# IRIS Resource Request Guidance

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The aim of a resource request is to ensure that the resource allocation panel is provided with the necessary information to make an informed decision about recommending allocations and for IRIS to fulfil any reporting requirement it may have.

Panel scrutinised requests form the basis on which IRIS negotiates funding from STFC, hence a strong request not only increases your chances of the panel recommending a full allocation, but also for IRIS to be able to provide that allocation.

To this end, please keep the following overarching guidance in mind when submitting a resource request:

* Showing usage of your currently allocated resources: A good usage of currently allocated resources increases confidence in the accuracy of future requests.
* Your predicted computing needs in the future and the process by which you arrived at these numbers (here referred to as “the computing model”): This lends credibility to the request.

Resources requested should relate to the science as outlined in your Science Partner document, which will be made available to the committee together with the resource request. If necessary, you can submit an updated Science Partner document with your request.

All sections of this document are required, but please leave out any subsections that are not relevant to your request (e.g., if you are only requesting compute, or only requesting storage). A template is available. For the sections where you are asked to provide information in a table, any other information you consider relevant can be added in whichever format you find convenient.

**For any questions with respect to your application, please contact rsap@iris.ac.uk**

**Please note that the ultimate responsibility for the accuracy of the request lies with the activity.**

# Administrative details

Project Name:

Resource Request Contact (for questions): You can list more than one contact person. Note that the panel decision will be communicated to all contacts listed on the Science Partner form.

# Glossary

Please define your terms.

# Usage made of IRIS resources in the previous year

**Please indicate “N/A” if this is a new request and continue in Section 4.**

IRIS aims to provide the resources needed by each activity and will not withdraw an allocation from one allocation period to the next if the resources are in use. For IRIS to effectively manage resources and secure future funding it is important that we have an accurate picture of current and future usage. Under- or over-usage of resources can be taken into account when making allocations.

## 3.1 IRIS resources allocated to your project

In this section, please describe the IRIS resources allocated to your project as of **October 1st** **2023** or closest convenient date (please give date).

If you have previously made requests and received allocations by sub-project, please list the resources by sub-project. **These projects should correspond to the ones listed on your Science Partner form.**

Please use the example tables and notes below as guidance for the information requested.

Additionally, if you have resources from different funding streams, either co-located with IRIS provided resources or elsewhere, please make a note of this in the appropriate section.

**CPU/GPU resources and attached storage.**

If these resources are provided bundled as machines (real or virtual), please describe the machines as provided. In the summary columns please provide a “high-level” view of the allocated resources: Total number of cores averaged over a year, total number of GPU cards averaged over a year, memory per core and fast storage attached to CPU. The latter has rarely caused an issue, but IRIS would like to be able to quickly flag any unusual requirements.

If the resources are provided as ‘grid like’, i.e., HTC resources, please leave the machine view blank and use the summary columns to describe your allocations. You can also report other GPU/CPU resources this way if this is more suitable for your project.

Please flag in the notes if any of the allocated resources have been allocated for the exclusive use of your activity. Examples of this would be login/access nodes, webservers or similar.

**New: A note on units:** Experience has shown that most (cloud) providers allocate vCPUs, often without explicitly notifying the activities if these correspond to a physical core, or e.g., a hyperthreaded one. If this applies to your activity, please list the vCPUs you have been allocated (and note that you are listing vCPUs) and your provider, IRIS will make the conversion to physical cores if applicable.

If you have been allocated CPU core hours, you can list them in the resource description if you wish, but please convert it to cores by averaging the core hours over a year. If you have any questions about this, please email rsap@iris.ac.uk.

For activities using HEPScore/HEPSpec, you can list this as additional information, but please also provide a conversion to cores.

Please keep in mind that IRIS is a hardware provider, and the requests are used to determine the number of physical cores IRIS needs to provide, as this informs IRIS purchasing decisions, hence the emphasis on cores rather than other units.

Example 1: Large memory nodes with GPUs

Project XYZ-Data Flow

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached fast storage | Location | CPUcores | CPUmem/core | GPUcards | GPUmem/card | storage/core |
| 3  | 1281 TB | 2 x A100 80GB | 120 GB | Manchester | 384 | 8 GB | 6 A100 | 40 GB | ~1GB |

Table 3.1 Current allocation for Project XYZ-Data Flow

Notes (example): We maintain 2 further machines with an identical specification at the same location; these were funded by a [Science Partner project grant].

Example 2: Resources provided as VMs by RAL SCD

Facility ZYX-Workflow QPT

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached fast storage | Location | CPUcores | CPUmem/core | GPUcards | GPUmem/card | storage/core |
| 50 | 8128 GB | 1 x A 10020 GB | 20GB | RAL SCD | 400 | 16 GB | 50 A100 | 20 GB | ~2GB |

Table 3.2 Current allocation for Facility ZYX-Workflow QPT

Notes (example): These compute resources are co-located with our data storage.

Example 3: ‘Grid like’ resources

Activity CCC - Simulations

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached fast storage | Location | CPUcores | CPU mem/core | GPUcards | GPUmem/card | storage/core |
| N/A | N/A | N/A | N/A | Imperial Cloud | 300 | 8 GB | 0 | N/A | N/A |
| N/A | N/A | N/A | N/A | Lancaster | 270 | 4 GB | 0 | N/A | N/A |

Table 3.3 Current allocation for Activity CCC

Notes (example): We are using also GridPP resources at a number of UK sites opportunistically/supported under the “GridPP/other VO scheme”. These generally are limited to 4GB/core.

**Storage**

Please describe any storage allocated to you by IRIS and whether it is disk or tape. Please also describe any other storage that you might have received through other funding streams that might be relevant to your project. This is especially important if this storage is co-located with your IRIS storage.

Examples:

Example1: Disk and Tape at RAL

|  |  |  |
| --- | --- | --- |
| Amount | Location | Disk/Tape |
| 2 PB | RAL Echo | Disk |
| 1 TB | RAL Antares | Tape |

Table 3.4 Storage allocated to Project X –Subproject Y

Example 2: Tape at RAL:

|  |  |  |
| --- | --- | --- |
| Amount | Location | Disk/Tape |
| 2 PB | RAL Antares | Tape |

Table 3.5 Storage allocated to Project U –Subproject I

Example 3: Grid accessible storage

|  |  |  |
| --- | --- | --- |
| Amount | Location | Disk/Tape |
| 500 TB | Manchester - Grid | Disk |

Table 3.6 Storage allocated to Project Q

## 3.2 Current usage of IRIS resources

**CPU/GPU Usage for 01/10/2022 to 31/09/2023 (or closest reporting period).**

**If your allocation in the reporting period was very different from the allocation that was available to you on 1st October 2023, please note this here. You can duplicate the appropriate table from 3.1 or use free form text, whichever fits your use case better.**

In this section, please describe briefly how you are monitoring the usage of your allocated resources and provide as much information as possible to show that your project has made good use of them. While IRIS is aware that, given the often-complicated technological constraints, full usage of allocated resources is unlikely, **any significant under usage should be explained**. This includes delays in access to resources, delays in data taking, personnel constraints and others. Please indicate if these issues have been resolved or when do you expect them to be resolved.

Please note that while the IRIS accounting portal does not (yet) log GPU usage, your cloud provider should be able to provide you with overall usage numbers.

**Storage usage (October 2023 or closest reporting period)**

Given the long procurement cycles, it is not assumed that your project will have used all the storage allocated to it at the time of submitting the resource request. IRIS is also aware that usage of non-archival storage might fluctuate up and down over the course of a funding cycle and that your project might need to reserve some spare capacity to accommodate these fluctuations. IRIS considers 85% storage usage as ‘full’.

For storage, please list the current usage and the anticipated date you will reach 85% use of your current allocation (use ‘N/A’ if your usage already exceeds this value).

Please use the table below as guidance of the information required. Please also note if you have any storage from other funding streams co-located with the IRIS provided storage.

Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Amount | Location | Type | Usage (Oct 2023) | 85% expected |
| 2 PB | RAL Echo | Disk | 1.2 PB | July 2024 |

Table 3.7: Storage used by Facility XYZ

# Your Resource Prediction/Computing Model and your Computing Environment

## 4.1 Computing Model – Tell us where your numbers come from!

In this section, please describe the model you use to determine your future computing needs. Please ensure that the determination of your requirements is presented in a way that the panel, who will be drawn from people outside your activity, can follow your reasoning. The requested resources need to follow deterministically from the model presented in this section. This forms a key part to assessing whether your request is credible.

Examples inputs to computing models are:

Fundamental types of workloads (e.g., primary reconstruction, simulation programme, autocorrelation jobs, instrument data reduction, modelling, fitting, data analysis);

CPU-hours and data I/O volumes per unit of data for the above (event, file, instrument run period);

Total annual running time of machines or beamline;

Total volume of raw data recorded per year;

… and others.

IRIS relies on the activities’ forecasts to make purchasing decisions and to obtain further funding for future hardware provisions.

## 4.2 Computing Environment

To place your computing model and resulting request into a technical context, please **briefly** describe your computing environment. This is especially important if this is a first request as this helps IRIS to place your request with an appropriate provider. Please note that any detailed implementation is beyond the scope of this document and should be discussed with your provider directly.

The information provided in this section will be aggregated across all requests and used to provide evidence of community computing needs to STFC and UKRI. It also feeds into the decision on where to place digital asset funds.

For all sections: Please give a high-level overview only but include references where available.

**Acknowledgement of limitations of IRIS computing support**

IRIS as an organisation and the IRIS resource providers do not receive funding for personnel to support science specific activities and any support for specific activities is on a best effort basis only. **In your request you must show that you have personnel in place to be able to use IRIS resources efficiently.** Please contact the IRIS Technical Working Group (IRIS-TWG@jiscmail.ac.uk) for further advice.

When describing your computing environment, the following are examples only of what kind of information IRIS is looking for. Please also include any other information you consider relevant.

**Basic compute information**

In this section provide basic information about the typical needs for the jobs that you expect to run. For diverse workloads, please give ranges. For existing allocations, if you have already described your machines earlier **and** they are suitable for your use, please just refer to the appropriate table.

Examples include, but are not limited to:

How many cores do your jobs need?

How much memory per core, job or node do you need?

Can your jobs take advantage of hyperthreading?

How much scratch space do you require?

Do you expect multiple jobs to be able to access shared scratch space?

**HPC:**

IRIS is not an HPC facility, but comment on any special backplane needs or requirements for MPI etc?

If you need access to HPC like resources, please contact the Science and Technical Director directly – they will advise you whether to submit a request to IRIS or elsewhere.

**Access for CPU/GPU and Storage**

New resources/new activities: In this section provide details of how you plan to access new computing and storage resources. If you are unsure or undecided yet, please contact the IRIS TWG for assistance.

For existing allocations, please include any details related to access not covered in previous sections. IRIS is aware that access models can change over time. In case you are planning to change your access model, or your access model has changed with previous requests, please explicitly note this.

Examples for CPU/GPU include, but are not limited to:

ssh login with a batch system

Cloud based computing (OpenStack)

Submission through a third-party software workload management system: e.g., DIRAC, Panda, glideinWMS

Submission through an activity specific workload management system

Jupyter Notebooks (please specify backend as well)

Data access via nfs, cloud volumes, grid protocols (srm, xrootd, davs), objects store etc.

Do you require access to central databases etc? If so, how do you (plan to) access them?

**How do you handle authentication/authorisation? (This is relevant to all projects.)**

**Networking**

In this section, please detail any additional information that may be relevant for network provision. This is particularly important if you have high network bandwidth requirements (for example anything above 1Gb/s) or if you need sustained connectivity over a long period of time (more than an hour or so) – so that is if you need to transfer a lot of data very quickly or if you are streaming data for a long period of time.

IRIS would expect that most activities can make use of the networks as is.

**Software**

In this section, please detail information with regards to how you distribute the software to be used in running your jobs.

How do you distribute your software (e.g., cvmfs, nfs, tarball, container, VM image)?

Do you have any specific software requirements (e.g., Openstack version, operating system) that need to be met by a provider? In this case, please provide a short explanation.

# Resource request for 1st October 2024 – 1st October 2025

In this section, please describe all the resources you request from IRIS for the period from 1st October2024 to 1st October 2025.

Please indicate clearly whether you are asking for **additional** resources with respect to your previous allocation or if you wish to **retain your current allocation** as is, or whether you can **release** IRIS resources previously allocated to your activity. IRIS would prefer to receive absolute numbers if possible. If **and only if** your request is for a continuation of resource provision on the same level as of October 2023 (i.e., as described in Section 3.1) without any changes, please state so explicitly and refer to section 3.1, it is not necessary to copy the tables.

IRIS will make every effort to fulfil any justified resource request as completely and quickly as feasible, taking into account available funding and procurement lead times.

IRIS overall strategy is a location agnostic allocation of resources, while at the same time acknowledging that this would not make sense for all activities. If you need resources to be allocated at a specific location, please include a brief explanation here.

All requested resources must be mentioned in this section.

**Your computing model should support all aspects of your request.**

Examples:

**Example 1: Activity XYZ-Data Flow – increase in requested resources, presented as increment**

In addition to the resources described in Table 3.1 the project requests the following resources

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached storage | CPUcores | CPU mem/core | GPUcards | GPU mem/card | Storage/core |
| 1 | 128/2TB | 4 x A100/160GB | 120 GB | 128 | 16GB | 4 A100 | 40GB | ~1GB |
| 10 | 16/128GB | 1xV100/16GB | 64 GB | 160 | 8GB | 10 V100 | 16GB | ~4GB |

Table 5.1 **Additional** resource request for Project XYZ-Data Flow

Notes: Increase as predicted by X described in Section 4,1. The preferred location for these nodes would be [HERE], to be co-located with the activity’s data storage.

**Example 2: Activity XYZ-Data Flow – increase in requested resources, presented in absolute numbers (preferred)**

We are requesting an increase in resources, the total compute resources requested are listed below

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached storage | CPUcores | CPU mem/core | GPUcards | GPU mem/card | Storage/core |
| 3 | 128/1TB | 2 x A100/80 GB | 120 GB | 384 | 8 GB | 6 A100 | 40GB | ~1 GB |
| 1 | 128/2TB | 4 x A100/160GB | 120 GB | 128 | 16 GB | 4 A100 | 40 GB | ~1 GB |
| 10 | 16/128GB | 1xV100/16GB | 64 GB | 160 | 8 GB | 10 V100 | 16GB | ~4 GB |

Table 5.2 **Total resource** request for Project XYZ-Data Flow

**Example 3: Maintain status same resources as before**

Activity CCC – Simulation

In line with our predictions, we ask for our current allocation to be maintained during the next allocation cycles. The table below lists the total amount of resources requested.

|  |  |
| --- | --- |
| Resource description (machine view) | Summary (please see notes) |
| Count | Cores/total RAM | GPU cards/total onboard memory | Attached storage | CPUcores | CPU mem/core | GPUcards | GPUmem/card | storage/core |
| N/A | N/A | N/A | N/A | 300 | 8 GB | 0 | N/A | N/A |
| N/A | N/A | N/A | N/A | 270 | 4 GB | 0 | N/A | N/A |

Table 5.3: Absolute compute request for Activity CCC – Simulation

**Example 4: Project TTT – Disk – decrease in requested resources**

Project TTT has completed data taking. The final data volume is such that the project requires 700 TB to store its data for ongoing analysis, and therefore wished to reduce its current IRIS allocation of 1 PB by 300 TB.

|  |  |  |
| --- | --- | --- |
| Amount | Location | Type |
| 700 TB | Imperial | Disk |

Table 5.4 Absolute amount of storage requested from IRIS.

**Note that IRIS will not normally ask Science Partners to move data unless the storage they are currently using is being decommissioned.**

**New: Example 5: Maintain status quo across the board**

As the project has entered a steady state as outlined in Section 4.1, we are requesting to retain the resources as described in tables 3.1, 3.2 and 3.3. (Please make sure you quote all the relevant tables, otherwise the Chair will make you type them out again in next year’s application.)

# Long term forecast

Please give a high-level overview of the **total** number of resources requested for the next 3 years following this resource request. This will be used to drive IRIS forward planning, resource management, and funding requests. Years run from 1st October to 1st October the following year. It is also used to flag expected large increases in required resources. IRIS is aware that long term forecasts are difficult, but we assume activities will have an idea about the trend of their requirements.

Example: Long term high-level forecast

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | GPU | CPU | Storage/Disk | Storage/Tape | Notes |
| 2025-2026 | 30 A100, 10 V100 | 3600 cores | 4 PB | 1 PB |  |
| 2026-2027 | 40 A100 | 5000 cores | 6 PB | 2 PB | XYZ comes online |
| 2027-2028 | 40 A100 | 5000 cores | 12 PB | 2 PB |  |

Table 6.1: Note: Construction of XYZ is currently on schedule. Tape requirements are not expected to increase any further until at least 2028.

# References

Please add any references you may have used above here.