EFET ELECTRONIC SETTLEMENT MATCHING

VERSION 3.2 ~~1~~

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1 About this Document

1.1 Revision History

Version	Date	Changes	Author of changes
0.1a	December 2007	First draft	eSM Task Force
0.1i	December 08	Working draft, amendments following PwG Meeting 7	eSM PwG / LEAP Settlement Group
0.1l	November 18	Working draft, amendments following Settlements Matching WG Meeting 4	eSM WG
0.1m	January 19	Working draft, amendments following final version of CpML document and Settlements Matching WG Conf call	eSM WG
0.1n	February 19	Final draft for validation	eSM WG
1.0	February 19	Final version	eSM WG
2.0	August 2019	Working draft	eSM WG
2.1	September 2019	Final Version	eSM WG
2.2	July 2020	Final Version	eSM WG
2.2.1	November 2020	Final Version	eSM WG
2.2.2	January 2021	Final version	eSM WG
3.0.0	August 2021	Final Version	eSM WG
3.1	October 2022	Final Version	eSM WG
3.2	March 2023	Final Version	eSM WG

1.2 Purpose and Scope

This document describes the EFET Electronic Settlement Process (eSM Process).

1.3 Target Audience

This document is for business analysts and IT professionals in commodity trading who want to provide standardized trade information in the CpML format for invoicing and settlement processes as imposed by master agreements.

For example, this can be:

- Software engineers and data architects who implement CpML interfaces
- Business analysts who develop process interfaces

The following knowledge is assumed:

- Familiarity with the terms and processes used in the commodity trading industry
- Know-how regarding the structure and functionality of XML schemas

- Some knowledge of the applicable invoicing and settlement processes and market practices

1.4 Additional Information

This section lists web sites or documents with additional information related to the eSM Process.

Reference document	Document Name	Document Version.Release	Document Publishing Date
[1]	EFET electronic Confirmation Matching Standards	4.0.1	October 2011
[2]	EFET_CpML_for_eSM	V0.9	December 2018
[3]	EFET_CpML_for_eSM	V1.0	May 2019
[4]	EFET_CpML_for_eSM	V2.0	September 2019
[5]	EFET_CpML_for_eSM	V2.0.7	January 2021
[6]	EFET_CpML_for_eSM	V3.0.0	August 2021
[7]	EFET_CpML_for_eSM	V3.1	October 2022
[8]	EFET_CpML_for_eSM	V3.2	April 2023

1.5 Conventions

1.5.1 Use of Modal Verbs

For compliance with the eCM and eRR Process and standardisation approaches, implementers need to be able to distinguish between mandatory requirements, recommendations and permissions, as well as possibilities and capabilities. This is supported by the following rules for using modal verbs.

The key words "must", "must not", "required", "should", "should not", "recommended", "may" and "optional" in this document are to be interpreted as follows:

Key word	Description
Must	Indicates an absolute requirement. Requirements must be followed strictly to conform to the standard. Deviations are not allowed. Alternative expression: shall, required, is mandatory
Must not	Indicates an absolute prohibition. This phrase means that the provision must not be used in any implementation of the standard. Alternative expression: must be omitted
Should	Indicates a recommendation. Among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others. There may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course. Alternative expression: recommended

Key word	Description
May	Indicates a permission. This word means that an item is truly optional within the limits of CpML. One data supplier may choose to include the item because a particular transaction requires it or because the data supplier feels that it enhances the document while another data supplier may omit the same item. Alternative expression: optional
Should not	This phrase means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label. Alternative expression: "not recommended"

1.5.2 Typographical Conventions

This documentation uses the following typographical conventions:

- 'DocumentID': Single quotation marks are used to indicate field names in XML schemas.

- "True": Double quotation marks are used to indicate field values in XML schemas.

- ESMDocument/ProcessInformation: Slashes indicate paths or nested nodes within XML schemas.

- LineItemsIncluded: Field names and values as well as attributes are consistently written with camel case spelling, as in the XML schemas. There are no spaces between words and each new word starts with an uppercase letter.

2 Executive Summary

2.1 The Need for EFET Standards

2.1.1 Problem Definition

Communication is an essential key to the successful integration of business processes. Successful communication requires that the communicating parties **speak the same language.** This fact is as important in electronic communication as it is in face to face communication.

As volumes increase in energy trading, business transactions are occurring more rapidly, and trading volumes are growing, traditional means of communication like phone and fax are necessarily being replaced as a core communication medium, by automated electronic communication.

Increasingly energy trading companies are looking towards the integration of internal and external business processes, with the eventual aim of straight-through processing. This is to enhance process efficiency, as well as to reduce operational risk, both of which reduce overall transaction costs.

The energy trading industry does not have in use widely accepted cross-process electronic communication standards. Like the financial industry there are some standards for specific parts of the industry, but the fragmentation is arguably even higher in the energy trading industry. Currently each service provider (exchanges, broker platforms, clearing houses, matching services, etc.) and each software vendor use their own proprietary "standard", requiring implementation of a different interface and cumbersome translation for each of these "standards". This results in a costly and risky "spaghetti" network of interfaces.

To solve the business process integration problem, common electronic communication standards (a common language) must be established within the energy industry and adopted within individual organisations. The messages and processes that need standardisation in the Energy Trading industry include Trade Invoicing and Settlements, Clearing and Margining, Scheduling and Logistics, etc.

By standardising the exchange of this information and the corresponding processes both internally and externally, companies could reduce costs and streamline business processes. Standardisation has to be driven by the industry itself and coordinated by an accepted industry wide neutral body.

2.1.2 The Solution: EFET Standards

EFET is an industry wide neutral body that can coordinate the creation and maintenance of industry standards. EFET project workgroups comprising members from the Business Process Optimization Committee, Back Office Group and IT Taskforce are specifically responsible for defining the **EFET Standards** for electronic exchange of information.

The EFET standards will define the structure of the electronic messages, as well as how these electronic messages are exchanged. The EFET standards apply to all electronic messages exchanged in the energy trading environment, and therefore can be considered a general standard.

These standards will also define the **reference codes (vocabulary of the language, as expressed in CpML ®)** to be used for commonly used data within these electronic messages. This includes the unique codes identifying the different trading parties, and the reference codes for energy specific characteristics such as market, commodity, etc. These reference codes could also be used in paper and fax communications.

EFET Standards should be, where possible, appropriate and effective, technology agnostic. Recent evolution has opened possibilities to apply several technologies to one standard process and there is a high likelihood and expectation that different technologies will (have) to cooperate in order to have an industry wide spread application of new standards. This standard document will therefore aim at not discriminating any technology but will strive at providing enough clarity, definitions and implementation guidance to ensure that different technology implantation of this standard can successfully co-operate.

2.2 The eSM initiative

2.2.1 eSM as a Proof of Concept or Pilot

EFET has decided on a prioritised approach to the development of standards covering the various business processes to facilitate rapid deployment of the systems and infrastructure required to implement working services. The eSM Project Workgroup has been tasked with focusing on one part of the overall information exchange, building on the standardisation work for centralised and peer-to-peer communication carried out by the electronic Confirmation Matching (eCM) project workgroup. Developing standards for a specific business process rather than attempting to cover all process simultaneously, will enable the production of measurable benefits throughout the overall standardisation process. The settlements process has grown substantially over time whilst still relying a non-standardised process. It was therefore a logical energy trading industry priority to focus on for the standardisation bodies within EFET.

The business process concerning the exchange and comparison (matching) of electronic documents that describe counterparty Settlement data will be referred to as eSM, which stands for "electronic Settlement Matching".

As a first step, **the eSM process itself has been clearly defined and agreed**. The workflow has been established defining how two trading parties will interact to compare their Settlement data together with the message flows and message structure definitions needed, to support this process.

These **EFET eSM standards consist of the definition of the exact message flow, message content and message structure, and matching criteria and rules** for the information exchanged during an eSM process.

2.2.2 EFET Compliant eSM Processes

The **eSM Project Workgroup** has structured the eSM process on a bilateral or peer-to-peer style of interaction building on the approach developed for electronic Confirmation Matching (eCM). The style of interaction involves a buyer and a seller, as participants in the SM process, regardless of the process running in peer-to-peer, centralised or distributed ledger environment. The eSM process description is furthermore agnostic of the technical implementation layer so that future implementations can be built on various technologies

whilst still respecting the eSM standard and thus guaranteeing interoperability between implementations.

2.2.3 The EFET eSM Standards

The EFET eSM standards consist of the definition of the message flow, message content and message structure, and matching criteria and rules, for the information exchanged during an eSM process.

The structure of the eSM messages, and – to some extent – the content of the messages, will, where possible, reuse similar elements developed for other EFET messages that have already been defined in other EFET standards. The applied data definitions and technical specifications, as laid down in CpML ® will be reused where possible and applicable. The EFET eCM and eRR standards (and CpML ® reference documentation) will therefore act as an important foundation and the eSM standards continue to demonstrate EFET's strategic aim of developing global standards covering the complete business requirements of traders.

Disclaimer: *This standard will not overrule other documents (e.g. EFET Master Agreement). Results of this standards may have influence on the next version on these documents.*

Next Steps

In each subsequent phase, the general EFET Standards will be extended to support further scope expansions and further business processes, including describing the standard interface between processes (see other EFET Standards).

The general EFET Standards will be extended to support each specific process and to describe it in greater detail (see other EFET Standards) once agreement has been reached upon the standardization of the process itself.

Service and/or system providers will be encouraged to comply with these standards. Companies will thus be able to achieve integration with these different service providers and/or systems without having to develop and maintain a different interface for each. Interoperability will be guaranteed, even with implementation over different technologies.

When the eSM project has been fully implemented, it is the intention to focus on other projects to stimulate electronic exchange of data, e.g. for nomination, scheduling, clearing, and other processes to make energy trading more efficient.

EFET will cooperate with other organisations and stimulate harmonisation and standardisation to increase electronic exchange of data in the European Energy industry.

2.3 High-Level Principles

The following fundamentals were agreed as input into the standardisation of the eSM process:

- Follow the existing invoice definition according to accounting principles (e.g. GAAP), without imposing the use of the EFET eSM CpML document as the legal Invoice.
- Follow predefined aggregation keys (lowest defined common denominator, even if leading to a higher volume of invoices, also eg separating negative price invoices).

- Invoices and netting documents are not connected technically (invoices can be matched without being on a netting statement, invoices can be on a netting statement without having gone through an eSM matching process).
- An invoice can have all line items associated with it, or none. Only if both parties submit those line items, will they match.
- Invoices will not have any embedded netting. So an invoice will be all sells or all buys (physical) or all positive or all negative (financial). Negative priced trades will form separate invoices.
- Physical and financial settlement will follow the same process. It will be for each company to determine how they reflect the financial 'invoices' in their accounting processes and systems.

2.4 Conclusions

Communication is an essential key to the successful integration of business processes. To solve the business process integration problem, common electronic communication standards (a common language) must be established within the energy industry and adopted within individual organisations.

EFET has selected the Settlement matching process as another area for standardisation building on the work of the eCM and eRR project and extending the coverage of EFETs standards into another process area. This project is called the eSM ("Electronic Settlement Matching") project and is driven by the need for the Back Office to improve the quality of Settlement data and related processes (mainly the invoicing process) within counterparty organisations for the overall benefit of each company and the broader industry.

It is expected that further standardisation work will be done to facilitate the electronic exchange of data to further increase efficiency in the European Energy Industry.

2.5 New in this version

2.5.1 Version 3.2

Description of changes:

- Updated reference to CpML V3.1
- Clarification: Price for financial invoices is always positive or zero because a differential has no negative unit price.
- Field 'TransactionType' becomes optional.
- Clarification: Cash-settled options on exercise are treated as fees. The original option premium is also invoiced as a fee, see section 4.4.16 "Clarification: Cash-settled options on exercise"
- Clarification: Line items with a value of 0 are invoiced with 'NatureOfPrice' = "PositiveOrZero". The tie-breaker rule determines which counterparty issues the official invoice with a 0 amount and which counterparty issues the shadow invoice with a 0 amount. This rule is based on using the SSDID ASCII order and allocates the 0 amount to the invoice of the counterparty that comes first (in ascending order). For more information, see section 4.4.14, "Tie Breaker Rule for Financially Settled Invoice Line Items with Zero Sum".

- ~~Amendment clarification: Official invoice documents cannot be amended. They must be canceled and reissued. Shadow documents may be amended.~~
- ~~Clarification: Tolerance matching for interoperability implies using the same tolerance by both parties. The value shall be nominated by the users of the service providers.For more information, see Appendix B. "Matching Tolerances by Currency".~~
- ~~Introduction of rounding rules in section 4.4.12, "Overall usage of rounding principles".~~
- ~~Fixed typos.~~
- ~~IndexName': No index name for fees or premiums.~~
- ~~Schema update for eSM documents: missing value 'PHYS_FEE' added to 'ESMTransactionType'.~~
- ~~Match Refusal document: Business rule for 'MatchResult' updated: Allowed values include 'Match'.~~
- ~~Clarification: One VAT rate applicable per invoice, line items do no longer mention VAT rate (and always represent the same VAT rate as the invoice)~~
- ~~Clarification: Use Invoice instead of Credit Note for negative prices transactions (see section 4.4, "Best practice guidelines for implementation of eSM".~~
- ~~Clarification: If a deal falls outside of the standard full (or within) month ie last week of April and first week of May- currently, it would split the invoicing into two. One invoice/payment for the week of April and one for the first week in May~~
- ~~For a fixed swap the convention is to represent the fixed leg always as leg 1.~~
- Updated CpML schema V3.2 and CpML Specification V3.2 to add new field 'BranchInformation' to 'Customer' section for invoices and netting statements. No change to eSM Standard.
- Added section 4.4.17, "Clarification: SSDSID and VAT": The SSDSID construction needs to be based on static data that is not linked to the invoice data or invoice line item details.
- Amended section 4.4.10, "Usage of Signs": i) Shadow Invoice/Purchase Order (instead of Credit Note) need to be used for negative prices transactions from the "(commodity) seller's perspective" and Invoice from the "(commodity) buyer's perspective".

3 Overview

3.1 Roles and Responsibilities in Standardisation

The EFET Board oversee all the activities undertaken or sponsored by EFET (www.efet.org). Responsibility for coordination of Back Office activities has been delegated to the BPOC and the Back-Office Group. Project Workgroups, such as the eSM Project Workgroup, carry out specific activities on behalf of EFET. The eSM Project Workgroup is sponsored by the EFET Board, controlled by the BO Group and comprises specialist personnel from both the Back Office and IT business areas.
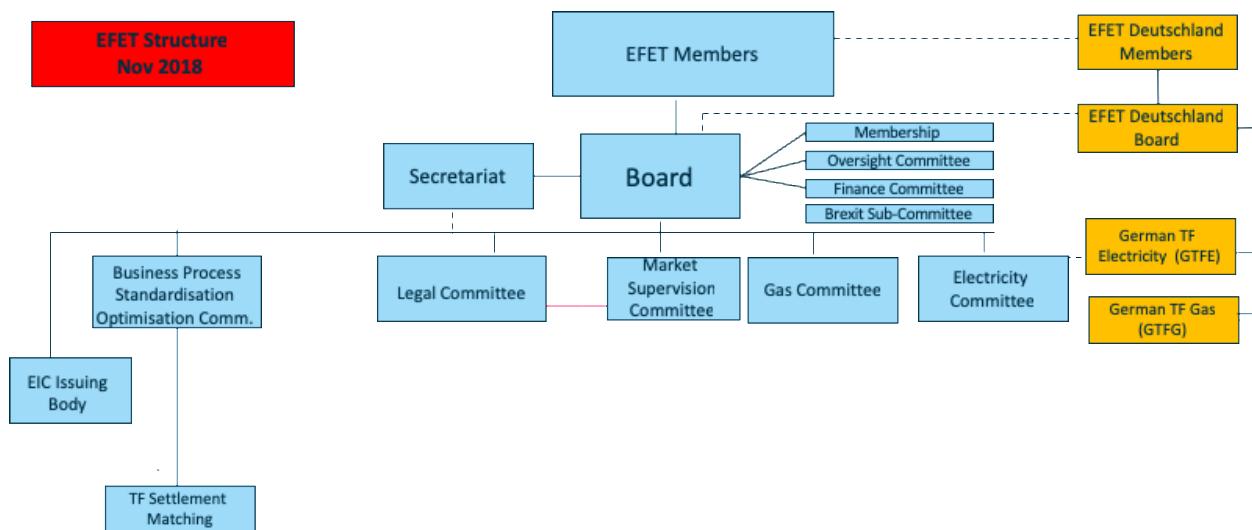
Figure 1: Organisation of the EFET working groups

3.2 Version Control

The EFET standards documentation for electronic confirmation matching comprises a single document with chapters and sections.

- The single document shall be a release item under control of the joint EFET Back Office Group on behalf of the EFET Board with major versioning, that is, 1.0, 2.0, 3.0…

- Each chapter shall be a configuration item within the single document controlled by either the eSM Project Workgroup and audited via the Revision History between major releases leading to intermediate versioning, that is, 1.1, 1.2, 1.3 (Also release version with change bars).

> **Note:** *Draft versions are signified by using a letter: 1.1a*

The related XML Schemas are expected to be backward compatible within the same version. I.e., an eSM implementation that is able to process Settlement Matching documents in version 3, release 3 is also able to process version 3, release 2 and version 3, release 1 – but not, e.g., version 2, release 3.

Extensions to the EFET XML Schema within the same version can only add optional elements or attributes or reduce the number of values in enumerations. Each EFET eSM Process implementation should therefore be able to process earlier releases within the same version.

Should different versions be supported (since individual counterparties may update their systems at different times), dedicated implementations should handle version-specific eSM protocols.

XML schemas will be documented by CpML®.

4 Current Processes and Business Requirements

4.1 Current Business Processes

The Settlement process is well understood but difficult to automate due to a lack of standardisation between market participants in how they implement their back-office settlement-specific processes. Although commodity settlement terms are well defined and highly standardised due to the comparatively small number of commodity master agreements under which the majority of deals are executed and settled, discrepancies inevitably exist between the content and layout of the actual invoices and statements that are produced by each organisation as part of the settlement process. There is, for instance, no standard for grouping transaction line-items on to the same settlement documents, this leads to complexity in matching and checking details when each counterparty's documentation can vary. Furthermore, perceived and regional differences in tax treatment, between physical and financial products has further complicated the situation and led to a divergence in the way these products are settled causing the additional overhead of operating two parallel processes, one for physical and one for financial product settlement. As a consequence, any automation for a settlement process is currently highly inefficient and ineffective.

4.1.1 Physical Product Settlement

Physical transactions are settled using invoices with the optional use of netting statements. Current (paper) invoices comprise a summary section including counterparty and banking information and tax related data as well as the aggregated total sum due to be paid by the customer to the supplier. Multiple line items, which must add up to the aggregate total in the summary section, are often included and identify the amount due under this invoice for each specific sale (trade). Invoice documents are issued by the supplier to the customer (according to the standard settlement process, see below for self-billing as an exception); the customer checks the invoice and approves or disputes it. The invoice checking process is 'asymmetric' with the inherent responsibility for issuing the invoice and collecting the money due under the contract falling to the supplier and the responsibility for validating and accepting the invoice falling to the customer who, on acceptance, must pay the sum specified. Invoices are official documents and must comply with tax and accounting rules. Paper versions are typically issued whereby the invoice number must follow appropriate rules defined by the authorities in the supplier and customer's location. Tax treatment of all sums in the appropriate currency (including conversion rates where applicable) or a legal statement identifying any relevant tax exemptions must be included. Invoices are important to tax authorities and to customers as they are both the basis for the collection of tax revenues and required documentary evidence for reclaimed tax. As such the invoices cannot be amended or cancelled only fully or partially reversed by issue of a credit note for all or part of the originally invoiced sum. Invoices with the same payment date are checked and passed to treasury ahead of the payment date so that the cash transfer can be organised with the customer's bank.

Netting of invoiced sums allows counterparties to optimise their cash usage. However, netting is less prevalent with physical products than with financial products, due in part to the relative lack of impetus towards implementing netting provided by underlying master agreements. Netting does occur however, especially if a specific netting agreement has been negotiated between the parties involved, but this leads to a degree of non-

standardisation in scope of physical product netting as agreements are negotiated bilaterally and can include netting across types of instrument, delivery locations, commodities, master agreements and possibly currencies. Netting statements aggregate cash-in and cash-out invoices, which fall within scope, on to one document with the summary including the counterparty and banking information, net settlement amount and net receiver. Since purchases and sales are combined both counterparties produce netting statements which are cross checked before settlement is agreed: the netting process is 'symmetric' involving full disclosure to and from both counterparties. The payment date is defined by the netting agreement which may be the same as the payment date for the invoices included or may be a specifically agreed netting payment date, typically earlier than the payment date for some or all of the underlying invoices.

The entire netting process is included in the scope of eSM.

The main sources of error in the current settlement process for physical products relate either to 'upstream' errors related to selection of the scope of deals to be settled by the invoice, the recording of the commercial terms of the deal or to errors or discrepancies introduced during the settlement process itself. Of the latter type the main sources of error are: tax treatments which can be complicated and vary depend on your location, measured amounts relating to the actual amount of delivered commodity and finally procedural errors such as rounding, or calculation methods employed by the supplier to calculate the invoice and by the customer to validate it.

A key flaw in the current process is that it is asymmetric: invoices are checked only by the customer against their records and not by the supplier against the customer's view of what they expected to pay. This implies that invoices containing errors leading to overpayments by the customer will be disputed whilst underpayments may go uncontested as they favour the customer who is conducting the checks, that is, there is an inherent downside operational risk for the supplier within the current process for physical settlement. Conversely the process of resolving disputes in invoices is somewhat simplified over that with netting statements because the invoice is the sole basis for agreement whereas in netting there are two documents of equal standing: in a dispute which is the correct document to which both counterparties should agree?

4.1.2 Financial Product Settlement

Netting is standard practice within the financial settlement process and is well supported by the major master agreements, such as ISDA, avoiding the non-standard nature of bespoke agreements. The current process of financial product settlement therefore focuses the use of 'statements' which, unlike invoices combine cash in and cash out for each underlying transaction on a single document specifying the net sum to be transferred without the need of a separate netting document. Statements contain summary data specifying counterparty and banking information, the net sum to be transferred and the recipient of the cash. Multiple line items, which must add up to the aggregate total in the summary section, are often included identifying the amount due for each individual transaction relevant for settlement on the payment date. The process is 'symmetric', responsibility is equally shared; although one counterparty is typically assigned to be the 'calculation agent', in practice both counterparties issue statements to one another and validate each other's documents against their own. Both statement documents are equally valid, there is no 'leading' document that can be agreed to in case of a discrepancy, instead agreement is achieved when statements from both counterparties match precisely or to within a tolerance, this means that any discrepancies must be reconciled by iterative amendment to

within the limit of the tolerance, if tolerances are accepted. Once agreed, the statement is passed to treasury for the transfer to be made by the net payer. Statements are not subject to legal or accounting rules, they are simply bilateral documents exchanged between the counterparties for the purpose of agreeing the settlement amount and can be freely amended. Financial settlement currently neglects to include any tax treatment. The absence of a standardised approach to addressing tax compliance, therefore, represents a flaw in the current process.

Although discrepancies are often caused by 'upstream' errors relating to the terms of the deal, such as the value of the notional amount in each period, there is also much room for introduced errors affecting the calculation of the settlement amounts. The major source of discrepancies tends to be rounding, either of the pricing sources themselves or due to differences in the calculation methods: how and at which point rounding is applied to the calculation. As well as rounding issues, collection of the underlying prices can be a source of error if counterparties are observing different holiday schedules etc. Being a 'symmetric' process, errors leading to both over and underpayments are detectable and may lead to the payee correcting cash-in line items in the case that they have undercharged for a transaction that the payer was correctly expecting to pay more for. However, resolution of discrepancies is more ambiguous than in the physical process simply because there is no single document that states what the payee was expecting to receive under the contract and which the payer can accept. The natural responsibility of the payee to specify and collect the sums due is combined with the requirement to specify what they believe they should pay as well. Under these circumstances, resolution of a discrepancy becomes more of an iterative adjustment resulting in a final compromise acceptable to both counterparties, which can be a complicated and time-consuming activity when large amounts of pricing data are involved.

Financial settlements are included in the of scope of eSM.

4.1.3 Summary

Although there are differences in the way physical and financial products are currently settled, there is also a high degree of similarity and purpose across the current processes. Furthermore, both processes have certain strengths which might be combined. The financial process supports and even requires matching between counterparties, whereas the physical process does not, as a result errors in the invoice leading to undercharging by the supplier can currently go unnoticed exposing the supplier to the risk of lost revenue. The physical process, on the other hand, separates cash-in from cash-out allowing counterparties to agree on the 'supplier's' document in case of a dispute, whereas in the financial process this basis for agreement is lost since both counterparties' statement documents are of equivalent status. The physical process also provides a basis for more formal tax treatment should this be required as it cannot be guaranteed in all regions and tax regimes that financial products do not and/or will not require any tax treatment to be expressly stated.

The current settlement process is, therefore, a strong candidate for standardisation as a high degree of benefit can be derived from a comparatively small degree of change to current practice. Most benefit would be derived from developing a single process common to physical and financial products with a single set of settlement documents that can be used internationally to settle a wide range of products and which combines the strengths of each of the current approaches. A single global process will result in increased efficiency and reduced operational risk due to simplification of the overall settlement process, reduced training requirements and more flexibility in staffing. Furthermore, the process must be able

not just to check settlement data but to replace the use of paper for the purpose of settlement since the greatest degree of benefit is achieved by moving to fully electronic settlement based on an automated matching process.

4.2 Benefits of electronic Settlement Matching

The effect and benefits of settlement matching are wide ranging and relate to the following responsibilities of the Back Office within a trading organisation:

- Operational risk reduction
- Business process improvement
- Efficiency and scalability
- Increased level of automation
- Cash flow improvement (i.e. through increased usage of netting)

Currently, settlement is a manual task that is time and effort consuming, prone to error and inefficient, especially when identifying discrepancies between two documents which refer to a different set of underlying transactions. Two separate processes currently exist for settlement of financial and physical deals introducing operational complexity and risk. The lack of compatibility between documents from different counterparties is due to a lack of general agreement between trading organisations classifying which transactions are to be grouped together, and with what granularity of detail, on a settlement document. Availability of standardised settlement documents and a single defined process for managing physical and financial settlement across multiple markets will positively impact each of the areas identified.

Table 1: Benefits of eSM

Area	Impact
Reduction of operational risk	A single global process for physical and financial settlement will reduce complexity and diversity in the settlement process and therefore scope for operational risk.
	Mistakes in the current settlement process can cause financial losses. The use of "expected invoices" in matching reduces the likelihood of a 'lost invoice', undercharging and consequential financial impacts including interest and late payments, whilst providing a single basis for agreement when resolving discrepancies.
	Security of transfer of information is improved through standardisation and automation, improvements include:
	• Sending to correct c/p
	• Reduced threat of reputational risk
	• Reduced threat of loss of business
	• 'Lost' invoices sent to wrong c/p
Business process improvement	A single global process for physical and financial settlement will permit better benchmarking of performance across regional teams.
	Increased standardisation allows for increased straight through processing, use of benchmarking, centralisation of reference data and reduction in training as well as reduction in media breaks and so operational risks. Specific examples include:
	• Standing Settlement Instructions (SSI): improved transparency and access to accurate invoicing data if maintained centrally as

Area	Impact
	part of the deployment of a service based on eSM. This will not be part of eSM Phase 1 but is foreseen within the data-models applied. • Industry wide knowledge and shared understanding of the settlement process across organisations leading to fewer errors (i.e. rounding) and faster issue resolution • Centralised contact information and collaborative working support.
Efficiency and scalability	Work will be moved from checking to exception handling increasing productivity. Savings include: • Tax people: time spent resolving complex tax issues often late in the process when remedial work required to correct a problem is higher • Settlement staff: time spent by staff manually checking counterparty invoices • Settlement staff: time spent by staff manually checking broker fee invoices • Scope of products and markets covered: Back Office processes are already capable of supporting new markets and products reducing the delay or risk of entering new markets • Scalability will allow the Back Office to offer an improved service to the Front Office • # of counterparties: the benefit in adopting a standardised process depends on the number of counterparties and brokers live with that process; in the case of eSM swift deployment should be possible based on size of the existing eCM and eRR communities. • Increased volumes can be managed without the need to recruit additional staff saving recruitment costs, training, management time and salaries. • A single global process for physical and financial settlement will deliver further benefits: • Training: all staff can be trained in just one process • Flexibility: staff can support each other and move more easily within the team • Scalability: resource can be better optimised over one common process as work load varies
Increased level of automation	Implementation of a standard electronic settlement matching process will lead to the automated exchange of all invoice documents in scope, including the matching of all invoice details and lien items upto the lowest level of granularity and scope of line items fields available. This will lead to a better focus on issues which will be identified more precisely by the eSM process.
Cash flow improvement	Netting frees up cash, creating value for the business. Cash improvements should result from wider adoption of netting and usage of EFET Payment Netting calendar. Automated settlements open opportunities for earlier settlements hence have a potential positive impact on liquidity and treasury costs.

Area	Impact
	Standardisation of the invoicing process should allow for integration of other supporting data, such as 'Transport 4' tickets in the Colonial Pipeline, speeding up the settlement and payment process.

4.3 Requirements of electronic Settlement Matching

The aim of the EFET eSM Project Workgroup has been to define a "standard electronic settlement matching process" that delivers benefits including those identified in Section 4.24.2, "Benefits of electronic Settlement Matching", and which may be used as an automated alternative to the paper based settlement process currently in use within the energy/commodity trading sector and which is compliant with regional (i.e. EU) and local (i.e. country, state) tax and accounting rules.

To achieve this aim, the eSM Standard has defined:

- Standard invoice documents and netting statements containing the data that is exchanged between two parties
- A standard process for detecting and locating discrepancies within the exchanged documents
- Best practice guidance, including matching frequency, methods of rounding etc., that counterparties should adhere to when they adopt the eSM process

Note that technical and security issues are addressed within the EFET eCM standards [1].

4.3.1 Invoice document requirements

The following data requirements are defined for the eSM business documents:

- Invoice documents: including invoices and credit notes that reverse invoices
- Invoices will be matched for all products defined within the scope of eCM v4.1, including:
    o physical forwards
    o index physical forwards
    o fixed/floating swaps
    o floating/floating swaps
    o options on physical forwards
    o options on swaps (fixed/float and float/float)
    o options on indexes
    o and fee broker invoices.
    Indexes will include simple commodity references and baskets.
- Commodities within scope are:
    o Electricity (physical)
    o Gas (physical)
    o Emissions (physical and financial)
    o Oil (financial products only)
    o Coal (financial products only)

- o Freight (financial products only)
- o Time Charter (financial products only)
- o Metals (financial products only)
- o Agriculturals (financial products only)
- Markets within scope are:
  - o European (trading zone)
  - o North American (financial products only)
  - o Asian (financial products only)
- The granularity of the data exchanged and matched will be at:
  - o Summary: the aggregated invoiced amount including 'invoice static data'
  - o Detail: the individual line item amounts (transactions) that comprise the Summary
- Invoice data will be sorted into separate 'actual' (Official invoice document issuer) and 'expected' (Shadow invoice document issuer) invoice documents, comprising the same set of individual line items for the same set of underlying transactions. The following sorting criteria must be used to ensure that each counterparty generates compatible invoice documents that contain the same transaction data which can then be meaningfully matched:
  - o Counterparty
  - o Invoice Type (e.g. Physical, Financial etc.)
  - o Floating/Fixed price products
  - o Master Agreement (e.g. ISDA, EFET etc.)
  - o Payment Date
  - o Currency
  - o Commodity
  - o PriceType indicator (PositiveandZeroPrices/NegativePrices)
  - o Invoicing Period Start and End Date (for physical products but not for financial products)
  - o Unit of Measure (for physical products but not for financial products)
  - o Delivery Location (for physical products except emissions but not for financial products)
- The key financial data used for matching within each invoice will include:
  - o Counterparty details
  - o Volumes (for physical products but not for financial products)
  - o Price Data
  - o Amounts (net and gross of tax as applicable)
  - o Tax Information and Amounts (if relevant under the prevailing tax laws and where counterparties are subject to the same local or regional tax jurisdiction)
  - o Foreign Exchange (if relevant)

4.3.2 Netting statement requirements

The following data requirements are defined for the eSM business documents:

- Netting statement documents: including netting statement documents that reverse netting statements

- Netting statements will be matched for all invoices as defined in the eSM Standard v2 referring to the products defined within the scope of eCM v4.1, including:
  - physical forwards
  - index physical forwards
  - fixed/floating swaps
  - floating/floating swaps
  - options on physical forwards
  - options on swaps (fixed/float and float/float)
  - options on indexes
  - and fee broker invoices.

  Indexes will include simple commodity references and baskets.

- Commodities within scope are:
  - Electricity (physical)
  - Gas (physical)
  - Emissions (physical and financial) (now in scope for eSM Phase 1)
  - Oil (financial products only)
  - Coal (financial products only)
  - Freight (financial products only)
  - Time Charter (financial products only)
  - Metals (financial products only)
  - Agriculturals (financial products only)

- Markets within scope are:
  - European (trading zone)
  - North American (financial products only)
  - Asian (financial products only)

- The granularity of the data exchanged and matched will be at:
  - Summary: the aggregated netting statement amount including 'netting statement static data'
  - Detail: the individual line item amounts (invoices) that comprise the Summary

- Netting statement data will be sorted into separate 'actual' (both parties acts as Official netting statement document issuer) netting statement documents, comprising the same set of individual line items for the same set of underlying invoices. The following sorting criteria must be used to ensure that each counterparty generates compatible netting statement documents that contain the same transaction data which can then be meaningfully matched:
  - Counterparty

- o Invoice Type (e.g. Physical, Financial etc.)
- o Floating/Fixed price products
- o Master Agreement (e.g. ISDA, EFET etc.)
- o Payment Date
- o Currency
- o Commodity
- o PriceType indicator (PositiveandZeroPrices/NegativePrices)
- o Invoicing Period Start and End Date (for physical products but not for financial products)
- o Unit of Measure (for physical products but not for financial products)
- o Delivery Location (for physical products except for emissions but not for financial products)

- The key financial data used for matching within each netting statement will include:
  - o Counterparty details
  - o Volumes (for physical products but not for financial products)
  - o Price Data
  - o Amounts (net and gross of tax as applicable)

4.3.3 Process requirements

The following process requirements are defined for eSM based on the data requirements defined previously:

- The eSM dialogue will focus on the first of two distinct phases combining the benefits and addressing the needs of both physical and financial product settlement within a single process:
  - o Invoice Matching: both physical and financial products must be subject to an initial matching phase using separate cash-in/cash-out 'invoice' documents to detect and remedy discrepancies in transaction level line items, aggregated summary purchase and sales amounts and related payment and (where relevant) tax data.
  - o Netting statement matching. Following the invoice matching process, an optional netting process can be initiated using separate cash-in/cash-out 'netting statement' documents to detect and remedy discrepancies in invoice level line items, aggregated summary netting statement amounts and related payment. This netting process can be initiated as well without an eSM invoicing process as precursor.

- Invoice data will be matched at Summary and at the Detail level, upon availability to the process, so that any compensating errors in the detail will be detected.

- Invoice matching will include an optional tolerance amount defined per currency for both the Summary and Detail data, see Appendix B. ~~Appendix B.~~ , "Matching Tolerances by Currency~~Matching Tolerances by Currency~~".

- Netting statement data will be matched at Summary and at the Detail level, upon availability to the process, so that any compensating errors in ~~the~~ detail will be detected.

- Netting statement matching will not include an optional tolerance amount.

Note: Best practices, based on the actual use of the eSM standard should reduce the tolerance permitted by the standard over time. Please see Section 4.44.4, "Best practice guidelines for implementation of eSM".

- The Payee will initiate the match for invoices (and for netting statements), except for self-billing processes
- Full e-Invoices issued by a counterparty cannot be amended but can be reversed under accounting rules applying to Invoices ("Full Credit Notes"-approach used)
- The eSM process will be using documents that are having a full valid accounting and tax scope and can be determined as such by each user, at whatever point in the eSM process
- Full e-Netting Statements issued by a counterparty cannot be amended but can only be fully reversed

4.4   Best practice guidelines for implementation of eSM

The following best practice guidelines regarding business procedures are considered as mandatory for compliant implementation of the eSM process within an organisation. Failure to comply with these guidelines will lead to failures of the eSM process due to external issues such as late delivery of invoice documents to counterparties or mismatches due to rounding errors within settlement calculations etc.

4.4.1 Settlement Process Deadlines

The eSM process will be triggered by the arrival of documents for matching. Invoice and, where applicable, netting statement documents must be submitted in a timely fashion, taking into account dependencies external to the eSM process such as Treasury execution times and processing of other related documentation. The eSM process may therefore be initiated as frequently as necessary to complete the settlement process for each transaction type within scope. The mandatory requirements of this standard for receipt of documents to match are as follows.

Invoices not Subject to Netting

Invoice documents not subject to netting should be submitted for matching by the deadline specified in the master agreement under which the deal was transacted and n**o later than 1 Business Days prior to the 'Actual Payment Date' specified in the document**. Current proposal for intermediate deadlines:

- Close of business on the Invoice Final Submission Date is the deadline by which invoice and 'expected' invoice documents should already have been submitted for matching, it is the Business Day prior to the Invoice Match Completion Date, this is to allow for matching and any necessary remedial action to be completed no later than close of business on the Invoice Match Completion Date
- Close of business on the Invoice Match Completion Date is the deadline for resolving any issues preventing matching of all invoices and 'expected' invoices submitted to the process prior to, and on, the Invoice Final Submission Date, it is the same Business Day as the 'Actual Payment Date' specified in the invoice, still allowing time for Treasury to complete the funds transfer for all invoiced amounts successfully matched by close of business on the Actual Payment Date

- If invoice documents are submitted, either new or as a correction (after full cancellation) to a document previously submitted to the process, after close of business on the Invoice Final Submission Date and Invoice Matching Completion Date, then those documents will be rejected from the process.

- Reversal Invoices will not be rejected after Invoice Matching Completion date if they refer to an invoice that is unmatched (i.e. Mismatched, Pending or Error) after Matching Completion date.

- If the Invoice Matching Completion Date deadline is missed by one or both invoice documents, whereby they remain unmatched (i.e. Mismatched, Pending or Error) and whereby both parties have agreed before to perform invoice matching (cfr process static data), must be either:

  o Processed as Final invoice whereby the Buyer (Payee, or Payer in case of self-billing) has opted for not sending in an eSM document for matching

  o Removed from the process by submitting a Reversal document for the Invoice with the original Actual Payment date and by submitting a new Invoice Document with the agreed new Actual Payment date (in case of full invoices).

  o Cancelled and re-issued with amendment of the original Invoice, in which the original payment date is replaced by the new agreed Actual Payment date; or by a cancelation of the original invoice and a resubmission of a new invoice with the new agreed Actual Payment date (in case of pro-forma invoices).

Note: The Payer's time zone is the time zone in which the deadlines are measured since it is the Payer that must make the cash transfer.

Netting Statements and Invoices Subject to Netting

Netting statements and invoice documents that are subject to netting should be submitted for matching by the deadline specified in the netting agreement and no later than 1 Business Days prior to the 'Actual Netting Payment Date' specified within the documents. All invoices in the process which have been referenced by a netting statement don't have to be matched by an eSM invoice matching process prior to the submission of the netting statement. (no, we can net without matching the invoice), To avoid a potential delay to the submission of netting statements – within the payment date settings imposed by the relevant Master Agreement or Netting Agreement, it is recommended that all implementations are capable of processing documents on intra-day timescales shows the intermediate deadlines:

- Close of business on the Netting Final Submission Date is the deadline by which invoices and 'expected' invoices should have been matched and netting statements should have been submitted for matching, it is the Business Day prior to the Netting Match Completion Date, this is to allow for matching and any necessary remedial action, including the correction of invoices and the netting statements themselves, to be completed no later than close of business on the Netting Match Completion Date

- Close of business on the Netting Match Completion Date is the deadline for resolving any issues preventing matching of all netting statements, and thereby invoices and 'expected' invoices referenced by the netting statement, submitted to the process prior to and on, the Netting Final Submission Date, it is 1 Business Day prior to the 'Actual Netting Payment Date' specified in the netting statement, allowing time for Treasury to complete the funds transfer

- If netting statements and/or invoice documents are submitted, either new or as a correction to a document previously submitted to the process, after close of business on the Netting Final Submission Date but before close of business on the Netting Matching Completion Date, then both parties are obliged to make all best efforts to ensure that matching is successfully completed by start of business on the Actual Netting Payment Date.

Note: This would require intra-day matching of invoices or at least corrections of previous invoices if a netting statement referencing match invoices is to be submitted subsequently and ahead of close of business.

- If netting statements and/or invoice documents are submitted after close of business on the Netting Matching Completion Date, then they will be rejected from the process. Reversal Invoices will not be rejected after Invoice Matching Completion date if they refer to an invoice that is unmatched (i.e. Mismatched, Pending or Error) after Netting Matching Completion date.

- If an invoice that is subject to netting is not included on a matched netting statement by the start of business on the Actual Netting Payment Date then it can either be

  o processed as an invoice not subject to netting since the matched netting statement cannot be further amended as the deadline for submitting amendments is passed. This will require that the invoice is removed (reversed in case of full invoices, or amended or cancelled in case of pro-forma invoices) and restated with the new Actual Payment Date and as not subject to netting.

  o processed as an invoice subject to netting with a new Actual Netting Payment Date. This will require that the invoice is removed (reversed in case of full invoices, or amended or cancelled in case of pro-forma invoices) and restated with the new agreed Actual Netting Payment Date and for a new netting statement to be submitted referencing the restated invoice once it is matched.

- If a netting statement is not matched by the start of business on the Actual Netting Payment Date, then

  o the matched invoices referenced on the netting statement must be processed as invoices not subject to netting (requiring that they are restated). This means that matched (matched, agreed matched or tolerance matched) invoices can be exceptionally reversed (in case of full invoices) or cancelled (in case of pro-forma invoices) and restated after Invoice Match Completion Date IF they are subject to netting and IF the Netting Statements on which they are referenced are NOT yet Matched by the start of the Actual Netting Payment Date.

  o a new Actual Netting Payment Date must be agreed and the Netting Statements must be resubmitted with the new Actual Netting Date. The choice should be made by the counterparty who did not cause the delay. In the latter case the Actual Netting Payment Date on the Netting Statement will be later than that on the matched invoices referenced by the Netting Statements.

Note: The Payer's time zone is the time zone in which the deadlines are measured since it is the Payer that must make the cash transfer.

4.4.2 Treatment of Rounding for Financial Products

This standard requires that all compliant organisations adopt the following approaches when calculating settlement amounts for financial products:

- Section 6.1 of the 2005 ISDA Commodity Definitions (Calculation of a Floating Amount) will be used in order to eliminate rounding differences caused by density conversion factors between Floating Prices with different Units of measure (e.g. metric tons vs. barrels/gallons)
- All indexes shall be rounded to a specified number of decimal places, as defined for each index identified in the Commodity Reference "Static Data" tables published and maintained in conjunction with this standard.
- The 'common method' or 'round up' algorithm will be used to calculate rounded values.
- The currency unit of measure MUST be specified.

Note: It is the aim of the work group to reduce the tolerance permitted by the standard, at least for financial instruments, over a target time period of 2 years, by which time organisations will be expected to have adopted these standard calculations and rounding guidelines.

4.4.3 Agreed Matching of Invoices

If an invoice and 'expected' invoice mismatch then the two counterparties are not permitted to manually agree a match between the two documents, and will continue the settlement process outside of the automated eSM process environment.

In case of a mismatch or a tolerance match, the eSM process will return a difference report identifying the differences between the Official invoice Document and Shadow Invoice Document ('expected' invoice). The difference report will identify the discrepancies between the 'Summary' sections of the two invoices, it will only identify individual discrepancies in the 'Detail' section if both Buyer and Seller have opted to send in the detailed sections.

4.4.4 Tolerance Matching of Invoices

The eSM Standard requires that a single central set of tolerances are defined by currency (for Netamount, VATAmount and GrossAmount) and maintained on a yearly basis to support matching of invoices sums that fall within the tolerance. Whilst tolerances are permitted by the standard they will be maintained and applied to the matching algorithm for invoices. The application of tolerances for Netting Statements is out of scope for eSM Phase 1. The application of tolerances to the matching of invoices will result in some invoices being matched even though the financial sums specified are not precisely equivalent.

By agreeing a tolerance match both counterparties are agreeing to accept the terms of the invoice issued by the Official Document Issuer (Payee), regardless of discrepancies with the 'expected' invoice issued by the Shadow Document Issuer (Payer). Tolerance matching must be an optional feature of the process and must only lead to a match if the Shadow Document Issuer has elected to accept tolerances.

The eSM process will return a difference report specifying the difference between the invoiced and expected sum. The difference report will identify the discrepancies between the sums in the 'Summary' sections of the two invoices; it will only identify individual discrepancies in the sums within the 'Detail' section if both Buyer and Seller have opted to send in the detailed sections and use them for detailed matching regardless of the matching of the invoice data.

Interoperability requires both parties to set an identical value for Tolerance Matching. It is up to the user communities to instruct their service providers applying that identical value going forward.

4.4.5 Treatment of Tax and Accounting Rules

As stated in Section 4.3~~4.3~~, "Requirements of electronic Settlement Matching", the treatment of e-invoices within the process should be compliant with tax and accounting rules on a local, regional and international basis; the following requirements are therefore defined for this standard:

1. To be compliant with the e-Invoicing requirements in each jurisdiction where it is deployed

2. To be compliant with the tax requirements in each jurisdiction where it is deployed

3. Not to validate tax information against legal requirements, but to permit:

    a. Matching of relevant tax information if either counterparty believes that the tax treatment should be included in matching

    b. The optional inclusion by counterparties, but not the matching, of tax information if neither counterparty believes that the tax treatment should compared

4. To permit tax only invoices relevant in the case of settlement of double taxation where a separate tax only amount is invoiced in addition to the normal deal invoice.

Given the possibility for users of the eSM process to apply the accounting status of an eSM document at their choice in or after the eSM process, the above-mentioned requirements are included in the eSM specifications but do not enforce the accounting applicability.

4.4.6 E-invoicing and Tax Laws Compliance by Region

This section specifies the relevant laws by region/locality and summarises the current state of compliance of this standard with the specified laws.

European Union (EU)

Article 2.2 of Directive 1999/93/EC specifies the use of "advanced electronic signature" for the purpose of e-invoicing where it is defined that:

> *"advanced electronic signature" means an electronic signature which meets the following requirements:*
>
> *(a) it is uniquely linked to the signatory;*
>
> *(b) it is capable of identifying the signatory;*
>
> *(c) it is created using means that the signatory can maintain under his sole control; and*
>
> *(d) it is linked to the data to which it relates in such a manner that any subsequent change of the data is detectable."*

The eSM process is fully compliant with the requirement of "advanced electronic signature" as this standard re-uses the communications requirements specified for other EFET processes (see Chapter 7~~7~~, "eSM State Processing").

Article 233 (2) of EC TAX Directive 2006/112/EC states that:

> *"Member States may also ask for the advanced electronic signature to be based on a <u>qualified certificate</u> and created by a secure-signature-creation device, within the meaning of points (6) and (10) of Article 2 of Directive 1999/93/EC"*

and

> *"Member States may also, subject to conditions which they lay down, require that an <u>additional summary document</u> on paper be sent."*

The eSM process is also compliant with these optional additional criteria introduced by the TAX Directive in addition to the basic e-invoicing Directive 1999/93/EC insofar as they affect implementation of the process: to be compliant implementation of the process within the EU is likely to require:

1. a *"secure-signature-creation device"* such as card readers and pin numbers

2. a set of reports on data within the eSM process compliant with the various local format requirements for *"<u>summary documents"</u>*

United States (US) (not in scope of eSM Phase 1 nor 2)

No specific requirements for e-invoices or tax compliant invoices have been identified which affect the scope of this standard for the US.

Other Localities

- Switzerland: covered by requirements specified for the EU
- Norway: covered by requirements specified for the EU
- Canada: no specific requirements for e-invoices or tax compliant invoices have been identified which affect the scope of this standard for Canada
- Japan: no specific requirements for e-invoices or tax compliant invoices have been identified which affect the scope of this standard for Japan
- Singapore: no specific requirements for e-invoices or tax compliant invoices have been identified which affect the scope of this standard for Singapore.

4.4.7 Processing of 'Alleged' Settlement Documents

It is foreseen that implementation of the eSM process will include the ability to generate settlement documents received from the counterparty to avoid the case where the eSM process, and consequently payment, is delayed by the Payer should they be unable to generate the 'expected' document and to facilitate 'click & return' manual approval.

4.4.8 Ordering of invoice Line Items

In order to have a performant matching engines and algorithms, it has been decided to adopt a standard way of ordering line items at invoice level.

The following order sequence keys have to be applied:

1. TradeDate
2. DeliveryStartDate
3. DeliveryEndDate

This sequence should not block the algorithm to find other random matching candidates but aims at optimizing the computing time of the matching process.

4.4.9 Ordering of Netting Statement Line Items

In order to have a performant matching engines and algorithms, it has been decided to adopt a standard way of ordering line items at netting statement level

The following order sequence key has to be applied:

1. InvoiceDate

This sequence should not block the algorithm to find other random matching candidates but aims at optimizing the computing time of the matching process.

4.4.10 Usage of Signs

In order to be able to determine at all times and within all process steps of eSM who is the Payor and who is the Payee, the following practices have been agreed for using signs in values and volumes:

The standard requires all eSM data volumes and values to be positive, this paragraph details how to use the standard in order to ensure matching will operate with all signs being positive.

a)   If a trade is for zero value it should still be included on an invoice.

b)   Physical trades that have happened at negative prices will be invoiced by the payee even though they have received the energy.

c)   Zero value physical value trades will be invoiced by the seller. For financial deals, zero value trades will be invoiced by the fixed price holder.

d)   Invoices are issued by the Payee, the Payee is recognised by being the "OfficialDocumentIssuer".

e)   Shadow Invoices are issued by the Payor, the Payor is recognised by being the "ShadowDocumentIssuer".

f)   In the case of Self Billing, both invoice and shadow must be produced by the Trader who undertakes the self-billing. The Trader would produce their invoice or shadow from them as normal (with SELFBILLING = FALSE) but also produce their counterparties invoice or shadow as if it were raised by the counterpart and apply SELFBILLING=TRUE. The matching engines will operate matching as usual.

g)   Regarding netting, again all values will be positive. At the line item level (a line item represents an invoice), the payor completes the "SupplierInvoiceID" field but leaves "CustomerInvoiceID" blank. The payee completes those fields in the opposite manner. If a line item (therefore invoice) is zero, the counterparty with the name highest in the alphabet will be the payee and the other counterparty the payor.

h) All values fields of type 'UnsignedPriceType' ('TotalAmount', 'VATAmount', 'VATAmount-Domestic', 'Price'), will be used with positive values. The sign or direction can be derived from other fields specifying the invoice, line item or netting statement.

i) ~~Invoice (instead of Credit Note) need to be used for negative prices transactions~~Shadow Invoice/Purchase Order (instead of Credit Note) need to be used for negative prices transactions from the "(commodity) seller's perspective" and Invoice from the "(commodity) buyer's perspective".

Case	Selfbill	Buyer/Seller Perspective for commodities	<PhysicalOr Financial>	<NatureOfPrice>	Supplier	Customer	SenderRole	SupplierInvoiceID	CustomerInvoiceID	Payee/Payor	sign Prize	sign on Volumes	sign on Amounts
1	No	Seller	Physical	PositiveOrZero	x		Official DocumentIssuer	x		Payee	positive	positive	positive
2	No	Buyer	Physical	PositiveOrZero		x	ShadowDocumentIssuer		x	Payor	positive	positive	positive
3	No	Seller	Physical	Negative	x		ShadowDocumentIssuer	x		Payor	negative	positive	positive
4	No	Buyer	Physical	Negative		x	Official DocumentIssuer		x	Payee	negative	positive	positive
5	No	Seller	Financial	PositiveOrZero	x		Official DocumentIssuer	x		Payee	positive	positive	positive
6	No	Buyer	Financial	PositiveOrZero		x	ShadowDocumentIssuer		x	Payor	positive	positive	positive
7	Yes	Seller	Physical	PositiveOrZero	x		Official DocumentIssuer (sent by Sell Biller)	x		Payee	positive	positive	positive
8	Yes	Buyer	Physical	PositiveOrZero		x	ShadowDocumentIssuer (sent by Sell Biller)		x	Payor	positive	positive	positive
9	Yes	Seller	Physical	Negative	x		ShadowDocumentIssuer (sent by Sell Biller)	x		Payor	negative	positive	positive
10	Yes	Buyer	Physical	Negative		x	Official DocumentIssuer (sent by Sell Biller)		x	Payee	negative	positive	positive

Figure 2: Usage of signs

4.4.11 Use of Supplier Invoice ID and Customer Invoice ID at Line-Item Levels in Netting Statements

There is up to this version (eSM 2.0) of the eSM Standard no enforced link between the invoicing and the netting process, amongst others to ensure that netting statement line items can be included in the process even if they have not gone through eSM or are out of scope of the current eSM invoicing process.

This implies that the payor/payee rules to identify the 'SupplierInvoiceID' and 'Customer-InvoiceID' cannot be inherited within the netting statement from the invoicing process. It is however the purpose for each user of the eSM netting process, to submit the 'SupplierInvoiceID' or 'CustomerInvoiceID' according to the same principles as if the same user would apply the eSM invoicing process to those netting statement line items.

So, regardless of the sender role on netting statement level, the sender shall determine for each netting statement line item separately whether they are the payor or payee, based on the processing of the fields 'SenderRole' and 'Selfbilling' that would apply if the corresponding invoice were submitted individually to the eSM process.

The line item matching process for netting statements will ensure that each matching pair of line items has one and only one 'SupplierInvoiceID' and one and only one 'CustomerInvoiceID'.

4.4.12 Overall Usage of Rounding Principles

The following rounding rules are applied:

1. Trades traded in major currencies other than GBP to be rounded to 4 decimal places.

2. Trades traded in GBP to be rounded to 5 decimal places. This extra decimal place ensures that trades done in Pence to 3 decimal places are fully recognised.

3. In the case of a calculation of a compound price, the calculation is done using the quoted price in full with no roundings.

4. There will be no trailing zeros.

5. .5 will round up and .4 will round down. Half way from zero rounding applies. For example, -23.5 is rounded to -24 and 23.5 is rounded to 24.

4.4.13 Financially Settled Invoice Line Items

When financial trades are invoiced, the official invoice document must be raised by the party receiving the cash for each line item (underlying trade) in that settlement period. The role of Supplier and Customer in the eSM invoicing process for finanical trade invoices is not fixed by the terms of the underlying trade as it is in the case of a physical trade invoices,

since no physical delivery is made and the differential between the two legs of the underlying trade can change from settlement period to settlement period, depending on the relative values of the two legs of the underlying swap trade.

Consequently, all line item amounts on the invoice will be positive (or zero) amounts from the perspective of the cash reviever and finaincal trade invoices can only be for positively (or zero) priced line item amounts.

4.4.14 Tie Breaker Rule for Financially Settled Invoice Line Items with Zero Sum

If either or both parties to a financial trade calculate at settlement that the net cash flow between them is zero, the principle set out in section 4.4.13, "Financially Settled Invoice Line Items" cannot be applied on its own. The difference of the amounts between the two legs in this settlement period is zero, therefore there is no 'direction' of the cash flow and the question "Who is charging who a zero amount and who is paying it?" cannot be answered.

In this scenario, eSM determines that alphanumeric sorting must be applied and the `SupplierSSDSID' then is the lesser party code of the two parties to the trade.

Example: "DE123456789_23X--160112-S--Q" is less than "DE129876543_10X1001A1001A264"

Correspondingly, the 'CustomerSSDSID' is the greater party code of the two parties to the trade.

A consequence of applying this tie breaker rule is that line items with zero value are always allocated to the official invoice document by the party with the lesser SSDID code and the other party will always allocate zero value line items to the shadow invoice document.

Line items with a value of 0 are invoiced with 'NatureOfPrice' = "PositiveOrZero".

4.4.15 Clarification eSM for Transactions Covering Multiple Invoice Periods

If a deal falls outside of the standard full (or within) month ie last week of Month M and first week of Month M+1May- it needs to be covered by 2 invoices. One invoice/payment for the week of Month M (as part of the monthly incvocing cycle for Month M) and one for the first week in Month M+1 (as part of the monthly invoicing cycle of Month M+1). The exact same logic applies regardless of the invoicing frequency.

4.4.16 Clarification: Cash-settled options on exercise

Cash-settled options on exercise are treated as fees. The original option premium is also invoiced as fee.

4.4.17 Clarification: SSDSID and VAT

The SSDSID construction needs to be based on static data that is not linked to the invoice data or invoice line item details.

This has no impact on the naming convention that remains the same: An SSDSID combines a VAT ID with an EIC code, separated by an underscore (Example: GB684966762_21X000000001022V).

It is therefore required to remove any business rule or implementation functionality that checks whether the VAT ID that is part of the SSDSID matches the VAT in the invoice data.

5 Electronic Business Processes – Overview

5.1 Introduction

5.1.1 Overview

eSM is an electronic document based process for the settlement of physical and financial wholesale energy and commodity transactions that is designed to address the flaws in the current settlement processes identified in section 4.1~~4.1~~, "Current Business Processes" and deliver the benefits of automation identified in Section 4.2~~4.2~~, "Benefits of electronic Settlement Matching". The process makes use of electronic settlement documents, which can replace the paper equivalent for tax and audit purposes, to facilitate automated matching, with or without applying tolerances. The content and treatment of each electronic settlement document within the process has been specified with the intention of being compliant with regional and local tax and accounting rules, where appropriate, permitting eSM to be deployed as a fully paperless process on an international basis. However, the process may also be operated in parallel with an existing paper-based process to gain the benefits of electronic matching whilst retaining the status of the paper documents, perhaps during a period of cut-over to fully paperless operation; the electronic documents contain explicit statements concerning their tax status relevant to the mode of deployment as 'full' or 'pro-forma' documents. Finally, a paper-equivalent input can be based on successful eSM matched documents.

The scope of the eSM business process includes the following functionality:

- Matching of invoice documents containing transaction level line items
- Matching of netting statements containing invoice summary level line items (out of scope of eSM Phase 1)
- Detection and identification of discrepancies between Payee (Supplier) and Payer (Customer) versions of these document types
- Subsequent cancellation, or, in the case of invoices, optional manual agreement of the documents.

The eSM process is designed to support netted and un-netted settlement. The process therefore comprises separate but related dialogues for matching Payee with Payer versions of the two types of business document: invoices and netting statements.

The eSM process can be started by the Official Document Issuer or the Shadow Document Issuer, not later than 1 business day prior to the payment date as stipulated by the Master Agreement governing the transactions in scope of the eSM process.

Official Invoice Document and Shadow Documents start their process lifecycle as 'Unmatched', prior to any matching algorithm.

Final statuses for eSM documents are:

- Matched
- Matched with Tolerance
- Mismatched (Timed-Out)
- Unmatched (Timed-Out)
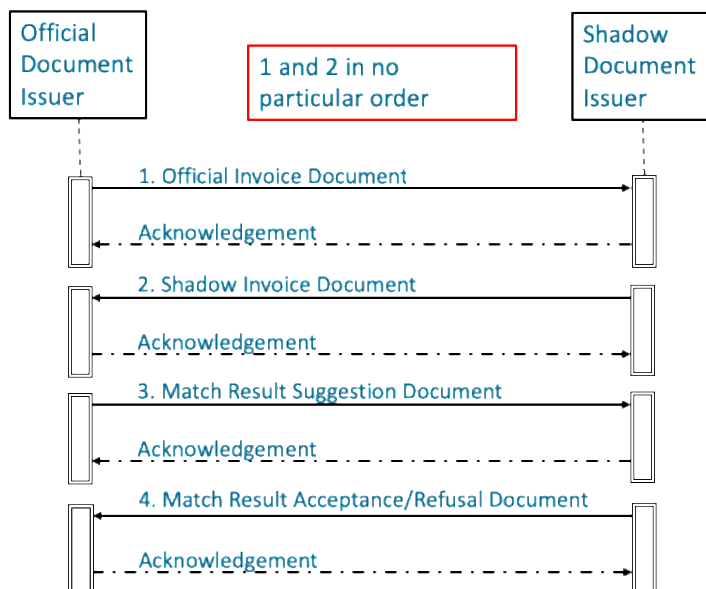
5.1.2 Invoice Matching Dialogue

Figure 3: Invoice Matching Dialogue

Figure 3: Invoice Matching Dialogue~~Figure 3: Invoice Matching Dialogue~~ shows that the Official Document Issuer, who receives payment, and the Shadow Document Issuer, who makes payment, exchange official invoice document and shadow invoice documents ('expected' invoice documents).

These documents are compared independently by both counterparties and through a subsequent exchange of Match Result Suggestion and Match Result Acceptance messages, a mutually agreed and fully audited result is reached: that the Official invoice document and Shadow invoice document ('expected' invoice) either match (full or tolerance) or mismatch. The automatic process requires the process to trigger the dialogue (or exchange of status results) and propose a result based on the availability of the Shadow invoice document ('expected invoice') as submitted by the Official Document Issuer (Payee), either a match or mismatch, which the Shadow Document Issuer (Payer) will independently verify responding with an official acceptance if they agree or with a refusal if they disagree. A full audit trail is created proving that each counterparty has checked and agreed to the result should there be any subsequent dispute.

The Shadow invoice document ('expected') represents the Payer's view of the Payee's invoice (Official Invoice Document) that they expect to receive, it is effectively a replica of the actual invoice document not a credit note for the same sum; it is constructed in such a way that it contains all financial and fiscal information as present of an Official Invoice Document without it having that official status to avoid any implication that the Payer has assumed responsibility for the issuing of invoices. As identified above, the accounting status of the esM document can be freely chosen by the users of the process (timing and sequence at the start, during or after the eSM process).

For matching of the invoice and 'expected' invoice documents to be possible, both counterparties must share a common view of what information should be included on the Official invoice document and 'expected' invoice documents. For more information on the specification of standard invoice documents and netting statements see Chapter 6~~6~~, "Electronic Business Processes – by Document Types" and the CpML® documentation for electronic Settlement Matching. The standard invoice document format contains information known as the "Aggregation Keys" which specify the scope and content of the document,

comprising fields such as payment date etc. An invoice and an 'expected' invoice with the same "Aggregation Keys" will have the same scope and include the same set of detailed transactions: those that share the same payment date, etc. The "Aggregation Keys" are used to identify a candidate matching pair of invoice and Shadow invoice document ('expected' invoice) documents which contain the same set of detailed line items and should match, pairs of these documents are compared by the Official document Issuer (Payee) and the Shadow Document Issuer (Payer) within the invoice matching dialogue and any discrepancies detected. The use of detailed line-item documents is a process-specific setting. Users of the eSM process have the choice of supplying this detailed dataset or not, and they can choose to apply matching at line-item level as default or only if the invoice documents mismatch. If the two documents are found to contain discrepancies, then the counterparties can either correct the discrepancies to achieve a match or they may choose to retain the 'Mismatch' status and sort out the issues outside of the automated eSM process.

The mechanism for correcting discrepancies to achieve a match is standardised: all documents issued (Official Invoice Documents and Shadow Invoice Documents) are treated by the process as being subject to accounting rules and must be reversed with a full cancellation note, a new document with a new unique invoice number may be issued in place of the erroneous original document.

If the Shadow Document Issuer (Payer) has chosen to permit the use of the defined tolerances during matching of financial fields (NetAmount, VAT and GrossAmount) then if the 'mismatch' is due only to discrepancies in the financial sums and these fall within the defined tolerance limits then the Match Result Suggestion message will be generated for a 'tolerance' match. The application of the tolerance, as specified by the Shadow Document issuer will lead to the acceptance of the Official Document Issuer GrossAmount and generate a Match Result Acceptance message for a tolerance match. Tolerance Matching rules and parameters will be treated in the Best Practice section of the eSM standard and will be updated during the lifecycle of the eSM standard its implementation.

And once matched, **if not subject to netting**, the documents may NOT be reversed, amended or cancelled up until nor after the Invoice Match Completion Date deadline.

The matching of line items happens if both parties have submitted them and does not influence the status of the Invoice Document matching process. Process information on line item matching is included as 'information' onto the Match Result documents.

Matched invoices which are **subject to netting** may be reversed up until the Netting Match Completion Date deadline. After the Netting Match Completion Date they can NOT be reversed, or cancelled anymore. There is one exception to this general rule: a matched invoice subject to netting may be reversed or amended even after the Netting Match Completion Date ONLY if the Netting Statement on which it is referenced is NOT yet Matched by the start of the Actual Netting Payment Date. (This will happen when a Netting Statement was not matched and when the counterparties decide to restate the referenced invoices with a new Actual Payment Date and as not subject to netting).

5.1.3 Netting Statement Matching Dialogue

All invoices matched in the Invoice Matching Dialogue that are subject to netting must be referenced on a netting statement submitted to the Netting Statement Matching Dialogue. Note that netting is mandatory for all financial invoices and for any physical invoices marked

as subject to netting, whereas physical invoices not subject to netting may not be referenced on a netting statement submitted to this dialogue.

The document flow is shown in Figure 4~~Figure 4~~. On submission to the process the netting statement is cross validated against the invoices to which it refers, if they have been previously submitted and are already 'known' to the process. The validation ensures that each invoice is subject to netting, is in a final matched state and that the financial sums on the netting statement correctly match the values on the matched invoices, so avoiding inconsistencies with the underlying invoices. The scope of a netting agreement is determined by the legal netting contract so there is not really a business rule to apply. Eligible in this case refers to the scope definition of the legal netting agreement signed by both counterparties. Invoices matched outside the eSM process can also be referenced on a netting statement to gain the benefits of netting, but such invoice references cannot be validated against the actual invoices since they are not 'known' to the process and are assumed to have been matched outside the scope of eSM.

The net Payee initiates the matching process and issues a Matching Result Suggestion to the net Payer who validates and accepts the result through the issue of a Matching Result Acceptance message or refuses it through issue of a Matching Result Refusal message. Netting statement candidate matching pairs are identified by the 'Netting Information' section; if this section in two documents contains the same values then the documents are understood to refer to the same netting 'scope' and the documents are matched since they should contain the same invoice summary data. As well as identifying netting statements for matching, the 'Netting Information' can also be used to associate matched netted invoices within the process which fall within the scope of the netting statement but which are not currently included.
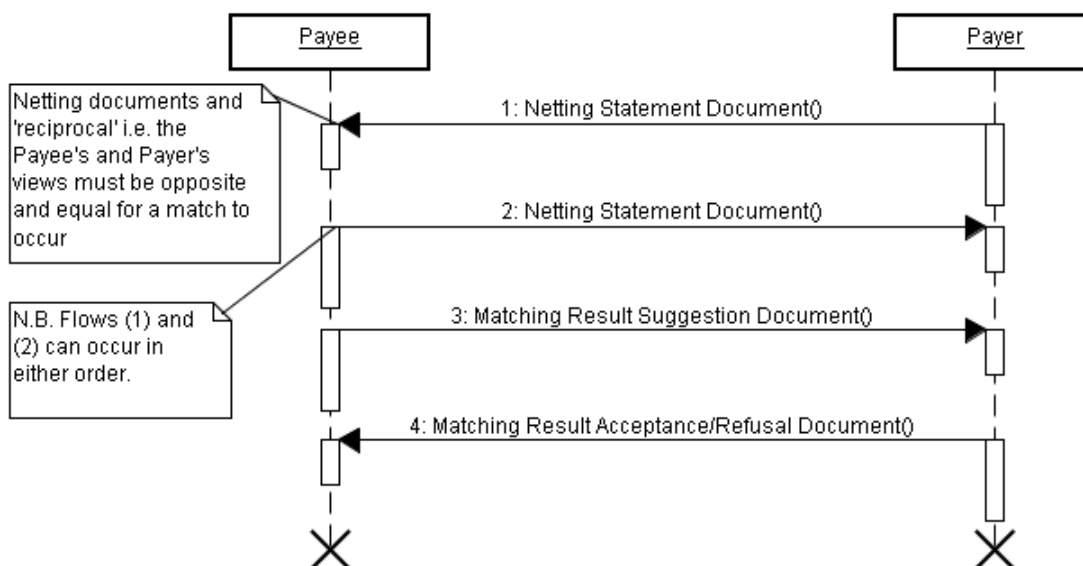
Figure 4: Netting Statement Matching Dialogue

Netting statements show the netting calculation from the independent perspective of each counterparty meaning that the Payer's sales must be matched with the Payee's purchases and vice versa. Since netting statements do not have the status of invoices for accounting or tax purposes they may be amended to resolve discrepancies.

Since invoices not known to the process may be included in a netting statement, a netting statement referencing invoices, none of which are known to the process can be submitted

for matching since the Netting Statement Matching dialogue is independent of the Invoice Matching dialogue although it is required for any invoices subject to netting.

Matched netting statements may be amended within the process until the Netting Match Completion Date deadline. Once the deadline is passed matched netting statements may not be further processed. If the deadline is passed and the netting statement is in an unmatched state (eg pending or mismatched), it may be amended or cancelled and resubmitted with a new Actual Netting Payment Date. In the latter case the Actual Netting Payment Date on the Netting Statement will be later than that on the matched invoices referenced by the Netting Statements.

A netting statement will be set to the 'Cancelled' state if a referenced matched invoice known to the process is reversed, amended or cancelled (as permitted), or should an 'unknown' invoice referenced on a netting statement subsequently be submitted.

5.2 High-Level Business Document Flows
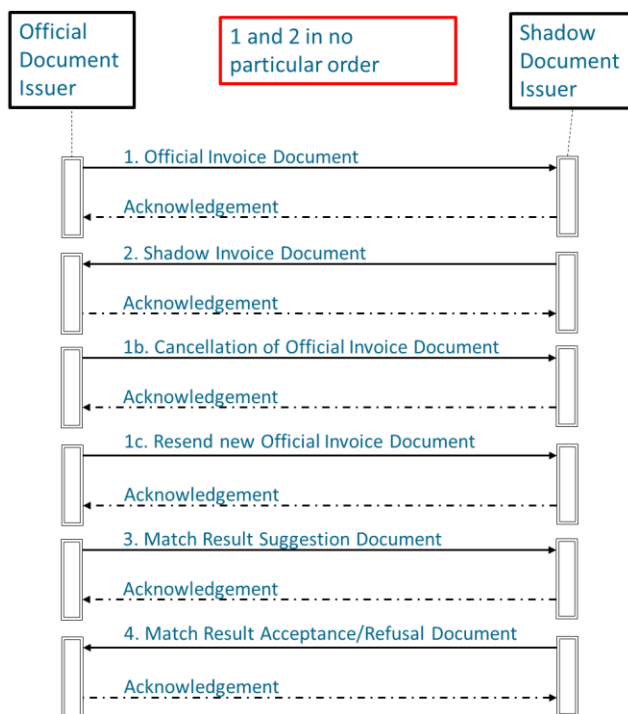
Figure 5: Invoice Matching Document Flow

5.2.1 High-Level Invoice Document Dialogue

The Shadow Invoice Document issuer (Payer) and the Official Invoice Document Issuer (Payee) each submit their versions of the Invoice Document, containing an Official Invoice document or Shadow Invoice document ('expected' invoice), to the process. Cancellations or Credit notes may not be submitted to the Invoice Document Dialogue for matching, they may only be used to reverse a referenced invoice (Shadow Invoice Document and/or the Official Invoice Document) already known to the process. The new document is validated on submission to the process and is either accepted or rejected, for example, if the submission deadline has expired or the Aggregation Keys are not unique in the set of active Invoice Documents. Accepted and format-valid documents are sent to the counterparty.

Through the use of an acknowledgement/rejection message, each party accepts receipt of, or rejects (due to processing errors), the counterparty Invoice Document. If the document is accepted by the counterparty then it is considered to have fully entered the process and is assigned the state 'Pending' in both the Official Document Issuer (Payee) and Shadow Document Issuer (Payer) instances of the process and a Process Result message will be exported by the process specifying the state change to the document.

Once an Invoice Document is in the 'Pending' state it is subject to matching. Invoice Documents in the Unmatched state and which share the same unique set of values in their 'Aggregation Keys' are automatically matched together. The Official Document Issuer (Payee) party takes the lead in the process and compares the two documents according to the appropriate matching mechanism (see section 5.3.1~~5.3.1~~, "General Match Processing of Documents" below).

Once a result is found the Official Document Issuer (Payee) sends a 'Match Result Suggestion' message to the Shadow Document Issuer (Payer) proposing an automatically calculated result. If a 'Match' has been calculated, then a 'Match Result Suggestion' with the match result 'Matched' is sent. If a 'Mismatch' has been calculated a 'Match Result Suggestion' with the match result 'Mismatched' is sent. If a 'Tolerance Match' has been calculated and tolerances are accepted by the Payee a 'Match Result Suggestion' with the match result 'Tolerance Matched' is sent, otherwise a 'Match Result Suggestion' with the match result 'Mismatched' is sent to the Shadow Document Issuer (Payer).

The Shadow Document Issuer (Payer) either accepts or rejects the 'Match Result Suggestion' message through the use of the Acknowledgement document or Rejection document. If the 'Match Result Suggestion' message is accepted by the Shadow Document Issuer (Payer), then the two Invoice Documents that comprise the candidate matching pair are both assigned the interim state of 'Match Suggested' in both the Payee and Payer instances of the process and a Process Result message will be exported by the process specifying the state change to the document(s). If the 'Match Result Suggestion' is rejected by the Shadow Document Issuer (Payer), then both Invoice Documents are assigned to the final 'Mismatched' state in both the Payee and Payer instances of the process as there is a fundamental problem agreeing a result between Payee and Payer and a Process Result message will be exported by the process specifying the state change to the document(s).

Otherwise the Shadow Document Issuer (Payer) applies the standard matching mechanism to the Invoice Documents in the 'Match Suggested' state and compares the result with that suggested by the Official document Issuer (Payee). If a 'Match' has been suggested and the Shadow Document Issuer (Payer) also calculates a 'Match' then a 'Match Result Acceptance' with the match result 'Matched' is sent by the Shadow Document Issuer (Payer) to the Official document Issuer (Payee). If a 'Mismatch' has been suggested and the Shadow Document Issuer (Payer) calculates a 'Mismatch' or a 'Tolerance Match' then a 'Match Result Acceptance' with the match result 'Mismatched' is sent by the Shadow Document Issuer (Payer) to the Official document Issuer (Payee). If a 'Tolerance Match' has been suggested and the Shadow Document Issuer (Payer) also calculates a 'Tolerance Match' then if tolerances are accepted by the Shadow Document Issuer (Payer) a 'Match Result Acceptance' with the match result 'Tolerance Matched' is sent by the Shadow Document Issuer (Payer) to the Official document Issuer (Payee), otherwise a 'Match Result Acceptance' with the match result 'Mismatched' is sent. In all other cases a 'Match Result Refusal' is sent by the Shadow Document Issuer (Payer) to the Official document Issuer (Payee).

The Official document Issuer (Payee) acknowledges the reception of either the 'Match Result Acceptance' or 'Match Result Refusal' message through the use of an Acknowledgement or Rejection document. If either message is rejected or if a 'Match Result Refusal' message has been sent by the Shadow Document Issuer (Payer) and accepted by the Official document Issuer (Payee), both Invoice Documents are assigned to the final 'Mismatch' state in both the Official document Issuer (Payee) and Shadow Document Issuer (Payer) instances of the process as there is a fundamental problem agreeing a result between Official document Issuer (Payee) and Shadow Document Issuer (Payer) and a Process Result message will be exported by the process specifying the state change to the document(s).

If the Official document Issuer (Payee) accepts a 'Match Result Acceptance' message, then an officially confirmed result has been automatically agreed and the two Invoice Documents that comprise the candidate matching pair are both assigned the state specified in the Match Result Acceptance message sent by the Shadow Document Issuer (Payer): 'Matched', 'Mismatched' or 'Tolerance Matched' in both the Official document Issuer (Payee) and Shadow Document Issuer (Payer) instances of the process and a Process Result message will be exported by the process specifying the state change to the document(s). If the Official document Issuer (Payee) suggested a 'Tolerance Match' and the Shadow Document Issuer (Payer) presented a 'Mismatch' then the automatically agreed result is a 'Mismatch' since a 'Tolerance Match' is a special case of a 'Mismatch' that can only be accepted if both counterparties apply the Shadow Document Issuer's tolerance settings.

If the documents are in the 'Mismatched' state then counterparties may wish to reverse or cancel one or both Invoice Documents or they may leave them into the 'Mismatch' status in order to manually continue the settlement process outside of the automated eSM process.

If both counterparties believe themselves to be the Shadow Document Issuer (Payer) or the Official document Issuer (Payee) then the invoices will not be identified for matching and the error will need to be noticed and remedied in the same way as a mismatch.

An Invoice Document, subject to netting, being assigned the state of 'Matched' or 'Tolerance Matched' may optionally (at the implementers discretion) be compared against the set of 'current' netting statements and if the invoice falls within the scope of the 'current' Netting Statement, defined by the 'Netting Information', then the standard 'Process Result' message will not include information identifying the Netting Statement(s). At the implementer's discretion, additional information may be provided referencing this newly matched invoice.

This completes the automated matching dialogue for the Invoice Documents.

5.2.2 High-Level Invoice Cancellation Dialogue

Either counterparty may initiate the Invoice Cancellation dialogue for one of their own Invoice Documents within the process by submitting a Cancellation message referring to a current Invoice Document (Official Invoice Document or Shadow Invoice Document) and Version. The document is validated on submission to the process and the document is either accepted or rejected. A cancellation must contain a reference to an existing Invoice Document version in a state that permits cancellation and will incorporate that specific state as well. If accepted the Cancellation message is sent to the counterparty. The current cancellation implementation of the eSM process covers both cancellations and reversals.

Through the use of an acknowledgement/rejection message, the counterparty accepts receipt of, or rejects (due to processing errors), the Cancellation message. If the message is accepted by the counterparty, then it is considered to have fully entered the process. The current version of the referenced Invoice Document version is assigned the state of the

'Cancelled' in both counterparty instances and removed from further processing and a Process Result message will be exported by the process specifying the state change to the document(s).

The dialogue is valid for official invoice documents and shadow invoice documents.

It is permitted to cancel official invoice documents and shadow invoice documents ahead of the defined deadlines, if they are in the 'Unmatched, 'Error', 'Matched', 'Tolerance Matched' or 'Mismatched' states. If the document is in the 'Matched', 'Error', 'Agreed Matched', Tolerance Matched' or 'Mismatched' state then the counterparty document will be returned to the 'Pending' state to participate in future matching with the re-stated invoice; if it is pending, the counterparty document will stay pending.

A new Invoice Document with the same Document ID but a higher version number than the 'Cancelled' document may subsequently be submitted to the process.

5.2.3 High-Level Acknowledgement/Rejection Dialogue

The recipient of a document will reply with either an Acknowledgement document or a Rejection document. Receipt of an Acknowledgement document will indicate that the counterparty in the dialogue has not only received the previous document issued in the course of this specific dialogue (concurrent dialogues are possible) but that the referenced document is 'Well Processed', that is it contains acceptable data that permits the dialogue to continue without intervention. Receipt of a Rejection document conversely will indicate that the counterparty cannot proceed with the dialogue due to an exception relating to the data contained in the previous document exchanged within the dialogue to which the Rejection document explicitly refers. In this case the documents involved may be set to the 'Error' state, meaning intervention is required to resolve the exception and a Process Result message will be exported by the process specifying the state change to the document(s). Such intervention may result in a Cancellation dialogue depending on the status of the invoice at the time of the exception. Alternatively, in the case of an Invoice document which cannot be amended, if after investigation it is found that the document can re-enter the process then the Invoice document will have to be resent with a higher document version whereby a Process Result message will be exported by the process specifying the state change to the document(s).

5.2.4 High-Level Netting Document Dialogue
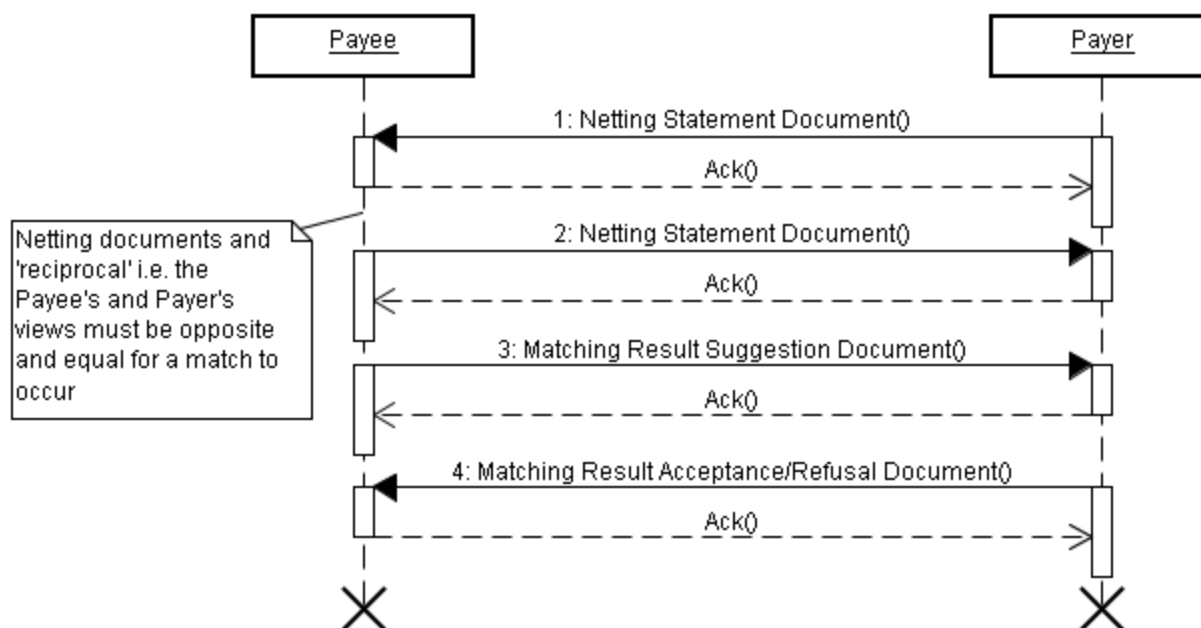
Figure 6: Netting Statement Matching Document Flow

The net Payer and the net Payee each submit their versions of the Netting Statement to the process. The document is validated on submission to the process and the document either accepted or rejected, for example if the submission deadline has expired or the Netting Information is not unique in the set of active Netting Statements. The references to invoices contained within the Netting Statements are validated against the set of current invoices (but not 'expected' invoices), if any referenced invoices are not subject to netting and/or not in the 'Matched' or 'Tolerance Matched' state, or if they differ in the invoiced amounts then the Netting Statement will be rejected. The scope of a netting agreement is determined by the legal netting contract so there is not really a business rule to apply. Eligible in this case refers to the scope definition of the legal netting agreement signed by both counterparties. Accepted Netting Statements which pass validation are sent to the counterparty.

Through the use of an acknowledgement/rejection message, each party accepts receipt of, or rejects (due to processing errors), the counterparty Netting Statement. If the document is accepted by the counterparty then it is considered to have fully entered the process and is assigned the state 'Pending' in both the Payee and Payer instances of the process and a Process Result message will be exported by the process specifying the state change to the document. If there are any current invoices that fall within the scope of the 'Pending' Netting Statement, defined by the 'Netting Information', then the 'Process Result' message may optionally (at the implementers discretion) also include information identifying the 'missing' Invoice Document(s) that could referenced by the Netting Statement.

Once a Netting Statement is in the 'Pending' state it is subject to matching. Netting Statements which are in the 'Pending' state and which share the same unique set of values in their 'Netting Information' are automatically matched together. The Payee party takes the lead in the process and compares the two documents according to ~~the~~ appropriate matching mechanism (see section 5.3.1~~5.3.1~~, "General Match Processing of Documents" below).

Once a result is found the Payee sends a 'Match Result Suggestion' message to the Payer proposing an automatically calculated result: either a 'Match' or a 'Mismatch' between the

two identified Netting Statement documents. The Payer either accepts or rejects the 'Match Result Suggestion' message through the use of the Acknowledgement document or Rejection document. If the 'Match Result Suggestion' message is accepted by the Payer, then the two Netting Statements that comprise the candidate matching pair are both assigned the interim state of 'Match Suggested' in both the Payee and Payer instances of the process. If the 'Match Result Suggestion' is rejected by the Payer then both Netting Statements are assigned to the final 'Error' state in both the Payee and Payer instances of the process as there is a fundamental problem agreeing a result between Payee and Payer and a Process Result message will be exported by the process specifying the state change to the document(s).

Otherwise the Payer applies the standard matching mechanism to the Netting Statements in the 'Match Suggested' state and compares the result with that suggested by the Payee and a Process Result message will be exported by the process specifying the state change to the document(s). If the results agree then the Payer sends a 'Match Result Acceptance' message to the Payee, otherwise a 'Match Result Refusal' document is sent.

The Payee acknowledges the reception of either the 'Match Result Acceptance' or 'Match Result Refusal' message through the use of an Acknowledgement or Rejection document. If either message is rejected or if a 'Match Suggestion Refusal' message has been sent by the Payer and accepted by the Payee then both Netting Statements are assigned to the final 'Error' state in both the Payee and Payer instances of the process as there is a fundamental problem agreeing a result between Payee and Payer and a Process Result message will be exported by the process specifying the state change to the document(s).

If the Payee accepts a 'Match Result Acceptance' message, then an officially confirmed result has been automatically agreed and the two Netting Statements that comprise the candidate matching pair are both assigned the state of 'Matched' or 'Mismatched', depending on the confirmed result, in both the Payee and Payer instances of the process and a Process Result message will be exported by the process specifying the state change to the document(s).

This completes the automated matching dialogue for the Netting Statements.

If the documents are in the 'Mismatched' state then counterparties must amend one or both Netting Statements to reinitiate the automatic matching dialogue, they may <u>not</u> be matched manually through the agreed matching mechanism.

If both counterparties believe themselves to be the Payer or the Payee then the netting statements will not be identified for matching and the error will need to be noticed and remedied in the same way as a mismatch.

5.2.5 High-Level Netting Statement Document Cancellation Dialogue

Either counterparty may initiate the Netting Statement Cancellation dialogue for one of their own Netting Statements within the process by submitting a Cancellation message referring to a current Netting Statements and Version. The document is validated on submission to the process and the document is either accepted or rejected. A cancellation must contain a reference to an existing Netting Statement version in a state that permits reversal. If accepted the Cancellation message is sent to the counterparty.

Through the use of an acknowledgement/rejection message, the counterparty accepts receipt of, or rejects (due to processing errors), the Cancellation message. If the message is accepted by the counterparty, then it is considered to have fully entered the process. The

current version of the referenced Netting Statement version is assigned the state of the 'Cancelled' in both counterparty instances and removed from further processing and a Process Result message will be exported by the process specifying the state change to the document(s).

It is permitted to cancel a Netting Statements, ahead of the submission deadline, if it is in the 'Pending', 'Error', 'Matched' or 'Mismatched' states.

A netting statement is also set to the 'Cancelled' state if a referenced Invoice changes state as the result of another dialogue.

A new Netting Statement with the same Document ID but I higher version number than the 'Cancelled' document may subsequently be submitted to the process.

5.3   Business Document Processing

5.3.1 General Match Processing of Documents

The Shadow invoice document issuer (Payer) and the Official Invoice document issuer (Payee) each independently executes the matching process. The process comprises two parts:

1. Retrieval - for each invoice document created by the local party and in the 'Pending' state, that party continually tries to retrieve from the set of received invoice documents, with a status of 'Unmatched', a document with matching Aggregation Keys to those of the local document currently being processed. Per Aggregation Key set, only one counterparty document can be retrieved as only one invoice, with the same Aggregation Keys and version (duplicates not allowed), from either party is allowed to be in the Unmatched state at any one time.

2. Comparison - once a candidate matching pair of invoice is retrieved or has been identified by a 'Match Result Suggestion' message the documents are compared according to the rules defined for matching Invoice Documents.

The following general rules define when two documents may be considered identical for business purposes:

1. Two document field values (XML attributes or elements) are called identical if they consist of the same sequence of characters. Leading and trailing blanks are not accepted within document fields (see CpML ® eSM documentation for field validation rules). Should the values be based on a numeric data type, the respective formatting rules apply, that is, 1.0 matches with 1 or 100 matches 10E2. Equality of values is given if two numeric values are considered equal according to the XML Schema standard (http://www.w3.org/TR/xmlschema-2/).

2. Two document *sections* are called identical if the respective values of all key fields are identical or are considered equivalent following the rules defined for matching the fields in question (e.g. within a tolerance). A section is defined as a sequence of XML elements. Such a sequence may either be the header part of a document or a *repeatable section*. Optional document fields and substructures count as part of the section.

3. Independent of the cardinality of an XML section, a repeatable section may be ordered or unordered. If a repeatable section is ordered, the order of the sections is defined by their sequential appearance.

4. Two lists of an unordered repeatable document section are called identical if there exists a one-to-one mapping between the sections of the one list and the sections of the other list such that each pair of sections is identical and all sections can be mapped.

In summary two different documents are considered identical if there exists:

- a one-to-one mapping between all corresponding lists of ordered repeatable sections of the two documents such that each pair of sequences is identical,

- a one-to-one mapping between all corresponding lists of unordered repeatable sections of the two documents such that each pair of sequences is identical,

- a one-to-one mapping between the two sets of remaining sections of the two documents such that each pair of sections is identical.

5.3.2 Match Processing of Invoice Documents

The invoice from the Official Invoice Document Issuer (Payee) and the Shadow Invoice Document from the Shadow Invoice Document Issuer (Payer) are considered matched if all key fields are equivalent since the document produced by the Official Invoice Document Issuer (Payee) and the document produced by the Shadow Invoice Document Issuer (Payer) must both describe the same cash flow from the Official Invoice Document Issuer's (Payee) perspective. The identity of the Official Invoice Document Issuer (Payee) and Shadow Invoice Document Issuer (Payer) is included in the 'eSM Process Information' section and matched so that a discrepancy as to the role of each counterparty will be detected. There is no need therefore to take account of the perspective of the author of the document when matching, that is, it is not necessary to take account of oppositely signed numeric values.

The matching will start at summary level and, depending on the static data options/settings chosen per eSM process application, be performed by default on trade level (or only in case of a mismatch of the summary).

A tolerance match is deemed true if two Invoice documents differ only in their cash amounts (NetAmount, VATAmount and GrossAmount) within the tolerance. The tolerance is applied to the matching of specific 'UnsignedPriceType' and 'UnsignedQuantityType' fields such that two fields are deemed to match if the two values from each document being compared vary one from another by exactly or less than the percentage AND the absolute value specified in the tolerance for the appropriate currency (where both types of tolerance are defined). All values for each currency are defined within the eSM Shadow Invoice document and may, in the near future, be maintained as 'Static Data' on www.efet.org. Tolerances for the Summary and Detail data are separately defined and must be appropriately applied during matching of the relevant sections.

5.3.3 Matching of Tax Information in Invoice Documents

Tax Information sections in the Invoice Document will be always be matched.

5.3.4 Match Processing of Netting Statement Documents

A netting statement from a Payee is considered to match a netting statement from the Payer if for:

- The 'Netting Information' section all key fields are equivalent

- The 'Summary' section all key fields are equivalent.

- The 'Counterparty Information' sections all key fields are equivalent

- The 'Purchases' section in one netting statement all key fields are equivalent to the key fields in the 'Sales' sections in the other netting statement.

5.3.5 Invoice and Netting Documents flagged as 'Timed-Out'

If an Invoice Document has not been assigned to the 'Matched' state by close of business on the Invoice Final Submission Date (based on the Payer's time zone), then it will be flagged as 'Timed-Out'.

If an invoice document which is subject to netting has not been referenced on a netting statement by close of business on the Netting Final Submission Date (based on the Payer's time zone), then it will be flagged as 'Timed-Out for Netting'.

If a netting statement document has not been assigned to the 'Matched' state by close of business on the Netting Final Submission Date, then it will be flagged as 'Timed-Out for Matching'.

5.3.6 State Changes Exported from the Processes

The process issues Process Results the backend process which provide information including: state changes to each invoice and netting statement as it is processed and 'difference' reports in the case of a pair of invoices being assigned to the 'Tolerance Matched' state.

6 Electronic Business Processes – by Document Types

This section has to be read in conjunction with the CpML for eSM Specification and Appendix A. ~~Appendix A.~~ "Definition of new eSM Field Names and Codes~~Definition of new eSM Field Names and Codes~~".

The appendix provides the reference to the list of all the types and codes that are valid within the eSM. Wherever this document is referenced the codes associated with the attribute referenced must be obtained from this source. In particular the code lists contained in the appendix may evolve independently from this section.

Within the following sections the following conventions are used to describe how each field is treated:

- Mandatory: must be present in the document
- Optional: may or may not be present in the document
- Conditional: Mandatory or Optional depending on the business rule
- Key: a matching field
- Information: a non-matching field
- Key Tolerance: a matching field subject to a tolerance
- Key Reversal: a matching field that must precisely off-set the field as part of the reversal dialogue

6.1 Naming and Typing Conventions

Document rules check the validity of data within a given document against the document type definition.

Agreed abbreviations for document types:

- "INV"   for Invoice document
- "NET"   for Netting document
- "REJ"   for Rejection
- "MRS"   for Match Result Suggestion
- "MRA"   for Match Result Acceptance
- "MRR"   for Match Result Refusal
- "ACK"   for Acknowledgement
- "CAN"   for Cancellation
- "PRS"   for Process Result
- "RAC"   for Reactivation

6.1.1 Partner Identification

The counterparty IDs used in eSM Documents are globally unique IDs (SSDSIDs) and so shall be identical to the code construction logic applied by other EFET standards ~~s used to identify counterparties in the eCM process,~~ see reference document [1]~~[1]~~.

6.1.2 Document IDs

Often, documents are listed in reporting tools, as XSL stylesheets, etc. To provide a common syntax that is comprehensible and maintains uniqueness, a rule for creating unique Document IDs is defined as follows:

A combination of the following components:

- Document type abbreviation (e.g. "INV" for Invoice Document)

- DateCode (8 characters, in yyyymmdd format),

- Locally & daily unique Internal Document ID (recommended min. 10 characters) of the sender side

This Document ID must be maintained independently of the payload for subsequent versions of the document since a change to the payload may cause the Document ID to change breaking the link between versions of the document although it is expected that Internal Document ID has a unique meaning in the context of the payload document and cannot be amended for an invoice, credit note or netting statement.

- "@"

- Sender identification, that is, SSDSID of the sender.

Example:

> INV_20070610_1234567890@BE0403170701_11XELECTRABEL--Z

This is a convention but it is mandated for compliancy with the eSM Standard and must be used for document types, with the exception of Agreement Documents for which naming is defined below, as it is believed that it makes document tracking easier.

Only the following characters are allowed:

- letters

- numbers

- special characters: - _ ( ) [ ] . @ $ +

6.2 Invoice Document

6.2.1 Invoice Types and Subtypes

Invoice Documents created by the Shadow Document Issuer (Payee) and Official Document Issuer (Payer) must comprise detailed line items for the same set of underlying transactions if they are to be usefully compared within the eSM process i.e. it is necessary to match 'apples with apples'. The presence of detailed line items is depending on a flag whereby parties agree to exchange these details and when to use them for matching (default or only in case of invoice mismatch). The following set of Invoice Document types and subtypes have therefore been defined for the transaction types within the scope of the eSM process. If different transaction types can be invoiced together then they have been included as subtypes within the same type of Invoice Document.

Figure 7: Invoice Types and Subtypes
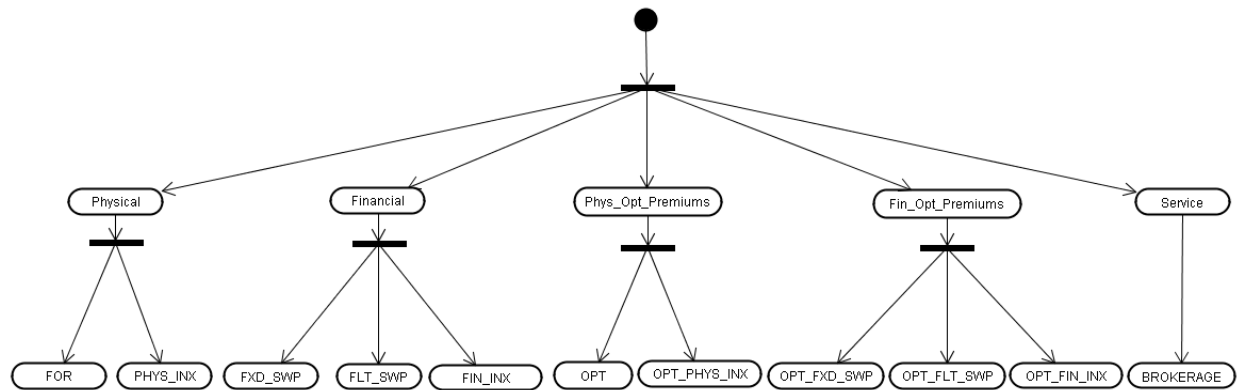
Figure 7: Invoice Types and Subtypes~~Figure 7: Invoice Types and Subtypes~~ shows the two levels of categorisation with eSM invoice types comprising:

- "Physical", for types of invoice dealing with payments related to physical forward transactions which comprises subtypes:
  - "FOR", physical forwards covering settlement of all types of fixed price physically delivered commodities within scope of the standard
  - "PHYS_INX", physical indexed deals covering settlement of all types of index priced physically delivered commodities within scope of the standard
- "Financial", for types of invoice dealing with payments related to financial transactions which comprises subtypes:
  - "FXD_SWP", fixed swaps
  - "FLT_SWP", floating swaps
  - "FIN_INX", pay outs on exercised financial options on indexes
- **In scope for eSM Phase 3:**
  - "Phys_Opt_Premiums", for types of invoice dealing with payments related to physical option premiums which comprises subtypes:
    - "OPT", covering options on physical fixed price forward deals
    - "OPT_PHYS_INX", covering options on physical index settled forward deals
- **In scope for eSM Phase 3:**
  - "Fin_Opt_Premiums", for types of invoice dealing with payments related to financial option premiums which comprises subtypes:
    - "OPT_FXD_SWP", covering swaptions for fixed swaps
    - "OPT_PHYS_INX", covering swaptions for floating swaps
    - "OPT_FIN_INX", covering options on a financial index
- **In scope for eSM Phase 3:**
  - "Service", for types of invoice dealing with payments related to services and which in this version of the eSM standard comprises:
    - "Brokerage", covering settlement for broker fees.

The types and subtypes defined by this standard may be extended in future versions to cover settlement of a wider set of underlying transactions.

6.2.2 Invoice Document Structure and Field Description

See CpML ® documentation for eSM.

6.2.3 Document-specific Business Rules – Invoice

See CpML ® documentation for eSM.

6.3 Match Result Suggestion Document (MRS)

The Match Result Suggestion Document forms a proposal from one counterparty to the other.

- If the document is issued as part of an automatic matching dialogue, the sender is the Official Document Issuer (Payee).
- If the document is issued as part of the agreed matching dialogue, then either counterparty can trigger the issuing of the message.

The Match Result Suggestion Document differentiates between a Perfect Match suggestion (MRSP) and a Tolerance Match Suggestion (MRST).

The Match Result Suggestion Document document is signed and therefore provides an auditable record.

Table 2: Element Specification for Match Result Suggestion

Name	Usage	Type	Business Rule
ESMMatchResultSuggestionDocument @SchemaVersion: schema version number @SchemaRelease: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the Match Result Suggestion document is a test message or a live message.
SenderID	M	SSDSIDType	The counterparty that is proposing a matching value for the ESMDocument.
ReceiverID	M	SSDSIDType	The counterparty that is receiving the matching proposal.
ReceiverRole	M	ESMRoleType	The role of the receiving counterparty that is receiving the matching proposal.
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.

Name	Usage	Type	Business Rule
MatchResult	M	ESMMatchResultType	The dialogue initiator's proposed result for the referenced documents. **Values:** • If the message is generated as part of an invoice matching dialogue, then the following values are allowed: 　○ "Match" 　○ "Mismatch" 　○ "ToleranceMatch" • Else, if the message is generated as part of the netting statement matching dialogue, then the following values are allowed: 　○ "Match" 　○ "Mismatch"
ReferencedInitiator-DocumentID	M	IdentificationType	Document ID of the ESMDocument corresponding to the invoice sent by the sender.
ReferencedInitiator-DocumentVersion	M	VersionType	Document version of the ESMDocument corresponding to the invoice sent by the sender.
Referenced-Responder-DocumentID	M	IdentificationType	Document ID of the ESMDocument corresponding to the invoice sent by the responder.
Referenced-ResponderDocument-Version	M	VersionType	Document version of the ESMDocument corresponding to the invoice sent by the responder.
ListItemsMatchYesNo	C	TrueFalseType	Indicates if the line items corresponding to the invoice or shadow document match. **Occurrence:** • If line items are available on both sides, then this field is mandatory. • Else, this field must be omitted. **Values:** • If the corresponding line items match, then this field is set to "True". • Else, this field is set to "False".
End of **ESMMatchResultSuggestionDocument**			

6.4 Match Result Acceptance Document (MRA)

The Match Result Acceptance document differentiates between a Perfect Match suggestion (MRAP) and a Tolerance Match Suggestion (MRAT).

The Match Result Acceptance document is signed and therefore provides an auditable record.

Table 3: Element Specification for Match Result Acceptance

Name	Usage	Type	Business Rule
ESMMatchResultAcceptanceDocument @SchemaVersion: schema version number @SchemaRelease: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the Match Result Acceptance document is a test message or a live message.
SenderID	M	SSDSIDType	The counterparty that is accepting a matching result.
ReceiverID	M	SSDSIDType	The counterparty that is receiving the matching result acceptance.
ReceiverRole	M	ESMRoleType	The role of the counterparty that is receiving the matching result acceptance.
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.
MatchResult-Suggestion-DocumentID	M	IdentificationType	The document ID of the MRS that this document is a response to.
MatchResult	M	ESMMatchResultType	The matching result that is being accepted.. Values: • If the message is generated as part of an invoice matching dialogue", then the following values are allowed: 　o "Match" 　o "Mismatch" 　o "ToleranceMatch" • Else, if the message is generated as part of a netting statement matching dialogue, then the following values are allowed: 　o "Match" 　o "Mismatch"
ListItemsMatchYesNo	C	TrueFalseType	Indicates if the line items corresponding to the invoice or shadow document match. **Occurrence:** • If line items are available on both sides, then this field is mandatory. • Else, this field must be omitted. **Values:** • If the corresponding line items match, then this field is set to "True". • Else, this field is set to "False".
End of **ESMMatchResultAcceptanceDocument**			

6.5 Match Result Refusal Document (MRR)

The Match Result Refusal document is issued if the responder's matching result does not equal the sender's matching result.

The Match Result Refusal document contains the mismatch result as calculated by the responder. That way, both the official document issuer and the shadow document issuer have the results from both counterparties.

The document is signed and therefore provides an auditable record.

Table 4: Element Specification for Match Result Refusal

Name	Usage	Type	Business Rule
ESMMatchResultRefusalDocument @SchemaVersion: schema version number @Schema Release: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the MatchResultAcceptanceResult document is a test message or a live message.
SenderID	M	SSDSIDType	The counterparty that is refusing to accept a matching proposal. // The party code of the responder to the MRS.
ReceiverID	M	SSDSIDType	The counterparty that is receiving the refusal to accept a matching proposal. // The party code of the sender of the MRS.
ReceiverRole	M	ESMRoleType	The role of the receiving counterparty that is receiving the match result refusal document.
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.
MatchResult-Suggestion-DocumentID	M	IdentificationType	The document ID of the MRS that this document is a response to.

MatchResult	M	ESMMatchResultType	The responders result to the matching proposal.
			• If the message is generated as part of the "Invoice Matching Dialogue" then permitted values are:
			  ○ "Mismatch", if a mismatch was calculated or a tolerance match was calculated but the responder does not permit tolerance matching.
			  ○ "Match", if a match was calculated by the sender or receiver whilst a mismatch was calculated by the other party.
			• Else if the message is generated as part of the "Netting Statement Matching Dialogue" then the only permitted is:
			  ○ "Mismatch", if a mismatch was calculated.

Name	Usage	Type	Business Rule
ListItemsMatchYesNo	C	TrueFalseType	Indicates if the line items corresponding to the invoice or shadow document match. **Occurrence:** • If line items are available on both sides, then this field is mandatory. • Else, this field must be omitted. **Values:** • If the corresponding line items match, then this field is set to "True". • Else, this field is set to "False".
End of **ESMMatchResultRefusalDocument**			

6.6 Process Result (PRS) Documents

Process Result documents are system-specific messages that are exchanged between the eSM system and the client system to indicated that a process step has been executed.

The Process Result document is exported by the process to the 'local' environment. It provides feedback on the state changes to the settlement documents (invoices and netting statements) as they occur. In the case of a state change to 'Tolerance Matched' it also contains information about the discrepancies between the Summary sections of the two invoices referenced in the match which in the case of a tolerance match is only the difference between the invoiced and 'expected' invoiced sums.

6.6.1 Cancellation Document (CAN)

A Cancellation Document refers to a proforma invoice document or netting statement and is used to inform the receiver of the sender's desire to remove the invoice document or netting statement from the process.

Table 5: Element Specification for Cancellation

Name	Usage	Type	Description
ESMCancellationDocument @SchemaVersion: schema version number @Schema Release: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the Cancellation document is a test message or a live message.
SenderID	M	SSDSIDType	
ReceiverID	M	SSDSIDType	
ReceiverRole	M	ESMRoleType	
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.
Referenced-DocumentID	M	IdentificationType	Document ID of the cancelled document

Name	Usage	Type	Description
Referenced DocumentVersion	M	VersionType	Version number of the cancelled document
End of **ESMCancellationDocument**			

6.6.2 Acknowledgement Document (ACK)

Each time that a document is well-processed, an Acknowledgement document is sent as confirmation. This applies to all document types except except Acknowledgement and Rejection documents.

Table 6: Element Specification for Acknowledgement

Name	Usage	Type	Description
ESMAcknowledgementDocument @SchemaVersion: schema version number @SchemaRelease: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the Acknowledgement document is a test message or a live message.
SenderID	M	SSDSIDType	
ReceiverID	M	SSDSIDType	
ReceiverRole	M	ESMRoleType	
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.
Referenced-DocumentType	M	ESMDocumentType	The document type of the acknowledged document.
Referenced-DocumentID	M	IdentificationType	Document ID of the acknowledged document.
Referenced-DocumentVersion	C	VersionType	Version number of the acknowledged document. **Occurrence:** • If the acknowledged document is an invoice or a netting statement, then this field is mandatory. • Else, this field must be omitted.
End of **ESMAcknowledgementDocument**			

6.6.3 Rejection Document (REJ)

Each time that a document cannot be well-processed, a Rejection document is sent. This applies to all document types except except Acknowledgement and Rejection documents.

The reasons for the rejection are listed in the form of reason codes in the document.

Note: *A placeholder for vendor-specific rejection reason codes has been included in this document.*

Table 7: Element Specification for Rejection

Name	Usage	Type	Description
ESMRejectionDocument @SchemaVersion: schema version number @Schema Release: schema release number			
DocumentID	M	IdentificationType	Unique document ID generated by the sender. Must be compliant with section 6.1.2~~6.1.2~~, "Document IDs".
DocumentUsage	M	UsageType	Indicates whether the Rejection document is a test message or a live message.
SenderID	M	SSDSIDType	
ReceiverID	M	SSDSIDType	
ReceiverRole	M	ESMRoleType	
Timestamp	M	UTCTimestampType	Time in UTC that the document was created.
Referenced-DocumentType	M	ESMDocumentType	The document type of the rejected document.
Referenced-DocumentID	M	IdentificationType	Document ID of the rejected document.
Referenced-DocumentVersion	C	VersionType	Version number of the rejected document. **Occurrence:** • If the acknowledged document is an invoice or a netting statement, then this field is mandatory. • Else, this field must be omitted.
ESMRejectionDocument/Reason: mandatory, repeatable section For each reason code, one 'Reason' section is added.			
ReasonCode	M	ESMReasonCodeType	A code indicating the motivation for the rejection.
ErrorSource	C	ErrorSourceType	In case of XML error, this element indicates where the error occurred in the document. **Occurrence:** • If 'ReasonCode' is set to "XML:ValidationFailure", then this field is mandatory. • Else, this field must be omitted.
Originator	O	OriginatorType	Explains which software component raised the error.
ReasonText	O	ReasonTextType	Additional informal information.
End of **Reason**			
End of **ESMRejectionDocument**			

6.7 Netting Statement Document Types

The netting statement comprises purchases, sales and the balance for a netting payment date between them which is paid by the Payer to the Payee. Each invoice that has been received from and counterparty will contribute to the total purchases and each invoice issued to the counterparty will contribute to the sales made. For two netting statements to

be meaningfully compared and matched they must contain the same sets of sales and purchases, that is, they must comprise the same sets of underlying invoices. The 'scope' of a netting statement is defined by the 'Netting Information' which contains values for each field in the invoice 'Aggregation Keys'. If an invoice shares values in its 'Aggregation Keys' with those specified in the 'Netting Information' of a netting statement, then they fall within the scope and should participate in netting if they are subject to netting and settle on the Netting Payment Date.

6.7.1 Netting Statement Document Structure and Field Description

See CpML ® documentation for eSM.

6.7.2 Document-specific Business Rules – Netting Statement Document

These business rules apply generally to the document or to specific sections. In addition to the field specific rules defined in the table above these rules provide guidance on the composition and completion of a standard compliant NET document for the various products and instruments supported.

See CpML ® documentation for eSM.

7 eSM State Processing

The eSM process comprises two related dialogues:

1. The Invoice document Dialogue
2. The Netting Statement Dialogue

The two dialogues are related through the participation of Invoice Documents and Netting Statements. State processing is concerned with the progression of the business documents from the initial Pending state through to the Matched, Agreed Matched or Tolerance Matched state for Invoice Documents and to the Matched and Mismatched state for Netting Documents.

There are 2 Invoice Document types "Invoice" and "Netting Statement".

The process is distributed with a separate instance of the process operating on behalf of each of the two counterparties to the documents being matched. Each instance of the process receives all input documents and performs an independent unilateral match the result of which is reconciled between the two instances to achieve an agreed bilateral match result. State changes of business documents, defined for each dialogue, must be synchronised between the instances of the process running at different sites to maintain the integrity of the overall process and to come to a consistent bilateral match result. The state processing is therefore presented below at three levels:

1. Business level – looking at the (unified) state transitions for the matching of the business documents: the Invoice document and the Netting statement (see section 7.1~~7.1~~ for a high-level view and section 7.4~~7.4~~ for a detailed view of the state transitions)

2. Communication level – looking at the state transitions for the 'well processed' processing of all documents including the business documents and the other supporting documents that are exchanged between the distributed instances of the process (see section 7.2~~7.2~~)

3. Synchronisation level – looking at the state changes for the 'well received' processing that is dependent on the exchange of business Acknowledgement or Rejection documents and which synchronises the state changes between distributed instances of the process (see section 7.3~~7.3~~)

Each of the diagrams and the processing they represent conform to three fundamental premises:

1. State changes for documents are at all times synchronised between distributed instances of the process

2. All documents must be unique within all states of the current instance of the process

3. Only one version of a document is permitted to be active within the process at any time.

Note: Multiple versions may be queued until processing of the current version is complete.

A general rule for any messages entering the process (that is 'well received') that are not in strict compliance with the order of the dialogue or semantically correct according to the business rules defined for the documents must be rejected using a Rejection Document and the received document set to the 'Failed' state within the communications process. Whereas defined semantic errors may result in referenced business documents (INV, NET or CAN) being set to the 'Error' state as specified in detailed processing, other essentially undefined

situations must not be permitted to affect the normal processing of business documents (INV, NET or CAN) to which they might refer. The following list is not complete but gives an idea of the types of situation where unexpected documents with undefined errors arrive and where a Rejection must be issued but where the business document must not be set to the 'Error' state.

- Receiving an MRS sent by the Payee (i.e. arrival of a 'well received' MRS which makes no semantic sense within the context of the current version of the process).
- Receiving an MRA referring to a INV instead of the expected MRS (i.e. arrival of a 'well received' MSA which makes no semantic sense within the context of the current version of the process).

Documents which are syntactically incorrect will not be well received and must be dealt with at the communications protocol level with the issuing of a technical rejection in accordance with the ebXML standard, an example would be: receipt of an MRS referring to one known INV only which is syntactically incorrect.

Notes:

- *Local notification documents are issued for local business documents only unless otherwise specified in the processing for a transition.*
- *In order to achieve a double check by both counterparties involved in the eSM matching process, a unilateral match is avoided. This is achieved by letting one party (the Payee) initiate the matching process by sending a Match Result Suggestion (MRS) document and the other resounding with a Match Result Acceptance (MRA) or Match Result Refusal (MRR). Only this avoids one party unilaterally overruling the other.*

7.1 Business level: High-Level State Transition Processing

The state processing of the Invoice document dialogue and the Netting Statement dialogue is described below.

7.1.1 State Transition Diagram for the Invoice Document Matching Dialogue

Figure 8: Invoice State Diagram~~Figure 8: Invoice State Diagram~~ shows the permitted state transitions for the Invoice Document of the eSM process. The diagram is valid for both the Payer and Payee of the process.
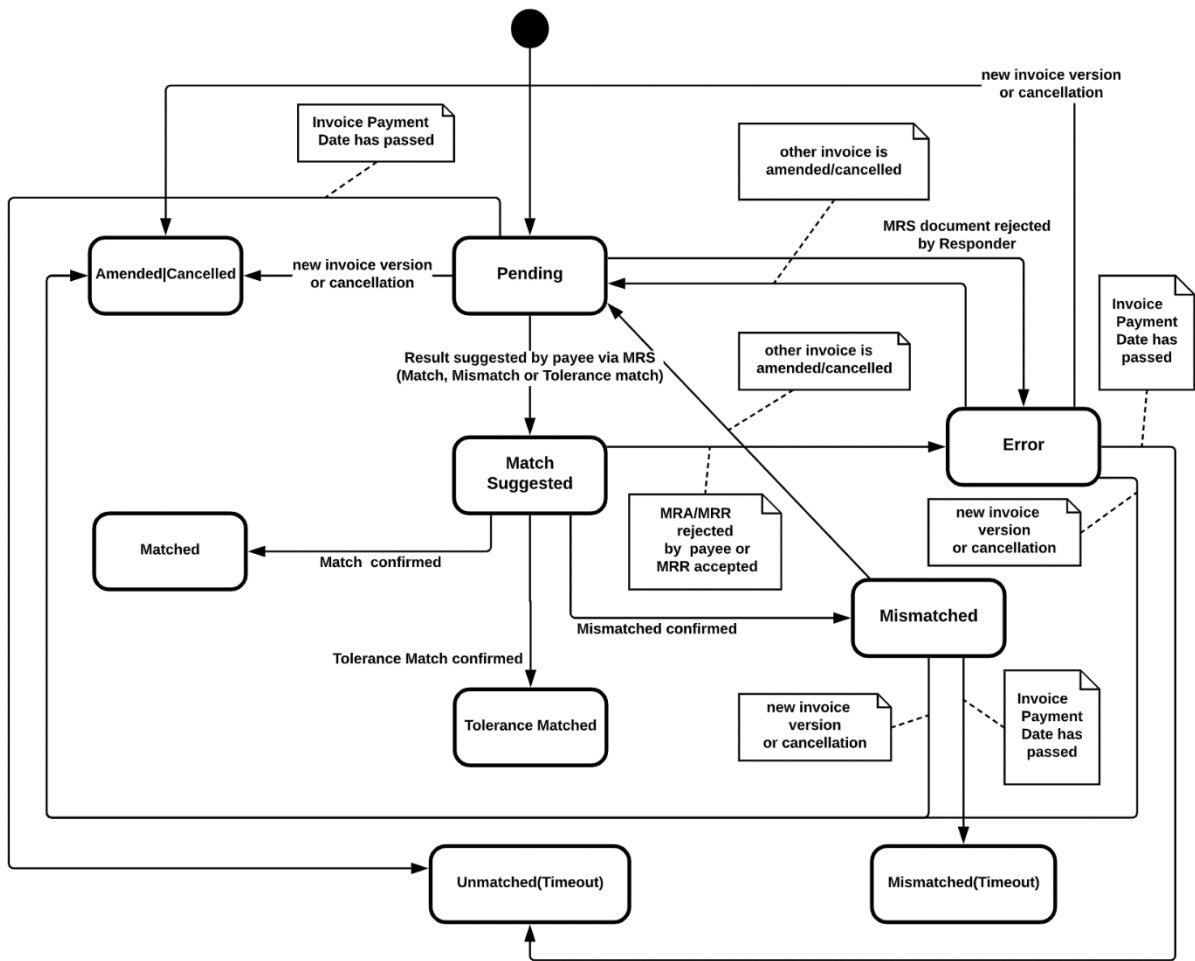
Figure 8: Invoice State Diagram

Validated documents entering the business process are assigned the **Pending state** signifying that they are available for matching.

Once a result (match, mismatch or tolerance match) is detected by the Payee the result is suggested to the Payer via a 'Match Result Suggestion' (MRS) and the two instances progress to the interim **Match Suggested state**. In the Match Suggested state the Payer validates the match suggestion made by the Payee using the algorithm defined in section 5.3.15~~5.3.1~~, "General Match Processing of Documents".

If a 'Match' has been suggested by the Payee and the Payer also calculates a 'Match' then a 'Match Result Acceptance' with the match result 'Matched' is sent by the Payer to the Payee. Both Invoice documents are assigned the **Matched state**.

If a 'Mismatch' has been suggested by the Payee and the Payer calculates a 'Mismatch' or a 'Tolerance Match' then a 'Match Result Acceptance' with the match result 'Mismatched' is sent by the Payer to the Payee. Both Invoice documents are assigned the **Mismatched state**.

If a 'Tolerance Match' has been suggested by the Payee and the Payer also calculates a 'Tolerance Match' then if tolerances are accepted by the Payer a 'Match Result Acceptance' with the match result 'Tolerance Matched' is sent by the Payer to the Payee. Both Invoice documents are assigned the **Tolerance Matched state**. If tolerances are not accepted by the Payer a 'Match Result Acceptance' with the match result 'Mismatched' is sent. Both Invoice documents are assigned the **Mismatched state**.

In all other cases a 'Match Result Refusal' is sent by the Payer to the Payee and both documents are assigned the final **Error state**.

If the payment date for an invoice document in the 'Pending' or 'Error' states is exceeded the document will be assigned to the 'Unmatched' state.

If the payment date for an invoice document in the 'Mismatched' state is passed the document will be assigned to the 'Mismatched – Time Out' state. If the other mismatching invoice document has not exceeded the payment date then it will be returned to the 'Pending' state, since the cause of the mismatch could be a discrepancy in the CpML Payment Date field between the two candidate matching documents.

Invoice Documents in the Pending, Mismatched, or Error state may be assigned to the **Amended** and to the **Cancelled state** based on an external event. The arrival of a new version of a previously submitted document causes the earlier version to be assigned to the Amended state (e.g. superseded) if the earlier version was in a state that allowed it to be superseded by a new version. The Cancelled state is reserved for INV or NET CpML documents where no further processing in eSM is required, so Cancellation differs from Amendment only insofar as processing for that DocumentID stops after a cancellation but continues (on the new version) after an amendment. The relation to the business process is presumably that a invoice was issued in error and need to be removed, not amended. Note that in both cases the same invoice could be reintroduced into the eSM process by resubmitting it, using a new DocumentID.

Either the Invoice Amendment dialogue in which one of the counterparties submits a new Invoice Document with the same Document ID but with a higher Version to the process, or either the Invoice Cancellation dialogue in which one of the counterparties submits a cancellation document to the process. It is not permitted to amend or to cancel an Invoice Document in a final state ('Matched', 'Tolerance Matched', 'Amended', 'Unmatched', 'Mismatched – Time Out' and 'Cancelled' are final states for the Invoice Document. 'Matched', 'Amended', 'Unmatched', 'Mismatched – Time Out' and 'Cancelled' are final states for the Netting Statement Document

In case of an Amendment and when the original document is in the 'Mismatched' or Error' state the other counterparty's document will be returned to the 'Pending' state to participate in future matching with the amended invoice. If the document was in the 'Pending' state, the counterparty's document will stay 'Pending'. In case of a Cancellation and when the original document is in the 'Mismatched' or 'Error' state the other counterparty's document will be returned to the 'Pending' state to participate in future matching. If the document was in the 'Pending' state, the counterparty's document will stay 'Pending'.

If there are problems with the 'well processed' processing of the documents that comprise the dialogue then documents in both instances (if it is possible to identify the document(s) concerned)will be assigned to the **Error state**.

'Mismatched', 'Pending', 'Match Suggested' and 'Error' are interim states for the Invoice Document. 'Matched', 'Tolerance Matched', 'Amended', 'Unmatched', 'Timed-Out for Matching', 'Mismatched – Time Out', 'Timed-Out for Netting' and 'Cancelled' are final states for the Invoice Document.

7.1.2 State Transition Diagram for the Netting Statement Matching Dialogue

Figure 9: Netting Statement State Diagram~~Figure 9: Netting Statement State Diagram~~ shows the permitted state transitions for the Netting Statement Document of the eSM process. The diagram is valid for both the Payer and Payee of the process.
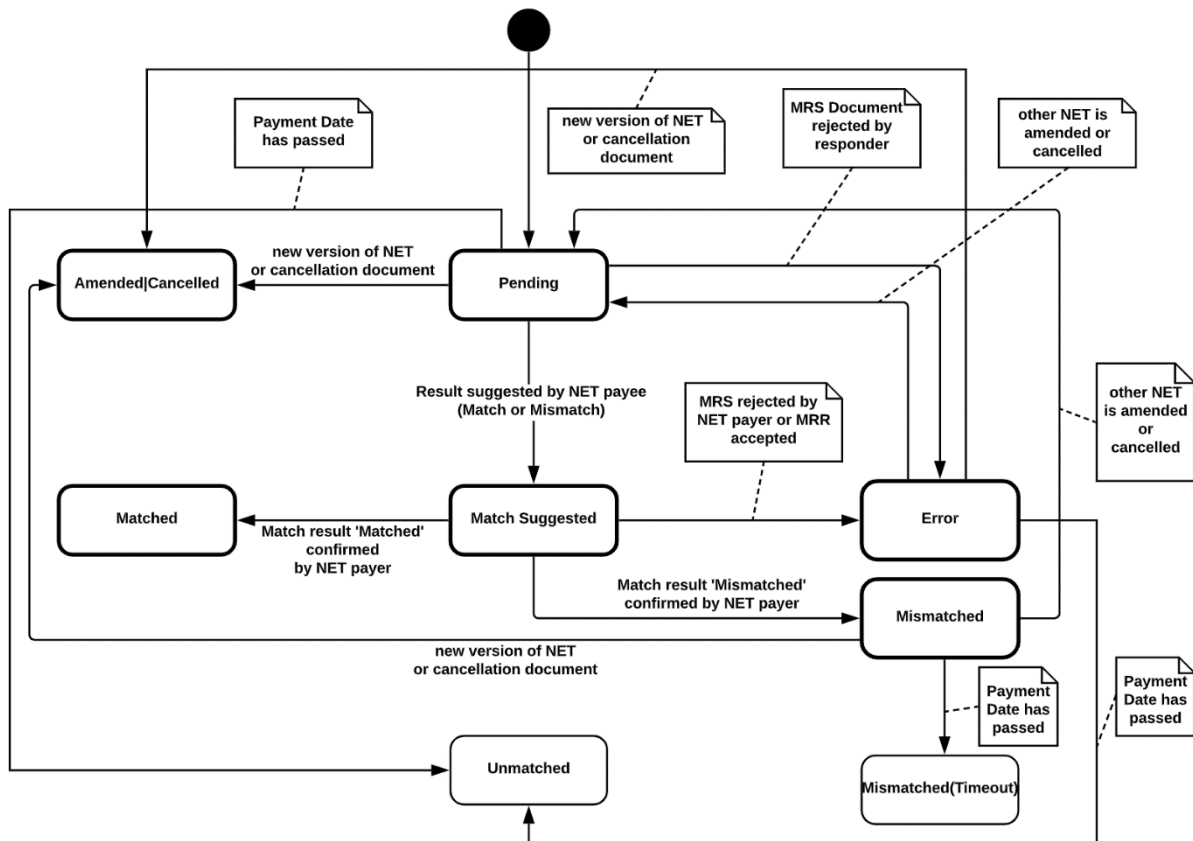
Figure 9: Netting Statement State Diagram

Validated documents entering the business process are assigned the **Pending state** signifying that they are available for matching.

Once a result (match, mismatch) is detected by the net Payee the result is suggested to the net Payer via a 'Match Result Suggestion' and the two instances progress to the interim **Match Suggested state**. In the Match Suggested state the net Payer validates the match suggestion made by the net Payee using the algorithm defined in section 5.3.1~~5.3.1~~, "General Match Processing of Documents".

If a 'Match' has been suggested and the net Payer also calculates a 'Match' then a 'Match Result Acceptance' with the match result 'Matched' is sent by the net Payer to the net Payee. Both Invoice documents are assigned the **Matched state**.

If a 'Mismatch' has been suggested and the net Payer calculates a 'Mismatch' then a 'Match Result Acceptance' with the match result 'Mismatched' is sent by the netPayer to the net Payee. Both Netting Statements are assigned the **Mismatched state**.

If the net Payer does not agree to the suggested result a 'Match Result Refusal' is sent to the net Payee and both documents are assigned the **Error state**.

If the payment date for a Netting Statement in the 'Pending' or 'Error' states is passed the document will be assigned to the **'Unmatched' state**.

If the payment date for a Netting Statement document in the 'Mismatched' state is passed the document will be assigned to the **'Mismatched – Time Out' state**. If the other mismatching invoice document has not exceeded the payment date then it will be returned to the 'Pending' state, since the cause of the mismatch could be a discrepancy in the CpML Payment Date field between the two candidate matching documents.

Netting Statement Documents in the Pending, Mismatched, or Error state may be assigned to the **Amended State** and to the **Cancelled state** based on an external event: either the Netting Statement Amendment dialogue in which one of the counterparties submits a new Netting Statement with the same Document ID but with a higher Version to the process, or either the Netting Statement Cancellation dialogue in which one of the counterparties submits a validated cancellation document to the process. It is not permitted to amend or to cancel a Netting Statement in a final state.

In case of an Amendment and when the original document is in the 'Mismatched' or 'Error' state the other counterparty's document will be returned to the 'Pending' state to participate in future matching with the amended Netting Statement. If the document was in the 'Pending' state, the counterparty's document will stay 'Pending'.

In case of a Cancellation and when the original document is in the 'Mismatched' or 'Error' state the other counterparty's document will be returned to the 'Pending' state to participate in future matching. If the document was in the 'Pending' state, the counterparty's document will stay 'Pending'.

If there are problems with the 'well processed' progressing of the documents that comprise the dialogue then documents in both instances (if it is possible to identify the document(s) concerned) will be assigned to the **Error state**. It is permitted to resubmit a document from the Error state to the **Pending state** by submitting a Reactivation Document. This will typically occur once the underlying issue that caused the original processing error has been resolved.

'Mismatched', 'Pending', 'Match Suggested' and 'Error' are interim states for the Netting Statement Document. 'Matched', 'Amended', 'Unmatched', 'Mismatched – Time Out' and 'Cancelled' are final states for the Netting Statement Document.

7.2 Communication Level: General Document Exchange State Processing
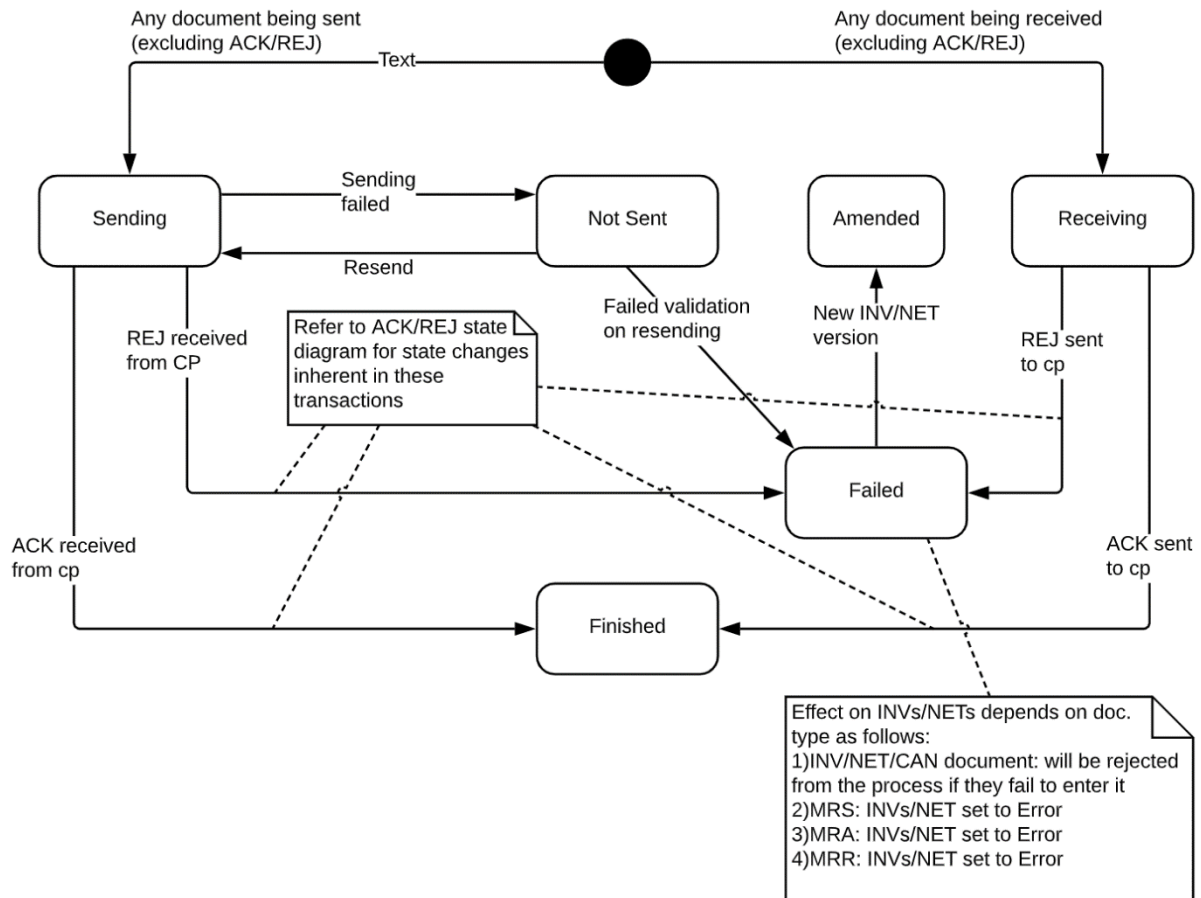
Figure 10: General Document Exchange State Processing

Figure 10: General Document Exchange State Processing~~Figure 10: General Document Exchange State Processing~~ shows the permitted state transitions that apply to all business documents (excluding Acknowledgement and Rejection documents). These state transitions deal specifically with the exchange of documents between the Payee and Payer and conform to the principles of synchronicity and uniqueness for documents in the process as previously stated.

By definition the state diagram is asymmetric as document exchange is directional i.e. from the sender and to the receiver. A document entering the process will therefore be in either the Sending or Receiving state when it is being transferred from one distributed instance of the process to the other instance.

A document in the '**Sending**' state will move to the '**Not Sent**' state if the delivery cannot be successfully achieved i.e. not 'well received'. The '**Not Sent**' state is an exception state and an external trigger is required to return it to the Sending state (i.e. either a timer or manual intervention). When a document is re-sent all validation must be reapplied this includes 'well processed' processing for the relevant document on submission to the communications process ('Sending' state) as well as on receipt ('Receiving' state). If the document fails validation on entry into 'Sending' then it will be moved to the Failed state and will not be reassigned to the Sending state.

A document in the '**Receiving**' state will be 'well received' but not yet 'well processed'. Validation against relevant business rules will result in the acceptance or rejection of the document leading to the issue of a business Acknowledgement or Rejection document as appropriate.

If the document was 'well processed' then an Acknowledgement Document is issued and it is moved to the '**Finished**' state and the document exchange process terminates.

If the document is not 'well processed' then a Rejection Document is issued and it is moved to the '**Failed**' state and the document exchange process terminates. The affect that a business rejection has on the broader eSM process depends on the status of the Invoice Documents or Netting Statements and is described in later sections.

New versions of Invoices or Netting Statements (defined as the same Document ID but a higher Version number) entering the process will cause earlier versions in Failed states to be moved to the Amended state and will themselves be processed. In the case of Invoices or Netting Statements in the Finished state new versions will not cause a transition for a previous version to the Amended state. The arrival of a new version of a business document is defined in 6.4 Detailed Transition Processing.

7.3 Synchronisation Level: Acknowledgement/Rejection Document State Processing

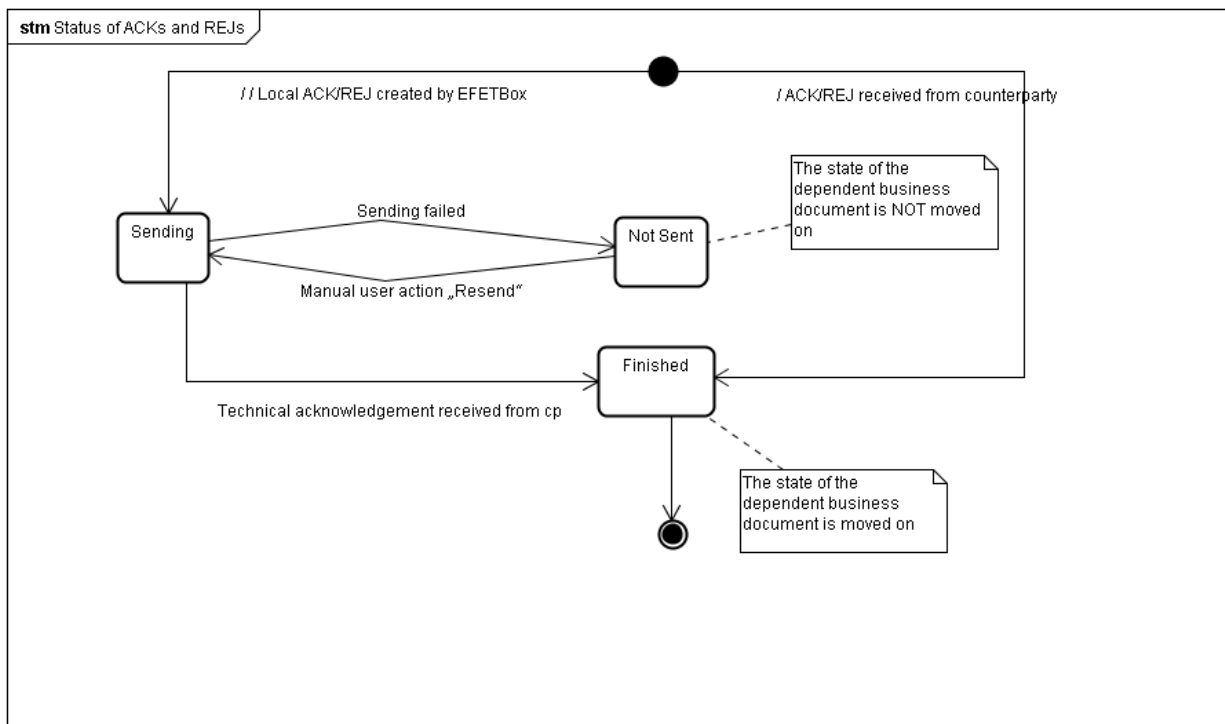*Figure 11: Acknowledgement/Rejection State Processing*

Figure 11: Acknowledgement/Rejection State Processing~~Figure 11: Acknowledgement/Rejection State Processing~~ defines the permitted state processing that applies to business Acknowledgement and Rejection documents. These state transitions relate to the synchronisation of state changes between the Payee and Payer instances of the eSM process.

This process is invoked by the 'Receiving' state to communicate whether an exchanged document is 'well processed' or not.

The document (Acknowledgement or Rejection) will be assigned the state of 'Sending' and will move to the 'Not Sent' state if it is not 'well received'. The 'Not Sent' state is an exception state and external intervention is required to return it to the Sending state. In this circumstance the 'Receiving' state will persist until the document (Acknowledgement or Rejection) is 'well received' and the state moved to 'Finished' at which point this instance of the process terminates. Consequently the document in the 'Received' state also proceeds to the final state.

Once the document (Acknowledgement or Rejection) is successfully delivered it is also assigned the state 'Finished' and the process terminates causing the document that is in the 'Sending' state in the remote instance of the document exchange process will progress to the final state so synchronising the two distributed process instances and the state changes of the business documents with both instances of the eSM process.

7.4 Business Level: Detailed State Transition Processing

Each of the following sections defines the detailed business rules for 'well processed' business documents within the Invoice Document and Netting Statement Dialogue.

7.4.1 Invoice Document Transition Processing for Official Invoice Documents

Start to Pending

Two ESMDocuments may enter an instance of the counterparty dialogue within the eSM process: invoice and shadow invoice. Both documents must be 'well processed' before they are assigned the Pending status.

A 'well processed' Invoice Document:

- is a new document, with a unique "DocumentID"/"DocumentVersion" combination, unknown to the current or a previous process instance, in which case:
  - o the Aggregation Keys are unique in the set of Invoice Documents, currently active in the process (invoice documents with duplicate content, other than the shadow invoice, are not allowed)
- the "Payment Date" must not be in the past defined as greater than 00:00:00 on Payment Date + 1 (note that since process instances may be in different time zones that there is a small chance of a document being accepted in one process instance but rejected from another process instance if the local clock time is after the Payment Date)
- or it is a new version of an existing invoice document, in which case:
  - o the current version of the document must be in a state that permits a valid transition to the amended state either:
    - ▪ if the document is in the 'Mismatched', 'Pending', 'Error' or 'Failed' state

An ESMDocument that fails local validation will be rejected from the process, it will not be assigned any state within the process, but a Process Result document must be issued by the process to provide an audit record of the rejection.

Note: Once in the Pending state match processing will be permitted to run to completion even if the "PaymentDate" for an invoice document passes.

A Process Result document will be exported by the process specifying the state change to the document. A Process Result document is issued for both the local document and for the invoice document received from the other party.

Pending to Match Suggested

The Payee instance of the process takes the lead and applies the matching algorithm defined. Once a potentially matching document has been identified by the Payee a Match Result Suggestion (MRS) document is created. The Payee can use 3 different types of MRS: a MRS(Match), a MRS(Tolerance Match) or a MRS(Mismatch).

A Match Result Suggestion (MRS) will be 'well processed' by the Payer

- if the Invoice Documents referenced in the MRS are known to the Payers instance of the Process, and
- if they are in the 'Pending' state.
- if it is of type Mismatch, Tolerance Match or Match.

If the MRS is 'well processed', it will be assigned to the 'Finished' state in the Communications Process and the referenced Invoice documents in both instances of the process will be moved from the 'Pending' to 'Match Suggested' state and the control moves to the Payer instance.

If either of the Invoice Documents referenced in the MRS cannot be identified in the set of Invoice documents in the 'Pending' state, then the MRS will not be 'well processed' i.e. set to the Failed status in the Communications Process. As defined in Section 6.2 Communication Level: General Document Exchange State Processing, a Rejection document will be issued to the Payee with a reason explaining the processing error.

If the MRS has been 'well processed' by the Payer, the Payer then applies the standard matching mechanism to the Invoice Documents in the 'Match Suggested' state and compares the result with that suggested by the Payee. If a 'Match' has been suggested and the Payer also calculates a 'Match' then a 'Match Result Acceptance' with the match result 'Matched' is sent by the Payer to the Payee.

If a 'Mismatch' has been suggested and the Payer calculates a 'Mismatch' or a 'Tolerance Match' then a 'Match Result Acceptance' with the match result 'Mismatched' is sent by the Payer to the Payee. *If a 'Tolerance Match' has been suggested and the Payer also calculates a 'Tolerance Match' then if tolerances are accepted by the Payer a 'Match Result Acceptance' with the match result 'Tolerance Matched' is sent by the Payer to the Payee. If tolerances are not accepted by the Payer a 'Match Result Acceptance' with the match result 'Mismatched' is sent. In all other cases a 'Match Result Refusal' is sent by the Payer to the Payee.*

Pending to Error

If the MRS is assigned to the 'Failed' state in the Communications Process, i.e. if it is referenced in a Rejection document, then the Invoice documents will be moved from the 'Pending' to the 'Error' state in both instances of the process.

A Process Result document will be exported by the process specifying the state change to the document.

Match Suggested to Matched, Mismatched or Tolerance Matched

Receipt by the Payee of a 'well processed' Match Result Acceptance (MRA) document, issued by the Payer, will result in the transition of Invoice Documents identified in the MRS referenced by the MRA in both instance of the process from the Match Suggested state to the Matched, Mismatched or Tolerance Matched state in synchronisation (depending on the type of MRS that has been sent by the Payee).

The MRA will be 'well processed'

- if the relevant Invoice documents are known to the Payee instance of the process and are in status Match Suggested.
- if the referenced MRS is known to the Payee instance
- if it has an equivalent Match Result as the Match Result of the MRS. A Match Result is equivalent if it is of the same type (i.e. MRA and MRS are both of type Mismatch, Tolerance Match or Match). Furthermore Tolerance and Mismatch are considered as equivalent.

If not, both Invoice Documents will be assigned to the 'Error' state.

A Process Result document will be exported by the process specifying the state change to the document.

If the document is set to the 'Tolerance matched' state then a Process Result document must be issued containing the delta between the Invoiced and 'expected' Invoiced amount.

Match Suggested to Error

Receipt by the Payee of a 'well processed' Match Result Refusal (MRR) document, issued by the Payer, will result in the transition of Invoice Documents identified in het MRS referenced by the MRR in both instances of the process from the Match Suggested state to the Error state.

The MRR will be 'well processed' by the Payee:

- if the relevant Invoice documents are known in the Payee instance of the process and are ins tatus Match Suggested
- if the referenced MRS is known to the Payee instance

if not both Invoice Documents will be assigned to the 'Error' state as well.

As mentioned above, in "Match Suggested to Matched, Mismatched or Tolerance Matched", also when a MRA is not 'well processed' by the Payee both Invoice Documents will be assigned to the 'Error' state.

A Process Result document will be exported by the process specifying the state change to the document.

Pending, Mismatched or Error to Amended

If an Invoice Document is in the 'Pending', `Mismatched' or 'Error' state it may be moved to the `Amended' state in both instances of the process by the submission of a new Invoice Document with the same Document ID but with a higher version by either counterparty.

The status of the current version will be changed to 'Amended' if the corresponding amendment is 'well processed' as described in the previous section.

The 'Amended' state is a final state for the Invoice Document since it cannot be further processed.

If the document was in the 'Mismatched' state then the counterparty document will be returned to the 'Pending' state to participate in future matching with the amended invoice.

A Process Result document will be exported by the process specifying the state change to the document.

Pending, Mismatched or Error to Cancelled

If an Invoice document is in the 'Pending', `Mismatched' or 'Error' state it will be moved to the `Cancelled' state in both instances of the process on entry into the process of a successfully delivered Cancellation Document.

A Cancellation document will be 'well processed' if it refers to an existing CpML Invoice Document in a state that permits a valid transition to the cancelled state.

If the document was in the 'Mismatched' state then the counterparty document will be returned to the 'Pending' state to participate in future matching.

A Process Result document will be exported by the process specifying the state change to the document.

Mismatched to Pending

The Invoice document in a mismatched pair is moved to the 'Pending' state to re-enter the matching process when the other document in the pair is moved to the 'Amended' or 'Cancelled' state.

Pending to Unmatched

If a CpML Invoice Document is in the 'Pending' state and the CpML "PaymentDate" passes (at 00:00:00 on Payment Date + 1) then the process will set the CpML Invoice Document to the 'Unmatched' state.

Pending to Unmatched is a local state transition, it does not require a document exchange with another instance of the process where the document is also present since the other process instance will apply the same state transition on the passing of the Payment Date in its local time zone. The synchronisation of the document's state transition in two process instances may vary if they are in different time zones, if a new version of the invoice document which is in the 'Unmatched' state in the instance of the process which is in a time zone ahead of the time zone of the other instance of the process, receives a new version of the document or a Cancellation document referencing the invoice document then those documents will fail business validation on receipt and will become not 'well processed'.

Mismatched to Mismatched – Time Out

If a CpML Invoice Document is in the 'Mismatched' state and the CpML "PaymentDate" passes (at 00:00:00 on Payment Date + 1) then the process will set the CpML Invoice Document to the 'Mismatched – Time Out' state.

'Mismatched' to 'Mismatched – Time Out' is a local state transition, it does not require a document exchange with another instance of the process where the document is also present since the other process instance will apply the same state transition on the passing of the Payment Date in its local time zone. The synchronisation of the document's state transition in two process instances may vary if they are in different time zones, if a new version of the invoice document which is in the 'Mismatched – Time Out' state in the instance of the process which is in a time zone ahead of the time zone of the other instance of the process, receives a new version of the document or a Cancellation document

referencing the invoice document then those documents will fail business validation on receipt and will become not 'well processed'.

7.4.2 Netting Statement Detailed Transition Processing

Start to Pending

A Netting Statement Document entering the process is first validated internally and is either accepted or rejected. A 'well processed' Netting Statement Document:

- is a new document, with a unique Document ID/DocumentVersion combination, unknown to the current or previous process instance, in which case:
  - o the Netting Information is unique in the set of active Netting Statements
  - o the CpML "Payment Date" must not be in the past, defined as greater than 00:00:00 on Payment Date + 1 (note that since process instances may be in different time zones that there is a small chance of a document being accepted in one process instance but rejected from another process instance if the local clock time is after the Payment Date)
- Or is a new version of an existing Netting Statement Document, in which case:
  - o the current version of the document is a state that permits a valid transition to the amended state

A netting statement that fails local validation will be rejected from the process, it will not be assigned any state within the process, but a Process Result document must be issued by the process to provide an audit record of the rejection.

Accepted documents are sent to the counterparty process instance.

A local notification message will be exported by the process specifying the state change to the document.

Pending to Match Suggested

The net Payee instance of the process takes the lead and applies the matching algorithm defined. Once a potentially matching document has been identified by the net Payee a Match Result Suggestion (MRS) document is created. The net Payee can use 2 different types of MRS: a MRS(Match) or a MRS(Mismatch).

A Match Result Suggestion (MRS) will be 'well processed' by the net Payer

- if the Netting Statements referenced in the MRS are known to the net Payer's instance of the Process, and
- if they are in the 'Pending' state.
- If it is of type Match of Mismatch

If the MRS is 'well processed', it will be assigned to the 'Finished' state in the Communications Process and the referenced Netting Statements in both instances of the process will be moved from the 'Pending' to 'Match Suggested' state and the control moves to the net Payer instance.

If either of the Netting Statements referenced in the MRS cannot be identified in the set of Netting Statements in the 'Pending' state, then the MRS will not be 'well processed' i.e. set to het Failed status in the Communications Processand a Rejection document will be issued to the net Payee with a reason explaining the processing error.

If the MRS has been 'well processed' by the net Payer, the net Payer must independently validate the suggested match received via the MRS document from the net Payee. If the Payer can agree to the Match, Tolerance Match or Mismatch suggested by the Payee a Match Result Acceptance (MRA) document will be issued by the Payer; otherwise a Match Result Refusal (MRR) will be issued.

Pending to Error

If the MRS is assigned to the 'Failed' state in the Communications Process, i.e. if it is referenced in a Rejection document, then the Netting Statements will be moved from the 'Pending' to the 'Error' state in both instances of the process.

A Process Result document will be exported by the process specifying the state change to the document.

Match Suggested to Matched or Mismatched

Receipt by the net Payee of a 'well processed' Match Result Acceptance (MRA) document, issued by the net Payer, will result in the transition of Netting Statements identified in the MRS referenced by the MRA in both instance of the process from the Match Suggested state to the Matched or Mismatched state in synchronisation (depending on the type of MRS that has been sent by the net Payee).

The MRA will be 'well processed'

- if the relevant Nettings Statements are known to the net Payee instance of the process and are in status Match Suggested
  - the referenced MRS is known to the net Payee instance.
- if it is of type Match or Mismatch
- If not, both Invoice Documents will be assigned to the 'Error' state.

A Process Result document will be exported by the process specifying the state change to the document.

Match Suggested to Error

Receipt by the net Payee of a 'well processed' Match Result Refusal (MRR) document, issued by the net Payer, will result in the transition of Netting Statements identified in het MRS referenced by the MRR in both instances of the process from the Match Suggested state to the Error state.

The MRR will be 'well processed'

- if the relevant Netting Statement document is known in the net Payee instance of the process, and are in status Match Suggested
  - the referenced MRS is known to the net Payee instance
- If not both Invoice Documents will be assigned to the 'Error' state as well.

As mentioned above, also when a MRA is not 'well processed' by the Payee both Invoice Documents will be assigned to the 'Error' state.

A Process Result document will be exported by the process specifying the state change to the document.

Pending, Mismatched or Error to Amended

If a Netting Statement is in the 'Pending', `Mismatched' or `Error' state, it may be moved to the `Amended' state in both instances of the process by the submission of a new Netting Statement with the same Document ID but with a higher version by either counterparty.

The status of the current version will be changed to 'Amended' if the corresponding amendment is 'well processed' as described in the section 6.4.3.1 'Start to Pending'.

The 'Amended' state is a final state for the Netting Statement, since it cannot be further processed, but not for the process.

If the Netting Statement was in the 'Mismatched' state then the counterparty Netting Statement will be returned to the 'Pending' state to participate in future matching with the amended netting statement.

A Process Result document will be exported by the process specifying the state change to the document.

Pending, Matched, Mismatched or Error to Cancelled

If a Netting Statement is in the 'Pending', `Mismatched' or `Error' state it will be moved to the `Cancelled' state in both instances of the process on entry into the process of a successfully delivered Cancellation Document.

A Cancellation document will be 'well processed' if it refers to an existing Netting Statement in a state that permits cancellation.

If the Netting Statement was in the 'Mismatched' state then the counterparty Netting Statement will be returned to the 'Pending' state to participate in future matching.

A local notification message will be exported by the process specifying the state change to the document.

Mismatch to Pending

The Netting Statement in a mismatched pair is moved to the 'Pending' state to re-enter the matching process when the other document in the pair is moved to the 'Amended' or 'Cancelled' state.

Pending to Unmatched

If a CpML Netting Statement Document is in the 'Pending' state and the CpML "PaymentDate" passes (at 00:00:00 on Payment Date + 1) then the process will set the CpML Netting Statement Document to the 'Unmatched' state.

Pending to Unmatched is a local state transition, it does not require a document exchange with another instance of the process where the document is also present since the other process instance will apply the same state transition on the passing of the Payment Date in its local time zone. The synchronisation of the document's state transition in two process instances may vary if they are in different time zones, if a new version of the Netting Statement document which is in the 'Unmatched' state in the instance of the process which is in a time zone ahead of the time zone of the other instance of the process, receives a new version of the document or a Cancellation document referencing the Netting Statement document then those documents will fail business validation on receipt and will become not 'well processed'.

Mismatched to Mismatched – Time Out

If a CpML Netting Statement Document is in the 'Mismatched' state and the CpML "PaymentDate" passes (at 00:00:00 on Payment Date + 1) then the process will set the CpML Netting Statement Document to the 'Mismatched – Time Out' state.

'Mismatched' to 'Mismatched – Time Out' is a local state transition, it does not require a document exchange with another instance of the process where the document is also present since the other process instance will apply the same state transition on the passing of the Payment Date in its local time zone. The synchronisation of the document's state transition in two process instances may vary if they are in different time zones, if a new version of the Netting Statement document which is in the 'Mismatched – Time Out' state in the instance of the process which is in a time zone ahead of the time zone of the other instance of the process, receives a new version of the document or a Cancellation document referencing the Netting Statement document then those documents will fail business validation on receipt and will become not 'well processed'.

Appendix A. Definition of new eSM Field Names and Codes

Field names or types that are not described here, already exist in the core CpML® specification or in the CpML® for eSM specification.

A.1 New Field Names

The following tables list all new CpML field names and types in eSM-specific process documents in alphabetical order. The valid values derived from the types are listed in the field type descriptions, "New Field Types".

Field name	Definition	Based on type
MatchResult	Document state as result of an invoice or netting statement matching process.	ESMMatchResultType
MatchResultSuggestion-DocumentID	The document ID of an Match Result Suggestion document that a Match Result Acceptance or Match Result Refusal document refers to.	IdentificationType
ReferencedDocumentID	The ID of a document that is referenced in the eSM process.	IdentificationType
ReferencedDocument-Type	The type of a document that is referenced in the eSM process.	ESMDocumentType
ReferencedDocument-Version	The version of a document that is referenced in the eSM process.	VersionType
ReferencedInitiator-DocumentID	Document ID of the ESMDocument corresponding to the invoice sent by the initiator.	IdentificationType
ReferencedInitiator-DocumentVersion	Document version of the ESMDocument corresponding to the invoice sent by the initiator.	VersionType
ReferencedResponder-DocumentID	Document ID of the ESMDocument corresponding to the invoice sent by the responder.	IdentificationType
ReferencedResponder-DocumentVersion	Document version of the ESMDocument corresponding to the invoice sent by the responder.	VersionType

A.2 New Field Types

The following table lists all new CpML field types in alphabetical order. Where applicable, valid values are described. The Length column describes the maximum string length, where applicable. If nothing else is stated, the minimum string length is 1.

Field Type	Definition	Base Type	Length
ErrorSourceType	Describes where an error occurred in an XML document.	String	
ESMDocumentType	Document types in eSM. The following values are allowed: ▪ INV: Invoice ▪ NET: Netting statement ▪ ACK: Acknowledgement ▪ CAN: Cancellation ▪ MRS: Match Result Suggestion ▪ MRA: Match Result Acceptance ▪ MRR: Match Result Refusal ▪ REJ: Rejection	String	
ESMMatchResult-Type	Indicates the result of an invoice or netting statement matching process. The following values are allowed: ▪ Match: A match was calculated. ▪ Mismatch: A mismatch was calculated or a tolerance match was calculated, but the initiator does not permit tolerance matching. ▪ ToleranceMatch: A tolerance match was calculated, and tolerance matches are permitted.	String	
ESMReasonCode-Type	A code defining a known technical or business processing error. The code relates to situations when a document is not well received or when a document is not well processed. The following values are allowed: ▪ XML:ValidationFailure ▪ ebxml:ValueNotRecognized ▪ ebxml:NotSupported ▪ ebxml:Inconsistent ▪ ebxml:OtherXML ▪ ebxml:DeliveryFailure ▪ ebxml:TimeToLiveExpired ▪ ebxml:SecurityFailure ▪ ebxml:MimeProblem ▪ ebxml:Unknown ▪ efet:InvalidData ▪ efet:TimeOut ▪ efet:InvalidMatchAttempt ▪ efet:AmendmentError ▪ efet:IDNotFound ▪ efet:UniquenessViolation ▪ efet:NoMatch ▪ efet:ReferencedDocNotExists ▪ efet:RefDocInvalidState ▪ efet:MinorVersionInInvalidState For a description of the values, see section A.1~~A.1~~, "Reason Code Types".	String	
ESMRoleType	The following values are allowed: ▪ OfficialDocumentIssuer ▪ ShadowDocumentIssuer	String	
OriginatorType	Explains with software component raised an error.	String	

A.1. Reason Code Types

Naming domain codes are used as a prefix to qualify error codes and originators:

- "xml"
- "efet"
- "ebxml"
- Vendor-specific, e.g. "ponton" etc.

Minimal required reason codes:

- ebXML Error Codes: See ebXML MS2.0 Spec. (ValueNotRecognized, NotSupported, Inconsistent, OtherXml, DeliveryFailure, TimeToLiveExpired, SecurityFailure, MimeProblem, Unknown)
- EFET Error Codes: TimeOut, TCAlreadyMatched, NoMatch, InvalidData
- Vendor-specific Error codes (non): See vendor-specific documentation

Table 8: Reason Code Types

Domain	Error Code	Comment
XML	ValidationFailure	An XML element/attribute could not be validated against the Schema
ebxml	ValueNotRecognized	XML enumeration not defined in Schema
ebxml	NotSupported	An ebXML feature that is not supported, e.g. multi-hop communication
ebxml	Inconsistent	In valid XML document
ebxml	OtherXML	Error explained in more detail in ReasonText
ebxml	DeliveryFaliure	Error explained in more detail in ReasonText
ebxml	TimeToLiveExpired	
ebxml	SecurityFailure	Error explained in more detail in ReasonText
ebxml	MimeProblem	Error explained in more detail in ReasonText
ebxml	Unknown	Error explained in more detail in ReasonText
efet	InvalidData	One or more data fields are invalid (yet XML Schema compliant).
efet	TimeOut	The trade confirmation timed out on the sender side of the document.
efet	InvalidMatchAttempt	The trade confirmation is generally in a document state that does not allows for matching (e.g. Amended, Failed, Matched etc.)
efet	AmendmentError	The amendment has a wrong version number
efet	IDNotFound	An externally defined ID (e.g. EIC Code) could not be verified
efet	UniquenessViolation	ID used in a trade confirmation is already in use

efet	NoMatch	The sender could not match the two trade confirmations referenced by the Match Suggestion
efet	ReferencedDocNotExists	The referenced Document does not exist in the Counterparts System.
efet	RefDocInvalidState	The referenced Document is not in a valid state for further processing. (e.g. state ACKNOWLEDGED was expected but it is in state PENDING)
efet	MinorVersionInInvalidState	The currently processed Trade Confirmation has minor versions in a state that does not allows amendments. (e.g. state is FAILED)

Appendix B.   Matching Tolerances by Currency

B.1 Tolerances for Physical Products – Summary Level

These tolerances may be applied to the summary amounts within the Shadow Invoice document. There are 2 ToleranceTypes specified: 'Percentage' and 'Absolute'.

Currency	Long text	Percentage Amount	Absolute Amount*
USD	US Dollar	n/a	<=50
EUR	Euro	n/a	<=50
GBP	Pound Sterling	n/a	<=50
JPY	Japanese Yen	n/a	<=50
Other	Other	n/a	<=50

* In order for the eSM standard to function correctly in interoperable mode, an equal tolerance is required between both parties. The precise amount will be set equal by the user communities of the eSM service providers.

B.2 Tolerances for Physical Products – Detail Level

These tolerances may be applied to the detail amounts within the Shadow Invoice document.

Currency	Long text	Percentage Amount	Absolute Amount*
USD	US Dollar	n/a	<=50
EUR	Euro	n/a	<=50
GBP	Pound Sterling	n/a	<=50
JPY	Japanese Yen	n/a	<=50
Other	Other	n/a	<=50

* In order for the eSM standard to function correctly in interoperable mode, an equal tolerance is required between both parties. The precise amount will be set equal by the user communities of the eSM service providers.

B.3 Tolerances for Financial Products – Summary Level

These tolerances apply to the summary amounts within the Invoice document.

Currency	Long text	Percentage Amount	Absolute Amount*
USD	US Dollar	n/a	<=50
EUR	Euro	n/a	<=50
GBP	Pound Sterling	n/a	<=50
JPY	Japanese Yen	n/a	<=50

Currency	Long text	Percentage Amount	Absolute Amount*
Other	Other	n/a	<=50

* In order for the eSM standard to function correctly in interoperable mode, an equal tolerance is required between both parties. The precise amount will be set equal by the user communities of the eSM service providers.

B.4 Tolerances for Financial Products – Detail Level

These tolerances apply to the detail amounts within the Invoice document.

Currency	Long text	Percentage Amount	Absolute Amount*
USD	US Dollar	n/a	<=50
EUR	Euro	n/a	<=50
GBP	Pound Sterling	n/a	<=50
JPY	Japanese Yen	n/a	<=50
Other	Other	n/a	<=50

* In order for the eSM standard to function correctly in interoperable mode, an equal tolerance is required between both parties. The precise amount will be set equal by the user communities of the eSM service providers.

Appendix C. E-Invoice TAX Requirements for EU Member States (Under construction)

MEMBER STATE	IS IT OBLIGATORY TO USE QUALIFIED CERTIFICATED AND SECURE-SIGNATURE-CREATION DEVICES FOR INVOICES SENT WITH ADVANCED ELECTRONIC SIGNATURES?	IS AN ADDITIONAL SUMMARY DOCUMENT ON PAPER OBLIGATORY FOR EDI?
Austria	Yes, where invoices contain a signature complying with the requirements of Article 2(3)(a) to (d) of the Signature Act certificated by a certification authority within the meaning of the Signature Act.	Summary paper document required (or certified electronic signature).
Belgium	Invoices sent electronically are accepted by the authorities provided that the authenticity of their origin and the integrity of their content are guaranteed, in particular by means of an advanced electronic signature which must meet the following requirements:

a) it is uniquely linked to the signatory;

b) it is capable of identifying the signatory;

c) it is created using means that the signatory can maintain under his sole control and it is linked to data to which it relates in such a manner that any subsequent change of the data is detectable.

It is not necessary to use a qualified certificate or a secure-signature-creation device. | Invoices sent electronically are accepted by the authorities in particular when they are sent in compliance with the EDI standard when the agreement between the parties relating to this interchange provides for the use of procedures guaranteeing the authenticity of the origin and integrity of the data.

It is not necessary to send an additional summary document on paper. |
| Bulgaria | Yes, authorised access. | Not applicable |
| Cyprus | Certificated signatures and secure signature creation are not obligatory for invoices sent with advanced electronic signatures. | No additional summary document is required for invoices sent by electronic data interchange. |
| Czech Republic | Yes, such invoices must be sent with advanced electronic signatures (or electronic marks) based on a qualified system certificate pursuant to Act No 227/2000 on electronic signatures.

Traders currently authorised to issue certificates are I.CA(http://www.ica.cz), Česká pošta (http://qca.postsignum.cz) and Identity (http://www.eidentity.cz/app) | No, an additional summary document on paper is not required. |
| Denmark | If an electronic (digital) signature is used, this must be based on an advanced electronic signature,

which shall have a security level at least equivalent to, for example, an OCES certificate (Offentlige Certifikater for Offentlig Service – public certificates for public services). This means that another equivalent digital signature is equally acceptable. The electronic signature system provides security, which is crucial for confidence, that is:

- authenticity: which provides the recipient of the invoice with reassurance that the invoice comes from the person who sent the invoice

- integrity: provides reassurance that the invoice has not been changed in transit. Please also see www.digitalsignatur.dk | No additional document has to be sent on paper when using electronic data interchange (EDI).

The use of EDI requires that a specific agreement exists between the buyer and seller laying down secure procedures for the electronic exchange of invoices using EDI. Its use requires the parties to use and uphold the special methods and rules necessary for data security, the authenticity of the data origin and integrity of the data content. |
| Estonia | No | No |

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Finland	Electronic signatures are not required.	An additional summary document need not be submitted in Finland when invoices are transmitted by electronic data interchange.
France	It is not necessary for the signature to be based on a qualified certificate. However, the certification and signature device adopted must be sufficiently secure to guarantee the authenticity and the integrity of the electronically transmitted invoices. The enterprise to which the invoices are addressed must verify the authenticity and the integrity of the document by means of the data inserted in the electronic certificate attached to the electronic signature.	An enterprise issuing or receiving paperless invoices (Article 289a of the General Tax Code), regardless of who has physically transmitted or received the messages in its name and on its behalf, must ensure that a sequential recapitulative list of all the messages transmitted or received and any anomalies they may contain is kept and stored on paper or data medium during the storage period.
Germany	Pursuant to Article 14(3)(1) of the Turnover Tax Act, the authenticity of the origin and the integrity of the content must be ensured, as a minimum, by a qualified electronic signature in accordance with the Signature Act of 16 May 2001, where invoices are sent electronically.	Pursuant to Article 14(3)(2) of the Turnover Tax Act, a summary invoice in paper form must also be sent when invoices are sent by electronic data interchange. The summary invoice may be sent electronically if it contains, as a minimum, a qualified electronic signature in accordance with the Signature Act.
Greece	The relevant provisions of Presidential Decree 150/2001 (Government Gazette 125/I/25.6.2001) apply to the sending of invoices with advanced electronic signatures, without a qualified certificate requirement. However, there is a requirement for creation of a digital signature by specific secure devices (marking mechanisms).	This is required only where the taxable person effects supplies of goods or services outside Greece (in another Member State or in a third country). The additional summary document (on paper) must state at least the full particulars of the parties to the transaction and the total value of the transaction. The document is not required if the taxable person keeps copies of invoices with full content.

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Hungary	Electronic invoices must be issued using advanced electronic signatures, time stamps, or electronic data interchange (EDI) systems. The definitions of advanced electronic signatures and time stamps are contained in Act XXXV of 2001 on electronic signature. Article 2 (15) 'Advanced electronic signature' shall mean an electronic signature that meets the following requirements: (a) it is uniquely linked to the signatory; (b) it is created by using means that the signatory can maintain under his sole control; (c) it is linked to the document to which it relates in such a manner that any change to the data of the document made subsequent to the execution of the signature is detectable. 'Time-stamp' shall mean a form of verification that is permanently attached to or logically associated with an electronic document intended to verify that the electronic document existed in an unaltered form at the time of time stamping. 'Qualified electronic signature' shall mean an advanced electronic signature that has been created by the signatory with a secure-signature-creation device and is attested by a qualified certificate.	Taxable persons are required to have monthly supplementary summary documents regarding the invoices sent by EDI. The provisions on accounting documents contained in the Act on accounting are applicable to the supplementary summary documents. The taxable person keeps one copy and sends the other copy to the customer. The document must contain the following: - the data relating to the issuer of the invoice: i. name ii. address: iii. tax number (Community tax number, if there is one). - the data relating to the purchaser: i. name ii. address: iii. tax number (Community tax number, if there is one). - serial number of the invoices issued in the given period; - the amount of the taxable base and the amount of the tax to be paid for the given period.
Ireland	No specific certification is required. Advanced electronic signatures are defined in Regulations. The definition lays down high-level criteria which are technology neutral and if the invoice is issued in accordance with these criteria it is acceptable.	No additional summary documentation is required. However, taxable persons are required to produce paper copies of specified invoices following a request by a tax official.

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Italy	By agreement with the recipient, the invoice may be sent electronically without macro-instructions or an executable code. The certification of the date, the authenticity of the origin and the integrity of the content of the electronic invoice are guaranteed by applying the temporary reference and qualified electronic signature to each invoice or batch of invoices (Article 21(3) of Presidential Decree 633/1972). The qualified electronic signature is an advanced electronic signature based on a qualified signature, and generated by a secure device for generating the signature (Article 1(1)(h) of the Decree of 23 January 2004).	The recipient's consent is necessary to send the invoice electronically. Therefore there is no requirement to print the invoice out on paper. However, the document must be made tamper-proof by qualified electronic signature and date reference. Therefore the obligation to send or deliver a paper document only arises when the recipient has not consented to electronic transmission. In that case, the standard provisions of Article 21 of Presidential Decree 633/1972 must be followed.
Latvia	No details published	No details published
Lithuania	Invoices sent by electronic means are accepted where advanced electronic signature defined by Law on Electronic Signature No VIII-1822 of 11 July 2000 of the Republic of Lithuania (as amended by Law No IX-934 of 6 June 2002) guarantees the authenticity of the invoice origin and the integrity of its contents. The Law is in accord with Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures. For the purposes of this Law, a qualified certificate means a certificate issued by a certification-service-provider who fulfils the requirements laid down by the Government or an institution authorised by it. The certificate must contain the following details: 1) an indication that the certificate is issued as a qualified certificate; 2) the identification of the certification-service-provider and the State in which it is established; 3) the name and surname of the signatory or a pseudonym; 4) specific attributes of the signatory if it is necessary for the purpose for which the certificate is intended; 5) signature-verification data which correspond to signature-creation data under the control of the signatory; 6) an indication of the beginning and end of the period of validity of the certificate; 7) The identity code of the certificate provided by the certification-service-provider; 8) the advanced electronic signature of the certification-service-provider issuing it; 9) limitations on the scope of the use of the certificate, if applicable;	Invoices sent by electronic means are accepted in all cases where the authenticity of their origin and the integrity of their contents is guaranteed by electronic data interchange (EDI) as defined in Commission Recommendation 94/820/EC of 19 October 1994 relating to the legal aspects of electronic data interchange, and where interchange agreements provide for a procedure guaranteeing the authenticity and integrity of data. It is required to use EDI standards (UN/EDIFACT, XML standards). No additional summary document is required.

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	10) limits of the value of transactions for which the certificate can be used, if applicable. For the purposes of this Law, a secure signature creation device means a signature creation device which meets all the requirements laid down in this section: 1) the signature-creation-data used for signature generation can practically occur only once, and their secrecy is reasonably assured; the signature-creation-data used for signature generation cannot, with reasonable assurance, be derived and the signature is protected against forgery using currently available technology; 3) the signature-creation-data used for signature generation can be reliably protected by the legitimate signatory against the use of others; 4) secure signature-creation devices must not alter the data to be signed or prevent such data from being presented to the signatory prior to the signature process. Qualified certificates created by foreign certification-service-providers are deemed to be legally equivalent to qualified certificates created by certification-service-providers of the Republic of Lithuania if: 1) They are created by a certification-service-provider accredited in the Republic of Lithuania; 2) They are created by a certification-service-provider accredited in a Member State of the European Union; 3) The certificate is guaranteed by a certification-service-provider of the Republic of Lithuania who fulfils the requirements for certification-service-providers creating qualified certificates laid down by the Government of the Republic of Lithuania or an institution authorised by it; 4) The certificate is guaranteed by a certification-service-provider of a Member State of the European Union who fulfils the requirements for certification service-providers creating qualified certificates equivalent to those laid down by the Government of the Republic of Lithuania or an institution authorised by it. The Republic of Lithuania recognises certification-service-providers of other countries and the certificates issued by them where their recognition is based on international agreements.	

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Luxembourg	Invoices issued pursuant to the relevant current legal provisions may be sent either on paper or, subject to acceptance by the customer, by electronic means. Invoices sent by electronic means are treated as invoices provided that the authenticity of the origin and integrity of the content are guaranteed - by means of an advanced electronic signature within the meaning of Article 2 of Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures; - or by means of electronic data interchange (EDI), as defined in Article 2 of Commission Recommendation 1994/820/EC of 19 October 1994 relating to the legal aspects of electronic data interchange, when the agreement relating to the interchange provides for the use of procedures guaranteeing the authenticity of the origin and the integrity of the data. Advanced electronic signature standards have not yet been defined.	No details published
Malta	The Twelfth Schedule's Item 11 caters for this and reads: Invoices by electronic means: 1. Invoices containing the details specified in item 2, and subject to the acceptance by the customer, may be sent by electronic means, provided that the authenticity of the origin and the integrity of the contents are guaranteed as may be provided for by national legislation with regard to the use of electronic signatures, or as may be required and approved by the Commissioner.	No details published
Netherlands	No. An advanced electronic signature is required within the meaning of Article 2(2) of Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures (OJ L 13, 2000). An advanced electronic signature must meet the following requirements: - it is uniquely linked to the signatory; - it is capable of identifying the signatory; - it is created using means that the signatory can maintain under his sole control; and - it is linked to the data to which it relates in such a manner that any subsequent change of the data is detectable.	No. With regard to the possibilities of electronic invoicing, it was stipulated, with effect from 1 January 2004, that where electronic data interchange was used in accordance with the Recommendation of 19 October 1994 (EDI), a reconciliation statement in paper form would be required. On the basis of experience acquired in the meantime, the individual requirement of a reconciliation statement in paper form lapsed as of 1 January 2006. This means that henceforth, where EDI is used, the general requirement suffices that the data interchange agreement provides for the use of procedures which guarantee the authenticity of the origin and the integrity of the data. This last general requirement may nevertheless mean that a paper-

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		based reconciliation statement is required under certain circumstances. However, in that case, this is an "other method" (see question 30).
Poland	Invoices can be issued, sent and stored in electronic form, provided that the authenticity of their origin and the integrity of their content is guaranteed: 1) by means of a secure electronic signature within the meaning of Article 3.2 of the Act of 18 September 2001 on the electronic signature (Journal of Laws No 130, item 1450, as amended), verified by means of a valid qualified certificate, or 2) by means of electronic data interchange (EDI), in accordance with the agreement on the European model of the electronic data interchange, when the agreement relating to the exchange provides for the use of procedures guaranteeing the authenticity of the origin of invoices and integrity of the content.	No, in the case of invoices sent by electronic data interchange there is no obligation to supply their paper version. Neither is it required to prepare a paper summary of invoices issued in electronic form.
Portugal	Portuguese law does not require the use of qualified certificated and secure-signature-creation devices for advanced electronic signatures on electronic invoices.	The Portuguese TAX Code stipulates that taxable persons issuing or receiving invoices electronically must retain paper lists identifying such documents for each tax period (month or quarter). The lists must identify the invoices – numbers and dates – and show the NIF (tax identification number) of both sender and recipient, as well as the amount of TAX paid and the total amount of the invoice. However, this stipulation of the Code is expected to be deleted.
Romania	Yes – there is a need for advanced electronic signature, electronic data interchange system (EDI) or other electronic means accepted by the IT Department of Ministry of Public Finance.	Yes – a summary document on paper form, with all the invoices issued by electronic means within a calendar month by a taxable person registered for TAX purposes, or with all the invoices received in a calendar month by every taxable person liable to pay TAX if the supplier is not registered for TAX purposes.
Slovakia	According to Section 75 (6) of Act No 222/2004 on TAX, as amended, an invoice may be issued in writing or electronically with the consent of the customer. The reliability of the origin and incorruptibility of the content of the electronically issued invoice must be guaranteed by the electronic signature pursuant to Act No 215/2002 on	According to Section 31 of Act No 431/2002 on accounting, as amended, an accounting record (including an invoice) made by electronic means must be able to be transferred into written form.

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	electronic signatures and amendments to some acts, as amended.	Transfer to written form is not required where a verifiable mark in technical form replacing a handwritten signature is used. Transfer from electronic form to written form and vice versa is secured in such a manner that the content of the accounts record in the new form is identical with the content of the 13 accounts record in the original form. This requirement is regarded as fulfilled if the accounting unit submits the accounts record in the original and new form, or their identical content is demonstrated in another way not disputed by any of the persons who work with the transferred record.
Slovenia	In accordance with the Electronic Commerce and Electronic Signature Act, a secure electronic signature certified with a qualified certificate must be used. In closed systems regulated entirely by contracts between a known number of contractual parties, an electronic signature that is not certified by a qualified signature may be used.	No
Spain	No details provided	No details provided
Sweden	Yes. In accordance with the Swedish TAX Act, electronic invoices may be sent by other electronic means in accordance with Article 22(3)(c), third subparagraph. The underlying condition in accordance with the Swedish Accounting Act and the Swedish Tax Payment Act for both paper-based and electronic invoices is that they must be correct and not have been altered. No specific method is indicated in the legislation for the safety of the contents of an invoice. The Swedish Tax Agency has been granted powers to issue regulations on simplified invoices if needed, but has not yet issued any such regulations.	See answer opposite.
United Kingdom	No	No

Appendix D. Glossary of Terms

Term	Description
ACK	Acknowledgement, document type in eSM
CAN	Cancellation, document type in eSM
eCM	Electronic Confirmation and/or Matching, EFET standard
EFET	European Federation of Energy Traders
EFET codes	Acceptable values (formats) for specific attributes of an object (e.g. counterparty, currency code, product code or delivery date). EFET codes are published by EFET as part of its EFET standard, see reference document [4][4].
eRR	Eletronic Regulatory Reporting, EFET standard
ISIN	International Securities Identification Number, as defined by ISO 6166.
MRA	Match Result Acceptance, document type in eSM
MRR	Match Result Refusal, document type in eSM
MRS	Match Result Suggestion, document type in eSM
PRS	Process Result, document type in eSM
REJ	Rejection, document type in eSM
SSDS	System Static Data Standard
VAT	Value-added tax
XML	eXtensible Markup Language