16. The PAST4 XML project file format

In PAST4 projects are stored in XML files.

A PAST4 project file normally has the file extension .P4P but of course you can save a project with a different extension as well (losing the functionality to automatically load it to PAST4 when double clicking on it in the Windows explorer).

A PAST4 project file has the following overall structure:

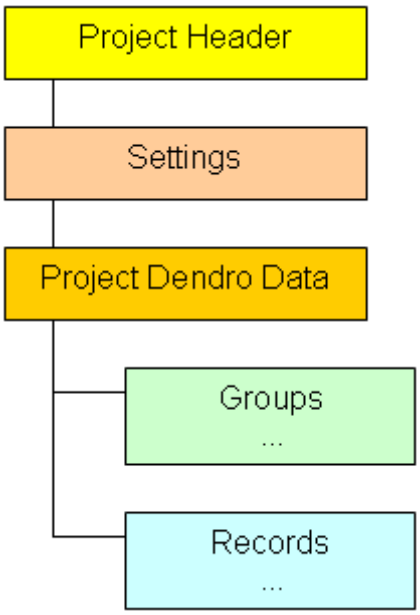

Fig. 1: The structure of a PAST4 XML project file

The **Project Header section** contains basic project related information such as name and description, creation date, last active group, index number of reference and sample record, etc...

The **Settings section** contains most of the program settings for the project, such as screen sizes and positions, statistical thresholds, colour settings etc...

The **Project Dendro data section** contains a list of all groups and records that are stored within the project.

XML Tags

The main tag of a PAST4 project file is <PAST_4_PROJECT_FILE>. All data is encapsulated within this tag. P4P files are not accepted by PAST if this Tag is missing or missspelled!

<PROJECT>

The information stored in the <Project>-Tag can be ignored if only the actual data is of interest.

The project header data is encapsulated in a tag labelled <PROJECT> with several attributes (Name, Version, Active Group etc...). The data stored in the <Project> Attributes is used to describe the project file.

Here are the Attributes:

Attribute Name	Description
ActiveGroup	Index of the Active Group (Zero based index)
EditDate	Date of last edit (File->Save/Save as)
Groups	Number of Groups that exist in the project
Locked	FALSE or TRUE -> If true you will need ->Password to open the file for edit (rarely used)
Name	Project Name displayed in the Project Manager Window
Password	Password used to lock project
PersID	Abbrev. of investigator, taken from the Created by Field in the Project Editor Window
Records	Number of records
Reference	Index of record selected as Reference (-1 if no selection)
Sample	Index of record selected as Sample (-1 if no selection)
Version	Main PAST version, currently always 400, will change to 450 in one of the next releases

A CDATA field belonging to the <Project> tag contains the project description as ASCII (if available, otherwise empty).

Although not recommended, except for the Name, Groups and Records attributes the other attributes can be omitted.

Here is an example for the <Project> part of a P4P file:

<?xml version="1.0"?>

```
<PAST_4_PROJECT_FILE>
<PROJECT Name="New project 0"
  Version="400"
  Locked="FALSE"
  Password=""
  CreationDate="08.07.2010"
  EditDate="08.07.2010"
  ActiveGroup="0"
  Reference="-1"
  Sample="-1"
  PersID="BK"
  Groups="1"
  Records="1">
  <![CDATA[Project Description]]>
</PROJECT>
...
```

<SETTINGS>

The Tag following the Project tag is labelled <SETTINGS>It is designed as one big empty tag with a number of attributes.

ALL attributes stored here are internal values to control the way a Project is opened and displayed in PAST4 and should be ignored by other software!

The entire <SETTINGS>-tag can be missing from a P4P file without problems!

<GROUPS>

The group tag is repeated for each group in the project. Each Group has an index (starting with 0 for the first group). If a new group is created in the program, it gets the next index number. If a group is deleted, all following group indices shift up. **Since groups can be nested hierarchically, loading the Groups section correctly is of great importance to preserve the running group index.**

Otherwise the Group tag is empty except for the following attributes:

Attribute Name	Description
Name	Group Name
Visible	FALSE or TRUE, if false group content is not displayed in the graphs
Fixed	FALSE or TRUE, if true group content cannot be moved
Locked	FALSE or TRUE, if true the group is locked and the then obligate group mean value can be used like any record for further mean value creation.
Changed	FALSE or TRUE, normally FALSE, used internally
Expanded	FALSE or TRUE, controls the Node behaviour in the Project navigation Window.
UseColor	FALSE or TRUE, if true Color is used to display content
HasMeanValue	FALSE or TRUE, if true, the group has a dynamic mean value (at least one record is checked and the Group Mean value is switched on)
IsChrono	FALSE or TRUE, if true the dynamic group mean value is calculated with density information
Checked	FALSE or TRUE, if true this group has a mean value, is locked and checked (to be used as a module on a higher hierarchical level)
Selected	FALSE or TRUE, if true this group is selected in the Project Navigation Window.
Color	Group color as 24bit integer RGB value (Borland style!)
Quality	Interpreted as integer value that describes the quality of a group mean value
MVKeycode	String, if not empty the group mean value keycode is set to this string, otherwise the group Name is used.
Owner	Interpreded as Integer, describes the group position in the project (-1 means a top group, otherwise this value is the index of the group that "owns" this group.

```
<GROUP Name="New group 0"
  Visible="TRUE"
  Fixed="FALSE"
  Locked="FALSE"
  Changed="FALSE"
  Expanded="TRUE"
  UseColor="TRUE"
  HasMeanValue="FALSE"
  IsChrono="TRUE"
  Checked="FALSE"
  Selected="TRUE"
  Color="8421504"
  Quality="0"
  MVKeycode=""
  Owner="-1">
  <![CDATA[Group description]]>
</GROUP>
```

When loading the groups it is important to load ALL groups (e.g. into objects that are stored in an indexed list or enumeration). After loading is finished, you must iterate through this list once to set the correct ownership of the groups.

If nested groups exist in the project that contain mean values that are used in higher level groups to create mean values there, further steps will be required to calculate all dynamic mean values in the right way (for example by iterating through the hierarchical group structure from the leaves to the stem).

A final CDATA section may contain the group description as ASCII text.

Although not recommended some of the attributes can be omitted (Visible, Fixed, Changed, Expanded, UseColor, Selected, Color, Quality, MVKeycode).

<RECORDS>

The actual dendro data for each record is stored in a number of <RECORDS>-tags.

Again, most information is stored in attributes:

Attribute Name	Description
Keycode	Record Name
Length	Interpreted as integer, holds the number of rings
Owner	Interpreted as integer, group index used to assign a record to a certain group
Chrono	FALSE or TRUE, if true the record has density information
Locked	FALSE or TRUE, if true, the record can not be moved
Filter	FALSE or TRUE, if true a dynamic filter (index function) is applied to the data (see later about original and processed data)
FilterIndex	Number of filter
FilterS1	Filter paramter 1
FilterS2	Filter parameter 2
FilterB1	Additional filter parameter
FilterWeight	Additional filter parameter
Offset	Position of record (position of last ring minus length)
Color	Color as 24bit RGB value
Checked	FALSE or TRUE, if true the record is checked and will be used when creating a dynamic group mean value in the record´s group
VShift	Interpreded as Integer, temporary value that will be added to the final data to allow for vertical shifting of records
IsMeanValue	FALSE or TRUE, if true, this is a dynamic mean value
Pith	FALSE or TRUE
SapWood	Interpreted as integer, holds the number of sapwood years (0 if none)
Location	String with location information
Waldkante	String with Waney Edge information
FirstValidRing	Interpreted as integer, if other than zero this record has a **left** marker set
LastValidRing	Interpreted as integer, if other than zero this record has a **right** marker set
UseValidRingsOnly	FALSE or True, internally used only
Quality	Interpreted as integer, can be set to assign a quality value to a record

Of those attributes most can be omitted (except Name, owner, length and offset).

After the attributes a <HEADER> tag follows, that is empty except for a CDATA-section that may contain additional header data.

This header data can be completely free form, or it may be structured like

Variable=Value

Following the <HEADER>-tag comes the <DATA>-tag.

This tag finally contains the ring values. Again it is an empty tag except for a CDATA section.

In this CDATA section each year is represented by a line (#13#10 line breakers).

Within a line, the following fields exist separated by a Tab (ASCII #9):

- Ring width (floating point value!)
- number of samples used for mean calculation of this year (1 if not a chrono)
- number of samples with ascending growth trend (1 if not a chrono)
- Latewood percentage (0-1), zero if no early/latewood information is present
- Backup ring width (containing original ring width data if a dynamic filter- (index-) function was applied, otherwise identical to the first field)
- ring information as string

```
<RECORD
 Keycode="DMN10030"
 Length="74"
 Owner="0"
 Chrono="FALSE"
 Locked="FALSE"
 Filter="FALSE"
 FilterIndex="-1"
 FilterS1="0"
 FilterS2="0"
 FilterB1="FALSE"
 FilterWeight=""
 Offset="0"
 Color="8421504"
 Checked="FALSE"
 VShift="0"
 IsMeanValue="0"
 Pith="FALSE"
 SapWood="0"
 Location="" Species=""
 Waldkante=""
 FirstValidRing="0"
 LastValidRing="0"
 UseValidRingsOnly="FALSE"
 Quality="0">
 <HEADER><![CDATA[DateBegin=100
  Unit=1/100 mm
  DataFormat=Tree
  Dated=Dated]]>
</HEADER>
<DATA><![CDATA[
166     1       1       0       166
191     1       1       0       191
272     1       1       0       272
.....
129     1       1       0       129
```

```
211     1       1       0       211
]]>
</DATA>
```