EARLY GOF PERSPECTIVES

Brendan Perry, XMM-Newton 20th Anniversary Goddard Symposium, October 21-22, 2019

THE “PRE-GOF” DAYS: 1992-1999

The HEASARC/OGIP “early position”:

- Provide some software/science/analysis expertise.
- Establish the mirroring of XMM data in the HEASARC archive for GO access.
- Create a GOF as single point of contact for US Guest Observers.

“PROVIDE SOME SOFTWARE/SCIENCE/ANALYSIS EXPERTISE FOR XMM”

Dean Hinshaw and I arrived to work ‘for’ the Leicester SSC in 1997

Our Assignment:

Support ~15 of the then ~250 SAS tasks.

Dean: 7 SAS tasks

Brendan: 8 SAS tasks

In addition:

Dean:

- ***Evselect***
- *Data Subspace*
- *Dsslib/ssclib/sorting*

Brendan:

- *Plotting/quicklook tasks*
- *Pipeline Processing modules*
- ***Data Transfer System (DTS)***

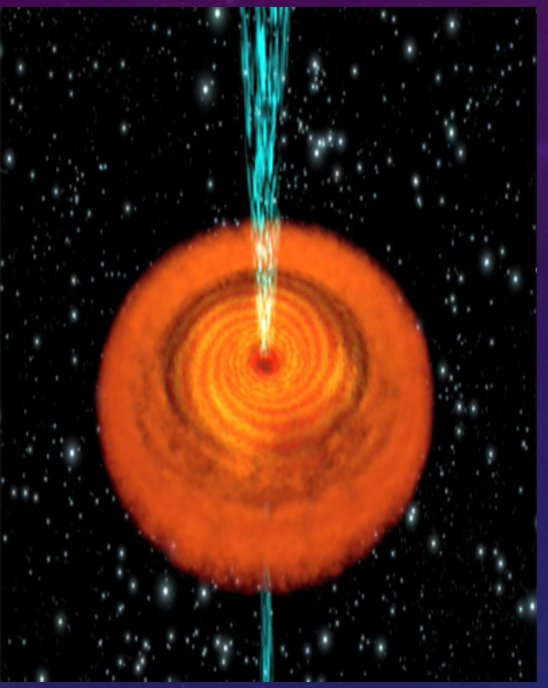
OUR “HIDDEN AGENDA”…

- Advocate for OGIP-compliant FITS files
- Advocate for certain platforms to be supported.

The HEASARC/OGIP wanted potential XMM FITS products analysis/ manipulation with FTOOLS (in addition to, or complementary with, the SAS).

The HEASARC/OGIP, desired phase out the use of DEC Alphas (and VAXes), and transition to (at minimum) Sun Workstations and Linux (MacOSX being non-existent in the late-90s).

TURBULENT TIMES AND THREADING NEEDLES 1

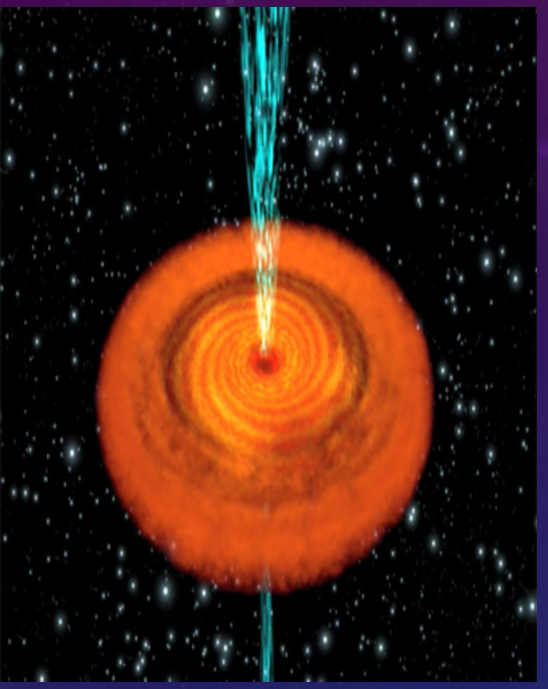


Some issues affecting a more successful rollout of SAS:

Using ”Legacy” machines and software reuse.

- Algorithms originally from, e.g. ROSAT, in FORTRAN and IDL
- Problems ‘playing nice’ with core XMM API (C/C++)
  - Required proprietary NAG FORTRAN compiler, pre-gcc/gfortran
  - The NAG FORTRAN was ’buggy’ on Solaris/DEC, then MacOSX
- Linux boxes became cheaper and more ‘flexible’
  - DEC Alpha=$30k in 1995, Our Sun Ultra 1s=$15k in 1997*

TURBULENT TIMES AND THREADING NEEDLES 2

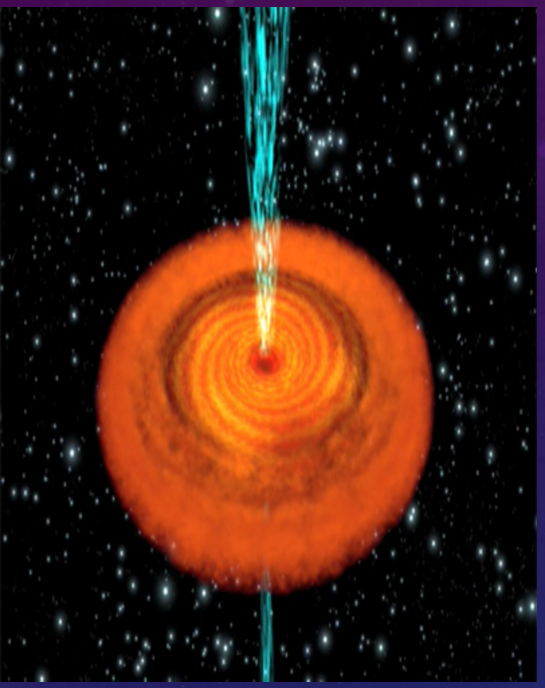


Some issues affecting a more successful rollout of SAS:

Size of RAM for average user at launch

- 1999: 64MB RAM was standard, even less on laptops
- Our LUX SSC Sun Ultra 1s: 167Mhz and 384MB RAM
- Big Issue: Reading full event lists + CCFs and/or multiple observations was ‘taxing’ on users’ systems
  - “Low Memory Option”

TURBULENT TIMES AND THREADING NEEDLES 3



Some issues affecting a more successful rollout of SAS:

Average internet speeds:

- 1999: 56k modem = ~12 hours per 300MB ODF!
- 2000: Dedicated SOC<->LUX line (128kbps) = ~6 hours per ODF
- 2006: “The 3TB drive” for 2XMM reprocessing

GSFC XMM GOF CONTRIBUTIONS TO MISSION 'SOLUTIONS' 1

- Mirroring XMM data and distributing CD-ROMs to US Guest Observers
  - 2000: Mailed CD-ROMs from SOC were duplicated, then sent to GOs, then eventually added to public archive
  - 2008-present: Daily rsync of SOC data
- Advocating Linux/Mac OSX builds and acting as a test bed for XMM SAS compilation. Historic 'highlights' include:
  - SAS 5, December 2000 = tru64/RH 6.2/SuSE 64/Solaris 2.6
  - SAS 6, March 2004 = OSF1/RH 7.1/FC9/EL3/SuSE 8.2/Solaris 2.8, *Mac OSX introduced (NAG finally ported to OSX!)*
  - SAS 8, June 2006 = Linux/Mac OSX/Solaris 2.8/Windows VM, *OSF discontinued*
  - SAS 11, February 2011 = Linux/Mac OSX/SunOS 5.8/Windows VM, *Introduced 32/64bit versions*
  - SAS 12, May 2012 = Linux/Mac OSX/Windows VM, *SunOS discontinued, 32/64 bit*
  - SAS 16, January 2017 = Linux/Mac OSX/Windows VM, *first GFORTRAN version*
  - SAS 17, June 2018 = Linux/Mac OSX/Windows VM, *32 bit version discontinued*

GSFC XMM GOF CONTRIBUTIONS TO MISSION ‘SOLUTIONS’ 2

- GOF Helpdesk (10’s of users helped monthly with software/science)
- Continued ESAS software (SAS-compliance/CCF support/New!)
- Continued XMM SAS task support (down to 3 tasks besides ESAS)
- Hera integration
- Trend Data archive (timeseries contributions from solar missions)
- Sparsebundle/Docker Container development (New!)
  - Plug and play external packaged + compiler environment
  - Provides devel-level SAS on *any* computer
  - Complements our continued XMM SAS devel test bed activities

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