heading “XML SFTR Reporting Schemas”)

- The following two XML Schema sets are less critical for the design and implementation of the Ukrainian TR:
 - o XML Schema sets for Inter-TR data exchange and
 - o XML Schema set TR to authority data exchange.

The RTS and ITS on registration and extension of registration of TRs under EMIR are less applicable to the Ukrainian TR insofar as there are no legacy TR yet, and we are assuming a unitary TR.

Where these standards are not fully available or finalized yet, Ukraine should put the requisite standards on the critical path of the TR design.

To recap, we advise the full adoption of the EMIR Refit message between submitting MPs and their TRs, which implement the ISO 20022 templates. To reap synergies, there should be no deviation in terms of changed XSD schema files or business rules. Having said this, certain optional fields in the data set may not be applicable to the Ukrainian market, therefore a web front-end will not have to support them. But the processing should cover any and all fields contained in the standard, even if never populated by Ukrainian MPs in the first few years. This way, testing approaches and exchange of data with other TR or ESMA will work regardless. Rather than rewording the standards, secondary legislation could refer to the standards published, and provide a non-binding translation, following the ECom approach to (not) translating ACER into Swiss law.

FORMAT OF TRADE REPORTS IN ENERGY MARKETS

Following Assumption 11 on synergies between financial and energy markets, the following observation is meant for the sake of completeness in TR design, even though Energy markets are outside the scope of this report. Even though a REMIT refit has been discussed a number of times in the past years, we do not expect a massive change in the coming three years. Therefore, any TR design allowing for synergies between financial and energy markets should work under the assumption that the full and current set of ACER XML specifications is to be implemented with no deviation. In particular, this refers to (all documents on <https://documents.acer-remit.eu/>)

- REMIT Reporting User Package with XSD schema files
- Transaction Reporting User Manual (TRUM), containing field lists, mappings, sample XML documents
- Manual of Procedures on data reporting
- RRM Requirements

The following documents should be disregarded:

- List of Standard Contracts

CODING OF LEGAL ENTITIES

For the coding of legal entities in the course of TR reporting in Ukraine, only the Legal Entity identifier (LEI) should be adopted, following the practices proscribed in the EMIR Refit. This 20-character reference code is an international standard (ISO 17442), which identifies the parties of a transaction.

Legal entities in Ukraine can register an LEI already today. Under EMIR, LEIs need to be used for encoding:

- Counterparties which are a legal entity
- Beneficiaries which are a legal entity;
- Brokers
- Central Counterparties (CCP)
- Clearing members
- Submitting entities (e.g. reporting service providers)

This system works reasonably well upon introduction of reporting, when most legal entities in the market will have to get a new LEI. There have been issues with renewal of LEIs and with the transfer in the event of mergers etc. To improve upon these issues, the EMIR Refit introduces business rules ensuring the validity (i.e. updating) of the LEI code. The Ukrainian TR should implement these rules to ensure continuing data quality:

- LEIs need to be issued by an endorsed LOU (Local Operating Units) of the Global Legal Entity Identifier System (GLEIF)
- LEIs need to be duly renewed and maintained according to the terms of the respective LOU
- All accepted LEIs must be in the status of "Issued", "Pending transfer" or "Pending archival".
- This business rule check applies to all LEIs in a report, not just the reporting or submitting party itself

This requirement implies live connection of the Validation module to the GLIEF database.

IDENTIFICATION OF TRADES

So far, the Unique Transaction Identifier has not been a success story in EMIR, REMIT or MiFID II. The bulk of the problems with reconciliation between counterparties and between TRs originate with the generation and use of differing UTIs. Even when counterparties recognize the non-reconciliation, it is not clear which party needs to make a change, especially in OTC trading.

Added to this are technical problems, in particular when the triplet of counterparty 1 LEI, counterparty 2 LEI and trade UTI is used to search, store and identify trade reports. In such a scenario, UTIs cannot be changed after submission, rather a faulty UTI needs to be corrected by a technical cancellation of the original report, followed up by a new submission. This approach is complex, and opens up issues of late reporting, so it is very rarely applied to fix an UTI reconciliation issue. Everybody in the market seems to have become used to UTIs not being aligned. If that is so, why make the effort to change it locally?

In a nutshell, the independent generation of UTIs by two separate parties will rarely result in the same UTI for the same trade. ACER tried to standardize this approach with their Guidance on the Unique Transaction ID (UTI), Annex IV of the TRUM. Under this guidance, counterparties use standard data elements from the trade (such as trade date, counterparty codes, volume, rice and delivery), which are formatted, normalized and then concatenated into one (rather long) string. This string is then hashed to arrive at the right string length for a UTI, but also to maintain confidentiality about the trade details. If any of the data fields are not exactly the same, or if the hashing algorithm is applied incorrectly, the resulting UTI will differ markedly. Unfortunately, this is very often the case. REMIT is no exception to the UTI conundrum.

Theoretically, ACER could have chosen to apply the UTI generation protocol itself, centrally upon submission to the ARIS system. All elements used in the hashing algorithm are contained in the ACER XML files. After central generation, the UTI would have been sent back to the reporting parties. This hypothetical approach would have turned ACER into the provider of a trade matching platform, which mostly matches upon first submission, but sometimes not. The follow-up (amendments?) would have to be performed by the reporting parties though – hardly practical. In addition, problems with non-reconciliation would have been the fault of ACER, not the reporting parties.

Since algorithmic and independent generation of UTIs does not work, and the central provision at one TR is not an option either, ESMA have chosen to mandate the generation of UTIs by one side as far as possible. This is done by a rather expansive flow diagram (page 28 of the of the ESMA consultation paper published 26 March 2020, reference ESMA74-362-47), which can be summarized by a ranking of parties. Roughly, and in this order (leaving out cross-jurisdictional cases and special master agreements):

- UTIs for cleared transactions should be generated by the CCP
- UTIs for centrally executed transactions should be generated by the venue
- UTIs for centrally confirmed transactions should be generated by the confirmation service
- UTIs for OTC trades between parties of different regulated status (e.g. FC vs NFC-) should be generated by the party with the higher regulated status (e.g. FC in this case)
- UTIs for OTC trades between parties of the same regulated status (e.g. NFC- vs NFC-) should be generated by the party with the LEI which comes first in a prescribed string ordering algorithm

This approach seems sound, however it omits the question on how UTIs would be transmitted between parties prior to reporting. For CCP, venue and central confirmation, this is less of a problem. In the purely bilateral OTC space, it remains to be seen how practical this is.

We propose the full-scale adoption of these UTI business rules for the Ukrainian TR. Business rules in the validation module should contain checks on whether UTIs submitted do indeed come from venue or CCP, as stated above. A provision of these UTI in the receipt messages would be a bonus.

CODING OF PRODUCTS AND MARKETS

So far, the Unique Product Identifier (UPI), formerly International Securities Identification Number (ISIN) and Alternative Instrument Identifier (AII) have not been great success stories in EMIR, REMIT or MiFID II either. Most venues, OTFs and CCP reverted to their idiosyncratic way of naming and numbering traded products. Cross—venue comparison remained elusive. For the energy markets the whole subject is further complicated by physical delivery locations and dates, which either lead to an explosion of ISINs or make comparisons useless.

The ESMA Refit suggest that

- ISINs should continue to be used for the identification of derivatives admitted to trading on trading venues or systematic internalizes, where ISINs already exist due to MiFIR.

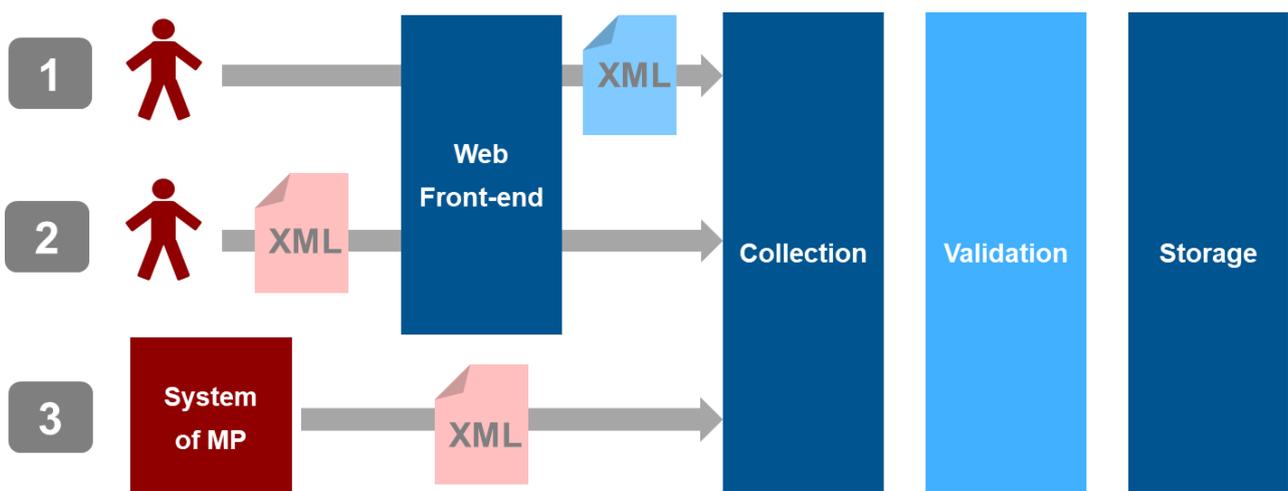
- ISINs would also apply to OTC contracts for products admitted to trading on a trading venue.
- UPIs should be used as a product identifier for all other derivatives

We find the notion of traders conducting an OTC trade, and looking up the equivalent trade on a venue to get the right UPI for a report to be far-fetched. The main reason for keeping ISINs in Western Europe is the “installed base” of legacy coding. This separation of coding schemes may generate more issues than it fixes.

Internationally, UPI seems the more broadly accepted coding scheme. We therefore advise to focus reporting for Ukrainian markets on UPI. However, the system should be able to handle ISINs as well, should these be imported from outside sources. The key is the establishment of a joint look-up system (list) for UPIs, to be populated by the venues and OTFs of Ukraine.

Input channels

System input is not limited to automatic transmission of XML files. In fact, the majority of market participants will use other routes. But in each of these cases, the input format will be translated to XML. We recommend three main ways to upload data to the TR, as shown in the diagram below. The secure web front-end is part of the module “Collection”, but is shown detached for greater clarity.



1. By manually entering the data through a secure web front-end provided by the TR, with the front-end mapping the entered data into the required XML format, and passing it on for validation. To avoid user frustration when using this front-end service, validation of the form must be provided, such that mandatory fields cannot be left blank, typed data fields have to be filled in the required manner (e.g. LEI fields have to have the required character length, dated have to be valid), or drop down fields are used where fields must be populated from a finite set. The aim is for the web front-end to be able to produce a valid XML file. The front-end should be made secure by user + password, coupled with certificate authentication (best practice: <https://www.acer-remit.eu/certificates>)
2. By manually uploading an XML file through the upload function of the secure web frontend. This XML file needs to be prepared off-line, either by using an XML editor in the case of recurring file transmission with very little change, or by other means such as an Excel file with macros. The TR operator should make sample XML files accessible for changing, adapting and submitting. The TR

operator may make sample Excel files available as well, but should refrain from taking these into support and maintenance, as they cannot be easily locked down. These tools can and should be changed by users, but supporting the changed variants cannot be done with reasonable effort anymore.

3. By automatic transmission of the XML files to the TR. This is the most prevalent means of submitting regulatory data to TRs in Western Europe, but it is dependent on trading and risk management systems able to produce these reports, and upon the volume to justify the significant fixed cost to make such a connection work. The most robust and widely-spread technology for this transmission are:
 - Secure File Transfer Protocol (sftp), combined with PKI payload encryption and authentication (recommended: GPG implementation of OpenPGP)
 - Followed by REST Web Service with channel encryption

We recommend starting with sftp, combining the provision of certificates with the certificates for web access.

Output and reporting

The output to submitting entities is not the first priority, but should not be left to later phases to ensure rapid and smooth uptake. The following channels should be provided:

- Web front-end for rapid feedback to reporting, look-up of UPI codes
- Excel, for providing more complex information via the web interface
- PDF, for reports to the public
- REST API for codes, list of trade reports submitted

SYSTEM DESIGN

Usability

- Usability: The TR must be intuitive to use. The technology needs to be transparent to users, so it enables them to concentrate on their tasks, rather than on system usage issues.
- Accessibility: Information needs to be accessible for users and partners to perform their respective duties, yet with security and privacy measures according to the applicable law
- Support for multiple languages (Ukrainian, English, others where advisable) needs to be delivered from the start

Modularity

- Interoperability: Software and hardware must follow established standards that promote data, application, and technology / functional interoperability (i.e. European standards, EMIR and MiFID-II standards).
- Components and services between modules must be loosely coupled to ensure flexibility and continuity. This enables replacement or modification with reduced risk of unexpected side effects.
- When designing the application, vendor should assume that the underlying infrastructure / layers will evolve and that the TR application must be able to cope with this evolution

Release planning

- Vendor need to provide a concept for future releases, independent of their own planning
- Standard release schedules should foresee a major release per year, and one code fix releases per quarter
- Where possible, testing and releases of the code per module should be independent of other modules, decreasing risk and effort

Openness for future needs

- Elasticity: There is no determination yet whether the solution should be deployed on-premise, in the cloud (cloud native), or be Cloud-ready
- Ideally, the system could be deployed to a particular cloud ecosystem, but could also be pulled from that environment if cost or security makes that necessary
- The IT architecture must be planned to reduce the impact of technological changes and ensure flexibility in business continuity
- Maintainability: Data management processes and tools to control the growing number of system users.

Buy vs. build

- The question of Buy vs. Build has been discussed in the experience of the TRs in Western Europe.
- Following the modular approach, there is no need for a uniform answer
- Without jumping to conclusions, we find it likely that the following component will be standard products, configured and extended to the needs of the Ukrainian TR:
 - o Business Intelligence module (BI Tool)
 - o Market Surveillance module (though postponed)
 - o Monitoring module, but with a heavy dose of customization
- The following modules will most likely be custom-built:
 - o Data Collection, including web front-end
 - o Data Validation module
 - o Data Storage module, though the underlying database and data lake / file storage will definitely be standard products
 - o Infrastructure

Licenses and open source

- In general, open standards and/or open source software is preferred over proprietary standards
- In case of proprietary standards or closed source software, vendor should demonstrate an exit strategy should the cost or functionality of such proprietary tools become untenable in the future
- Where software is developed specifically for the TR, vendor must provide an unlimited, non-expiring license and provide for source code escrow

SYSTEM REQUIREMENTS

The development of the TR including the provision of standard software components should be guided by the following principles. These principles are not fixed and may evolve in the future. Potential vendors should be prepared to demonstrate how their solution adheres to these principles, or in case of gaps or deviations should justify these.

Security

- Security by design: The TR solution must adhere to the latest IT security strategy and legislation. (XaaS policy, IPG policy, development guidelines).
- The overall TR must be secure at all application levels
- The TR software must be secure by itself
- The solution must adhere to current Ukrainian and EU privacy standards and legislation as it relates to personal data, in particular GDPR
- Shared Information: Users have access to information that is necessary for performance of their respective tasks. Therefore, information is shared between different regulatory agencies and positions, depending on the security levels established for that particular set of information.

Availability

- Business continuity: Business activities on the TR must be maintained, despite system interruptions
- Scalability: The TR solution and concept needs to be scalable for example, if number of transactions, orders or market participants go up significantly
- Availability: In principle, the system should be available 24 x 7 x 365, but human intervention on the TR side, e.g. monitoring or operations staff needs to be kept to normal working hours (8 x 5), otherwise cost is increased manifold

Verifiability

- At any stage of processing the data submitted and receipts being sent, the steps of data handling, validation, enrichment and mapping must be transparently logged
- Key to verifiability is a chain between the data as it has been submitted by the reporting party, and the data as it ultimately arrives in storage
- Audit trails will need to span multiple modules

Load and performance

Estimating the number of market participants, venues, and trade and order reports is difficult upfront, because only the scope of reporting put down in the Capital market Reform act and secondary legislation will bring light to these. Having said these, the following key figures have been mentioned in interviews with Ukrainian stakeholders:

- Market participants (MP)
 - o Investors trading on their own behalf and liable to report: 200 to 500
 - o Brokers, OTFs, arranging financial trades or trading on behalf of others: 300 max.
 - o Total number of financial MPs: about 1'000 max., of which three - four major banks and some 80 smaller banks / brokerages
 - o For comparison, there some 450 MPs registered for trading on the exchange, out of which only 60 are active. This is roughly the figure of active clearing members
 - o Total number of energy MPs: 1'000 to 2'000 max., in practice (power markets) only 400 registered MP, of which 200 are actively trading
 - o Total number of MPs across financial and energy markets: 5'000 max reporting entities, with a higher bound of 20'000 entities counting beneficiaries and non-active MPs which may be included in reports
- Trades (transactions), not counting orders or lifecycle events:
 - o Number of trades in energy markets (only power, Day-ahead and Intra-day): 300 per trading day
 - o For benchmarking, the notional value of traded power is about 25 % of total consumption. This is the opposite of churn, the bulk of power is not traded on wholesale markets, but sold using long-term contracts
 - o Number of trades in the financial markets: less than 100 bond transactions per day, less than 1'000 FX transactions per day
 - o Equity market has low liquidity, with only 10 stocks having market makers and 4 stocks making up the index
 - o With these two financial markets (government bonds and FX) being the most liquid, the overall reported trading volume is in the low thousands per trading day
- Users (persons) per entity
 - o The bulk of trading entities is very small, so we expect to have one to two persons as named users per entity.

For comparison, the following figures apply to financial and energy markets in Western Europe:

- In 2018, ESMA reported it receives seven million records on financial instrument reference data per day.
- In one month in 2018, total of 3 million EU financial instruments that were published
- ACER processes the following number of records per year:
 - o 2017 437 Million records / year
 - o 2018 728 Million records / year
 - o 2019 1'036 Million records / year
- One record can be an order or a transaction, with the messages of fundamental data being negligible.
- The typical order to trade ratio is three to one. Therefore, the above figures implied a transaction count of 260 Million transactions / year.
- Since energy is mostly traded on week days, this amounts to a daily volume of one million transactions

It is apparent that the total size of the Ukrainian market and the daily trading activity is about four orders of magnitude smaller than in Western Europe. This is good news, as systems do exist to deal with the magnitudes in Western Europe. A look at the ACER figures also show growth rates of 25 % y-o-y. Still, using the same software and storage architectures as for TRs in Western Europe would be unnecessary.

OPERATIONS

Training

- Vendor or operator must provide trainings to initial TR staff
- Training to pilot users should be combined with workshops
- Training to hundreds of users cannot be given in person, instead focus on short instructional videos, combined with a train-the-trainer approach with auditors and consultants.

Documentation

- Vendor must provide documentation of software, focusing on tool tips, FAQs and context-based documentation
- Massive PDF manuals are rarely read.

Total cost of ownership

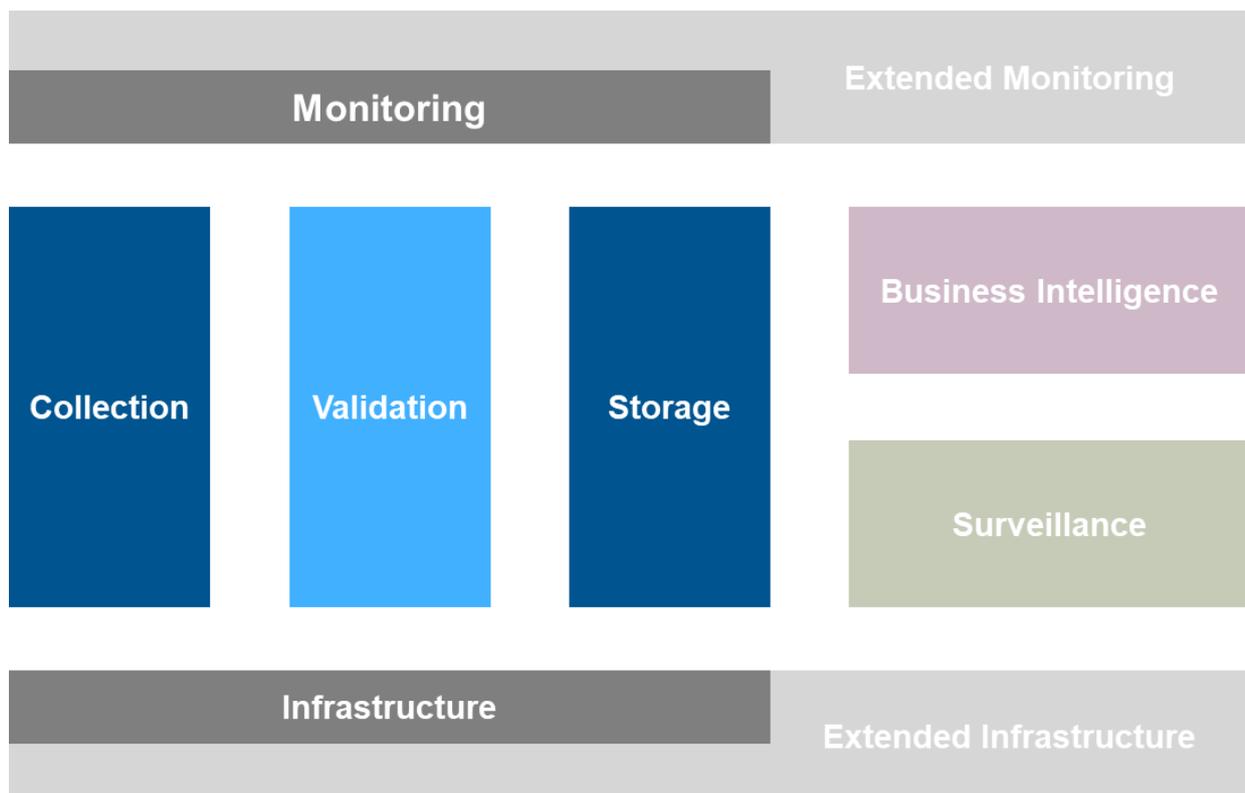
- Vendor should commit to TCO calculation, assuming certain growth rates in data and users
- Due to the split in modules, this TCO calculation can ultimately only be done by the operator.

NEXT STEPS

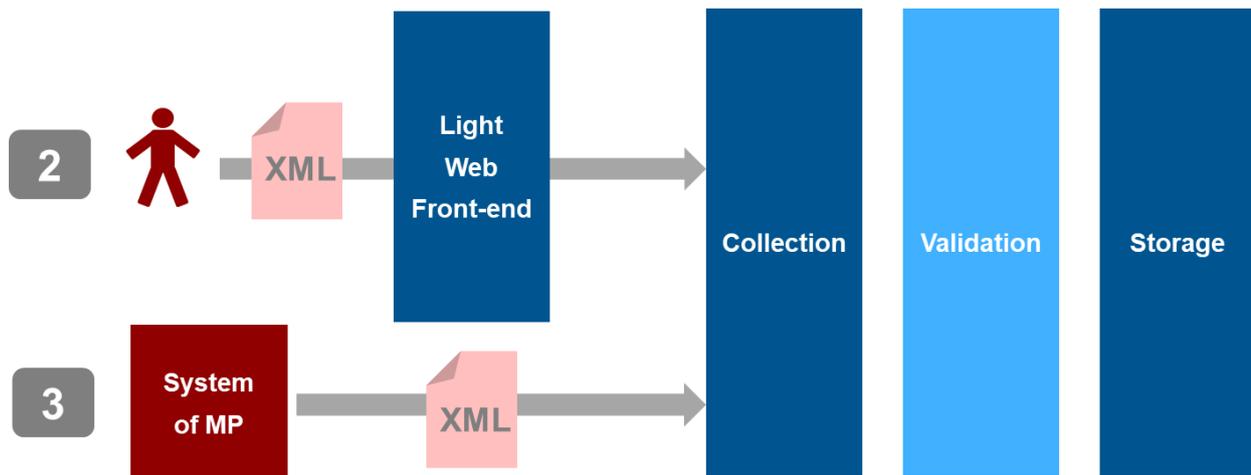
This section on “next steps” is an attempt to sketch out a possible sequence of events after the acceptance of this report, which would bring the envisioned future reporting landscape and TR into existence. It has been written without a detailed understanding of the mechanisms and timing of bringing secondary legislation into force. Another point not fully considered is the question of budgeting – where an initial budget would come from, and how long it would take to secure it. One thing about budgets is certain though: The lower the cost, the easier the approval process. By the same token, any sponsoring organization would like to see quick results, with the ability to make changes as necessary. The last point precludes a waterfall model of development, where every last detail is specified, and then rigidly implemented. Agile development seems more suitable, especially in an environment where many requirements are not fully formed yet.

Choosing the scope for the first stage

We are assuming that all recommendations and assumptions in this report hold. The first decision to be made concerns the scope of a first stage delivery. Following the recommendations in this report, we remove the Business Intelligence and – crucially – the Market Surveillance modules from the first stage. As a consequence, significant parts of the monitoring and infrastructure are not required at first. However, the infrastructure should be chosen in a way that allows for later additions to cater for the needs of these modules omitted at first. The same goes for the data volumes, scalability is key. If the intention is to go for a cloud-deployed architecture, that is what the first stage should start with as well. Nonetheless, the infrastructure and monitoring component will be significantly lighter and less costly for this stage, resulting in this picture of the first stage (greyed out parts are out of scope):



The data channels are reduced by one: The web entry (No. 1) assumes a fully functional web interface for form-based entry and quick validation. This is very dependent on the choices of the implementation data set, in other words the breadth of fields optional under EMIR Refit, yet to be removed from the set for entry into the TR. At the same time, usability, good flow, tool tips and sensible choices for default values are required to make this work well. Front-end development is also quite time consuming. Starting this component early wastes a lot of effort on something which will have to change later. This leaves the two file-based channels, one for manual upload (2) and one for system-to-system transmission like sftp (3). Thus, we have the following picture of the first stage for data channels:



In both channels, users have to prepare the compliant EMIR Refit XML files themselves, locally. As a convenience, the TR operator could provide some sample XML files for different asset classes, which users can then modify and submit, using license-free XML editors and the like.

Note that this architecture is not a throw-away prototype, but a first, fully functional step to the TR architecture as envisioned.

Another scope decision to be taken concerns the types of asset classes for the first stage, the deal types etc. Here, the focus should be on what the pilot users actually have transactions in and can bring forward through an interface / file types to be developed. This follows the approach of “build first only what you can test quickly”.

TR as a not-for-profit operation

This report makes a strong case for having one TR for financial markets in Ukraine only. Regardless of tendering or licensing models, even this reduction in complexity and competition will not result in a viable business case for a commercial entity looking at building and operating the TR. This unfortunate fact is a consequence of the high fixed cost for building and operating a TR combined with the small transaction volumes in Ukraine to be reported to a TR.

Even TR operators in Western Europe are struggling with how to make and keep their TRs profitable, due to the many changes in regulation and the high cost of compliance for keeping the license. Most TRs in Western Europe mainly exist to protect the data and clients inside the walled gardens of the exchanges and clearing

houses of their respective groups, those operations being truly profitable. Data services are a fast-growing business too, but these exchange / settling groups already have the data from price finding, settling and clearing. Putting a TR on top does not increase the value of the data, it just prevents the competition from accessing it.

With these facts about (lack of) profitability in mind, the fees for using a Western European TR are typically structured like this:

- One-off / registration / on-boarding fee, e.g. 2'000 €
- Flat fee / membership fee / minimum fee independent of volume, e.g. 3'000 to 6'000 € p.a.
- Volume based fees, e.g. between 0.1 and 10 € cents per UTI, depending on volumes

These prices are (just) sufficient to cover the cost of operations and ongoing changes of the large TRs. Whether the investment of the first build phase can be recouped from the revenues is an open question – probably not.

Keeping in mind that the cost of building and operating the TR is primarily fixed cost, it becomes apparent that the prices for Ukrainian market participants would have to be significantly higher – maybe by two orders of magnitude – to make up for the smaller volumes and user count. Such high prices would critically endanger the functioning, let alone the growth of the financial markets in Ukraine.

How to get to a “business model” which works? Firstly, one should accept that this is not a commercial opportunity, but calls for a state-run or state-sanctioned not-for-profit operation instead. Collecting taxes is not a commercial undertaking either. Secondly, the commercial TRs in Western Europe incur roughly half their cost in making sure they stay within the licensing requirements, keep on the good side of regulators, have all the appropriate documentation, etc. Regulators in charge of their own TR like ACER or the No-EU NRA are able to run a much leaner organization.

Therefore, the TR for financial markets should be run by the regulators itself. For the financial markets this means a suitable combination of NSSMC and NBU.

While the nucleus of the compliance and legal responsibility is within NSSMC, the IT work should rest on the shoulders of teams already existing. Much of the work to be done requires specialists, but many of them would not be required full-time. With existing personnel, there is chance to soak up resources without incurring extra cost. The natural fit for this role is therefore SMIDA.

The resources available within NSSMC and SMIDA could be augmented by external sources, e.g. consultants, but not in the way of tendering away the project responsibility.

Setting up the team to make it work

Start with a vision, and involve market participants early. The following team composition could work:

- Project lead, with a strong grasp of market needs and IT implications (full time, key contact for Steering Group)
- Head of architecture, design and test strategies (full time, in charge of vendors)
- Head of usability and user interaction, market facing (key person for dealing with pilot users)
- Head of security and infrastructure, operations

Any personnel below these functions could be variable staffers, outside help and the like. The steering group would require sufficient commitment and time to make hard decisions about scope, so that function would be fairly detailed for some members.

Timeline

With the above scope in mind, it should be feasible to deliver a working system within 6 to 8 months, provided that pilot users (one commercial bank, one exchange) are on board and cooperate in building out to something which will change.

Agile development means working in sprints, e.g. lasting three weeks. Each sprint brings a new increment of usable functionality.

The resulting system would validate the approach, serve as the nucleus for the TR under the NSSMC, and provide valuable and detailed feedback for forming the outstanding secondary legislation and detailed design for the target TR system.