SAPP AT TSMS

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OUTLINE

- SAPP System
- Workflow And Features of SAPP
- SAPP vs HAPP
- Installation of SAPP At TSMS
- SAPP Related Activities
- Monitoring of SAPP
Scalable Acquisition and Pre-Processing (SAPP) System is a pre-processing software developed by ECMWF to use in pre-processing of the observations coming from different sources (e.g. GTS). The main functions of SAPP are as follows:

- Obtain observations from a multitude of sources (in the order of 200).
- Decode the different types of formats (e.g. BUFR, GRIB, HDF, netCDF, text).
- Apply initial quality control.
- Convert the observations into suitable format for the use of data assimilation.
With the approval of **SAPP Optional Program** by ECMWF Council the Member and the Co-operating States that have decided to participate in the SAPP Optional Programme are provided with SAPP user support, workshops, and online documentation.

TSMS has been using SAPP software package operationally since July 2020. The previous system for observation pre-processing at TSMS was HAPP.
1. **Acquisition**: Newly received observation file is sent to the decoder.

2. **Processing**: The decoder is run on the messages and the messages are turned into reports.

3. **Extraction**: The data from the reports generated at the previous stage are extracted.

SAPP VS HAPP

- Scalable - several processes on several nodes,
- Fault tolerant - in case of a problem a new available node is used,
- SAPP Dispatcher instead of SMS,
- Usage of Python, no more errors related to FORTRAN codes of HAPP,
- SAPP provides easier decoding without any problem and processes more observations,
- Easier monitoring by SAPP (real-time monitoring, detect errors, solve issues quickly),
- Using eccodes for routing and metadata.
SAPP was obtained from ECMWF as a virtual machine and installed in the virtual environment of TSMS.

The Centos Linux release 7.1 server with 4 CPUs, 8 GB of memory was transferred to TSMS via current network line between ECMWF and TSMS and it was deployed to VMware virtualization environment at TSMS.

After the installation of SAPP some specific adjustments were done:
- changing hostname,
- installation of Mars Client for archiving the observations,
- creating the crontab scripts and installation of the ftp service to receive the observations to be processed by SAPP.
SAPP RELATED ACTIVITIES

Observation types:

- Synoptic observations (Turkey and abroad)
  - Automatically recorded

- Automatic Weather Station observations
  (Nearly 1750 stations, Turkey)

- Radiosonde observations (Turkey and abroad)

- METAR observations (Turkey and abroad)

- Airep observations (All)

- Ship observations (Turkey and abroad)

<table>
<thead>
<tr>
<th>Observation Type</th>
<th>Daily Total Obs. (03/03/2021)</th>
<th>Daily Station/Obs. Point Number (03/03/2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synop</td>
<td>280.337</td>
<td>8316</td>
</tr>
<tr>
<td>Temp</td>
<td>3009</td>
<td>485</td>
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<tr>
<td>Ship</td>
<td>21.815</td>
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<tr>
<td>Metar</td>
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<tr>
<td>Airep</td>
<td>187.278</td>
<td>2901</td>
</tr>
<tr>
<td>Local AWOS</td>
<td>34.437</td>
<td>1634</td>
</tr>
</tbody>
</table>
• A shell script is running every hour to send the bufr obs. to NWP servers.

• Modified ext_cmd.py python script is used (developed at ECMWF).

• DA window time details, decoders, BUFR subtypes, and more are passed to ext_cmd script expects.

• Local stations were defined in SAPP.

• ext_cmd.py and utils.py scripts support standard WMO Blocks.

• TSMS Official WMO Block id is 17, but we also use 18,19, and 20. These ids were added.

• All TSMS BUFR observations are sent to NWP.
SAPP RELATED ACTIVITIES

DAaKIT Activities-Arome-Tr Surf. DA –Pre-operational

- 72 vertical levels, 1.7 km horizontal resolution cy43t2_bf10,
- Tstep: 60 sec. coupled with ECMWF-IFS,
- 24 hr forecast every 3 hours,
- CANARI-OIMAIN Method. LMESCAN=T,
- SAPP synop obs (Rh2m, T2m) are assimilated.
- bator_decodbufr_mod.F90, param.cfg kindly provided by Eoin Whelan helped us decode SAPP synop obs. (Because of template 307005)
- ECMWF bufrdc library–ECMWF bufrtables are used.
SAPP RELATED ACTIVITIES

Verification Results

Selection: ALL using 118 stations
Rh2m  Period: 20210310-20210331
Hours: [00]

Selection: ALL using 118 stations
T2m  Period: 20210310-20210331
Hours: [00]
SAPP RELATED ACTIVITIES

• At TSMS, we prepared a wiki page for DAsKIT where we can share our work in the scope of DAsKIT.

• DAsKIT wiki is quite new. Its enrichment is ongoing by the precious effort of participants.

• This wiki is only open to ACCORD members. Login is also required. An e-mail is sent to ycengiz@mgm.gov.tr by writing name, surname, and institution in mail content and DAsKIT wiki login in the mail subject.

• In this wiki, one of the topics is pre-processing of observations which includes SAPP.
MONITORING OF SAPP
References

THANK YOU FOR YOUR ATTENTION!