

# Step report

## About *ValidMaker* research project

### *CISCO configuration abstract representation*

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We, Clément Parisot and Sylvain Stoesel, worked from October till December 2013 on a research project related to CISCO configurations, their analysis and their representations. We participated in the development of **ValidMaker** software, software which is able to read, modify and analyze CISCO configurations.

It should be noted that the configurations to analyze can come from many different CISCO equipment and, consequently, their CISCO software version number can differ. The goal for us is to generate an abstract configuration file, independent of the CISCO software version. Manipulate and analyze this abstract configuration file will be easier because it is not any more manufacturer dependent but it is generic. Another advantage is the capacity to determine the commands required on the equipment to modify a part of the configuration.

Our first researches were about syntactic analysis (parser) integrated into **ValidMaker** software. We determined the possibilities but also the limits of this parser. Indeed, it was not always able to create the same abstract representation of CISCO configuration files that have two different versions. For example, when a CISCO command syntax changes for one version to another, the abstract generated file structure varies also.

Then we try to determine if other existing parsers, like **Augeas** or **CiscoConfParser**, could replace the integrated solution. We found that these programs have limited functionalities and does not suit to our exigencies. Even if they effectively generate files corresponding to the configuration, these depend on the syntax and version used. Furthermore, no solution permits to retrieve the CISCO commands that are used to change a specific parameter.

This work was finished in October. In November and December, we reoriented our researches, in collaboration with our managerial employee Mr Sylvain Hallé. Indeed, no existing parsers allow solving the complex problem we faced. We decided to design our own parser, corresponding exactly to what we want to do.

So, we began the conception of a program structure that would convert a CISCO configuration in the corresponding abstract representation, as well as the reverse operation. The whole data structure that permits to implement these operations was recreated. We worked on a UML diagram that defines the program itself and the structure of the XML files used to save the abstract configurations in memory. Please find enclosed a copy of the diagram on the next page.

Finally, for December, we started to concretely implement this data structure and the associate **Python** program, in order to achieve the first tests. We will be capable of easily load XML abstract configuration files and generate the corresponding CISCO commands.

Annex : UML diagram of the data structure used

