

Moving Virtual Research Environments from high maintenance Stovepipes to Multi-purpose Sustainable Service-oriented Science Platforms

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MINERAL RESOURCES
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Why VREs?



- The researcher of today is likely to be part of a team:
 - Distributed over multiple sites
 - Access data from an external repository
 - Process data on remote cloud or HPC
- These components will be connected into a Virtual Research Environments.
 - Share data, models, tools, software, workflows, infrastructures, etc.

VREs as “Cylinders of Excellence”



Image R. Zenz CC BY-SA

- Many VRE’s are built in isolation:
 - designed to meet a specific research program,
 - components tightly coupled,
 - ‘stovepipes’ that cannot be repurposed for other use cases.
- The limited number of users of some VREs can mean unacceptably high maintenance cost per researcher.

VREs as Science Platforms



Image © NeCTAR

- The alternative is to develop service-oriented Science Platforms.
 - Offer access to data, software tools and processing infrastructures through interconnected modules.
 - Enable multiple communities to develop specialised solutions for specific research programs.

Virtual Geophysics Lab (VGL)

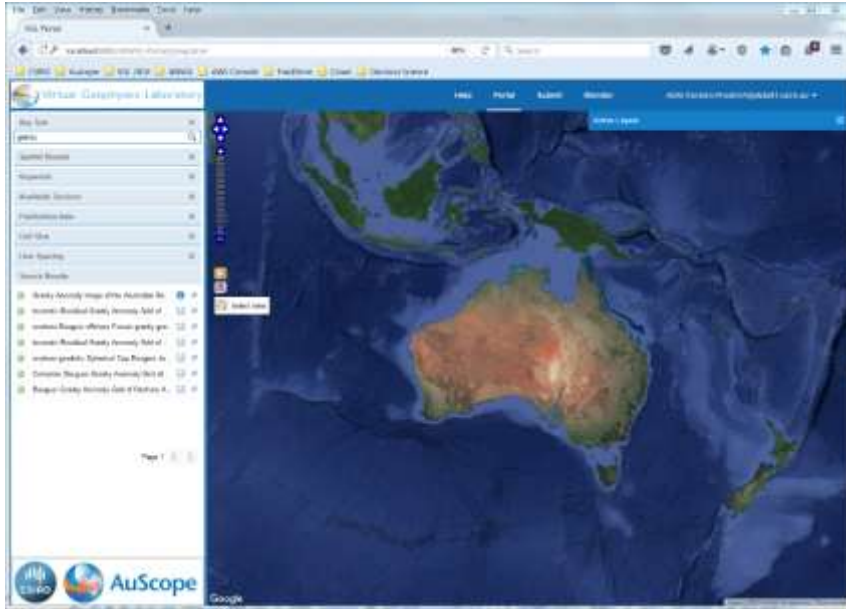
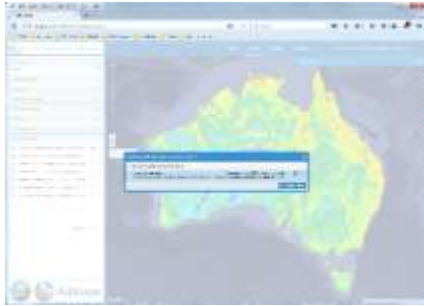


Image © CSIRO

- the Virtual Geophysics Laboratory (VGL) was initially built to enable processing of specific geophysical data by a specific group of researchers:
 - specific data sets,
 - limited number of tools.

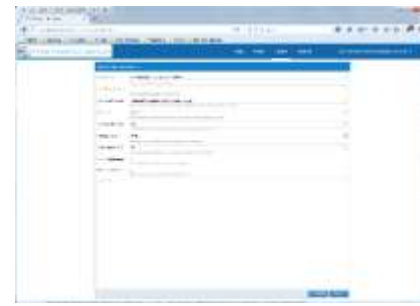
Workflows



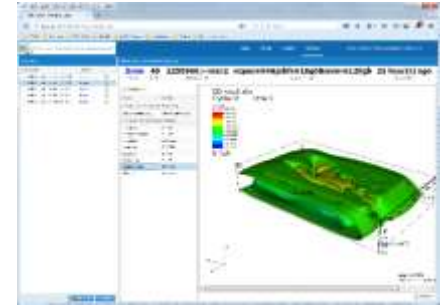
Select dataset



Parameterise process



Select compute infrastructure



Access results

Workflows and Interfaces

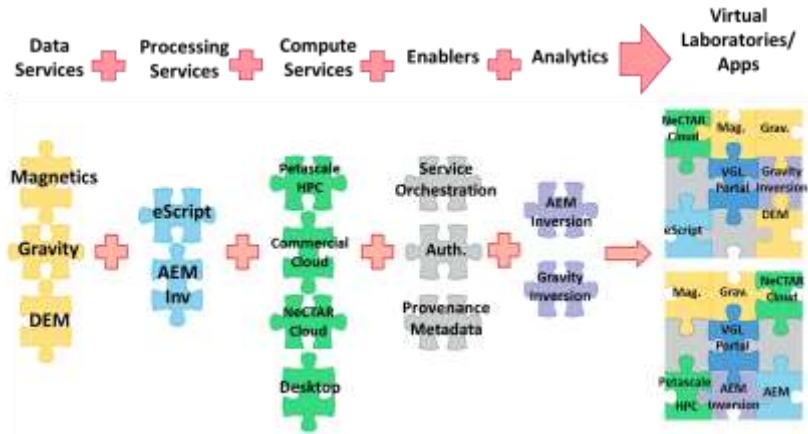


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- Data, tools and compute resources are loosely coupled via interfaces.
- Architecture based on international standards and web services.
- This architecture made the expansion to new fields of application relatively easy.

LIKELIHOOD YOU WILL GET CODE WORKING
BASED ON HOW YOU'RE SUPPOSED TO INSTALL IT:



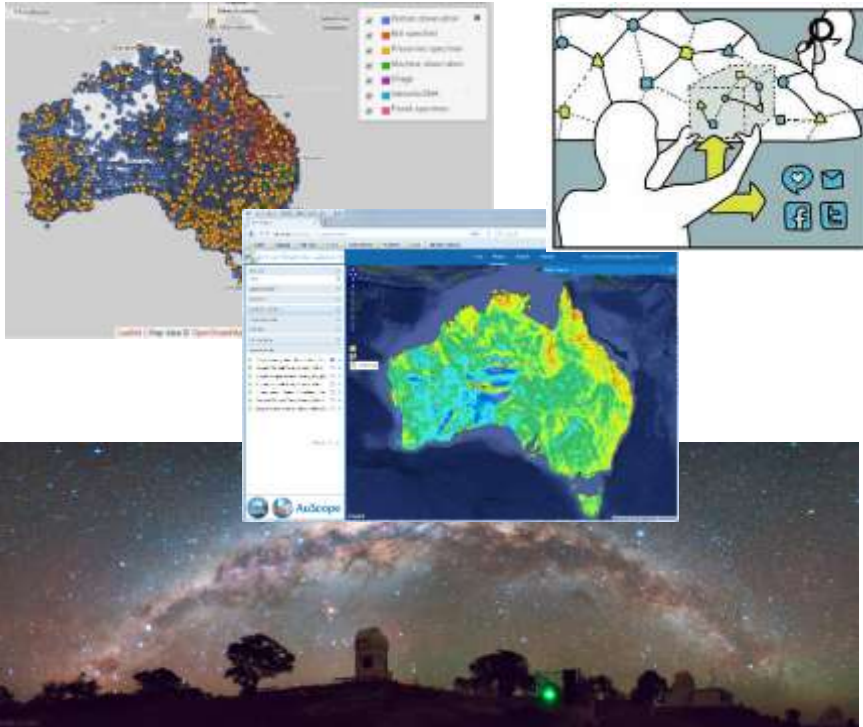
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... Batteries Included

- Enabling new science applications requires portability of components.
- Software-as-a-Service in the research sector is not yet mature.
- In response, we developed a Scientific Software Solutions Centre (SSSC).
- SSSC enables researchers to discover, deploy and then share computational codes, code snippets or processes both in a human and machine-readable manner.

Australian Virtual Lab Community

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- the Australian Virtual Laboratory community is growing:
 - Astronomy
 - Genomics,
 - Environment
 - Humanities
 - Climate
 - ...

Sustainable VREs



Image © ANDS



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- Components such as access control, provenance, visualisation, accounting etc. are common to all scientific domains
- Sharing of components across multiple domains
 - reduces costs,
 - increases the ability to undertake interdisciplinary science.
- These efforts are transitioning VREs to more sustainable Service-oriented Science Platforms that can be delivered in an agile, adaptable manner for broader community interests.

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