



**Basel Convention on the
Control of Transboundary
Movements of Hazardous
Wastes and Their Disposal**

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**Rotterdam Convention on the
Prior Informed Consent
Procedure for Certain
Hazardous Chemicals and
Pesticides in International
Trade**



**Stockholm Convention on
Persistent Organic Pollutants**

Conferences of the parties to
the Basel, Rotterdam and Stockholm conventions
Second simultaneous extraordinary meetings
Geneva, 28 April–10 May 2013
Item 4 (c) of the provisional agenda*

Enhancing cooperation and coordination among
the Basel, Rotterdam and Stockholm conventions:
joint activities for the biennium 2014–2015

**Draft guidance document for parties and other stakeholders to
facilitate the implementation of the joint clearing-house
mechanism at the national and regional levels**

Note by the Secretariat

1. As referred to in document UNEP/FAO/CHW/RC/POPS/EXCOPS.2/2/Add.4 on joint activities, the annex to the present note contains draft guidance for parties and other stakeholders to facilitate the implementation of the joint clearing-house mechanism at the national and regional levels.
2. The development of the draft guidance document was included in the joint workplan for the development of a clearing-house mechanism to service the Basel, Rotterdam and Stockholm conventions covering the biennium 2012–2013, set out in annex III to the 2011 synergies decisions.¹

The Secretariat prepared, in consultation with a number of experts, the preliminary draft guidance document contained in the annex to the present note, which has not been formally edited. Further work is required to complete the draft, which will be undertaken before the end of 2013. The completed draft will be made available on the Secretariat website.

* UNEP/FAO/CHW/RC/POPS/EXCOPS.2/1.

¹ Decisions BC-10/29, RC-5/12 and SC-5/27 on enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions.

Annex

Draft guidance document to facilitate the implementation of the clearing-house mechanism at the national and regional levels

Table of Contents

I. EXECUTIVE SUMMARIES.....	5
A. For decision makers	5
1. Background and mandates	5
2. Objective of the guidance document for the development of the joint clearing-house mechanism regional and national nodes	5
3. Expected benefits	6
4. Requirements	6
B. For knowledge management professionals.....	7
1. Background.....	7
2. Decentralized approach.....	7
C. For Information Technology Professionals	8
II. OBJECTIVE OF THIS GUIDANCE DOCUMENT: DEVELOPING LOCAL NODES OF THE CLEARING-HOUSE MECHANISM	8
III. CLEARING-HOUSE MECHANISM CONCEPTS.....	10
A. Description of the clearing-house mechanism principles.....	10
1. An information exchange system.....	10
2. The three pillars of the clearing-house mechanism:.....	10
3. Management approach	12
4. Centralized vs. Decentralized approach	13
5. Benefits for end-users	15
6. Benefits for information providers.....	15
7. Mandates.....	16
B. What is a local node of the joint clearing-house mechanism?	16
1. Definition	16
2. Information scope	16
3. Integration with existing systems and processes.....	17
4. Interconnection with other nodes.....	18
5. Node languages.....	18
IV. MANAGEMENT OF A DECENTRALIZED JOINT CLEARING-HOUSE MECHANISM.....	18
A. Nodes content guidelines	19
1. Quality control	19
2. Evaluation criteria.....	19
3. Inclusion of content.....	19
4. Exclusion of content	19
5. Distribution policy	20
6. Global directory management.....	20
7. Change management process	20
8. Extension mechanism	20
B. Nodes taxonomy guidelines	20
1. Quality control	20
2. Evaluation criteria.....	20
3. Inclusion of content.....	21
4. Exclusion of content	21

5.	Change management process	21
C.	Infrastructure considerations for local nodes.....	21
1.	Underlying systems and repositories	21
2.	Using a central index or a local index	21
3.	Security	21
V.	API SPECIFICATIONS	22
A.	Information scope	22
1.	Documents	22
2.	Contacts	22
3.	Events	23
4.	News	24
5.	Common references	25
B.	Taxonomy and indexing.....	27
1.	Taxonomy description	27
2.	Taxonomy schema	28
3.	Mappings with existing vocabularies.....	28
C.	Technology.....	29
1.	Introduction to OData	29
2.	Infrastructure requirements	30
3.	Exposing information to other nodes	31
4.	Retrieving information from other nodes.....	31

I. Executive summaries

A. For decision makers

1. Background and mandates

Joint clearing-house mechanism overview

3. The overall objective of the joint clearing-house mechanism is to facilitate the exchange of information relevant to the implementation of the Basel, Rotterdam and Stockholm conventions, in order to enable Parties and other stakeholders to make sound decisions, including the promotion of communication and exchange of sound measures and valuable experiences in the implementation of the conventions.

4. The joint clearing-house mechanism is fed by information provided by Parties, the Secretariat of the Basel, Rotterdam and Stockholm conventions, intergovernmental organizations, non-governmental organizations and other stakeholders resulting in the establishment of a global and collaborative knowledge base to support the implementation of the conventions.

Current situation and concepts

5. Participation in the joint clearing-house programme is, and will remain, voluntary.

6. Currently, the joint clearing-house mechanism is following a centralized approach in which information providers are sending information to the secretariat, usually through emails or other means of correspondence, and the secretariat disseminates it through a central clearing-house mechanism.

7. One of the benefits of a centralized approach is that it facilitates the maintenance of the joint clearing-house mechanism infrastructure and tools. Some of the disadvantages are slow information flows and complex processes for sharing and updating the information.

8. A decentralized approach, thanks to new Information Technology tools, will tackle the above mentioned disadvantages by enabling automatic information exchange, harvesting and aggregating information between all clearing-house mechanism nodes. In a decentralized approach, all regional and national online information repositories can become a node of the Basel, Rotterdam and Stockholm conventions clearing-house mechanism.

Mandates

9. The following decisions of the Conferences of the Parties to the Basel, Rotterdam and Stockholm conventions, requested the Secretariat to move towards the implementation of regional and local nodes of the joint clearing-house mechanism by first producing this guidance document: BC-IX/10, RC-4/11, SC.4/21, Omnibus decisions (BC.Ex-1/1, RC.Ex-1/1, SC.Ex-1/1), BC-10/29, RC.5/9, SC.5/15.

2. Objective of the guidance document for the development of the joint clearing-house mechanism regional and national nodes

10. The objectives of this document are to:

(a) Help decision makers to understand the benefits and resource implications related to the development of a regional / national node for the joint clearing-house mechanism, serving the Basel, Rotterdam and Stockholm conventions;

(b) Help knowledge management professionals that are working on information exchange projects at national, regional and global levels to understand the scope, diversity and formats of the information exchanged through the joint clearing house mechanism and how participating in this project will add value to their own information exchange projects;

(c) Provide guidance to information technology professionals that are supporting information exchange projects at the national, regional and global levels to build and maintain the necessary technological infrastructure to support a local node of the joint clearing-house mechanism and what are the standards and protocols to make all nodes compatible with one another.

3. Expected benefits

11. The benefits of developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions, particularly regional centres, from an executive point of view, are:

(a) The owner of the local clearing house node becomes an "information provider" for the joint clearing house mechanism, reaching specialized target audiences, particularly parties of the three conventions, NGOs, industry association and other conventions' stakeholders;

(b) Information providers can promote their activities to a broader and more diverse target audiences and can foster collaboration with other members of the joint clearing house;

(c) Information providers will also be able to harvest information from other clearing house nodes and aggregate or re-package depending on the intended purpose, for instance it will be possible to organize regional information exchange processes on regional issues and in a local language;

(d) The information content will still be managed, processed and stored on each node repositories and systems in order to ensure full ownership and control to the information owners;

(e) The current knowledge management processes and systems within each node will not be impacted by the implementation of a local node;

(f) The combination of all clearing-house mechanism nodes will be accessed in a friendly manner by all stakeholders as if it was one large repository of information;

(g) The quantity and quality of information will be increased for each node of the joint clearing-house mechanism by leveraging the combined efforts of global, regional and national institutions, which are actively contributing information to the joint clearing house mechanism.

4. Requirements

12. The requirements for developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions are:

(a) Availability of information, expertise, best practices, cases studies etc., relevant to the implementation of the Basel, Rotterdam and Stockholm conventions that can be shared for the benefits of other members of the joint clearing house mechanism, as well as the man/power to keep this information updated and relevant;

(b) Availability of up-to-date and structured digital repositories, such as databases or websites, from which information will be exposed to the other nodes;

(c) A web server and internet connection to make the information available to other nodes;

(d) Approximately 25 man/days for a computer programmer to implement the tool that will expose the local node information to the other nodes. Alternatively, the Secretariat will develop a toolkit and provide assistance to reduce this need to 5 man/days;

(e) Approximately 10 man/days per year for ensuring proper maintenance and quality control of the local node by an Information Technology and Knowledge Management specialist.

B. For knowledge management professionals

1. Background

Joint clearing-house mechanism overview

13. The overall objective of the joint clearing-house mechanism is to facilitate the exchange of information relevant to the implementation of the Basel, Rotterdam and Stockholm conventions, in order to enable Parties and other stakeholders to make sound decisions, including the promotion of communication and exchange of sound measures and valuable experiences in the implementation of the conventions.

14. The joint clearing-house mechanism is fed by information provided by Parties, the Secretariat of the Basel, Rotterdam and Stockholm conventions, intergovernmental organizations, non-governmental organizations and other stakeholders resulting in the establishment of a global and collaborative knowledge base to support the implementation of the conventions.

Current situation and concepts

15. Currently, the joint clearing-house mechanism is following a centralized approach in which information providers are sending information to the secretariat, usually through emails or other means of correspondence, and the secretariat disseminates it through a central clearing-house mechanism.

16. One of the benefits of a centralized approach is that it facilitates the maintenance of the joint clearing-house mechanism infrastructure and tools. Some of the disadvantages are slow information flows and complex processes for sharing and updating the information.

2. Decentralized approach

17. A decentralized approach, thanks to new Information Technology tools, will tackle the above mentioned disadvantages by enabling automatic information exchange, harvesting and aggregating information between all clearing-house mechanism nodes. In a decentralized approach, all regional and national online information repositories can become a node of the Basel, Rotterdam and Stockholm conventions clearing-house mechanism. Objective of the guidance document for the development of the joint clearing-house mechanism regional and national nodes.

18. The objectives of this document are to:

(a) Help decision makers to understand the benefits and resources implications related to the development of a regional / national node of the Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism;

(b) Help knowledge management teams to understand the scope and variety of the information exchanged and how it will add value to their information repositories;

(c) Guide information technology teams to build and maintain the necessary information infrastructure to support a Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism node and to make sure that all nodes are compatible one with another.

Expected benefits:

- (a) The benefits of developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions, from a knowledge management point of view, are:
- (b) The information content will still be managed, processed and stored on each node repositories and systems in order to ensure full ownership and control to the information owners;
- (c) The current knowledge management processes and systems will not be impacted by the implementation of a local node;
- (d) Stakeholders willing to retrieve information from the joint clearing-house mechanism will have automatic access to the combined repository of information of all nodes;
- (e) Relevant information will be extracted from all nodes, aggregated in a meaningful way and accessible either from a single point or from various web portals;
- (f) Information providers can disseminate of their work to a broader and more diverse audience;
- (g) Stakeholders will be able to harvest information either from the conventions' node or from any other node in order to aggregate specific data sets, for instance on particular regional issues.

Requirements:

19. The requirements for developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions are:
- (a) Availability of up-to-date and structured digital repositories, such as databases, websites content management systems or document management systems, from which information will be exposed to the other nodes;
 - (b) Approximately 10 man-days/year for ensuring proper maintenance and quality control of the local node by an Information Technology and Knowledge Management specialist.

C. For Information Technology Professionals

20. **[under development]**

II. Objective of this guidance document: developing local nodes of the clearing-house mechanism

21. This document is intended to provide guidelines on how to implement a local clearing-house mechanism node compatible with the Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism.
22. Therefore, this document describes a simple information exchange system that will enable each joint clearing-house mechanism node to expose its information repositories to other nodes. At the same time, each node will be able to harvest information from the combined data repository of all nodes.
23. As a consequence, each node of the Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism will increase the quantity and quality of its information, as well as

its geographic and thematic coverage. This will be achieved by leveraging the efforts of global, regional, national and sub-national institutions to manage and make available information, in support of the objectives of the Basel, Rotterdam and Stockholm conventions.

24. In order to enable such a meaningful, automated and interactive information exchange system across diverse organization providing content, common information management practices and technology standards need to be followed. They are described in this document.

25. Furthermore, to ensure a successful implementation of a local node of the Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism, the system presented in this document can be implemented with existing and limited resources.

26. Participation in the joint clearing-house programme is, and will remain, voluntary.

27. The objectives of this document are to:

(a) Help decision makers to understand the benefits and resources implications related to the development of a regional / national node of the Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism;

(b) Help knowledge management teams to understand the scope and variety of the information exchanged and how it will add value to their information repositories:

(c) Guide information technology teams to build and maintain the necessary information infrastructure to support a Basel, Rotterdam and Stockholm conventions joint clearing-house mechanism node and to make sure that all nodes are compatible one with another.

28. The benefits of developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions are:

(a) The information content will still be managed, processed and stored on each node repositories and systems in order to ensure full ownership and control to the information owners;

(b) The current knowledge management processes and systems will not be impacted by the implementation of a local node;

(c) The quantity and quality of information will be increased for each node of the joint clearing-house mechanism by leveraging the efforts of global, regional, national and sub-national institutions to manage and make available information;

(d) Stakeholders willing to retrieve information from the joint clearing-house mechanism will have automatic access to the combined repository of information of all nodes;

(e) Information providers can disseminate of their work to a broader and more diverse audience;

(f) Stakeholders will be able to harvest information either from the conventions' node or from any other node in order to aggregate specific data sets, for instance on particular regional issues;

(g) Relevant information will be extracted from all nodes, aggregated in a meaningful way and accessible either from a single point or from various web portals.

III. Clearing-house mechanism concepts

A. Description of the clearing-house mechanism principles

1. An information exchange system

29. The overall objective of the joint clearing-house mechanism is to facilitate the exchange of information relevant to the implementation of the Basel, Rotterdam and Stockholm conventions, in order to enable Parties and other stakeholders to make sound decisions, including the promotion of communication and exchange of sound measures and valuable experiences in the implementation of the conventions.

30. The joint clearing-house mechanism is fed by information provided by Parties, the secretariats of the Basel, Rotterdam and Stockholm conventions, intergovernmental organizations, non-governmental organizations and other stakeholders, on a voluntary basis, resulting in the establishment of a global and collaborative knowledge base on the implementation of the conventions. The information is re-packaged and integrated, processed and made accessible to different user groups in a user-friendly format by means of information products and services. Other multilateral environmental agreements and information exchange initiatives are profiting from and contribute to the mechanism.

31. The aim of this global and collaborative knowledge base on chemical and wastes issues is to empower stakeholders and users with the means to contribute and access up-to-date quality information necessary to implement the Basel, Rotterdam and Stockholm conventions in a transparent, neutral, efficient and user-friendly manner.

32. In more concrete terms, the joint clearing-house mechanism is the tool used by the Secretariat to undertake, among other things, the following information-exchange activities:

- (a) To make available information relevant to meetings and conferences;
- (b) To provide the information that might be required to facilitate assistance to the Parties in the implementation of the conventions;
- (c) To coordinate information-exchange activities with the secretariats of other multilateral environmental agreements and relevant international bodies;
- (d) To collect and re-package data, reports, evaluations and other information as information products and undertake their dissemination;
- (e) To perform any other information-exchange function as may be assigned to it by the Conference of the Parties.

2. The three pillars of the clearing-house mechanism:

33. The joint clearing-house mechanism major components are:

- (a) Information capital which consists of all information required to implement the conventions by all stakeholders. In most cases this information is captured as part of documents, events information, projects information, news and information on contacts and their expertise;
- (b) Network which consists of the various information providers and information consumers organized as an information exchange and collaborative community;
- (c) Infrastructure, tools and processes which include the technology and mechanisms that support collection, re-packaging and dissemination of information to various target audiences and information exchange in general.

Information capital

34. Information capital is intended here to refer to the information that is available to the Parties and other stakeholders through the joint clearing-house mechanism to help them to implement the conventions. The Parties and other stakeholders are defining the content through established mechanisms of consultation, with assistance from the Secretariat, and through various regional and national initiatives.

35. The scope of information covers specific aspects of the life cycle of chemicals and wastes or specific aspects of the implementation of the conventions. Specialized centres, such as laboratories, could set up clearing-house mechanism nodes specialized in information generation, for example, while others might set up information dissemination nodes or specialize in public awareness and education.

36. A user needs analysis¹, produced by the Stockholm Convention, identifies the information sources and needs, as well as certain generic information categories. Those categories provide a helpful base from to organize the information exchanged through the joint clearing-house mechanism. These generic categories are:

- (a) Documents, including among others meeting documents, reports, chemical profiles, publications, presentations and other submissions;
- (b) Contacts and their expertise;
- (c) Events and meetings information;
- (d) Projects information;
- (e) News related articles.

Networking

37. Network is intended here to refer to the community of people, groups and institutions providing and consuming information related to the implementations of the conventions.

38. Thanks to the secretariats online collaboration platforms, namely PIC and POPs Social, the community members can work together to draft, discuss, debate and finally produce information that is disseminated through the joint clearing-house mechanism.

39. Networking, as the human component, behind the information flows is a main element of the joint clearing-house mechanism. Its objective is to ensure production of quality information and efficient dissemination to targeted audiences by leveraging the efforts of each member.

40. The following groups are part of the joint clearing-house community:

- (a) Conferences of the Parties and their subsidiary bodies;
- (b) Secretariat of the Basel, Rotterdam and Stockholm conventions;
- (c) Parties to the Conventions (through official contact points and national focal points);
- (d) States non-Parties (through official contact points);
- (e) Regional centres and other information centres on chemicals and waste issues;
- (f) Environmental non-governmental organizations;
- (g) Industry and private sector associations;

¹ This analysis can be found in COP document UNEP/POPS/COP.3/INF/10

- (h) UNEP and multilateral environmental agreements (including information exchange initiatives like CIEN, INFOCAP, InforMEA, pollutant release and transfer registers, etc.);
- (i) United Nations bodies and specialized agencies;
- (j) Funding agencies and mechanisms and other donors;
- (k) Researchers, universities and related initiatives.

Infrastructure and processes

41. Infrastructure and processes is intended here to refer to the technological tools and mechanisms needed to ensure an efficient information collection and flow on a global scale. The purpose of this major component of the joint clearing-house mechanism is to facilitate the identification and integration of information content and the sources of the information and to facilitate information exchange.

42. The joint clearing-house mechanism embraces all traditional, scientific and technological ways and means of transmitting information, including paper-based, electronic components and internet-based tools. It operates as a global, open and transparent network. It takes a proactive and collaborative approach to identifying, prioritizing and meeting the information needs of its wide range of users. In so doing, it, under guidance from the Conferences of the Parties, is responsive in meeting the evolving needs of its stakeholders and users and contribute to achieving the broader objectives of the conventions.

43. In order to gather, aggregate and disseminate meaningful information to proper target audiences, the infrastructure component of the joint clearing-house mechanism heavily relies on modern information and communication technologies, such as:

- (a) Document-based systems for small volumes and heterogeneous information (information which is not standard and not easily integrated);
- (b) Database systems for larger volumes and more structured types of information requiring the performance of repetitive tasks;
- (c) Internet and other electronic means of data transfer and information dissemination where feasible, thereby minimizing the use of paper-based data transfers;
- (d) CD-ROMs, paper and other media where internet use is not feasible and not the right dissemination media for the right target audience.

3. Management approach

44. The joint clearing-house mechanism uses a traditional management approach structured in phases, cycles and stages. One cycle is understood to mean one full rotation throughout the stages set out in Figure 1 below. One cycle covers two calendar years, coinciding with the conventions budget cycle. One phase of joint clearing-house mechanism implementation and operation covers two cycles.

45. A pilot phase was conducted in 2006 and 2007 to validate the concepts and approach. The first phase of the implementation of the joint clearing-house mechanism covered the period 2008-2012. The second phase of the joint clearing-house mechanism covers 2012-2016.

46. As illustrated in Figure 1 below, each phase consists of three stages:

- (a) Needs and priority analysis;
- (b) Implementation;

(c) Evaluation.

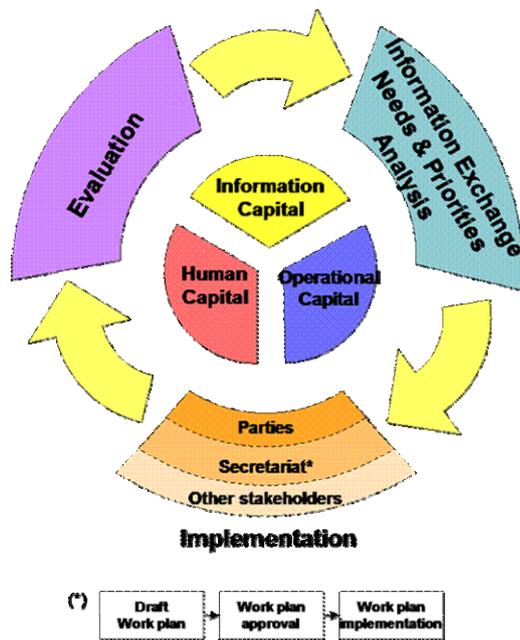


Figure 1. Joint clearing-house mechanism management approach

47. The same management approach will be used for the implementation of the local and regional nodes of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions. After approval of this guidance document, a pilot phase will be initiated with few interested organizations to establish a proof of concept before moving further the implementation of local nodes.

4. Centralized vs. Decentralized approach

Centralized approach overview

48. During the first phase (2008-2012) of the joint clearing-house mechanism, a centralized approach was chosen. As illustrated in Figure 2 below, in a centralized approach, all the information is sent by the information providers to the secretariats for processing and further dissemination.

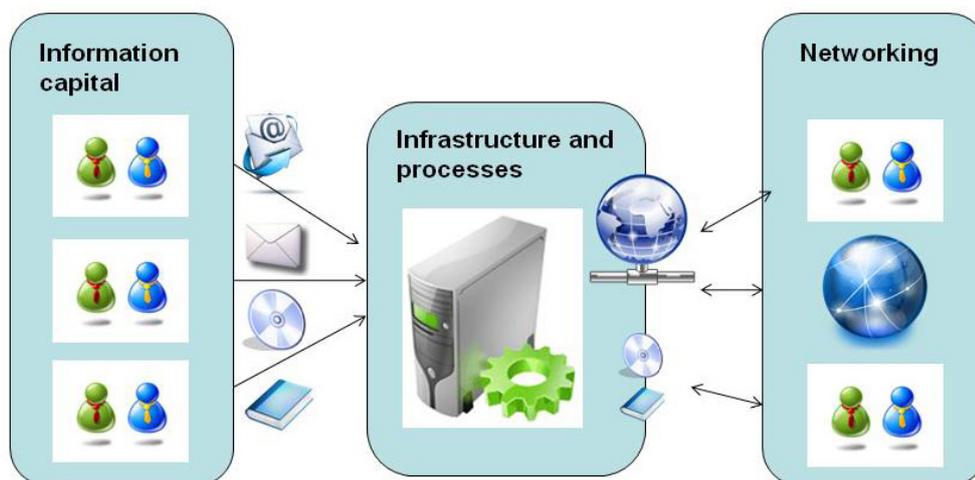


Figure 2. Centralized joint-clearing house mechanism

49. Such an approach facilitates the implantation and maintenance of the infrastructure and processes component of the joint clearing-house mechanism. On another hand, a centralized approach creates a bottleneck in terms of information flow. In a centralized approach, there are two main weaknesses in the information flow process:

(a) An information provider has to transmit its information to the secretariats either through email, faxes, CD-Rom or other non automated ways. As a consequence, the information is not always directly sent to its destination and is sometimes incomplete which generates a back and forth discussion to finalize its processing. This weakness also applies when an information needs to be updated;

(b) The Secretariat has to process a large amount of information with a significant amount of manual intervention. As a consequence, the information is not always disseminated in a timely manner.

Decentralized approach overview

50. Following the decisions² of the Conferences of the Parties to the Basel, Rotterdam and Stockholm conventions, the Secretariat is requested to move towards a decentralized approach by first producing this guidance document. As illustrated in Figure 3 below, in a decentralized approach, trusted and compatible information sources are considered as nodes, or components, of the joint clearing-house mechanism. Each node is exposing its information repositories so they can be automatically harvested by any other node of the joint clearing-house mechanism for their processing and further dissemination. In this approach the Secretariat node is maintaining an up-to-date index of all information harvested from all nodes and exposes it so all nodes can harvest its information and process it. Each node can also harvest content directly to another one without going through the Secretariat node. Similarly, each node can also maintain an index of all, or selected nodes content in order to aggregate information on specific issues or specific geographical coverage.

² BC-IX/10, RC-4/11, SC.4/21, Omnibus decisions (BC.Ex-1/1, RC.Ex-1/1, SC.Ex-1/1), BC-10/29, RC.5/9, SC.5/15.

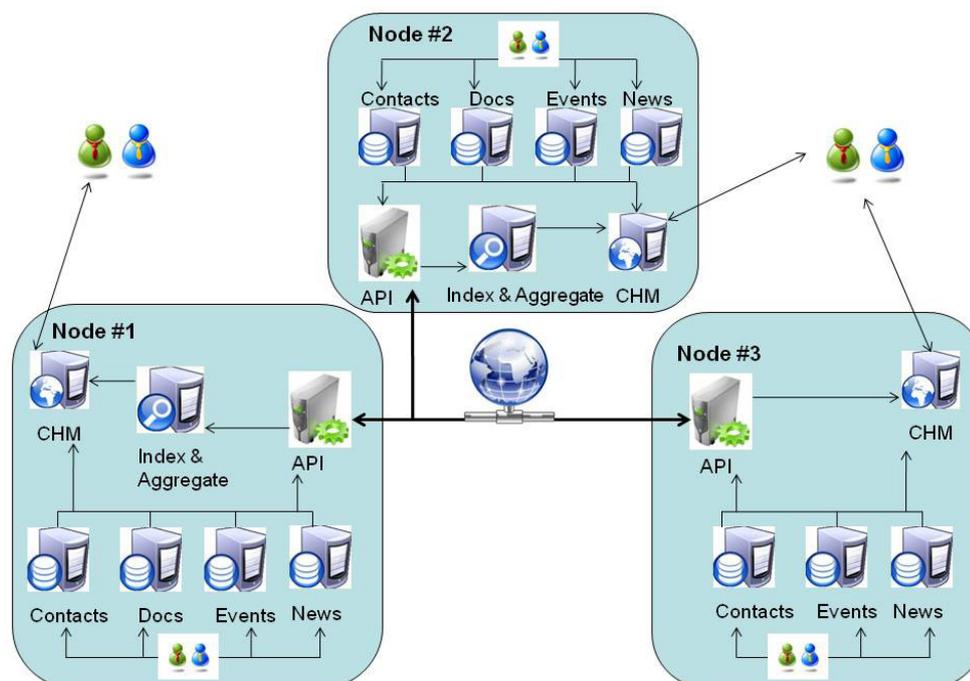


Figure 3. Decentralized joint clearing-house mechanism

51. A decentralized approach facilitates and enhances the flow of information between each node of the joint clearing-house mechanism by automatically exposing, harvesting, aggregating and leveraging the information management activities of each node. In such an approach, each node keeps managing its information with its same tools and processes. The only additional layer for each node is an API (Application Programming Interface) that exposes and encapsulates the information according to the standards described in section 0 below. Thanks to those standards, the information can then be harvested by any other node, processed and further disseminated.

52. As the information is automatically exposed by the API, there are no delays in the transmission of the information or its processing by other nodes. Furthermore, by standardizing and automating the transmission process, the information immediately reaches its right destination.

53. At the Secretariat level, complete and up-to-date information is harvested and immediately disseminated without further processing resulting in a more timely delivery of the information packages.

5. Benefits for end-users

54. The benefits of developing local nodes of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions, from an end-user, or information consumer, point of view, are:

- (a) Information consumers will have access to an increased quantity of information from each node of the joint clearing-house mechanism;
- (b) Information consumers will have accessed to more meaningful and complete information from a single entry point due to the possible aggregation of various information sources, while remaining focused on local priorities and operating in local languages.

6. Benefits for information providers

55. The benefits of developing a local node of the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions, from an information provider point of view, are:

- (a) The current knowledge management processes and systems will not be impacted by the implementation of a local node;
- (b) The quantity and quality of information will be increased for each node of the joint clearing-house mechanism by leveraging the efforts of global, regional, national and sub-national institutions to manage and make available information;
- (c) Information providers willing to retrieve information from the joint clearing-house mechanism will have automatic access to the combined repository of information of all nodes;
- (d) Information providers can disseminate of their work to a broader and more diverse audience;
- (e) Information providers will be able to harvest information either from the conventions' node or from any other node in order to aggregate specific data sets, for instance on particular regional issues.

7. Mandates

56. The following decisions of the Conferences of the Parties to the Basel, Rotterdam and Stockholm conventions, requested the Secretariat to move towards the implementation of regional and local nodes of the joint clearing-house mechanism by first producing this guidance document: BC-IX/10, RC-4/11, SC.4/21, Omnibus decisions (BC.Ex-1/1, RC.Ex-1/1, SC.Ex-1/1), BC-10/29, RC.5/9, SC.5/15.

B. What is a local node of the joint clearing-house mechanism?

1. Definition

57. A local node of the joint clearing-house mechanism is supported by an existing on-line information repository from an organization dealing with chemicals and wastes issues.

58. Such on-line repositories could be for instance, existing websites, documents libraries and any other databases.

59. Targeted organization could be for instance, regional centres, laboratories, national Governments specialized agencies and institutions, laboratories or research and academic centres.

60. Interested organizations will continue to manage their information as usual, using their own systems and processes.

61. An API (Application Programming Interface) will be implemented on top of each organization's on-line repositories to expose selected information in a format compatible with the joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions. Those formats and standards are described in section 0 below. In simple terms, the API will automatically make this information available in a form of feeds over the Internet.

62. The Secretariat node, and any other node, will be able to automatically harvest, or pull, information by connecting to the node's API. Thanks to this interconnection, each node can automatically exchange relevant information with other nodes of the joint clearing-house mechanism.

2. Information scope

63. Based on the standards described in section 0 below and on the current availability of existing on-line repositories, the pilot phase will be limited to the following elements:

- (a) Documents;
- (b) Events;
- (c) Contacts;
- (d) News.

64. The documents component will be used to access any information contained in a document format such as: Word, PDF, Excel, PowerPoint, images, movies, web pages etc. Among others, those documents could be:

- (a) Official ones (COP or subsidiary body meeting documents, official communications and formal submissions);
- (b) Any type of report such as a meeting report or a report on a particular issue;
- (c) Any type of e-publication, such as a research paper, a white paper, a case study, a concept note, an evaluation paper, a guideline, a presentation, a press release, a formal publication etc;
- (d) Any type of planning document such as a business plan, an implementation plan, a term of reference etc.

65. The events element is related to meetings and other workshops venue, date and so on.

66. The contacts information element is related to expert and focal point information. This element playing a crucial role in the context of the joint clearing-house mechanism, as it will enable the identification of members of the community and their collaboration.

67. The news element is related to updates on specific activities and projects implementation.

68. For later phases of the implementations of the local nodes, more information types could be identified.

3. Integration with existing systems and processes

69. The above mentioned types of information can be managed and stored in various ways depending on the expertise and needs of each organization.

70. The objective is to keep the current systems and knowledge management processes unchanged. It means, that before being stored in an organization repository, the information will be produced and validated following each organizations processes.

71. The technical solution described in this document will enable any organization using an on-line repository such as a simple website or more complex databases systems to expose their information to other nodes. By implementing the API on top of the current information systems, the organization's information will be packaged according to agreed standards and made available through web services to other nodes.

72. To function properly the API will be configured by each organization to extract relevant and complete information. A set of content descriptors, or metadata, will be attached to each piece of information by the API to allow its processing and indexing. As a consequence, existing information systems have to be able to produce extracts of information based on few descriptors in order to be properly catalogued.

73. Access to each API will be secured to avoid disclosing information to non trusted sources.

4. Interconnection with other nodes

74. Following the joint clearing-house mechanism concepts outlined in section 0 above, each node will be connected to the others, either directly or through the Secretariat node. Each node will then become both an information provider and consumer.

75. This approach will enable interested parties to build their clearing-house mechanism nodes based on technologies and expertise that are readily available to them, minimizing the need for training and capacity-building in this area. It will also enable the integration of information from other chemicals-related environmental conventions, which will facilitate greater cooperation and coordination at the regional and national levels.

76. Each node will keep its specificity and focus, but will be able to access all information repositories in order to enhance collaboration at all levels.

5. Node languages

77. The API is compatible with all languages and permits the exchange of information on all languages.

IV. Management of a decentralized joint clearing-house mechanism

78. A Steering Committee composed of one representative from each organization participating in the implementation of the decentralized joint clearing-house mechanism will be established. It is open to observers involved in information and knowledge management of stakeholders' generated data.

79. The Steering Committee is tasked to examine issues of common interest in the area of data and information management. It is tasked to provide recommendations on possible collaborative activities to the organizations' executives participating in the implementation of the decentralized joint clearing-house mechanism of the Basel, Rotterdam and Stockholm conventions.

80. The Steering Committee will designate working groups and task forces to implement agreed upon strategies and collaborative activities amongst several or all participating stakeholders as required.

81. Through the Steering Committee, the participating stakeholders will:

(a) Endeavour to make their information interoperable and accessible and develop information services and resources through mutually agreed formats, protocols and standards, with full recognition of source and with due regard to existing intellectual property rights;

(b) Identify possible synergies through collaboration in areas of common interest such as the development of web services and examine the potential of adhering to a collaborative approach to the use of information and knowledge management systems;

(c) Coordinate with related processes and contribute to the development of information and knowledge management strategies of United Nations system organizations and others partners;

(d) Establish and maintain a network of experts across stakeholders to promote sharing of experiences and lessons learned;

(e) Review the possibility of needs assessments, jointly hosting, training activities and sharing information.

82. The Steering Committee will meet once a year to review and further guide the implementation of this guidance document.

83. Task Forces and Working Groups designated by the Steering Committee shall meet in between Steering Committee Meetings to collaborate toward the implementation of agreed projects and provide recommendations for the consideration of the Steering Committee.

84. The work of the Steering Committee and its Task Forces and Working Groups will be coordinated and facilitated through the Basel, Rotterdam and Stockholm conventions Secretariat Information and Knowledge Management team in cooperation with the participating organizations.

A. Nodes content guidelines

1. Quality control

85. Each node is considered as a trusted source of information, which means that the information exposed through the API must be validated by each nodes experts.

86. To ease the quality control among the nodes of the joint clearing-house mechanism, each node representative will be able to report inappropriate content or any other issue to the Steering Committee and its Working Groups. All representatives will be able to exchange their views, report issues that may arise and indentify mutually agreed solutions through the Secretariat on-line collaborating platform.

87. All representatives will act on behalf of their organization and be able to propose new versions of the API that must be adopted by the group by consensus.

2. Evaluation criteria

88. In order to evaluate the quality of the information exchanged among the nodes, the following criteria will be used:

- (a) Validity;
- (b) Objectivity;
- (c) Authority;
- (d) Verifiability;
- (e) Relevancy to the chemicals and wastes issues;
- (f) Completeness;
- (g) Timeliness.

3. Inclusion of content

89. All information exposed trough the node's API is virtually shared with all other nodes. In order to maintain the compatibility among each nodes, during the pilot phase, the information exchanged will be limited to the scope describe in 0 above. The Steering Committee will have authority to expand this scope to other types of information based on consensus among the committee members.

90. Based on consensus among the Steering Committee members, a new organization willing to become a node of the joint clearing-house mechanism can be accepted.

4. Exclusion of content

91. The Steering Committee members will have authority to exclude certain content from the information scope describe in 0 above based on mutually agreed decisions.

92. Based on consensus and tangible evidence of misconduct, Steering Committee members will have authority to exclude an organization from the joint clearing-house mechanism.

5. Distribution policy

93. Each node will grant access to its content for distribution and usage by the other nodes with full recognition of source and with due regard to existing intellectual property rights.

6. Global directory management

94. The Secretariat will maintain a global directory of nodes services endpoints and access rights. The objective of the global directory is to guarantee a secure authentication over the Internet to access, with read-only permissions, the information exposed by each node and the web address to access each node API.

7. Change management process

95. Any change to the API, or one of its elements, will have to be reviewed and endorsed by the Steering Committee.

96. Each new version of the API will maintain backward compatibility to give to each organization the necessary time to implement the new versions.

97. The Secretariat will maintain an up-to-date and accessible documentation on a change log and versions log.

8. Extension mechanism

98. Each node will be able to add more properties and descriptors to their information, providing that they are using a different namespaces.

B. Nodes taxonomy guidelines

1. Quality control

99. To ensure proper quality control of the controlled vocabularies and taxonomy used among the nodes of the joint clearing-house mechanism, the Steering Committee and its Working Groups will periodically review those critical elements.

100. All representatives will be able to exchange their views, report issues that may arise and identify mutually agreed solutions through the Secretariat on-line collaborating platform.

101. One of the principles is to keep the controlled vocabularies simple, in order to avoid improper usage of it.

2. Evaluation criteria

102. In order to evaluate the quality of the controlled vocabularies and taxonomy used among the nodes, the following criteria will be used:

- (a) Relevance;
- (b) Narrowness and broadness;
- (c) Complexity;
- (d) Usage.

3. Inclusion of content

103. The Steering Committee will have authority to expand the purpose and number of controlled vocabulary items, based on consensus among the committee members. Special attention will be given to backward compatibility to avoid disrupting existing classifications.

4. Exclusion of content

104. The Steering Committee will have authority to remove unnecessary controlled vocabulary items, based on consensus among the committee members. Special attention will be given to backward compatibility to avoid disrupting existing classifications.

5. Change management process

105. Any change to the commonly adopted taxonomy and controlled vocabularies, will have to be reviewed and endorsed by the Steering Committee.

106. Each new version of the taxonomy will maintain backward compatibility to give to each organization the necessary time to implement the new versions.

107. The Secretariat will maintain an up-to-date and accessible documentation on a change log and versions log.

C. Infrastructure considerations for local nodes**1. Underlying systems and repositories**

108. In order to become a node of the joint clearing-house mechanism, an organization must have:

- (a) Up-to-date and structured digital repositories, such as databases or websites, from which information will be exposed to the other nodes;
- (b) A reliable web server that will expose the information to other nodes over the Internet.

2. Using a central index or a local index

109. The Secretariat will harvest all nodes content of the joint clearing-house and index the information on a central index web service. This central index will be accessible by all nodes to search for information from other nodes.

110. It is understood that the central index will not store the information provided by the nodes, but rather reference it so one will be able to pull it from the source nodes who will keep full control of its information and information systems and storage.

111. If an organization wishes to create a local copy of the central index, they will be able to do so by harvesting the Secretariat index.

3. Security

112. To ensure confidentiality and integrity of the information exchanged among the nodes, each node will have to:

- (a) Protect access to its API with a login and a password that will grant read-only access to its content over a secure internet communication protocol (https);
- (b) Authenticate itself against the global directory managed by the Secretariat as outlined in 0 above in order to be granted access to other nodes information through their APIs.

V. API specifications

A. Information scope

1. Documents

Purpose

113. The objective of the Documents schema is to share and access any information contained in a document format such as: Word, PDF, Excel, PowerPoint, images, movies, web pages etc. Among others, those documents could be:

- (a) Official ones (COP or subsidiary body meeting documents, official communications and formal submissions);
- (b) Any type of report such as a meeting report or a report on a particular issue;
- (c) Any type of e-publication, such as a research paper, a white paper, a case study, a concept note, an evaluation paper, a guideline, a presentation, a press release, a formal publication etc;
- (d) Any type of planning document such as a business plan, an implementation plan, a term of reference etc.

Schema description

Field ³	Type	Data Type	Mandatory	Usage
title	Element	lstring	Yes	Title of the document. (lstring is a complex type class used to store a text in various languages. See complex types section below).
description	Element	lstring	No	Description, abstract or executive summary of the document.
UNnumber	Element	String	No	Specify the document UN number, if available, like UNEP/POPS/COP.3/13
ISBN	Element	String	No	Specify the document ISBN number, if available.
copyright	Element	String	No	Text of a copyright or credits
files	Element	documentFiles	Yes	This complex type represents a set of document information such as the document URL, mime type or size. This set of fields is used to generate links to a given document in various formats, languages and versions. See complex types section below
targetAudiances	Element	targetAudiances	No	Value taken from a list of a common Target Audiences like Focal Points, Parties, Experts, Academics, Media etc. See Event Types enumeration table below.
notes	Element	lstring	No	Documents notes that can be used to further describe the document.

2. Contacts

Purpose

114. The objective of the Contacts schema is to store contact information in order to be able to find and locate a person, either by expertise, role etc. The joint clearing-house mechanism

³ In addition to those fields, the Documents schema will also include the fields listed in section 0.

heavily relies on people's input to nurture its network and enhance its content capital. Exchanging contact information among the nodes is therefore an important element.

Schema description

Field ⁴	Type	Data Type	Mandatory	Usage
prefix	Element	String	No	Contact's prefix (like Ms., Mr.)
firstName	Element	String	Yes	Contact's first name.
lastName	Element	String	Yes	Contact's last name.
designation	Element	String	Yes	Contact's job title
department	Element	String	No	Contact's department or division.
organization	Element	String	No	Contact's organization name
address	Element	String	No	Street name and number and any other details such as a floor number, a building name etc.
city	Element	String	No	Name of the city.
state	Element	String	No	State or province name.
postalCode	Element	String	No	Postal or zip code for this address
countryCode	Element	String	Yes	Country code related to this address in ISO 3166-1 - 3-letter code or ISO 3166-1 - 2-letter country code
countryName	Element	String	Yes	Full name of the country
phone	Element	String	No	Contact's phone number.
fax	Element	String	No	Contact's fax number.
email	Element	String	Yes	Contact's email addresses.
websiteURL	Element	String	No	Specify the contact's website URL
websiteDescription	Element	String	No	Label or description for the website URL
photoURL	Element	String	No	Link to the contact's picture (gif, jpg or png format)
notes	Element	Istring	No	Contact's notes that can be used to store additional information about the contact. (Istring is a complex type class used to store a text in various languages. See complex types section below).

3. Events

Purpose

115. The objective of the Events schema is to share meetings calendars between the nodes to better promote and disseminate information related to meetings.

Schema description

Field ⁵	Type	Data Type	Mandatory	Usage
title	Element	Istring	Yes	Title of the event or meeting. (Istring is a complex type class used to store a text in various languages. See complex types section below).
description	Element	Istring	No	Event's description (what it is about, objectives etc.).
status	Element	String	Yes	Value taken from a list of a common event status like tentative, confirmed etc. See Event Status enumeration table below.
eventType	Element	String	Yes	Value taken from a list of a common event types like Meeting, Workshop, Seminar, COP etc. See Event Types enumeration table below.
eventLanguages	Element	eventLanguages	No	Store the language(s) id as per RFC 3066 in which the event will take

⁴ In addition to those fields, the Contacts schema will also include the fields listed in section 0.

⁵ In addition to those fields, the Events schema will also include the fields listed in section 0.

				place.
attendanceRights	Element	String	No	Value taken from a list of a common event types like Restricted, Open etc. See Attendance Rights enumeration table below.
photoURL	Element	String	No	URL to the event logo or illustrative picture
photoName	Element	String	No	Name of the event logo or illustrative picture
photoCredits	Element	String	No	Copyrights or picture credits
websiteURL	Element	String	No	Specify the event webpage URL
websiteDescription	Element	String	No	Label or description for the website URL
dateStart	Element	DateTime	Yes	Store the start date and time of this event. Format used is yyyy-mm-ddThh:mm:ss. By default time is UTC but one can specify a different time zone by adding + or – before the time.
dateEnd	Element	DateTime	Yes	Store the start date and time of this event. Format used is yyyy-mm-ddThh:mm:ss. By default time is UTC but one can specify a different time zone by adding + or – before the time.
venue	Element	String	No	Event location (building, office, hotel name etc.).
address	Element	String	No	Street name and number
city	Element	String	No	Name of the city.
state	Element	String	No	State or province name.
postalCode	Element	String	No	Postal or zip code for this address
countryCode	Element	String	Yes	Country code related to this address in ISO 3166-1 - 3-letter code or ISO 3166-1 - 2-letter country code
countryName	Element	String	Yes	Full name of the country
organizerName	Element	String	No	Name of the organizer or organization responsible for this event
notes	Element	lstring	No	Events notes that can be used to further describe the event.

4. News

Purpose

116. The objective of the News schema is to share updates and news alerts on specific activities and projects implementation.

Schema description and diagram

Field ⁶	Type	Data Type	Mandatory	Usage
title	Element	lstring	Yes	News title.
link	Element	String	Yes	Specify the URL of the news page.
description	Element	lstring	No	Short description or news abstract.
enclosure	Element	documentFiles	No	Set of elements that describes a file attached to the news item. Most likely this will be an MP3 file used for podcasting purposes.

⁶ In addition to those fields, the News schema will also include the fields listed in section 0.

5. Common references

Purpose

117. The fields below will be common to all information types exchanged within the nodes of the joint clearing-house mechanism. Those will be added to each information type schema listed in this guidance document.

118. Those fields will be used by each node systems to describe, categorize and manage the actual content captured by the information types listed in this document. For instance, each record, being a document or an event, needs to have an id, a list of keywords, a source, a creation date etc.

119. Those fields are listed separately in this sub-section to ease the reading of the document, rather than repeating them in each schema of a particular information type.

Schema description

Field	Type	Data Type	Mandatory	Usage
schemaVersion	Element	Integer	Yes	Used to store the schema version of this record in order to accommodate changes in the schemas and version control.
id	Element	String	Yes	Unique key used to identify a record in the local node system.
dateCreated	Element	DateTime	Yes	Stores the date when the record was created. Format is yyyy-mm-ddThh:mm:ssZ. By default all dates are stored in UTC time, hence the Z at the end. See W3C recommendations for more details.
dateLastUpdated	Element	DateTime	Yes	Stores the most recent date when the record was updated. By default all dates are stored in UTC time, hence the Z at the end. See W3C recommendations for more details. If available this field will be used to optimize harvesting among the nodes if a local index is maintained at the local node level.
nodeId	Element	String	Yes	Name of the CHM node who owns this record. The list of CHM nodes names will be predefined
authorName	Element	String	No	Name of the person who created, or who own, this record
keywords	Element	tags	No	Stores a tag text describing the document based on the common taxonomy. It can be a topic, a geographical reference etc. Common tags list are maintained in the Clearing House Mechanism to facilitate classification and search. See Complex Types section below.

Complex Types

120. Some of the elements, or fields, described above are complex. In simple words, they cannot be encapsulated in a single field. They are made of at least two child elements or they can contain a list of many child elements. In an information technology language, complex types are de facto custom data types or custom classes.

121. For instance, the file element of a document can link to various files in different languages. Similarly, the keywords element contained in the metadata of each information type can be made of more than one keyword.

122. The complex types used by the above schemas are listed below since some of them are common to various information types.

Istring (localizable string)

Field	Type	Data Type	Mandatory	Usage
Language	Element	String	Yes	Language of the record. Use ISO 2-letter code of the language (en, fr etc.)
value	Element	String	Yes	Value of the string in a specified language

Tags

Field	Type	Data Type	Mandatory	Usage
tag	Element	String	Yes	Term or tag taken from the common taxonomy or controlled vocabulary
namespace	Element	String	Yes	URL identifying the namespace. If it is a term taken from the common controlled vocabulary, the namespace is: http://synergies.pops.int If it is a term taken from a local node controlled vocabulary it can be http://someorganization.org

documentFiles

Field	Type	Data Type	Mandatory	Usage
id	Element	String	Yes	Unique document Id in the local node system
documentURL	Element	String	Yes	Pointer to the document
filename	Element	String	No	Name of the original file of the document
language	Element	String	Yes	Language of the document. Use ISO 2-letter code of the language (en, fr etc.)
mimeType	Element	String	Yes	Mime type of the document. Use one of the pre-defined values from the Mime Type enumeration. See Mime Types enumeration table above.
size	Element	Long	No	Size of the document in bytes

eventLanguages

Field	Type	Data Type	Mandatory	Usage
language	Element	String	Yes	Language of the record. Use ISO 2-letter code of the language (en, fr etc.)

Enumerations

123. Some of the properties described above have predefined values, which are taken from the enumerations below.

Document's Enumerations

Target Audiences	
Value	Description
focalPoints	Official Focal Points
governments	
regionalCentres	
experts	
academics	
media	
industry	
ong	
igo	

Mime Types ⁷	
Value	Description
pdf	application/pdf
doc	application/msword or application/vnd.openxmlformats-officedocument.wordprocessingml.document
rtf	text/rtf

7

The Mime Type enumeration is the same for Documents and News

odt	application/vnd.oasis.opendocument.text, application/x-vnd.oasis.opendocument.text
html	text/html
txt	text/plain
ppt	application/vnd.ms-powerpoint or application/vnd.openxmlformats-officedocument.presentationml.presentation
odp	application/vnd.oasis.opendocument.presentation
xls	application/vnd.ms-excel or application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
ods	application/vnd.oasis.opendocument.spreadsheet
zip	application/zip
gif	image/gif
jpeg	image/jpeg
png	image/png
mp3	audio/mpeg
wma	audio/x-ms-wma
wave	audio/vnd.wave
flv	video/x-flv
mpeg	video/mpeg
avi	video/avi
wmv	video/x-ms-wmv
quicktime	video/quicktime

Event's Enumerations

Event Status	
Value	Description
tentative	
confirmed	
postponed	
cancelled	

Event Type	
Value	Description
cop	
subsidiary	
expert	
working	
symposia	
conference	
workshop	
informal	
side event	
outreach	

Attendance Rights	
Value	Description
public	Open meeting or event
invitation	Accessible only on invitation
registration	Accessible only after following a registration process

B. Taxonomy and indexing

124. The common taxonomy described in this document will be used to describe, categorize and manage the actual content captured by the information types listed in this document and produce meaningful search results.

125. The entire taxonomy will be exposed from the Secretariat node to allow other nodes to reference it.

1. Taxonomy description

126. This section describes the controlled vocabularies, their terms, hierarchy and description which would be made available once completed in Appendices I.1 below.

127. An initial list of terms covering the following main items has been compiled:

- (a) Geographical coverage, including list of countries and regions;
- (b) Chemicals names and QAS numbers;
- (c) Types of documents, such as presentations, white papers, submissions, etc.;
- (d) An initial list of topics related to chemicals and wastes issues.

128. This list will be finalized upon review by the expert group.

2. Taxonomy schema

Field	Type	Data Type	Mandatory	Usage
schemaVersion	Element	Integer	Yes	Used to store the schema version of this record in order to accommodate changes in the schemas and version control.
Id	Element	Integer	Yes	Unique identifier of the term
parentId	Element	Integer	Yes	Identifier of the parent term (i.e. broader term) from which this term is a child.
Tag	Element	String	Yes	Term or tag taken from the common taxonomy or controlled vocabulary
Description	Element	String	No	Description of the term including its purpose and usage.
Namespace	Element	String	Yes	URL identifying the namespace. If it is a term taken from the common controlled vocabulary, the namespace is: http://synergies.pops.int If it is a term taken from a local node controlled vocabulary it can be http://someorganization.org

3. Mappings with existing vocabularies

129. Most of the organizations participating in the joint clearing-house mechanism are currently using their own, and business specific, controlled vocabularies to catalogue their information. Therefore mapping existing vocabularies with the joint clearing-house mechanism ones will be required.

130. In order to map vocabulary items, one can use the following approaches:

- (a) Identical mapping. This is used when the same term is used in both vocabularies with the same purpose. Accordingly, the local node API will have to use its term as it is;
- (b) Synonym mapping. This is used when a similar term is used in both vocabularies with the same purpose. Accordingly, the local node API will have to convert its term to the equivalent one in the common vocabulary;
- (c) Mapping with narrower term. This is used when no identical or synonyms terms can be identified between both vocabularies. Accordingly, the local node API will have to map to an identified narrower term in the common vocabulary;
- (d) Mapping with broader term. This is used when no identical, synonyms or narrower terms can be identified between both vocabularies. Accordingly, the local node API will have to map to an identified broader term in the common vocabulary.

C. Technology

1. Introduction to OData

OData

131. The Open Data Protocol (OData) is suited for querying and updating distributed datasets. It applies and builds upon Web technologies such as HTTP, Atom Publishing Protocol (AtomPub) and JSON to provide access to information from a variety of applications, services, and stores. The protocol emerged from experiences implementing AtomPub clients and servers in a variety of products over the past several years.

132. The Open Data Protocol specification is currently available under the Microsoft Open Specification Promise (OSP), allowing third parties, including open source projects, to build Data Services for any runtime as well as clients to consume such services.

133. For a more in-depth description and technical analysis of the OData protocol visit <http://www.odata.org>.

134. The entry point of the service is available through the HTTP protocol, and the transfer of the data is achieved using an XML format that is built on the existing Atom standard.

135. The list of services that expose their data using the OData protocol is available at <http://www.odata.org/producers>. Because OData is a relatively new protocol at the moment, there are a few limitations in what these libraries can expose, especially on non-Microsoft platforms.

136. The Secretariat web portal encapsulates an OData consumer that connects at regular intervals to each of the organization's node and retrieves their data. If the API service on the organization's node is for some reason inaccessible during the harvesting process, a notification will be sent to the administrator and the corresponding synchronization will be rescheduled.

137. The OData protocol specification allows producers to:

- (a) Describe their exposed entities;
- (b) Group objects of the same type into collections of objects that can be queried and retrieved;
- (c) Secure their service to allow only authorized client access the resources.

Collections

138. A Collection is a Resource that contains a set of Member Resources as defined in RFC 5023. In OData, a Collection is represented as an Atom Feed or an array of JSON objects.

139. The joint clearing-house API expects from the organizations' nodes to expose the following types of collections outlined in section 0 above:

- (a) Documents;
- (b) Events;
- (c) Contacts;
- (d) News.

140. Although not all nodes can make all this data available, they may implement as much as possible. The whole process is built with extensibility and backwards compatibility in mind.

141. Examples of Collections documents can be found at <http://services.odata.org/Northwind/Northwind.svc/>,

Metadata

142. OData services are self-describing services. This means that, when a client connects to that service, it will know exactly what it exposes to the outside world. This is achieved through a document called metadata that is available at the service endpoint (for example [http://services.odata.org/Northwind/Northwind.svc/\\$metadata](http://services.odata.org/Northwind/Northwind.svc/$metadata)). The document contains the list of collection entities, their primitive attributes, their data types (string, integer, etc.) and relations between entities. Based on this metadata document, API consumer libraries may generate client and proxy classes that enable the querying and the retrieval of data.

Querying, filtering and pagination

143. The joint clearing-house mechanism service harvests all data locally, on its indexing server, and makes queries to get the full information on each nodes API. Each node may choose to also add filtering capabilities to their service, as other Web applications may use it.

144. This specific feature is used by the joint clearing-house mechanism portal to optimize the synchronization and querying process, by getting only new or changed records; however, it is not mandatory in order for the service to successfully work. Such implementation is possible only if the entities have the “last edited” and “created” date attributes.

145. When synchronizing the entities, joint clearing-house mechanism relies on the unique ID that identifies the record within the each node. On an organization repository, this may be a primary key of a table, a filename, a checksum a GUID etc. This data is mandatory in order to avoid duplicate records.

146. Another feature that would be very useful for the organization node to implement in order to optimize the traffic and server loading is the pagination. If a result of a query contains 3000 results, they can be retrieved by a client 100 or 1000 at a time, instead of generating a huge response with 3000 results. Based on the response, clients will compute the number of roundtrips required to fetch all the results.

147. OData queries and pagination are described in MSDN library <http://msdn.microsoft.com/en-us/library/gg312156.aspx>, as well as on the OData website <http://www.odata.org>.

Error handling

148. The errors produced by the OData service are standard errors of the HTTP protocol such as 404, 500 etc. Each client should handle the errors according to the HTTP protocol specifications.

2. Infrastructure requirements

Web Server

149. Each organization participating to the joint clearing-house mechanism by exposing its information through a node needs to maintain a stable and connected web server that will provide the API service endpoint.

150. The OData endpoint can be hosted on a dedicated web server or an existing one together with other web applications.

Data sources

151. The organizations participating in the joint clearing-house mechanism store their data in a large variety of formats: relational databases, files, static HTML documents etc. In theory, OData can be extracted from any structure, by using a series of converters in conjunction with an OData producer, but going further away from the relational model of a database, the extracting process can become a challenging task.

Programming languages

152. OData is compatible with a set of clients to access this service, for instance:

- (a) Web browsers that have news reading features;
- (b) News readers;
- (c) Microsoft Office suite, which allows loading data in Excel VB.NET API (<http://blogs.msdn.com/b/marcelolr/archive/2010/02/16/consuming-odata-with-office-vba-part-i.aspx>);
- (d) OData browsers such as Silverlight OData Explorer (<http://silverlight.net/ODataExplorer/>);
- (e) Client libraries - programming libraries that make it easy to consume OData services, such as the Microsoft OData SDK or PHP OData SDK. The up to date, complete list is available at <http://www.odata.org/developers/odata-sdk>.

Local node architecture

153. Each node will implement an API using based on OData standards to extract information from their repositories and expose it to other nodes over the HTTP protocol.

154. The integration of the API within each organization's Information Technology infrastructure is the responsibility of each organization IT teams.

Security considerations

155. An OData web service can be made private, and access granted only to authenticated users. This is achieved by using standard HTTP Basic authentication scheme that will require clients to provide a username and password in order to connect to the service.

156. Since HTTP Basic authentication transmits the username and passwords in clear text over the network, the service can be further secured by moving it entirely over encrypted SSL protocol (https), which is the recommended approach.

157. Furthermore each node should enable read-only permissions to the username used by other nodes to access their information to ensure data integrity.

3. Exposing information to other nodes

158. Each node of the joint clearing-house mechanism will expose its information through a single OData endpoint. By accessing this endpoint, any node of the joint clearing-house mechanism will be able to automatically discover its collections (Documents, Contacts, News, etc.) and retrieve information from them either in XML or JSON format for processing.

159. Each node packages its information according to the standards described in section 0 above in order to allow any other nodes to build automated processes to process the information.

160. Each node will implement access to their collections based on availability of resources and systems in their organization. For instance, if an organization does not maintain any form of structured Documents repository, then this node will not be able to expose the Documents collection.

161. Each node will protect access to its information through a login and a password that will be used to retrieve a security token from the Secretariat Directory service. Before exposing its information a node will validate this security token against the Secretariat Directory service.

4. Retrieving information from other nodes

162. The endpoint URL of each node will be published on the Secretariat OData endpoint in the directory collection.

163. By accessing this endpoint, the Secretariat node will be able to harvest its information at frequent intervals and update a central index of information from all nodes.
164. Each node will be able to browse and search the central index to identify information stored in each node of the joint clearing-house mechanism. The index will only provide the necessary information to extract it from each node's repository.
165. Each node will also be able to harvest other nodes information from their endpoints for their processing.
166. Below is an example of the information retrieved from the Secretariat endpoint:

```
<?xml version="1.0" encoding="utf-8"?>
<service xmlns:atom="http://www.w3.org/2005/Atom" xmlns:app="http://www.w3.org/2007/app"
xmlns="http://www.w3.org/2007/app" xml:base="http://informea.pops.int/brs/oData.svc/">
  <workspace>
    <atom:title>Default</atom:title>
    <collection href="Documents">
      <atom:title>Documents</atom:title>
    </collection>
    <collection href="Contacts">
      <atom:title>Contacts</atom:title>
    </collection>
    <collection href="Meetings">
      <atom:title>Meetings</atom:title>
    </collection>
  </workspace>
</service>
```

I. Appendices

1. Taxonomy and controlled vocabularies

2. Support

3. Examples

4. Resources
