DATA EXCHANGE STANDARDS FOR REGISTRY SYSTEMS UNDER THE KYOTO PROTOCOL

FUNCTIONAL SPECIFICATIONS (Version 1.0)

Non-paper

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Functional Specifications

1. Introduction

1.1 Purpose

These functional specifications contain the key requirements mandated by the data exchange standards for registries and the transaction log under the Kyoto Protocol. They build upon the general design requirements of the standards, as adopted by the Conference of the Parties.

The functional specifications are to be further elaborated by preparing technical specifications of the data exchange standards. Whereas the functional specifications set out *what* needs to be done in registries and the transaction log, the technical specifications will detail *how* these need to be implemented. The technical specifications are to ensure that the data exchange standards are implemented in all registries and the transaction log in a compatible manner.

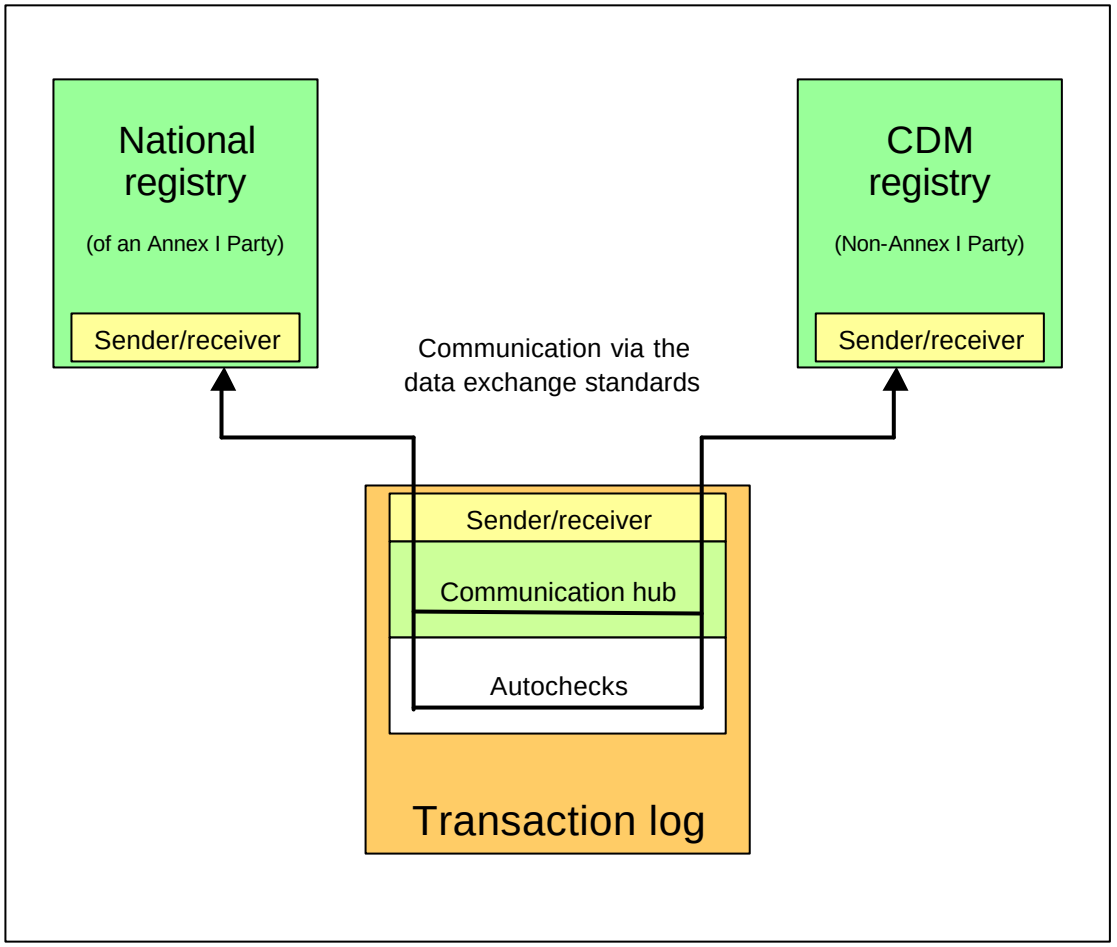
With this in mind, these functional specifications set out constraints within which the technical specifications must remain and, where greater discretion is possible, acceptance criteria to guide the development of the technical specifications.

1.2 Intended audience

This document is to guide technical experts in preparing the technical specifications.

1.3 Scope

The data exchange standards define how data is to be exchanged between national registries, the CDM registry and the transaction log (known generically as “registry systems”) under the Kyoto Protocol. The standards therefore relate to sequences of messages and the data protocols and formats to be used in the data exchange (the arrows below), as well as requirements that registries and transaction log need to fulfil.



This functional specification includes:

Section 2	Assumptions Facts held to be true for the functional specifications to be valid
Section 3	General constraints General boundaries that the system must stay within
Section 4	Exchange mechanism Standards sequences of messages and their manner of transmission
Section 5	Transfer format Requirements for how to format of data contained in messages
Section 6	Data logging Requirements for data that is to be recorded in registries and the transaction log
Section 7	Operational management Requirements for the publication of information by the transaction log and for data accuracy, data integrity, data processing, system testing, and security
Section 8	Change management Manner in which the data exchange standards may be changed over time
Annex A	Glossary of terms Definitions, acronyms and abbreviations
Annex B	Interaction processes Processes of interaction among registries and the transaction log

1.4 Definitions, acronyms and abbreviations

See the glossary in annex A for definitions, acronyms and abbreviations.

Note in particular that the term “registries” refers to both national registries and the CDM registry. “Registry systems” refers to both registries and the transaction log.

1.5 References

These specifications are derived from decisions by the Conference of the Parties:

- **Decision 19/CP.7**
  On modalities for accounting for assigned amount (including requirements for national registries and the transaction log in section II of the annex)
  → document FCCC/CP/2001/13/Add.2
  → http://unfccc.int/resource/docs/cop7/13a02.pdf
- **Appendix D to the annex of decision 17/CP.7**
  On the CDM registry requirements, see
  → document FCCC/CP/2001/13/Add.2
  → http://unfccc.int/resource/docs/cop7/13a02.pdf
- **Decision 24/CP.8**
  On the general design requirements of the data exchange standards
  → document FCCC/CP/2002/7/Add.3
  → http://unfccc.int/resource/docs/cop8/07a03.pdf
- **Informal paper** by the chair of the inter-sessional consultations on possible data exchange standards
  → document FCCC/SBSTA/2002/INF.20
  → http://unfccc.int/resource/docs/2002/sbsta/inf20.pdf
- **Decisions 15-18/CP.7**
  On emissions trading and projects under the clean development mechanism and joint implementation
  → document FCCC/CP/2001/13/Add. 2
  → http://unfccc.int/resource/docs/cop7/13a02.pdf

2. Assumptions

These functional specifications have been developed on the basis of the following assumptions.

Number	Assumption
A1	The decisions contained in the derivation documents will remain stable

3. General Constraints

These general constraints represent design decisions that have been mandated for the data exchange standard and shall be adhered to.

Title	**Single holding of unit**
Number	DES-C1
References	Decision 19/CP.7, para 20 Decision 17/CP.7, appendix D, para 4
Description	Each unit shall be held in only one account at a given time

Title	**Industry standards**
Number	DES-C2
References	Decision 24/CP.8, paras 5h, 8
Description	If an international or industry standard meets the requirements, it shall be used in preference to an internal standard being developed

Title	**Platform and software independence**
Number	DES-C3
References	Decision 24/CP.8, paras 5h, 8
Description	The data exchange standard shall not be bound to a platform, software or software vendor

Title	**Independent design of registry systems**
Number	DES-C4
References	Decision 24/CP.8, paras 5h, 8
Description	The data exchange standard shall not unnecessarily constrain the design or operation of the registries or the transaction log

Title	**Universal time**
Number	DES-C5
References	-
Description	All date and time certification shall be in “universal time”

4. Exchange mechanism

4.1 Functional requirements

4.1.1 Message transport

Title	**Sender/receiver module**
Number	DES-EM1
References	Decision 24/CP.8, para 6
Description	Registry systems shall be able to send data to other registry systems and receive data from other registry systems
Constraints	All messages shall be routed through the central communications hub integrated with the transaction log Buffering of messages shall be supported, on a first-in first-out basis

Title	**Communications protocol**
Number	DES-EM2
References	Decision 24/CP.8, paras 7h, 7i
Description	Registry systems shall send and receive all messages using a specified communications protocol
Constraints	The protocol shall use a reliable data stream All messages shall be acknowledged Sender shall be notified in event of errors
Acceptance criteria	Use Web Services

Title	**Data transfer format**
Number	DES-EM3
References	Decision 24/CP.8, paras 6, 8, 9
Description	Registry systems shall send and receive all messages using a specified data transfer format
Constraints	Format shall support structured data storage
Acceptance criteria	Use XML

Title	**Secure transmission**
Number	DES-EM4
References	Decision 24/CP.8, para 5f
Description	Registry systems shall send and receive all messages using secure connections

Title	**Authentication**
Number	DES-EM5
References	Decision 24/CP.8, para 20b
Description	Registry systems shall be uniquely and securely identified and identifiable using authentication information
Constraints	Authentication information for each registry system shall be unique throughout the transaction log, national registries and the CDM registry Specific authentication information shall be defined by the transaction log

Title	**Encryption**
Number	DES-EM6
References	Decision 24/CP.8, para 20a
Description	Registry systems shall encrypt data before transmission to another system using a specified type and level of encryption
Constraints	Shall use at least 128 bit encryption

4.1.2 Transaction sequences

Title	**Transaction sequences**
Number	DES-EM7
References	Decision 19/CP.7, paras 38-43 Decision 24/CP.8, paras 6, 7g, 11, 12, 18
Description	Registry systems shall carry out transactions through data exchange defined by standard sequences of messages
Constraints	Sequences shall include: • Issuance of AAUs, RMUs and CERs • Conversion of AAUs and RMUs to ERUs • External transfer of AAUs, RMUs. ERUs and CERs to another registry • Internal transfer of AAUs, RMUs, ERUs and CERs to a cancellation or retirement account • Carry over of AAUs, ERUs and CERs to the next commitment period Sequences shall define, at minimum, for each message: • Order in the sequence • Purpose • Transferring registry system • Receiving registry system • Content • Response times • Point at which the transaction is deemed unequivocally final Content shall include data defined by the data transfer format, as appropriate for each sequence The carry-over sequence shall be followed by the cancellation of units not carried over from the previous commitment period All messages shall be routed through the central communications hub integrated with the transaction log Discrepancy information shall be included in messages transmitted subsequent to the discrepancy being discovered
Acceptance criteria	Sequences are consistent with the transaction processes contained in Annex B

Title	**Transaction priority**
Number	DES-EM8
References	Decision 24/CP.8, para 13
Description	Units subject to an initial transaction shall not be processed as part of a further transaction until the initial transaction is completed, terminated or cancelled

Title	**Transaction termination**
Number	DES-EM9
References	Decision 19/CP.7, para 43a Decision 24/CP.8, para 7g
Description	Upon notification of a discrepancy by the transaction log, affected registries shall terminate the affected transaction
Constraint	The initiating registry shall terminate the affected transaction in the first instance The acquiring registry, where relevant, shall be able to terminate an affected transaction where it has not previously been terminated Transactions shall be terminated as a whole and not in part

Title	**Transaction cancellation**
Number	DES-EM10
References	Decision 24/CP.8, para 12
Description	In the event of a specified response time having elapsed without a response to a message, the transaction log shall cancel the affected transaction
Constraint	Response times shall be specified Transactions shall be cancelled as a whole and not in part

4.1.3 Reconciliation sequences

Title	**Reconciliation sequences**
Number	DES-EM11
References	Decision 24/CP.8, paras 6, 18, 26
Description	Registry systems shall carry out reconciliation through data exchange defined by a standard sequence of messages
Constraints	Reconciliation shall take place on the basis of a data snapshot for a common specified time The sequence shall define, at minimum, for each message: • Order in the sequence • Purpose • Transferring registry system • Receiving registry system • Content Reconciliation occurs through registries providing data to the transaction log; the transaction log compares the data with its own records and identifies any inconsistencies between the data sets Reconciliation can occur a maximum of once every 24 hours Reconciliation may proceed on three levels: • Total units, by unit type and unit status, in aggregate of all holding accounts, in aggregate of all cancellation accounts, and in the retirement account • Serial numbers of unit detail in respective aggregates • Transaction detail and other audit information Content shall include data defined by the data transfer format All messages shall be routed through the central communications hub integrated with the transaction log

Title	**Transaction prevention**
Number	DES-EM12
References	Decision 24/CP.8, paras 25e, 26
Description	Registries shall prevent transactions involving units for which an inconsistency has been discovered through the reconciliation process, until that inconsistency is resolved
Constraints	Registries shall terminate current transactions involving affected units Registries shall prevent the initiation of transactions involving affected units until the inconsistency is resolved

Title	**Administrator manual influence**
Number	DES-EM13
References	Decision 24/CP.8, paras 20c, 26
Description	Where an inconsistency is discovered through a reconciliation action, the administrators of the affected registry systems shall, as appropriate and in consultation with the administrator of the other registry system, manually adjust unit holdings information in order to correct the inconsistency and inform the other administrator of the manual adjustments made
Constraints	Inconsistency information shall be examinable Data which may be manually adjusted by the registry administrator within the registry shall include: • Units holdings data • Serial numbers Manual adjustments shall be automatically listed and shall be available for audit purposes The transaction log shall notify the affected registry and the secretariat of inconsistencies remaining unresolved beyond a specified period of time
Acceptance criteria	Data maintained by the transaction log represents a single, full and final record of unit holdings and transactions

5. Transfer Format

5.1 Functional requirements

5.1.1 Transaction-related attributes

Title	**Transaction number**
Number	DES-TF1
References	Decision 19/CP.7, para 41a Decision 24/CP.8, para 7c
Description	The data transfer format shall incorporate the transaction number
Constraints	Shall use an attribute

Title	**Transaction type**
Number	DES-TF2
References	Decision 19/CP.7, para 41b Decision 24/CP.8, paras 6, 7b
Description	The data transfer format shall incorporate the type of transaction
Constraints	Shall use an attribute Transaction types shall include: • Issuance of unit (initial creation of a unit) • Conversion of unit (transformation to create an ERU) • External transfer of units (between registries) • Cancellation of unit (internal transfer) • Retirement of unit (internal transfer) • Carry-over of unit (extension of validity)

Title	**Record set**
Number	DES-TF3
References	Decision 19/CP.7, para 41b Decision 24/CP.8, para 7d
Description	The data transfer format shall incorporate the “record set” of information to be associated with each transaction
Constraints	Shall use attributes The record set shall include: • Total quantity of units involved • Serial numbers of units involved • Account number of the activity or source account • Account number of the destination account, where applicable

Title	**Transaction status**
Number	DES-TF4
References	Decision 24/CP.8, para 7e
Description	The data transfer format shall incorporate the status of a transaction
Constraints	Shall use an attribute Transaction states shall include: • Proposed • Checked (no discrepancy) • Checked (discrepancy) • Accepted • Completed • Terminated • Cancelled • Rejected

Title	**Discrepancy information**
Number	DES-TF5
References	Decision 24/CP.8, paras 7f, 15
Description	The data transfer format shall incorporate discrepancy information
Constraints	Shall use attributes Discrepancy information shall include: • Serial numbers of affected units • Rules against which there is a discrepancy

5.1.2 Reconciliation-related attributes

Title	**Reconciliation number**
Number	DES-TF6
References	Decision 24/CP.8, paras 7c
Description	The data transfer format shall incorporate the reconciliation number
Constraints	Shall use an attribute

Title	**Action type**
Number	DES-TF7
References	Decision 24/CP.8, paras 6, 7b
Description	The data transfer format shall incorporate the type of action
Constraints	Shall use an attribute Shall identify the action as a reconciliation action

Title	**Record set**
Number	DES-TF8
References	Decision 24/CP.8, para 26
Description	The data transfer format shall incorporate unit holdings information (for registries to transmit data to the transaction log)
Constraints	Reconciliation data shall include, as requested by the transaction log: • Total units, by unit type and unit status, in aggregate of all holding accounts, in aggregate of all cancellation accounts, and in the retirement account • Serial numbers of unit detail in respective aggregates • Transaction detail and other audit information
Acceptance criteria	Shall use attributes

Title	**Reconciliation stage**
Number	DES-TF9
References	Decision 24/CP.8, para 7b
Description	The data transfer format shall incorporate the stage reached within a reconciliation sequence
Constraints	Shall use an attribute Shall conform to the exchange mechanism

Title	**Reconciliation status**
Number	DES-TF10
References	Decision 24/CP.8, para 7e
Description	The data transfer format shall incorporate the status of a reconciliation action
Constraints	Shall use an attribute Reconciliation states shall include: • Initiated • Completed • Total inconsistent • Unit inconsistent

Title	**Inconsistency information**
Number	DES-TF11
References	Decision 24/CP.8, para 26
Description	The data transfer format shall incorporate inconsistency information (for the transaction log to inform registries of inconsistencies discovered)
Constraints	Shall use attributes Inconsistency information shall include: • Serial numbers of affected units • Transaction details and other auditing information

Title	**Manual influence information**
Number	DES-TF12
References	Decision 24/CP.8, para 20c
Description	The data transfer format shall incorporate information on manual adjustments undertaken by the administrator (for the transaction log and registries to inform each other of actions taken)
Constraints	Information shall include manual adjustments made to: • Unit holdings data • Serial numbers
Acceptance criteria	Use attributes

Title	**Time certification information**
Number	DES-TF13
References	Decision 24/CP.8, para 7a
Description	The data transfer format shall incorporate the date and time at which the data snapshot shall be taken
Constraints	Shall use an attribute

5.1.3 Attributes relating to messages

Title	**Message identifier**
Number	DES-TF14
References	Decision 24/CP.8, para 7b
Description	The data transfer format shall incorporate a unique identifier for each message
Constraints	Shall use an attribute Each identifier shall be unique throughout the transaction log, national registries and the CDM registry

Title	**Purpose**
Number	DES-TF15
References	-
Description	The data transfer format shall incorporate the purpose of each message
Constraints	Shall use an attribute Information shall conform to the purpose information defined in the exchange mechanism

Title	**Time certification information**
Number	DES-TF16
References	Decision 24/CP.8, para 7a
Description	The data transfer format shall incorporate the time stamp identifying the time at which the message is received or sent by the transaction log

5.1.4 Attributes relating to registry systems

Title	**Authentication information**
Number	DES-TF17
References	Decision 24/CP.8, para 20b
Description	The data transfer format shall incorporate authentication information of the registry or transaction log transmitting the message
Constraints	Information shall ensure that: • Each registry system is uniquely and securely identified • Each registry system may identify other registry systems Authentication information for each registry system shall be unique throughout the transaction log, national registries and the CDM registry Specific authentication information shall be defined by the transaction log

Title	**Destination registry system**
Number	DES-TF18
References	-
Description	The data transfer format shall incorporate information on the destination registry system
Constraints	Shall use an attribute

5.1.5 Identifier contents and formats

<table>
<tr><td>Title</td><td>Serial number format</td></tr>
<tr><td>Number</td><td>DES-TF19</td></tr>
<tr><td>References</td><td>Decision 17/CP.7, appendix D, para 7
Decision 19/CP.7, paras 24, 27, 29
Decision 24/CP.8, para 14</td></tr>
<tr><td>Description</td><td>Each unit shall have a unique serial number (assigned by the registry of the originating Party) conforming to a specified format</td></tr>
<tr><td>Constraints</td><td>Each serial number shall be unique throughout the transaction log, national registries and the CDM registry
Serial numbers shall not be modified, except for changes in the unit type indicator and the addition of a project identifier during conversion of AAUs and RMUs to ERUs
Units carried over to a next commitment period shall maintain their original serial numbers
The originating Party identifier shall use the 2 letter country code (ISO3166)
Serial numbers shall consist of at least the following elements:
<table>
<tr><th>Element</th><th>AAU</th><th>RMU</th><th>CER</th><th>ERU</th></tr>
<tr><td>Originating Party</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Unit type</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Unique number</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Original commitment period</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Applicable commitment period</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>LULUCF activity</td><td>NO</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Project</td><td>NO</td><td>NO</td><td>YES</td><td>YES</td></tr>
<tr><td>Track 1 or 2</td><td>NO</td><td>NO</td><td>NO</td><td>YES</td></tr>
</table>
The LULUCF activity element shall distinguish:
• Category 1: Afforestation, reforestation and deforestation activities (Note: these activities are included under Article 3.3 of the Protocol; all LULUCF activities under the CDM for the first commitment period will be in this category)
• Category 2: Forest management activities (Note: these activites are included under Article 3.4 of the Protocol)
• Category 3: Cropland management, grazing land management and revegetation (Note: these activities are included under Article 3.4 of the Protocol)</td></tr>
<tr><td>Acceptance criteria</td><td>One consistent format is to be used for serial numbers of all units
Size of data transmission is not to be greater than necessary; data processing is to be efficient</td></tr>
</table>

<table>
<tr><td>Title</td><td>Account number format</td></tr>
<tr><td>Number</td><td>DES-TF20</td></tr>
<tr><td>References</td><td>Decision 17/CP.1, appendix D, para 5
Decision 19/CP.7, para 22
Decision 24/CP.8, para 16</td></tr>
<tr><td>Description</td><td>Each account in a registry shall have a unique account number (assigned by the registry of the Party) conforming to a specified format</td></tr>
<tr><td>Constraints</td><td>Each account number shall be unique throughout the transaction log, national registries and the CDM registry
Account numbers shall consist of at least the following elements:
<table>
<tr><th>Element</th><th>Holding Account</th><th>Cancellation Account</th><th>Retirement Account</th></tr>
<tr><td>Party identifier</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Commitment Period</td><td>NO</td><td>YES</td><td>YES</td></tr>
<tr><td>Account Type</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>Unique number</td><td>YES</td><td>YES</td><td>YES</td></tr>
</table>
The Party identifier shall use the 2 letter country code (ISO3166)
The account type element shall distinguish, at minimum, holdings accounts, cancellation accounts, retirement accounts</td></tr>
<tr><td>Acceptance criteria</td><td>One consistent format is to be used for all account numbers</td></tr>
</table>

Title	**Transaction number format**
Number	DES-TF21
References	Decision 19/CP.7, para 41a Decision 24/CP.8, para 17
Description	Each transaction shall have a unique transaction number (assigned by the registry of the initiating Party) conforming to a specified format
Constraints	Each transaction number shall be unique throughout the transaction log, national registries and the CDM registry Transaction numbers shall not be modified once they are assigned Transaction numbers shall consist of at least the following elements: • Initiating Party identifier • Commitment period • Unique number The initiating Party identifier shall use the 2 letter country code (ISO3166)

Title	**Project number format**
Number	DES-TF22
References	Decision 19/CP.7, para 41a Decision 24/CP.8, para 17
Description	Each project shall have a unique project number (assigned by the registry of the initiating Party) conforming to a specified format
Constraints	Each project number shall be unique within the originating registry Project numbers shall not be modified once they are assigned Project numbers shall consist of at least the following elements: • Party hosting the project • Unique number • Activity The originating Party identifier shall use the 2 letter country code (ISO3166) The activity element shall distinguish: • Category 1: Removals through afforestation, reforestation and deforestation activities • Category 2: Removals through forest management activities • Category 3: Removals through cropland management, grazing land management and revegetation • Category 4: Emission reductions

Title	**Reconciliation number format**
Number	DES-TF23
References	Decision 24/CP.8, para 26
Description	Each reconciliation action shall have a unique reconciliation number (assigned by the transaction log) conforming a specified format
Constraints	Each reconciliation number shall be unique throughout the transaction log, national registries and the CDM registry Reconciliation numbers shall not be modified once they are assigned Reconciliation numbers shall consist of at least the following elements: • Party identifier • Unique number The Party identifier shall use the 2 letter country code (ISO3166)

5.2 Non-functional requirements

Title	**Language support**
Number	DES-TF24
References	Decision 24/CP.8, para 9
Description	The data transfer format shall support multiple languages
Constraints	The character set in use shall support non-Roman characters The character set used shall function on any operating system

6. Data Logging

6.1 Functional requirements

Title	**Logging transactions**
Number	DES-DL1
References	Decision 24/CP.8, paras 5c, 20e
Description	Registries and the transaction log, including the communications hub, shall log information on transactions
Constraints	Logged information shall include, for each transaction: • Transaction number • Transaction type • Record set • Final transaction status • Time certification for initiation of the transaction • Time certification of final transaction status being reached • Information on unresolved discrepancies • Additions to units holdings • Subtractions from units holdings • Modifications to serial numbers (conversion transaction) • Carry over of units to next commitment period Logged information shall be available for audit purposes

Title	**Logging messages**
Number	DES-DL2
References	Decision 24/CP.8, paras 5c, 20e
Description	Registries and the transaction log, including the communications hub, shall log information on messages
Constraints	Logged information shall include, for each message: • Identifier • Content • Time certification of transmission or receipt Logged information shall be available for audit purposes

Title	**Logging registry interactions**
Number	DES-DL3
References	Decision 24/CP.8, paras 5c, 20e, 25a, 25e, 25b, 25c
Description	Registries and the transaction log, including the communications hub, shall log information on interactions with the system
Constraints	Logged information shall include: • Users interacting with the registry • Other registry systems interacting with the registry • Time certification of interaction • Data input by users • Data input based on messages received from other registry systems Logged information shall be available for audit purposes

Title	**Logging reconciliation data**
Number	DES-DL4
References	Decision 24/CP.8, paras 5c, 26
Description	Registries and the transaction log, including the communications hub, shall log reconciliation data
Constraints	Inconsistency information shall be logged and shall be available for audit purposes

Title	**Message storage**
Number	DES-DL5
References	Decision 24/CP.8, paras 5c, 20e
Description	Registry systems shall store all messages and their contents in their original form

6.2 Non-functional requirements

Title	**Record retention**
Number	DES-DL6
References	Decision 24/CP.8, paras 5c, 27
Description	Registries and the transaction log, including the communications hub, shall retain their logged records
Constraints	Retained records shall include: • Logged transactions • Logged messages • Logged account information • Logged registry interactions • Stored messages Records for a commitment period shall be retained, at minimum, until: • After the additional period for fulfilling commitments relating to the commitment period • After any questions of implementation relating the commitment period have been resolved

7. Operations Management

7.1 Functional requirements

7.1.1 Publication of information by the transaction log

Title	**Publication of discrepancy rules**
Number	DES-OM1
References	Decision 24/CP.8, para 25f
Description	The transaction log shall ensure the transparency of the rules it uses to detect discrepancies
Constraints	Changes in the discrepancy rules shall be made available, at the latest, immediately upon the change taking effect
Acceptance criteria	Information is publicly accessible on the internet

Title	**Publication of discrepancy information**
Number	DES-OM2
References	Decision 19/CP.7, para 43a Decision 24/CP.8, paras 5c, 5d, 23
Description	The transaction log shall ensure the transparency of information relating to discrepancies it has discovered
Constraints	Information shall include: • Serial numbers of affected units • Rules against which there is a discrepancy • Registries in which the units are held • Transaction numbers of the affected transactions • Date and time of the change in transaction status to “checked (discrepancy)” • Current transaction status Upon notification of the discrepancy to the affected registries, the transaction log shall: • Make information publicly available • Forward the information to the secretariat Information shall remain available until the discrepancy is resolved
Acceptance Criteria	Information is publicly accessible on the internet

Title	**Publication of transaction information**
Number	DES-OM3
References	Decision 19/CP.7, para 43d Decision 24/CP.8, paras 5c, 5d
Description	The transaction log shall ensure the transparency of information relating to transactions
Constraints	Information shall include: • Logged transaction information • Total unit holdings in all holding accounts for each Party, by status • Total unit holdings in all cancellation accounts for each Annex I Party, by status • Total unit holdings in the retirement account for each Annex I Party
Acceptance Criteria	Information is publicly accessible on the internet Information is updated on completion of the daily reconciliation action

7.2 Non-functional requirements

7.2.1 Validity

Title	**Accuracy of data**
Number	DES-OM4
References	Decision 24/CP.8, paras 5b, 25a, 25d, 25e
Description	Registry systems shall ensure the accuracy of their data and data transfer
Acceptance criteria	Procedures and checks in place to discover inaccuracies

Title	**Integrity of data**
Number	DES-OM5
References	Decision 24/CP.8, paras 5f, 20d
Description	Registry systems shall ensure the integrity of their data and data transfer
Acceptance criteria	Procedures and checks in place to prevent unauthorized data modification

Title	**Discrepancy prevention**
Number	DES-OM6
References	Decision 24/CP.8, para 25f
Description	Registries shall prevent discrepancies from occurring
Constraint	Registries shall terminate transactions where it discovers a discrepancy
Acceptance criteria	Procedures and checks are in place to discover discrepancies against discrepancy rules defined by the transaction log

7.2.2 Performance

Title	**Efficient processing**
Number	DES-OM7
References	Decision 24/CP.8, para 5e
Description	Registry systems shall ensure the efficient processing of data

Title	**System testing**
Number	DES-OM8
References	Decision 24/CP.8, paras 19, 24
Description	Registry systems shall test systems before operation, including in relation to the interaction with the communications hub
Acceptance Criteria	All registry systems shall use common protocols and procedures for testing, initiation and suspension Disruption of operations shall be minimized

Title	**Scheduled downtime**
Number	DES-OM9
References	Decision 24/CP.8, paras 5g, 22, 24
Description	Registry systems shall keep scheduled downtime to a minimum
Constraints	System testing shall be possible with minimal disruption of operations
Acceptance criteria	Problems are isolated so that components may be fixed individually

7.2.3 Safety

Title	**Authorization**
Number	DES-OM10
References	Decision 24/CP.8, paras 5f, 20b, 25 b
Description	Registry systems shall protect data from unauthorized access
Constraints	Registries shall use authentication information defined by the transaction log

Title	**Viruses, hackers and denial of service attacks**
Number	DES-OM11
References	Decision 24/CP.8, paras 5f, 25c
Description	Registry systems shall protect data against exposure to security compromises
Acceptance Criteria	Action plan in place Alarm and notification mechanism in place

Title	**Robust systems**
Number	TL-OM12
References	Decision 24/CP.8, paras 5g, 25d
Description	Registry systems shall be robust
Constraints	Procedures shall be in place for: • Safeguarding data • Recovering data • Recovering registry service • Maintaining and restoring communications

8. Change management

Title	**Change management**
Number	DES-CM1
References	Decision 24/CP.8, para 9
Description	In the event of necessary changes to the technical specifications of the data exchange standards, old versions shall remain valid and identifiable until administrators have had sufficient time to implement new versions
Constraints	New versions shall be compatible with old versions
Acceptance Criteria	Old version(s) remain valid for a specified period (to be defined)

Annex A
Glossary of terms

AAU	Assigned amount units. These are tradable units derived from an Annex I Party's emissions target under the Kyoto Protocol. They may be counted by Annex I Parties towards compliance with their emissions target and are equal to one tonne of carbon dioxide equivalent gases.
Account	An account is used to partition a registry and can hold units. There are three accounts types: holding account, cancellation account and retirement account.
Accuracy	Condition in which information is not modified randomly by the software system.
Administrator	A role to configure and maintain a software system. Configuration can range from system set-up to amending data and parameters within the system.
Annex I Party	A Party to the UNFCCC listed in Annex I to the UNFCCC. These are industrialized countries, including those with economies in transition.
Article	An Article of the Kyoto Protocol.
Attribute	Identifier for a piece of information.
Audit	Checking of recorded data.
Authentication	The process to confirm the identity of a user.
Authorization	The process to verify a permission to do something.
CER	Certified Emission Reductions. These are tradable units generated by projects in non-Annex I Parties under the CDM. They may be counted by Annex I Parties towards compliance with their emissions target and are equal to one tonne of carbon dioxide equivalent gases.
CDM	Clean Development Mechanism under Article 12 of the Kyoto Protocol. Projects in developing countries under the CDM result in reduced emissions, or enhanced removals, in a host non-Annex I Party and generate CERs.
CDM Executive Board	The board supervising the CDM. It is serviced by the secretariat.
CDM registry	The registry established by the CDM Executive Board on behalf of non-Annex I Parties hosting CDM projects. It is to ensure the accurate accounting of transactions of CERs by those Parties.
Commitment period	A specified period in which an Annex I Party is to show it compliance with its emissions target. The first commitment period is from 2008 to 2012.
Communications hub	The central communication component integrated in the transaction log, through which all registries and the transaction log communicate.
Communications protocol	Formal rules describing how to transmit data.
Conference of the Parties (COP)	The supreme decision-making body under the UNFCCC. Attended by delegations from all state Parties to the UNFCCC. COP9 will be held in Milan, Italy, from 1-12 December 2003.
Customisation	Configuration of systems toward specific user needs within certain boundaries.
Denial of service Attack	A very high number of requests in very short period aimed at a software system with the goal of achieving an overload and crash of that software system.
Discrepancy	An instance of non-conformity with agreed rules for transactions. The purpose of the transaction log is to identify discrepancies in transaction proposals.
Downtime	The time in which a software system is not available for use.

Emissions trading	The trading of units which may count towards compliance by Annex I Parties with their emissions targets. Emissions trading is provided for under Article 17 of the Kyoto Protocol. Domestic (e.g. UK) and regional (e.g. EU) emissions trading schemes are also being established.
Encryption	A way of protecting data from unauthorized access.
Entities	Legal entities authorized by a government to participate in emissions trading or joint implementation projects. Private and/or public entities involved in the CDM. Such entities may be from public, private or non-governmental sectors.
ERU	Emission reduction units. These are tradable units generated by projects in Annex I Parties under joint implementation. They may be counted by Annex I Parties towards compliance with their emissions target and are equal to one tonne of carbon dioxide equivalent gases.
Exchange mechanism	System for exchanging data.
Functional requirement	Requirement for which the quality test result is binary (e.g. yes/no or right/wrong)
Inconsistency	A difference found through a comparison of at least two different data sets.
Integrity	Data cannot be modified by any party not authorized to do so.
Joint Implementation	Joint implementation under Article 6 of the Kyoto Protocol. Projects in industrialized countries under JI result in reduced emissions, or enhanced removals, in a host non-Annex I Party and generate CERs.
Kyoto mechanism	The three “flexibility mechanisms” established by the Kyoto Protocol: Joint implementation projects under Article 6, clean development projects under Article 12 and emissions trading under Article 17.
Kyoto Protocol	Allied agreement to the UNFCCC containing emission reduction targets for Annex I Parties.
Logging	Functionality of a software system that stores information on the system for auditing and tracking.
Message	Electronic transmission of data.
National Registry	A registry established by an Annex I Party.
Non-Annex I Party	A Party to the UNFCCC which is not listed in Annex I to the UNFCCC. These are developing countries.
Non-functional requirement	Requirement for which the quality test result is measure or a score (e.g. from 1-10 or high/medium/low)
Party	A state that has ratified the Kyoto Protocol.
Question of Implementation	A problem identified in the review of a Party’s emissions inventory or other information submitted by a Party in the context of the Kyoto Protocol.
Reconciliation	The process by which data from different registry systems is compared and inconsistencies are resolved.
Recovery	The complete re-installation and re-configuration of a software system from scratch.
Registry	A software system for the accounting of transactions in AAUs, RMUs, ERUs and CERs. Includes national registries and the CDM registry.
Registry system	Generic term for national registries, the CDM registry and the transaction log.
Release Process	Process that describes how a new piece of software is deployed to the system in operation.
Removal	Removals of greenhouse gases from the atmosphere through LULUCF activities. Such removals may lead to the generation of RMUs, CERs or ERUs. They are the “opposite” of emissions of greenhouse gases.

RMU	Removal units. These are tradable units generated on the basis of removals of greenhouse gases from the atmosphere through LULUCF activities under Articles 3.3 and 3.4 of the Kyoto Protocol. They may be counted by Annex I Parties towards compliance with their emissions target and are equal to one tonne of carbon dioxide equivalent gases.
Robust	A characteristic of a software system that describes the extent to which it is protected from loss of service or data integrity.
Role	A role is a set of permissions for functions that a person is allowed to perform. A role may be assigned to a user (person) or a group.
Scalability	The ability of a software system to handle higher workload then initially planned without modifying the program code.
Secretariat	Secretariat to the UNFCCC
Stage	A uniquely identifiable step in a data exchange sequence.
Status	A characteristic given to transaction (e.g. initiated, terminated, completed)
TCP	Transmission control Protocol.
Transaction	An operation applied to AAUs, RMUs, ERUs and CERs (issuance, transfer, cancellation, retirement, carry-over).
Transaction log	An electronic database established by the secretariat to monitor the validity of transactions between registries.
True-up period	The period from the end of the commitment period (2012) until 100 days after the completion of the Kyoto Protocol reviews of emissions information relating to the commitment period. Transfers of units may continue to take place during this period. The true-up period may therefore last until some time in 2015.
UNFCCC	United Nations Framework Convention on Climate Change. This is the framework treaty to which the Kyoto Protocol is allied.
Unit	Generic term for AAUs, RMUs, ERUs and CERs.
Universal time	Equivalent to Greenwich Mean Time (24 hour clock).
User	A person (human being) who interacts with a system.
User Acceptance Test	A test performed by a user of the system against a set of predefined test cases.
User Interface	The interface used by a person to interact with an application.
Virus	A software program that harms software systems or other software programs.
XML	EXtensible Markup Language. Standard used for structured data storage.

Annex B
Transaction Processes

This annex outlines the processes of interaction that national registries, the CDM registry and the transaction log will need to undertake. The six main types of interaction processes, which the data exchange standards will need to support and be consistent with, are summarized in the table below.

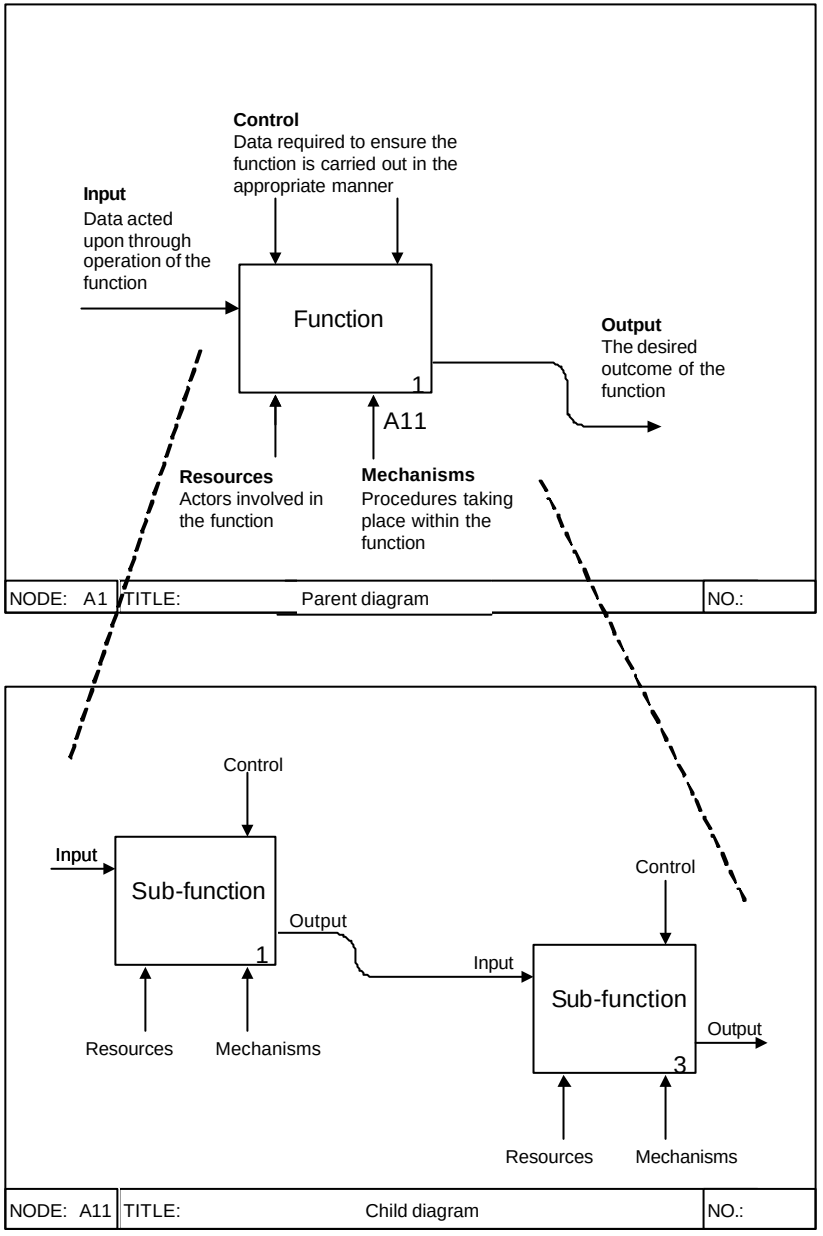
Type of interaction	Relevant transactions and activities
1. Issuance	Issuance of AAUs and RMUs in national registries
	Issuance of CERs in the CDM registry
2. Conversion	Conversion of AAUs and RMUs into ERUs
3. External transfer	Transfer and acquisition of AAUs, RMUs, ERUs and CERs between holding accounts in different registries
4. Internal transfer	Transfers of AAUs, RMUs, ERUs and CERs to a cancellation account to prevent them being counted towards an Annex I Party's emissions target
	Transfers of AAUs, RMUs, ERUs and CERs to a retirement account to set them aside for being counted towards an Annex I Party's emissions target
5. Carry-over	Carry-over of AAUs, ERUs and CERs to the next commitment period
6. Reconciliation	Reconciliation of unit holdings data between registries and the transaction log

The following diagram generically illustrates the method used in this annex to define the interaction processes between the registries and the transaction log. This method defines each process as a "function" (shown here in the generic parent diagram) and decomposes it further into sub-functions (shown here in the generic child diagram).

Each function and sub-function is represented by a box. The specific operations contained "within" the boxes are not defined. However, the arrows represent the minimum set of constraints which will need to be applied in the operation of the functions and sub-functions: inputs, outputs, mechanisms, resources and controls.

The remainder of this annex, including figures 1 to 5, applies this method to the six processes listed in the table above. The functions and sub-functions form the basis for interactions for registry systems and hence for the data exchange standards, in particular in relation to the exchange mechanism and the data transfer format.

A "confirm amount" sub-function has been included in some parent diagrams. This operation is shown with dashed lines as it is not to be undertaken by the transaction log or the registries. However, this operation is included in order to show the context within which these registry systems are to exist. It is a necessary prior step to some of the functions of the registries and transaction log being undertaken.



Issuance of AAUs, RMUs and CERs

The issuance of AAUs is undertaken by a Party in its national registry on the basis of its assigned amount (which is in turn calculated on the basis of greenhouse gas emissions during the base year). The issuance of RMUs is undertaken by a Party in its national registry on the basis of its removals of greenhouse gases through LULUCF activities. The issuance of CERs into a pending account is undertaken by the CDM Executive Board, in the CDM registry, on the basis of verified and certified reductions in greenhouse gas emissions through a CDM project activity. Issuance of such units is monitored by the transaction log.

In **figure 1a**, the dashed function shows the confirmation of the amounts that may be issued as AAUs, RMUs and CERs. This is undertaken by means of inputs, resources, procedures and control rules under the Kyoto Protocol that are external to registry systems. These confirmed amounts act as a constraint on issuance, shown as the solid function, which is undertaken through registry systems.

Figure 1b shows sub-functions decomposed from function 1 in figure 1a:

Sub-function 1. The administrator of a registry initiates an issuance and, in doing so, specifies the quantity of units to be issued. This must be lower than or equal to the amount confirmed by the external processes. The registry generates, in accordance with the data transfer format, a transaction number for the issuance and a serial number for each unit to be issued, and informs the transaction log of the proposed issuance.

Sub-function 2. The transaction log receives the information on the proposed transaction from the relevant registry as an input and verifies the validity of the issuance against:

(a) The rules defining data formats, as established in the data exchange standards,

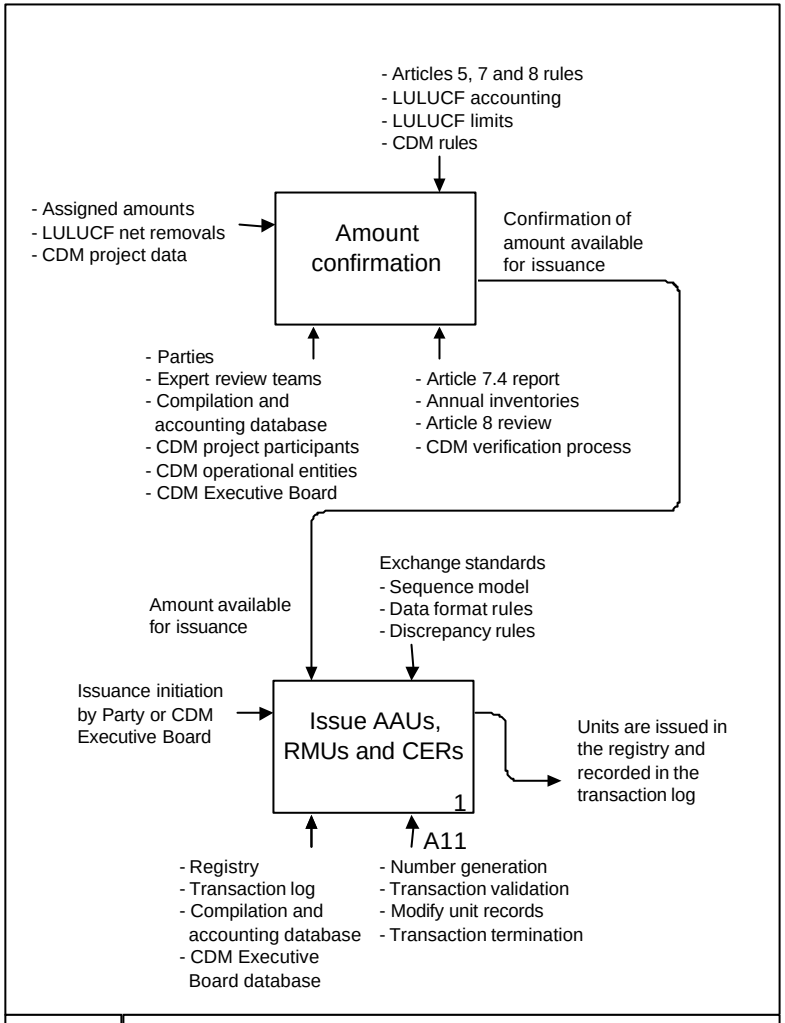
(b) The rules defining discrepancies, based on decisions by the COP on the Kyoto Protocol, including with regard to the confirmed amount available for issuance (contained in the secretariat's compilation and accounting database in the case of AAUs and RMUs and in the CDM Executive Board information systems in the case of CERs).

The transaction log informs the registry of its findings. Where the transaction log discovers a data format error, the registry must repeat its number generation or message, as appropriate, if it wishes to continue with the issuance. Where the transaction log discovers a discrepancy, it flags its record of the relevant unit holding in order to aid in conducting its checks on future transactions.

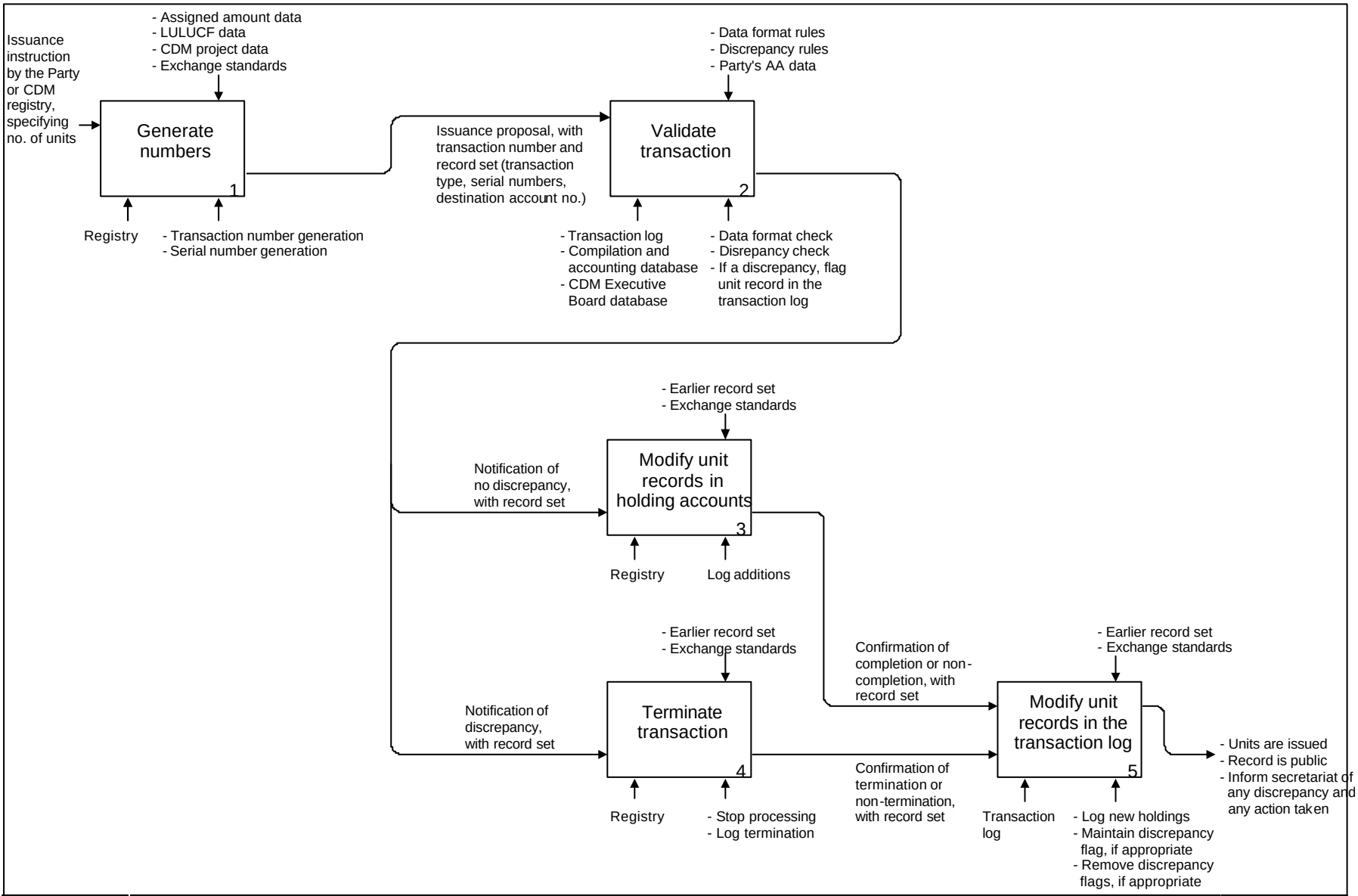
Sub-function 3. In the event of no discrepancy being discovered, the registry concerned modifies its unit holdings data to record the newly issued units and informs the transaction log of its actions.

Sub-function 4. In the event of a discrepancy being discovered, the registry terminates the proposed issuance and informs the transaction log of its actions.

Sub-function 5. The transaction log receives the confirmation from the registry of its actions and, accordingly, updates its own records of unit holdings in the relevant registry. In the event that the registry has terminated the proposed issuance for which a discrepancy was discovered, the transaction log removes the relevant flag on its record of the unit.



NODE: A1 | Figure 1a: Context of issuance of AAUs, RMUs and CERs



NODE: A11	TITLE: Figure 1b: Issuance of AAUs, RMUs and CERs	NO.:

Conversion of AAUs and RMUs to

The conversion of AAUs and RMUs to ERUs is undertaken by a Party in an account in its national registry. AAUs are converted to ERUs on the basis of verified reductions in emissions through a joint implementation project. RMUs are converted to ERUs on the basis of verified removals of greenhouse gases through a JI project. Conversion of such units is monitored by the transaction log.

In **figure 2a**, the dashed function shows the confirmation of the amounts that may be issued as ERUs. This is undertaken by means of inputs, resources, procedures and control rules which apply to JI projects and which are external to registry systems. These confirmed amounts are to act as a constraint on conversion, shown as the solid function, undertaken through registry systems.

Figure 2b shows sub-functions decomposed from function 1 in figure 2a:

Sub-function 1. The administrator of a registry initiates a conversion and, in doing so, specifies the units to be converted. The amount of units is to be lower than or equal to the amount confirmed by the external processes. In the case of JI projects involving LULUCF activities, the conversion proposal must specify the LULUCF activity and RMUs generated on the basis of the same LULUCF activity must be proposed for conversion. The registry generates, in accordance with the data transfer format, a transaction number for the conversion and the modifications to be applied to the serial numbers (adding a project identifier and changing the type indicator) of units to be converted. The registry informs the transaction log of the proposed conversion.

Sub-function 2. The transaction log receives the information on the proposed transaction from the relevant registry as an input and verifies the validity of the conversion against:
(a) Its unit holdings data regarding the units available for conversion,
(b) The rules defining data formats, as established in the data exchange standards,
(c) The rules defining discrepancies, based on decisions by the COP on the Kyoto Protocol, including, in the case of projects under track 2 of the JI rules, with regard to the confirmed amount to be converted (contained in the Article 6 Supervisory Committee's information systems).

The transaction log informs the registry of its findings. Where the transaction log discovers a data format error, the registry must repeat its number generation or message, as appropriate, if it wishes to continue with the conversion. Where the transaction log discovers a discrepancy, it flags its record of the relevant unit holding in order to aid in conducting its checks on future transactions.

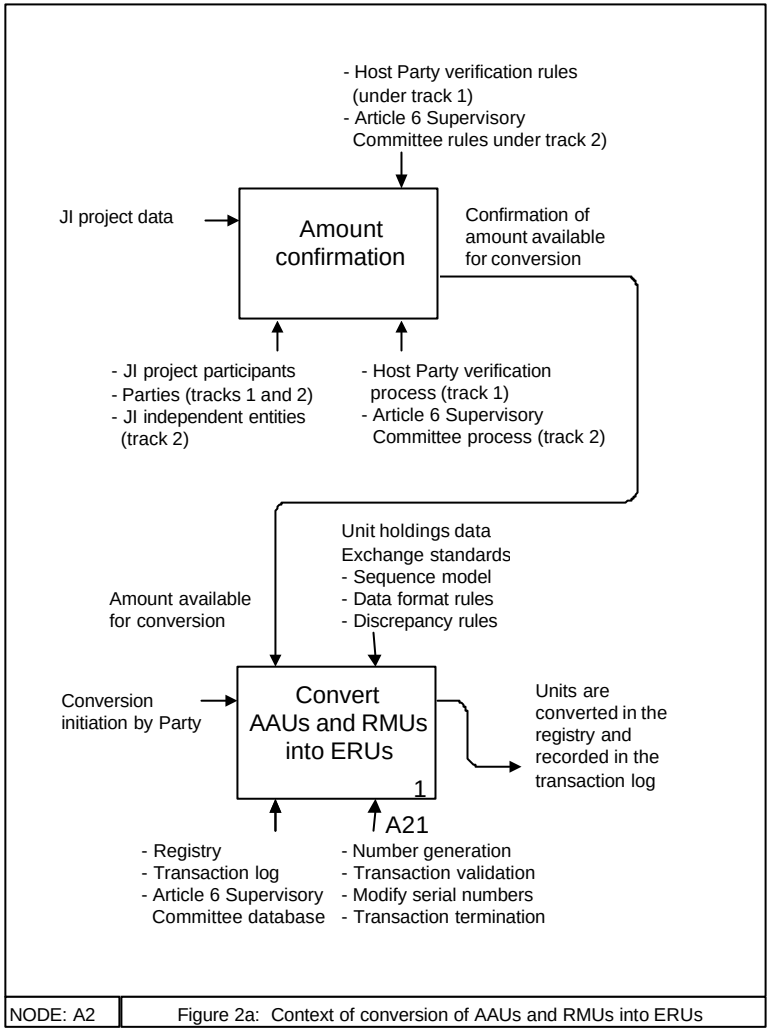
Sub-function 3. In the event of no discrepancy being discovered, the registry concerned modifies its unit holdings data to record the modified serial numbers and informs the transaction log of its actions.

Sub-function 4. In the event of a discrepancy being discovered, the registry terminates the proposed conversion and informs the transaction log of its actions.

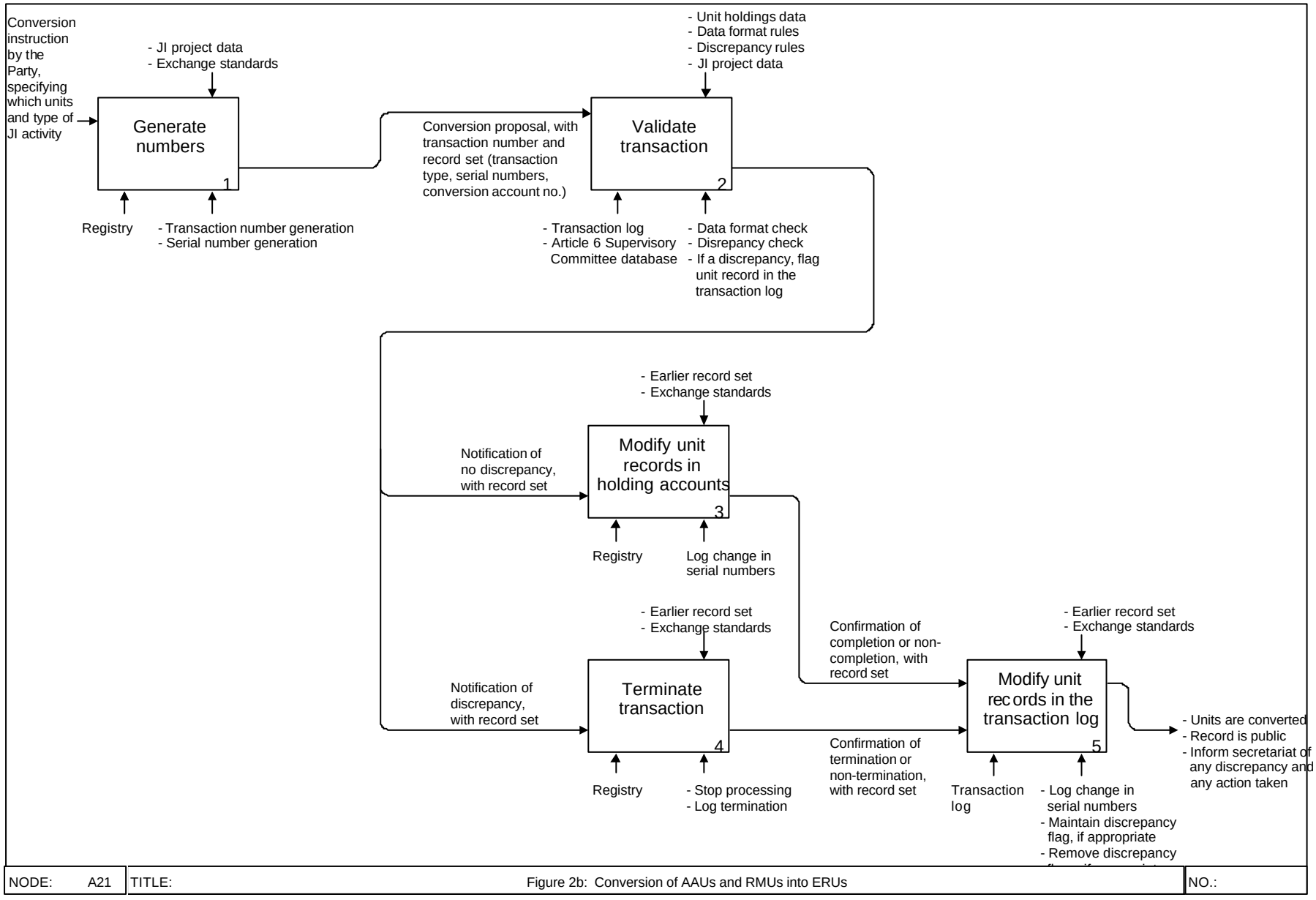
Sub-function 5. The transaction log receives the confirmation from the registry of its actions and, accordingly, updates its own records of serial numbers in the relevant registry. In the event that the registry has terminated the proposed conversion for which a discrepancy was discovered, the transaction log removes the relevant flag on its record of the unit.

According to the rules decided by the COP, the newly converted ERUs are to be transferred to an acquiring registry. For this transfer process, see “external transfer of AAUs, RMUs, ERUs and CERs”.

Also according to the rules decided by the COP, JI projects involving LULUCF activities must be accounted for under the Articles 3.3 and 3.4 of the Kyoto Protocol. Such activities may therefore also lead to the issuance of RMUs. For this transfer process, see “issuance of AAUs, RMUs and CERs”.



NODE: A2 | Figure 2a: Context of conversion of AAUs and RMUs into ERUs


Conversion instruction by the Party, specifying which units and type of JI activity
- JI project data
- Exchange standards
Generate numbers
1
Registry
- Transaction number generation
- Serial number generation
Conversion proposal, with transaction number and record set (transaction type, serial numbers, conversion account no.)
- Unit holdings data
- Data format rules
- Discrepancy rules
- JI project data
Validate transaction
2
- Transaction log
- Article 6 Supervisory Committee database
- Data format check
- Disrepancy check
- If a discrepancy, flag unit record in the transaction log
- Earlier record set
- Exchange standards
Notification of no discrepancy, with record set
Modify unit records in holding accounts
3
Registry
Log change in serial numbers
- Earlier record set
- Exchange standards
Notification of discrepancy, with record set
Terminate transaction
4
Registry
- Stop processing
- Log termination
Confirmation of completion or non-completion, with record set
Confirmation of termination or non-termination, with record set
- Earlier record set
- Exchange standards
Modify unit records in the transaction log
5
Transaction log
- Log change in serial numbers
- Maintain discrepancy flag, if appropriate
- Remove discrepancy
- Units are converted
- Record is public
- Inform secretariat of any discrepancy and any action taken
NODE: A21
TITLE:
Figure 2b: Conversion of AAUs and RMUs into ERUs
NO.:

External transfer of AAUs, RMUs, ERUs and CERs

The external transfer of AAUs, RMUs, ERUs and CERs to another registry is undertaken by a Party, an entity or the CDM Executive Board, on the basis of the amount proposed by the transferor. The external transfer of such units is monitored by the transaction log.

The function in **figure 3a** shows the inputs, resources, procedures and control rules for the transfer of units from an account in one registry to an account in another registry.

Figure 3b shows sub-functions decomposed from function 1 in figure 3a:

Sub-function 1. The administrator of a transferring registry initiates a transfer and, in doing so, specifies the units to be transferred. These units must be included among the units held in the specified transferring account. The transferring registry generates, in accordance with the data transfer format, a transaction number for the transfer. The transferring registry informs the transaction log and the acquiring registry of the proposed transfer.

Sub-function 2. The transaction log receives the information on the proposed transaction from the transferring registry as an input and verifies the validity of the transfer against:

(a) Its unit holding data regarding the units available for the transfer,

(b) The rules defining data formats, as established in the data exchange standards,

(c) The rules defining discrepancies, based on decisions by the COP on the Kyoto Protocol.

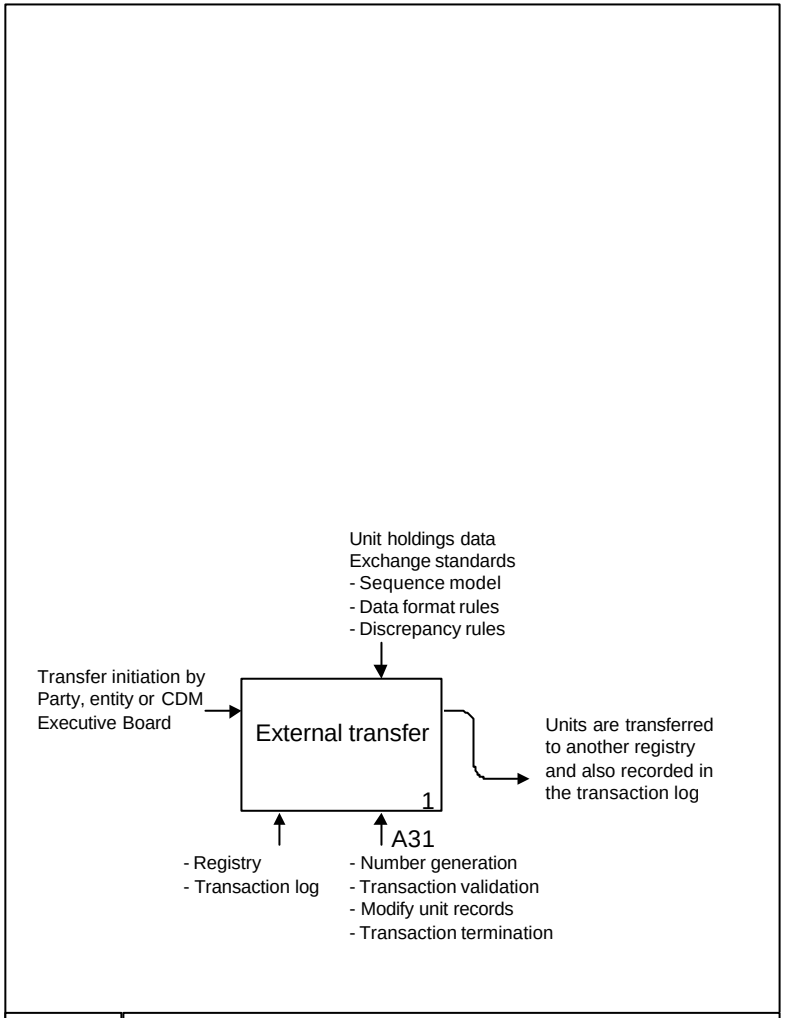
If no discrepancy is found, the transaction log informs the acquiring registry of its findings. Where the transaction log discovers a data format error, the transferring registry must repeat its number generation or message, as appropriate, if it wishes to continue with the transfer. Where the transaction log discovers a discrepancy, it flags its record of the relevant unit holding in order to aid in conducting its checks on future transactions.

Sub-function 3. In the event of no discrepancy being discovered, the acquiring registry modifies its unit holdings data to record the addition of the acquired units and informs the transaction log of its actions.

Sub-function 4. In the event of a discrepancy being discovered, the transferring registry terminates the proposed transfer and informs the transaction log of its actions. In the event that the transferring registry does not terminate the transaction, the acquiring registry terminates it.

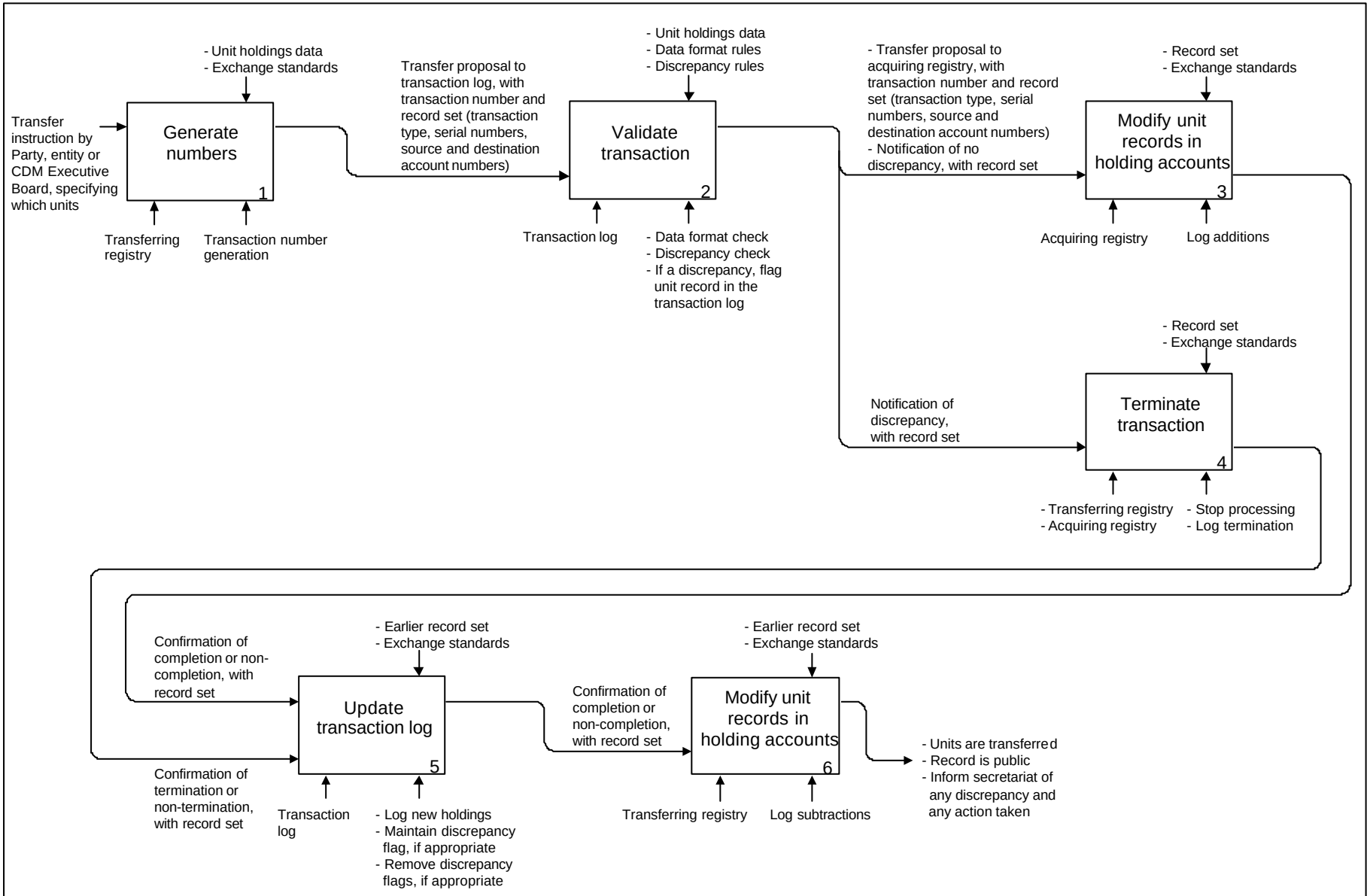
Sub-function 5. The transaction log receives the confirmation from the acquiring registry of its actions and, accordingly, updates its own records of unit holdings in the relevant registries. In the event that a registry has terminated the proposed transfer for which a discrepancy was discovered, the transaction log removes the relevant flag on its record of the unit.

Sub-function 6. The transferring registry modifies its unit holdings data to record the subtraction of the acquired units and informs the transaction log of its actions.



NODE: A3

Figure 3a: Context of external trasfer of AAUs, RMUs, ERUs and CERs



NODE: A31	TITLE: Figure 3b: External transfer of AAUs, RMUs, ERUs and CERs	NO.:

Internal transfer of AAUs, RMUs, ERUs and CERs for cancellation or retirement

The internal transfer of AAUs, RMUs, ERUs and CERs to a cancellation account is undertaken by a Party, an entity or the CDM Executive Board, on the basis of the amounts proposed by the transferor. The internal transfer of these units to a retirement account is undertaken by a Party or an entity, on the basis of the amounts proposed by the transferor. The internal transfer of such units is monitored by the transaction log.

The function in **figure 4a** shows the inputs, resources, procedures and control rules for the transfer of units from an account to a cancellation or retirement account within the registry.

Figure 4b shows sub-functions decomposed from function 1 in figure 4a:

Sub-function 1. The administrator of a registry initiates a transfer and, in doing so, specifies the units to be transferred. These must be included among the units held in the specified transferring account. The registry generates, in accordance with the data transfer format, a transaction number for the transfer and informs the transaction log of the proposed transfer.

Sub-function 2. The transaction log receives the information on the proposed transaction from the relevant registry as an input and verifies the validity of the issuance against:

(a) Its unit holdings data regarding the units available for the transfer,

(b) The rules defining data formats, as established in the data exchange standards,

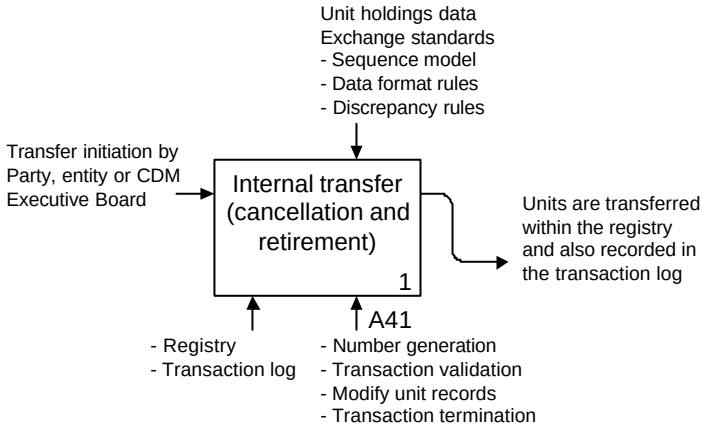
(c) The rules defining discrepancies, based on decisions by the COP on the Kyoto Protocol.

The transaction log informs the registry of its findings. Where the transaction log discovers a data format error, the registry must repeat its number generation or message, as appropriate, if it wishes to continue with the transfer. Where the transaction log discovers a discrepancy, it flags its record of the relevant unit holding in order to aid in conducting its checks on future transactions.

Sub-function 3. In the event of no discrepancy being discovered, the registry concerned modifies its unit holdings data to record the subtractions from the transferring and additions to the acquiring account and informs the transaction log of its actions.

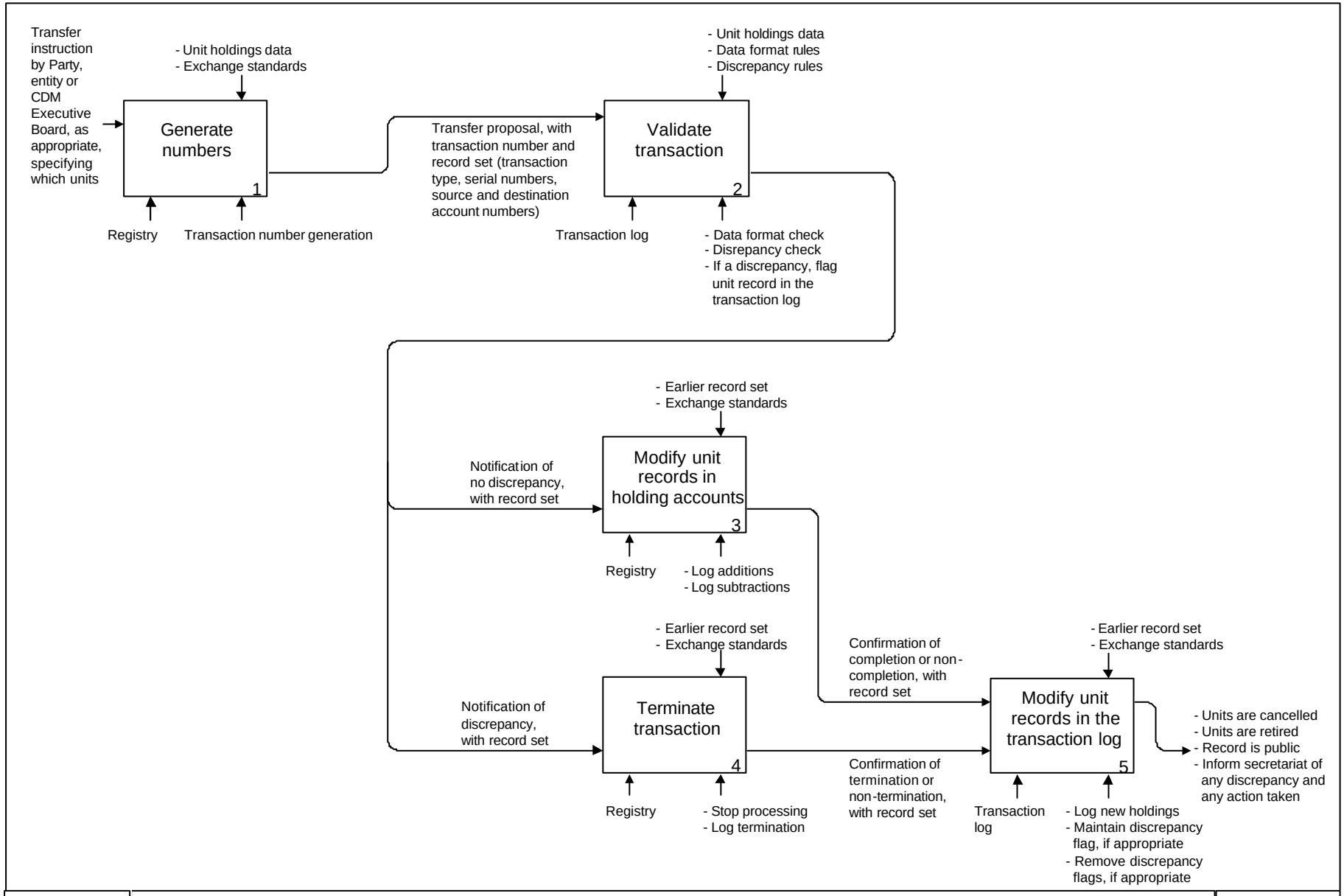
Sub-function 4. In the event of a discrepancy being discovered, the registry terminates the proposed transfer and informs the transaction log of its actions.

Sub-function 5. The transaction log receives the confirmation from the registry of its actions and, accordingly, updates its own records of unit holdings in the relevant registry. In the event that the registry has terminated the proposed transfer for which a discrepancy was discovered, the transaction log removes the relevant flag on its record of the unit.



NODE: A4

Figure 4a: Context of internal transfer of AAUs, RMUs, ERUs and CERs



NODE: A41	TITLE: Figure 4b: Ìnternal transfer of AAUs, RMUs, ERUs and CERs for cancellation and retirement	NO.:

Carry-over of AAUs, ERUs and CERs

The carry-over of AAUs, ERUs and CERs is undertaken by a Party in an account in its national registry, on the basis of the amount of units in holding accounts (i.e. units that have not been cancelled or retired for that commitment period) after expiration of the additional period for fulfilling commitments (the "true-up period"). The units remain in the same account and the serial numbers remain unchanged. The effect of the carry-over transaction is to give recognition, both within the registry and the transaction log, to the validity of the units in the next commitment period. Any units in holding accounts that are not carried over in this manner are to be cancelled. The carry-over of units is monitored by the transaction log.

In **figure 5a**, the dashed function shows the confirmation of the AAUs, ERUs and CERs that may be carried over to the next commitment period. This is undertaken by means of inputs, resources, procedures and control rules, external to registry systems, concerning the assessment of Parties' compliance with their emissions targets under the Kyoto Protocol. This identification of units acts as a constraint on carry-over, shown as the solid function, undertaken through registry systems.

Figure 5b shows sub-functions decomposed from function 1 in figure 5a:

Sub-function 1. The administrator of a registry initiates a carry-over and, in doing so, specifies the units to be carried-over and any units not to be carried-over. The total of these amounts must be equal to the total amount of units in holding accounts within the registry after the true-up period. The registry generates, in accordance with the data transfer format, a transaction number for the carry-over and informs the transaction log of the proposed carry-over.

Sub-function 2. The transaction log receives the information on the proposed transaction from the relevant registry as an input and verifies the validity of the issuance against:

(a) Its unit holding data on the units in holding accounts after the true-up period,

(b) The rules defining data formats, as established in the data exchange standards,

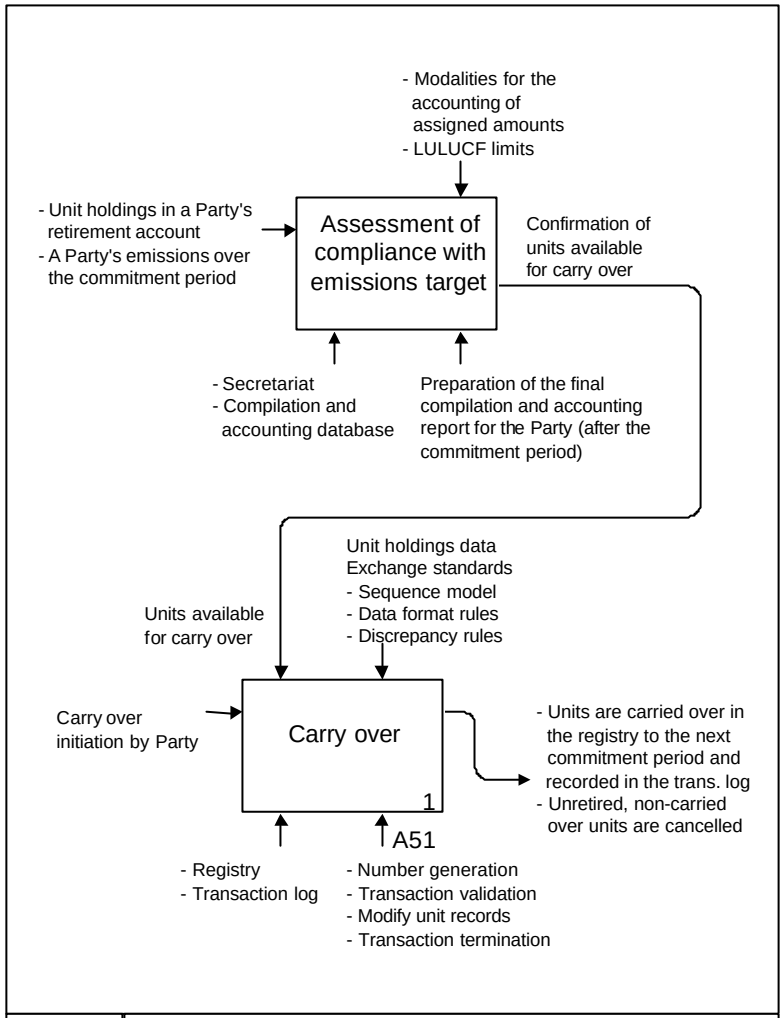
(c) The rules defining discrepancies, based on decisions by the COP on the Kyoto Protocol, including with regard to the units available for carry-over (identified in the final compilation and accounting report of the Party).

The transaction log informs the registry of its findings. Where the transaction log discovers a data format error, the registry must repeat its number generation or message, as appropriate, if it wishes to continue with the carry-over. Where the transaction log discovers a discrepancy, it flags its record of the relevant unit holding in order to aid in conducting its checks on future transactions.

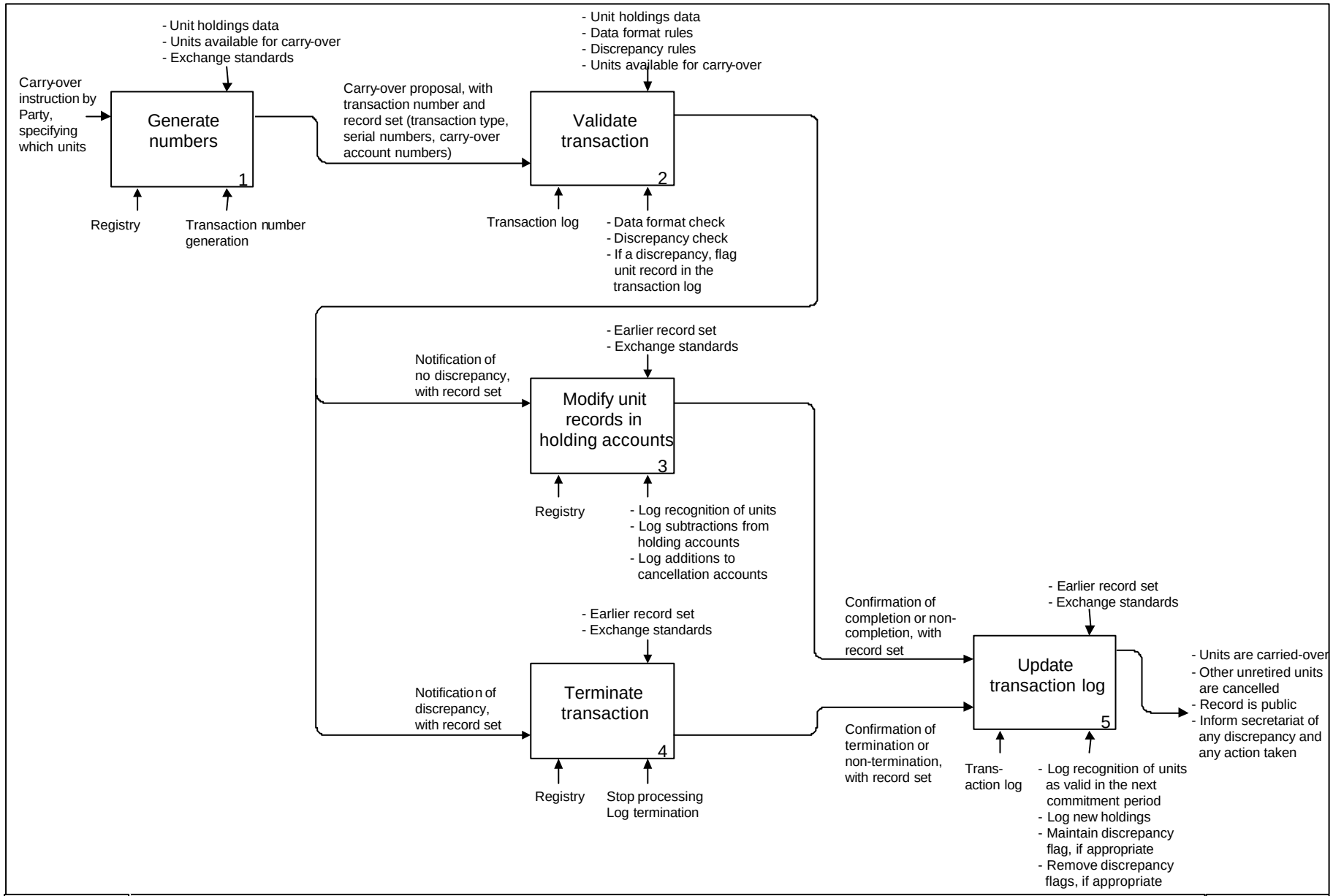
Sub-function 3. In the event of no discrepancy being discovered, the registry concerned modifies its unit holdings data to recognize the carried-over units for the next commitment period, subtract any non-carried-over units from holding accounts and add any non-carried-over units to cancellation accounts. The registry informs the transaction log of its actions.

Sub-function 4. In the event of a discrepancy being discovered, the registry terminates the proposed carry-over and informs the transaction log of its actions.

Sub-function 5. The transaction log receives the confirmation from the registry of its actions and, accordingly, creates a record of units of that Party which it recognizes as being valid for the next commitment period. In the event that the registry has terminated the proposed carry-over for which a discrepancy was discovered, the transaction log removes the relevant flag on its record of the unit.



NODE: A5 | Figure 5a: Context of carry over of AAUs, ERUs and CERs



NODE: A31	TITLE: Figure 5b: Carry over of AAUs, ERUs and CERs	NO.: