

Extra examples

Operators extravaganza

Roberto Ribas

Forecast Department

Copernicus Production Section

Operators ???



How to change the attributes of a key

So far, we have changed the BUFR structure, and changed some key values, but, can we change the attributes of a key?

We will start from the **synop.bufr**, and create a very simple message where we can play with the attributes.

Create a rules filter that changes the width of the key **airTemperature** so its new value is **26**. Does it work? Why?

Change attributes of a key

We will get a different approach, we will start from a very simple message containing some geographic information (latitude/longitude/heightOfStation) and we will find the way to change the width of the airTemperature key.

1. Find in table B the descriptors for

airTemperature

temperature

In table D common sequences, find the expansion for **301022**

2. Create a simple message by setting the unexpanded descriptors to the keys found in part 1. Start with the 301022 sequence.

Hint:

```
unexpandedDescriptors={301022,12101,12023};
```

Change attributes of a key

Check with **bufr_dump** that you have the expected keys. Add some values to the latitude, longitude, heightOfStation, temperature and airTemperature.

What happens if you try to set the key temperature to 301?

What happens if you try to set the key airTemperature to 1000?

Look at table B common sequences for the two keys.

Change attributes of a key

We may use BUFR operators to change the width attribute of a key, that way, we can store bigger values. To do so, we have to refer to **table C**, that contains the Data Descriptor **operators**.

We can use the operator to change the data width of airTemperature and see if we can set a higher value for this key.

Bear in mind that the operator affects all subsequent descriptors, so we must disable the operator at the end of the sequence change.

Change attributes of a key

Now set your unexpandedDescriptors to the following sequence

```
{301022, 12023, 201138, 12101, 201000, 12023 }
```

Why 201 138?

Try now to set airTemperature to 1000. What is the width of this key now?
Compare it with the width of this key before we activated the operator.

Does the temperature key width attribute change? Why?

Change attributes of a key

- Now move the data operator 201000 after the 12023 descriptor, set the temperature to 301. Run the filter. Does it work?

What happens if you don't disable the change of width operator 2 01 138?

Try to add another data descriptor to the unexpandedDescriptors for example (dewpointTemperature 012024). What is the width of this key now.

So, it is important to disable the change of width operator, so it modifies only the intended keys.