INAF-IBM COLLABORATION AND THE OPENPOWER FOUNDATION

ANDREA BULGARELLI - INAF ADRIANO DE ROSA - INAF

INAF-IBM COLLABORATION

- Collaboration with IBM started in summer 2014
 - **CTA** Real-Time Analysis
 - S824L server + GPU NVIDA + FPGA Nallatech
 - IBM Labs
- INAF in the OpenPower Foundation (Academic Membership): April 2015

CTA REAL-TIME ANALYSIS



THE CTA REAL-TIME ANALYSIS

- The CTA/Real-Time Analysis must be capable of issuing alerts from flaring events in 30 seconds
 - Full gamma-ray analysis (from data acquisition to alert generation):
 - background rejection
 - maps generation
 - maximum likelihood analysis
 - gamma-ray flare check and generation
- Data rate: 8 GByte/s
- For telescope repointing





FPGA NALLATECH

- 385-A7

- NIC mechanical form factor
- Typical application $\leq 25W$
- Altera Stratix V A7 FPGA
- Network-enabled with (2)
 SFP+ network ports
- DDR3 2 x 4GB SDRAM



RESULTS (ANDREA ZOLI - INAF) WILL BE PUBLISHED IN THE ICRC CONFERENCE THIS SUMMER

IBM LABS



IBM



- IBM Labs Network and INAF:
 - David Turek
 VP of Exascale Computing
 - Bruce Elmegreen
 Astrophysics programs coordinator
 - Bruno Spruth
 Boeblingen Labs Manager
 - Bharat Sukhwani
 Yorktown Communication Research
 - Thomas Roewer Communication Design
 - Joerg-Sthepan Vogt
 Boeblingen FPGA Development
 - Bruce Wile
 Poughkeepsie Hardware Design
 - Brian Allison
 Rochester Logic Design Engeneer
 - Christoph Hagleitner ZurichResearchLabs



12 labs. 6 continents.



- February 2015: Technical meeting in Bologna between IBM and INAF to share knowledge about IBM technology and the CTA Real-Time Analysis
 - 10 people from INAF
 - 6 people from IBM
 - Andrea Negro (Responsabile divisione server di IBM)
 - Cecilia Carniel (Responsabile ecosistema Power - sistemi low end)
 - Silvia Onchini
 - Alberto Damigella
 - Bruce Wile, responsabile dell'hardware design dei server Power
 - Brian Allison, ingegnere che lavora sul logic design
 - 1 person from VARGROUP



OPENPOWER



Fueling an Open Development Community



| | | Acceleration | Sall JUSE CA |
|---|------------------|--------------|--------------------|
| ASTRI | Academic / Assoc | Research | Hong Kong |
| CINECA | Academic / Assoc | Academic | Bologna Italy |
| Coimbatore Institute of Technology | Academic / Assoc | Academic | Coimbatore India |
| Freebsd Foundation | Academic / Assoc | Software | Boulder CO |
| Hartree Centre STFC | Academic / Assoc | Academic | Warrington UK |
| IIT Bangalore | Academic / Assoc | Academic | Bangalore India |
| IIT Bombay | Academic / Assoc | Academic | Bombay India |
| IIT Roorkee | Academic / Assoc | Academic | Roorkee India |
| INAF | Academic / Assoc | Research | Rome Italy |
| Inst of Comms & Computer Systems, NTUA | Academic / Assoc | Academic | Athens Greece |
| Interaction Asia Pacific | Academic / Assoc | User Group | Victoria Australia |
| Jülich Supercomputer | Academic / Assoc | Research | Jülich Germany |
| Lousiana State University | Academic / Assoc | Academic | Baton Rouge LA |
| Max Planck Society | Academic / Assoc | Research | Garching Germany |
| Oak Ridge National Lab | Academic / Assoc | Research | Oak Ridge TN |
| Oregon State University | Academic / Assoc | Academic | Corvallis OR |
| POSTECH | Academic / Assoc | Academic | Gyungbuk S Korea |
| Rice University | Academic / Assoc | Academic | Houston TX |
| Sandia National Lab | Academic / Assoc | Research | Albuquerque NM |
| Seoul National University | Academic / Assoc | Academic | Seoul S Korea |
| Shanghai Jiao Tong University | Academic / Assoc | Academic | Shanghai China |
| Symbiosis Institute (SICSR) | Academic / Assoc | Academic | Pune India |
| Tsinghua University | Academic / Assoc | Academic | Beijing China |
| Tohoku University | Academic / Assoc | Academic | Sendai Japan |
| Univeristy of Campinas | Academic / Assoc | Academic | Campinas Brazil |
| University of Arkansas | Academic / Assoc | Academic | Fayetteville AR |
| University of Hawaii | Academic / Assoc | Academic | Maui, Hawaii |
| University of Hyderabad | Academic / Assoc | Academic | Hyderabad India |
| University of Illinois | Academic / Assoc | Academic | Champaign IL |
| University of Oregon | Academic / Assoc | Academic | Eugene OR |
| University of Patras | Academic / Assoc | Academic | Patras Greece |
| University of Central Florida | Academic / Assoc | Academic | Orlando FL |
| Waseda University | Academic / Assoc | Academic | Tokyo Japan |
| Pieter Van den Abeele | Individual | Individual | Galmaardan Balaium |

OPENPOWER FOUNDATION FOR INAF

- Academic membership (free of charge)
- OpenPower is like an "open source" model for the hardware:
 - non-profit technical membership
 - to create an open ecosystem using POWER architecture
 - to share expertise: participation of work groups within the OpenPOWER foundation
 - <u>"not IBM" vendors for power8 ecosystem</u>
- access to technical information for POWER systems
- buy IBM hardware with discounts