

IASI Operational Software

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IASI Operational Software

- Context
- OPS design
- Using the OPS
- Porting the OPS
- OPS benchmark

Context

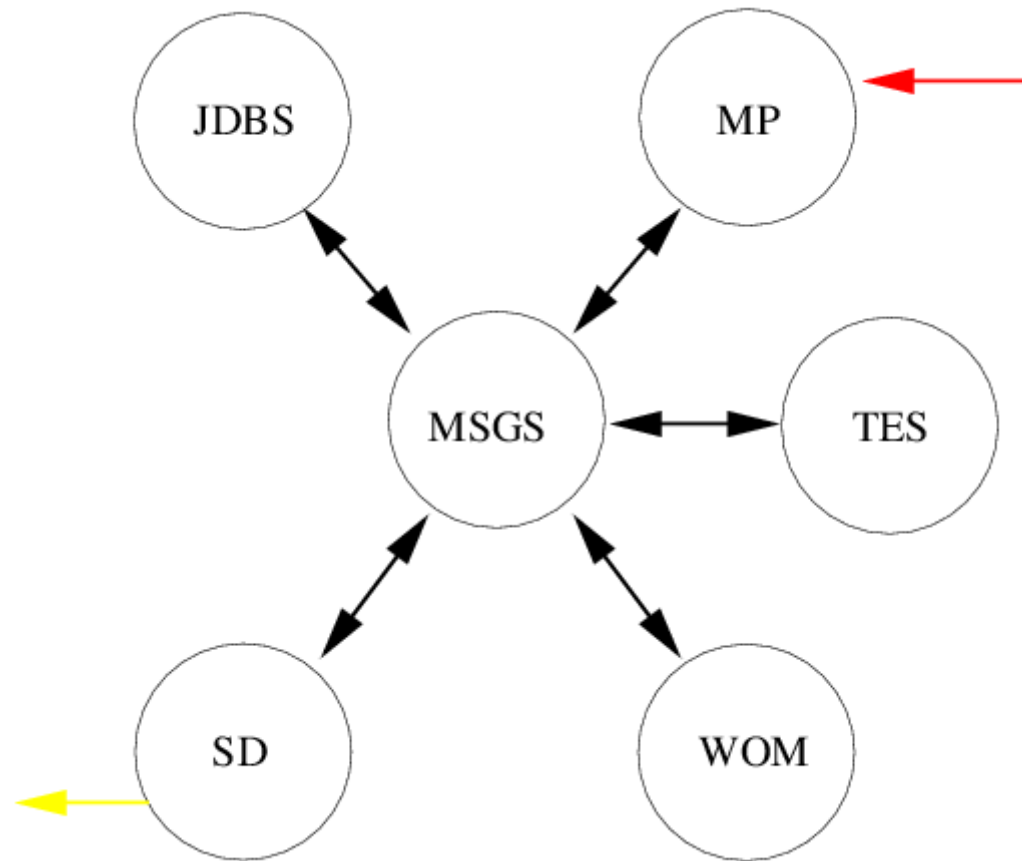
- IASI OPS is part of the EUMETSAT CGS
- IASI OPS developed by CNES & Thales
- SAFNWP has been authorized to adapt IASI OPS for direct reception, and to redistribute it to AAPP users

OPS design (1)

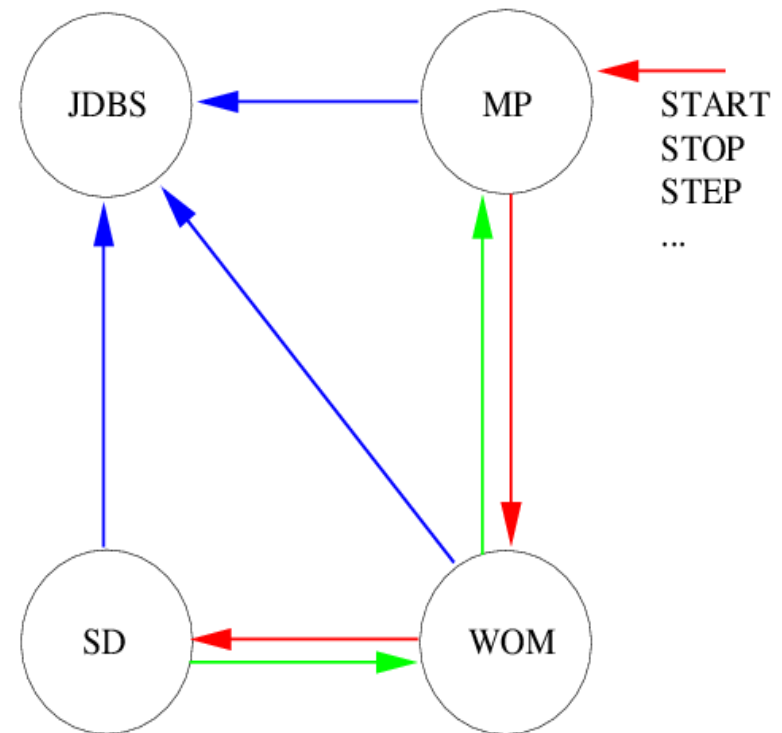
- French C & C++ (40 % / 60 %)
- POSIX threads
- System calls
- Developed for IBM power4
- Advanced industrial framework

OPS design (2)

- MP : main process
- MSGS : message server
- WOM : work order manager
- SD : data server
- JDBS : log server
- TES : time event scheduler



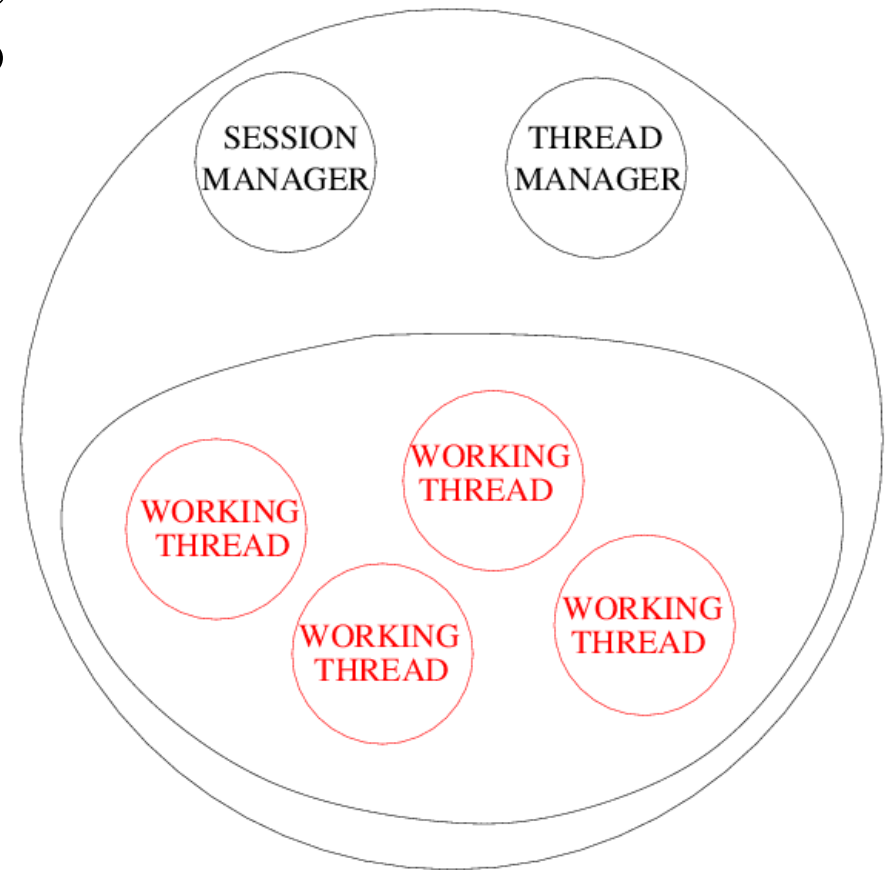
OPS design (3)



- MP starts and stops all other processes and collects commands
- WOM interprets commands
- SD executes commands

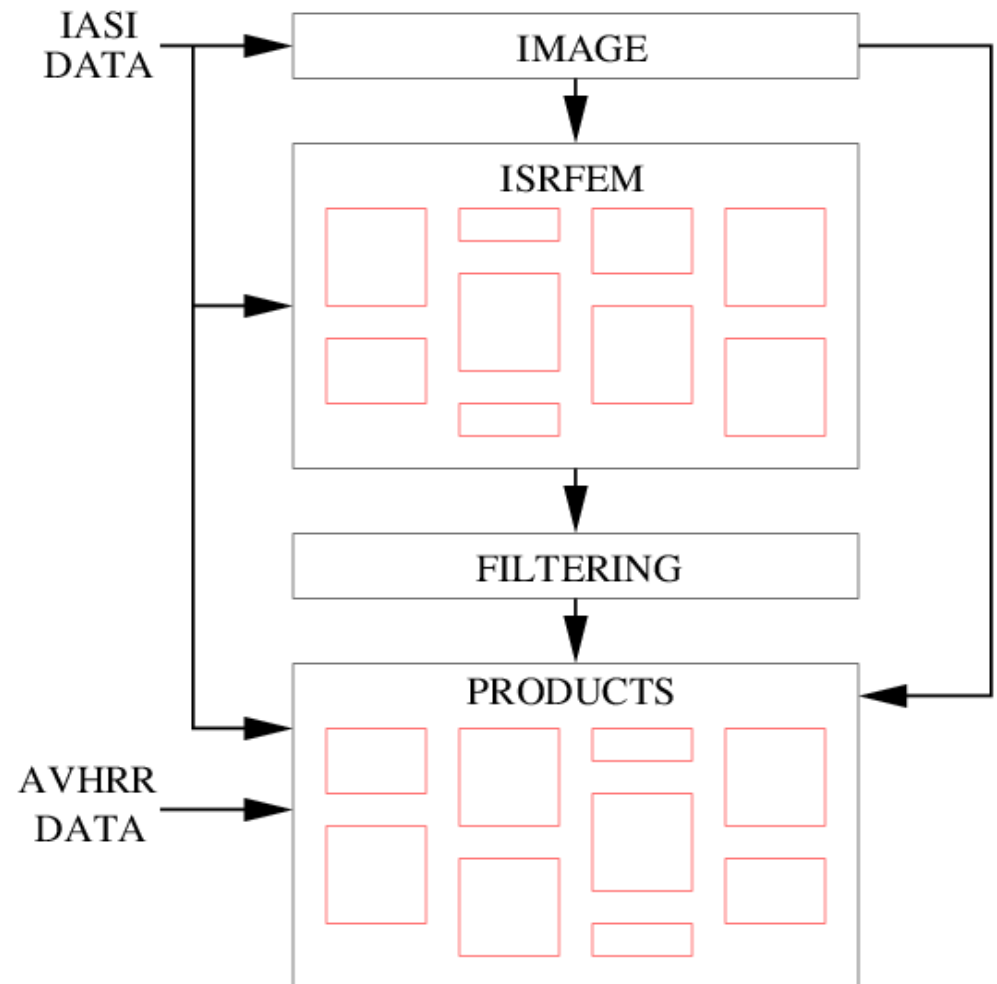
OPS design (4) - Data server

- Session manager handles incoming messages and subdivides them into tasks
- Thread manager dispatches tasks to working threads
- Tasks fall into two distinct categories :
 - *Line* : such tasks can be executed concurrently
 - *Rendez-vous* : such a task must be run separately



OPS design (5) - execution flow

- IMAGE : radiometric calibration
- ISRFEM : interferometer axis position / spectral calibration / apodisation functions
- FILTERING : of the interferometer axis position
- PRODUCTS : 1A / 1B / 1C



Using the OPS (1)

INPUTS

- Level 0 products (from HRPT), PFS L0
- AVHRR 1B (from HRPT), PFS L1B
- Context file (recursive data), binary
- Spectral database (EUMETSAT, TBD), binary
- Configuration files (EUMETSAT, TBD), binary
- Command + Work-Order, xml

Using the OPS (2)

OUTPUTS

- Report file, xml
- Log/HKTM files
- Context file, binary
- Engineering data, PFS
- Verification data, PFS
- 1A, 1B, 1C products, PFS

Using the OPS (3)

```
philou@caladan: /home/philou
Fichier  Édition  Vue  Terminal  Aller à  Aide
$ find .
./IASI_1_wo_002
./aux_data
./aux_data/IASI_BRD_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_200209101252Z
./aux_data/IASI_BRD_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_200209101252Z
./aux_data/IASI_GRD_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_XXXXXXXXXXXX
./aux_data/AVHR_XXX_1B_M01_20020808181949Z_20020808182249Z_N_T_20020808
./aux_data/AVHR_XXX_1B_M01_20020808182249Z_20020808182549Z_N_T_20020808
./aux_data/AVHR_XXX_1B_M01_20020808182549Z_20020808182849Z_N_T_20020808
./aux_data/IASI_ODB_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_XXXXXXXXXXXX
./aux_data/XXXX_DBT_XX_M01_20021008025258Z_XXXXXXXXXXXXXXXX_V2_200210081657
./aux_data/XXXX_DSV_XX_M01_20021008162458Z_20021008163458Z_200210081713
./aux_data/XXXX_SVM_XX_M01_20020101030000Z_20040115030000Z_200401100300
./aux_data/IASI_CTX_XX_M01_20021008025258Z_XXXXXXXXXXXXXXXX_200210081657
./unproc_data
./unproc_data/IASI_XXX_00_M01_20020808182246Z_20020808182550Z_N_T_20020
./product_model
./product_model/IASI_ENG_XX_M01_20020808181957Z_20020808182253Z_N_0_200
./product_model/IASI_VER_XX_M01_20020808181957Z_20020808182253Z_N_0_200
./product_model/IASI_XXX_1A_M01_20020808181957Z_20020808182253Z_N_0_200
./product_model/IASI_XXX_1B_M01_20020808181957Z_20020808182253Z_N_0_200
./product_model/IASI_XXX_1C_M01_20020808181957Z_20020808182253Z_N_0_200
$ cat IASI_1_wo_002
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE PPF_Work_Order SYSTEM "PPF_Work_Order.dtd">
<PPF_Work_Order>
<ProcessingType>L1a</ProcessingType>
<SensingStart>20020808182250Z</SensingStart>
<SensingStop>20020808182550Z</SensingStop>
<TimeIntervalFlag>Full</TimeIntervalFlag>
<TimeIntervalCounter>1</TimeIntervalCounter>
<UnProcData>input/unproc_data/IASI_XXX_00_M01_20020808182246Z_20020808182550Z_N_T_20020808182550Z</UnProcData>
<AuxData>input/aux_data/AVHR_XXX_1B_M01_20020808181949Z_20020808182249Z_N_T_20020808182249Z</AuxData>
<AuxData>input/aux_data/AVHR_XXX_1B_M01_20020808182249Z_20020808182549Z_N_T_20020808182549Z</AuxData>
<AuxData>input/aux_data/AVHR_XXX_1B_M01_20020808182549Z_20020808182849Z_N_T_20020808182849Z</AuxData>
<AuxData>input/aux_data/XXXX_SVM_XX_M01_20020101030000Z_20040115030000Z_20040110030000Z_FDFX_FDGEDEVENT</AuxData>
<AuxData>input/aux_data/XXXX_DBT_XX_M01_20021008025258Z_XXXXXXXXXXXXXXXX_V2_20021008165703Z_FDFX_METDOBTUTC</AuxData>
<AuxData>input/aux_data/XXXX_DSV_XX_M01_20021008162458Z_20021008163458Z_20021008171313Z_FDFX_FDORBPREDI</AuxData>
<AuxData>input/aux_data/IASI_BRD_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_20020910125223Z_IASI_0000000001</AuxData>
<AuxData>input/aux_data/IASI_GRD_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_XXXXXXXXXXXXXXXX_IASI_0000000000</AuxData>
<AuxData>input/aux_data/IASI_ODB_XX_M01_20020101181957Z_XXXXXXXXXXXXXXXX_XXXXXXXXXXXXXXXX_IASI_0000000000</AuxData>
<AuxData>input/aux_data/IASI_CTX_XX_M01_20021008025258Z_XXXXXXXXXXXXXXXX_20021008165703Z_IASI_XXXXX01001_1</AuxData>
<ProdModel>input/product_model/IASI_XXX_1A_M01_20020808181957Z_20020808182253Z_N_0_20030320120000Z</ProdModel>
<ProdModel>input/product_model/IASI_XXX_1B_M01_20020808181957Z_20020808182253Z_N_0_20030320120000Z</ProdModel>
<ProdModel>input/product_model/IASI_XXX_1C_M01_20020808181957Z_20020808182253Z_N_0_20030320120000Z</ProdModel>
<ProdModel>input/product_model/IASI_ENG_XX_M01_20020808181957Z_20020808182253Z_N_0_20030320120000Z</ProdModel>
<ProdModel>input/product_model/IASI_VER_XX_M01_20020808181957Z_20020808182253Z_N_0_20030320120000Z</ProdModel>
</PPF_Work_Order>
$
```

Using the OPS (4)

```
philou@caladen: /home/philou
Fichier  Édition  Vue  Terminal  Aller à  Aide
$ ls -l *20040427_1421* *.log
-rw-r--r--  1 philou  bon           851 Apr 27 14:40 CMD_20040427_142137
-rw-r--r--  1 philou  bon        15538 Apr 27 14:40 HKTH_20040427_142137
-rw-r-----  1 philou  bon         2808 Apr 27 14:40 LOG_20040427_142147
-rw-r-----  1 philou  bon       167732 Apr 27 14:40 SD.log
-rw-r-----  1 philou  bon        19464 Apr 27 14:41 TRACE_20040427_142147
-rw-r-----  1 philou  bon          0 Apr 27 14:21 MON.log
$ cd ../to_pgf
$ ls -l
total 336336
-rw-r-----  1 philou  bon         7182 Apr 27 14:40 IASI_1_wo_002_001.rpt
-rwxr-x--x  1 philou  bon       240112 Apr 27 14:40 IASI_CTX_XX_M01_20040427144058Z_XXXXXXXXXXXXXXXXXX_20040427144058Z_IASI_XXXXX01001_00002
-rw-r-----  1 philou  bon      2236272 Apr 27 14:40 IASI_ENG_XX_M01_20020808182254Z_20020808182549Z_N_0_20040427143905Z
-rw-r-----  1 philou  bon      4773242 Apr 27 14:40 IASI_VER_XX_M01_20020808182254Z_20020808182549Z_N_0_20040427143906Z
-rw-r-----  1 philou  bon      52266020 Apr 27 14:40 IASI_XXX_1A_M01_20020808182254Z_20020808182549Z_N_0_20040427143903Z
-rw-r-----  1 philou  bon      52266020 Apr 27 14:40 IASI_XXX_1B_M01_20020808182254Z_20020808182549Z_N_0_20040427143846Z
-rw-r-----  1 philou  bon      60240096 Apr 27 14:40 IASI_XXX_1C_M01_20020808182254Z_20020808182549Z_N_0_20040427143849Z
$
```

IASI OPS tools

- Libraries & programs for reading, displaying, converting configuration files.
- Library for reading, displaying IASI level 1C
- Library, programs to convert from AAPP 1B AVHRR to PFS 1B AVHRR

Porting the OPS

- System dependent features
- ESSL (IBM scientific library) :
 - FFTW (C)
 - LAPACK (F77)
 - NCAR math library (F77)
- Metop Lib : AAPP navigation routines

OPS benchmark

| Platform | Seconds / 3 minutes |
|----------------------------|---------------------|
| altix-4cpu-linux-gcc-3.2 | 164. |
| altix-4cpu-linux-icc | 92. |
| v40z-4cpu-linux-gcc-3.3 | 99. |
| v40z-4cpu-linux-icc | 105. |
| v40z-4cpu-solaris-cc | 123. |
| v40z-4cpu-solaris-gcc-3.3 | 122. |
| pc-2cpu-2Ghz-linux-gcc-3.4 | 235. |
| ibm-4cpu-power4 | 91. |

OPS port validation

- Validation against various cases provided by CNES
- Sounder and imager radiances reproduced with utmost accuracy
- Geolocation data reproduced with 1/1000 degree error
- In the process of validating against EUMETSAT test orbit