



## **Milestone M4.36**

# **Xper<sup>2</sup>-CDM-relation for taxonomic hierarchy specification**

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## Introduction

Xper<sup>2</sup> software has three components: two java desktop applications (one that manages descriptive data as knowledge bases and one that performs a multi access key of taxa described in the application) and a java Applet for online identification (Xper<sup>2</sup>Applet).

In Xper<sup>2</sup> vocabulary, the knowledge base contains:

- *items* (i.e taxa for taxonomic content), in Xper<sup>2</sup> version 2.2 only displayed in a flat list
- *descriptors* (characters) used to describe the items. The descriptors can be managed in three views: a basic flat list, a dependency tree, or in groups.

In systematics, an item can refer to a species, a genus, a family, etc... The aim of this work was to add a mechanism for taxonomic hierarchies items in Xper<sup>2</sup> in order to manage such taxonomic hierarchy like in CDM and scratchpads.

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## Work plan

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Developed by the LIS (Laboratoire Informatique et Systématique) engineering team, Xper<sup>2</sup> (currently in release 2.2) is still being maintained. The next version (2.3), thanks to ViBRANT support, will include improvements and new features. In the context of this milestone, the tasks developed on Xper<sup>2</sup> (full version) were to implement a taxonomic hierarchy management mechanism. Let's improve Xper<sup>2</sup> items management and increase it with the same functionalities of the descriptors management system.

We added two taxon management views:

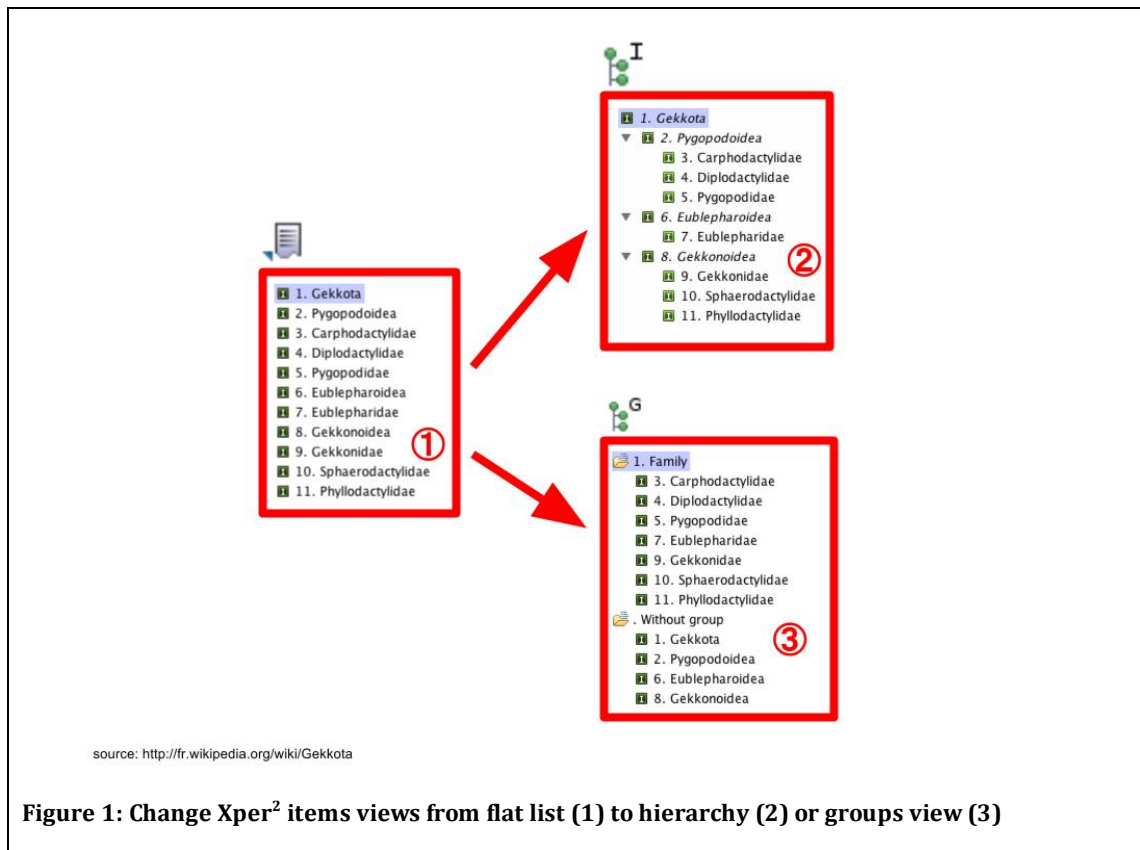
- A taxonomic tree (*e.g.* to represent a taxonomic hierarchy with the family / genus / species ...). This view can also be used in another purpose than the taxonomic ranks.
- Groups of taxa (arbitrary, set by the user to create an artificial pool of taxa

sharing informations, *e.g.* a geographical area, ecological traits, ...).

Note: the taxon groups are not supported in the SDD format<sup>1</sup> (in the specification 1.1), this information is lost when Xper<sup>2</sup> exports a knowledge base in this XML-based format.

### Display taxa in hierarchy and groups

Taxa management is now possible in three views (cf. figure 2). The default view is the original one, the flat list (1). The other views (taxonomic tree (2) and groups (3)) allow drag & drop for quick edition. In the groups view, one taxon can belong to more than one group. The user can also create groups of groups.



In the example shown in fig. 1, we first (2) use the taxonomic hierarchy to represent species, genera and families of the *Gekkota* (an infraorder of reptiles). Later (3) we order taxa in the taxon groups view and group them according to their taxonomic rank.

<sup>1</sup> Gregor Hagedorn. The structured descriptive data (sdd). w3c-xml-schema, version 1.1, 2006.

## Import / Export of taxonomic hierarchies

- Xper format: the Xper format (version 1.01 or higher) is able to manage the described taxon hierarchies. The older version of Xper<sup>2</sup> (version 2.2 or less) can read these files but will skip the data related to taxonomic hierarchies and groups.
  - SDD format: the SDD format in version 1.1 fully supports taxon hierarchies, however, it does not support the concept of taxon groups (thus, the data will not be exported in this format).
  - CSV format: Xper2 can export and import taxonomic hierarchy and groups in CSV files. This format is an easy way to split or merge knowledge bases.
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## Web export including taxonomic hierarchies

Xper<sup>2</sup> is able to export a knowledge base in two web-oriented formats: HTML and MediaWiki. This is an easy way to publish and browse a knowledge base. Both taxon hierarchies and groups are displayed in these output formats.

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## Validation tests

For the Xper format, which is only supported by Xper<sup>2</sup>, we created it so we fully control the data storage in this file format; we upgraded the specification of the Xper's file format from 1.0 to 1.01.

Older versions of Xper<sup>2</sup> cannot manage these new features so they are skipped on opening, however a warning message informs the user that a new version of Xper<sup>2</sup> is available with the following message: "This base was created with a newer version of Xper2, some data may be ignored. Xpd file version 1.01".

We check the validity of generated SDD files using Altova's XML-Spy tools<sup>2</sup>. We use the web-version of Xper (Xper<sup>3</sup>, not publicly available yet) to check the data integrity.

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<sup>2</sup> <http://www.altova.com/xmlspy.html>

## Access to software and documentation

Documentation, as well as access to the applications can be found here:

[http://infosyslab.fr/lis/ressources/xper2/doc/readme/doc\\_xper\\_2.3\\_core\\_en\\_3f6fb33.pdf](http://infosyslab.fr/lis/ressources/xper2/doc/readme/doc_xper_2.3_core_en_3f6fb33.pdf)

[http://infosyslab.fr/lis/?q=en/resources/software/cai/xper2/downloads/last#Xper2.3\\_beta](http://infosyslab.fr/lis/?q=en/resources/software/cai/xper2/downloads/last#Xper2.3_beta)