

GRIB API. A database driven decoding library.

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GRIB is a standard format regulated by WMO [1]. It is widely used to exchange meteorological data and several decoders are available for the scientific and technical users. Since the new edition 2 of this specification has been released a new generation of software has been produced to encode and decode according to the new specifications. As the new format is very complex and different from the previous edition 1 the software available at the moment is able to decode only one of the two editions with a bad consequence for the user having to switch from a library to another to decode different editions of the message. To address this problem ECMWF has produced a library able to decode both editions with the same function calls and the same technique. This library (GRIB API) is going to replace the old GRIBEX decoder in all ECMWF applications. To cover the two specifications a complex method for the organisation of the description of the metadata was needed and some databases have been realised to keep a coherent picture between the application behaviour and the GRIB specifications.

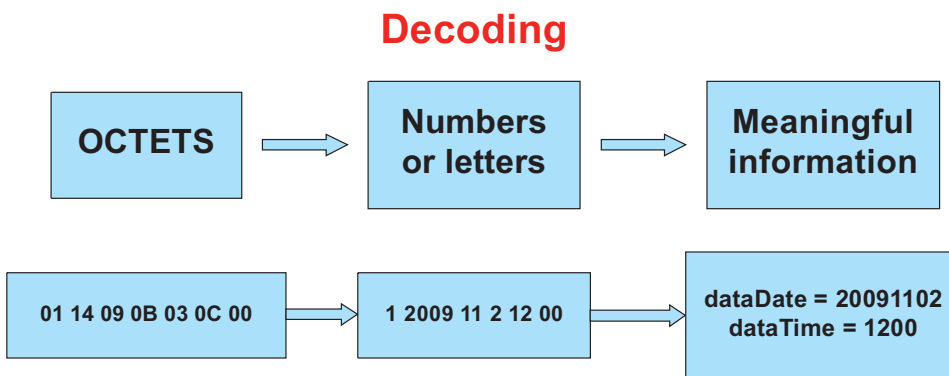


Fig. 1 Decoding process from binary information (octets), through number and letters, to meaningful information.

GRIB is a binary format and to decode it we need to transform the coded bytes in numbers or letters and then to group or collect these elements of decoded information to give them some meaning (see fig. 1). The specifications for this format are given as a complex set of rules of binary encoding [1] and with the new edition 2 those rules can be extended to code new products. We have decided to process the specification document provided by WMO to save each item of information, its coding rules and its meaning in a database. Having the coding rules in a database organised in form allows us to build the decoding rules used by GRIB API automatically and to have a coherent representation of the specifications in our application (figure 2).

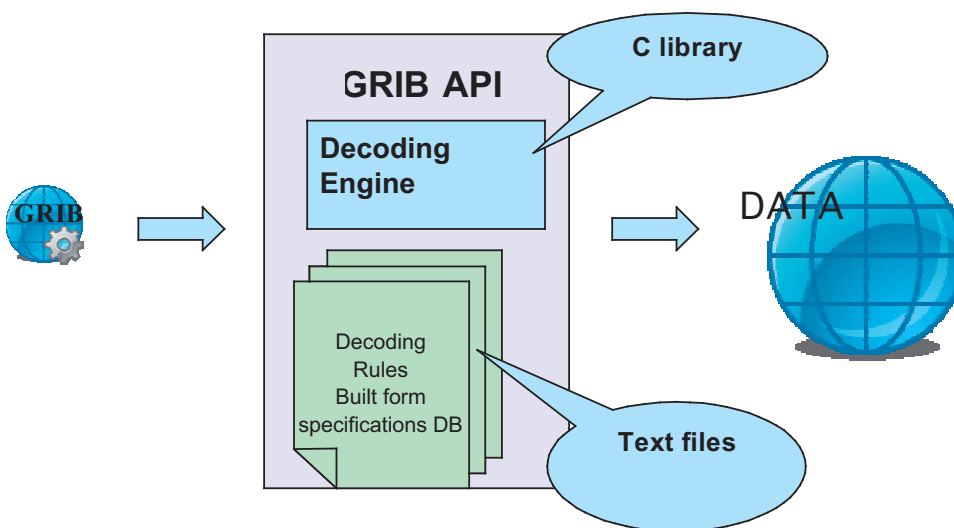


Fig. 2 GRIB API is a decoding engine using some decoding rules contained in text files and built from the GRIB specifications database.

The information contained in our GRIB specifications [1] database can be accessed from the ECMWF web site [3,4] and it provides also an up to date documentation of the GRIB API keys. Indeed the GRIB specifications database is also the GRIB API keys database and it is the bridge between our decoding application and the specifications on which it is built.

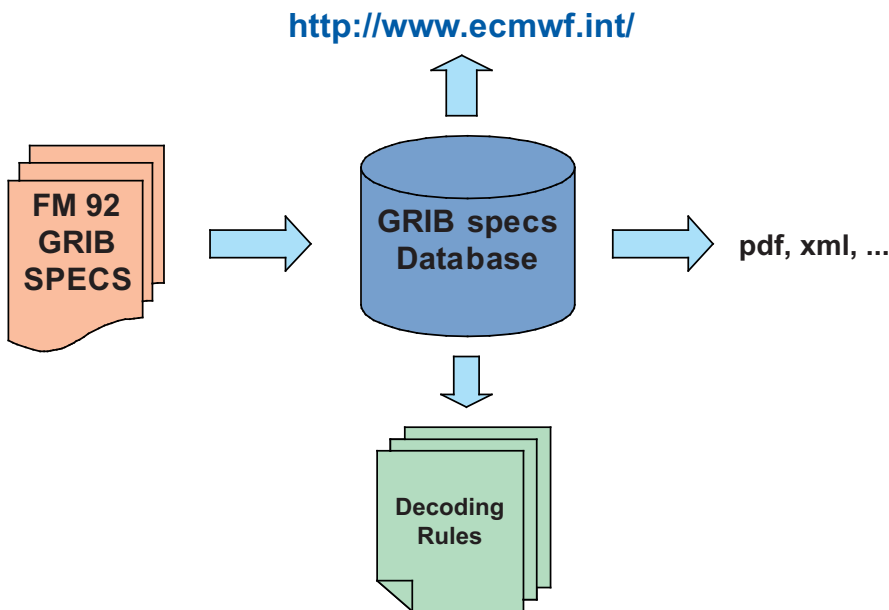


Fig. 3 From GRIB specifications database the web page, the decoding rules and pdf and xml documents are built.

A very well established practice of coding meteorological parameters using local tables has lead to different flavours of GRIB coding. To deal with all the possible ways of coding parameters we have implemented in GRIB API a very flexible way of configuring the decoding system to deal with different GRIB flavours. To maintain all the different parameter descriptions in both editions of GRIB we have realised a database from which the decoding information in GRIB API is built. The information contained in our parameter database and the description of the parameters in GRIB 1 and 2 can be accessed from our web site [4].

The database of parameters will be extended including all the parameters used by ECMWF member states and other national meteorological organisations.

References

- [1] WMO Manual on Codes, Volume 1.2 FM-92 GRIB
- [2] ECMWF GRIB 1 documentation <http://www.ecmwf.int/publications/manuals/d/gribapi/fm92/grib1/>
- [3] ECMWF GRIB 2 documentation <http://www.ecmwf.int/publications/manuals/d/gribapi/fm92/grib2/>
- [4] ECMWF parameters database <http://www.ecmwf.int/publications/manuals/d/gribapi/param/>