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METHODOLOGICAL ISSUES

GUIDELINES UNDER ARTICLES 5, 7 AND 8 OF THE KYOTO PROTOCOL

Report on intersessional consultations on registries

Note by the Chair of the consultations

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I. INTRODUCTION

A. Mandate

1. The Conference of the Parties (COP), by its decision 19/CP.7, requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to develop technical standards for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the clean development mechanism (CDM) registry and the transaction log, with a view to recommending to the COP, at its eighth session, a decision on this matter, for adoption by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its first session, to facilitate the early development and establishment of national registries, as well as of the CDM registry and transaction log.

2. By the same decision, the COP also requested the Chair of the SBSTA, with the assistance of the secretariat, to convene intersessional consultations with Parties and experts for the purposes of:

(a) Preparing draft technical standards for consideration by the SBSTA at its sixteenth and seventeenth sessions;

(b) Providing for the exchange of information and experience between Parties included in Annex I and Parties not included in Annex I, as well as the secretariat, in relation to the development and establishment of national registries, the CDM registry and the transaction log (FCCC/CP/2001/13/Add.2).

B. Scope of the note

3. This report provides information on the intersessional consultations on registries convened by the Chair of the SBSTA and chaired by Mr. Murray Ward (New Zealand). In particular, this report contains the outcomes of consultations held on 19-20 October 2002 in New Delhi, India, for consideration by the SBSTA at its seventeenth session. These include:

(a) Draft technical standards, in the form of general design requirements, for data exchange between national registries, the CDM registry and the transaction log (referred to below as "registry systems"), as contained in the annex to this report;

(b) Possible modalities for continuing work on this issue to elaborate the detailed functional and technical specifications of the technical standards, on the basis of the general design requirements;

(c) An informal paper of 13 June 2002 by the Chair of the consultations which participants wished to be forwarded as a starting point for any further work to elaborate the functional and technical specifications.

C. Possible action by the SBSTA

4. The SBSTA may wish to consider the information contained in this report and recommend, for adoption by the COP at its eighth session, a draft decision on general design requirements and modalities for continuing the work to elaborate the functional and technical specifications of the technical standards.

II. PROCEEDINGS OF THE CONSULTATIONS

A. Background

5. The consultations on registries in New Delhi were attended by 45 representatives of Parties and organizations, including participants from 21 Annex I Parties and seven non-Annex I Parties. A working

paper had been prepared by the secretariat, with the assistance of technical experts, as a basis for the consultations.[1]

6. The technical standards for data exchange are to provide a basis for transactions under the mechanisms defined in Articles 6, 12 and 17[2] and the modalities for the accounting of assigned amounts under Article 7, paragraph 4. They pertain to the exchange of data between registry systems, in accordance with decisions -/CMP.1 (*Modalities for the accounting of assigned amounts*) and -/CMP.1 (*Article 12*).[3] The technical standards are therefore complementary to those decisions.

B. Framework of the technical standards

7. In order to support the elaboration of technical standards and their implementation in all registry systems, the participants at the consultations considered that the technical standards should have the following tiered framework:

(a) General design requirements for data exchange between registry systems, forming the basis for a complete model for data exchange;

(b) Detailed functional specification of the interface between registry systems, in accordance with the general design requirements;

(c) Detailed technical specification of the interface between registry systems, in accordance with the general design requirements, at a level of detail sufficient for administrators of registry systems to implement and test them.

8. The draft technical standards contained in the annex address the level of the general design requirements. They relate, at a general level, to the actions and system characteristics involved in the exchange of data between registry systems and standard levels of performance to be reached in these respects. This was considered by participants in the consultations to be the appropriate level of mandatory technical standards to be adopted by the COP.

9. The general design requirements would form the basis for the subsequent elaboration of the more detailed tiers of the technical standards framework that is necessary to ensure that the technical standards are implemented in all registry systems in a compatible manner. Taken as a whole, the three levels of the technical standards framework, when elaborated, should provide specific requirements against which the performance of registry systems may be measured in relation to the exchange of data.

10. The consultations also made progress on more detailed material in relation to the content of electronic messages to be exchanged between registry systems and the format of the serial, account and transaction numbers.[4] While participants considered that this material was not appropriate for inclusion in general design requirements, they felt it would be a good starting point for future work to elaborate the functional and technical specifications and should be forwarded for consideration in future work.

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[1] This working paper, and presentations made during the consultations, are available on the UNFCCC web site (see http://unfccc.int/sessions/workshops.html).

[2] In the context of this document, "Article" refers to an Article of the Kyoto Protocol, unless otherwise specified.

[3] Attached to decisions 19/CP.7 and 17/CP.7, respectively.

[4] This information is contained in an informal paper by the Chair of the intersessional consultations on registries (see http://unfccc.int/sessions/workshop/020602/pap_chair.pdf), dated 13 June 2002, reproduced in annex II.

C. Modalities for continuing work on this issue

11. Participants raised the concern that the time frame for elaborating and implementing the full framework of the technical standards should be consistent with the desire of many Parties to introduce emissions trading schemes in 2005 and to meet the eligibility requirements for the mechanisms in early 2006. In this light, the participants in the consultations considered that significant progress in elaborating the functional and technical specifications is needed prior to COP 9. Participants noted the detailed technical nature of this work and the need to progressively involve information technology experts.

12. The participants also noted that elaborating the functional and technical specifications of the technical standards is an integral component of the development of the transaction log. This was considered particularly important as participants felt that all data exchange between registries should be routed through a central communications hub integrated with the transaction log.

13. In this light, participants stressed the need that, in developing the transaction log, the secretariat prioritize work to elaborate the functional and technical specifications of the technical standards. This work should be undertaken through a close collaborative effort between the secretariat and technical experts of interested Parties.

14. It was also felt that the intersessional consultations on registries should continue as a means of sharing the results of work on the functional and technical specifications with other Parties. Such consultations could also help in preparing any further recommendations to the SBSTA to continue this work in the future.

15. Many Parties considered that the implementation of registry systems would benefit from further cooperation between the administrators of national registries, the CDM registry and the transaction log. Such cooperation could focus on additional, important issues related to the design and operation of registry systems which, as they are not related to the exchange of data, should not be included in a decision by the COP on the technical standards.

16. Specific issues which may benefit from such cooperation could include the elaboration and implementation of public accessibility requirements, as well as the implementation of measures to ensure that no infringement occurs upon the commitment period reserve, upon limits on the issuance and use of removal units or certified emission reductions from afforestation and reforestation project activities under the CDM or upon limits on the carry-over of emission reduction units, certified emission reductions, assigned amount units and removal units.

17. In addition, other issues could include reaching agreement on further transaction rules, legal agreements, administrator standards, monitoring and testing procedures, or user and language interfaces.

18. Participants voiced the concern that considerable resources will be needed to complete the work on the technical standards and the transaction log and to facilitate the establishment of national registries and the CDM registry. Contributions by Parties to the UNFCCC Trust Fund for Supplementary Activities would be required to finance the development of the transaction log by the secretariat.

Annex I

DRAFT TECHNICAL STANDARDS FOR DATA EXCHANGE BETWEEN REGISTRY SYSTEMS UNDER THE KYOTO PROTOCOL

GENERAL DESIGN REQUIREMENTS

I. PURPOSE

1. The technical standards for data exchange provide a technical basis for transactions under the mechanisms defined in Articles 6, 12 and 17 of the Kyoto Protocol and the modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol. They pertain to the exchange of data between national registries, the clean development mechanism (CDM) registry and the transaction log (referred to below as "registry systems"), in accordance with decisions -/CMP.1 (*Article 12*) and -/CMP.1 (*Modalities for the accounting of assigned amounts*)[1], and are complementary to those decisions.

2. Transactions requiring the exchange of data between registry systems are the issuance, transfer and acquisition between registries, cancellation, retirement and carry-over, as appropriate, of assigned amount units (AAUs), certified emission reductions (CERs), emission reduction units (ERUs) and removal units (RMUs) (referred to below as "units").

3. In order to support the elaboration of technical standards and their implementation in all registry systems, the technical standards shall have the following tiered framework:

(a) General design requirements for data exchange between registry systems, forming the basis for a complete model for data exchange;

(b) Detailed functional specification of the interface between registry systems, in accordance with the general design requirements;

(c) Detailed technical specification of the interface between registry systems, in accordance with the general design requirements, at a level of detail sufficient for administrators of registry systems to implement and test them.

4. The provisions contained herein address the general design requirements of the technical standards.

II. PRINCIPLES

5. The elaboration and implementation of the technical standards for the exchange of data between registry systems shall:

(a) Effectively facilitate the mechanisms under Articles 6, 12 and 17[2] and the modalities for the accounting of assigned amounts under Article 7, paragraph 4;

(b) Ensure the accuracy of data and their exchange;

(c) Ensure the transparency and auditability of transaction processes;

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[1] Attached to decisions 17/CP.7 and 19/CP.7, respectively.

[2] In the context of this annex, "Article" refers to an article of the Kyoto Protocol, unless otherwise specified.

(d) Ensure the transparency of non-confidential information;

(e) Promote efficiency in transaction procedures;

(f) Ensure the security of data and their exchange;

(g) Promote the maximum resilience and availability of registry systems;

(h) Allow the independent design of individual registry systems.

III. INTERFACE BETWEEN REGISTRY SYSTEMS

A. Message sequences

6. In the course of conducting their activities, registry systems shall transmit and receive standardized messages, at minimum, for the types of message sequences listed in table 1, in accordance with standardized message sequences to be developed. Such messages shall use formats and protocols that allow messages to be electronically processed by the receiving registry systems.

Table 1
Minimum standardized message sequence types for registry systems

Transactions
1. Issuance of units in a national registry or the CDM registry
2. Internal transfer of units (a) from the CDM registry pending account, (b) to a cancellation account or (c) to a retirement account
3. External transfer of units to a national registry
4. Carry-over of units, as appropriate, to the subsequent commitment period

Other activities
5. Reconciliation of data between registries and the transaction log
6. Testing of connections between registry systems
7. Notification of change to online status of the transaction log
8. Notification of change to offline status of the transaction log

7. The message sequences and content shall incorporate, as appropriate:

(a) Time certification, using a common format;

(b) Message identification, uniquely identifying the relevant message sequence, stage of the message sequence and message;

(c) The transaction number assigned by the registry system initiating the message sequence;

(d) The transaction record associated with the transaction number, as generated by the registry system initiating the message sequence, containing information, as appropriate, on:

(i) The total quantity of units involved;

(ii) The serial numbers of units involved, in blocks of consecutive numbers;

(iii) The account number of the transferring account;

(iv) The account number of the acquiring account;

(e) The status of the transaction;

(f) An indication of units for which a discrepancy has been notified by the transaction log until it has been resolved;

(g) Confirmation responses to notify that a message has been received;

(h) Error messages, as necessary, identifying the point of failure.

8. A common language protocol shall be used for each type of message sequence. The language protocol for the messages shall be able to support a structured messaging format and shall be independent of the platform and the software vendor.

9. The messaging format shall allow for the possibility of changes and additions to the data contained in a message. The character set used in the message shall also be independent of software vendor and be able to support non-English letters.

10. Message content and the interaction between the systems shall be modelled using a standard notation.

B. Transaction rules

11. A specific point shall be identified in each message sequence at which the transaction shall be deemed unequivocally final.

12. Subsequent messages in the sequence shall be sent in a time frame consistent with the functional and/or technical specification to be developed. The transaction log shall place incoming messages in a queue and process them on a first-in-first-out basis. The transaction log shall cancel transactions after a specified period of time has elapsed without a response to a message.

13. Units for which a transaction process is initiated shall not be available to other transactions until the initiated transaction process is completed or terminated. The transaction log shall verify, as part of its automated checks, whether units are already subject to a transaction process.

IV. REGISTRY SYSTEM REQUIREMENTS RELATED TO DATA EXCHANGE

A. Number elements

14. Each unique serial number assigned by a registry to a unit shall consist of at least the elements contained in table 2, in accordance with formats and codes to be developed.

Table 2
Elements of serial numbers

Element	*AAU*	*RMU*	*CER*	*ERU*
Originating Party identifier	yes	yes	yes	yes
Issuance commitment period	yes	yes	yes	yes
Unit type	yes	yes	yes	yes
LULUCF activity	no	yes	yes	yes
Project identifier	no	no	yes	yes
Unique number	yes	yes	yes	yes

LULUCF: Land use, land-use change and forestry

15. Each unique account number assigned by a registry shall consist of at least the elements contained in table 3, in accordance with formats and codes to be developed.

Table 3
Elements of account numbers

Element	*Holding account*	*Cancellation account*	*Retirement account*
Party identifier	yes	yes	yes
Commitment period	no	yes	yes
Account type	yes	yes	yes
Unique number	yes	yes	yes

16. Each unique transaction number assigned by a registry shall consist of at least the elements contained in table 4, in accordance with formats and codes to be developed. The transaction number shall be assigned by the registry initiating a transaction and shall thereafter be associated with the transaction record relevant to that transaction.

Table 4
Elements of transaction numbers

Originating Party identifier
Commitment period
Date
Transaction type
Unique number

B. Infrastructure

17. The interface between registry systems shall operate through a central communications hub integrated with the transaction log. Each registry shall therefore maintain direct links with the hub.

18. Registry systems shall apply common protocols and procedures for the testing, initiation and suspension of the operation of registry systems or parts thereof.

19. Registry systems, and the exchange of data between them, shall apply security measures that ensure:

(a) Confidentiality: data transmitted between registry systems shall be encrypted so as to be unreadable by any other party;

(b) Authentication: transmitting registry systems shall be uniquely and securely identified and identifiable. The transaction log shall act as the central reference database for authentication information;

(c) Non-repudiation: there should be a single full and final record of all actions such that those actions cannot be disputed or repudiated;

(d) Integrity: data exchanged between registry systems shall not be modifiable by any other party;

(e) Auditability: a full audit trail shall be maintained for each message and message sequence to document all processes, actions and messages and the date and time at which they occurred.

20. Sensitive data, which would cause a loss of value if corrupted, shall be securely managed so as to ensure their integrity. Registry systems shall be protected from exposure to security compromises such as through viruses, hackers and denial of service attacks.

21. The scheduled downtime of registry systems shall be kept to a minimum. Registry systems shall have systems and procedures in place to isolate any problems and minimize the interruption or suspension of their functions.

22. A separate messaging test environment shall be maintained by each registry system, in conjunction with its operational system, in order to allow registries to test the development and amendment of their messaging infrastructure without disrupting the operational messaging framework.

23. Each registry system shall implement measures, including automated internal checks, to ensure that:

(a) Its data records and transactions are accurate;

(b) Data are protected against unauthorized manipulation and any change in data is automatically and securely recorded using journaling and auditing functionality;

(c) It is protected against exposure to security compromises, such as through viruses, hackers and denial of service attacks;

(d) It has robust systems and procedures for safeguarding data and the recovery of data and registry service in the event of a disaster;

(e) It prevents and minimizes inconsistencies and, where they arise, holds transactions until the inconsistencies have been resolved;

(f) It prevents and minimizes discrepancies and, where they arise, terminates transactions.

C. Data

24. The transaction log and registries shall reconcile their data with each other in order to ensure data consistency and facilitate the automated checks of the transaction log. The transaction log shall, on a daily basis, compare a statement from each registry of its unit holding position against the records of the transaction log. The transaction log shall notify each registry of the result. In the event of an inconsistency being found, all transactions in question shall be halted until the inconsistency has been resolved.

25. Each registry system shall retain its data records of unit holdings and transactions pertaining to a commitment period at least until any questions of implementation relating to emissions or assigned amount information, for which the data records were created, have been resolved.

26. In order to facilitate the automated checks of the transaction log, registries shall, in a timely manner, provide the following information and ensure that it remains up to date:

(a) Confirmation of the completion or termination of transactions;

(b) The authorization, or removal thereof, by Parties of:

(i) Legal entities to participate in Article 6 projects under decision -/CMP.1 (*Article 6*);

(ii) Private and/or public entities to participate in Article 12 project activities under decision -/CMP.1 (*Article 12*);

(iii) Legal entities to transfer and/or acquire ERUs, CERs, AAUs or RMUs under decision -/CMP.1 (*Article 17*).

Annex II

INFORMAL PAPER BY THE CHAIR OF THE INTERSESSIONAL CONSULTATIONS ON REGISTRIES

Note: This annex contains a paper of 13 June 2002 by the Chair of the intersessional consultations on registries, Mr. Murray Ward (New Zealand). It has been reproduced here, in unedited form, in order that it may be used as a starting point in the elaboration and implementation of the functional and technical specifications of the technical standards. It should be noted, however, that some of this material has been superseded in the subsequent work of the intersessional consultations.

Possible technical standards for national registries, the clean development mechanism registry and the transaction log under the Kyoto Protocol

1. These technical standards shall apply to national registries, in accordance with decision 19/CP.7, the clean development mechanism (CDM) registry, in accordance with decision 17/CP.7, and the transaction log under decision 19/CP.7.

A. Number elements

2. A serial number assigned to an AAU, RMU, ERU or CER ("unit") shall consist of at least the elements contained in table 1 (using the specified formats and codes)[1]. Elements which are not relevant to a particular unit shall be set to zero[2].

Table 1: Serial numbers		
Element	Format	Codes
Party of origin	2A[3]	ISO 3166-1 country code
Issuance commitment period	2n[4]	Consecutive, beginning 01=2008-2012
Unit type	1n	1 = AAU; 2 = RMU; 3 = ERU converted from an AAU; 4 = ERU converted from an RMU; 5 = CER
LULUCF activity	2n	[5]
JI or CDM Project identifier	4n	Unique consecutive number
Unique number	12n	Unique consecutive number
The LULUCF activity element is relevant only to RMU serial numbers. The project identifier element is relevant only to ERU and CER serial numbers[6].		

3. An account number shall consist of at least the elements contained in table 2 (using the specified formats and codes)[7]. Elements which are not relevant to a particular account shall be set to zero[8].

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[1] This requirement would define a minimum number of elements (including formats and codes) to be contained in serial numbers assigned by registries. This may be useful for transparency and public accessibility. A registry may however hold these elements in separate fields and may define further elements for internal purposes.

[2] For example, the LULUCF activity element would be "00" for AAUs.

[3] This refers to the number of upper-case alpha characters.

[4] This refers to the number of numeric characters.

[5] 2n would allow for up to 99 distinctions between LULUCF activities. At minimum, these need to distinguish between the LULUCF categories subject to different limits under decision 11/CP.7 (afforestation, reforestation and deforestation under Article 3.3; cropland management, grazing land management and revegetation under Article 3.4; forest management under Article 3.4).

[6] Projects other than those under JI or the CDM could be identified through additional elements used internally within a registry.

Table 2: Account numbers		
Element	Format	Codes
Party of origin	2A	ISO 3166-1 country code
Commitment period	2n	Consecutive, beginning 01=2008-2012
Account type	1n	1 = holding account; 2 = cancellation account; 3 = retirement account[9]
Unique number	12n	Unique consecutive number
The commitment period element is relevant only to cancellation and retirement accounts[10].		

4. A transaction number shall consist of the elements contained in table 3 (using the specified formats and codes)[11]. It shall be generated by the registry initiating a transaction and shall thereafter be associated with the transaction record, consisting of the quantity of units, relevant serial numbers and relevant account numbers, contained in the pre-advice and/or proposal messages, as appropriate.

Table 3: Transaction numbers		
Element	Format	Codes
Party of origin	2A	ISO 3166-1 country code
Commitment period	2n	Consecutive, beginning 01=2008-2012
Date	?n	[a standard date format][12]
Transaction type	2n	[13]
Unique number	12n	Unique consecutive number

B. Message exchange[14]

5. At a minimum, national registries, the CDM registry and the transaction log shall transmit and receive the standard messages outlined in tables 4 to 8[15]. Such message transmission shall use formats and protocols that allow messages to be electronically read and processed by receiving registries and by the transaction log. Subsequent messages in the sequence shall be sent [in real-time] [within [1 minute] [24 hours] of a message being received].

6. For the purpose of messages exchanged between registries, and between registries and the transaction log: serial numbers shall consist only of the elements (using the specified formats, codes and sequence) contained in table 1[16]; account numbers shall consist only of the elements (using the specified

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7 See footnote 1.

8 For example, the commitment period element would be "00" for holding accounts.

9 The account type could be further elaborated by distinguishing holding accounts for Parties, legal entities, and brokers and distinguishing cancellation accounts for Article 3.3/4, non-compliance and to strengthen targets. The format of this element could be extended to 2n if necessary.

10 Only cancellation and retirement accounts are to be distinct for different commitment periods. Holding accounts continue from one commitment period to the next.

11 See footnote 1.

12 A date element was not specified in decision 19/CP.7 but may be useful for transparency and searchability.

13 2n would allow for 99 distinctions between transaction types. At minimum, these need to distinguish between issuance, transfers to another registry, transfers to a cancellation account, transfers to a retirement account, and carry-overs. It may increase transparency/searchability to distinguish further: issuance of AAUs, of RMUs, of ERUs, of CERs; carry-over of AAUs, of ERUs, of CERs. Such distinction would help identify transactions that are subject to limits.

14 See appendix for diagrams of the message exchange implied by tables 4 to 8. This appendix is included for information only and would likely not be required in a final version of the technical standards.

15 It may be useful to define further messages for inclusion in a COP8 decision on technical standards or to elaborate further messages after COP8 as part of a detailed technical specification of the standards.

16 This is specified to limit and standardize the sequence of serial number elements.

formats, codes and sequence) contained in table 2[17]; and transaction numbers shall consist of the elements (using the specified formats, codes and sequence) contained in table 3.

7. For the purpose of messages exchanged between registries, consecutive serial numbers shall be recorded in blocks such that, where other elements of serial numbers are identical, only the beginning and end unique number elements of the block shall be included. A transaction involving one unit shall indicate a block with identical beginning and end unique number elements.

8. As appropriate, a transaction shall involve one transferring account and one account in which units are to be acquired, issued or carried-over.

Table 4: Messages for an issuance of AAUs, RMUs or CERs		
1. Proposal	Purpose:	Notification of proposed issuance
	Sender:	Issuing registry
	Receiver:	Transaction log
	Content:	Message type[18]
		Transaction number
		Quantity of units[19]
		Serial numbers to be assigned (begin/end of blocks)
		Account number into which units are issued
2. Proposal response	Purpose:	Notification of transaction log check results
	Sender:	Transaction log
	Receiver:	Issuing registry
	Content:	Message type
		Transaction number
		Status: no discrepancy found / discrepancy found[20]
3. Confirmation	Purpose:	Notification of transaction completion or termination
	Sender:	Issuing registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Status: completed / terminated[21]

[17] This is specified to limit and standardize the sequence of account number elements.

[18] The message type element should distinguish this message from others necessary for this transaction.

[19] A quantity of units element is not specified in decision 19/CP.7 but, if registries could include multiple blocks in a single transaction, would be useful to ensure that information for all blocks is received and processed.

[20] Standard categories could be specified to identify the reason for a “discrepancy found” status being given.

[21] Standard categories could be specified to identify the reason for terminating a transaction.

Table 5: Messages for an issuance of ERUs		
1. Proposal	Purpose:	Notification of proposed issuance
	Sender:	Issuing registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Quantity of units
		Serial numbers of units to be converted (begin/end of blocks)[22]
		Serial numbers to be assigned (begin/end of blocks)
		Account number into which units are issued
2. Proposal response	Purpose:	Notification of transaction log check results
	Sender:	Transaction log
	Receiver:	Issuing registry
	Content:	Message type
		Transaction number
		Status: no discrepancy found / discrepancy found
3. Confirmation	Purpose:	Notification of transaction completion or termination
	Sender:	Issuing registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Status: completed / terminated

Table 6: Messages for a transfer of units to a cancellation or retirement account		
1. Proposal	Purpose:	Notification of proposed transfer
	Sender:	Transferring registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Quantity of units
		Serial numbers to be transferred (begin/end of blocks)
		Transferring account number
		Acquiring account number
2. Proposal response	Purpose:	Notification of transaction log check results
	Sender:	Transaction log
	Receiver:	Transferring registry
	Content:	Message type
		Transaction number
		Status: no discrepancy found / discrepancy found
3. Confirmation	Purpose:	Notification of transaction completion or termination
	Sender:	Transferring registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Status: completed / terminated

[22] This is the only difference between tables 4 and 5, due to ERUs being converted from AAUs or RMUs.

Table 7: Messages for a transfer of units to an account in another registry		
1. Pre-advice	Purpose:	Notification of intent to transfer
	Sender:	Transferring registry
	Receiver:	Acquiring registry
	Content:	Message type
		Transaction number
		Quantity of units
		Serial numbers to be transferred (begin/end of blocks)
		Transferring account number
		Acquiring account number
2. Pre-advice response	Purpose:	Notification of in principle interest
	Sender:	Acquiring registry
	Receiver:	Transferring registry
	Content:	Message type
		Transaction number
		Status: accepted / declined[23]
3. Proposal	Purpose:	Notification of proposed transfer
	Sender:	Transferring registry
	Receiver:	Acquiring registry and the transaction log
	Content:	Message type
		Transaction number
		Quantity of units
		Serial numbers to be transferred (begin/end of blocks)
		Transferring account number
		Acquiring account number
4. Proposal response	Purpose:	Notification of transaction log check results
	Sender:	Transaction log
	Receiver:	Transferring registry and acquiring registry
	Content:	Message type
		Transaction number
		Status: no discrepancy found / discrepancy found
5. Instruction	Purpose:	Instruction to continue or terminate transaction
	Sender:	Transferring registry
	Receiver:	Acquiring registry
	Content:	Message type
		Transaction number
		Status: continue / terminate
6. Instruction response	Purpose:	Notification of transaction continuation or termination
	Sender:	Acquiring registry
	Receiver:	Transferring registry
	Content:	Message type
		Transaction number
		Status: completed / terminated
7. Confirmation	Purpose:	Notification of transaction completion or termination
	Sender:	Transferring registry and acquiring registry
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Status – completed / terminated

[23] Standard categories could be specified to identify the reason for a “declined” status being given.

Table 8: Messages for a carry-over of units to the subsequent commitment period		
1. Proposal	Purpose:	Notification of units to be carried-over
	Sender:	Registry carrying-over units
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Quantity of units
		Serial numbers for carry-over (begin/end of blocks)
		Account number in which carry-over is to occur
2. Proposal response	Purpose:	Notification of transaction log check results
	Sender:	Transaction log
	Receiver:	Registry carrying-over units
	Content:	Message type
		Transaction number
		Status: no discrepancy found / discrepancy found
3. Confirmation	Purpose:	Notification of transaction completion or termination
	Sender:	Registry carrying-over units
	Receiver:	Transaction log
	Content:	Message type
		Transaction number
		Status: completed / terminated

C. Data quality

9. National registries, the CDM registry and the transaction log shall apply levels of security equivalent to those accepted for [internet commerce] [international bank transfers][24] [25]. This shall involve, *inter alia*, the establishment of secure connections for electronic communication, the unique identification of the transmitting system and the authentication of the transmitting system by the receiving system. Secure elements of such systems shall be securely managed so as to ensure the integrity of system data[26].

10. National registries, the CDM registry and the transaction log shall implement adequate measures to ensure:

(a) The accuracy of data records and transactions;

(b) That no infringement occurs upon the commitment period reserve, as defined in accordance with decision -/CMP.1 (*Article 17*)[27];

(c) That no infringement occurs upon the limits on the issuance and use of RMUs and CERs from afforestation and reforestation project activities under the CDM, as defined in accordance with decision -/CMP.1 (*LULUCF*)[28].

11. Data records of unit holdings and transactions pertaining to a commitment period shall be retained at least until the Party's final compilation and accounting report for the subsequent commitment period has

[24] This approach links registries security to standards in other fields. Further consideration would need to be given to which other fields are appropriate and what accepted security standards exist there. Alternatively, a more detailed description of the required performance level in relation to security could be given.

[25] To help indicate the worth of maintaining secure registries and inter-registry communication, it may be noted that the total value to be held in national registries for the first commitment period could be in the region of US$550-600 billion (at US$10 per tonne of CO2-equivalent).

[26] It may be necessary to include a list of registry/log elements which need to be made secure.

[27] Draft decision -/CMP.7 (*Article 17*) is attached to decision 18/CP.7.

[28] Draft decision -/CMP.7 (*LULUCF*) is attached to decision 11/CP.7.

been published and any questions of implementation relating to emissions or assigned amount information during that commitment period have been resolved[29].

D. Public accessibility

12. National registries and the CDM registry[30] shall make information, as specified in decision 19/CP.7, publicly accessible through:

(a) An internet site;

(b) Transmitting and receiving the standard messages for an enquiry of publicly accessible information outlined in table 9.

Table 9: Messages for an enquiry of publicly accessible information		
1. Request information	Purpose:	Notification of public request for information
	Sender:	External systems, incl. registries and transaction log
	Receiver:	Registry[31]
	Content:	Message type
		Request reference number
		Search parameters
2. Provide information	Purpose:	Provision of requested information
	Sender:	Registry
	Receiver:	External systems, incl. registries and transaction log
	Content:	Message type
		Request reference number
		Search results

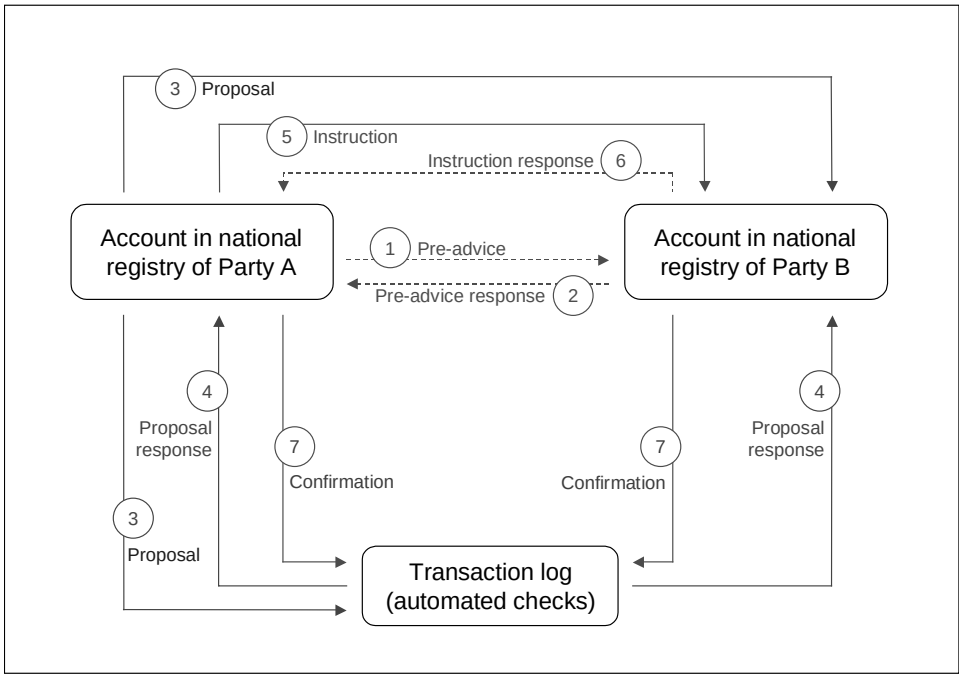
[29] Alternatively, data could be retained for two commitment periods or a number of years may be specified.

[30] The transaction log could also be made subject to such public accessibility, though this is not specified in decision 19/CP.7.

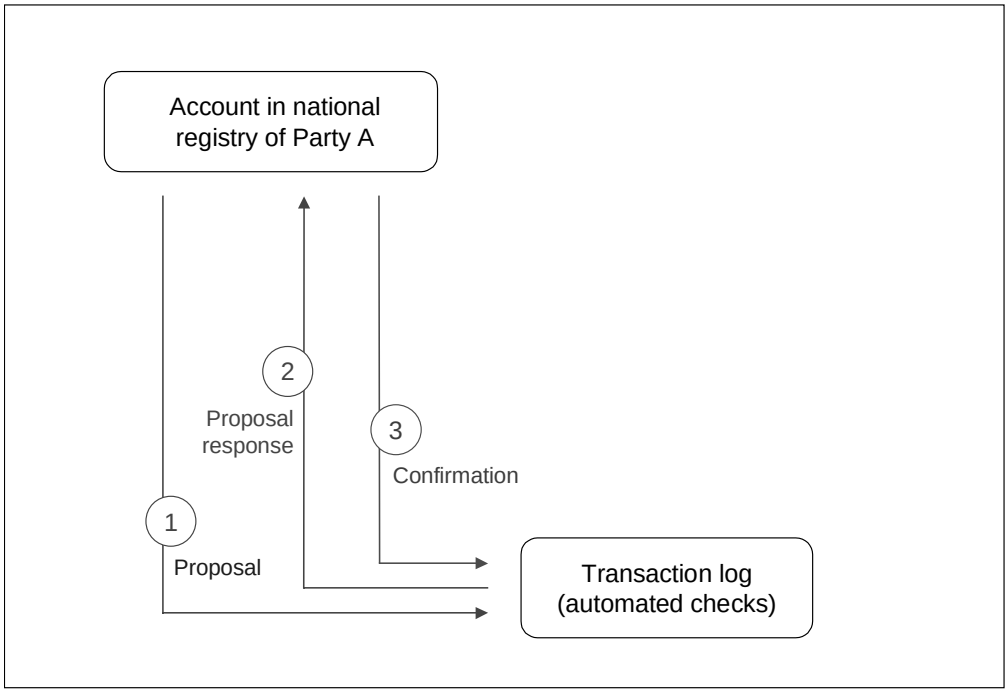
[31] Enquiries could also be made of the transaction log, though this is not specified in decision 19/CP.7.

Appendix to annex II

Possible message exchange: International transfer



Possible message exchange: Issuance, cancellation, retirement and carry-over



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