

Updates of MARS at CPTEC

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Summary

- Introduction
- Hardware characteristics
- Software installation
- Highlights
- Future needs

- INPE

Government agency in Brazil for space research

- <http://www.inpe.br>

- CPTEC

Weather Forecasting and Climate Studies Center

- <http://www.cptec.inpe.br>
- Works with several models (regional and global scales)

- CPTEC data content
 - Observations, models output, satellite, etc.
 - Amount of data formats → *in-house* solutions have been used to the conversions
 - ASCII, *BUFR*, *GRIB*, HDF, ODS, etc.

The use of MARS at CPTEC aims to improve the organization, archival and access of data with direct impact in the production and research

- Experimental environment
 - Limited interface to our production environment

Features

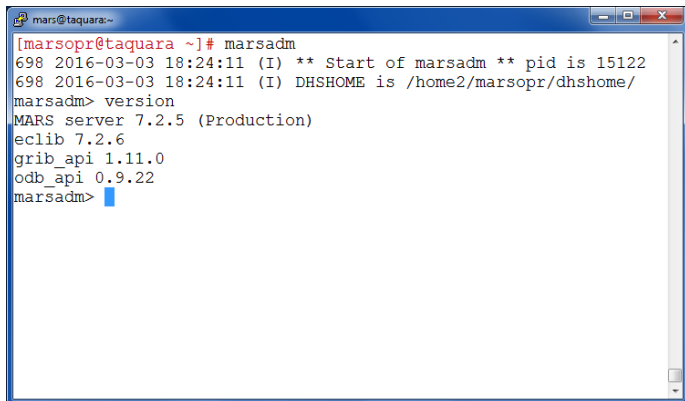
- Three models (about 2 TB)
 - Regional (SA) - BRAMS and Eta
 - Global - T213L42
- Observations from GTS (about 400 GB)
- Data is stored in a local disk
 - No access to the HSM
- Server/client are in the same host

Characteristics

- Processor
 - Model: AMD Opterontm Processor 6136
 - Clock: 2.4GHz
- Memory: 74GB
- Hard-disk: 3.5TB
- Operating System
 - Type: Linux
 - Flavor: openSUSE (12.1)

Installation

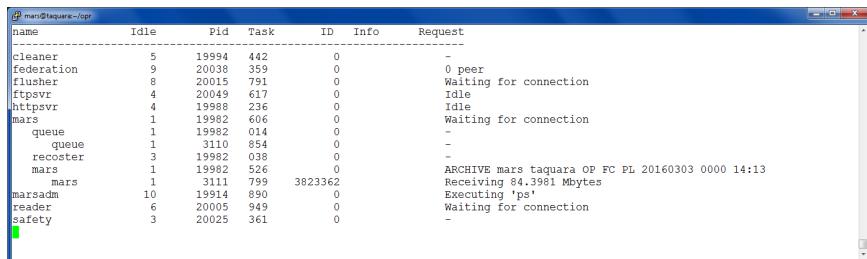
- MARS Server
 - From 7.0.1 to 7.2.5



```
mars@taquara:~  
[marsopr@taquara ~]# marsadm  
698 2016-03-03 18:24:11 (I) ** Start of marsadm ** pid is 15122  
698 2016-03-03 18:24:11 (I) DSHHOME is /home2/marsopr/dhshome/  
marsadm> version  
MARS server 7.2.5 (Production)  
eclib 7.2.6  
grib_api 1.11.0  
odb_api 0.9.22  
marsadm>
```

Fig. 1: Server version

- Models
 - Different scales (regional and global)
 - Regional (BRAMS and Eta) and Global (T213L42)



```
name      Idle   Pid   Task   ID   Info      Request
-----
cleaner   5     19994 442    0    -         -
federation 9     20038 359    0    0 peer   0 peer
flusher   8     20015 791    0    -         Waiting for connection
ftpsvr    4     20049 617    0    -         Idle
httpsvr   4     19988 236    0    -         Idle
mars      1     19982 606    0    -         Waiting for connection
  queue   1     19982 014    0    -         -
  queue   1     3110  854    0    -         -
  recoster 3     19982 038    0    -         -
  mars    1     19982 526    0    -         ARCHIVE mars taquara OP FC PL 20160303 0000 14:13
  mars    1     3111  799    3823362  -         Receiving 84.3981 Mbytes
marsadm   10    19914 890    0    -         Executing 'ps'
reader    6     20005 949    0    -         Waiting for connection
safety    3     20025 361    0    -         -
```

Fig. 2: Archiving a model output (T213L42)

- Observations and satellite
 - Conversions with BUFRDC API

```

#run$more:
Total path for bufr tables is 1
/home2/mars/bufrtbl/000408/bufrtc
BUFR TABLES TO BE LOADED: 8000000000000000000022000.TXT,00000000000000000022000.TXT
1
  BUFR SECTION 0
LENGTH OF SECTION 0 (BYTES)      8
TOTAL LENGTH OF BUFR MESSAGE (BYTES)  37340
BUFR EDITION NUMBER              4
1
  BUFR SECTION 1
LENGTH OF SECTION 1 (BYTES)      22
BUFR MASTER TABLE              0
ORIGINATING CENTRE              43
ORIGINATING SUB-CENTRE          0
UPDATE SEQUENCE NUMBER          0
FLAG (REFERENCE OF SECTION 2)   0
DATA CATEGORY                    0
DATA SUB-CATEGORY               7
LOCAL DATA SUB-CATEGORY        7
VERSION NUMBER OF MASTER TABLE 22
VERSION NUMBER OF LOCAL TABLE  0
YEAR                             2014
MONTH                             3
DAY                               3
HOUR                             12
MINUTE                           0
SECOND                           0
1
  BUFR SECTION 3
LENGTH OF SECTION 3 (BYTES)      9
RESERVED                          0
NUMBER OF DATA SUBSETS          187
FLAG (DATA TYPE/DATA COMPRESSION) 126

DATA DESCRIPTORS (UNEXPANDED)
1 007091

DATA DESCRIPTORS (EXPANDED)
1 001101 STATE IDENTIFIER
2 001102 NATIONAL STATION NUMBER
3 001001 WHO BLOCK NUMBER
4 001002 WHO STATION NUMBER

#run$more:
Total path for bufr tables is 1
/home2/mars/bufrtbl/000408/bufrtc
BUFR TABLES TO BE LOADED: 8000000000000000000022000.TXT,00000000000000000022000.TXT
1
  BUFR SECTION 0
LENGTH OF SECTION 0 (BYTES)      8
TOTAL LENGTH OF BUFR MESSAGE (BYTES)  37400
BUFR EDITION NUMBER              4
1
  BUFR SECTION 1
LENGTH OF SECTION 1 (BYTES)      22
BUFR MASTER TABLE              0
ORIGINATING CENTRE              43
ORIGINATING SUB-CENTRE          0
UPDATE SEQUENCE NUMBER          0
FLAG (REFERENCE OF SECTION 2)   126
DATA CATEGORY                    0
DATA SUB-CATEGORY               7
LOCAL DATA SUB-CATEGORY        7
VERSION NUMBER OF MASTER TABLE 22
VERSION NUMBER OF LOCAL TABLE  0
YEAR                             2014
MONTH                             3
DAY                               3
HOUR                             12
MINUTE                           0
SECOND                           0
1
  BUFR SECTION 2
LENGTH OF SECTION 2              52
REPORT DATA MARK KEY

RDB DATA TYPE                   1
RDB DATA SUBTYPE                 7
YEAR                             2014
MONTH                             3
DAY                               3
HOUR                             12
MINUTE                           0
SECOND                           0
LATITUDE 1                       -21.23
LONGITUDE 1                      -43.77
LATITUDE 2                       -24.92
LONGITUDE 2                      -54.68
NUMBER OF OBSERVATIONS            32
IDENTIFIER                        0

```

Fig. 3: Preparing a data file (BUFR) to MARS

Data (cont.)

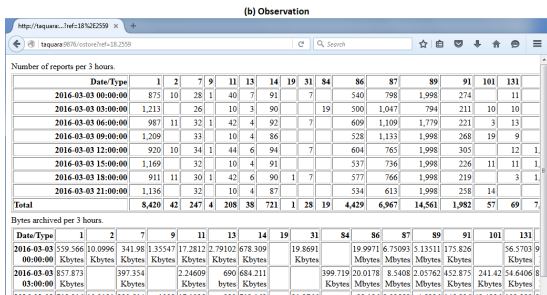
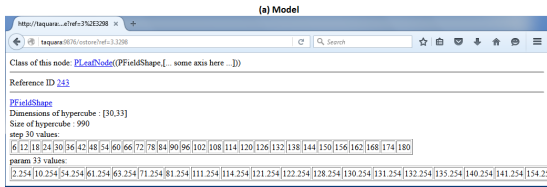


Fig. 4: Data layout. (a) Model; (b) Observation.

- Installation
 - One week training at ECMWF (March, 2012)
 - Support of ECMWF specialists
 - Server and client are working well
 - On-line data access has not been explored (yet!)
- Archive/retrieve
 - BUFR and GRIB data got **success!**
- Works
 - Beginning the use of MARS at CPTEC

- Install
 - Production (and research) environment
- Archive
 - HSM system
- Implement
 - Access data stored in HSM
 - Data requests using Web interfaces
 - Products derived