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Introduction

This document is supplementary to existing CREST publications and describes the additional aspects of CREST's service offering in support of Virt-x.

Virt-x is the new pan-European stock exchange created from the merger of Tradepoint and the Swiss Exchange (SWX). Virt-x will offer trading services, using the EBS trading platform, in blue chip equities that comprise the FTSE Eurotop 300, MSCI Pan European, S&P 500 and STOXX Europe, thereby covering the constituents of the major national indices.

Virt-x will benefit from a fully integrated and low-cost clearing and settlement solution which will offer Virt-x members:

- straight through processing;
- a flexible selection of settlement locations including The Settlement Network – the alliance between CREST and SegalInterSettle (SIS); and
- T+3 settlement.

The settlement solution, in which The Settlement Network will play a major role, will be introduced in two phases.

Phase 1 will go live with the launch of the Virt-x market on 25 June 2001 with the introduction of UK¹ and Swiss blue chip securities. Securities in the STOXX 50 and EuroSTOXX 50 will be added on 2 July and all others on 9 July. The settlement solution for phase 1 will not involve a central counterparty.

CREST members wishing to take full advantage of Virt-x will not need to undertake specific developments for the first phase and will be able to re-use CREST's existing international services, full details of which are available on the international section of the CREST website (www.crestco.co.uk).

At this stage the full specification for phase two is not finalised but a key objective for CREST is that you will be able to continue using your standard CREST interface. Virt-x are progressing the detailed delivery plan for phase 2 which will include The London Clearing House acting in the capacity of central counterparty providing risk management and post-trade anonymity.

CREST has tailored a settlement service which supports Virt-x through our alliance with SIS as part of The Settlement Network; it does not require members to make any changes to existing interfaces or message formats². The detailed CREST service for Phase 1 is described in this publication.

¹ For the avoidance of doubt this does not include Irish securities.

² There are some differences in status changes returned for cross border DvP.

Background

CRESTCo

CRESTCo operates the CREST settlement system, which is the home CSD for UK, Irish, Isle of Man, Jersey and Guernsey securities and provides settlement services for the London Stock Exchange and other UK and Irish Exchanges.

CREST provides high capacity, real-time low cost settlement services in a very wide range of securities. In particular:

- CREST settles over 280,000 transactions a day with a value of over £200 billion.
- CREST has over 30,000 members including all the major international institutions, custodians, banks, stockbrokers and private investors, operating over 500,000 accounts holding over 3 million individual security balances.
- CREST offers a wide range of UK and Irish corporate securities, British government securities, debt instruments and investment funds.
- CREST offers extensive cross-border settlement services in European securities through the Settlement Network – CRESTCo's co-operation with SIS.
- CREST provides settlement services for the LSE International Retail Service .
- All international securities in CREST are as simple and as cheap to hold and transfer between CREST members as domestic securities.
- CREST offers a comprehensive ECSDA style custody service. The service has proven a critical factor in the successful distribution of stock in a number of high profile cross border corporate actions.
- CREST and London Clearing House have built a highly efficient central counterparty service for UK equity markets which went live on 26 February 2001.

A full description of all services offered by CRESTCo can be obtained from the CREST website (www.crestco.co.uk). Members will find the following documents particularly helpful:

CREST Manual	www.crestco.co.uk/search/man_index.html
Procedures and Guidance Manual	www.crestco.co.uk/search/pg_index.html
The International Manual	www.crestco.co.uk/international/intman_index.html
The International Service Description	www.crestco.co.uk/international/int_serv_index.html

The advantages of settling in London

London offers a world leading equity market infrastructure with a combination of strengths that is unique in Europe. This will be available to Virt-x and its users. The key components of this infrastructure are as follows.

- A fully integrated central counterparty, netting³ and settlement solution that will give market users a single interface for all post trade processes, capable of supporting settlement cycles down to T+0.
- High capacity real-time processing through modern fully automated systems at very low cost.
- Complete flexibility as to where entities carry out trading, clearing and settlement.
- Counterparty risk is accepted by LCH in real-time at the time of trade rather than at the end of the day.
- Substantial risk backing for the central counterparty through the LCH default fund, insurance and capital.
- International coverage that provides access to securities and to counter parties from domestic, European and US markets through a single standard interface.
- Automated corporate action information in a standard format for all securities with fully automated processing of corporate action events. This has been extensively enhanced to support all international markets covered by Virt-x. Since its introduction this service has already proved a critical element for the efficient, timely and successful processing of cross border corporate actions.
- An extensive range of sophisticated services to support collateral management and the efficient, active and competitive equity stock borrowing and lending market in London for UK and IE (FTSE 350) securities.
- A consistently high success rate for settlement on intended settlement day that regularly exceeds 97%. This is delivered by means of CREST's efficient, user friendly and flexible settlement processes and is supported by a fair, effective and established settlement discipline regime which covers UK and Irish FTSE 350 securities.
- A single consistent and robust legal and regulatory structure.
- Sterling and euro settlement in central bank money available in late 2001 with the choice of commercial bank providers for credit and liquidity.

³ Netting will be introduced in early 2002.

CREST – A technical overview

CREST is based on the latest S74000 fault tolerant Compaq Tandem computers, and is one of the largest configurations of its type. Transaction input, matching, settlement and enquiry/reconciliation are all processed in real time. There are upwards of 4,000,000 messages a day being received and processed of which 99% receive responses within 2 minutes of receipt by CREST.

A full-scale standby system is in place at a separate site from the main system, and is kept constantly in step with the live system by a real time data feed. In the unlikely event of the main system failure, CREST can return to normal operation on the standby system within 1 hour. CREST regularly completes contingency tests which involve the transfer of the business to our standby system.

CREST is an exceptionally secure and reliable system. The regulations under which CREST operates define strict criteria for security, reliability and integrity. The same security, reliability and integrity features have been extended to benefit the international business undertaken by CREST members.

CREST has a fully functional trialling system available for members' use. It can be used for testing either market wide developments or for members wishing to test alterations in their own systems. In both scenarios, members are able to introduce new software developments into a live environment in the knowledge they have been fully tested.

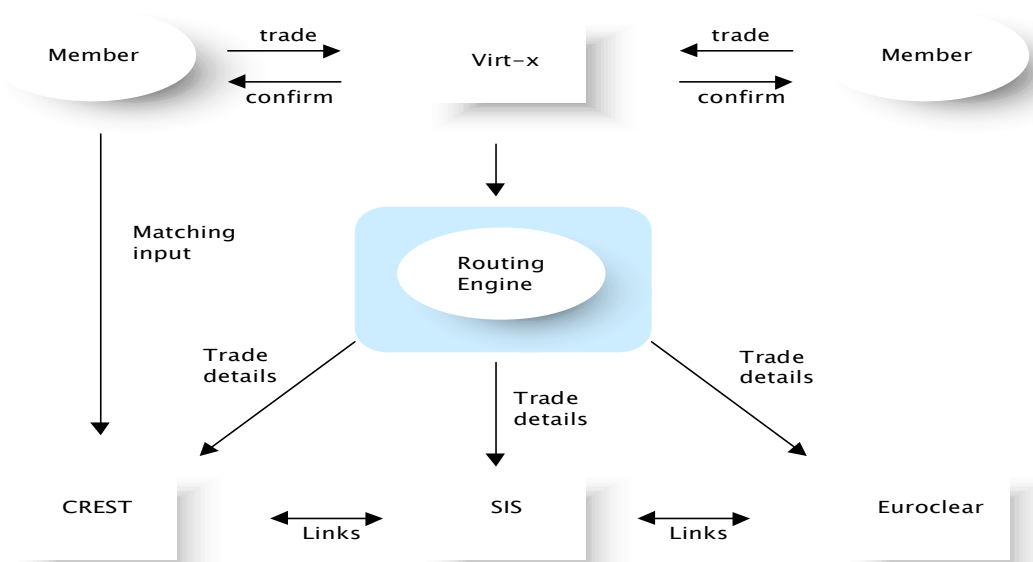
CREST operates real time settlement through out the course of a structured operational day. The daily timetable is available in electronic form from the CREST system, allowing members to plan their online settlement day with ease. Any changes to the daily timetable are automatically transmitted to members.

The CREST settlement model

CREST and SIS (the Settlement Network) have worked with Euroclear to provide a straight-through processing solution for all Virt-x trades in all supported currencies - euros, sterling, the Scandinavian kroner (Danish kroner, Norwegian kroner and Swedish krona) and Swiss francs following existing market practices in each CSD where possible.

Virt-x members can choose their settlement location and can, therefore, decide to centralise their European settlements through the CREST system if they wish.

Basic settlement model



Trading and settlement routing

The diagram above shows the basic settlement model. All trades on Virt-x will be confirmed back to the two members who have traded and the trade details will also be sent to the Virt-x routing engine. This routing engine will hold a table of Virt-x trading members and their chosen settlement system(s). Each Virt-x member will need to give standing instructions for settlement to Virt-x indicating the settlement system to be used for each security by country. Members will know who they have traded with and will know which participant ID to match against to effect settlement in CREST – this will be either be another CREST participant or the CSD participant representing SIS⁴ (message formats are the same in either instance).

⁴ In this model, Euroclear are treated as any other participant in either CREST or SIS.

Where the counterparty to the trade is in Euroclear and the security is a domestic CREST security, members should match against the Euroclear participant code in CREST (56XKK). Any other cross border settlement to either Euroclear or SIS requires matching against the SIS participant code in CREST (INSE).

Where settlement is between two CREST participants in euro or sterling, CREST members will match and settle directly with each other as if they were domestic trades – CREST will not require allegements from Virt-x for these transactions. In other scenarios the Virt-x routing mechanism will submit the trade details to CREST. The CREST member will only need to input a standard CREST delivery instruction (the DEL). This will match with the delivery instruction generated by CREST from the Virt-x feed containing the basic details of the transaction such as the identifier of the counterparty, the ISIN and the consideration.

Payments

CREST provides settlement in all currencies supported by Virt-x. Virt-x rules require that settlement in phase 1 will always be in the same currency as used in the transaction. There are restrictions on the currencies available for each security depending on its country of incorporation.

Sterling and Euro

For sterling and euro settlement, the existing CREST assured payments mechanism will be used by CREST members. This is the standard CREST CMA process which is supported by commercial bank money. The project to convert this to central bank money is well placed to be completed in November 2001.

Swiss Franc and Kroner settlement

With the benefit of our alliance with SIS, CREST is able to offer its members freedom of choice and the benefits derived from a competitive market place in providing payment facilities for these “non CREST” currencies. The solution allows CREST members the use of existing CREST interfaces to make payment in Swiss franc and Scandinavian kroner linked with standard services provided by correspondent banks. For most members intending to use Virt-x in phase 1, we anticipate this will allow you to build on an existing relationship with a correspondent bank

CREST members will require a relationship with a correspondent bank which has a direct account in SIC (for Swiss francs) or SECOM and is willing to “sponsor” the account as “Gottibank” (godfather). Under this arrangement, the correspondent bank facilitates the provision of credit facilities. Members are free to negotiate their required credit limit with their supplier and the principles and the daily operational process are similar to those for CREST CMAs. CREST members use their standard CREST interface for the management of settlement but there will not be any entries in the CREST CMA. Banking movements will be reported directly to members in accordance with the terms and service levels agreed with the chosen correspondent bank.

Swiss franc settlement uses exactly the same mechanism used since our link with SIS first went live in September 1999. In summary, on settlement day, CREST sends an instruction to SIS; this generates a resource check by SECOM. Where your counterparty is also a CREST member, the instruction will be for cash only. Where your counterparty is either an SIS or Euroclear member, the instruction will relate to stock and cash. In either case, the movement of stock and payment of cash are linked; the resource check is similar to that undertaken in CREST and settlement only occurs when there is both sufficient cash (or credit) and stock. Cash movements for Swiss francs can be in either central bank money (via SIC) or commercial bank money (via collateralised accounts in SECOM).

A similar approach is used for **Scandinavian kroner** settlement except that payment is only possible via commercial bank money. Here again the process is started by an instruction from CREST on intended settlement day. Where your counterparty is a CREST member this is a cash only instruction; it will be a cash and stock instruction in all other scenarios. Where your counterparty is a member of SIS, the process is exactly the same as for Swiss franc settlement but there is a technical difference where the CREST member is buying stock and your counterparty is a Euroclear member. After successfully completing the resource check and reserving sufficient credit, SIS instruct Euroclear to move stock. The movement of stock and cash remain linked and settlement only occurs when there is both sufficient credit and stock.

In all situations, and against all currencies, confirmation of settlement is provided by the appropriate system in real time. CREST members are able to monitor settlement by using their standard CREST interface regardless of the actual location of DvP.

In developing this payment solution, we have sought to ensure that CREST members benefit from being able to choose services from competitive credit providers and are not obliged to use a single supplier. Members will appreciate that CREST is unable to recommend the services of one bank against another and that the level of service will depend on the commercial relationship they have with their correspondent bank.

Stamp duty

CREST offers its members a full suite of functionality to enable members to discharge their obligations in regards to both UK SDRT and Irish stamp duty. The full range of exemptions and reliefs available under the terms of the UK stamp legislation (including intermediary and stock lending reliefs) can be applied through the CREST system. CREST also reports all transactions in stampable securities to the relevant tax authority, thus automatically discharging members' reporting obligations.

Transaction reporting

We believe Virt-x are due to publish their transaction reporting requirements in due course, but CREST has the full range of functionality to cater for their requirements. For transaction reporting to Virt-x, the "Trade System of Origin" field should be set to "T" – this is the value formerly applied to trades struck

on the Tradepoint exchange. As Tradepoint is now part of the Virt-x exchange, this will minimise changes for members. In due course, the value “T” will be redefined in the technical documentation to mean Virt-x.

Delivery and receipt of securities to and from home CSDs

The settlement solution for Virt-x is most efficient where stock is held at one of the core CSDs but it is recognised that some transactions will require the movement of stock to or from home markets.

As part of the package of international services that CREST provides to its members, effective mechanisms for delivering and receiving securities to and from CSDs outside the core Virt-x settlement locations are in place. Such transfers require the traditional delivery and receipt of stock cross border. These free of payment transfers are competitively priced; full details are contained on the CREST website (www.crestco.co.uk) and are outlined at the back of this document.

Members will understand that such transfers may take longer in view of the additional process involved. Some links are electronic and have facilities that support straight through processing whilst others require manual intervention; many transfers involve the physical movement of stock from one home market custodian to another. For this reason there are specific time requirements for each market to have a realistic chance of achieving timely settlement and the following table provides indicative last times for the delivery of instructions to CREST. As with domestic activity CREST is unable to guarantee settlement even where these time targets are met.

Indicative Schedule

Market	CREST DFP deadline (CET time)
Austria	S, 1 .30 p.m.
Belgium	S, 9:30 a.m.
Denmark	S-1, 1:30 p.m.
Finland	S-2, 2:30 p.m.
France	S, 10:00 a.m.
Germany	S-1, 2:30 p.m.
Greece	Not available
Ireland	S, 3:3 0 p.m.
Italy	S-1, 11:30 a.m.
The Netherlands	S , 1:30p.m.
Norway	S-1, 10:30 a.m.
Portugal	S-1, 3:00 p.m.
Spain	S-1, 12:30 p.m.
Sweden	S-1, 11:00 a.m.
Switzerland	S, 3:30 p.m.

Market	CREST DFP deadline (CET time)
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United Kingdom	S, 3:30 p.m.
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S = settlement day

The CREST custody service

Custody service

CREST offers all members a wide variety of custody support services for corporate actions, dividend payments and claims, with competitive deadlines for optional events for domestic and international securities. The services do differ – for example, for international securities we provide notification of events where stock is held in the name of CREST International Nominees, whereas securities for domestic markets are registered in the name or nominee name of the member who receives information about the event directly from the issuers' agent.

The notification service involves advice of the corporate action after announcement and as soon as possible after the information is advised to CREST by the Issuer CSD (usually within 24 hours); this is via the standard 'Corporate Action Details' screen – KCAP. CREST does not distribute offer documents or other publications regarding international securities to CREST participants.

The main points of this relatively new service are listed below and full details are contained in the CREST International Service Description (www.crestco.co.uk/international/int_serv_index.html).

- Mandatory cash only distributions (dividends, interest payments and compulsory redemptions).

All mandatory cash corporate actions are carried out in the same way and follow much the same mechanisms as for domestic distributions, with the exception that cash is distributed through CREST where it is possible to do so. Where the distribution is paid in a non CREST- settleable currency (e.g. Swiss francs or Scandinavian kroner) and members have a bank account available in that currency, it is paid direct to that bank account. Where the member has a CMA in CREST for the currency in which the distribution is paid, it is paid to the member through CREST in that currency. In other cases the distribution will be paid in the nominated default payment currency or, if none has been set up, in the first CMA available in alphabetical order.

- Mandatory stock only distributions (subdivisions, consolidations, capitalisations, pari passu, enfranchisements, schemes of arrangement and renominations).

All mandatory stock corporate actions are carried out in the same way and follow much the same mechanisms as for domestic distributions. In many ways mandatory stock only distributions are simpler than cash distributions as all stock will be distributed through CREST, assuming the stock is CREST-eligible. CREST should receive the stock into their account at the relevant CSD on value date.

- Voluntary and optional actions.

Voluntary and optional actions cover events that are both mandatory but have options (e.g. a scrip dividend) and voluntary (e.g. an annual conversion). Raising the event follows the same process as mandatory events; CREST is informed by the Issuer CSD with regard to events in securities where CREST has a holding. If cash is needed for the acceptance (a call payment for example) and the

currency is CREST-settleable, payment should be made through CREST. If the currency is not CREST settleable, payment needs to be made to a bank account specified by CREST.

Claims

Claims are raised on appropriate corporate actions (e.g. a dividend) on overseas securities. Where the claim is between two CREST members, the usual claim processing occurs. However, processing is more complicated where one party to the claim is another CSD. CREST generates non-settling claims for notification purposes. The procedures for actually debiting or crediting the benefit due depend on whether the CREST member is the debit or credit party. Essentially, CREST will credit your account with stock or cash in the instance of a credit claim, or remove stock or cash in the instance of a debit claim.

Members should also be aware that while CREST will always generate claims in the currency of distribution, it is possible for members to elect to receive the actual distribution in a different currency.

Transformations

The XDL transaction is included within Automatic Transformation processing. Where overseas securities are involved, CREST will be informed of the corporate action details by the Issuer CSD and will load them into CREST.

Tax services

CREST offers a comprehensive tax service including a range of reclaim services. CREST is at an advanced stage in the delivery of a tax relief at source service (RAS) for members in circumstances where it is appropriate.

Currently CREST offers a choice of services to recover excess withholding tax that has been applied on overseas dividends. The three services (as outlined below) have been available since September 2000. In each case CREST can forward the tax reclaim forms to the tax authorities and upon receipt of the tax refunds pay the distribution to the applicant.

- Full service for Withholding Tax reclaims (available where the applicant is the ultimate and sole beneficial owner). CREST will automatically prepare tax reclaim forms on the basis of the information provided and the foreign dividends received.
- Partial service level 2 for Withholding Tax reclaims (applicable for nominee member accounts, where not all beneficial owners wish to pursue tax reclaims).
- Partial service level 3 for Withholding Tax reclaims (available where the applicant does not require the tax forms to be prepared by CRESTCo, but requires CRESTCo to submit all completed documentation directly to the tax authority and to monitor all progress up to recovery of the reclaimed amount).

New members

Virt-x is likely to generate interest from firms who are not existing members of Tradepoint or SWX. CREST has a very open membership structure and welcomes participation from individuals and corporates located within the European economic area.

Full details about how to join CRESTCo and contact names are contained on the Joining CREST section on the CREST website (www.crestco.co.uk).

The CREST tariff

The full CREST tariff is available from the CREST website (www.crestco.co.uk).

Transaction tariff (as it applies to Virt-x)

All deliveries of Virt-x securities between CREST members will be subject to CRESTCo's low domestic tariff. The following tariff is applicable where the security is held in one of the core CSDs.

Counter Parties	Currency	Tariff	Sterling amount
CREST <-> CREST	GB or euro	1 TU	GBP 0.20 – 0.55
CREST <-> CREST	Other currencies	1 TU	GBP 0.20 – 0.55
CREST <-> Euroclear	GB / IE ISINs	1 TU	GBP 0.20 – 0.55
CREST <-> SIS	All securities and currencies	5 TU	GBP 1.00 – 2.75
CREST <-> Euroclear	Non GB / IE ISINs – all currencies	5 TU	GBP 1.00 – 2.75

Custody tariff

The custody charge is a flat rate charge calculated in basis points (1bp = 0.01%)

European market	Custody rate (bp s) per annum
Austria	3.00
Belgium	2.50
Denmark	2.00
Finland	4.50
France	2.00
Germany	1.50
Greece	23.00
Italy	1.50
Luxembourg	3.00
The Netherlands	2.00
Norway	2.00
Portugal	9.50
Spain	3.00
Sweden	1.75
Switzerland	1.00

Delivery and receipt of securities to and from home CSDs

European market	CREST tariff	Minimum tariff	Maximum tariff
Austria	£15+ 5TU	£16.00	£17.75
Belgium	£15+ 5TU	£16.00	£17.75
Denmark	£12+ 5TU	£13.00	£14.75
Finland	£15+ 5TU	£16.00	£17.75
France	£15 + 5TU	£16.00	£17.75
Germany	£6 + 5TU	£7.00	£8.75
Greece	Not available due to local market conditions		
Italy	£15 + 5TU	£16.00	£17.75
Luxembourg	£12 + 5TU	£13.00	£14.75
The Netherlands	£9 + 5TU	£10.00	£11.75
Norway	£15 + 5TU	£16.00	£17.75
Portugal	£15 + 5TU	£16.00	£17.75
Spain	£15 + 5TU	£16.00	£17.75
Sweden	£12 + 5TU	£13.00	£14.75

Contacts

Questions on CREST's services for Virt-x should be directed to **Rob Fair** on +44 20 7849 0115 or e-mail robert.fair@crestco.co.uk, or **Dick Newman** on +44 20 7849 0036 or e-mail dick.newman@crestco.co.uk.

Questions about CREST membership should be directed to **Bradley Lewis** on +44 20 7849 0074 or e-mail bradley.lewis@crestco.co.uk.

A comprehensive selection of publications on CRESTCo's international services is available from the website at www.crestco.co.uk/international/index.html.