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| **Tertiary ICT Excellence Awards Submission Form** |
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| **Submitter Name:**  | Michelle Lindsay and Paul Arnold |
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| **Abstract Title:**  | Multi-cloud environment transformation in a tertiary word: UC's multi-cloud journey |
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| **Describe the technology or process that is core to your submission. Please be precise in describing exactly why this should be considered for the awards (max 500 words).**  |
| The delivery of the multi-cloud environment has been transformational across the UC digital landscape. It has delivered foundational capabilities which provided a base to move ahead with expansion of services to our broad range of end users enabling a full multi-cloud catalogue for the wider UC business.We commenced with foundation capabilities including delivery of:* Refreshed storage capability
* Modernised backup environment to cater for cloud-based systems and on-premises systems
* Repeatable Azure landing zone environment with supporting operational capabilities
* Upskilling of the in-house team including certifications and on-the-job learning supported with a key delivery partner
* Bringing our AWS environment support more in-house and engaging full-time platform engineers

Moving on from the foundational capabilities, we moved to expansion of the usage of our cloud capabilities partnering with our faculty teams:* Lift and shift migrations of some on-premises workloads to Azure – which gave us the added benefit of revisiting all workloads and retiring a large portion
* Proving out and enabling AWS usage for our research community
* Implementing a private cloud high performance compute environment for our researchers
* Modernising some of our key platforms into Kubernetes containers
* Embedding and enriching our FinOps capabilities
* Increasing our use of IaC and migrating to GitHub

In our last year of delivery, we are focusing on completing the catalogue of services across web applications, databases, virtual machines, desktops, containers, and more to ensure that our communities have a true multi-cloud experience available.We believe that these activities should be considered for an award due to the transformational journey we have undertaken from pockets of cloud use mixed with our on-premises environment through to a fully supported multi-cloud environment with a catalogue of services available tailored to our customer needs. This has realised our cloud strategy and put us on a path for maximum flexibility for future needs. |
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| **Briefly summarise how your submission supports and is valued by your organisation. Describe the customer or business benefits of the technology or process. For example, which key strategies did the enhancement meet, what business problem needed to be solved, or perhaps how does a key customer group benefit from a new or improved delivery process. (max 500 words).** |
| The Cloud Strategy provided a road map for the adoption of new technologies and processes to enable new ways of working to succeed. New ways of working were required to support our UC Strategic Vision 2030 which challenged us to provide ‘state of the art’ research, equipment, facilities and e-infrastructure. For UC, the Cloud Strategy provided the tools and core foundations required to provide our learners and researchers with the tools and experiences needed to fulfil this vision.To ensure that our business needs were considered and met, we progressed a multi-cloud implementation to ensure that flexibility to our end user needs was core and we were not constrained by our platforms as much as possible.Delivery of the multiple streams in our multi-cloud delivery has enhanced our business in the following ways:* Refreshed storage environment:
	+ Consumption based storage environment with visibility of usage to our end users
* Modernised backup environment with air-gapped/offsite Cybervault:
	+ Ability to backup all legacy and modern workloads and enabling a fast and robust recovery position
	+ Increasing our security maturity level
* Robust Azure environment with knowledgeable support staff:
	+ Provided a key platform for ongoing projects and solutions to utilise when a cloud-based environment is required
	+ Application teams can take ownership of their environments including the platform components
	+ Application teams can ‘try before they buy’ by utilising sandpits then validating their understanding with our team of cloud consultants
* Infrastructure as Code:
	+ Repeatable and highly supportable environment with a centralised repository for modules to be utilised by all teams
* AWS environment with in-house platform consultants:
	+ Alternate environment for desktops and bespoke services particularly for our research community
* FinOps capabilities:
	+ Visibility of usage consumption across storage, public cloud, private cloud and on-premises environments
	+ Environment owners can see the benefits of their optimisations and make better decisions on future enhancements
* Private cloud for our research community:
	+ Flexible toolset available for researchers to run their computational tasks against - offering high performance compute functionality and fast results
* Catalogue of services:
	+ Provides a ‘shop-front’ for our customers showing what is available through our multi-cloud environment, how it could be used, and providing flexibility depending on their end user needs
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| **Describe the broader applicability of the enhancement across different teams, departments, or institutions and how it might support long-term transformation and adaptability in the IT landscape.** |
| The resulting catalogue of services will be used by all our faculty teams to provide their end customers with fit for purpose platforms for their specific needs.It provides a flexible environment for future services involving our multi-cloud platforms utilising our centralised IaC repositories, robust FinOps capabilities, which is surfaced and served from our ServiceNow front end. |

**Describe how the project was taken from vision/idea to delivery, what challenges were met and how they were handled on the way (max 500 words).** |
| The vision for the implementation started with the Cloud Strategy published in 2022. This underpinned the Digital Strategy and the UC Strategic Vision 2030.Several business cases were approved across 2023 with delivery beginning later that year.Multiple procurements were required throughout delivery with various vendor selections based on best-fit against our multi-cloud strategy and our business need.Challenges faced by the project team included:* Delays in contracting
* Compressed delivery timeframe – particularly for the backup solution
* Ensuring that the current operations continued successfully whilst implementing new solutions
* Multiple vendors with some in different time zones
* Moving to consumption-based technologies and providing a show-back mechanism – visibility into what was previously considered to be ‘free’
* Scope control – keeping our focus on the end goal and not including too many additions throughout delivery

These challenges were managed with a very supportive and engaged governance team who assisted with priority calls when needed and guided the delivery team when scope needed to be challenged.Having a very collaborative and varied delivery team including vendors during the multiple streams that were implemented, ensured that issues were collectively discussed and addressed as quickly as possible.Our technology partners throughout delivery have been just that – partners rather than simply vendors delivering solutions. Through ongoing relationships, we have worked together to ensure we are delivering the business outcomes and not purely delivering a solution and walking away.Communications have played a key role in providing the visibility of the new technologies and the benefits of their use to our customers. This will continue to the end of the delivery and beyond with the help of our business champions and through our adoption of a collaborative approach with our faculty teams to increase their knowledge of the catalogue of services being implemented.We are not finished yet. After delivering the foundations, expanding on their use, and starting our move towards a full catalogue of services, we still have work to do. However, having a vision at the start and a delivery team that have been there from the beginning and will be supporting the full set of end products into the future, we feel confident in the benefits we are delivering for our customers. |
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| **Please detail any technologies that were implemented to deliver your enhancement or supply any other information you think may assist your submission (max 500 words).** |
| Across the delivery to date, technologies implemented have been as follows:* Consumption based PowerScale environment to increase our capacity allowing visibility of cost per usage and rapid scalability when required
* Commvault Cloud and on-premises Commvault backup environments to ensure all workloads can be backed up including an air-gapped, offsite Cybervault capability to rapidly enable recovery in a disaster
* Azure Landing Zones with Azure App Services, Azure Kubernetes Service, Azure Update Manager, Azure Policy, Azure Recovery Vaults, Azure Monitoring, Azure Front Door, VMs, SQL MI, Web Application Firewalls, ExpressRoute and other functions to provide a full-service Azure environment
* AWS services for our research community utilising EC2 instances, SQL and non-SQL DB, web application firewalls, serverless Lambda functions, S3 buckets, load balancing, Elastic Block Storage, Route 53, and deployments via CloudFormation
* Terraform Azure Verified Modules to ensure that IaC is at the heart of our deployment strategy
* FinOps utilising cloud native and on-premises pricing mechanisms for our PowerBI dashboards to provide a ‘show-back’ cost model for our end customers
* Lift and shift migrations utilising Azure Migrate with Dr Migrate for discovery information
* Private cloud environment with Dell infrastructure utilising an Open OnDemand front end and a configuration utilising Metal as a Service, OpenStack, Kubernetes, HPC Middleware, and Slurm, with the ability to burst out to the AWS environment when more capacity is needed
* GitHub pipelines for CI/CD including self-service provisioning through ServiceNow (commenced in 2025)
* AWS linux desktops utilising both AppStream 2.0 and AWS Workspaces

Throughout this delivery, we have ensured that repeatable design patterns and standard operating procedures have been documented into Confluence to provide operational teams with the knowledge to successfully support the newly implemented environments.Training and certifications across the technologies have also been completed by the supporting staff.Please see the supplemental information for a view of the high level repeatable patterns and designs – noting that this is the high level view only and the actual documented designs have build steps and operational requirements included.We have also included a short video of our AWS linux desktops service offering as an example of the services that we are building to share out with our customers. |
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| **Please supply the name, title and contact details of two people whom our judges may contact as referees. Ideally the referees should have knowledge of the implementation and its benefits from a customer or Institutional management perspective.** |
| * Michael Oulsnam – Chief Digital Officer, 021 737 125, Michael.oulsnam@canterbury.ac.nz
* Keith Longden – Executive Director of Planning, Finance and Digital Services, 03 369 3454, keith.longden@canterbury.ac.nz
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| **Please list all technology suppliers involved in the project.** |
| * Sempre
* Datacom
* Dell
* DoItNow
* AWS
* Microsoft
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