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*Ministry of Transport, Public Works
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OMI Data Processing Overview and Status

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Status data processing

- This year there have been two instrument anomalies:
 - Anomaly 1: March 3/orbit 61881 – March 16/orbit 62070.
No calibration measurements during anomaly period.
 - Anomaly 2: May 29/orbit 63151 – June 13/orbit 63371.
Instrument switched off, so no data at all during anomaly period.
- Impact on data processing due to both anomalies:
 - For the OSIPS L0->L1b data processing use is made of in-flight, measurement based calibration products that are automatically updated at KNMI on a daily/weekly/monthly basis.
 - Differences between time consecutive calibration products (e.g. bad pixel maps) must be small. Due to anomaly, differences became too big. Automated analysis process has been restarted (manually) three times.
 - No remaining impact on quality of science data.



Status data processing

- Version 1.1.3 of the L0-L1b data processing software is running since February 2010. No plans for software updates on a short term.
- Current data collection is Collection 3 (since 2007).
- All Collection 3 L1b, L2 and higher data products are available on the DISC.
- No L0 reprocessing plans on a short term.
- In case of a changing behaviour of the OMI row anomaly, occasional post-processing of the L1b data is needed (updating flags only). Last update of these flags was in Autumn 2014. No change of row anomaly behaviour since then.



Preparations for a possible Collection 4

- Analysis of all OMI L1b data has started in July 2014. Analysis will take a few years.
- Goal is to find any trends/errors/omissions in the key calibration parameters.
- Based on analysis results a decision will be made to yes/no reprocess all L0 data for a new Collection 4.
- Based on analysis results so far, there are no indications that an immediate reprocessing of L0 data is required. May be at the end of mission.
- An update of the L0-L1b data processor is needed for L0 reprocessing.
- A possible reprocessing for Collection 4 will take a few years.



Hardware at KNMI

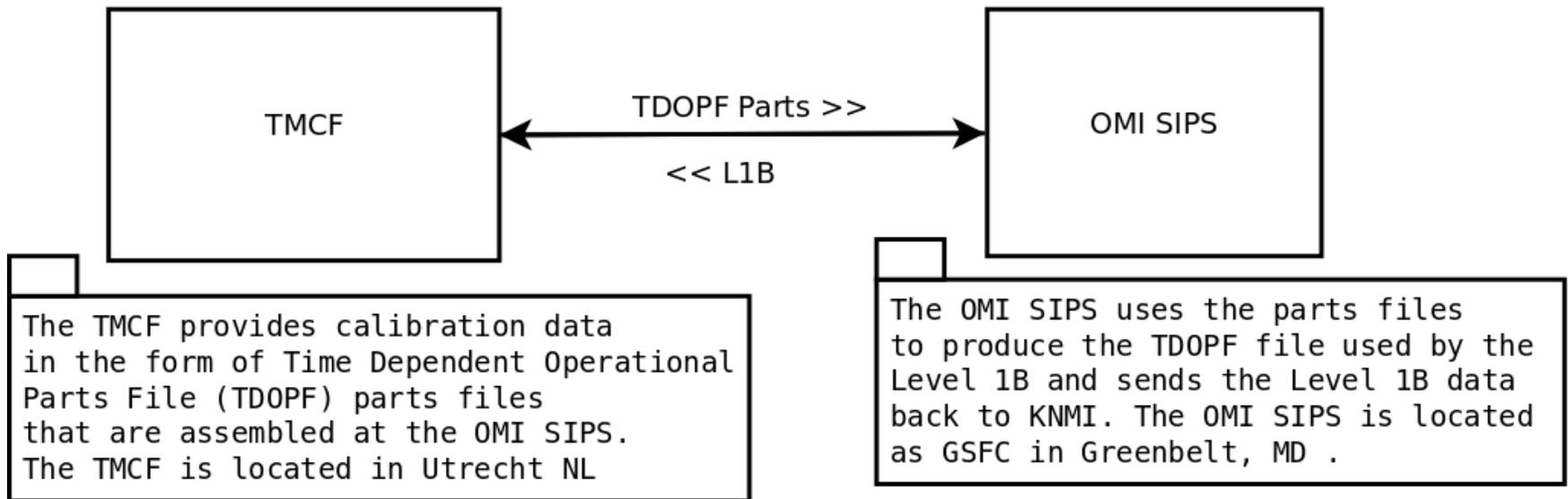
- The current hardware of the OMI Data Processing System (ODPS) is operational since the end of 2014.
- Hardware replacement needed around 2019/2020, in case the AURA mission is still ongoing by then.

Data preservation

- Discussion on budget for data preservation has started. Activity at KNMI will not start before end of mission.



Processing interface between KNMI's Trend Monitoring Computing Facility (TMCf) and the OMI SIPS .





SIPS Level 2 Data Processing Status

Level 2 Reprocessing over past 2 years

Standard Products:

SO₂ – Switched to use the Principal Component Analysis algorithm

NO₂ – Uses improved Slant Column Densities

US Aerosols – general improvement

OMMYCLD – Joint OMI MODIS Cloud product

Research Products:

OMMYGEO – OMI/MODIS ground pixel mappings, will be used with aerosol

OMACA – Aerosol Above Clouds

CHCHO(Glyoxal) – New retrieval

Reprocessing campaigns planned for this year:

OMCLD02, OMAERO, OMNO2A, OMDOAO3

OMTO3 v9

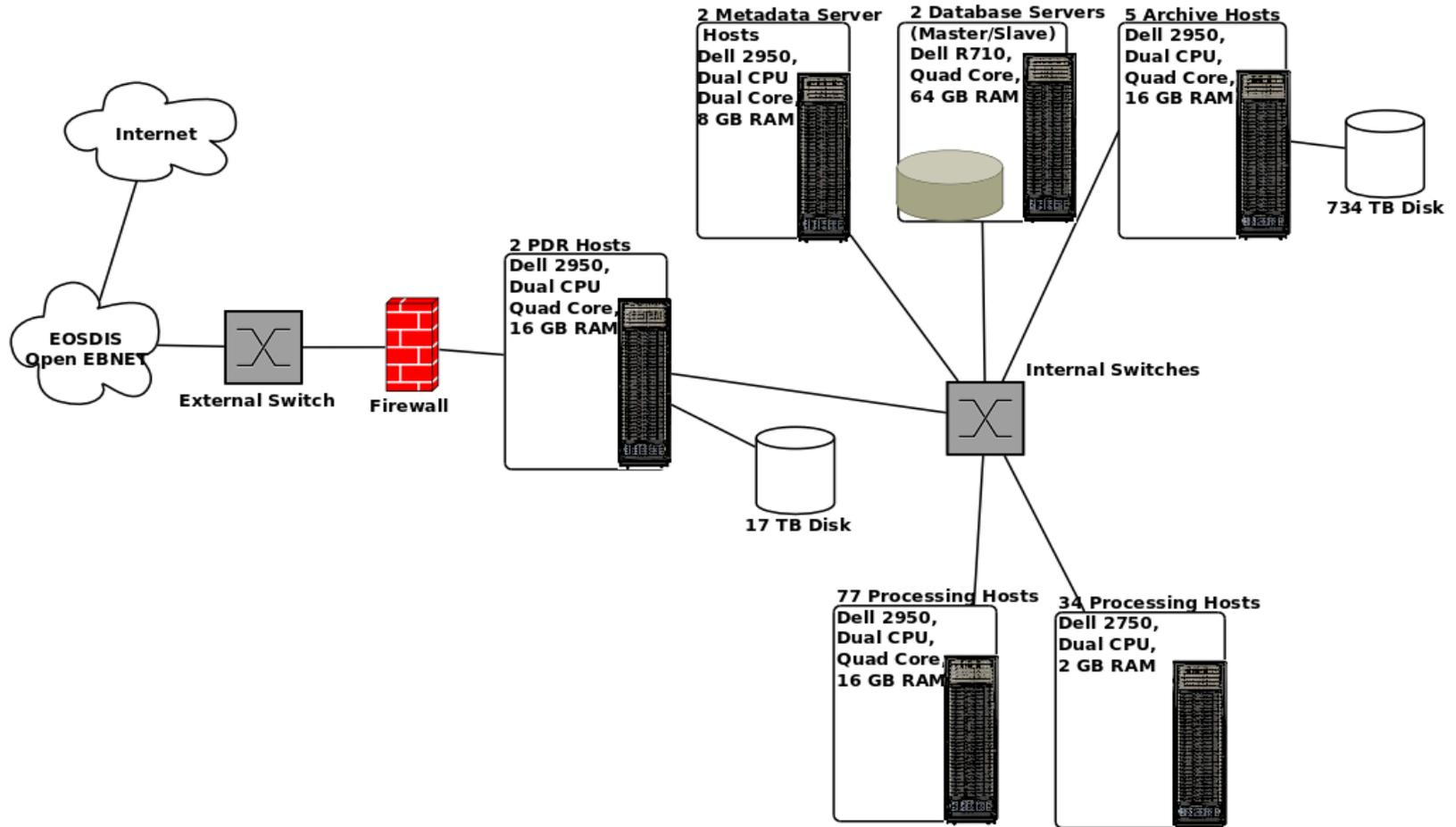


Hardware at the OMI SIPS

- Processing hosts are Dell 2950 circa 2008 with 16 GB RAM.
- CPU missing avx instruction set which can help optimize for matrix operations.
- Currently 734 TB of Disk space (shared between OMI and OMPS).
- Backend network 10GB though hosts use 1GB.
- DB Host was upgraded in 2012 to a Dell R710 , 64GB ram.
- Plan on adding new Dell 730 hosts (128 GB RAM) this year .



OMI/Ozone SIPS Hardware Architecture





OS and Software change plans over the next year

Upgrade OS to 64bit (CentOS 7):

- Most existing 32bit science software will continue to run (statically linked).
- We plan to convert science applications to 64 bit as they are delivered.
- Should be better for data preservation as 32bit support is fading.
- There are some problems running statically linked 32 bit software on 64 bit operating system. The problems are related to hardware and file system access and is limited to certain system calls (eg fstat).
- Switch from PGI Fortran compiler to gfortran compiler .



Multi Instrument Products and Ancillary Inputs

- OMMYCLD and OMMYDGAE0 use MODIS Aqua data:
 - Access MODIS data using the XML/SOAP interface to find granules for the given orbit (or time period). This is done at run time; while it works well but sometimes results in failures when system down for maintenance.
 - Note we share the same network with MODIS so access is quick and dynamically pulling the data limits the impact on disk space requirements.
 - MODIS latency is an issue ; we usually wait 1-2 weeks to ensure the standard data is available since there is no latency requirement for the products.
- The US OMI Aerosol product (OMAERUV) uses climatology for forward processing and AIRS CO data for reprocessing. Note that the AIRS data is only ancillary data and data is archived locally.
- The US Ozone product (OMTO3) is planning on using the GMAO's MERRA-2 data for processing ozone. The same strategy as the Aerosol product will be used; a climatology for forward processing and the actual data for reprocessing.



Data Preservation

- Activities dispersed among teams.
- Work has not formally begun, but current activities overlap.
- Are only standard products included in the scope of this activity?
OMI has some research products that have been used in papers and are available at the AVDC .



Data Preservation

Activity	Primary Responsibility	Notes/Status
Preflight/Pre-Operations Calibration	KNMI	
Science Data Products	SIPS	Delivered to GES DISC. Research products at AVDC, should they be included?
Science Data Product Documentation	Science Team	Delivered to GES DISC as README, ATBDs and OMI Data Users Guide. Is more detailed algorithm descriptions needed?
Mission Data Calibration	KNMI/US Calibration team	
Science Data Product Software	SIPS	Most stored in SIPS configuration management system.
Science Data Product Inputs	SIPS/Science Team	Most in CM, documentation and code is sparse.
Science Data Product Tools	Science Team/GES DISC	Delivered to and provided by GES DISC.
Deliverables Checklist	SIPS/GES DISC	TBD



TROPOMI is the future.
Current launch beginning of
2017.



sentinel-5p

