ESAS upgrades in SAS

Carlos GABRIEL + S3MT + SAS WG

XMM-Newton Science Operations Centre – ESAC / ESA
SAS development, future plans, and expected ESAS upgrades in SAS

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XMM-Newton Science Operations Centre – ESAC / ESA
* due to 32- and 64-bit versions number of binaries released almost doubled wrt SAS 10

### Table of SAS 11.0.0 builds and supported Operating Systems and Versions

<table>
<thead>
<tr>
<th>Build on</th>
<th>Processor</th>
<th>Kernel</th>
<th>gcc/libc</th>
<th>File to download</th>
<th>Tested to work as well on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux Red Hat 9</td>
<td>Intel</td>
<td>2.6.20</td>
<td>32 bit</td>
<td>4.3.2/2.7.2</td>
<td>sas_11.0.0-RHEL-9-32.tgz</td>
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<tr>
<td>Linux Red Hat Enterprise (RHEL) 4</td>
<td>Intel</td>
<td>2.6.9</td>
<td>32 bit</td>
<td>4.3.2/2.7.4</td>
<td>sas_11.0.0-RHEL4-32.tgz</td>
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<tr>
<td>Linux Red Hat Enterprise (RHEL) 5</td>
<td>Intel</td>
<td>2.6.18</td>
<td>32 bit</td>
<td>4.3.2/2.7.4</td>
<td>sas_11.0.0-RHEL5-32.tgz</td>
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<tr>
<td>Linux Red Hat Enterprise (RHEL) 5.1</td>
<td>Intel</td>
<td>2.6.18</td>
<td>64 bit</td>
<td>4.3.2/2.7.4</td>
<td>sas_11.0.0-RHEL5.1-64.tgz</td>
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<tr>
<td>Linux Open SUSE 11.2</td>
<td>Intel</td>
<td>2.6.31</td>
<td>32 bit</td>
<td>4.3.2/2.10.1</td>
<td>sas_11.0.0-openSUSE11.2-32.tgz</td>
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<tr>
<td>Linux Open SUSE 11.2</td>
<td>Intel</td>
<td>2.6.31</td>
<td>64 bit</td>
<td>4.3.2/2.10.1</td>
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<tr>
<td>Linux Fedora 8</td>
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<td>sas_11.0.0-Fedora8-32.tgz</td>
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<td>Linux Fedora 8</td>
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<td>4.3.2/2.7.2</td>
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<td>Linux Fedora 12</td>
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<td>2.6.31</td>
<td>32 bit</td>
<td>4.3.2/2.11.1</td>
<td>sas_11.0.0-Fedora12-32.tgz</td>
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<td>Linux Ubuntu 8.04</td>
<td>Intel</td>
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<td>32 bit</td>
<td>4.3.2/2.7.2</td>
<td>sas_11.0.0-Ubuntu8.04-32.tgz</td>
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<tr>
<td>Scientific Linux CERN 4.05</td>
<td>Intel</td>
<td>2.6.8</td>
<td>32 bit</td>
<td>4.3.2/2.3.4</td>
<td>sas_11.0.0-Scientific Linux 4.05-32.tgz</td>
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<tr>
<td>Solaris 8 (Sparc)</td>
<td>Sparc</td>
<td>Solaris 8</td>
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<td>4.3.2/2.3.4</td>
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<tr>
<td>Mac OS X 10.5.8 (Darwin 9.8.0, Leopard)</td>
<td>Intel</td>
<td>Darwin 9.8</td>
<td>32 bit</td>
<td>4.3.2/3.2.4</td>
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<tr>
<td>Mac OS X 10.5.8 (Darwin 9.8.0, Leopard)</td>
<td>PowerPC</td>
<td>Darwin 9.8</td>
<td>32 bit</td>
<td>4.3.2/3.2.4</td>
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<td>Mac OS X 10.6.6 (Darwin 10.6.0, Snow Leopard)</td>
<td>Intel</td>
<td>Darwin 10.6.6</td>
<td>32 bit</td>
<td>4.3.2/3.2.4</td>
<td>sas_11.0.0-Darwin-10.6.0-32.tgz</td>
</tr>
</tbody>
</table>

### Virtual Machines for SAS 11.0.0 (VM4SAS11)

<table>
<thead>
<tr>
<th>Assembled on</th>
<th>File to download</th>
<th>tested to work on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux Fedora 14 32 bit</td>
<td>VM4SAS11-32.27d (3.01 GByte)</td>
<td>Windows XP and Vista, Linux and Mac OS X</td>
</tr>
<tr>
<td>Linux Fedora 14 64 bit</td>
<td>VM4SAS11-64.17d (4.02 GByte)</td>
<td>Windows XP and Vista, Linux and Mac OS X</td>
</tr>
</tbody>
</table>
SAS Building and Development Environment

Linux

- sasdmz01 - FC 12 – 32 bits
  Dell Optiplex 960
  8 GB RAM - Intel Core 2 Quad 2.83 GHz
  256 GB HD

- xmmls11 - RH 9 – 32 bits
  Dell PowerEdge 2650
  2 GB RAM - 2 CPU Xeon P-IV 2.8 GHz
  6 x 146 GB HD Raid 5

Mac OS X

- xmacserver
  10.5.8 - Leopard (Intel)
  4 GB RAM
  Quad Core Intel Xeon 2.8 GHz - 1 TB

- xmac01
  10.6.5 - Snow Leopard (Intel)
  2 GB RAM
  Intel Core 2 Duo 2.16 GHz - 250 GB

- xmac02
  10.5.8 - Leopard (PPC)
  2.5 GB RAM
  Power PC 4 xG5 2.5 GHz - 232.9 GB HD

Solaris

- xvsas04 - Solaris 8
  Sun Blade 1000 - 4 GB RAM
  2 CPU 1000 MHz - 36 + 36 GB HD

- xmmwv16 - Solaris 8
  Sun Blade 1000 - 1 GB RAM
  1 CPU 750 MHz - 36 + 36 GB HD

SAS development, future plans and expected ESAS upgrades in SAS | Carlos Gabriel | BGWG Meeting | Leicester, UK - 6/3/2012
EPIC

- new spatially dependent PN CTI/gain > finished - DONE
- catcorr task - boresight rectification using catalogues > finished - DONE
- eboxdetect upgrade (solving problems for slews) > finished - DONE
- epnoise - new algo to reject soft X-ray noise in PN > basically done - testing by MPE needed - still
- a background flare filtering task > bkgfilter basically done - DONE
- 2D-PSF as default mode > re-normalization of components done - DONE
  new spoke keywords in CCF needed <-> CAL upgrade
- pile-up corrections > work started - simulator built - ~ September
  trainee at ESAC working on it
- refinement of PN event time jumps recognition > agreement MPE - SOC - “easy” to be done
- specgroup upgrade > “easy” to be done
- emosaicproc and emosaicprep upgrades > too complex - splitting for Mosaic and overlapping cases
  see discussion
- ESAS general upgrade > re-written in F90 + CAL-DB into normal CCFs
  status to be clarified <-> CAL upgrade needed - still
RGS and OM

- RGS heliospheric corrections
  > ready - DONE

- RGS wavelength scale correction due to RGA tilt (?)
  > temperature & solar aspect angle dependency
  using catcorr? #CAL-Sci input needed

- RGS LSF components separation
  > out of rgsrcmfg & into CAL >> calview

- RGS: provide separate arf/rmf response matrix components
  > work started together with LSF

- RGS bad pixel filtering refinement
  > criteria for hot pixels / columns wrong for
  bright sources # CAL-Sci input needed

- RGS spatial imaging of emission lines from extended sources
  > images with less background than EPIC
  images in narrow energy range - schedule?

- OM-SAS upgrades (omdetect + omqualitymap flagging)
  > Partially done

GENERAL

- graphical I/F for xmmextractor
  > no clear schedule for implementation yet

Planning to go into release track mode mid March
Future of ESAS

>> change of emask discovered to break ESAS software after SAS 11 release (by SS)
>> ESAS upgraded promptly by SS + esas-caldb upgraded at same time (no public info on this)
>> after re-validation testing (on Linux machine) SAS 11.0.1 patch released

... a week after >> tests on MacOS (Snow Leopard) showing problems with ESAS-swcx (seg faults)
(I recall: SAS 11.0 = binaries for 15 platforms + 2 VMs !)

Conclusions - endorsed by BGWG 2011:

- we need to make ESAS tasks MORE “SAS conform”, including harness testing
  >> re-writing everything in C++/F90?  GOF: “(75+-25)% will be recoded by October ... 2011”

- big effort by KK (+ others at GOF?) for a reduction of calibration files (122 >> 25 !!, 2.8 GB >> 1.4 GB !!)
  >> should be followed by real conversion to CCFs under Configuration Control of SAS CCB
ESAS - Upgrades for the next release

Major
- MOS processing will use 5 eV spectral channels >> will require upgraded CalDB files
- Adaptive smoothing tasks now provide additional information >> Image and histogram of FWHM of smoothing kernel

Minor
- A number of relatively minor bug fixes >> None affect quantitative results

Missed
- Conversion to F90/95 - process has begun
- Conversion from CalDB to CCF << Senior Review and Trend data production conflicted

Other
- Trend data processing now works
- Archive mostly now populated
- Documentation partially completed
- Trend data tools partially completed