



Science Gateways
Community Institute



CI landscape, Four Facings and Theory-Software Translation

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The Four Facings defined by CaRCC

- Researcher facing
 - Systems facing
 - Software/data facing
 - Sponsors/Stakeholder facing
-
- All areas are interesting for us – Where do we start?

The CI Professional Ecosystem

- Clemson-led ACI-REF project, ACI-REF VR
- Coalition for Academic Scientific Computation (CASC)
- Campus Research Computing Consortium (CaRCC)
- Campus Champions
- CyberAmbassadors
- Linux Clusters Institute
- SIGHPC Education Chapter
- Software & Data Carpentry
- Science Gateways Community Institute
- UK Research Software Engineer Association
- US Research Software Engineer Association
- UK Software Sustainability Institute
- Working Toward Sustainable Software for Science Practice and Experience (WSSSPE)
- US Research Software Sustainability Institute
- ...



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US
Research
Software
Sustainability
Institute

Research Software Landscape

Get to know our

- users (diverse research domains, faculty, ...)
- stakeholders (host institution, funding bodies – NSF, NIH, DoE, DoD, DARPA, Moore Foundation, etc.)
- partners (projects, initiatives, experienced IT people)
- volunteers (contributors to open-source and/or open science)

and their challenges as well as their goals – besides publications and funding.

Often their challenges are our challenges!

- Research software solutions
- Computing resources
- Data analytics
- Preservation needs

Sustainability for Cyberinfrastructure

Bridging the Gap to Data Sharing

Researchers



Image Credit: Pavel Afanasyev (CC BY 2.0)

"the local academic community struggles to effectively manage its assets which manifested itself in a number of challenges, and as for researchers, they lacked storage capacity and data curation processes, and the institution lacked standard metadata and indexing technologies, as well as tools that would support the whole research workflow" - Digital Asset Strategy Committee, DigitalND, 2011

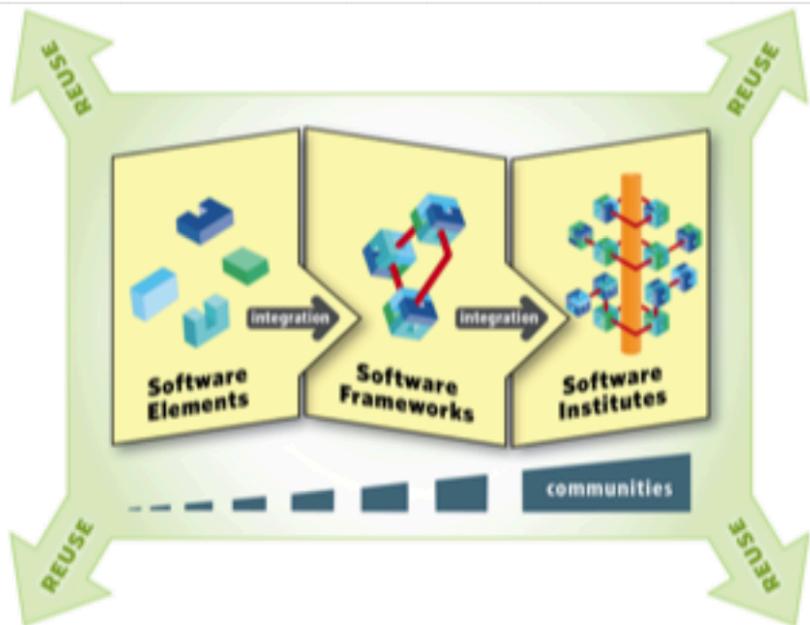
Libraries

Typically, data curation happens retroactively, and as a result data is either not captured at all or available metadata is incomplete.

Pressures from the Outside

"...digitally formatted scientific data resulting from unclassified research supported wholly or in part should be stored and publicly accessible to search, retrieve, and analyze." - White House OSTP Public Access Memo, Feb. 2013

Sustainability for Cyberinfrastructure - NSF



Elements: Small groups - create & deploy robust capabilities for demonstrated need to advance science & engineering.

Framework Implementations: Larger teams organized around the development and application of common infrastructure aimed at solving common research problems, resulting in a sustainable community framework serving a diverse community or communities.

Planning Grants for Community Cyberinfrastructure: Focus on long-term capabilities in cyberinfrastructure to serve a research community of substantial size and disciplinary breadth.

Community Cyberinfrastructure Implementations: Focus on long-term hubs of excellence in cyberinfrastructure and technologies, to serve a research community of substantial size and disciplinary breadth.

SI2
Software Infrastructure for
Sustained innovation

CSSI
Cyberinfrastructure for Sustained
Scientific Innovation

Sustainability for Cyberinfrastructure - NSF

Sustainability Institutes and Excellence Hubs are funded to support the CI and research community

Support via implemented institutes is free for you!
Your chance to influence conceptualizations!

Implementations

- Science Gateways Community Institute
- The Molecular Sciences Software Institute
- High-Energy Physics

Conceptualizations

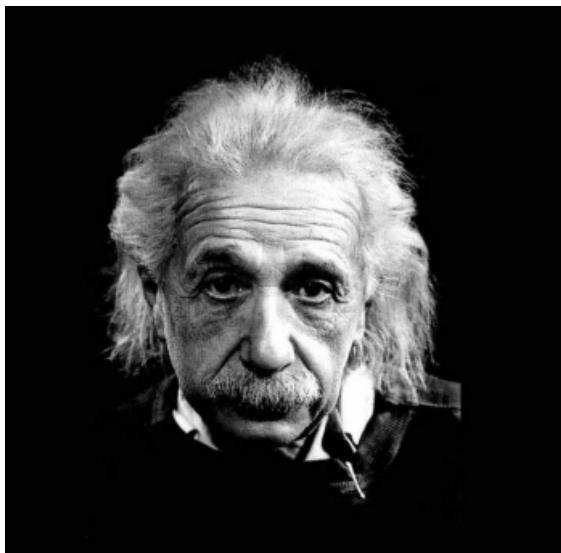
- URSSI
- Geospatial
- ...



State of the Art in Research

Increased complexity of

- research questions
- hardware
- software
- instruments
- data volume
- data formats

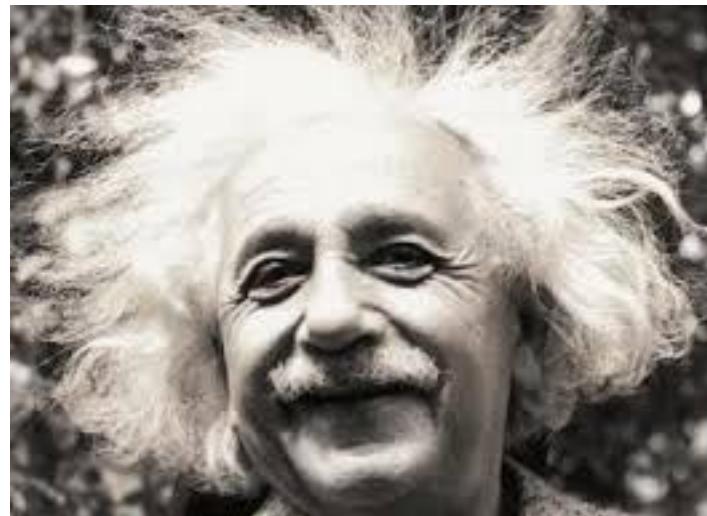


The need for **end-to-end solutions** for accessing **data, software, computing services, and equipment** specific to the needs of a science or engineering discipline

Science Gateways

Increased complexity of

- research questions
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The need for **end-to-end solutions** for accessing **data, software, computing services, and equipment** specific to the needs of a science or engineering discipline

Science Gateways!

Research Software

Use
Can't
continue
without

90%

70%

95%

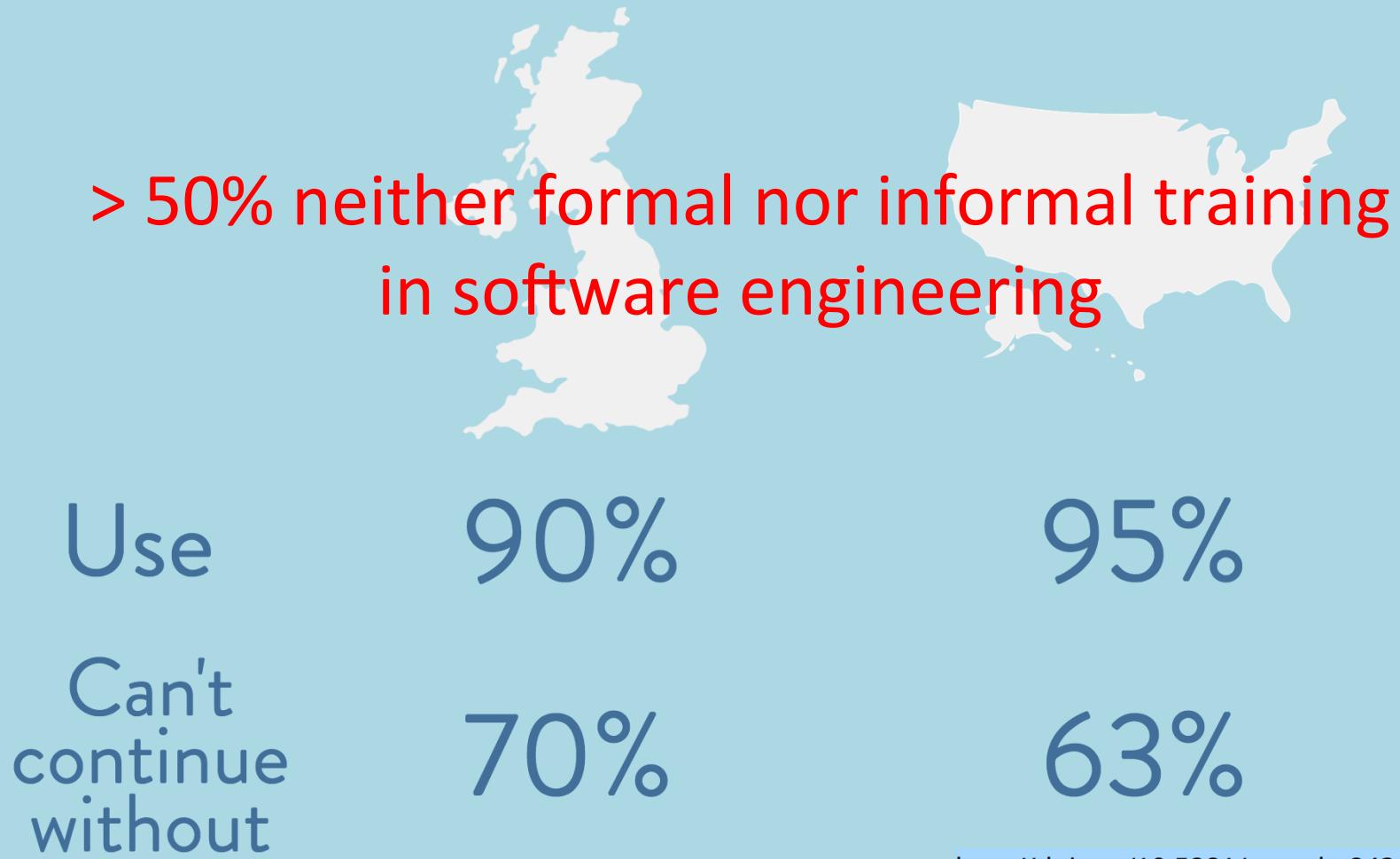
63%



Source: US National Science Foundation Survey

<http://doi.org/10.5281/zenodo.843607>

Research Software



<http://doi.org/10.5281/zenodo.843607>

- Functioning of the individual and team
- Functioning of the research software
- Functioning of the research field itself



Developing a pathway to
research software sustainability

Lessons Learned on International Level

UK SSI and UK Research Software Engineer Association

- Buy-in from universities
- Viable career path
- Large community



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Software Sustainability



Software
Sustainability
Institute

About

Programmes and Events

The importance of sustainability

Sustainability means that the software you use today will be available - and continue to be improved and supported - in the future.

Better science through superior software

Our work is focussed around four themes we believe are fundamental to doing research correctly in the digital age. These are related to [our manifesto](#).

The first of these is **Skills and Training**: creating a capable research software community by enabling access to software development training for all researchers and teaching them methods to advance their research.

Recognition and Reward promotes and contributes to systems of credit for good software development and reuse practice.

Career Paths recognises and champions the varied job roles associated with research software; with a primary focus on the academic sector but suggesting industrial practice where applicable.

Finally, **Reproducible Research** promotes the fundamental place of software in supporting confidence in the research process and its results.

Taken together, these enable the efficient and effective use of software to tackle both the grand challenges that push the boundaries of human knowledge to day-to-day research software tasks.

<https://www.software.ac.uk/about>



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What Are Our Next Steps?

How to change **research culture**? How to have
not scattered approaches?

- Meetings with stakeholders
- Topics
- White papers
- Community building
- ...

What Are Our Next Steps?

Let's make the next steps together!

Thanks!

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