

GRIB API & TOOLS

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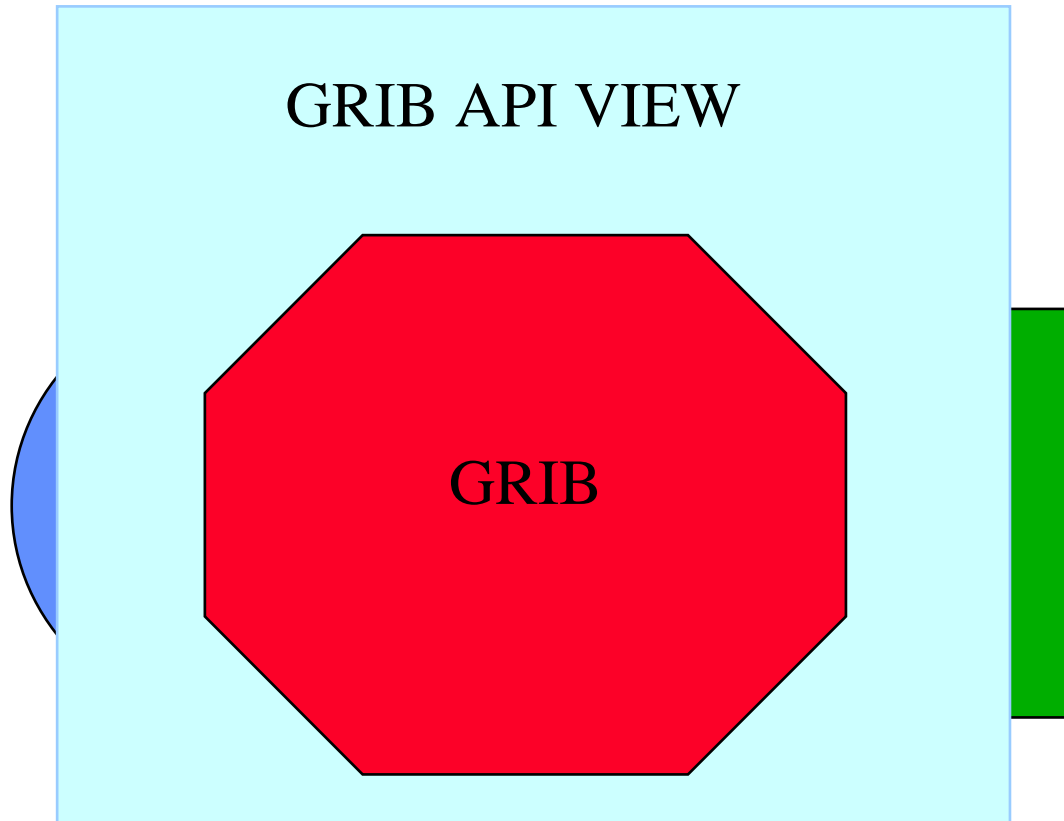
Overview

- **Introduction**
- **GRIB 1 vs. 2**
- **GRIB TOOLS**
- **GRIB API new features**
- **Summary**

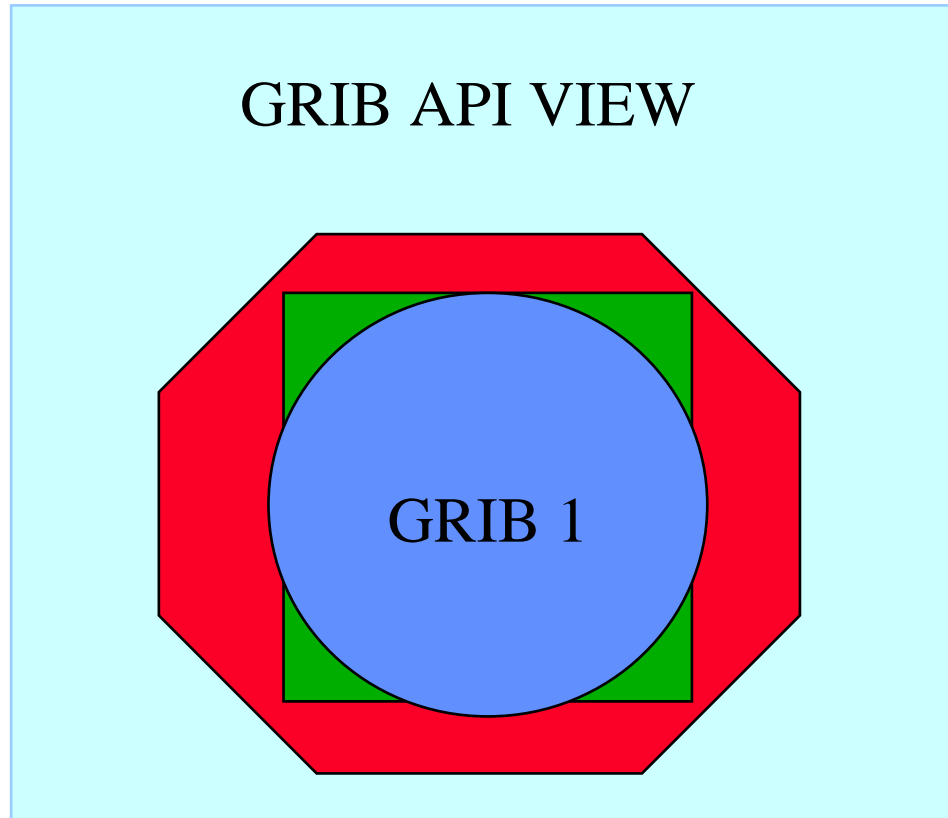
GRIB API & Tools

- **GRIB API provides a set of functions (C or Fortran) to access and modify the content of a GRIB edition 1 or 2**
- **It will replace in the future the GRIBEX decoding routine at ECMWF**
- **It is released under an LGPL license**
- **A set of command line tools are included in the distribution**
- **It is based on a key/value design which allows to access or change elements from a message setting or getting the value of some keys.**

GRIB 1 vs. 2



GRIB 1 vs. 2



GRIB 1 vs. 2

 **VIRTUAL** latitudeOfFirstGridPointInDegrees=40

 **CODED** latitudeOfFirstGridPoint=40000

 **CODED** latitudeOfFirstGridPoint=40000000

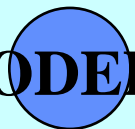
GRIB 1 vs. 2

VIRTUAL



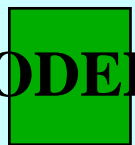
gridType=reduced_gg

CODED



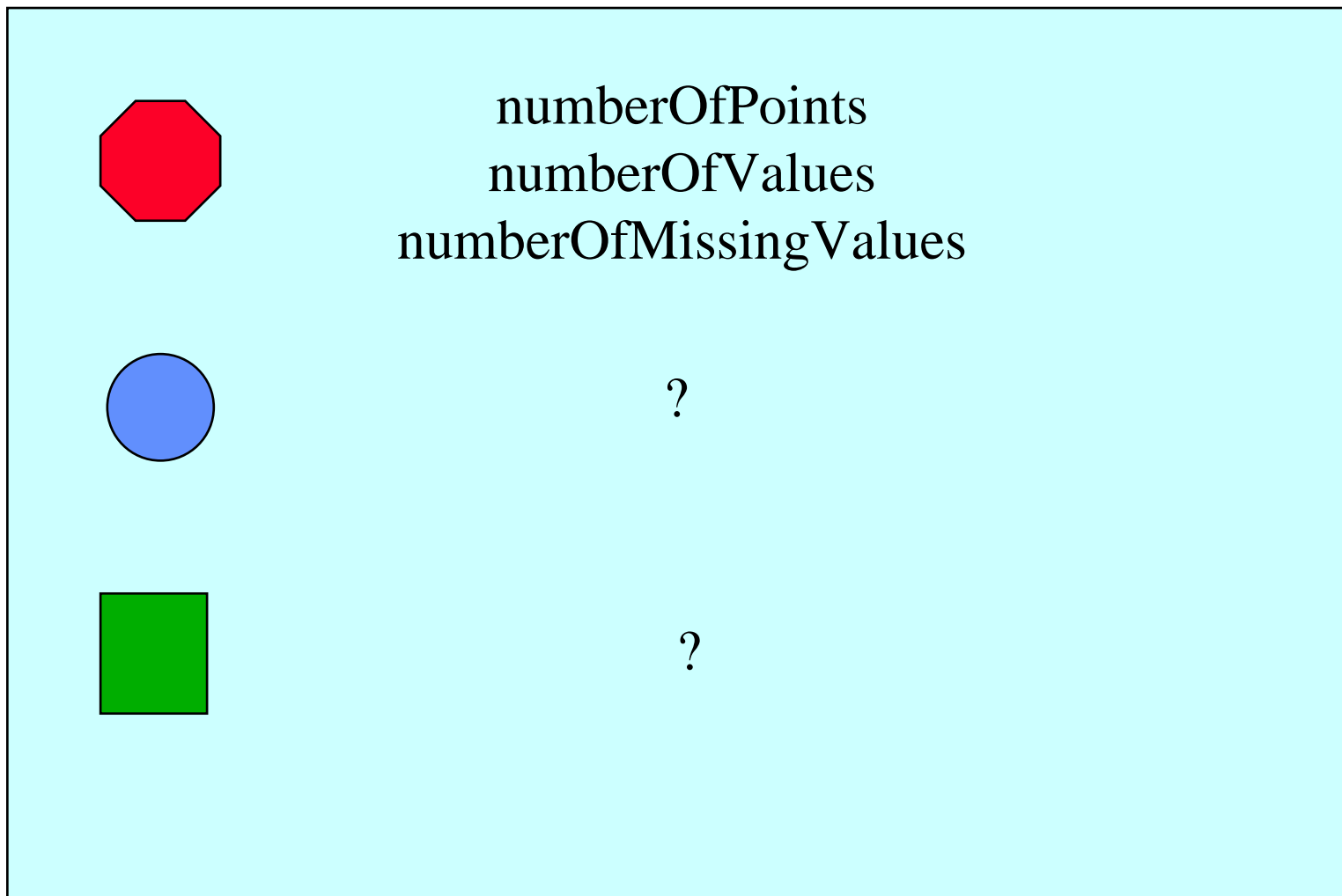
dataRepresentationType=4
numberOfPointsAlongAParallel=MISSING
ijDirectionIncrementGiven=0
pl = { ... }

CODED



gridDefinitionTemplateNumber=40
numberOfPointsAlongAParallel=MISSING
iDirectionIncrementGiven=0
iDirectionIncrement=MISSING
pl = { ... }

GRIB 1 vs. 2



GRIB TOOLS

- **grib_ls, grib_get** (quick listing of the content of a file)
- **grib_dump** (detailed views of the grib messages)
- **grib_get_data** (latitude/longitude/value list)
- **grib_set, grib_convert** (to change header values)
- **grib_copy** (to copy selected messages)
- **grib_filter** (to set and write to different files)
- **grib_compare** (to compare two grib files)

GRIB Tools: options

A set of options common to all the tools is provided.

- **-p key[:{s/d/l}],key[:{s/d/l}],...**

Declaration of keys to print. For each key a string (key:s) or a float (key:d) or a integer (key:l) value is printed. Default type is string.

- **-w key[:{s/d/l}]{=/{!}=}value,key[:{s/d/l}]{=/{!}=}value,...**

Where clause. Grib messages are processed only if they match all the key/value constraints. A valid constraint is of type key=value or key!=value. For each key a string (key:s) or a double (key:d) or a long (key:l) type can be specified. Default type is string.

GRIB Tools: options

```
grib_ls -w levelType=sfc sample.grib
```

```
grib_copy -w levelType=sfc sample.grib sfc.grib
```

```
grib_set -w levelType=sfc -s packingType=jpeg  
sample.grib2 sfc_jpeg.grib2
```

GRIB Tools: options

`grib_ls -B"step,param desc,levelType" x.grib`

`grib_copy -B"step,param desc,levelType" x.grib order.grib`

GRIB TOOLS: grib_ls

grib_ls -p step,shortName -l40/11 reduced_gg.grib

step	shortName	value1	value2	value3	value4
0	2T	291.57	291.88	291.92	291.61
0	TP	0.00	0.00	0.00	0.00
12	2T	292.19	292.08	292.21	291.69
12	TP	0.00	0.00	-0.00	-0.00

Input Point: latitude=40.00 longitude=11.00

Grid Points

- 1 - index=39302 latitude=39.78 longitude=11.25 distance=32.86 (Km)
- 2 - index=39301 latitude=39.78 longitude=10.69 distance=36.54 (Km)
- 3 - index=38662 latitude=40.22 longitude=11.25 distance=32.80 (Km)
- 4 - index=38661 latitude=40.22 longitude=10.69 distance=36.47 (Km)

GRIB TOOLS: grib_ls

grib_ls -p step,shortName -Bparam,step -l40/11 reduced_gg.grib

step	shortName	value1	value2	value3	value4
0	2T	291.57	291.88	291.92	291.61
12	2T	292.19	292.08	292.21	291.69
0	TP	0.00	0.00	0.00	0.00
12	TP	0.00	0.00	-0.00	-0.00

Input Point: latitude=40.00 longitude=11.00

Grid Points

- 1 - index=39302 latitude=39.78 longitude=11.25 distance=32.86 (Km)
- 2 - index=39301 latitude=39.78 longitude=10.69 distance=36.54 (Km)
- 3 - index=38662 latitude=40.22 longitude=11.25 distance=32.80 (Km)
- 4 - index=38661 latitude=40.22 longitude=10.69 distance=36.47 (Km)

GRIB TOOLS: grib_Is

grib_Is -p step,shortName -Bparam,step -l40/11/1 reduced_gg.grib

step	shortName	value
0	2T	291.92
12	2T	292.21
0	TP	0.00
12	TP	-0.00

Input Point: latitude=40.00 longitude=11.00

**Grid Point index=38662 latitude=40.22 longitude=11.25 distance=32.80
(Km)**

GRIB TOOLS: grib_Is

grib_Is -p step,shortName -Bparam,step -i 38662 reduced_gg.grib

step	shortName	value(38662)
0	2T	291.92
12	2T	292.21
0	TP	0.00
12	TP	-0.00

GRIB Tools: grib_filter

grib_filter filter.rules x.grib

filter.rules

```
if ( step <= 120 && levelType is "sfc") {  
  write "[date]_[centre].grib[editionNumber]"  
}
```

20071116_ecmf.grib1

20071116_kwbc.grib1

20071116_babj.grib1

GRIB Tools: conversion 1->2 & 2->1

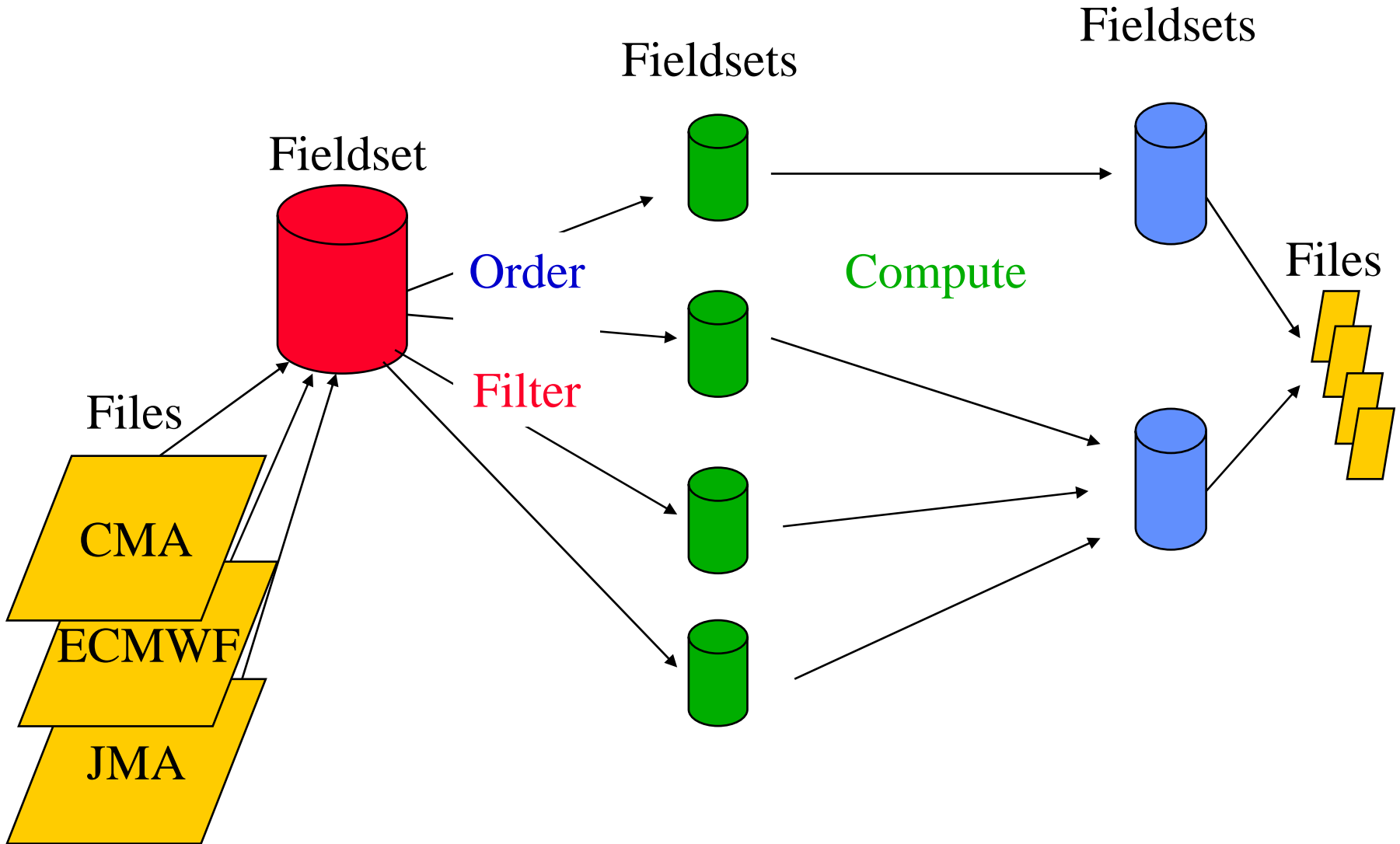
```
grib_set -s editionNumber=1 x.grib2 x.grib1
```

```
grib_set -s editionNumber=2 x.grib1 x.grib2
```

```
grib_convert convert.rules in.grib out.grib
```

```
editionNumber=2;  
if ( indicatorOfParameter=6) {  
  productDefinitionTemplateNumber=1;  
  discipline=0;  
  parameterCategory=3;  
  parameterNumber=5;  
  typeOfFirstFixedSurface=100;}
```

GRIB API new features



GRIB API new features

- Where condition
- Order by
- Formula

grib_compute

-s "u((shortName==u), step asc, number desc), v
((shortName==v), step asc, number desc)"

-f "sqrt(u*u+v*v)"

GRIB API new features

- **Where condition**
- **Order by**
- **Formula**

grib_compute

-s"tp(((centre==babj) or (centre==ecmf)) and
(shortName==tp), step,number,centre)"

-f freq(tp ,number, <10)

Distribution

- **GRIB API & TOOLS: 1.0** released in April, release 1.3 available now with new features and several improvements.
- **Version 2.0** will be released soon with the full set of compute and fieldset new features.
- **Lesser General Public License.**
- **Download**
http://www.ecmwf.int/products/data/software/download/grib_api.html
- **It will be included in the Debian linux.**
- **Support Software.Services@ecmwf.int**

Summary

- **GRIB API & Tools provide full access to the low level GRIB 1 & 2 encoding.**
- **GRIB API & Tools provide higher level access independent from the edition.**
- **Indexing functionalities already available and more to come in the following versions.**
- **Computation support gives powerful tools to address the EPS/Statistics needs.**

Questions ?