Astronomy Australia Limited

Astronomy Supercomputer Time Allocation Committee Allocation Principles

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1 Introduction

Merit-based access to research infrastructure is necessary to ensure its proper use in supporting research of demonstrated excellence, particularly in those cases where the resource is limited, or where there are substantial expenses associated with the infrastructure and its access. Merit-based allocation schemes for supercomputing have their historical origins in the processes used for several decades to assign time on large time-shared telescope systems.

In 2015, Australian astrophysicists have a number of resources available to them for advanced computation using high performance supercomputers. This includes parallel machines with a large number of cores and supercomputers with integrated Graphic Programming Units (GPUs). The available resources are described in the "Supercomputer Resources Document" at http://astronomyaustralia.org.au/commitees/astac.

As described in the "Supercomputer Resources Document", there are a number of avenues for astronomers to seek HPC time, including:

- The National Computational Merit Allocation Scheme (NCMAS), which allocates time, not only on the NCI Peak Facility located at ANU, but also on a number of other facilities.

- Time on NCI under an institution's Partner Share with NCI. Partners are the ANU, CSIRO High Performance Scientific Computing, Bureau of Meteorology, Geoscience Australia, INTERSECT NSW, Pawsey Supercomputing Centre WA and QCIF Qld.

- CAASTRO members have access to an 8MSU allocation on NCI

- Pawsey Centre machines have a specific allocation for MWA and ASKAP operations. Applications for these telescope operations time should be made to the Pawsey Radio Astronomy Committee (PRAC).

- The Pawsey Centre has a Partner Share scheme. Partners are CSIRO, Curtin University, Edith Cowan University, Murdoch University and the University of Western Australia.

- ***Astronomy Supercomputer Time Allocation Committee*** (ASTAC), which is a committee of Astronomy Australia Ltd (AAL), and allocates available time on the following supercomputer resources for dedicated national astronomy access:

  o GreenII, Swinburne University Supercomputer (gSTAR & swinSTAR)

  o Fujitsu Primergy System, NCI National Facility

  o Fornax and Galaxy, Pawsey Supercomputing Centre

  AAL will consider ASTAC allocating time on any other supercomputer resources that have dedicated national astronomy access, where appropriate.

This document outlines the key allocation principles, assessment criteria, and implementation processes for ASTAC. These details will continue to evolve in order to improve the ASTAC process and respond to the needs of the community.

2 Principles of ASTAC

The merit allocation processes that have been developed and refined over a number of years (through NCI and its antecedents) are now quite mature in their rigour and robustness, and have the confidence of Australia's research community in the integrity of their implementation. ASTAC incorporates a number of these principles.

2.1 Independence of ASTAC from a Facility Operator

A key element that contributes to the integrity of, and respect for, merit allocation schemes is the separation of the resource allocation decisions (solely on the basis of research and computational merit) by ASTAC from their implementation by the facility operator —as is the case for the NCMAS. This independence of decision making and implementation of these decisions is preserved in ASTAC.

Facility staff provide valuable, preparatory technical input (including expert assessments of computational suitability and issues relating to data management) which guides the work of the Committee. In addition, the implementation of ASTAC is a significant undertaking, requiring substantial experience in its stewardship. For these reasons, senior members of the NCI, Pawsey Centre and the Swinburne Supercomputing Manager are invited to be present at meetings of ASTAC in the capacity of advisors, however they are not eligible to vote on or directly contribute to the committee's recommendations. Under AAL's funding agreement with Swinburne through the NCRIS2013 scheme, Swinburne also provides the secretariat to the Committee, a non-voting role.

2.2 Expertise and Diversity of the ASTAC Members

A second critical element in maintaining the integrity of and confidence in ASTAC is the expertise of its membership. Members of ASTAC are experts recognised in their fields through their personal records of achievement—through publication in highly ranked journals, peer reviewed, grants, fellowships etc.

The membership of ASTAC must be expert and diverse, sufficient to cover the breadth of the Astrophysics and Astronomy research fields and computational techniques from which the applications derive. Membership should not be geographically based.

Also of importance is:

- the maintenance of a corporate memory—which requires an incremental refreshing of the membership, and
- the implementation of strategies for succession planning, particularly for the important post of the Chair of the Committee.

The remainder of the committee comprises at least three researchers with skills in computational astrophysics and observational astronomy.

3 Assessment Criteria and Allocation Process

The assessment criteria adopted by ASTAC have evolved over time, based initially on the NCMAS criteria (used for the National Facility and Specialised Facility allocations). The criteria used in 2014 are outlined below.

3.1 Research Team

- Experience and demonstrated research capacity of the applicant and the project team.
- Note: Applications will list:
  - "Lead Chief Investigator", which can be a PhD student, who leads and directs the research program (and who is provided with project accounts),

- - "Other Chief Investigators", and
  - "Researchers", which includes students, research assistants, research associates and other staff.
- The research track record is requested for each Chief Investigator, with this contributing to the assessment of the research team.

3.2 Science Case
- Merits of the research (excellence and impact dimensions), as assessed by the potential of the work to generate new knowledge in an important area, the comparative scientific merits of the work within its discipline, its originality and the international competitiveness of the research.
- Alignment with national research priorities and, as appropriate, complementing other national research infrastructure capability investments.

3.3 Feasibility and need for requested resources
- The feasibility of the project (for successful, on-time completion) given the resources requested and the resources already available to the research team
- Appropriateness of the computational resources requested for the project:
  - The need for such resources to conduct the research.
  - Suitability of the system (hardware/software) and its operational environment to support the project.
  - Evidence or experience to demonstrate that the project will use the facilities effectively and efficiently.
    - Effective and efficient use of the resources allocated means that the use will result in both the stated research outcomes and good system utilisation (i.e., maximised compute outcomes/outputs for the grant that is awarded).
- Reasonableness of the level of resources requested:
  - Relative to the total resources available.
  - Needed to make adequate progress in the proposed research program.
- Track record in using merit allocated computational resources (where relevant):
  - In the case of proposals to continue a project, or a new project from existing grant holders, this implies a record of achievement and the demonstration of effective and efficient use of previous allocations.

Each of the above criteria are given a score out of ten and weighted as follows: Research Team (25%), Science Case (50%), Feasibility (25%).

Each ASTAC member is asked to read each proposal and score it, based on the above criteria and these ASTAC Allocation Principles. Each proposal is assigned a Lead Assessor who is expected to lead the discussion on the proposal during the ASTAC meeting to allocate time.

Note: An ASTAC conflict of interest register is maintained for each proposal round. Those with a declared conflict of interest on a proposal do not score the proposal or participate in discussions and decisions about that proposal.

In determining the allocation of time to each successful proposal, ASTAC will take into account the scores against the assessment criteria, the size of the request relative to other requests, and the total resources available.

In cases where there is significant variation between individual assessors' rankings, the Chair may suggest that the Committee revisit the assessment, either to confirm individual assessments, or to suggest that additional information be sought from an applicant to assist in confirming a decision.

4   Implementation of ASTAC

- ASTAC is an AAL committee, and the Chair and members of ASTAC are appointed by the AAL Board.

- ASTAC members are typically appointed for two year terms, with the possibility of renewal.

- The ASTAC Chair position is typically a one year term, as the AAL Board sees value in regular turnover of this important role.

- AAL and Swinburne University provide administrative, logistical, and secretarial support for ASTAC

- ASTAC meets and allocates time twice per year, in Nov-Dec to allocate resources for quarters 1 and 2, and in May-June to allocate resources for quarters 3 and 4. Meetings are via videocon/telecon.

- Facility Operators endorse the independence of ASTAC and agree to implement its resource allocation recommendations without variation.