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Province of Bolzano Municipal Weather Forecasts Data Collector v1.1, 19.10.2023

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Preliminary notes

The Weather Office of the Province of Bolzano has launched a new forecasting service which allows to get specific weather forecasts for each municipality in South Tyrol.

Data structure and transfer modalities

At present, there is no official open data API to these new forecasts. However, JSON files are produced as output of this forecasting engine, we could be used for the data integration in the Open Data Hub. For the exchange of these files, we have imagined an automatic upload on a certain IT environment controlled by NOI. The automatic upload could be done by the Weather Office through a script.

Kommentiert [RCN1]: To be defined with Software Architects!

Data Collector specification

FORECASTING SERVICE

The forecasting model provides interesting overall information related e.g. to the average temperatures and precipitation over the whole period and municipalities. The reference data and metadata are to be found in the structure "info", e.g.:

```
"info":  
{  
  "model": "SMOS-ECMWF",  
  "currentModelRun": "2023-09-12T02:00:00+02:00",  
  "nextModelRun": "2023-09-12T14:00:00+02:00",  
  "fileName": "SMOS_MCPL-WX_EXP_SIAG.JSON",  
  "fileCreationDate": "2023-09-12T10:18:24+02:00",  
}
```

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Nature of Innovation.



```

"absTempMin":5,
"absTempMax":35,
"absPrecMin":0,
"absPrecMax":10
}

```

Therefore we can imagine to have a “virtual” station with stationtype = WeatherForecastService, with following mapping:

Forecast json file fields	Open data hub DB fields (table station)
model	name
model	stationcode
currentModelRun	METADATA
nextModelRun	METADATA
fileName	METADATA

Please note that the fields linked to METADATA mean that have to be stored in the metadata table. The following additional aspects have to be taken into account:

- **origin:** to be set as “province-bolzano”
- **pointprojection:** in this case we should hard-code a reference location, since we don’t have here any geographical reference. Proposal: somehow in the middle of the city of Bolzano
- **stationtype:** to be set as “WeatherForecastService”

For the data types: we could reuse the existing types “**air-temperature-max**” and “**air-temperature-min**”, to be coupled with “absTempMax” and “absTempMin”, respectively. For the parameters “absPrecMin” and “absPrecMax” we should instead foresee two new data types, i.e. “**precipitation-min**” and “**precipitation-max**”, respectively.

All this data should be stored within the measurement (measurementhistory) table. The reference timestamp to be used is related to the field “fileCreationDate”. The forecasts are updated twice very day, so we could in general configure the scheduler to make a control of new forecasts every hour

FORECASTING DATA

Weather forecasts are specific to a municipality, and this is the main improvement that has been introduced. For each municipality reported, forecasted values (quantitative, not quantitative as the generic weather forecasts integrated in the Tourism Data Space of the Open Data Hub) are provided for a certain number of weather parameters.

The proposal is to consider as Open Data Hub “station” the municipality with respect to which the weather forecasts are provided, with the following mapping:

Forecast json file fields	Open data hub DB fields (table station)
code	stationcode
nameDe	name
nameIt	name
nameEn	METADATA
nameRm	METADATA

The following additional aspects have to be taken into account:

- **origin:** to be set as “province-bolzano”
- **pointprojection:** in this case we should hard-code a reference location, since we don't have here any geographical reference. Proposal: somehow in the middle of the municipality
- **stationtype:** to be set as “WeatherForecast”
- **name:** should be mapped as “nameDe_nameIt”








The following weather forecast types are provided and are to be integrated:








Weather forecasts parameters	Description	Period [s]
tempMin24	Forecast of minimum daily temperature	86400
tempMax24	Forecast of maximum daily temperature	86400
temp3	Forecast of temperature every 3 hours	10800
ssd24	Forecast of daily solar radiation duration	86400
precProb3	Forecast of precipitation probability every 3 hours	10800
precProb24	Forecast of maximum daily precipitation probability	86400
precSum3	Forecast of cumulated precipitation every 3 hours	10800
precSum24	Forecast of cumulated daily precipitation	86400
windDir3	Forecast of wind direction every 3 hours	10800
windSpd3	Forecast of wind speed every 3 hours	10800








For the types “symbols3” and “symbols24”, actually there is a relevant forecast associated, i.e. an overall description of the weather forecasted at a certain date / time. This description is matched with a specific icon, representing a certain weather condition (see following Table). The description information should be stored, and not the corresponding icon code. Please note that differently from the other types, which have to be stored as measurement, in this case value is a string and has to be stored as a measurementstring. The suffix “_d” and “_n” have to be ignored since they reflect another icon (e.g. icons for day and night, respectively).




The proposal is to consider for these data types (to be renamed “**qualitativeForecast3**” and “**qualitativeForecast24**”, with period 10800 and 86400, respectively) in the Open Data Hub a proper translation between symbol and “qualitativeForecast”, as in the mapping table below

Kodex	Bild	Beschreibung deutsch	Beschreibung italienisch	Possible value content for qualitativeForecast type
a		Wolkenlos	Sereno	sunny
b		Heiter	Poco nuvoloso	partly cloudy

c		Wolkig	Nuvoloso	cloudy
d		Stark bewölkt	Molto nuvoloso	very cloudy
e		Bedeckt	Coperto	overcast
f		Wolkig, mäßiger Regen	Nuvoloso, piogge moderate	cloudy with moderate rain
g		Wolkig, starker Regen	Nuvoloso, piogge intense	cloudy with intense rain
h		Bedeckt, mäßiger Regen	Coperto, piogge moderate	overcast with moderate rain
i		Bedeckt, starker Regen	Coperto, piogge intense	overcast with intense rain

j		Bedeckt, leichter Regen	Coperto, piogge deboli	overcast with light rain
j		Bedeckt, leichter Regen	Coperto, piogge deboli	overcast with light rain
k		Durchscheinende Bewölkung	Nuvolosità translucida	translucent cloudy
l		Wolbig, leichter Schneefall	Nuvoloso, nevicata deboli	cloudy with light snow
m		Wolbig, starker Schneefall	Nuvoloso, nevicata intense	cloudy with heavy snow
n		Bedeckt, leichter Schneefall	Coperto, nevicata deboli	overcast with light snow
o		Bedeckt, mäßiger Schneefall	Coperto, nevicata moderate	overcast with moderate snow

p		Bedeckt, starker Schneefall	Coperto, nevicate intense	overcast with intense snow
q		Wolkig, Schneeregen	Nuvoloso, pioggia e neve	cloudy with rain and snow
r		Bedeckt, Schneeregen	Coperto, pioggia e neve	overcast with rain and snow
s		Hochnebel	Nuvolosità bassa	low cloudiness
t		Nebel	Nebbia	Fog
u		Wolkig, Gewitter mit mäßigen Schauern	Nuvoloso, temporali con moderati rovesci	cloudy, thunderstorms with moderate showers
v		Bedeckt, Gewitter mit starken Schauern	Coperto, temporali con rovesci intensi	cloudy, thunderstorms with intense showers

w		Wolkig, Gewitter mit mäßigen Schneeregenschauern	Nuvoloso, temporali con moderati rovesci nevosi e piovosi	cloudy, thunderstorms with moderate snowy and rainy showers
x		Bedeckt, Gewitter mit starken Schneeregenschauern	Coperto, temporali con intensi rovesci nevosi e piovosi	cloudy, thunderstorms with intense snowy and rainy showers
y		Wolkig, Gewitter mit mäßigen Schneeschauern	Nuvoloso, temporali con moderati rovesci nevosi	cloudy, thunderstorms with moderate snowy showers

The proposal is to foresee completely new data types, since at present we don't have such weather forecasts in the Open Data Hub and there is no specific data types that might be used. We have also to distinguish with types referring to measurement stations, since in this case it is not about computing a forecast on a time series of a specific weather parameter, but this is the output of a model that provides forecasts for a certain (small) area.

Important final notices:

- types have the field "name" ("cname" in the Open Data Hub "type" table) in multiple languages. The reference type name to be considered is English, the other name fields are to be stored in the type_metadata table;
- in general, UTF-8 is not supported in the JSON files. In order to properly read text with accents, umlauts, etc. a proper decoding mechanism has to be foreseen.

All data expect for the one related to the types "qualitativeForecast3" and "qualitativeForecast24" (to be saved in measurementstring / measurementstringhistory) have to be saved in the tables measurement / measurementhistory