Introduction to the new ACCESS modelling environment

accessdev, rose and cylc

www.cawcr.gov.au

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NCI

ARC CENTRE OF EXCELLENCE FOR CLIMATE SYSTEM SCIENCE

Australian Government
Bureau of Meteorology

The Centre for Australian Weather and Climate Research
A partnership between CSIRO and the Bureau of Meteorology

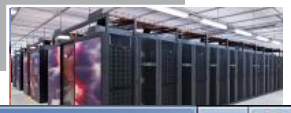
CSIRO

Overview

- NeCTAR Climate and Weather Simulation Laboratory
- Goals
- Present status
- Why change?
- accessdev
- cylc
- rose

NeCTAR CWSLAB





Virtual lab

cwslab-webdev.nci.org.au

Google

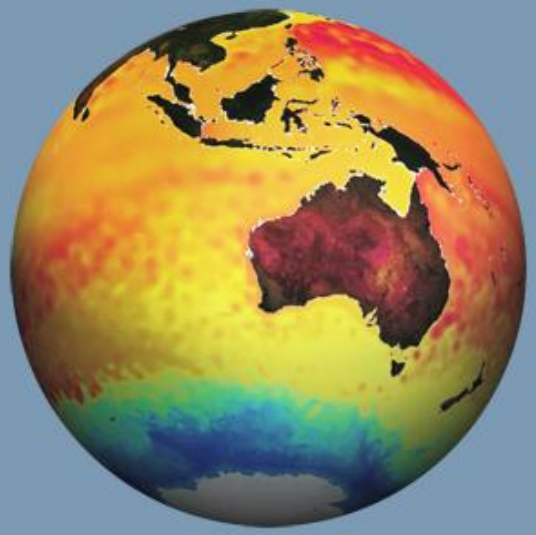
Feedback

CLIMATE + WEATHER SCIENCE LABORATORY LAB SIGN IN

cws lab

an open community

beta



Are you new here?

CREATE AN ACCOUNT

If you already have an NCI account, registering with us will let view projects and view experiments, collaborate with other researchers and more

EXPLORE THE LAB

See what's on offer, look around. Make suggestions using our feedback form.

The climate and weather science

- increase access to data archives and modelling products
- reduce technical barriers to state of the art tools

NeCTAR CWSLAB

1. ACCESS Simulation and Modelling Service
2. Model analysis service
3. Data library, analytics, and service interfaces
4. Web content and integrated services

Ambition

- All users (COE and CAWCR) have the same modelling environment
  - Seamless across organisations
  - Documentation and support
  - Efficient workflows
  - Reproducibility and traceability
  - Testing and release management
- Capability to do the same wide range of experiments
  - NWP, seasonal, climate, ESM
  - Global, regional, idealised
  - Availability of observations and initial conditions

Goals

- Library of supported and documented standard experiments
  - Including climate, NWP, idealised
- Improved user interface for the coupled model
  - Experiment configuration database for coupled model
- BOM research and operational NWP configurations available
- Adoption of new Met Office technical infrastructure
- Integration with archiving and analysis services
- Better access to BOM data (forecasts, analyses, initial conditions)
- *Goal is to improve ease of use, reproducibility, support and sharing of code, data and experiments*

Existing modelling system

- Models run on raijin and ngamai with UMUI on accesscollab, cherax and ngamai
- Various code repositories on access-svn.nci.org.au
- Wiki at https://trac.nci.org.au/trac/access/wiki
  - Met Office wiki http://collab.metoffice.gov.uk/view
  - COECSS CMS wiki http://climate-cms.unsw.wikispaces.net/
- Help mailing list access_help@nci.org.au
- raijin:~access
  - Data
  - Software modules

Why change?

- Opportunities with BOM moving research to NCI
- Met Office introducing new modelling infrastructure
  - UMUI has many good features but is difficult to maintain and keep up to date with code changes
- Need for a better system for running the coupled model than existing scripts.
  - Doesn't have a lot of the benefits we've found with the atmospheric model and the UMUI
- More sophisticated job control within suites
  - BOM has had this with SMS for NWP

accessdev

- NCI cloud is a new way of managing virtual machines for special purposes
  - NCI would like to retire older systems like acesscollab
  - New system has benefits for reproducibility of configurations, creating test systems etc
- We needed a new system for testing new tools without upsetting anything on accesscollab
- Eventually accesscollab will be retired and UMUI jobs migrated to accessdev
- rose & cylc won't be supported on cherax

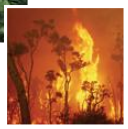
accessdev: Getting started

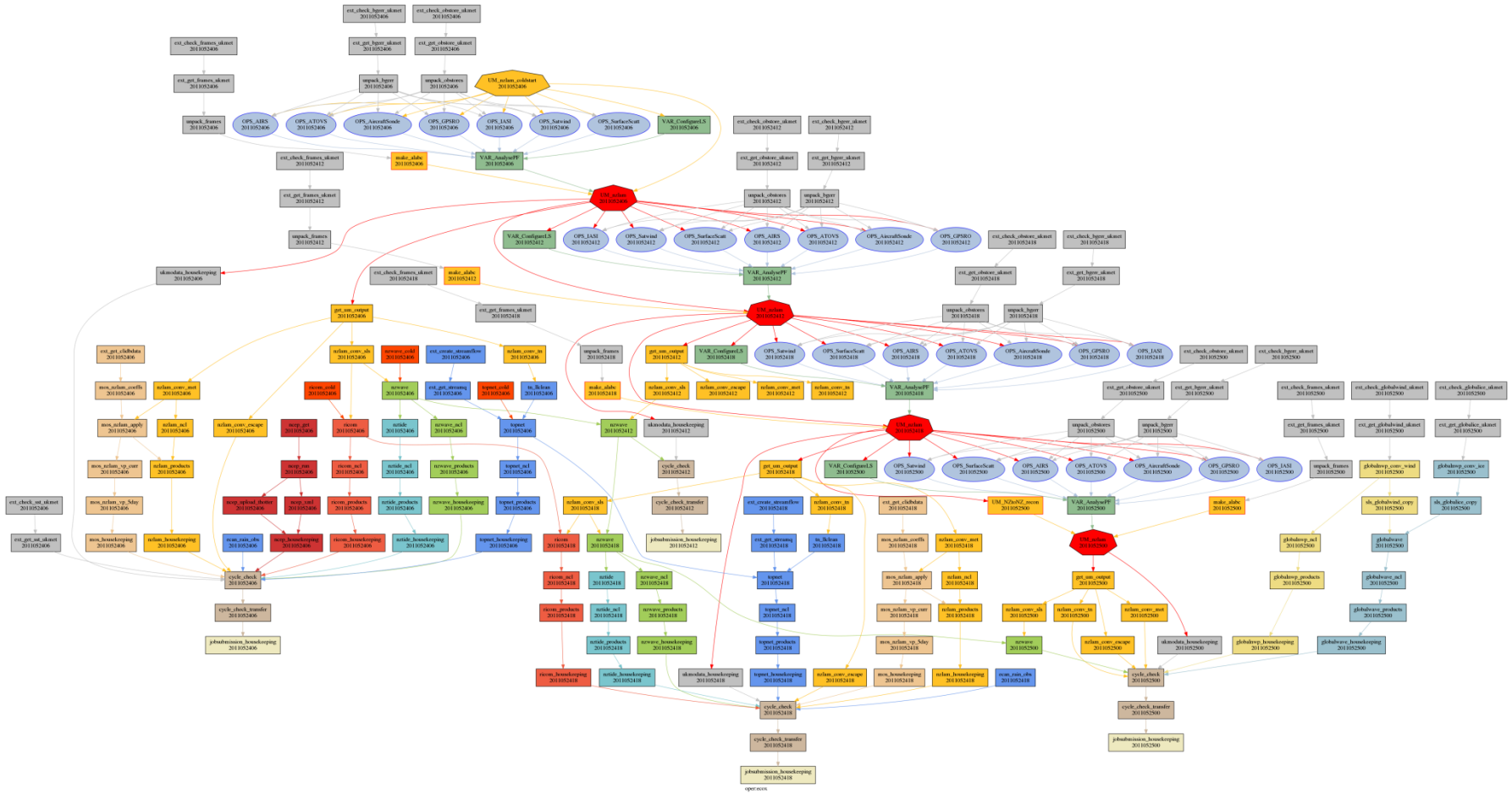
- Some information at https://trac.nci.org.au/trac/access/wiki/accessdev
- Login with your NCI account
- Home filesystem is separate to raijin.
- /g/data is mounted for selected projects
- Home filesystem has 12 GB quota
  - Will eventually move to a different technology but shouldn't affect users
- *FCM (svn) is slower than on accesscollab at the moment*

cylc

- Controls suites of cycling tasks
  - NWP forecast
  - Long running climate simulations
- Submits and monitors jobs on remote hosts
- Takes care of job dependencies, triggering other jobs on success or failure etc

Cylc: NIWA operational suite





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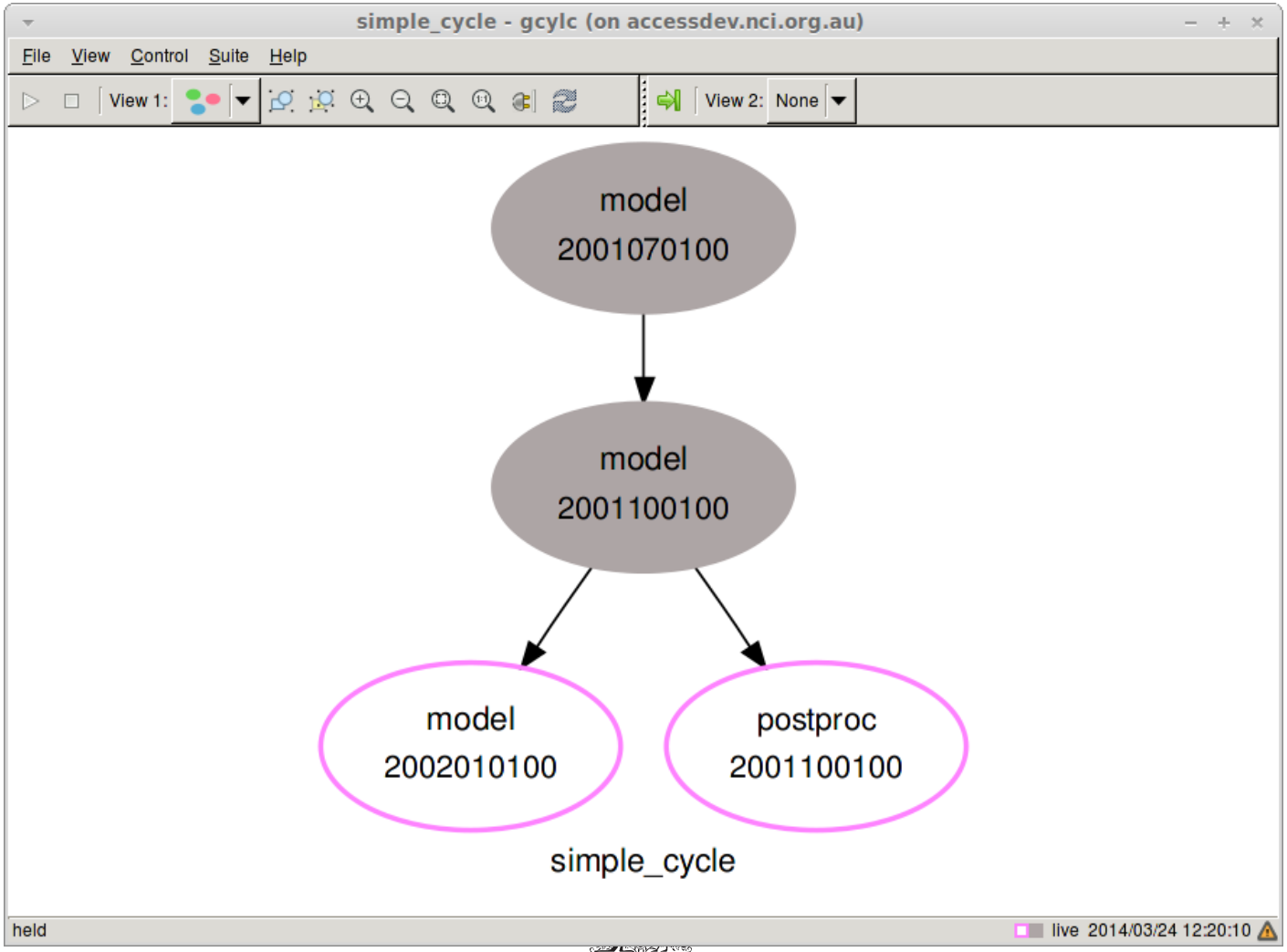
Cylc: A simpler example



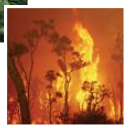
Rose: Configuration and suite control

- Replaces UMUI for model configuration (namelist editing)
- Model namelist metadata is part of the UM source code rather than part of the UI
- Uses svn repository for suite storage
- Utilities for suite discovery, viewing log files, model testing
- Not really a clear line between rose and cylc
- Cylc tasks can be rose apps

Rose metadata example

```
[namelist:run_cloud=l_pc2]
compulsory=true
description=Use prognostic cloud scheme PC2?
help =Use prognostic cloud scheme PC2
     =
     =Choosing the PC2 scheme creates Prognostic Cloud and Prognostic
     =Condensate variables, which are incremented as a result of each
  process
     =that occurs in [the model.
trigger=namelist:run_cloud=l_eacf: .false.;
       =namelist:run_cloud=l_ensure_min_in_cloud_qcf: .true.;
       =namelist:run_cloud=l_fixbug_pc2_qcl_incr: .true.;
       =namelist:run_cloud=i_fixbug_pc2_checks: .true.;
       =namelist:run_cloud=l_fixbug_pc2_mixph: .true.;
type=logical
```

Suite discovery: rosie go



au - rosie go (on accessdev.nci.org.au)

File Edit View History Help

View all revisions

roses:/ Search

local	idx	owner	revision ▲	title
	au-aa025	ibc599	179	ACCESS 1.0 coupled
	au-aa062	mrd599	161	Copy of au-aa025: ACCESS 1.0 coupled
	au-aa041	pfu599	98	Testing of ACCESS cycling suite
	au-aa027	pfu599	69	GA6 N96
	au-aa024	mrd599	48	8.6 reconfiguration test with grib

au | 5 local suites found at 2014-03-24 14:00:57

Suite discovery: rosie web



au: Rosie Web

https://accessdev.nci.org.au/rosie/au/search?s=*

Google

Feedback

au: Rosie Web

search | query

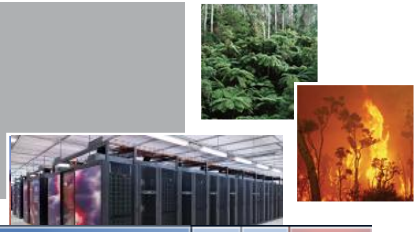
* all revisions search

Filter results:

Show / hide columns

?	id	branch	revision	owner	project	title
?	au-aa025	trunk	179	ibc599	ACCESS	ACCESS 1.0 coupled
?	au-aa067	trunk	177	jtl548	dp9	Test Ops_ss task (Copy of au-aa066)
?	au-aa066	trunk	170	jtl548	dp9	Test OPS bgerr task (Copy of au-aa034)
?	au-aa060	trunk	168	jtl548	dp9	Add OPS CrlS task (Copy of au-aa034)
?	au-aa065	trunk	167	pfu599	ACCESS	Copy of au-aa025: ACCESS 1.0 coupled
?	au-aa064	trunk	166	jtl548	dp9	single-suite/multi-user suite for collaborative development of APS2 N512 (Copy of au-aa034
?	au-aa034	trunk	165	jtl548	dp9	Copy of au-aa028: N512 PS32
?	au-aa063	trunk	163	ibc599	p66	Stand alone Reconfiguration Build example of UM8.5 with GA06
?	au-aa062	trunk	161	mrd599	ACCESS	Copy of au-aa025: ACCESS 1.0 coupled
?	au-aa000	trunk	160	saw562	test	test
?	au-aa055	trunk	159	ffb548	du7	Copy of au-aa034 jtl548
?	au-aa059	trunk	158	ibc599	p66	UM Stand Alone Development Build job of UM8.5 with GA06

Log viewer: Rose bush



mrd599: Rose Bush

https://accessdev.nci.org.au/rose-bush/suites?user=mrd599

Google

Feedback

Rose Bush @ accessdev | mrd599

User mrd599 has 20 suite(s) installed. 2 minutes ago

simple_cycle	cycles list, jobs list	35 minutes ago		
au-aa062	cycles list, jobs list	3 days ago	ACCESS	Copy of au-aa025: ACCESS 1.0 coupled
cycle	cycles list, jobs list	5 days ago		
au-aa025	cycles list, jobs list	8 days ago	ACCESS	ACCESS 1.0 coupled
au-aa041	cycles list, jobs list	13 days ago	ACCESS Dummy Suite	Testing of ACCESS cycling suite
test_vn86_build	cycles list, jobs list	13 days ago	um	Copy of au-aa027: GA6 N96
vn9.0_pretest	cycles list, jobs list	a month ago		
reload	cycles list, jobs list	a month ago		
basic	cycles list	a month ago		

Alternate web view

vn8.5_rose_stem_test

https://accessdev.nci.org.au/~mrd599/cylc-run/vn8.5_rose_stem_test/log/index.html

Google

Feedback

vn8.5_rose_stem_test

rose: suite-run version | suite-run.conf | suite-run log | cylc: suite log | suite out | suite err

suite info

last updated: 2013-11-24 14:43:59

cycle times filter (1 of 1 selected)

Filter results:

Show / hide columns

Job	Status	t_{submit}	Δt_{queue}	Δt_{run}	Out	Err	Other Files
stashmaster_nci.1	pass	2013-11-24 14:29:51	0:00	0:01	view	empty	
fcm_make_nci_n48_noomp.1	pass	2013-11-24 14:29:52	0:00	2:28	view	view	
fcm_make2_nci_n48_noomp.1	pass	2013-11-24 14:32:26	0:11	0:58			
recon_nci_n48_noomp.1	pass	2013-11-24 14:33:44	0:17	0:44			
atmos_nci_n48_noomp_4x4.1	pass	2013-11-24 14:34:52	7:11	1:10			
rose_ana_nci_n48_noomp_recon_kgo.1	pass	2013-11-24 14:34:53	0:05	0:05			
rose_ana_nci_n48_noomp_atmos_kgo.1	pass	2013-11-24 14:43:19	0:10	0:28			

Showing 1 to 7 of 7 entries

Present rose/cylc use

- Coupled model suite - Ian
- ACCESS C suite – Wenming
- APS2 global suite – Xiao
- Model build example – Ian & Mike
- Rose stem tests - Martin

Rose stem test job

File View Control Suite Help

View 1: running failed... View 2: None

task	state	message	Tsubmit	Tstart	mean dT	E
1	submitted					
NCI_N48_NOOMP	submitted					
atmos_nci_n48_noomp_4x4	submitted	atmos_nci_n48_noomp_4x4.1 subi	01:34:52	*	*	*
fcm_make2_nci_n48_noomp	succeeded	fcm_make2_nci_n48_noomp.1 suc	01:32:26	01:32:37	0:00:58	*
fcm_make_nci_n48_noomp	succeeded	fcm_make_nci_n48_noomp.1 succ	01:29:52	01:29:51	0:02:28	*
recon_nci_n48_noomp	succeeded	recon_nci_n48_noomp.1 succeede	01:33:44	01:34:01	0:00:44	*
rose_ana_nci_n48_noomp_atmos_kgo	waiting		*	*	*	*
rose_ana_nci_n48_noomp_recon_kgo	succeeded	rose_ana_nci_n48_noomp_recon_l	01:34:53	01:34:58	0:00:05	*
STASHMASTER	succeeded					

waiting runahead held queued submitting submitted submit-failed running succeeded failed retrying

running live 2013/11/25 01:35:03

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UM releases

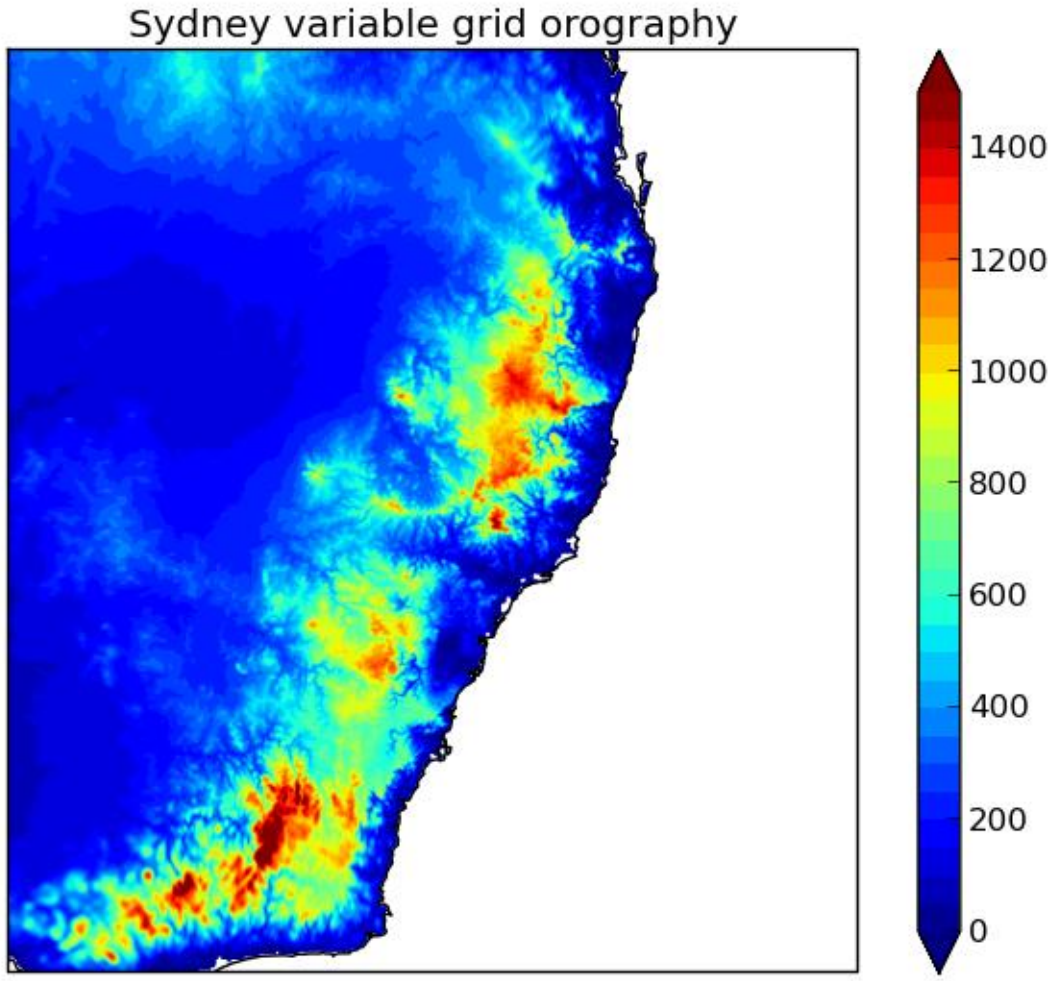
- vn8.5
  - GA6.0 atmospheric configuration
- vn8.6
- vn9.0 March
  - We have a prerelease of the external release
  - No UMUI!
  - fcm make replaces fcm extract/build
  - UM automatic resubmission now handled by cylc
- vn 9.1 expected end of June
  - Full rose support

Steps to final release

- Accessdev issues
  - File system, security
- Documention
  - For new capabilities
  - For migration
- Migration from accesscollab and other internal systems
  - access-svn etc

Iris

- New Met Of based)
  - Uses matpl
  - Reads UM
- Now installe
- Promising b
  - Can be a bi
  - Incomplete
- Developers



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https://trac.nci.org.au/trac/access/wiki

Thank you

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