**Students Database**

General Architecture

# Deployment and inter-connections between the projects

One strong technical requirement is that people from each project must have fast access to the application (not using Internet), and must be able to work even Internet connection is not working.

This means that we need to deploy the application in each project, on the respective local network.

This constraint will not allow to have a single database for all projects. But most of the time, someone in a particular project only needs to access to the data regarding the project on which he/she is working. However, we still want to make people from any project, to consult data from other projects.

For this, the proposed solution consists in:

* The software is deployed locally in every project
* The data of each project is separated into different databases:
  + 1 database corresponding to the local project, which is writable
  + A copy of the databases of other projects, which are readable only. These copies of other projects’ databases can be synchronized on a regular schedule (for example every night).

However, the software of every project will be made accessible from Internet. Even the speed will probably be quite slow, this will still allow anybody from other projects to

* Consult the latest information (in case we exceptionally need it)
* Edit an information, in case we have this requirement in the future, for any reason.

Each project will also provide an authentication system, accessible from outside. This will allow for example, a PNC staff to connect to the software in PNV.

Regarding users, the administrator of each project will maintain the access rights of users for the database of its project. As the rights will be stored in the database, and thus duplicated in the copies in other projects, if someone from a project A wants to access data of project B, he needs to have this right, and this right is managed by the administrator if project B.

For example, if the project manager of PNV wants to access to PNC data, first PNC administrator needs to allow it.



# Editable database structure, and consistency

This design brings the problem of consistency of the different databases.

Indeed, one of the requirement is that we want the software to allow someone to modify the database structure: for example, we want to be able to attach a new field to a student. In this case, we don’t want to need a developer to change the software and the database, then deploy it everywhere, but we want to be able to do it easily, directly from the application.

However, we need to ensure consistency of the databases between the project. If two projects need to add the same information, we want that this same information is consistent in the two projects. This to make easier statistics, gathering of information among the projects…

Having different databases for each project, not directly connected, may bring to inconsistencies.

The proposed solution is:

* First, when someone wants to add a new information, he will have to check if this information does not already exist among the information already added in the databases of other projects.
* At this moment, we will do a tentative to connect to other projects’ database, to synchronize the database structures (only the structure, not the data), to avoid the exceptional case 2 projects try to add the same information the same day… We will assume this will not occur within the same minute…