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Future scenarios on the next generation of infrastructure for processing securities (background document)

Executive summary

The processing infrastructure of securities will face major changes during the coming years due to regulatory, technology and customer requirement developments. The industry will most probably move to the next level of processing technology and considerably increased efficiency. The technology will shift into immediate real-time trading&delivery in a truly global 24/7 network environment, which is completely integrated within a fully automated straight-through-processing design. The industry market setup can alternatively a) consolidate into global oligopolies/monopolies or b) move towards a flat and open network of interoperable competing service providers. Current processing patterns are inherited from the paper- and batch-age, while achieving benefits of modern technology and moving to next generation systems will require complete process restructuring inline with what has been done in other data processing based industries. E-efficiency requires clear addresses and common international identifiers for example for custody accounts (ICAN?) and taxation identifiers (ITID?)

The change-over to the next generation infrastructure would result in improved services at a lower cost level to end-users, issuers and investors. The current infrastructure operates far below the currently achievable level of efficiency. A large part of the current legacy service provider will find their current operations, margins and investments threatened by modern developments. A strong resistance against change can therefore be foreseen.

The regulators can affect the new market structures (consolidation or openness), the development speed towards the new generation (acceleration or retardation), the efficiency of the process of change and the extent of benefits reaching the end-users. **An efficient regulatory support for reaching the next generation infrastructure will require a common authority vision of next generation “design” to be implemented via a common regulatory policy.** It will also require a firm support of the change process itself. A prolonged use of the out-dated technology and market®ulatory setup will postpone the benefits and maintain current risk levels.



1. Introduction

The Finnish Ministry of Finance has submitted this background document as we find it important to first have general discussions on the overall objectives before making regulations regarding specific parts of the infrastructure in the securities industry. Changes in one part of the legislation and/or infrastructure can have large impact on other parts. It would be important to have a common vision of where we are heading. **What kind of next generation “target situation” are we aiming at in this industry?**

This is needed in order to find the most efficient path towards the “new” environment both from timetable and cost point of view. We see otherwise a large danger of non-coordinated and even conflicting developments resulting in high costs of change for all parties involved and even a non-preferred end situation. These thoughts have been triggered off by the consultative process regarding CSD legislation. CSDs are important parts of the transaction processing infrastructure in the securities industry. CSDs operate in a highly cooperative processing environment and changes in the CSD functions can initiate changes far up and down the processing chain.

The objective of this paper is to share views on critical factors affecting the securities market in the future. It should be seen as an issues for discussion paper on where we are heading and to which extent authorities can affect future developments. **What could be the fruitful ambitions of authority regulations?**

2. Current unsatisfactory situation

Most of the EU authorities in this field seem to share the views that the current infrastructural setup

- is too expensive and inefficient for the end-users (issuers and investors)
- there is a lack of competition in the market due for example to monopolies in the form of non-interoperable “silo-type” of structures and the infrastructure seems to consolidate further
- particularly cross-border processing is inefficient hindering a truly common internal market to emerge
- the overall structure is outdated due to its legacy overload from the paper and batch era, when technology developments have been rapid in other industries
- current systems operate with both higher operative and stability risks than necessary.

The infrastructural changes referred to in the CSD consultation paper would have very deep and profound impact on the current stakeholders. However, these change proposals seem mostly to be based on the current legacy paper-based technology and the current non-competitive institutional setup. We see a need for making a deeper analysis on what kind of securities infrastructure would benefit the citizens, issuers and investors, in the future, before starting to change the infrastructures via regulatory interventions.

3. Major development trends

There are currently several “mega trends” affecting the capital markets and the society in general

- **global network openness** with freely moving capital, data, labour, tax payers and processing resources. The idea of a permanent “home country/location” start to disappear and is replaced by a “suitable temporary location” for given activities based on individual choices. A growing volume of activities are conducted just somewhere in the network at a physically/geographically difficult-to-locate web-address.
- **borderless business consolidation** with multinational business structures, which are difficult to oversee, supervise and control by individual local authorities regarding overall risks and abuse of market powers. Most multinational entities are just “too big” for local authorities and their geographically limited mandates.
- **increasing stability concerns** due growing institutional dependencies, highly critical parts in operational networks/hierarchies and risk containing conventions like “short-selling”
- **integrated immediate information and communication technology** providing global end-to-end straight-through-processing in real-time. All necessary data is available in the network and there is no practical limitation on data volumes. The most efficient processing convention is immediate transaction based processing. (Compare with the developments in flight ticketing and mobile services.)
- **global network externalities** driving towards global monopolies/oligopolies or open competitive service provision among competing network-based service providers. (Compare with the differences in email and facebook structures)
- **emergence and growth of “flat” service provision structures** with end-customers and original service providers trading directly with each others, that is, abolishment of intervening middle men and expensive high service hierarchies
- **defensive actions of legacy systems to preserve their privileges**, as long the old structures remain, current high profit margins can be maintained without new investment needs. It is very difficult for new entrants to gain volumes on monopoly or near monopoly markets.

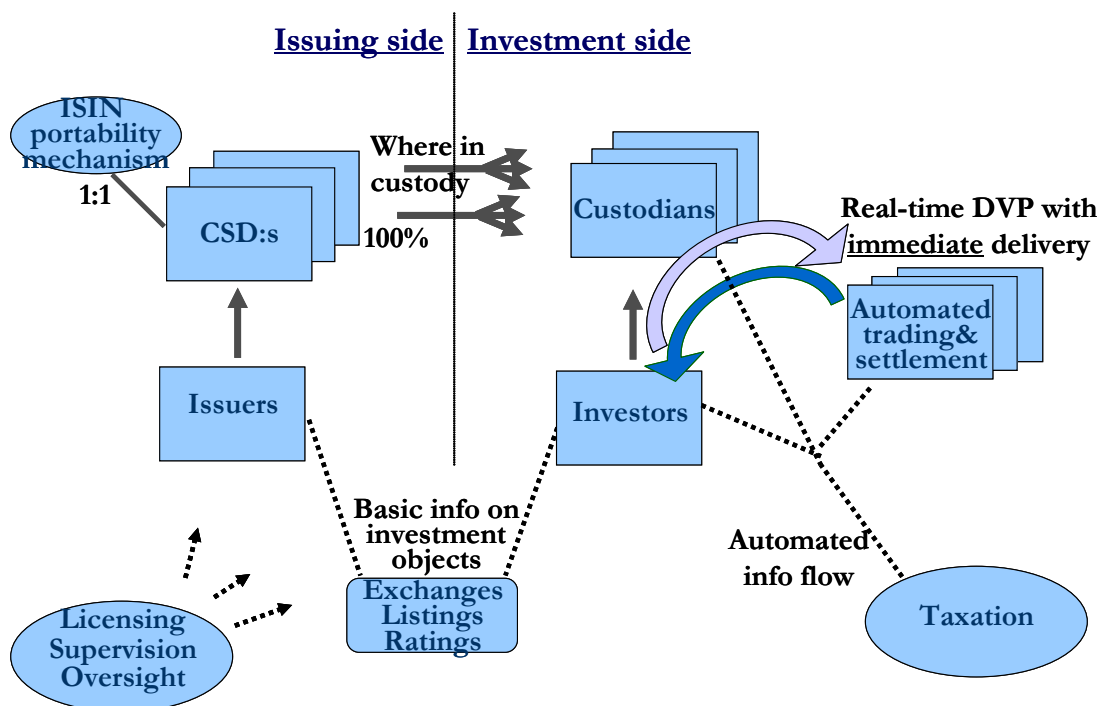
The main customers groups of the securities industry, issuers and investors, would gain from developments towards increased efficiency and competition especially when authorities ensure sufficient stability. Authorities need to review their policies and actions in order to support increased efficiency and sufficient stability in this rapidly changing environment.

4. Emerging e-based, flat and lean infrastructures

Modern infrastructures are characterized by complete electronification, organisational “flatness” (reduction of high organisational service hierarchies into direct end-user services) and functionally focused efficient entities. The processing in modern e-based infrastructures is split into simple base-functions, which are combined into transaction-

based service processes operating seamlessly from-end-to-end in a common network surrounding. Straight-through-processing (STP) operates from sending to receiving customer automatically and immediately, with each participant in the chain carrying out the assigned base-functions. (Compare with e-ticketing services and systems flight reservations operating all over the world in real-time in the internet.) In order to achieve efficient leanness the current processing patterns need to be restructured according to possibilities delivered by modern ICT solutions.

Figure 1 An alternative infrastructure model for efficient securities' processing



Efficiency and leanness require simplification and restructuring of the current infrastructure based on the essential processes in a real-time environment. Tiered and hierarchical structures need to be replaced by equal and interoperable entities providing the required base functions. Each group of operative entities are assigned specific tasks to be performed according to common standards. Figure 1 contains the most obvious structure for a future flat and lean model, in which competitive CSDs provide issuer services, custodians in competition provide investor services and automated trading&settlement platforms facilitate trading. The described hierarchical simplicity will support efficiency and competition. The functions of each entity is described more in detail below

CSDs would, in a flat and lean setup, purely provide the basic issuing functions, that is increase and decrease the amount of issued securities on the market, distribute interest and dividends as well as providing corporate action services based on issuers' requests. The CSD focus is on issuing services including keeping accounts on where the issued securities are kept in custody, that is, ensuring that the overall balance of each security in custody by custodians continuously is the same as the total issued (ie the sum of all custodians' omnibus accounts at the CSD needs continuously to equal total issued securities). In a flat setup, CSDs would operate in an interoperable network facilitating portability of issued securities. Issuers could easily move their business to another competing CSD. This requires that all CSDs operate using standardised links in all directions, towards issuers and custodians supported by a ISIN portability mechanism/register. When

an issuer moves to another CSD, the sending (old) CSD will need to send its custodian link and omnibus account information to the receiving (new) CSD where the issuer services have moved.

ISIN portability mechanism/register keeps register on issued securities and the current CSD in charge of the specific securities (ISINs). This is necessary in a CSD network with portable securities (ISINs). It need to be operationally efficient because active use of portability will result in daily employment.¹ This register could be operated within a specific institutional entity, but it could also be a virtual function within the CSD network.

Custodians. In a flat and lean environment customers' security book-entry accounts would be kept by custodians operating in a non-hierarchical network. The main task of custodians would be to keep records of the ownership of securities by its customers. In a flat model there would be no sub-custodians as all custodians would be on the same level and would have direct links to all CSDs. As each CSD would operate strictly standardised custodian links, maintaining parallel CSD-links would just be copying single link information to different CSD addresses. If an issuer changes CSD, the corresponding custodian link needs to move automatically to the new CSD based on the information received from the portability mechanism/register. In the same way, if an investor changes custodian, the sending (old) custodian need to transfer the necessary security account information to the receiving (new) custodian. When the investor transfer several types of securities these kind of transactions could involve several CSDs when the custodian omnibus accounts need to be updated. Each custodian would/should be in the position to provide custody services for all ISIN codes in the system using direct links. Keeping investors' book-entry accounts in this kind of structure resembles very much keeping bank customers' currency accounts. From technical point of view each ISIN-code just represents a different currency. In order to promote competition and portability custodians would need to use standardized customer interfaces for the core custody services (investors would have difficulties to change custodian if they need to update their basic interfaces every time by adjusting to different custodians' technical "dialects").

Settling trading platforms. The largest efficiency gain that modern technology and a flat infrastructure will bring is the possibility for immediate settlement on highly efficient trading platforms. Trading will move to automated trading platforms (often called MTFs or ATSS) which are just geared to match trading transactions in a continuous 24/7 environment. Trading will, for all book-entry securities, become a computer-to-computer straight-through-processing service, the growth of which we have already witnessed for some time. However, the current platforms are just matching trade transactions and have left settlement to be done sometimes late after the actual trading occasion in legacy systems. With the available technology, it would already now be more efficient to settle the trade immediately as part of the trading process. In a real-time environment everything can be done in one go and, in fact, it is even more costly to postpone settlement to a later point. Investors would receive the results of the trade immediately after the trade match, which require them to present the funds/securities immediately before the trade. Immediately after any trade, investors get title to the asset and could resell immediately. The settling trading platforms will need to block the traded assets for the split second of trade to initiate the DVP settlement dialogue, between the custodians involved. Straight-through processing from end-to-end will require the use of common standardised transactions between all trading platforms, custodians and CSDs.

¹ Just as an example calculations with 20.000 issuers and a CSD-change rate of once every 20 years would result in on average of 3-4 changes of CSDs per day on the EU-level.

Listing and rating agencies. Securities' listings have been important parts of the functions of exchanges. However, they are not an essential part of the core securities processing and trading. The rating or listing status has no impact on the technical processing of securities. The settling trading platforms will process any book-entry ISIN code exactly the same way. Listing and rating agencies provide information services to the investors completely outside the scope of asset transactions. In a flat standardised environment, trading platforms could specialise in trade with a given set of ISINs or provide general services for any ISIN including the trade price information. The "automated" exchanges just process transactions. These information agencies perform an important task for the investors by analysing the issued assets according to given requirements and assuring in that way a given "quality" of the assets, but they will have no processing functions.

5. Short-selling, lending, liquidity and market-making with immediacy

One very topical subject has been the need for restricting "naked" short-selling. With immediate trading&settlement this problem disappears. In order to struck a deal the seller has to provide the securities and buyer the money. The ownership will be recorded directly after the trade. Nobody can in this kind of immediate system short-sell or –buy. Securities trading will fall back to the common situation in other markets, participants can only sell what they own.

This will affect the liquidity by limiting everybody to deal with their current portfolios. This might at first sight look like a severe limitation, but with immediate trading&settlement it gives the investors the possibility to turn around their portfolios any number of times during the day. The result of each trade can immediately be used for the next trade. Basically this implies continuous immediate netting across the assets in the portfolios. For example full-scale algorithmic trade will still be possible, but the algorithms have to respect the short-trading limitation of just selling what is in the portfolio and buying with the money in the portfolio. If/when somebody assign wrong parameters to an algorithm, trading will automatically stop when the assets in the portfolio has been consumed.

Securities lending will be possible in this kind of environment. The title to the securities needs to change in order to make the assets tradable. The stakeholders can/will agree upon suitable collateral for repayment. This provides the possibility for "covered" short-selling in a secured way. The market-makers will also face the same constraint; they need to operate within their real-time portfolios and/or lending capabilities.

As the overall balance of a given security of any custodian will always be the sum of the individual balances of its customer, the custodian can never run out of settlement assets in the form of securities. However, there will be an increased requirement for custodians and/or settlement banks to meet the immediate liquidity needs and fluctuations in money assets due to customer trade. As a consequence custodians/settlement banks will need improved cash liquidity planning and sufficient intraday credit facilities at the central bank. The liquidity need will be netted by offsetting customer trades, which will even out intraday fluctuations.

6. Basics of efficient interoperable STP operations

The industry has in the past initiated different straight-through-processing STP projects, but these have failed because of the lack of interest by legacy service providers to make coordinated changes to their systems or even agree on what the common standards should be. STP can only be realised when all systems in the processing chain use the same common transaction standards, addressing keys and processing conventions.

Making book-entry transfers are basically completely bulk-type of recording tasks, which require basic sets of common standardised transactions. With the current level of electrification the necessary information is available in the system, but it has to be forced into common interoperable standards, in order to make it efficiently available for all processing phases. Within the SWIFT/ISO community the standardisation work on transactions standards has started by creating the ISO 150022 set of standards, which grew in to ISO 20022 standards. This is descriptions of meta data for processes and messages. In order for the transaction standards to become useful the market participants need also to agree on actual interoperable addressing and reference standards, which transfer the transactions to the right processes and refer them to the correct data sets in the different databases. There is also a need for common processing conventions of these transactions.

The most important address information to agree upon would be a common custody account numbering for investors' assets. We need to agree upon something that could be called **ICAN (International Custody Account Number)**² which in the same way identifies any asset account as the IBAN identifies any money account within the EU area.

Each transaction processed in the network has also to be identified via a common structured identifier. This provides the possibility to trace the transactions through the system and match them exactly and individually. It can be compared to the parcel number created for example by UPS in order to be able to trace any parcel shipment in real-time all through the parcel shipments. Securities transactions ship in most cases much larger values than parcel shipment and would therefore require at least the same kind of real-time process monitoring possibilities. This kind of code could for example be called **ISTI (International security transaction identifier)**.

In an automated environment all participants have databases containing their view of the transaction process. The transaction processes are dialogues where initiated transactions will at some point of time (generally split seconds in a real-time environment and days in current batch systems) generate replies or confirmations. The originator would then need automated facilities to find the original information for reconciling, error processing and other purposes. This would require clear references created by each participant to be used all through the process of a given chain of tasks. In a flat environment it would require the references of the sending investor and custodian and the receiving investor and cus-

² The ICAN structure could resemble that of IBAN eg ICAN + country code + check digit + custodian's BIC + custodian's current asset account number. This would give each custodian the possibility to continue to use the current internal custody account numbers within a common international structure. The domestic bank account numbers (BBAN) have generally a bank identifier in the beginning of the account number. As most markets lack a domestic custody account structure the BIC is proposed to become the necessary bank identifier in the ICAN coding.

todian and which inline with the other identifiers could be called **RFSI, RFRI, RFSC and RFRC (reference codes for sending and receiving investors and custodians)**. These references could have a very general structure (just maximum length and control digit) making it possible for each participant to create the desired internal structures.

In addition to message and data field standards, modern technology provides the possibility for **developing common reusable application modules stored in a common library**. Each stakeholder could pick out from this kind of library those standardised modules he needs. (It is like a common store of standardised “lego-pieces” for everyone to use.) The programming task at individual stakeholders will decrease drastically when the standardisation is extended to standardised processing modules.

The purpose of this section was to show that the prerequisites for increased efficiency and competition is to get the very basic transaction “plumbing” interoperable based on common transaction and addressing standards. Without this kind of concrete base, STP will be unachievable. In the same way as within SEPA, the market lack incentives to coordinate these due to the legacy privileges and barriers and it seems inevitable that the required coordination can only be achieved via authority regulations (compare with the IBAN, ISO 20022, end-date, pricing and interchange fee regulations required for SEPA). **A Europe-wide interoperability project implies launching a SESA (Single European Securities Area) undertaking.**

7. Basics of automated tax information

The member states have common interest in ensuring correct and efficient taxation of investor assets and their returns. This can be divided into two different sub-tasks:

- automation of the taxation processes and
- incentivising and controlling actual tax payments.

Due to the increasing cross-border connections tax collection is more and more a task requiring international cooperation among tax authorities. The very basic requirement for tax collection automation will be to create a tax payer identifier for cross-border usage which could be called **ITID (International tax payer identifier)**.³ The tax authorities would provide the ITID to their citizens and these can then forward it to their service providers in the different parts of EU (or even outside). This is a very basic requirement in order to make international tax collection efficient among law-abiding citizens.

The necessary information for tax collection is always available in a book-entry infrastructure. Authorities need to create the incentives to make the proper reports using ITID coding. One simple way to create such incentive is to levy higher tax rates on securities, returns and transactions, when proper tax coding is omitted.

³ The structure of ITID could use an IBAN analogy, that is ITID + country code + check digit + current local tax identifier (TIN). Every country could in this way keep its current tax identifiers and the benefit would be an improved check digit feature.

8. Need for regulatory policy changes to reach the “next” generation

The basic objectives of market regulations will remain the same; sufficient competition, processing efficiency and stability. However, the future regulatory stance can select between two main alternatives

- a) continuing along the current path using current technology resulting mainly in moving from national monopolies/oligopolies to similar European level structures or
- b) turning towards open competitive network structures tuned towards competition and technology efficiency

The technology changes require new adaptations and moving to the new generation at some point of time. These changes put emphasis on efficiency and competition issues as these are the area of change, which will also require changes in the policy stances of authorities. The presented flat and lean model was based on following common international policy stances

- same kind of clear-cut industry structures
- common interoperable standards
- openness and portability with equal stakeholders in an interoperable network
- common license, supervision etc regulatory requirements.

The proposed development objective would imply profound changes by moving from national systems to truly international systems, from monopoly silos to open networks, from high barriers for service provider changes to efficient portability, from institutions with mixed functions/services to stream-lined single-purpose entities and from legacy batch technology to modern real-time transaction-based processing. The markets and industry will face a completely new competitive world. However, full benefits can be achieved only via profound restructuring within a coherent overall new design, which have been the situation in many other industries facing “generation” changes.

One important policy issue related to enhanced competition is the possibility of cross-ownership among entities with different licenses. This could lead to “disguised” silo constructions and thereby a risk for abuse of market power and cross-subsidisation. A strong pro-competition stance would require limiting strongly all kinds of cross-ownerships in the competitive processing chain.

Authorities can select different policy stances to these developments for example

- passively following market developments,
- correcting afterwards negative developments,
- pushing for developments in desired directions and/or
- actively building parts of the new infrastructure.

As the future is unclear all of these stances will probably be used in parallel. **However, the Finnish Ministry of Finance believe that there is currently a need for an active push in desired directions. This would speed up developments and benefits would be achieved earlier. A clear “next generation” vision provided by authorities and their proposals for measures to reach the objectives would provide clarity to the market on expected developments.** Today, developments seem to be in some kind of stand still due to mixed signals, conflicting regulations and defensive actions of legacy service providers (for example increased consolidation). Authorities will be in a very important position regarding the speed, content and customer benefits of developments in this indus-

try. The legacy burden of the current industry structure is so heavy, that it lack the internal power for starting a restructuring process.

Introduction of an efficient change process

The design of the change process itself will be an important cost factor. A lengthy and uncoordinated change process can increase the cost of change even dramatically. A lengthy process will also postpone the benefits of restructuring. Typical for these kinds of change processes is a large variety of conflicting views voiced by stakeholders, whose positions in the processing chain will change due the new structures. In order for the change process to run smoothly, coordinated decisions have to be made and implemented. These include the design of the future processing chains and the transaction/data standard used in these.

Typical are also lengthy discussions on the design starting point, that is, building on current legacy designs or starting from scratch. These decisions will also affect the implementation process, which can either be a stepwise co-ordinated update of current infrastructures or constructing a new parallel infrastructure to which the volumes are shifted in a co-ordinated way. Moving to real-time processing in an open network environment will be such a radical change that updating old batch processes will most probably be an unfeasible solution with much higher costs than implementing a new parallel structure.

All stakeholders, service providers, customers and authorities, need to be aboard in the design phase and especially the end-users, investors and issuers, as a major part of the overall benefits of a new infrastructure relates to STP automation benefits in the customer interfaces. Conflicting views are very hard to avoid in these kinds of large restructuring projects, which will emphasise the need for authority involvement as a neutral arbitrator of conflicting interests. Authority involvement can be beneficial when the development speed can be enhanced, because the cost of change and foregone benefits will increase during a longer change-over period.

It will be important to clearly distinguish which parts of such a change process will be authority and which market driven. An efficient transfer from old to new technologies becomes more and more demanding because of the growing system integration and automated stakeholder relationships. A successful approach will therefore require coordinate public and private efforts.

As it seems evident that this industry faces a major restructure effort, the main question seems to be when this undertaking should be started, now or later?

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