

2016-11-04T23:16:32+00:00 INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33516 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
data/192/1.artifactstorage.lock"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33519 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
data/192/1.artifactstorage.lock"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33522 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
t-list 101 -o uuid -H"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33525 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
t-switch 101 --id \\{326ca8a7-e728-487e-ad97-f1b42d97b087\\}"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33528 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:32+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33531 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
root/101/projectdata"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33641 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
/mnt/vzdata/192/ /vz/root/101/projectdata"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33655 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
s/tmp/node-101.json | sudo vzctl exec2 101 cat \\> /etc/chef/project-node.json"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33672 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01 \\[\\[\\[\\[ -f\\ /var/chef-solo/container\_solo.rb\\ \\[\\[\\[\\[ \\[\\[\\[\\[ cp\\ -f\\ /var/chef-solo/container\_solo.rb\\ /etc/chef/solo.rb"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33685 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:34+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01 chef-solo\\ -o\\ \\'recipe\\[perform\_builds::gnocci\_start\_build\\]\\[\\[\\[\\[ -j\\ \\[\\[\\[\\[ /etc/chef/project-node.json\\[\\[\\[\\[
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 33695 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01 rm\\ /etc/chef/project-node.json"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 34535 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01 chown\\ -R\\ go:go\\ /projectdata/artifacts/192"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 34540 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
--save --cpuunits 1000 --cpus 2 --cpulimit 200 --ram 2147483648 --diskspace 20G:20G"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 34545 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
s/tmp/run\_list-101.json | sudo vzctl exec2 101 cat \\> /tmp/gnocci\_config.json"
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 34551 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
01 su\\ go\\ -c\\ \\[mkdir\\ -p\\ /projectdata/artifacts/192/defaultPipeline/1/SampleStage/1\\[\\[\\[\\[
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:38+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
atus pid 34559 exit 0)
vzhost01.smoke snap-ci-baby-sitters.log: [2016-11-04T23:16:44+00:00] INFO: [blue private-vzhost01-blue-smoke.snap-ci.com 2] [PCN] [snap-ci/integrated-branch-build-spec (master)] [PIP-1] [STG-SampleStage] [JOB-1] [CTID-101]
-04T23:16:41.383150 #1645] DEBUG -- : Run list:
vzhost01.smoke snap-ci-baby-sitters.log: "#<Gnocci::JobConfig:0x007f9f05272260>"
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.383287 #1645] INFO -- : \$ pwd
vzhost01.smoke snap-ci-baby-sitters.log: D, [2016-11-04T23:16:41.383333 #1645] DEBUG -- : sh(pwd)
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.407405 #1645] INFO -- : Command pwd exited successfully with status 0.
vzhost01.smoke snap-ci-baby-sitters.log: Took 0.02403 seconds.
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.407548 #1645] INFO -- : \$ ls -a
vzhost01.smoke snap-ci-baby-sitters.log: D, [2016-11-04T23:16:41.407593 #1645] DEBUG -- : sh(ls -a)
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.430012 #1645] INFO -- : Command ls -a exited successfully with status 0.
vzhost01.smoke snap-ci-baby-sitters.log: Took 0.02241 seconds.
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.430105 #1645] INFO -- : \$ sudo find -mindepth 1 -delete
vzhost01.smoke snap-ci-baby-sitters.log: D, [2016-11-04T23:16:41.430151 #1645] DEBUG -- : sh(sudo find -mindepth 1 -delete)
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.454333 #1645] INFO -- : Command sudo find -mindepth 1 -delete exited successfully with status 0.
vzhost01.smoke snap-ci-baby-sitters.log: Took 0.02417 seconds.
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.454452 #1645] INFO -- : \$ pwd
vzhost01.smoke snap-ci-baby-sitters.log: D, [2016-11-04T23:16:41.454516 #1645] DEBUG -- : sh(pwd)
vzhost01.smoke snap-ci-baby-sitters.log: I, [2016-11-04T23:16:41.480143 #1645] INFO -- : Command pwd exited successfully with status 0.
vzhost01.smoke snap-ci-baby-sitters.log: Took 0.02562 seconds.

I don't even see the code anymore...



```
#1763] INFO -- : $ npm install
#1763] INFO -- : npm
#1763] INFO -- :
#1763] INFO -- : WARN
#1763] INFO -- :
#1763] INFO -- : deprecated
#1763] INFO -- : autoprefixer-loader@3.1.0: Please use postcss-loader instead o
#1763] INFO -- : npm
#1763] INFO -- :
#1763] INFO -- : WARN
#1763] INFO -- :
#1763] INFO -- : deprecated phantomjs@2.1.7: Package renamed to phantomjs-prebui
#1763] INFO -- : npm
#1763] INFO -- : ERR! Linux 2.6.32-042stab105.14
versions/node/v5.8.0/bin/node" "/opt/local/nvm/versions/node/v5.8.0/bin/npm" "inst
#1763] INFO -- : code ECONNRESET
#1763] INFO -- :
#1763] INFO -- : npm
#1763] INFO -- : ERR! network socket hang up
#1763] INFO -- : npm ERR! network This is most likely not a problem with npm its
#1763] INFO -- : npm
#1763] INFO -- : ERR! network and is related to network connectivity.
#1763] INFO -- : ERR!
#1763] INFO -- : network In most cases you are behind a proxy or have bad netwo
#1763] INFO -- : network
```

**TURN ON FLOW LOGS THEY  
SAID**

**IT WILL HELP, THEY  
SAID**

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.8 80 46409 6 2 112 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.194 10.0.20.63 47880 443 6 8 1318 1478457401 1478457461 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.8 443 50502 6 10 2590 1478457401 1478457521 ACCEPT OK

Destination  
adress

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.100 443 28609 6 7 509 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.8 443 50510 6 57 27918 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.63 10.0.20.194 443 47729 6 9 4595 1478457401 1478457461 ACCEPT OK

Interface  
name

2 244009580433 eni-72badd33 10.0.10.100 443 28625 6 33 1697 1478457401 1478457521 ACCEPT OK

Port number  
with source

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.8 443 28631 6 51 26306 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 10.0.10.100 10.0.20.194 28612 443 6 7 810 1478457401 1478457521 ACCEPT OK

NAT

2 244009580433 eni-72badd33 10.0.20.194 10.0.20.63 48003 443 6 9 1519 1478457401 1478457461 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.194 10.0.20.63 47432 443 6 8 1318 1478457401 1478457461 ACCEPT OK

2 244009580433 eni-72badd33 10.0.10.100 10.0.20.194 28616 443 6 124 82130 1478457401 1478457521 ACCEPT OK

As of a week ago

2 244009580433 eni-72badd33 10.0.20.194 10.0.10.8 443 50502 6 10 2590 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.63 10.0.20.194 443 48003 6 8 3779 1478457401 1478457461 ACCEPT OK

2 244009580433 eni-72badd33 10.0.10.8 10.0.20.194 50505 443 6 19 8200 1478457401 1478457521 ACCEPT OK

2 244009580433 eni-72badd33 52.84.243.148 10.0.20.194 443 57317 6 8 1125 1478457401 1478457461 ACCEPT OK

2 244009580433 eni-72badd33 10.0.20.194 10.0.20.63 47551 443 6 9 1452 1478457401 1478457461 ACCEPT OK

# debugging highly dynamic networks

- virtual network interfaces get burnt down and recreated with each deployment
- IP addresses keep changing
- NAT keeps IP addresses obfuscated

Why did my build lose  
network connectivity?

# Designed for deployment

Badri Janakiraman

@badrij <https://snap-ci.com> ThoughtWorks Inc



# some assumptions

- you work on applications with some number of distributed components
- you run and operate the software you create
- you are familiar with AWS or some such cloudprovider
- you use Chef or some such IaC tool

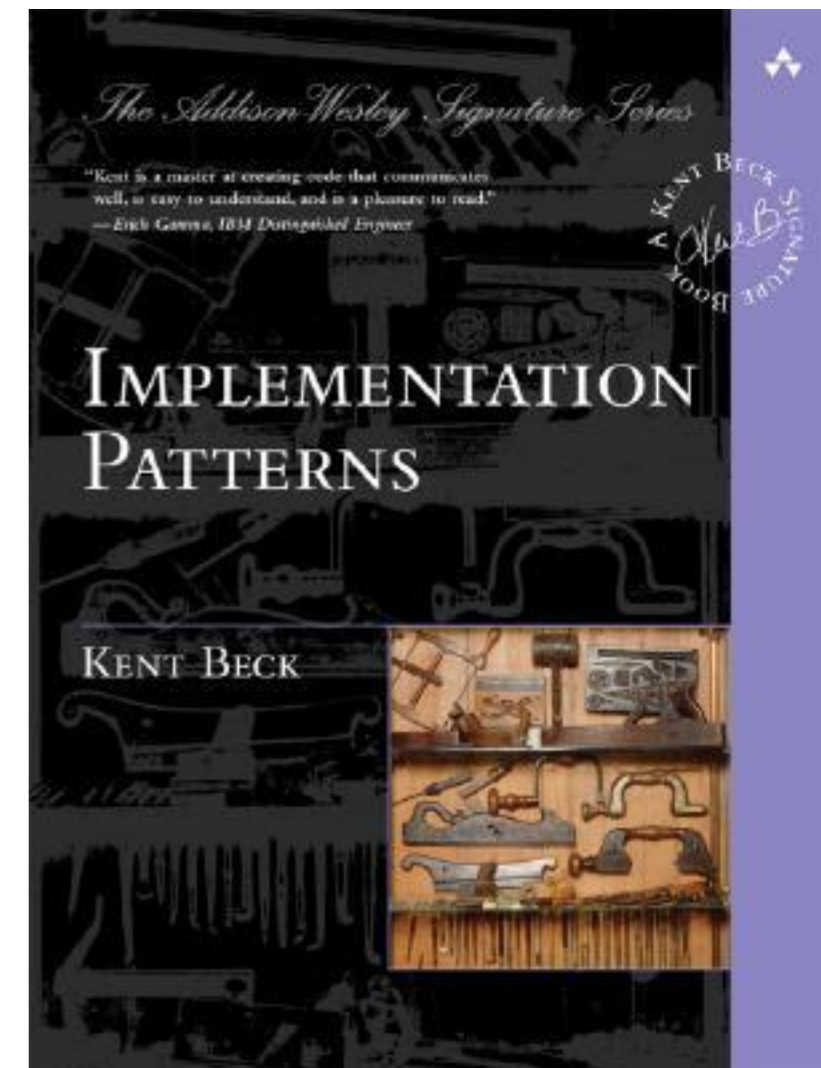
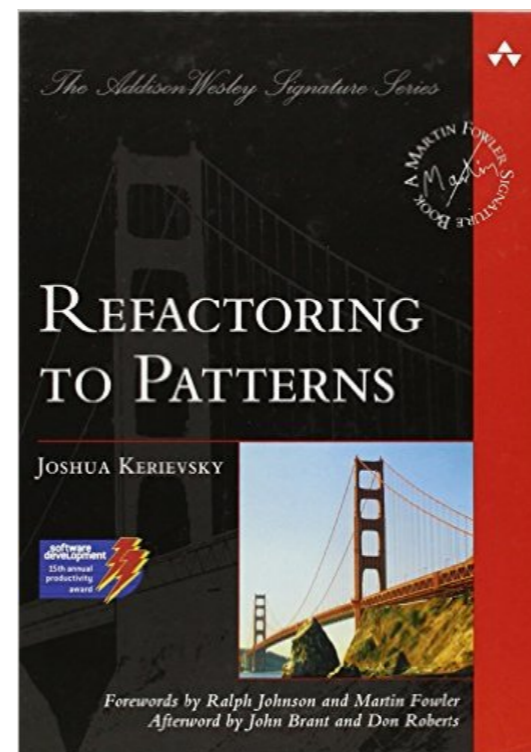
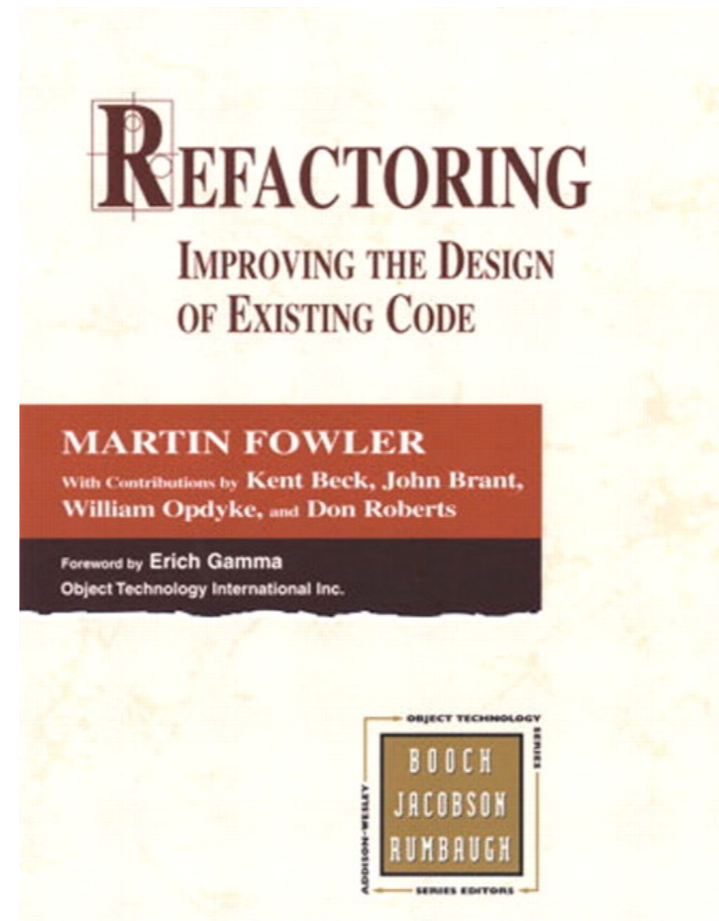
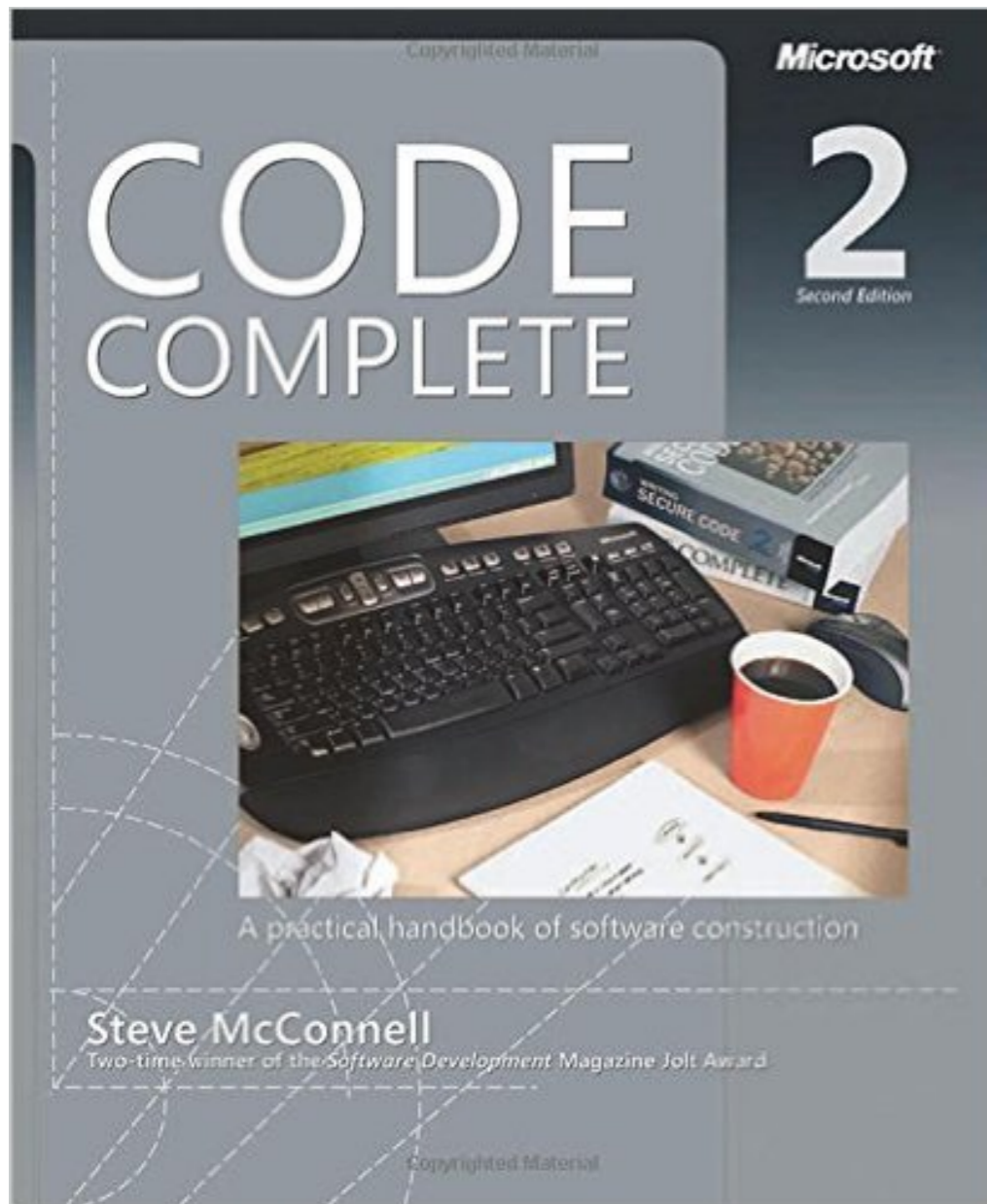
# what you can expect

- what things other than application code can keep a team from being efficient in getting software deployed
- some lessons that took us a while to learn
- how to design things other than software that nonetheless have a massive impact on getting it to your users

“Code is read much more often than it is written, so plan accordingly. Design for readability.”

-Raymond Chen

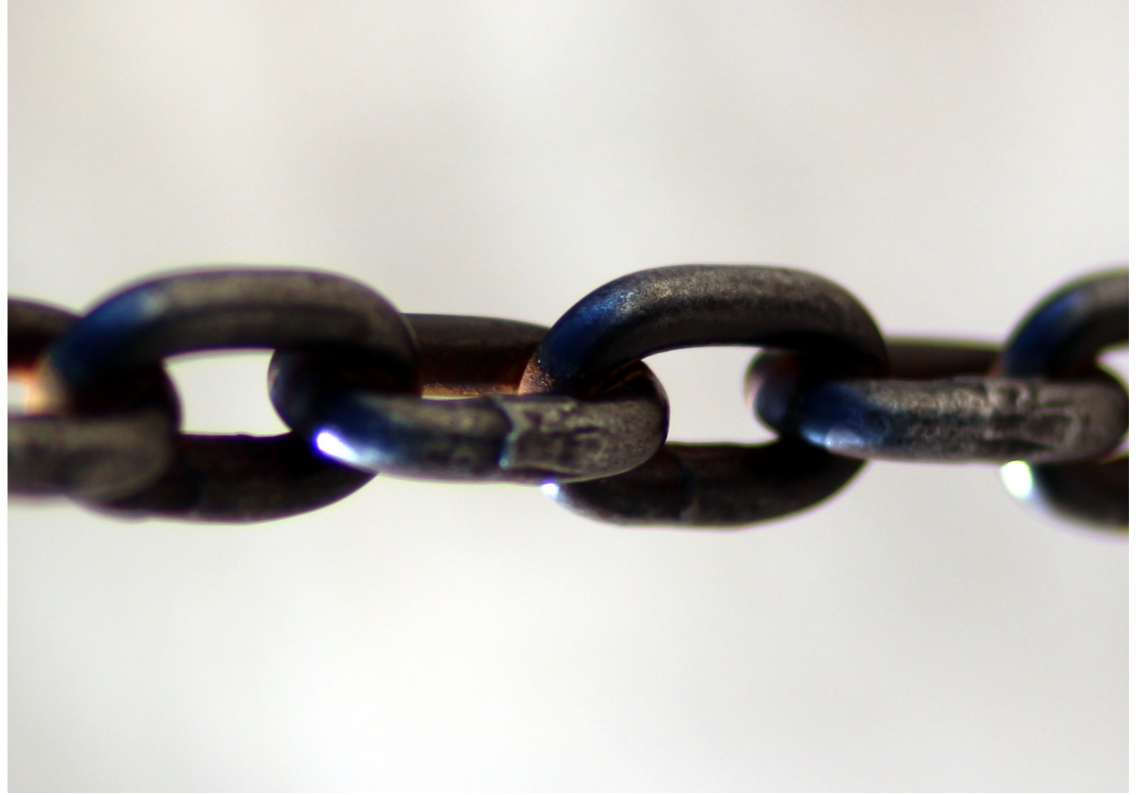
<https://blogs.msdn.microsoft.com/oldnewthing/20070406-00/?p=27343>



- sensible variable names
- keeping methods small
- using composed methods
- eschewing magic numbers
- refactoring to explain rather than commenting the code
- using tests as living documentation
- format consistently...
- ....

# you build it, you run it

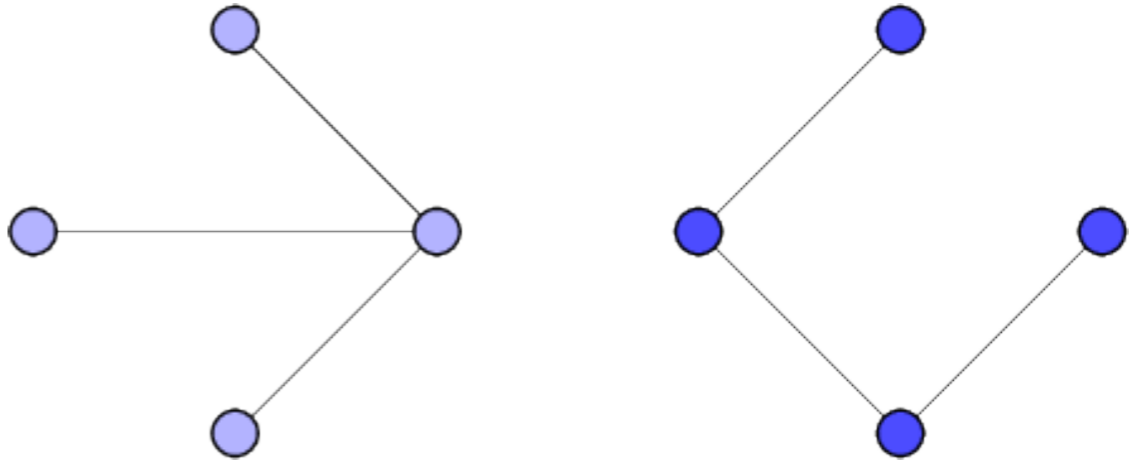
- we deploy over 50 times
- multiple environments
- run 10000s of builds a day
- we run software and triage issues as much as we write or read code



**2 inputs required**

A diagram showing a central blue node labeled 'Bump' with a play button icon and a warning triangle. Two grey nodes labeled 'gfx' are connected to the top of the 'Bump' node. One grey node labeled 'gfx' is connected to the bottom of the 'Bump' node.

**always 1 output**





# Telling stories

@dherholz - <https://flic.kr/p/8a8Xqf>



# anatomy of a log line

```
[PCN] [owner/repo (#739)] [PIP-4] [STG-  
run_tests] [JOB-1] [CTID-307] [LXC]  
execute: "..."
```

```
[qtp647111342-5400] INFO:  
c.s.a.p.BackendUploadProcessor - Source  
Path: ...
```

# tracing requests through services

- aggregated searchable logs
- for historical context: log data that doesn't expire
- maintain logging context across services
- custom request headers to propagate context
- reconstruct histories from stored facets



# Dependencies

astro@spaceboyz.net - <https://flic.kr/p/qePnFA>

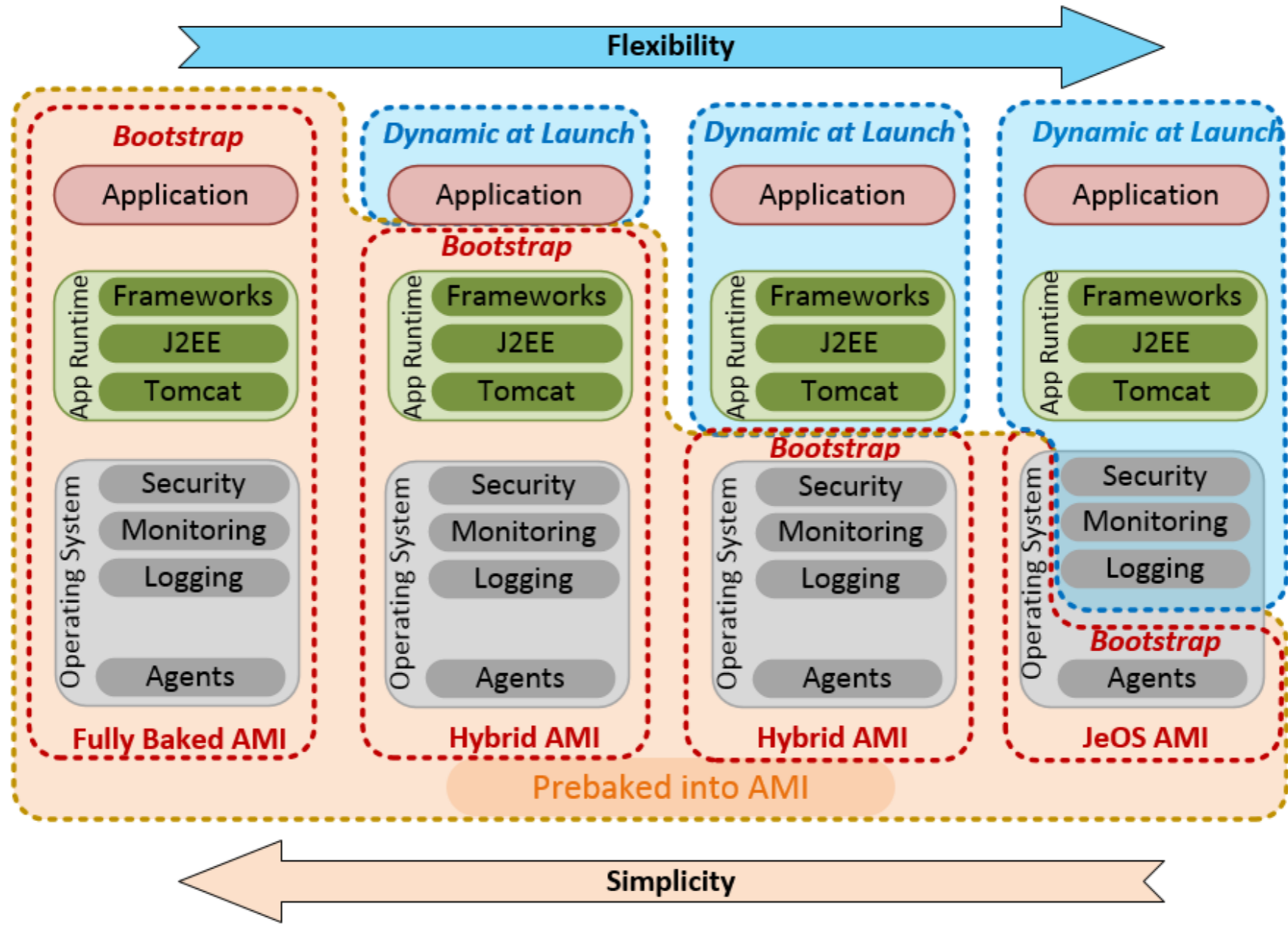
story time:

or how we ended up trying to compile  
mongodb from source when  
upgrading git

# bringing servers to spec

- automate building of server images
- there isn't a "lock" file for native packages
  - be explicit in the versions you require

problems discovered in  
image build pipeline



problems discovered in  
deployment pipeline

# bringing servers to spec

- publish installed packages as build artifacts
  - `yum list all / dpkg -l`

## All Available Aurora Packages

---

acl 2.2.49	alsa-lib 1.1.0	apr 1.3.9
apr-util 1.3.9	apr-util-ldap 1.3.9	armadillo 4.550.2
arpack 3.1.3	aspell 0.60.6	aspell-devel 0.60.6
at 3.1.10	atk 1.30.0	atlas 3.8.4
attr 2.4.44	audit-libs 2.4.5	authconfig 6.1.12
autoconf 2.63	automake 1.11.1	avahi 0.6.25
avahi-compat-howl 0.6.25	avahi-compat-howl-devel 0.6.25	avahi-compat-libdns_sd 0.6.25
avahi-compat-libdns_sd-devel 0.6.25	avahi-devel 0.6.25	avahi-libs 0.6.25
basesystem 10.0	bash 4.1.2	bc 1.06.95
bind-libs 9.8.2	binutils 2.20.51.0.2	bison 2.4.1
blas 3.2.1	boost-thread 1.41.0	bzip2 1.0.5
bzip2-devel 1.0.5	bzip2-libs 1.0.5	bzip2-libs 1.0.5
ca-certificates 2015.2.6	cairo 1.8.8	cdparanoia-libs 10.2
centos-indexhtml 6	centos-release 6	cfitsio 3.240
CGAL 4.0.2	CharLS 1.0	checkpolicy 2.0.22
chef 11.18.12	chkconfig 1.3.49.5	chrome-deps-stable 3.11
cloog-ppl 0.15.7	cmake 2.8.12.2	compat-libevent14 1.4.13
compat-libtermcap 2.0.8	compat-slang 1.4.9	compat-xcb-util 0.4.0
ConsoleKit 0.4.1	ConsoleKit-libs 0.4.1	coreutils 8.4
coreutils-libs 8.4	couchdb-1.6.1 1.6.1	cpio 2.10



```
# Removed
-compat-libtermcap 2.0.8
-compat-slang 1.4.9
-gaul-devel 0.1849
-google-chrome-driver-2.10 2.10.267518
-google-chrome-driver-2.11 2.11.298611
-google-chrome-driver-2.12 2.12.301324
-google-chrome-driver-2.13 2.13.307649
-google-chrome-driver-2.14 2.14.313457
-google-chrome-driver-2.15 2.15.322448
-google-chrome-driver-2.16 2.16.333243
-google-chrome-driver-2.17 2.17.340116
-pgrouting_92 1.05
-slang-devel 2.2.1
```

```
# New
+boost-system 1.41.0
+python-six 1.9.0
```

```
# Updated
-CGAL 4.0.2
+CGAL 4.7
-firefox 45.3.0
+firefox 45.4.0
-geos 3.4.2
+geos 3.5.0
-mysql-community-client 5.6.33
+mysql-community-client 5.6.34
-mysql-community-common 5.6.33
+mysql-community-common 5.6.34
-mysql-community-devel 5.6.33
+mysql-community-devel 5.6.34
-mysql-community-libs 5.6.33
+mysql-community-libs 5.6.34
-mysql-community-libs-compat 5.6.33
+mysql-community-libs-compat 5.6.34
-mysql-community-server 5.6.33
+mysql-community-server 5.6.34
-pgrouting_93 2.0.0
+pgrouting_93 2.0.1
-pgrouting_94 2.0.0
+pgrouting_94 2.0.1
-python-dateutil 1.4.1
+python-dateutil 2.5.3
-redis 3.2.3
+redis 3.2.4
-tzdata 2016f
+tzdata 2016g
-tzdata-java 2016f
+tzdata-java 2016g
```

# maintain your own mirrors

- package maintainers try to be good - but sometimes packages disappear
- maintain your own versioned package mirror for system packages
  - `reposync / aptly`
- accumulate packages in your system package mirrors
  - `v2=v1+updated_packages`
- have canary builds point to internet mirrors
- keep canary builds clean

# maintain your own mirrors

- use dependency tracking in your deployment pipeline tool to keep application binary dependencies in check.
- if you need a mirror for application packages, keep it distinct from system packages
- do not accumulate packages in application package mirrors

# 2 inputs required



# always 1 output

# WYSIWYG IAC

Simon Strandgaard - <https://flic.kr/p/4Ns5LQ>

story time:

or how we ended up causing an  
outage due to automatic attributes kept  
on chef-server

chef disclaimer

“The canonical source of a role’s data is stored on the Chef server, which means that keeping role data in version source control can be challenging.”

<https://docs.chef.io/roles.html>

# chef-solo with non-secure attributes in VCS

- one place for attribute defaults (attribute files)
- one place for final attribute values (environments)
- maintain role-cookbooks if needed
- avoid chef-server, prefer chef-solo
- use cloud-init and git to move cookbooks into servers



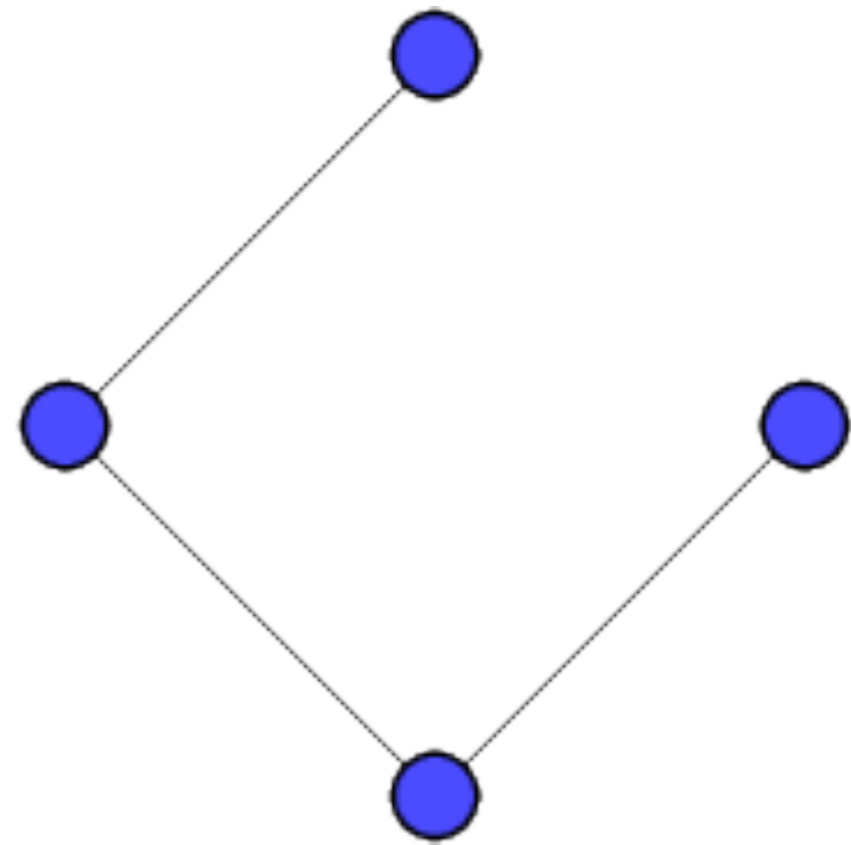
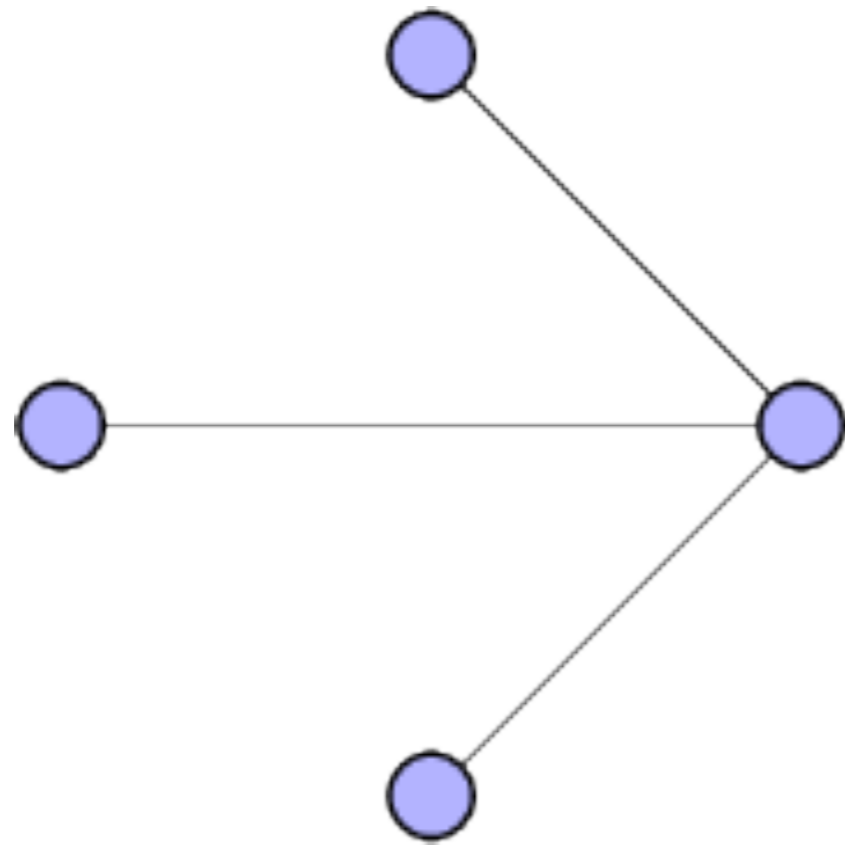
# but security ...

- minimize the number of credentials and secure information that needs to be explicitly set
- encrypt secure attributes before storage in version control systems
  - gitcrypt / blackbox
- keep secure information in your CD tool
  - but remember to secure your CD tool

AWS disclaimer

# cloudformation

- never rely on output parameters from a previous run
- the generated template should describe all aspects of the deployment
- use identity-management-service & key-management service to achieve minimal secure information transmission

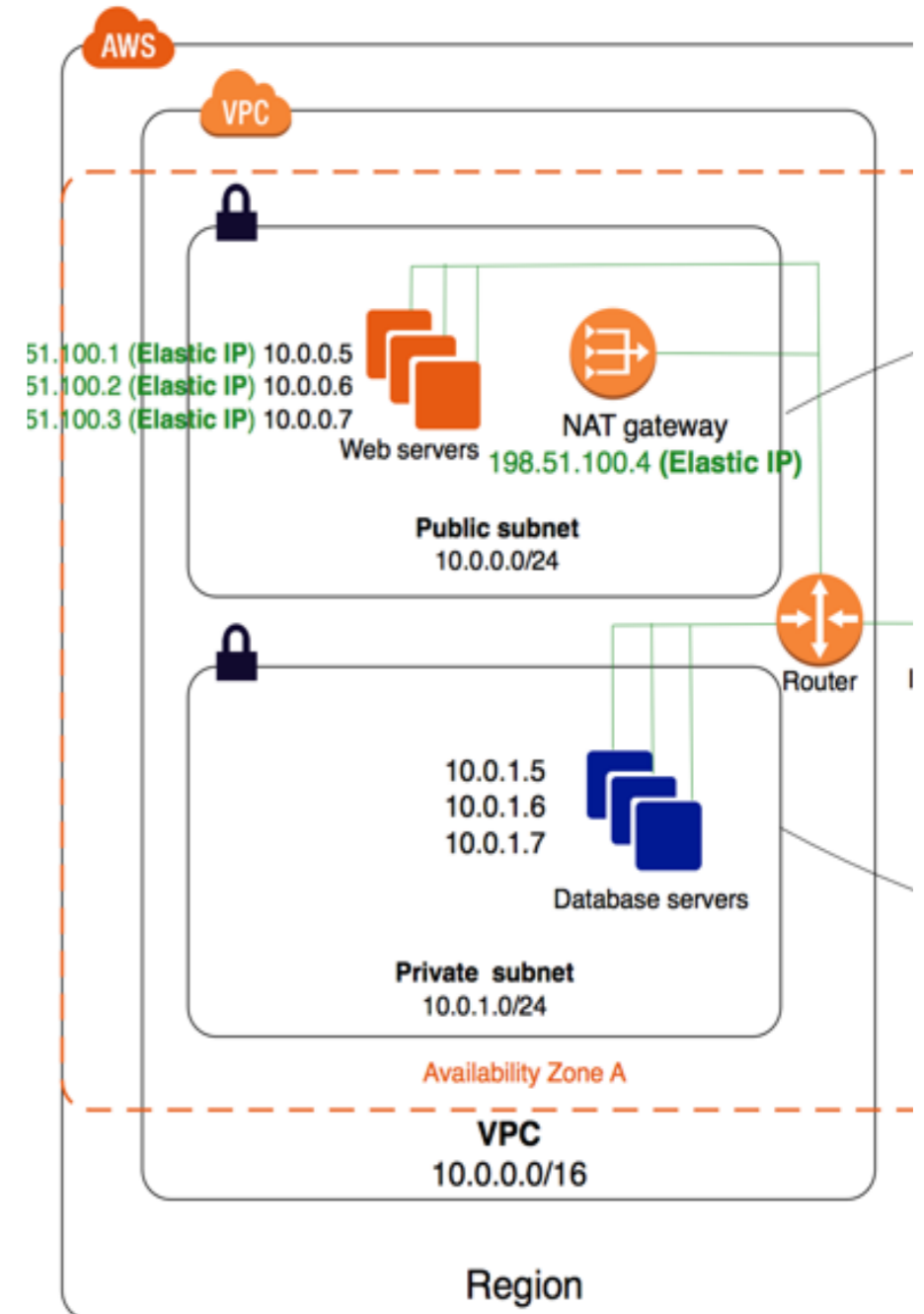
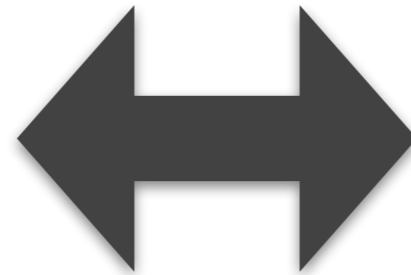


Separate template from topology

<https://math.stackexchange.com/users/139/douglas-s-stones> - <https://math.stackexchange.com/questions/221198/the-number-of-non-isomorphic-spanning-trees-in-k4>

# template-topology correspondence

```
{
  "AWSTemplateFormatVersion" : "2010-09-09",
  "Description" : "AWS CloudFormation Sample Te
  "Parameters" : {
    "InstanceType" : {
      "Description" : "WebServer EC2 instance t
      "Type" : "String",
      "Default" : "m1.small",
      "AllowedValues" : [ "t1.micro","m1.small"
      "ConstraintDescription" : "must be a vali
    },
    "DBRootPassword": {
      "NoEcho": "true",
      "Description" : "Root password for MySQL"
      "Default" : "admin",
      "Type": "String",
      "MinLength": "1",
      "MaxLength": "41",
      "AllowedPattern" : "[a-zA-Z0-9]*",
      "ConstraintDescription" : "must contain o
    }
  },
  "Mappings" : {
    "AWSInstanceType2Arch" : {
      "t1.micro" : { "Arch" : "64" },
      "m1.small" : { "Arch" : "64" },
```



# Layering the cloud

<https://www.thoughtworks.com/insights/blog/layering-cloud> - @petegillardmoss

- DNS, load balancers etc.

Static and consistent.

**Visible**

- servers, application services.

Highly dynamic.

**Volatile**

- DB and file servers. The

IMPORTANT stuff.

**Persistent**

# template for each layer

Visible

```
{
  "AWSTemplateFormatVersion" : "2010-09-09",
  "Description" : "AWS CloudFormation Sample Te
  "Parameters" : {
    "InstanceType" : {
      "Description" : "WebServer EC2 instance t
      "Type" : "String",
      "Default" : "m1.small",
      "AllowedValues" : [ "t1.micro","m1.small"
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      "MaxLength": "41",
      "AllowedPattern" : "[a-zA-Z0-9]*",
      "ConstraintDescription" : "must contain o
    }
  },
  "Mappings" : {
    "AWSInstanceType2Arch" : {
      "t1.micro" : { "Arch" : "64" },
      "m1.small" : { "Arch" : "64" },
```

Volatile

```
{
  "AWSTemplateFormatVersion" : "2010-09-09",
  "Description" : "AWS CloudFormation Sample Te
  "Parameters" : {
    "InstanceType" : {
      "Description" : "WebServer EC2 instance t
      "Type" : "String",
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  "Mappings" : {
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      "m1.small" : { "Arch" : "64" },
```

Persistent

```
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      "Type" : "String",
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      "MinLength": "1",
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      "AllowedPattern" : "[a-zA-Z0-9]*",
      "ConstraintDescription" : "must contain o
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  },
  "Mappings" : {
    "AWSInstanceType2Arch" : {
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      "m1.small" : { "Arch" : "64" },
```

# snap templates

visible+volatile

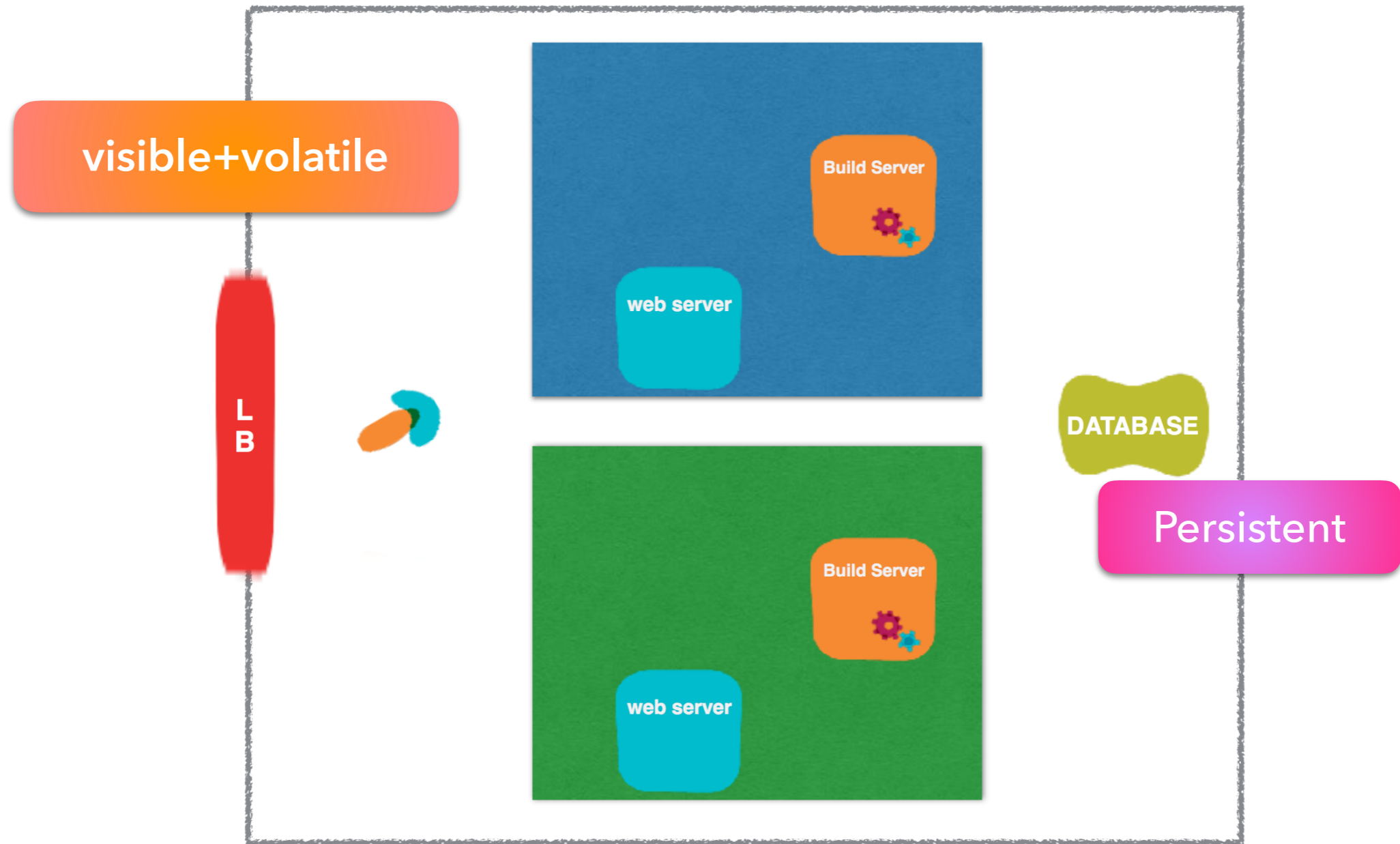
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      "ConstraintDescription" : "must be a vali
    },
    "DBRootPassword": {
      "NoEcho": "true",
      "Description" : "Root password for MySQL"
      "Default" : "admin",
      "Type": "String",
      "MinLength": "1",
      "MaxLength": "41",
      "AllowedPattern" : "[a-zA-Z0-9]*",
      "ConstraintDescription" : "must contain o
    }
  },
  "Mappings" : {
    "AWSInstanceType2Arch" : {
      "t1.micro" : { "Arch" : "64" },
      "m1.small" : { "Arch" : "64" },
```

Persistent

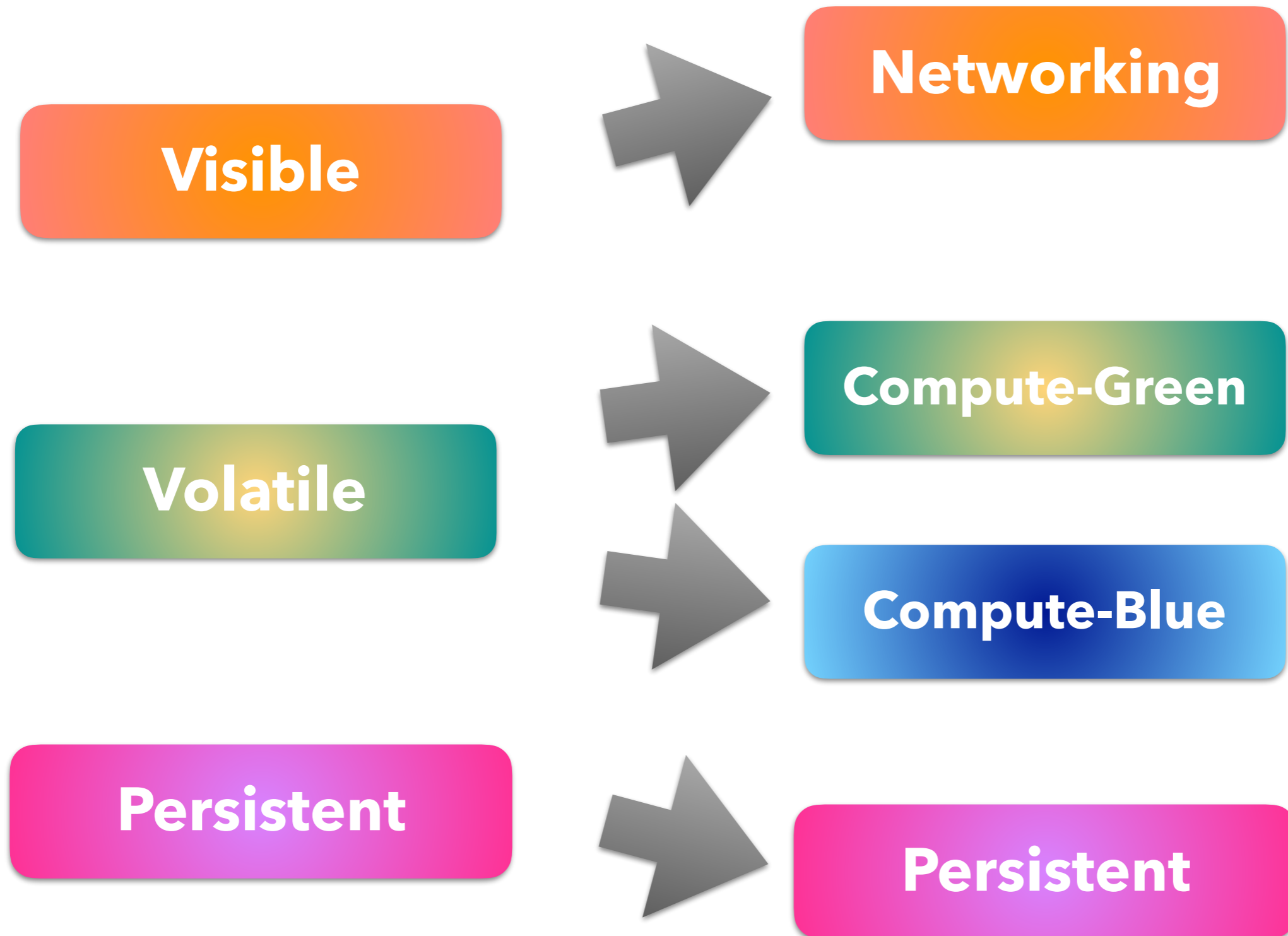
```
{
  "AWSTemplateFormatVersion" : "2010-09-09",
  "Description" : "AWS CloudFormation Sample Te
  "Parameters" : {
    "InstanceType" : {
      "Description" : "WebServer EC2 instance t
      "Type" : "String",
      "Default" : "m1.small",
      "AllowedValues" : [ "t1.micro","m1.small"
      "ConstraintDescription" : "must be a vali
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      "Description" : "Root password for MySQL"
      "Default" : "admin",
      "Type": "String",
      "MinLength": "1",
      "MaxLength": "41",
      "AllowedPattern" : "[a-zA-Z0-9]*",
      "ConstraintDescription" : "must contain o
    }
  },
  "Mappings" : {
    "AWSInstanceType2Arch" : {
      "t1.micro" : { "Arch" : "64" },
      "m1.small" : { "Arch" : "64" },
```



# blue/green deployments



# refactoring templates



# template-topology relationship

- Define stacks in terms of deployment units
- Single stack a bad idea for anything but static and small applications.
- Always isolate the persistence stack.
- Within a stack, use declarative benefits
- Outside a stack, use imperative logic to move the "stacks" into place

# designing for deployment

- application design & code quality are necessary but not sufficient
- retain the ability to tell stories even with multiple services
- maintain system and platform dependencies with the same rigor as application dependencies
- ensure that your IAC tooling does not rely on globals ambient information to avoid side-effects
- define infrastructure components in terms of deployment units, not logical or topological units

thank you

Badri Janakiraman

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