

Enhancing coding skills with CloudStor SWAN

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Abstract

CloudStor SWAN (AARNet, 2022) is a research-focused web service for running analyses that is available to staff and students at many research institutes and Universities across Australia and New Zealand. In 2021, we used SWAN as a teaching tool in the master-level subject, Computational Genomics (COMP90016) at The University of Melbourne. This subject aims to teach students how to analyse large genomic datasets using best practices software tools, pipelines and student-written, custom code.

Although CloudStor SWAN was not conceived as a teaching tool, we worked with their technical staff to tailor the service to our use case. This innovative use of existing research infrastructure allowed us to effectively transition the subject to remote learning. Students and staff could log in to the service using their existing University credentials, from anywhere in the world, without the use of a VPN. The ability to access the platform from a web browser allowed for a consistent computing environment for all students regardless of operating system, and without having to worry about software installations on local machines. This presented a significantly improved experience from the custom servers that had been used in the past.

We used SWAN for weekly workshops during semester and for assessment in the form of assignments and an exam. It allowed us to format subject material in Jupyter notebooks where we could seamlessly integrate text, graphics and code. Additionally, assessed code questions can incorporate automatic marking and written submissions can be checked for plagiarism. SWAN also allowed us to introduce students to the UNIX command line, an important skillset that was not previously taught in the University of Melbourne Master of Science (Bioinformatics) program.

From a student perspective, SWAN allowed for a practical skillset to be developed alongside theoretical knowledge from other aspects of the course. The platform was simple to learn and allowed students to focus on the subject content and the tasks asked of them, rather than on the interface. From a teacher's perspective, having a unified platform allowed for a single set of clear instructions, improved troubleshooting and clearer management of tool versions and software dependencies. The use of Jupyter notebooks simplified lesson plans and assessments by integrating multiple elements into single documents. This element also made the lessons more easily sharable between colleagues and collaborators.

Our integration of this technology into our tertiary teaching has served as a model for a similar use at a different Australian university. We hope to share the lessons learned from this subject, the advantages of using CloudStor SWAN in a teaching environment for both staff and students and provide some advice for others who may want to adapt it to fit their own teaching needs.

References

AARNet. (2022). *CloudStor: Access, store, share and work with your data in one place.*
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