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| **IRIS Resource Scrutiny and Allocation Process for HTC and Storage resources** | |
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Contents

[Description of Document 1](#_Toc529206587)

[Timeline Delivery for setting up the IRIS Resource Scrutiny and Allocation Panel (RSAP) 2](#_Toc529206588)

[Principles of resource allocation 3](#_Toc529206589)

[Approved Partners who can request resources 5](#_Toc529206590)

[The Scrutiny and Allocation Process 5](#_Toc529206591)

[Typical Time line for The Project Request for Resource Process 5](#_Toc529206592)

[The Outline Resource Request Document 6](#_Toc529206593)

[Communication to the Technical Working Group (TWG) 7](#_Toc529206594)

[Reporting to the IRIS Delivery Board and STFC 8](#_Toc529206595)

[Appendix A: Membership and roles of the IRIS Research Scrutiny and Allocation Panel 8](#_Toc529206596)

[Appendix B: Dealing with Non-approved activities & Communication with the DIRAC Resource Allocation Committee and the Ada Lovelace Centre in the case of non-peer reviewed requests 9](#_Toc529206597)

# Description of Document

Following the award of £16M of BEIS funding for IRIS Collaboration physical eInfrastructure for 4 years from 1st April 2018, there is a requirement to have a formal resource scrutiny and allocation process.

The scrutiny and allocation of IRIS resources is one of the main work packages of the IRIS Collaboration.

This document describes the process by which resources are allocated to Activities

IRIS resources, for the purpose of this document, refers to hardware infrastructure in the form of High Throughput Computing (HTC) and its constituent components of CPU, disk, tape, and networks.

* Requests for HPC time are covered by the existing DiRAC RAC process.

The enabling infrastructure for IRIS, such as queue schedulers, cloud middleware will be covered in other documents and will be listed on the IRIS webpage.

The situation regarding other (activity specific) software, which remains the responsibility of the Activity, is covered in other documents and listed on the IRIS webpage.

# Timeline Delivery for setting up the IRIS Resource Scrutiny and Allocation Panel (RSAP)

The timeline for setting up the Resource Scrutiny and Allocation Panel below.

**The key date is the 14 December**. For it is only then that the Chair of the RSAP and the Director (Science) and Director (Technical) can aggregate requests and hence plan the FY19 hardware configuration and expenditure. This in turn feeds into the projection of what the RSAP can allocate in January.

This is the process by which community requirements are turned into real hardware systems.

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| **Timeline** | **Activity** | **Owner** |
| **17 and 24 October** | RSA Panel meets to   * Finalise documentation for Resource Request and Scrutiny process * Decide Allocation Methodology | **JY** |
| **30 October** | * TWG to approve the list of Resources and Enabling Infrastructure offered for use by the Projects | **AS** |
| **1 November** | * DB to approve the Project Resource Request Process * Resources and Enabling Infrastructure ready for testing by a subset of Partners | **PC** |
| **2 November at 1200 GMT** | * Project Resource Request Documentation is uploaded to the IRIS website and emailed to the Projects. * A common table format will be used for Resource Requests in the document, which will be in a machine-readable form * Information on the list of Enabling Infrastructure published on the IRIS website * Request for Resources from IRIS Opened. | **JY & AM** |
| **5/11 to 4/12** | * Partners prepare and upload Resource Requests to the IRIS website | **Partners** |
| **4 December at 1600 GMT** | * Annual Request for Resources from IRIS Closed * IRIS will consider out of sequence requests during the year where there is good reason | **JY** |
| **10 December** | * RSA Panel (Technical Scrutiny) meets to write formative recommendations to the Partners to allow changes to be made. * Recommendations are sent to the Partners | **JY, DB, and 1 more** |
| **14 December at 1600 GMT** | * Deadline for the Partners to upload modified Resource Requests to the IRIS website. * The Predicted Resources Schedule for 2019 will be constructed for use by the RSAP and IRIS Procurements | **Partners**  **Directors** |
| **January** | * Full RSA Panel meets to decide on allocations to recommend to the DB | **JY, RSA** |
| **February** | * DB formally agrees allocations | **JY, AS & DB** |
| **March** | * Partners informed of Allocation Decision * IRIS website populated with Information for Users for the various resources and Enabling Infrastructure * Projects given access given to the IRIS Authorisation & Accounting Infrastructure | **TWG**  **TWG** |
| **1st April** | * FY18 allocation available to Activities | **Partners** |
| **1st Sept** | * FY19 Capacity deployed and available to Activities |  |

# Principles of resource allocation

IRIS is a Collaboration. The list of Collaborators is listed here <https://www.iris.ac.uk/about/partners/> .

The IRIS Delivery Board has mandated that Resources be allocated to its collaborating members via a scrutiny process based mainly on the successful CERN Computing Resources Scrutiny process (CRSG) <http://wlcg.web.cern.ch/collaboration/management/computing-resources-scrutiny-group> with additions from the DIRAC Resource Allocation Committee processes <https://dirac.ac.uk/resource-allocation-committee/>

The Delivery Board has created a body, the Resource Scrutiny and Allocation Panel (RSAP), to recommend allocations of IRIS resources to members of the IRIS Collaboration.

Every year the RSAP should scrutinize the following: -

* The resource accounting figures for the preceding year
* The use the Projects made of these resources
* The overall request for resources for every Project for the following year and forecasts for the subsequent two years
* The RSAP shall also examine the match between the resource requests and available (actual and predicted) IRIS resources.
* The RSAP shall make recommendations concerning apparent under-funding

Every year the RSAP will make resource allocations to Projects: -

* Each year the RSAP will communicate its Allocation Recommendations to the IRIS DB for approval
* Each year the RSAP will communicate its Allocation Recommendations to the IRIS Technical Working Group for implementation.
* It should be noted that this is not an application process.
* Rather it is a regularly organized opportunity for Collaborating members of IRIS to make Resource Requests to IRIS so ensure already approved activities can be carried out.
* The RSAP may need to alter Resource Requests if there are not enough resources.
* For example, the application of a common % reduction in Resource Requests to all Requests is a way to ensure the Allocations do not exceed available resources. In such an example smaller Resource Requests may be protected to ensure Project viability.
* However, the RSAP is expected to use its judgement and experience when deciding allocations.
* Pro Formas will be used to assist with the Scrutiny and Allocation processes. This will ensure decisions are consistent and transparent.
* The use a Project’s makes of its previous year’s allocation may affect the size and nature of future awards.

The principles by which the Scrutiny and Allocation Process will be carried out are as follows: -

* Resources will be granted to Approved Activities.
  + In the main Approved Activities means
    - Resource requests from already peer reviewed PPAN Activities
    - Provision being made for Facilities themselves, and users with awarded time.
    - Approved activates for partner facilities outside of STFC
  + Approved Activities should not face double jeopardy in respect of the science or the fundamental need for computing resources for production work, i.e. they should NOT have to re-present science cases.
  + They should however have to justify their requested computing resource volumes needed to do their approved science programmes.
* Non-approved Activities should be subject to appropriate peer review scrutiny of science and computing resources.
  + For the Facilities requests that might fall into this category the case should be considered by the ALC and the Chair of the RSAP
  + For PPAN activities The DIRAC RAC will be used to facilitate a peer review process to scrutinize non-approved Activities
  + Anything falling outside of the above will be considered on a case by case basis by the Chair of the RSAP
* The job of the Resource Scrutiny and Allocation Panel is to: -
  + Ensure the Resource Request is justified by the science programme.
  + Ensure the Resources requested will deliver the science in the science programme in an efficient and efficacious manner.
  + Monitor the resource usage of Projects
  + Note the scientific output of the Projects as given in their Resource Requests.
* The approved Activities will undertake the following kinds of computational work: -
  + Computing needed during project construction,
  + Computing needed as part of operating an experiment or instrument to produce data sets suitable for use by scientists
  + Exploitation work if the science has been approved (e.g. via PPGP, award of time on a National Facility). This should ensure there is no double jeopardy.

# Approved Partners who can request resources

The IRIS Collaboration was founded by partners which are listed here

<https://www.iris.ac.uk/about/partners/>

In this next cycle (FY19) the activities represented by those Projects listed on this Partner List will submit Resource Request Documents (RRDs) (essentially this means all IRIS Partners). These are defined on the IRIS website.

IRIS is aware that in time it needs to develop a process to also support other activities, for example: Smaller Astronomy Projects, PRD, Accelerator R&D Projects. These are likely to be small requests, and will be dealt with on a case by case basis for FY19 whilst a more formal arrangement is made.

Notwithstanding, some additional activities which have already been identified may also submit RRDs in this cycle.

# The Scrutiny and Allocation Process

The Process is given in the Typical Timeline below. This will be implemented for the 2020 Resource Scrutiny and Allocation Cycle.

* A repository shall be set up to store all documents
* An RSAP email list will be set up to

## Typical Time line for The Project Request for Resource Process

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| **Timeline** | **Activity** | **Owner** |
| **1 October** | * TWG to approve the list of Resources and Enabling Infrastructure offered for use by the Projects * TWG sends the RSAP the following   + List of available resources (current and predicted) for April 1st the following year   + List of Enabling Infrastructures | **Chair, TWG** |
| **Mid-October** | * RSAP finalises documentation for Resource Request and Scrutiny process * RSAP Reviews and Updates Allocation Methodology * DB to approve the Project Resource Request Process * Project Resource Request Documentation is uploaded to the IRIS website and emailed to the Projects * Information on the list of Enabling Infrastructure published on the IRIS website * Request for Resources from IRIS Opened | **RSAP**  **Director**  **Chair**  **Chair**  **Chair** |
| **Mid October to early December** | * Partners prepare and upload Resource Requests to the IRIS website | **Partners** |
| **A day in early December at 1600 GMT** | * Request cycle Closed * The Predicted Resources Schedule for 2019 will be constructed for use by the RSAP and IRIS Procurements | **Chair**  **Directors** |
| **10 December** | * RSA Panel (Technical Scrutiny) meets to write formative recommendations to the Partners to allow changes to be made. * Recommendations are sent to the Partners | **RSAP** |
| **14 December at 1600 GMT** | * Deadline for the Partners to upload modified Resource Requests to the IRIS website | **Partners** |
| **January** | * Full RSA Panel meets to decide allocations | **Chair, RSAP** |
| **February** | * Partners informed of Allocation Decision * Resources and Enabling Infrastructure ready for testing by a subset of Partners | **Chair & TWG** |
| **March** | * IRIS website populated with Information for Users for the various resources and Enabling Infrastructure * Projects given access given to the IRIS Authorisation & Accounting Infrastructure * RSAP produces its annual report for the IRIS Delivery Board and STFC | **TWG**  **TWG**  **Chair** |
| **1st April** | * IRIS Projects can start to use their new Resource Allocations form FY18 deployment. | **Partners** |
| **1st Sept** | * IRIS Projects can start to use their new Resource Allocations form FY19 deployment. |  |

## The Outline Resource Request Document

All such Activities will prepare an annual compute resource requirement document. To be known as the RRD). This will be an important public document, and be available externally (e.g. to Advisory Panels, Review Panels)

This will: -

* Summarise (briefly) the approved science programme and its science processing requirements over the next few years. This need not change much annually, it is simply to set context.
  + The summary from a successful grant application would suffice for instance.
* Describe briefly the computing model. This need not change much annually,
* Report on the use made of IRIS resources in the previous year in comparison to allocation (n-1). This should include a list science outputs that have already been generated by use of IRIS Resources in the last period
* Provide a firm estimation of eInfrastructure requirements for the next year (n)
* Provide a preliminary estimation of eInfrastructure requirements for year (n+1)
* Provide a brief forward look (i.e. as far as you can naturally go up to year n+3)
* eInfrastructure requirements should include
  + Compute volume and type
  + Disk storage volume
  + Tape storage volume
  + Network requirements if significant w.r.t JANET
  + Application Requirements to check that that applications can run on IRIS systems
  + Compiler & Numerical Library Requirements to check that codes and applications can be compiled and linked on IRIS systems
  + Enabling Infrastructures, e.g. AAAI, cloud middleware, grid middleware, data transport applications, container and VM support and so on will be presented to users
* What will the Requested IRIS Resources be used for? This is really a technical justification of why your workflows need to use the resources for which you have asked. E.g. to achieve a rms noise/error etc. our workflow needs so many cores, so much diskspace and so much RAM.
* Examples and templates will be provided for use by those wishing to ask for Resources.
* Activities are reminded that IRIS can only provide physical hardware and basic access software as described elsewhere in the RSA documentation on the website. It remains the responsibility of the activity to provide any software Infrastructure it needs to utilise the hardware. Activities should give an explicit statement that they are aware of these limitations and have the means to use the hardware resource allocation
* Activities should also give an indication of the total FTE of software engineering effort they would ideally need to create and run and software Infrastructure they need to run on top of the hardware. Please give FTE-years per year as best you can
  + This information will only be used for aggregation to make the case upward for RSE support.
* List the main science highlights and publications generated by the previous year’s usage. This will be required from October 2020.

## Communication to the Technical Working Group (TWG)

* The Chair and Deputy Chair of the RSAP will formally communicate with the Project Director (Technical)
* The RSAP Technical Scrutineers will be members of the TWG.
* The Chair/Deputy Chair will delegate communication functions to the Technical Scrutineers as and when required.

## Reporting to the IRIS Delivery Board and STFC

The RSAP shall report to the Delivery Board with its recommendations to be approved.

This Report shall be presented to the Delivery Board by mid-February of each year.

It will form the final document used to decide the next equipment procurement and deployment round (typically April to September of a given year). (Preparatory work will start with the RRD submissions).

It is by this process that the communities’ requirements are translated into hardware provision.

The Report will include: -

* Available Resources Provided by IRIS
* Enabling infrastructures Provided by IRIS
* List of Allocations to Projects
* Oversubscription Data and Usage Trends
* Usage Data for IRIS and for each Project
* Science Outputs for IRIS and for each Project
* Description of Allocation Methodology
* Issues that arose from the Technical Scrutiny Process

# Appendix A: Membership and roles of the IRIS Research Scrutiny and Allocation Panel

The annual compute resource requirement documents will be scrutinised by a Resource Review Board (RSAP). The RSAP shall:

* Have a Chair (chosen by the Delivery Board) and Deputy (chosen by the RSAP) to ensure that there can be a chair of any meeting with no conflict.
* Be comprised of members chosen from the science activities
* Include a cross member from the DiRAC RAC
* Have two technical scrutineers to assess the suitability of the workflows for the equipment resource requested.
* Appoint suitable Observers when required.
* Scrutinise the requested resource requirements of each activity, and require further information where it deems necessary.
* Approve (amended requirements documents) and publish the aggregate requirements across STFC in an Annual report.
* Make allocation recommendations consistent with the known available resources.
* Be responsible for collating the science outputs from usage of IRIS resources from the Projects.

# Appendix B: Dealing with Non-approved activities & Communication with the DIRAC Resource Allocation Committee and the Ada Lovelace Centre in the case of non-peer reviewed requests

DiRAC and the ALC are eInfrastructure providers for the IRIS Collaboration.

DiRAC has a formal STFC run Resource Allocation Process.

The ALC has a formal internal Resource Allocation Process

When a request from a non-approved activity is received, the Chair of the RSAP will submit this to the Chair of the DiRAC RAC and the Chair of the ALC so that peer review can be undertaken. The recommendation of the DiRAC RAC and/or the ALC will determine if the Request can proceed to the RSAP Resource Request Process.

It should be noted that GridPP have had a place on the DiRAC RAC for several years in order to identify HTC workloads that can best run on their systems. This will be extended to include the ALC.

* The current DIRAC-GridPP arrangement will become a DIRAC-IRIS arrangement.
* The Chairs of the IRIS RSAP, the ALC Chair and the DiRAC RAC will notify each other of Projects that are best suited to the other’s resource suite.
* A suitable internal process will take place to review the resource request and if appropriate award resources to it.

This class of proposals would in the main include the following activities

* Large activities in project exploratory/preparatory/development stage
* Individuals in project exploratory/preparatory/development stage

All such Activities will submit a request for resource requirements

If the request for resources is small (defined as a small fraction of “2-3%” of the total IRIS resources: -

* Then the Activity shall submit a request for resources to be considered by the RSAP (possibly out of annual cycle for individuals at least)
* The RSAP will make a recommendation on the level and length of resources to be allocated within the “2-3%”.
* The request format shall be as lightweight as appropriate (to be developed).

If the request is large then:

* It shall be submitted to the DiRAC RAC or ALC.
* The activity should submit an application following the normal DiRAC RAC or ALC procedures
* The DiRAC RAC or ALC will make a recommendation on the level and length of resources to be allocated.
* The RSAP will consider the DIRAC RAC or ALC recommendation out of cycle and may make a recommendation for an interim level of allocation prior to the next annual cycle.
* The RSAP will subsequently consider this as part of the overall annual allocation process.
* The RSAP may recommend interim resources prior to the next annual cycle.