



# FROM CONCEPT TO CLOUD

PIONEERING DIGITAL SOLUTIONS FOR  
RESEARCH-BASED TEACHING IN THE  
HUMANITIES AND THE SOCIAL SCIENCES



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AARHUS UNIVERSITY

DIGITAL CURRICULUM  
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MADS ROSENDAHL THOMSEN  
PROFESSOR



# FROM CONCEPT TO CLOUD

## – PIONERING DIGITAL SOLUTIONS FOR RESEARCH-BASED TEACHING IN SSH

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AARHUS  
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CENTER FOR HUMANITIES COMPUTING



# OUTLINE

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1. background
2. problem formulation – concept
3. solution – cloud
4. challenges & opportunities



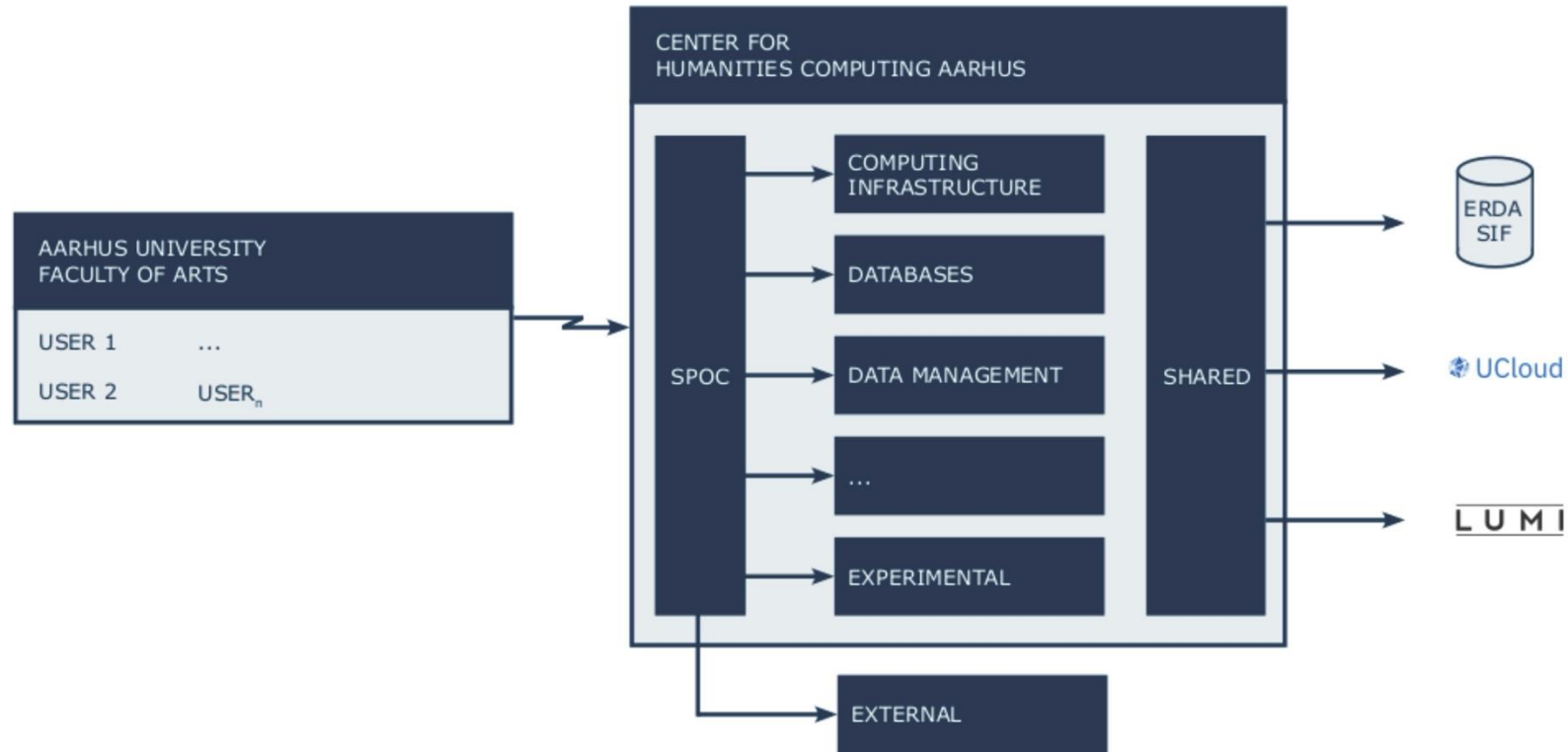
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# Center for Humanities Computing



research, develop and deploy scalable digital research infrastructure, from databases to AI tools.



## Tooling for education

proper tooling makes researchers and educators' lives *a lot* easier

⇒ demand for flexible tools is a response to tool diversification and large, heterogeneous data

**flexibility/usability tradeoff** :: flexible tools satisfy more requirements → complexity↑ & usability↓

*SSH have historically solved the f/u tradeoff with a gui-based model*

**graphical user interface** ::

- visual approach to computer interaction
- fast learning curve & **usability**↑
- 'plug-n-play' solution with limited flexibility

**command line interface** ::

- text-based approach to computer interaction
- resource efficient & **flexibility**↑
- expert-friendly solution with limited usability

*interactive solutions (flexibility↑ & usability↑) are gaining traction in research*

DC-Support

Data

Tools



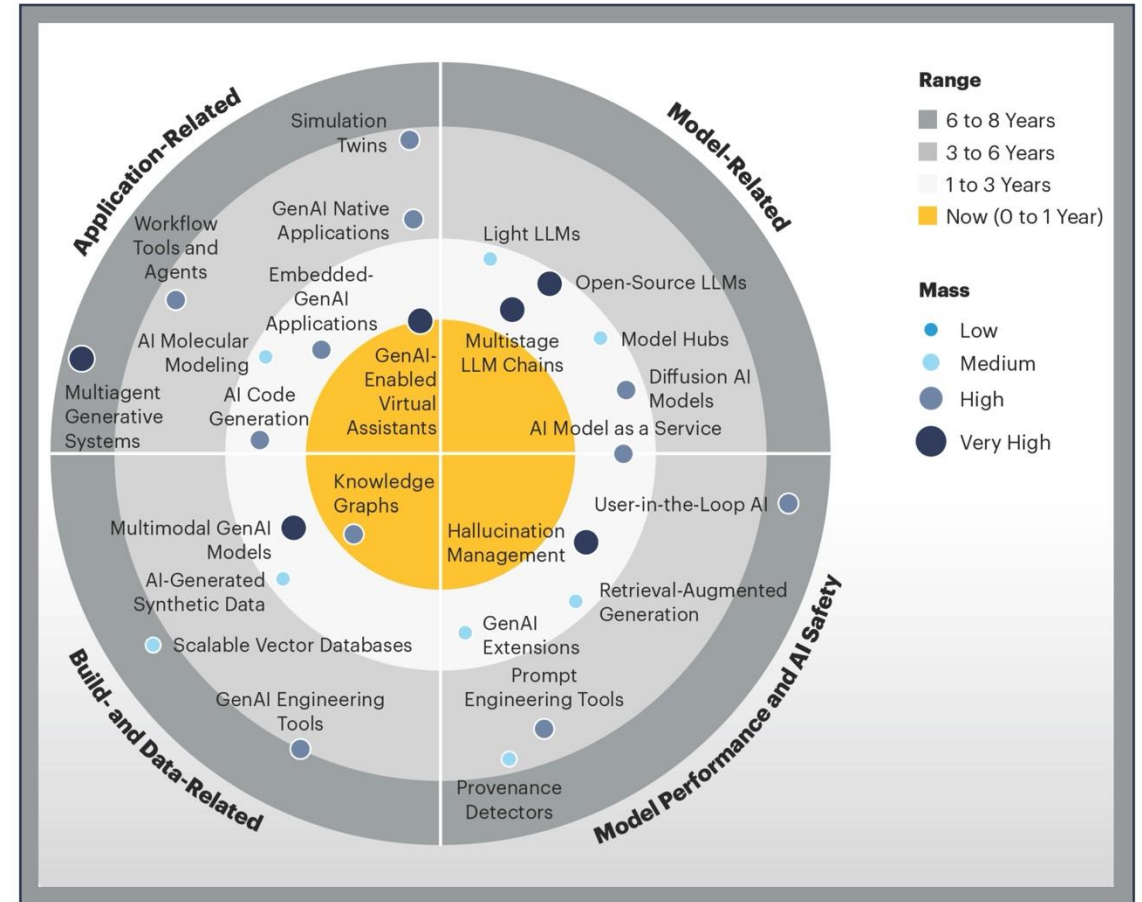
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# digital curriculum

“at its core, Digital Curriculum focuses on integrating knowledge and technologies from the digital transformation of research into education, equipping students with advanced tools and insights early in their learning journey.”

- translating Research IT to an educational context
- DC is *not* about educational IT



Impact reader for GenAI anno 2023, source: Gartner



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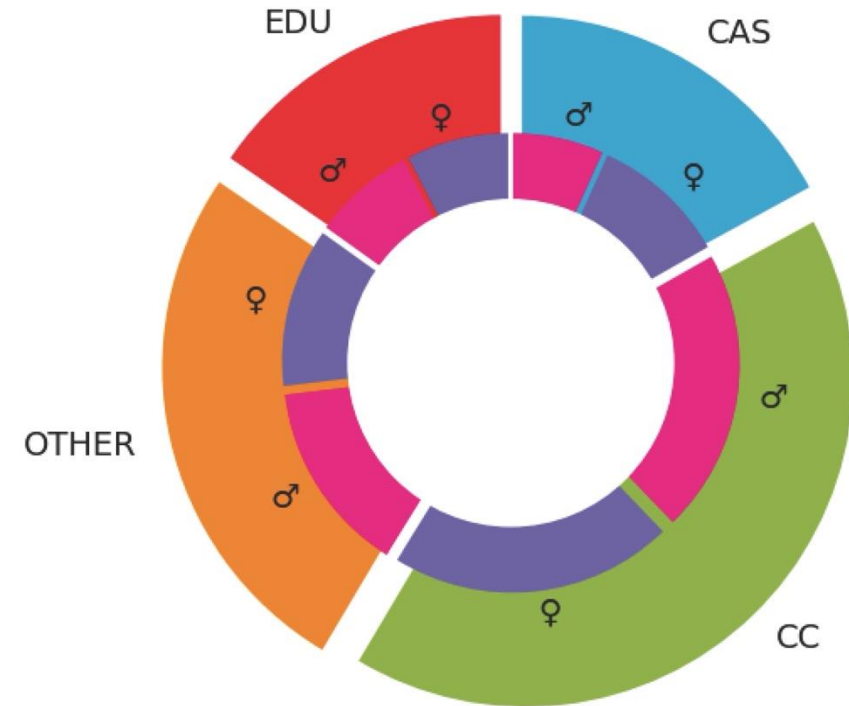


**the toolchain compatibility challenge** – arises when teaching technical subjects that require scripting and programming across a diverse range of student operating systems (Windows, macOS, Linux). Instructors must navigate the complexities of toolchain **installation and maintenance on various platforms, each with different configurations, permissions, and dependencies**. This issue is not isolated to the first class but **persists as students encounter system updates or version conflicts**, making consistent learning experiences difficult to manage.



## secondary dependencies

- digital equity in education
- resilient digital infrastructure in education
- unified resource management for instructors and students
- sustainable course infrastructure that reflects the reality of course management



cloud-based *VRE projects* distributed on AU Schools and Gender



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## WORKSTATION

seamless access to a large flexible work station

## COLLABORATION

share data with your collaborators in secure virtual environments

## DATA SCIENCE & AI

popular frameworks in everything from interactive notebooks and AI frameworks to a Spark cluster for complex workflows

## INTERACTIVE

GUI to give access to interactive HPC with preloaded apps and on-demand customization

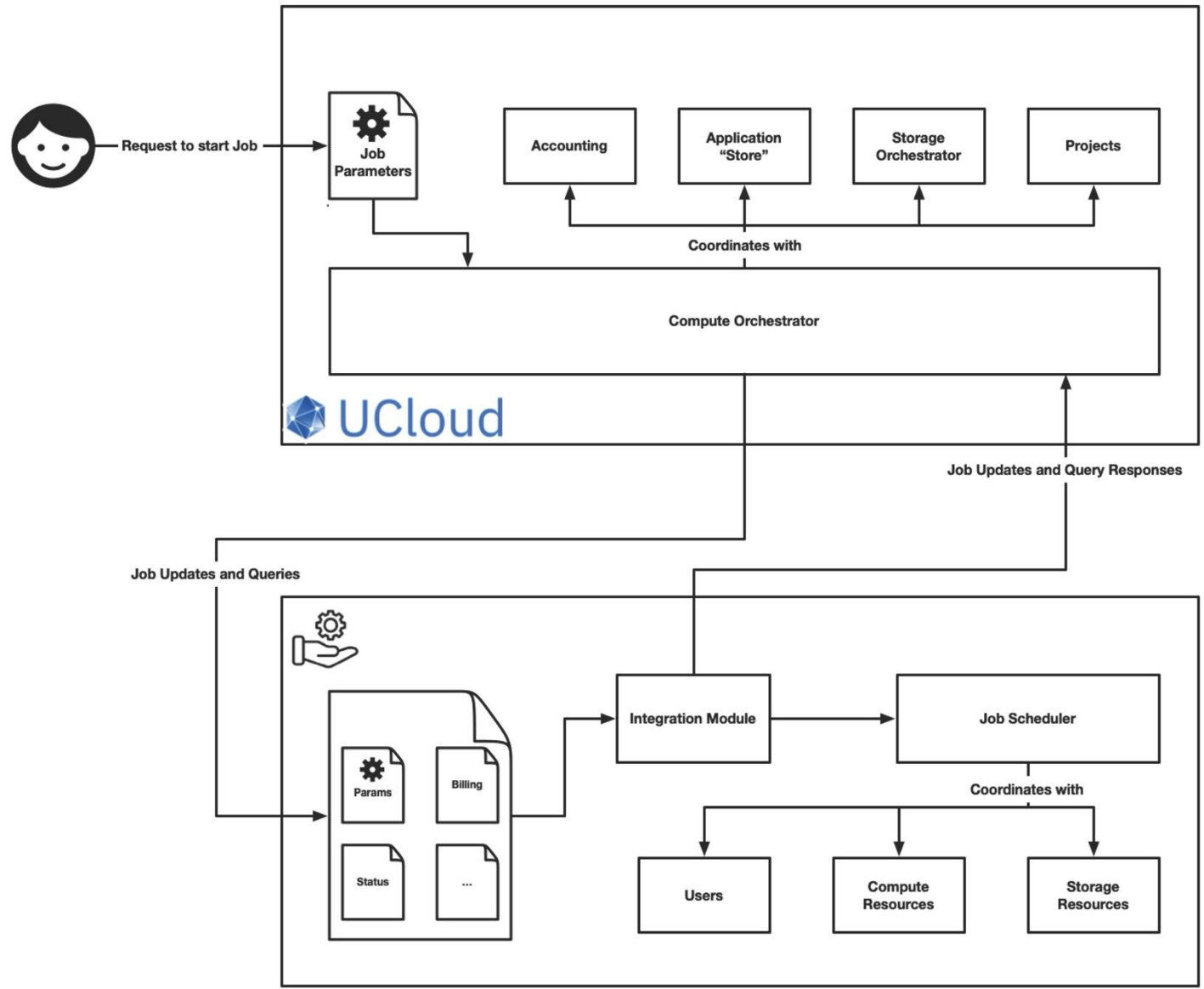
## EDUCATION

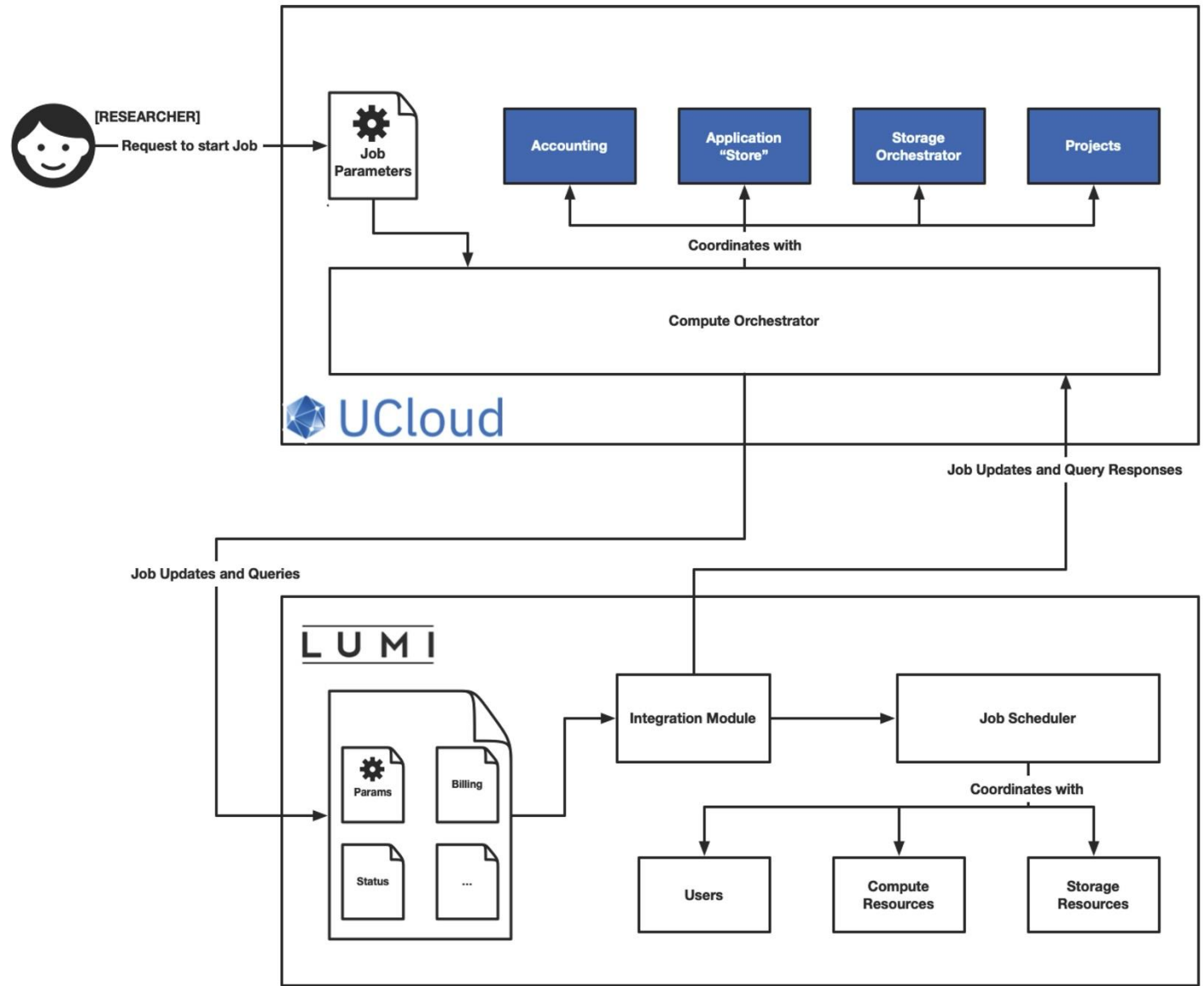
student access with university credentials 24/7 with simple resource management

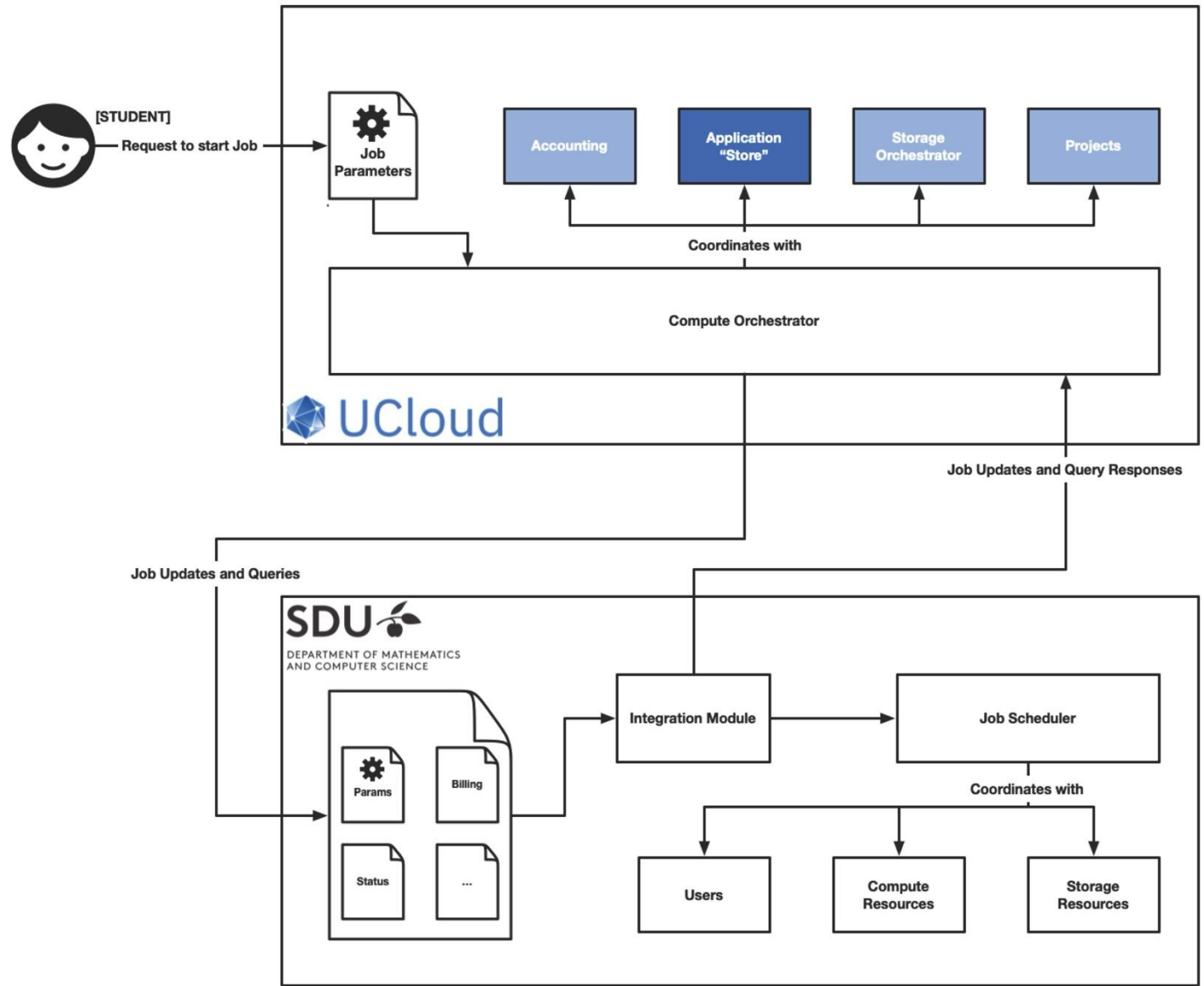
## SECURITY

suitable for sensitive data analyses in compliance with GDPR regulations









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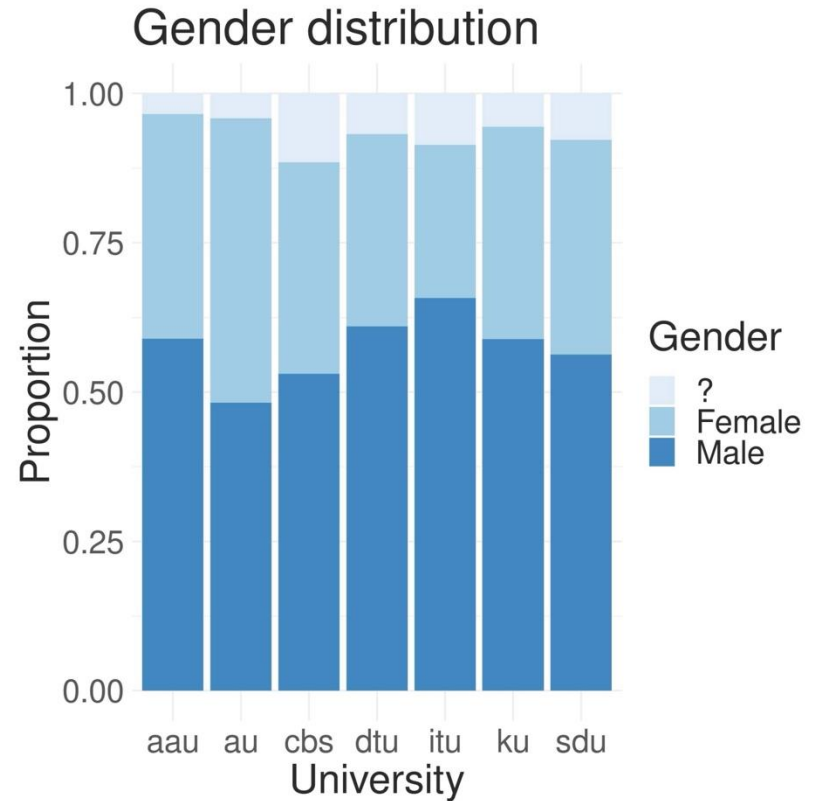
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## » towards an educational cloud model

- interactive cloud is a **scalable solution** to the need for technology in education
- students use technology that **translates to a job market**
- educational applications solve the 'the toolchain compatibility challenge'
- enable **equity and resilience** in a unified and sustainable infrastructure

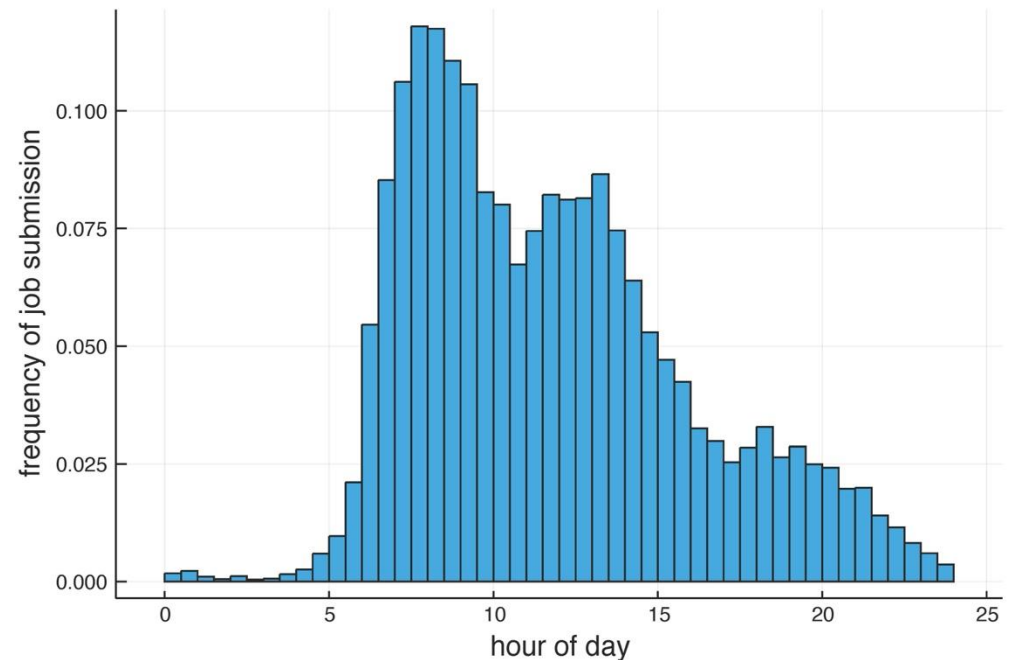


Distribution of gender between Danish universities.



## » challenges in cloud-based teaching

- *there is no such thing as a free lunch*
- pedagogical alignment
- teacher competency and adoption resistance
- **culture shift** – influencing requirements to how educators can engage with technology
- data privacy and security should be managed by the institution



Distribution of jobs over 24hr



**THANK YOU**

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**SLIDES**

[knielbo.github.io/files/dc-2024.pdf](https://knielbo.github.io/files/dc-2024.pdf)



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SLIDE 18 IN 18

