

(cl-infrastructure-rid)= # Research Infrastructure Developer: Overview

Research Infrastructure Developers (RIDs) are experts in building and maintaining the customised hardware and software infrastructure used by researchers, ranging from the very large (High Performance Computing systems and data storage services) used by thousands of users down to bespoke virtual machines for individual projects. They are highly skilled team members who can also conduct their own research as part of their role.

(cl-infrastructure-rid-role)= ## What do Research Infrastructure Developers do?

Research Infrastructure Developers design and build the computational and data infrastructure for researchers, making use of best practice techniques such as software defined infrastructure, continuous integration and deployment, version control) to create systems that are performant, resilient and easy to (re-)deploy and maintain.

They may be attached to a specific project or they may work as part of a team building and supporting larger, shared services (most usually both).

Because the role involves design responsibility for future infrastructure, RIDs may be PIs or have their own research projects related to infrastructure (for example looking at a new accelerator, network or processor technology), depending on the institution and policies of the projects they are working on.

As they progress in their career, RIDs may be responsible for entire large infrastructure at an institution or nationally.

## 1 Who are Research Infrastructure Developers?

Research Infrastructure Developers come from a wide variety of backgrounds - some are professional system administrators or experienced DevOps professionals who have joined from the commercial world, while others are ex-Researchers who picked up infrastructure skills as part of their career as a researcher, a classic example being the PhD or postdoc who as part of their duties looks after a small Linux cluster for their group, or helps their group deploy their application stack on supercomputers they have access to (or even the Cloud) so that other researchers can get on with their research.

## 2 What qualifications or skills do you need to be a Research Infrastructure Developer?

The very nature of this work means that qualifications are hard to come by and so the most important skills are creative problemsolving, a desire to be helpful and the kind of mind that doesn't accept systems not working properly. Extremely useful technical skills to have (depending on the exact area) are Linux, shell, Python, debugging compiler/library issues, management of schedulers, file-systems and automation tools like Puppet or Ansible.

## 3 Challenges for Research Infrastructure Developers

- Balancing the needs of the institution vs those of individual academics.

- Building infrastructure “right” (not increasing tech debt) despite resource constraints and changing requirements.
- The technology stack is a moving target and so RIDs need to be flexible and able to keep up to date.
- IT work is not esteemed by institutions or funders and so it can be challenging to feel the value to give to the organisation.

## 4 Benefits of having Research Infrastructure Developers

- The infrastructure which underlies research is more reliable and sustainable.
- Having experts build infrastructure frees up “brain capacity” of researchers to focus on research problems.
- Sharing of best practices in infrastructure design across projects and the consolidation of hardware and software.

(cl-infrastructure-rid-support)= ## Organisations that support Research Infrastructure Developers

Currently there are no national organisations as this is a new area being pioneered at UCL ARC. If you want help setting up a RID team in your organisation please contact ARC.

- [UCL ARC](#)

(cl-infrastructure-rid-summary)= ## Summary

Research Infrastructure Developers are highly skilled, valuable members of any institution that is conducting computational research. They bring technical design skills as well as best practices from hardware/software architecture and open source development to academic research. Some also conduct their own independent research projects.

## Bibliografie