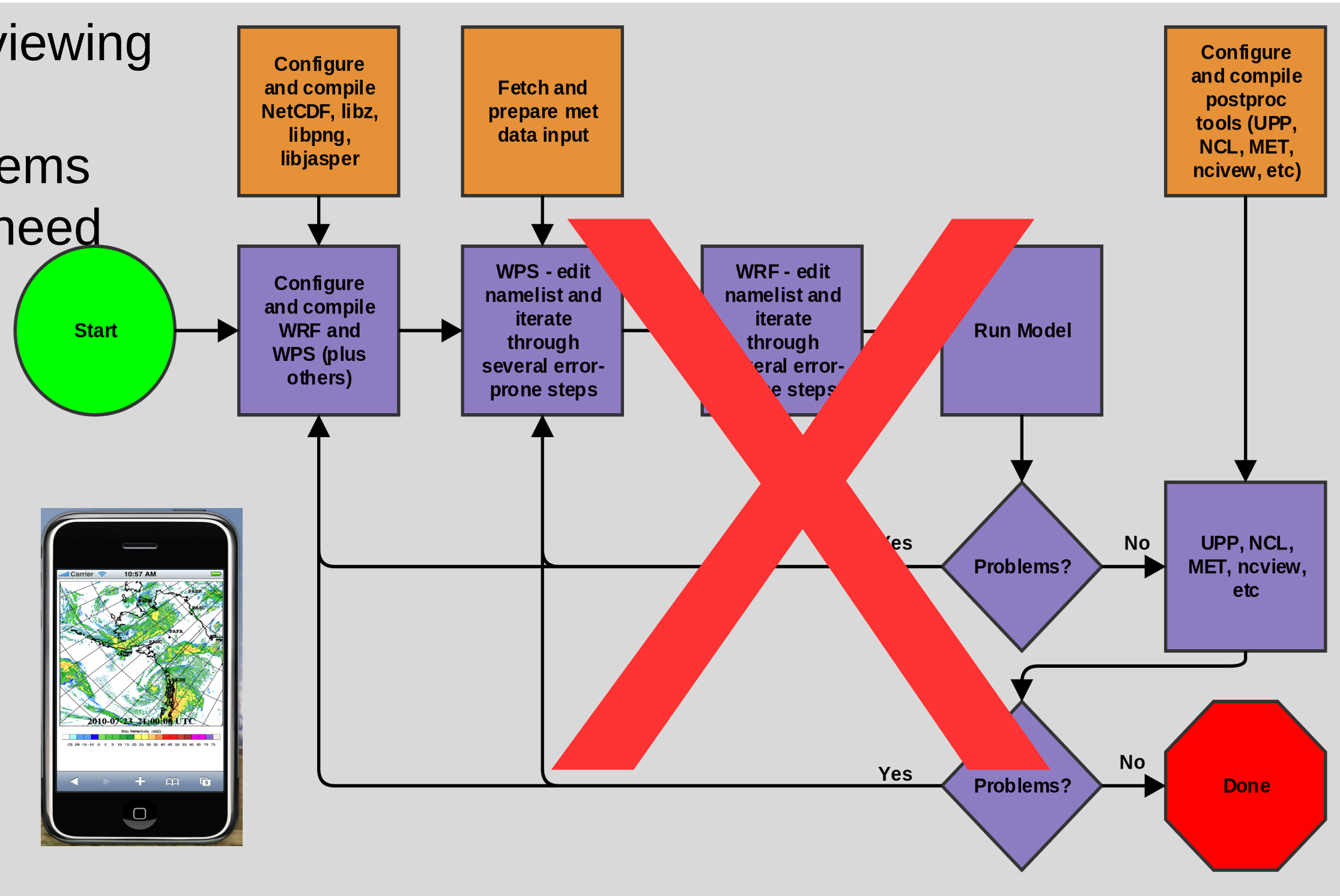
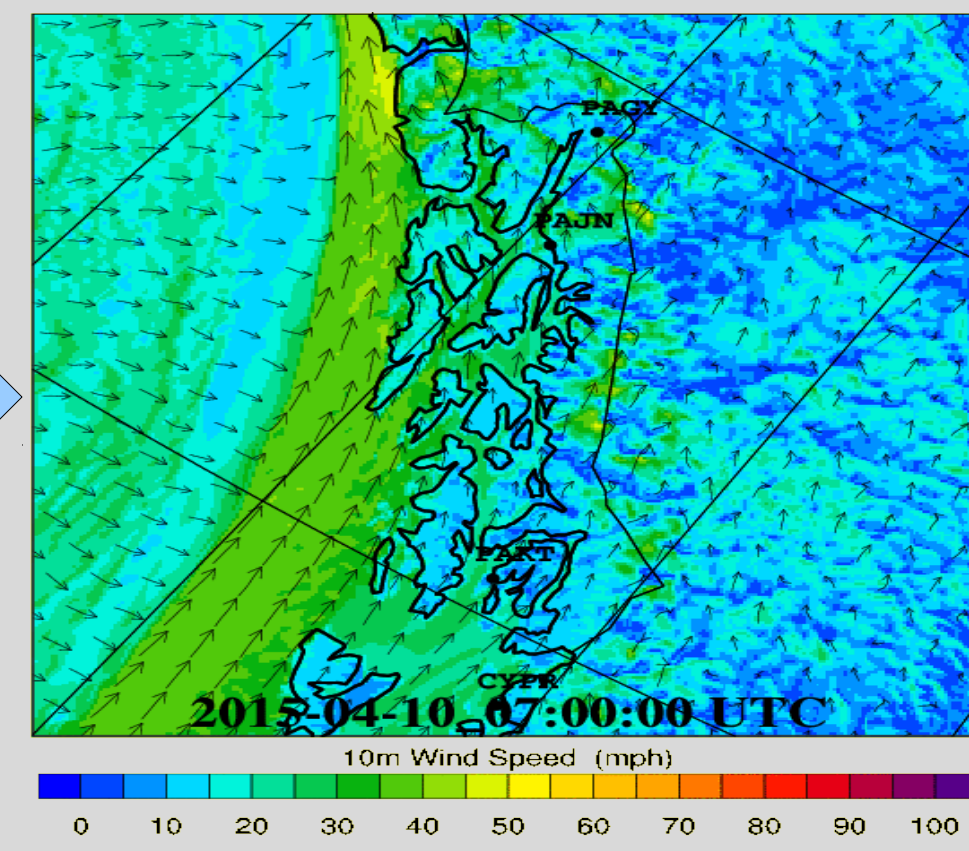


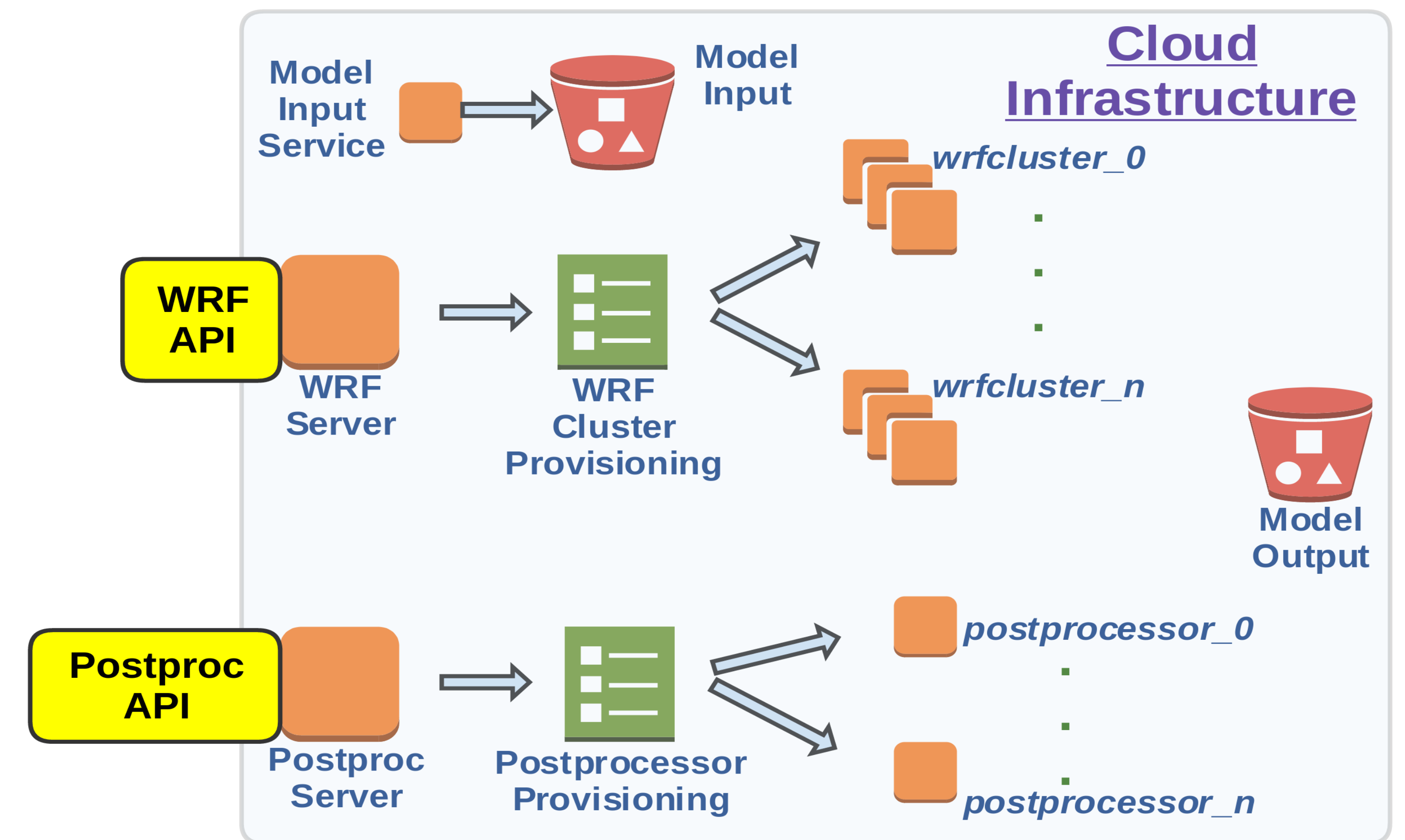
Vision

There is more information available at our fingertips during a walk in the woods than in any computer system, yet people find a walk among trees relaxing and computers frustrating. Machines that fit the human environment, instead of forcing humans to enter theirs, will make using a computer as refreshing as taking a walk in the woods.
Mark Weiser, The Computer for the 21st Century, Scientific American, September 1991.

- Atmospheric modeling should be like setting up a Netflix movie for viewing
- Easily launch one or more model runs at short notice
- No time wasted to understand intricacies of specific computing systems
- Users state their needs at a high, abstract level, and get what they need
- The Star Trek vision - "Computer, ..."

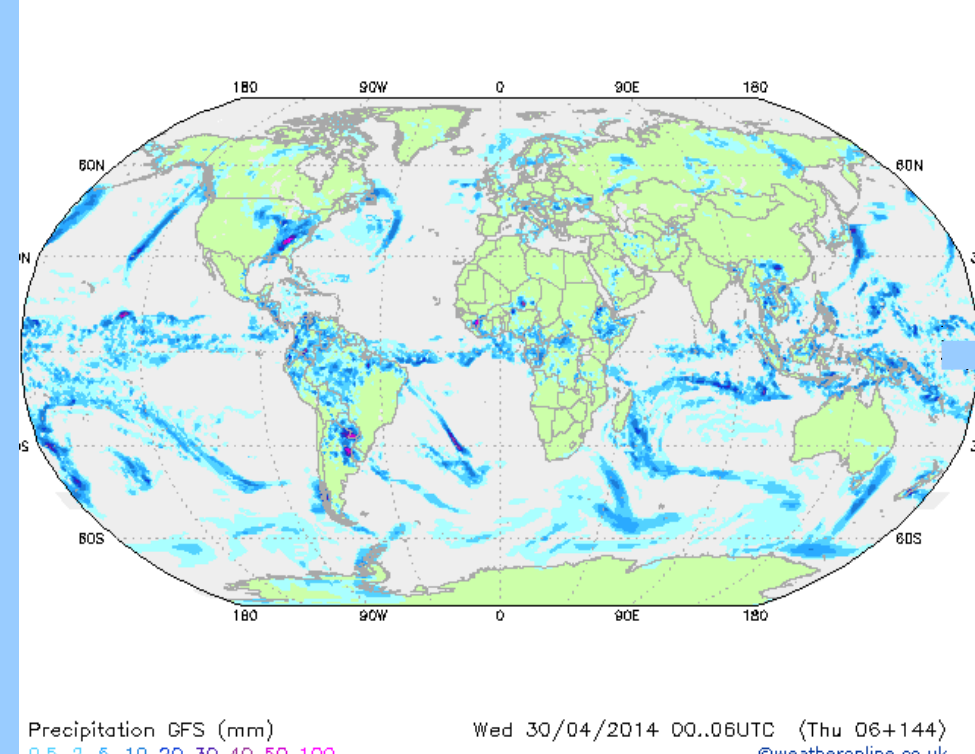


Cloud Infrastructure

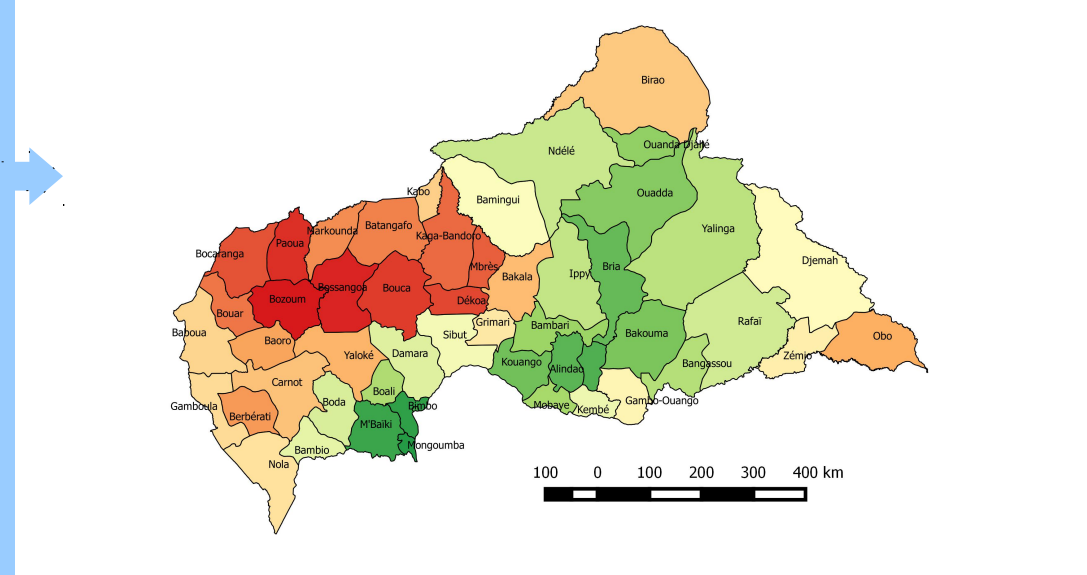


Scenarios

- On-demand customized simulations for potential emergency response

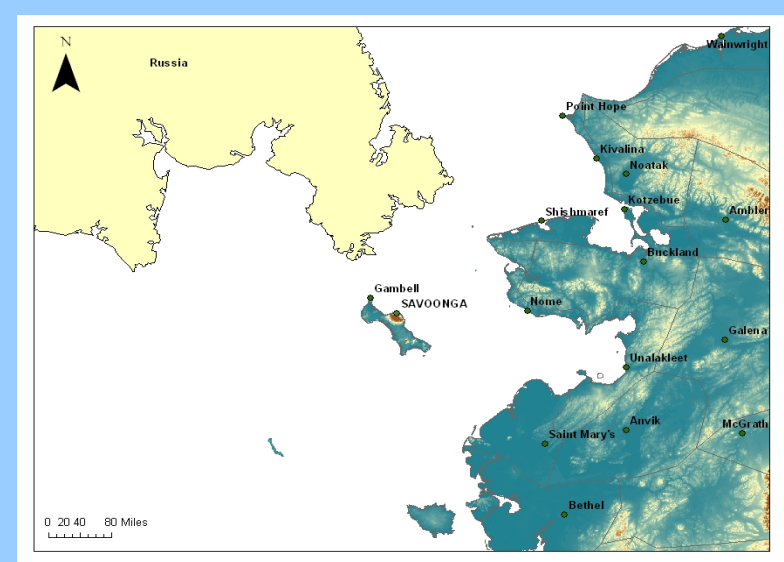


Global Forecast System precipitation forecast

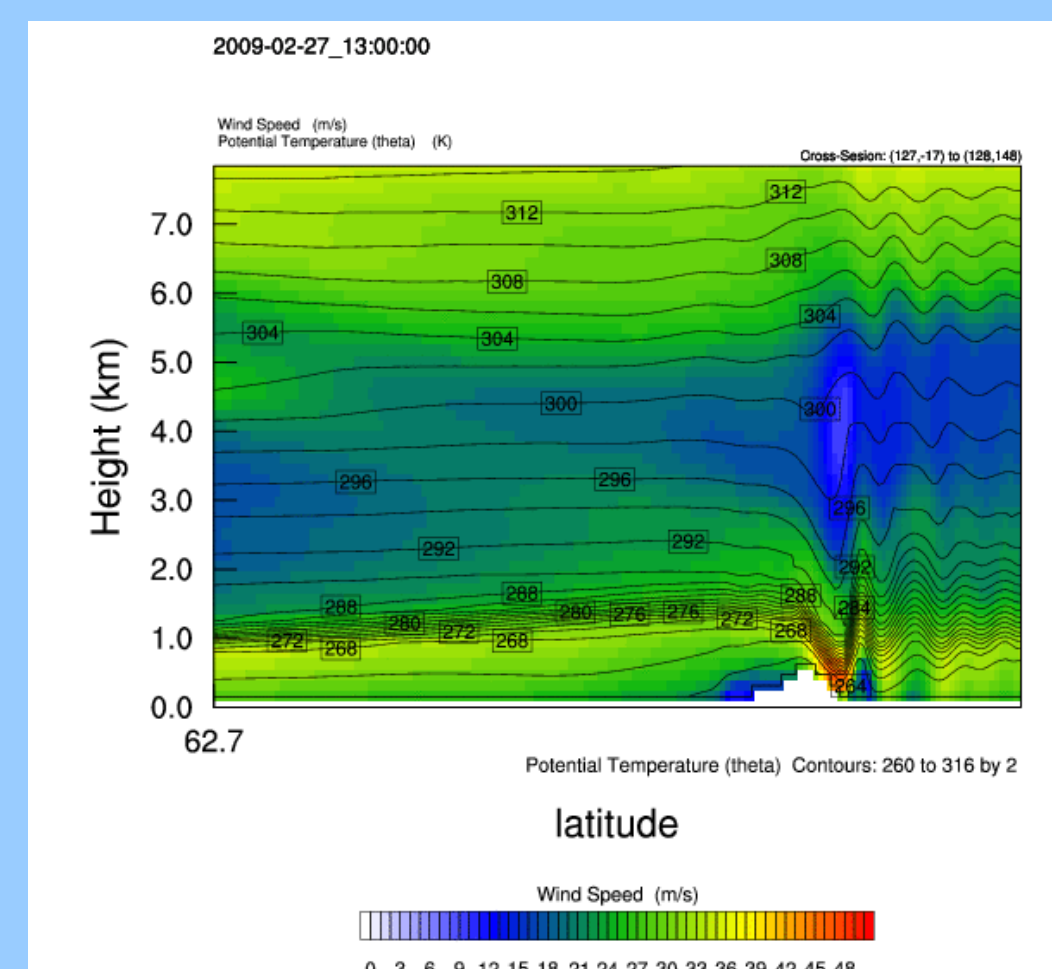


Central African Republic average precipitation map

- Exploration of hypotheses

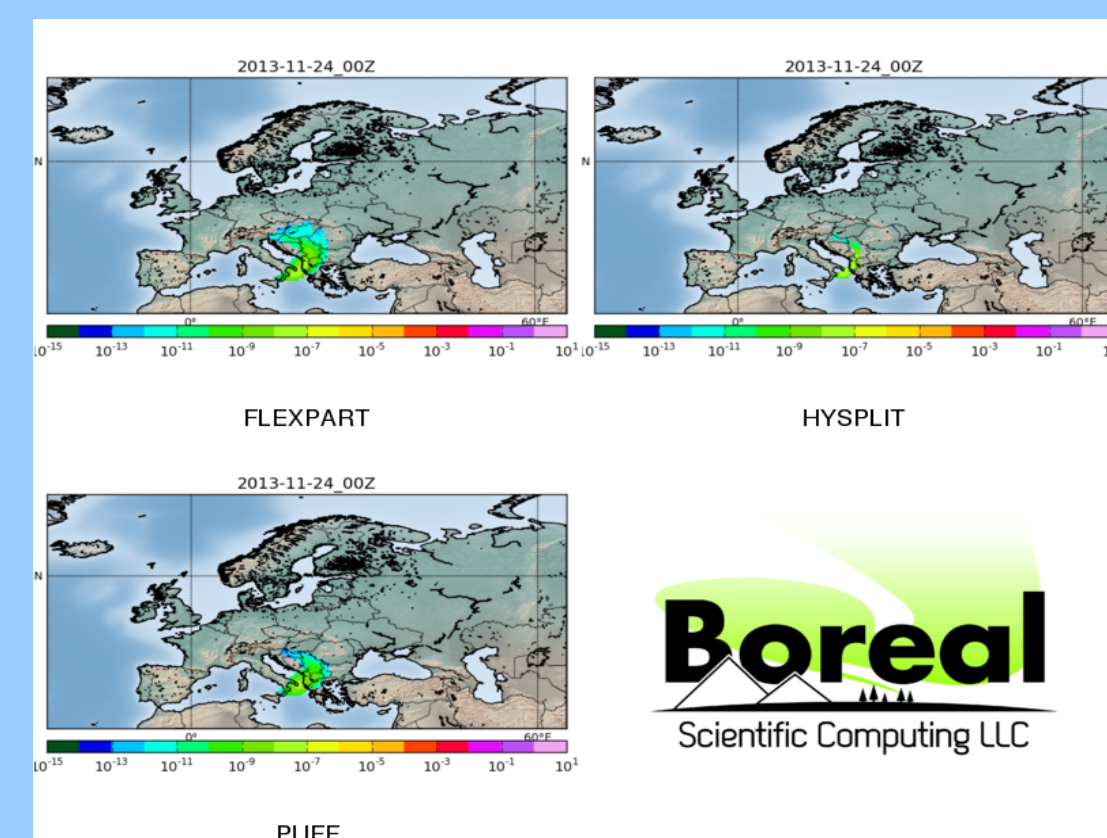


Peak wind 61 mph at Gambell



Peak wind 139 mph at Savoonga

- Short-term, rapid-deployment of ensembles for situational awareness



Boreal Scientific Computing LLC

Provisioning – Infrastructure as Code

```
[aws]
aws_region_name = us-west-2

[cluster hpcv1]
vpc_settings = wrfvc
key_name = GenericTesting

## m4.large has two vCPUs and 8 GiB
compute_instance_type = m4.large
master_instance_type = m4.large
scheduler = sge
base_os = ubuntu1604
initial_queue_size = 5
max_queue_size = 2

Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud

[ebs myhpcv1]
# shared wrfcluster snapshot-20170912
ebs_snapshot_id = snap-0ad944b4b97e18352
#volume_size = 80

Last login: Mon Jun 12 05:21:58 2017 from 52.201.31.179
/usr/bin/xauth: file /home/ubuntu/.Xauthority does not exist
ubuntu@ip-172-31-40-218:~$
```

Cluster defined as code

```
rm -rf $DIR/jasper-1.900.1.tar.gz
EOH

# Just a partial test that skips this resource if these exist
not_if 'test -e $DIR/grub2/lib/libjasper.a'
end

# Install WRF (dm mode)
bash 'wrf-install' do
  user 'ubuntu'
  group 'ubuntu'
  cwd ENV['ROOT_DIR']
  code <<EOH
cookbook_file['/shared/WRF/qdwrif/qdwrif.py'] action create (up to date)
wget -nv http://www2.mmm.ucar.edu/wrf/src/WRFV3.9.1.TAR.gz
tar xzf WRFV3.9.1.TAR.gz
cd WRFV3
./configure --prefix=/usr --libdir=/usr/lib --with-pthread --with-mpi --with-mpiexec=/usr/bin/mpirun --with-mpiexec_flags='-xmpiexec_maxprocs=256'
make
make install
end

# Running handlers:
Running handlers complete
Chef Client finished, 2/44 resources updated in 01 minutes 56 seconds
ubuntu@ip-172-31-40-218:~$ wrf_cfncluster/chef$
```

WRF environment defined as code

```
START_TIME = '2017091400'
FCST_HOURS = 3

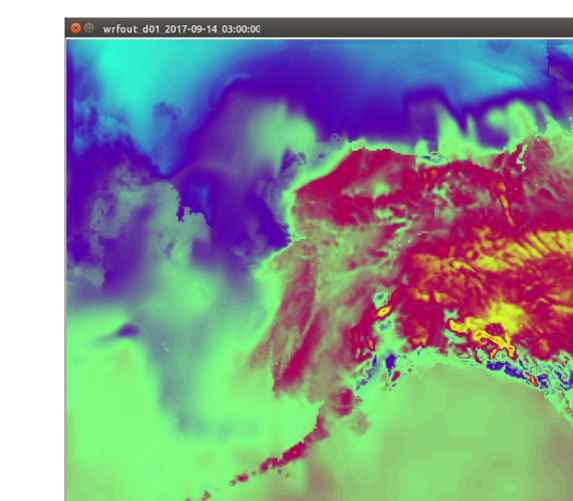
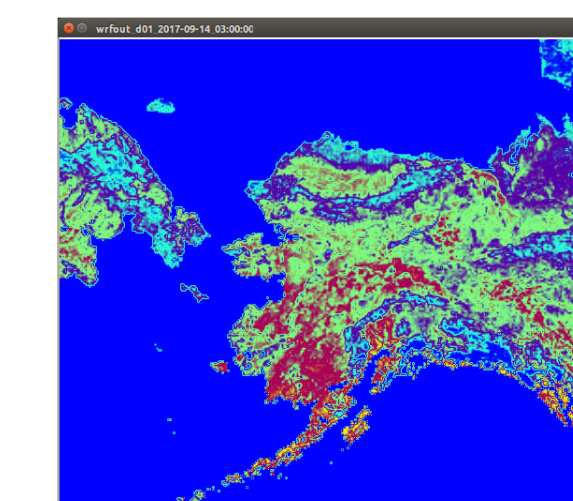
# Domain definitions
# We are currently restricted to Lambert
# conformal projection
NUMX = 980
NUMY = 700
DX=3000
DY=3000
REFLAT=65.00
REFLON=-155.00

# Number of parallel tasks
NUMPES=256
```

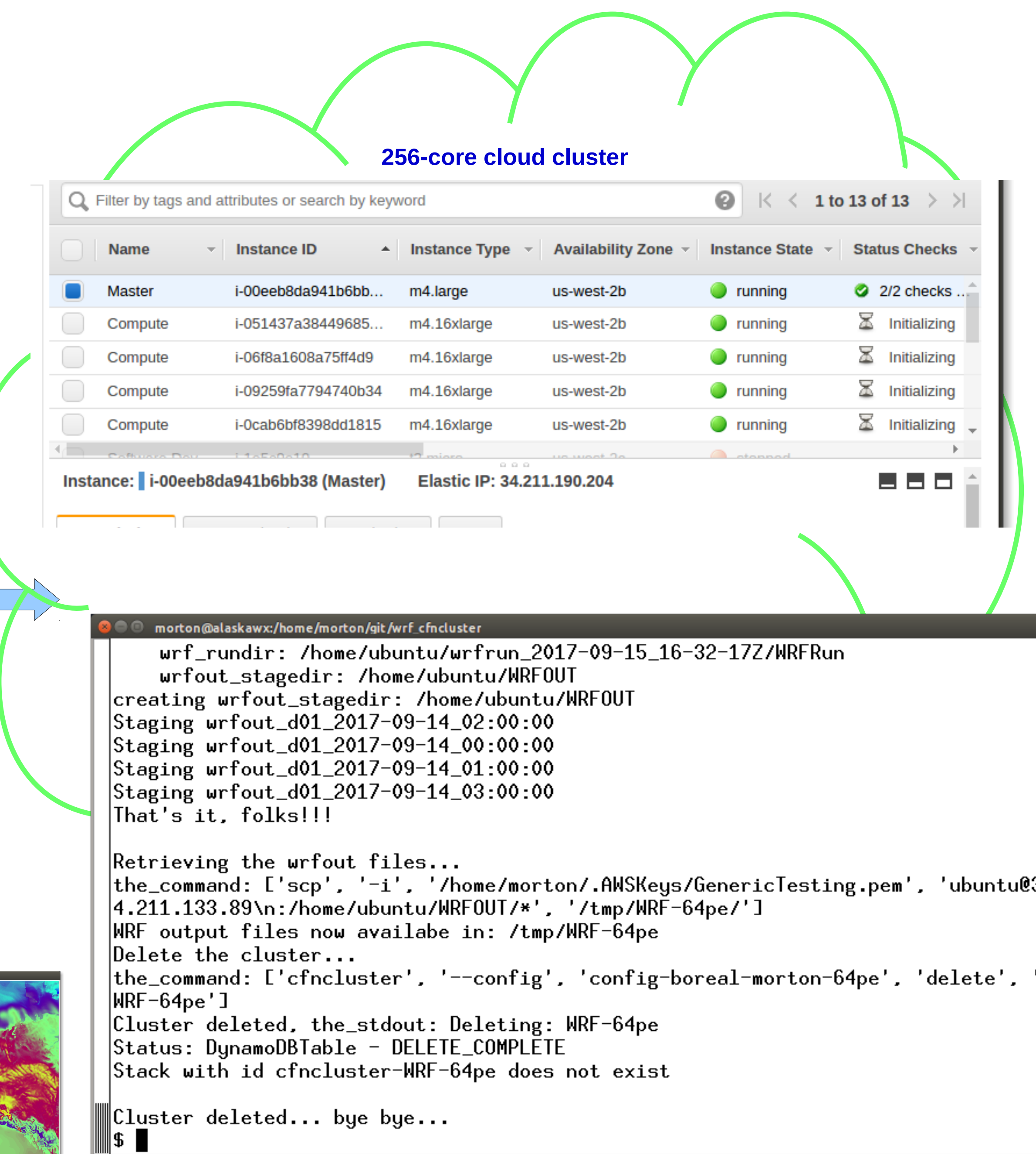
go.py

- Create specified cluster
- Run specified simulation
- Retrieve output from cluster
- Delete cluster

Cluster configuration specifications file



Prototype



The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.
Mark Weiser, The Computer for the 21st Century, Scientific American, Sep 1991.

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