



# Building Flood Models with Geonode

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Geonode Summit 2018 Turino, Italy

Legend ✕

Max Depth - 4

0.00m

0.10m

0.20m

0.40m

0.60m

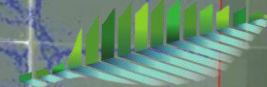
0.80m

1.00m

Full

☐

50mm\_hr

☐





Settings

Manage  
Inputs

Manage  
Simulations

Legend

Max Depth - 4

0.00m

0.10m

0.20m

0.40m

0.60m

0.80m

1.00m

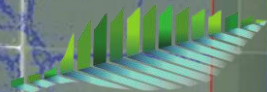
Full

50mm\_hr



BY SA

Powered by Hydrata



# The ANUGA finite volume numerical model

- ANUGA is open-source software for the simulation of the shallow water equation.
- Open source development is led by the Australian National University and Geoscience Australia.
- Used to analyse flood, tsunami, dam-break, bridge design, river restoration, erosion management...
- Written in Python (most) and C (computational components)

[https://github.com/GeoscienceAustralia/anuga\\_core](https://github.com/GeoscienceAustralia/anuga_core)

The screenshot shows the GitHub repository for 'GeoscienceAustralia / anuga\_core'. At the top, it displays repository statistics: 55 Unwatch, 36 Star, 32 Fork, and 32. Below this, there are tabs for Code, Issues (40), Pull requests (2), Projects (0), Wiki, and Insights. The repository description is 'AnUGA for the simulation of the shallow water equation' with a link to 'https://anuga.anu.edu.au'. There are also tags for 'shallow-water-equations', 'tsunami', 'finite-volume', and 'flooding'. A progress bar shows 4,229 commits, 3 branches, 7 releases, and 16 contributors. Below the progress bar, there are buttons for 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find file', and 'Clone or download'. The main content area shows a list of files and their commit history:

File	Commit Message	Time Ago
stoiver Update appveyor.yml	Latest commit 0c7d723 12 days ago	
anuga	Merge pull request #164 from 88hoddle/reporting	13 days ago
doc	build_all.py runs setup.py build but hides the warnings	3 years ago
examples	fixes for trapezoid	4 months ago
source/anuga_parallel	Getting runtests.py to work	3 years ago
tools	Update install_conda_macos.sh	3 months ago
validation_tests	Merge pull request #164 from 88hoddle/reporting	13 days ago
.coveragerc	Update .coveragerc	3 years ago
.gitignore	added cairns_initialcond to gitignore	a year ago
.travis.yml	Turn parallel off on travis	4 months ago
CONTRIBUTING.rst	Fixes #32 - Incorrect master branch link in CONTRIBUTING.rst	3 years ago
INSTALL.rst	Update INSTALL.rst	a year ago
LICENCE.txt	small cleanup of get_revision code	3 years ago
MANIFEST.in	Finding MICROSOFT compiler bugs	3 years ago
README.rst	Update README.rst	4 months ago
appveyor.yml	Update appveyor.yml	12 days ago
build_all.py	build_all.py runs setup.py build but hides the warnings	3 years ago

## Traditional Flood Study



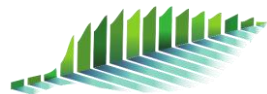
- Stored on a specialist's hard-drive.
- Hard to update.
- Hard to manage change.
- Expensive licensing can restrict stakeholder access for scenario testing

VS

## Online Flood Study



- Stored in Geonode.
- Update online.
- Can track change.
- Open source model licensing allows for accessible scenario testing and collaboration.







Projects

Merewether01



david.kennewell

- Settings
- Manage Inputs
- Manage Simulations

Legend







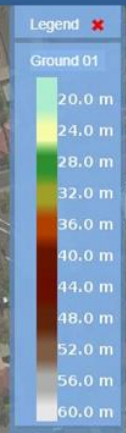
Projects

Merewether01



david.kennwell

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- Manage Simulations







Projects

Merewether01



david.kennewell

Settings

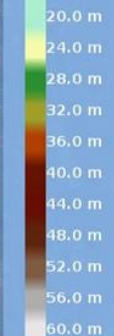
Manage  
Inputs

Manage  
Simulations



Legend

Ground 01



100yrSurface

full





Projects

Merewether01



david.kennewell ▾

- Settings ▾
- Manage Inputs ▾
- Manage Simulations ▾



Legend

Ground 01

20.0 m  
24.0 m  
28.0 m  
32.0 m  
36.0 m  
40.0 m  
44.0 m  
48.0 m  
52.0 m  
56.0 m  
60.0 m

100yrSurface

Houses 01

full





Projects

Merewether01



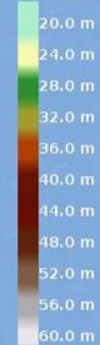
david.kennewell ▾

Settings ▾

Manage  
Inputs ▾Manage  
Simulations ▾

Legend

Ground 01



100yrSurface



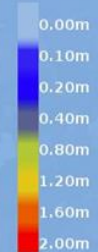
Houses 01



full



Max Depth - Existing100yr



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44° 20' E

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Projects

Merewether01



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Settings

Manage  
InputsManage  
Simulations

Legend

100yrSurface

Houses 01

full

Max Depth - Existing 100yr

0.00m

0.10m

0.20m

0.40m

0.80m

1.20m

1.60m

2.00m





Projects

Merewether01



david.kennewell

Settings

Manage Inputs

Manage Simulations

Legend

100yrSurface

Houses 01

full







Projects

Merewether01



david.kennewell

Settings

Manage Inputs

Manage Simulations

Legend

100yrSurface

Houses 02

full







Projects

Merewether01



david.kennewell

Settings

Manage Inputs

Manage Simulations



Legend

- 100yrSurface
- Houses 02
- Max Depth - Proposed 100yr
- 0.00m
- 0.10m
- 0.20m
- 0.40m
- 0.80m
- 1.20m
- 1.60m
- 2.00m
- full





Projects

Merewether01



david.kennewell ▾

Settings ▾

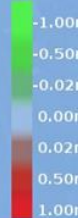
Manage  
Inputs ▾Manage  
Simulations ▾

Legend

100yrSurface

Houses 02

full

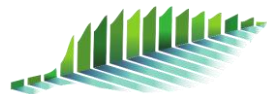
Existing100yr and  
Proposed100yr



Interactive demo:  
<https://hydrata.com/anuga>

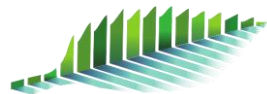
Training video:  
<https://youtu.be/Xztwz3sEDvs>

GitHub:  
<https://github.com/Hydrata>

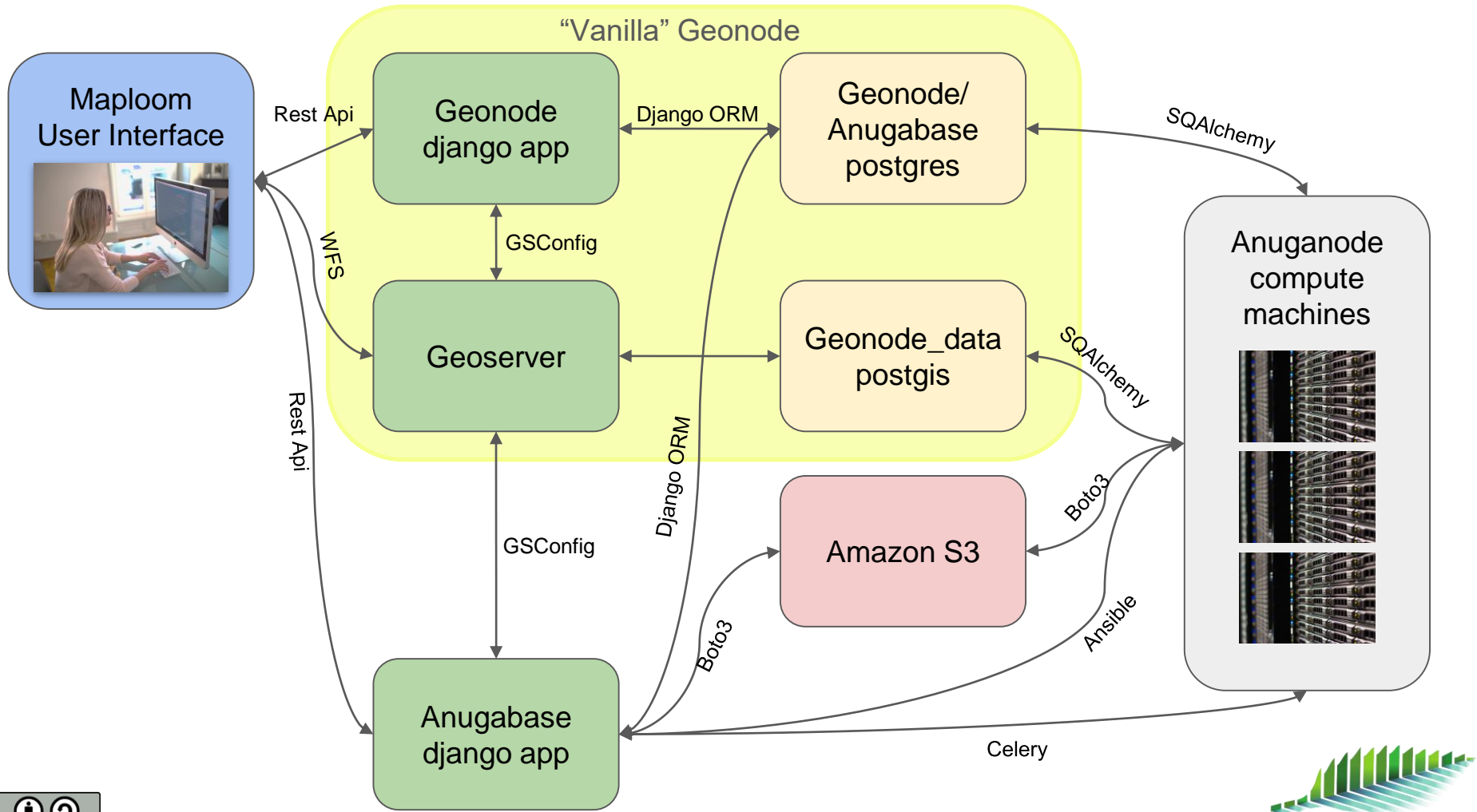




# How does it work?









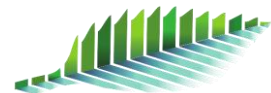
# Some lessons learned

- Commit to a cloud vendor, but not too much (for example, use IaaS, not PaaS)
- Always script the server build process (for example: vagrant, shell scripts and ansible)
- The most effective way to namespace data in this case is to prepend identifiers onto any data filenames when they are uploaded or created:

`merewether_dem_myfreeformLayerNameHere.shp`

Project id    Data type id    Description  
10 chars    3 chars    the rest

These datasets can then be filtered/classified/secured by the UI or APIs as required, anywhere in the app.



Please do get in touch.  
It would be great to:

- Partner on a project together
- Collaborate on Geonode development
- Set you up with a free trial for hydrata.com
- Receive feedback (bonus points for this!)

david.kennewell@hydrata.com

