

The Three C's of DevOps

Nathen Harvey, Community Director, Chef
@nathenharvey



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Nathen Harvey

- Community Director, Chef
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What is DevOps?

DevOp with Me!

- I f*%\$ing hate DevOps!
- Which DevOps tool should we use?
- A job title at your company includes:
 - DevOps Engineer
 - DevOps Lead
- Your company has a “DevOps Team”









Product
Management

Development

\$ sudo su -



Quality
Assurance

DevOps



**Product
Management**



Development

\$ sudo su -



DevOps





Rails Devops Cheatsheet

A curated collection of command line tips and time-saving snippets
 Live version with filtering at <http://rubytune.com/cheat>
 Corrections and tip-offs to sudara@rubytune.com

PROCESS BASICS

All processes, with params + hierarchy

```
ps auxww -H
```

Show all ruby-related PIDs and processes

```
pgrep -f1 ruby
```

What is a process doing?

```
strace -f -p $PID
```

What files does a process have open?
 (also detects ruby version of a process)

```
lsof -p $PID
```

Flavors of kill

```
kill xxxx
```

```
kill xxxx yyyy zzzz
```

```
pkill <name of process>
```

```
pkill -f <word in processname>
```

Keep an eye on a process

```
watch 'ps aux | grep ruby'
```

TIPS N TRICKS

Run Previous command as root

```
sudo !!
```

Change to last working dir

```
cd -
```

Run something forever

```
while true;do ruby ghetto.rb;done
```

MEMORY

How much mem is free?

```
free -m
cat /proc/meminfo
```

Are we swapping?

First line is avg since boot.

```
vmstat 1
```

List the top 10 memory hogs

```
ps aux --sort=-resident|head -11
```

Detect OOM and other bad things

```
for i in messages kern.log
syslog; do egrep -i "s[ie]g[oo](m|ps)" /var/log/$i{,.0};
done
```

Disable OOM killer for a process

```
echo -17 > /proc/$PID/oom_adj
```

TERMINAL & SCREEN

Start a screen session as the current user

```
screen -x
```

Join/re-attach to a screen session

```
screen -r
```

Record a terminal session

```
script filename.out 2> filename.timing
```

Playback a recorded terminal session

```
scriptreplay filename.timing
filename.out
```

DISK/FILES

Check reads/writes per disk

```
iostat -xnk 5
```

Files (often logs) marked for deletion but

not yet deleted

```
lsarf | grep delete
```

Overview of all disks

```
df -h
```

Usage of this dir and all subdirs

```
du -hs
```

Find files over 100MB

```
find . -size +100M
```

Low hanging fruit for free space. Check /var/ log too!

```
ls -al /tmp
```

Find files created within the last 7 days

```
find . -mtime -7
```

Find files older than 14 days

```
find . -mtime +14 -type f -name
'*.*gz'
```

Delete files older than 14 days

```
find *.gz -mtime +14 -type f
-exec rm {} \;
```

Monitor a log file for an IP or anything else

```
tail -f file.log | grep
192.168.1.1
```

NETWORK

TCP sockets in use

```
lsof -nPi tcp
```

Get IP/Ethernet info

```
ip addr
ifconfig
```

host <=> IP resolution

```
host 192.168.1.1
```

```
host MyRouter
```

Curl, display headers (I), follow redirects (L)

```
curl -LI http://google.com
```

Traceroute with stats over time (top for traceroute) Requires install

```
mtr google.com
```

Traceroute TCP to avoid ICMP blockage

```
tcptraceroute google.com
```

List any IP blocks/rules

```
iptables -L
```

Drop any network requests from IP

```
iptables -I INPUT -s
66.75.84.220 -j DROP
```

Show traffic by port

```
iftop
```

Show all ports listening with process PID

```
netstat -tlnp
```

D/L speed test (don't run in prod! :)

```
wget cachefly.cachefly.net/100mb.test -O /dev/null
```


DevOps is not...

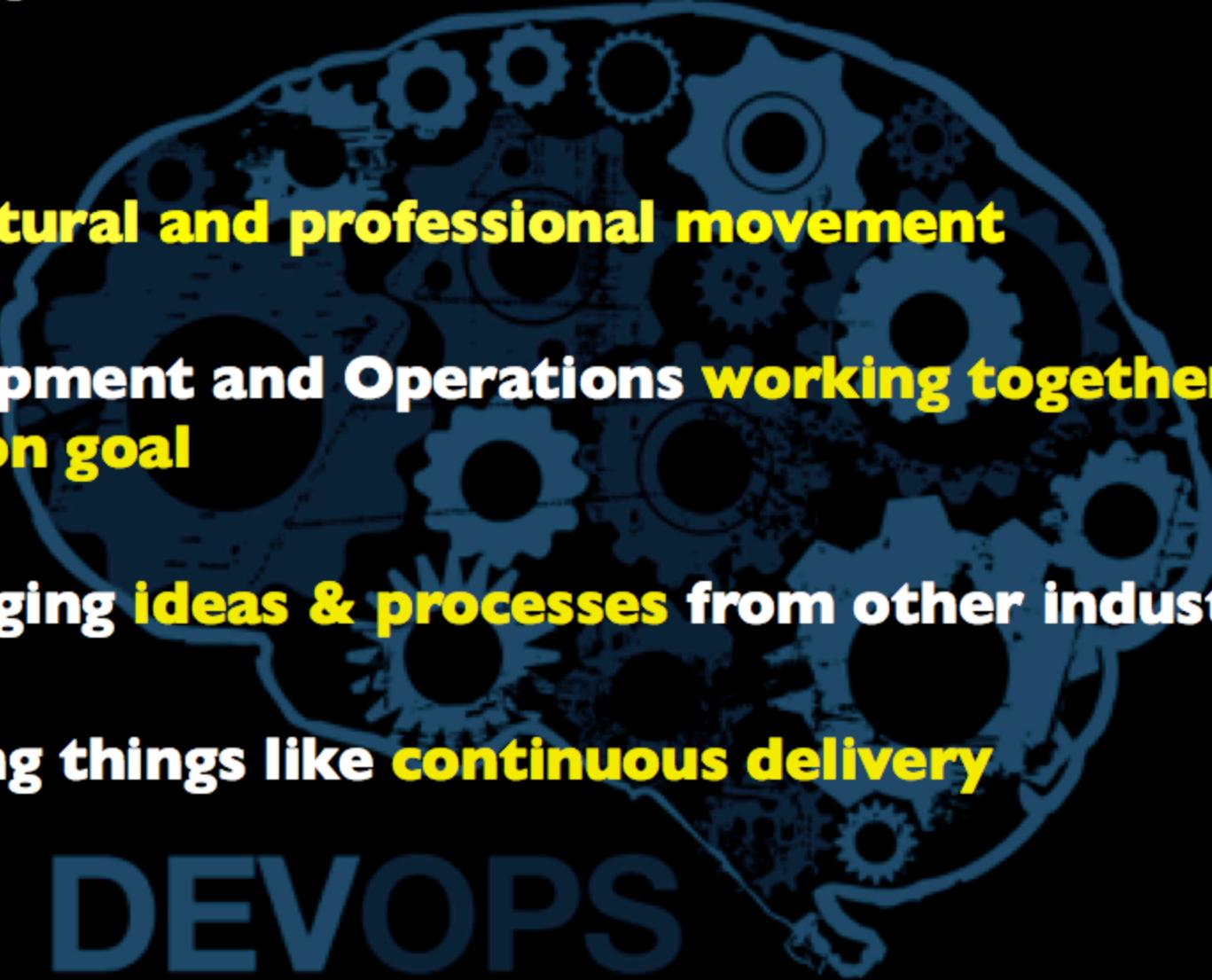
- A new name for
 - System Administration
 - Operations
 - Release Engineering
 - Site Reliability Engineering
- A tool
- A team

DevOps is not...

- A new name for
 - System Administration
 - Operations
 - Release Engineering
 - Site Reliability Engineering
- A tool
- A team*

* Except when it is a team, sometimes that's OK

DevOps



Is a cultural and professional movement

Development and Operations working together toward a common goal

Leveraging ideas & processes from other industries

Enabling things like continuous delivery

DEVOPS

Three C's of DevOps

- Cultural and professional movement
- Development & Operations working together toward a common goal
- Leveraging ideas & processes from other industries
- Enabling things like continuous delivery

Three C's of DevOps

- **Cultural** and professional movement
- Development & Operations working together toward a **common goal**
- Leveraging ideas & processes from other industries
- Enabling things like **continuous delivery**

Three C's of DevOps

- Culture

Three C's of DevOps

- Culture
- Common Goal

Three C's of DevOps

- Culture
- Common Goal
- Continuous Delivery

Three C's of DevOps

- Culture
- Common Goal
- Continuous Delivery
- Chef

Three C's of DevOps

- Culture Character
- Common Goal
- Continuous Delivery
- Chef

Three C's of DevOps

- ~~Culture~~ Character
- ~~Common Goal~~ Communication
- Continuous Delivery
- Chef

Three C's of DevOps

- ~~Culture~~ Character
- ~~Common Goal~~ Communication
- ~~Continuous Delivery~~ Improvement
- Chef

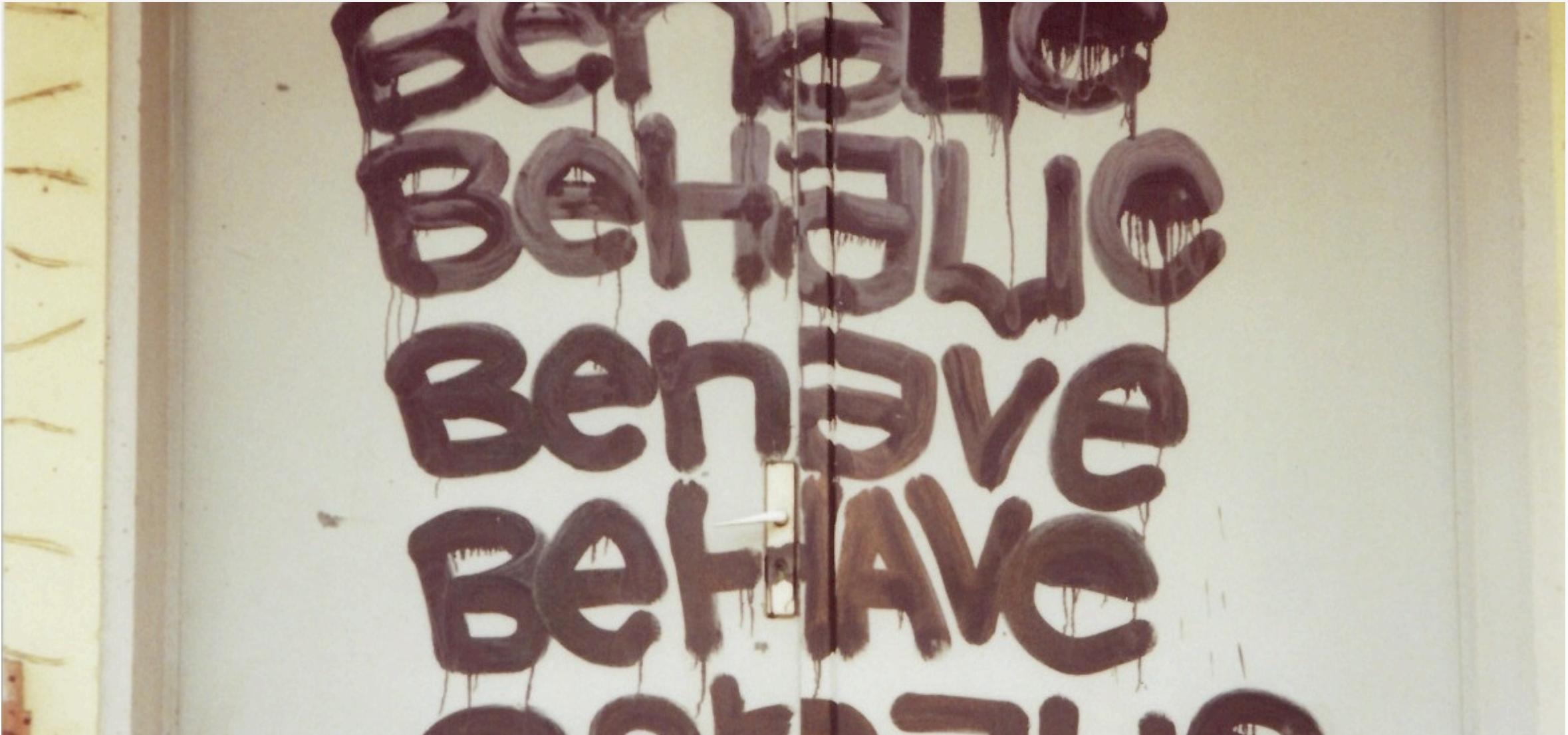
Three C's of DevOps

- ~~Culture~~ Character
- ~~Common Goal~~ Communication
- ~~Continuous Delivery~~ Improvement
- ~~Chef~~ (we have a constraint of 3!)

Character

the mental and moral qualities distinctive to an individual

Trust others to behave responsibly



Perseverance

- Curiosity
- Learning
- Troubleshooting



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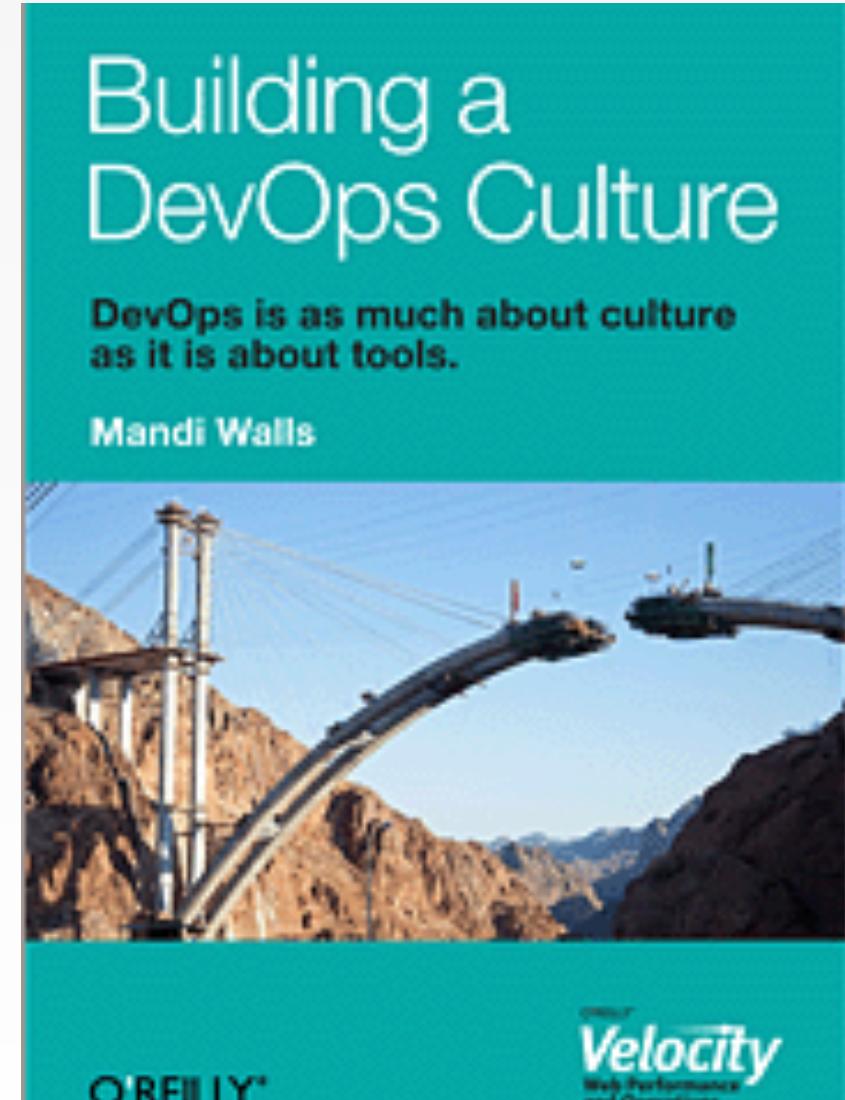
Lift Up

- Mentor and help those around you
- Hire people smarter than you



Respect

You don't have to like each other but you do need to recognize contributions and treat each other well.



Walls, Mandi. O'Reilly Media. 2013

Empathy

The action of understanding, being aware of, being sensitive to, and vicariously experiencing the feelings, thoughts, and experience of another



<https://www.flickr.com/photos/schaaflicht/346073>

Empathy

The action of understanding, being aware of, being sensitive to, and vicariously experiencing the feelings, thoughts, and experience of another



Character

- Trust
- Learning & Curiosity
- Perseverance
- Mentoring
- Respect
- Empathy

Character Traits – In Practice

- Test-driven development
- Automated deployment
- Hack days

Character Traits – In Tools

- Distributed Version Control Systems
- Automated build, test, and deployment pipelines
- Metrics and data that are freely available

Three C's of DevOps

- Character
- ~~Common Goal~~ Communication
- ~~Continuous Delivery~~ Improvement
- ~~Chef~~ (we have a constraint of 3!)

Communication

the imparting or exchanging of information or news

Aligning Objectives



<http://www.flickr.com/photos/amylovesyah/5042999235>



<http://www.flickr.com/photos/mroach/106771711>

Communication

- Current Infrastructure and Process are documented

Infrastructure as Code

```
template "/etc/apache2/apache2.conf" do
  source "apache2.conf.erb"
  owner "root"
  group "root"
  mode "0644"
  variables(:allow_override => "All")
  notifies :reload, "service[apache2]"
end
```

- Current Infrastructure and Process are documented

Infrastructure as Code

```
machine 'db' do
  recipe 'mysql'
end

1.upto(50) do |i|
  machine "web-#{i}" do
    recipe 'apache'
  end
end
```

- Current Infrastructure and Process are documented

Metrics for All



Sit Together



<http://www.flickr.com/photos/philliecasablanca/3344142642>

Eat Together



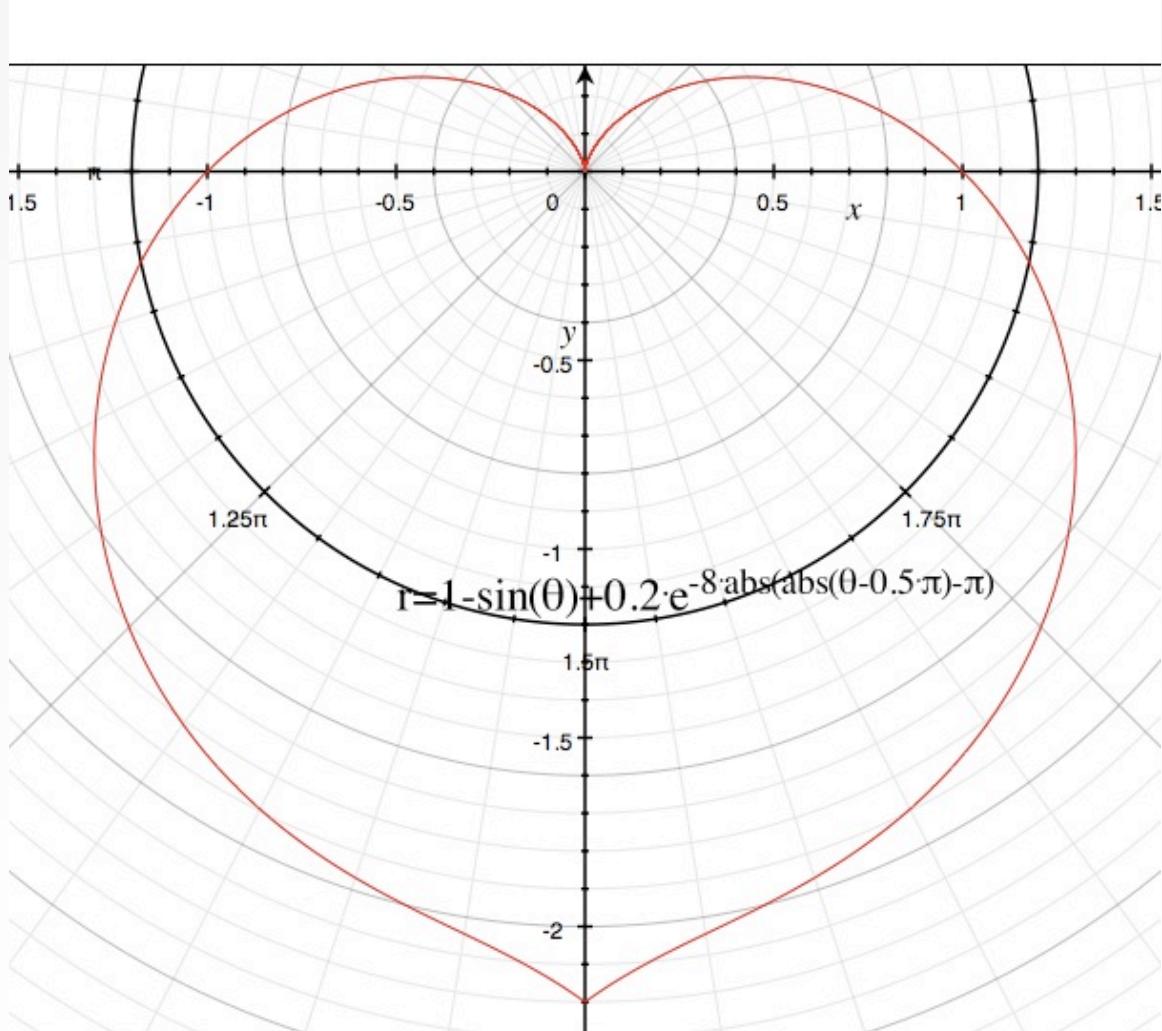
<http://www.flickr.com/photos/libraryman/5460313574>

Water Cooler



<http://www.flickr.com/photos/pieterdewit/3507446040/>

Alignment



- Is my work aligned with the objectives of the business?
- How does this task help make the customer experience more awesome?

The No Asshole Rule

THE NO ASSHOLE RULE

*Building a Civilized Workplace
and Surviving One That Isn't*



ROBERT I. SUTTON, PHD

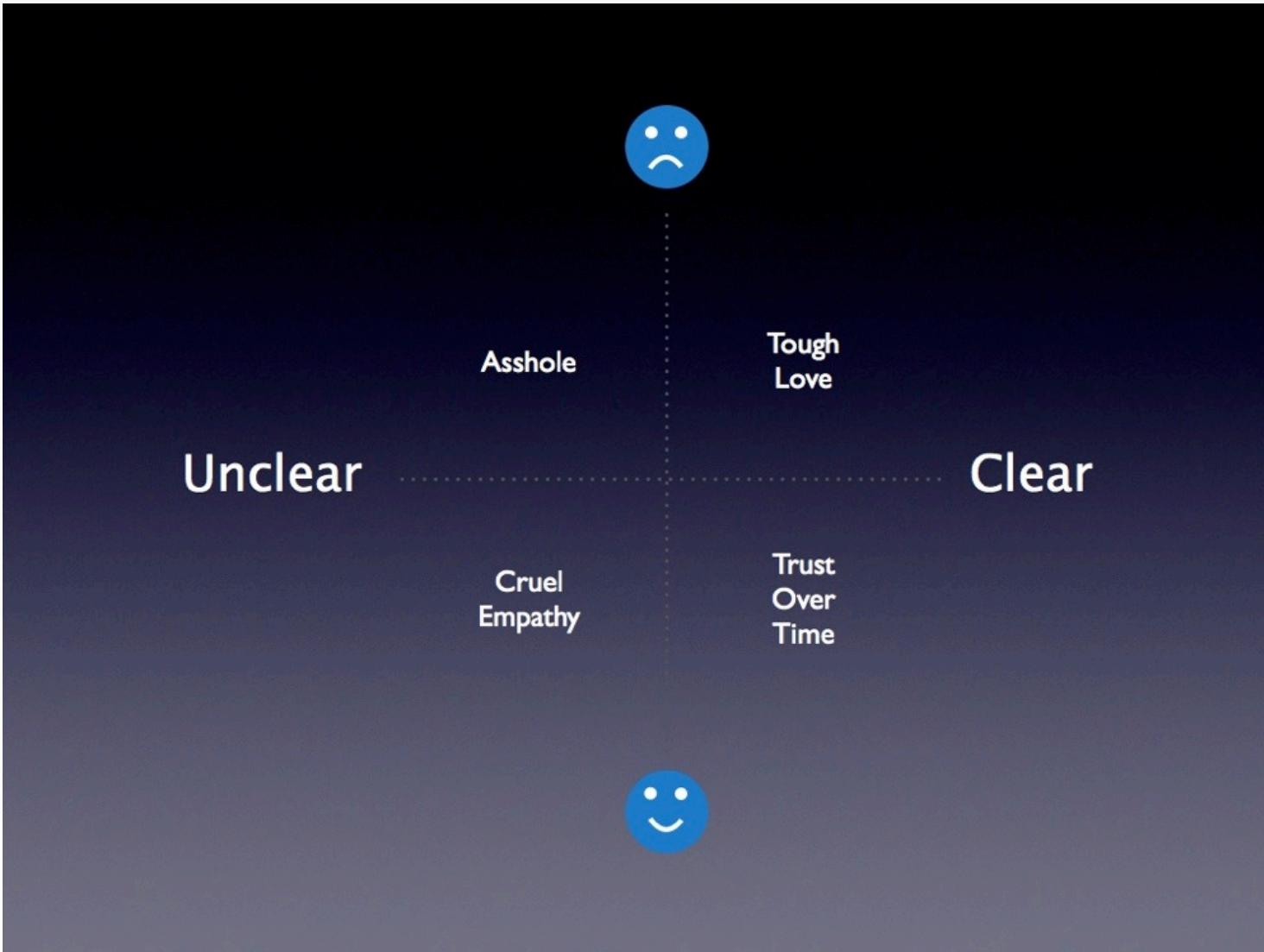
- Assholes target people less powerful than themselves
- After encountering one, people feel oppressed, humiliated, or otherwise worse about themselves

Effective Communication



- Lead with questions, not statements
- Understand the effort and time others have invested
- Avoid the passive aggressive snark

Beware of Cruel Empathy



Communication

- Aligned Objectives
- Coded Infrastructure and Process
- Metrics for All
- Co-location
- Know your co-workers
- Fire or shun assholes

Communication – In Practice

- Code Sharing
- Metrics Sharing
- Lunch and Learn
- Make the work visible
- More than just development and operations
- Game Days
- Team Building

Communication – In Tools

- Infrastructure as code
- Big, visible monitors with
 - Build status
 - Business metrics
- Group Chat
- Visibility of work – Kanban Board
 - Ability to tie work to business priorities

Three C's of DevOps

- Character
- Communication
- Continuous ~~Delivery~~ Improvement
- ~~Chef~~ (we have a constraint of 3!)

Continuous Improvement

ongoing effort to improve products, services or processes. These efforts can seek “incremental” improvement over time or “breakthrough” improvement all at once.



Key to Improvement



Kaizen



- Change for the better
- Continuous Improvement

Kaizen – Small Improvements

- Evaluate a process, make it better.
- Try using the scientific method
 - Ask a question
 - Do research
 - Construct a hypothesis
 - Test your hypothesis
 - Analyze data and draw a conclusion
 - Communicate your results

Kaizen

- Anyone can do it!

Kaikaku – Radical Change



10

<https://www.flickr.com/photos/coutinhobr/6114716068>

- Recognize when desired results are beyond incremental improvement.
- Start fresh, incorporate a new process, then do Kaizen

<https://github.com/adamhjk/good-at-ops>

Continuous Improvement – In Practice

- Continuous Integration
- Shorter Feedback Loops
- Rotations in other departments
- Experiencing your products as a new customer
- Game Day
- Post Mortems

Continuous Improvement – In Tools

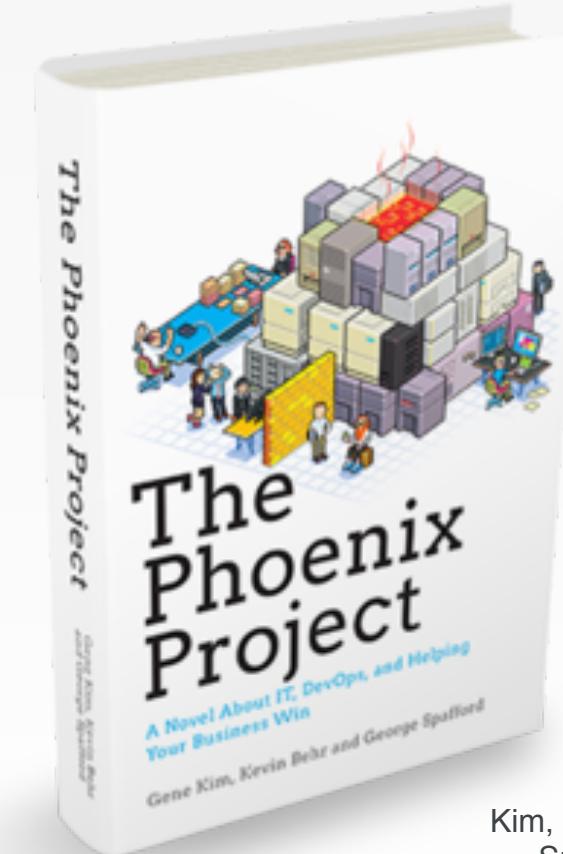
- Continuous Integration servers
- Real User Monitoring
- Supportive HR and management policies

Three C's of DevOps

- Character
- Communication
- Continuous Improvement
- ~~Chef~~ (we have a constraint of 3!)

The Back Office Becomes The Front Office

“In ten years, I’m certain every COO worth their salt will have come from IT. Any COO who doesn’t intimately understand the IT systems that actually run the business is just an empty suit, relying on someone else to do their job.”



Kim, Gene; Behr, Kevin;
Spafford, George
(2013-01-10). The Phoenix
Project: A Novel About IT,
DevOps, and Helping Your
Business Win

Culture & Tools



<https://www.flickr.com/photos/lwr/3077084978>

Making DevOps Work

- Strong cultures of personal empowerment and accountability
- Treat failure as a learning opportunity, not as a dangerous thing to be avoided
- Web-oriented architectures
- Allergy to things that make you slow
- Addicted to data

DevOps – To Do

- Put dev and ops in the same room
- Take a whole-systems view of your technology platform
- Reinforce culture with technology, and vice versa
- Take responsibility
- Trust your teammates

DevOps – To Stop Doing

- Mislabeled things
- Hoarding information
- Looking for someone to blame
- Waiting for someone else to transform your business

Web-scale IT

The future is already here – it's just not very evenly distributed



Web-scale IT

The influence of DevOps on IT culture, tools, processes and organizational structure is resulting in the **acceleration of application delivery** and an environment of **continuous experimentation**.

Combining new software architectures with DevOps-style approaches can become the **catalysts to improve an IT organization's ability to adapt to change**.

STAMFORD, Conn., March 5, 2014

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Gartner Says By 2017 Web-Scale IT Will Be an Architectural Approach Found Operating in 50 Percent of Global Enterprises

Outlook for Web-Scale IT to be Discussed at the Gartner Infrastructure, Operations and Data Center Summit 2014, May 21-22 in Sydney

By 2017, Web-scale IT will be an architectural approach found operating in 50 percent of global enterprises, up from less than 10 percent in 2013, according to Gartner, Inc. Web-scale IT is a pattern of global-class computing that delivers the capabilities of large cloud service providers within an enterprise IT setting by rethinking positions across several dimensions.

"Large cloud services providers such as Amazon, Google, Facebook, etc., are reinventing the way in which IT services can be delivered," said Cameron Haight, research vice president at Gartner. "Their capabilities go beyond scale in terms of sheer size to also include scale as it pertains to speed and agility. If enterprises want to keep pace, then they need to emulate the architectures, processes and practices of these exemplary cloud providers."

"Web-scale IT looks to change the IT value chain in a systemic fashion," said Mr. Haight. "Data centers are designed with an industrial engineering perspective that looks for every opportunity to reduce cost and waste. This goes beyond redesigning facilities to be more energy efficient to also include in-house design of key hardware components such as servers, storage and networks. Web-oriented architectures allow developers to build very flexible and resilient systems that recover from failure more quickly."

Mr. Haight said that open and freely available blueprints of data center facilities and associated server, storage and networking hardware are lowering costs and disrupting the traditional IT vendor landscape.

"IT organizations have historically had a limited number of vendors from which to source their hardware, whether the need was for servers, storage devices or network equipment. This began to change when large, cloud services providers, because of their extreme needs for scale and cost control, began to design and assemble infrastructure components," said Mr. Haight. "These devices were different than those sold to traditional enterprises, because they did not have some of the basic features often available in commercial products."

Regardless of the cloud services company, a common element among all these devices was an organizational requirement to run an open-source OS, not only to reduce costs, but also to increase the control of IT environments.

This brings several ramifications for the traditional enterprise. First, and perhaps most importantly, an open

Web-scale IT

Historically, enterprise IT has been focused on managing risk... However, the major DevOps underpinnings...are enabling these same enterprises to realize they can **be fast and 'safe.'** **Embracing risk** is not as risky as it sounds with a DevOps mindset. Having the architecture of the application being more resilient in the first place enables IT operations teams to implement and support leaner and more agile processes that might otherwise be viewed as inappropriate for conservatively minded organizations.

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Walk This Way



THE BOSS
NEXT

Walk This Way



<https://www.morrisonhotelgallery.com/photo/default.aspx?photographID=7360>

Walk This Way

“Oh, hell no! This is hillbilly gibberish”



Walk This Way

“Oh, hell no! This is hillbilly gibberish”



“I don’t understand this code”

Walk This Way

“Oh, hell no! This is hillbilly gibberish”



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“Oh, hell no! This is hillbilly gibberish”



“I don’t understand this code”

“What the hell are they doing to our song?”



Walk This Way

“Oh, hell no! This is hillbilly gibberish”



“I don’t understand this code”

“What the hell are they doing to our song?”



“It works fine on my machine”

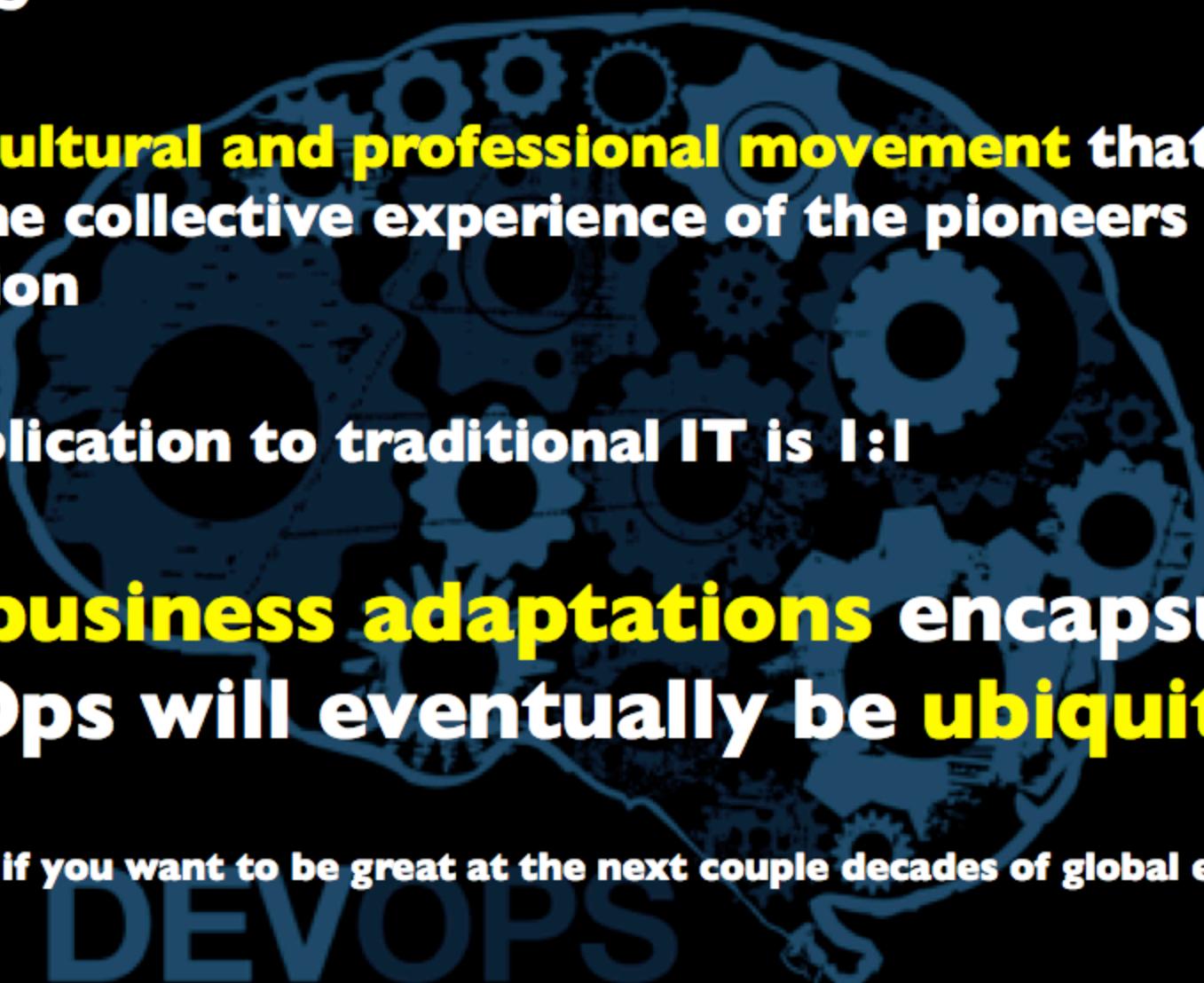
Bring The Noise



© Rik Goldman

http://userserve-ak.last.fm/serve/_/44943949/Anthrax+feat+Public+Enemy+AnthraxPublicEnemyrockrapmash9.jpg

DevOps



Is the **cultural and professional movement** that grew directly from the collective experience of the pioneers of this transition

It's application to traditional IT is 1:1

The **business adaptations** encapsulated in **DevOps** will eventually be **ubiquitous**

....At least, if you want to be great at the next couple decades of global economic growth

DEVOPS



CHEF™

**STOP BY THE
CHEF BOOTH
FOR A T-SHIRT!**

**Ask us about
delivering speed,
scale and
consistency to your
infrastructure.**

MONDAY, JULY 28 @ 10:45AM

“The Three C’s of DevOps”

Presented by:

Nathen Harvey, Chef Community Director

FIND US @ AGILE 2014

JULY 28 @ 3:45PM

**Awesome Chef:
Fletcher Nichol
presents**

**“Agile Infrastructure
Development with
Test Kitchen”**

JULY 31 @ 9:00AM

**Community Member:
Jeffrey Hulten
presents**

**“Reducing Resistance:
Deployment as a Surface”**



CHEF™

Thank You

- What questions do you have?
- @nathenharvey
- nharvey@getchef.com
- bit.ly/farmer-nathen
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Bonus Round!

- Community
- Infrastructure as Code
- Stages of Learning
- Hiring DevOps
- Ask me anything about...
 - Chef
 - DevOps

Community



Community

- Meetups
- Podcasts
- Conferences
- Code Sharing

Road Trip!



v<http://www.flickr.com/photos/smemon/4834936917>

Engineer Exchange



<http://www.flickr.com/photos/sleatusf/9919775853>

Job Interviews



<http://www.flickr.com/photos/usfbps/4607150722>

Bonus Round!

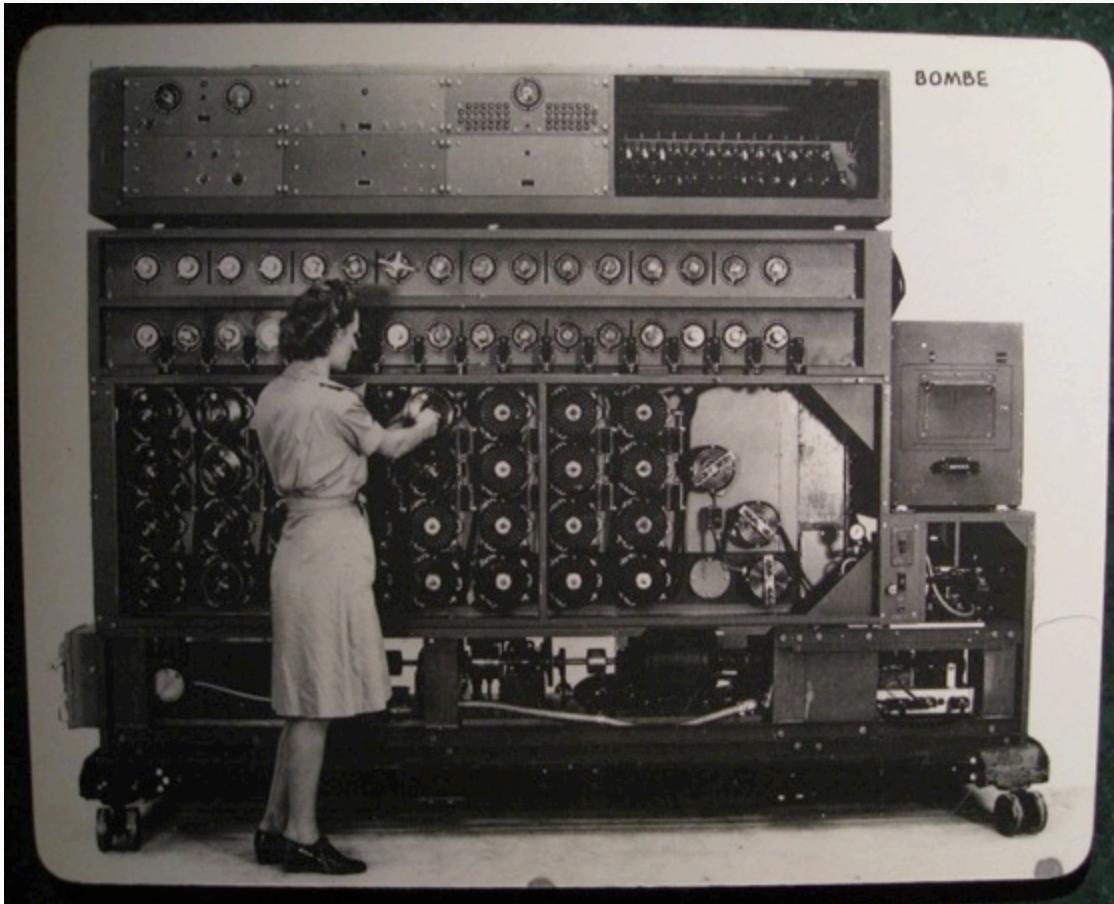
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Infrastructure as Code



Infrastructure as Code

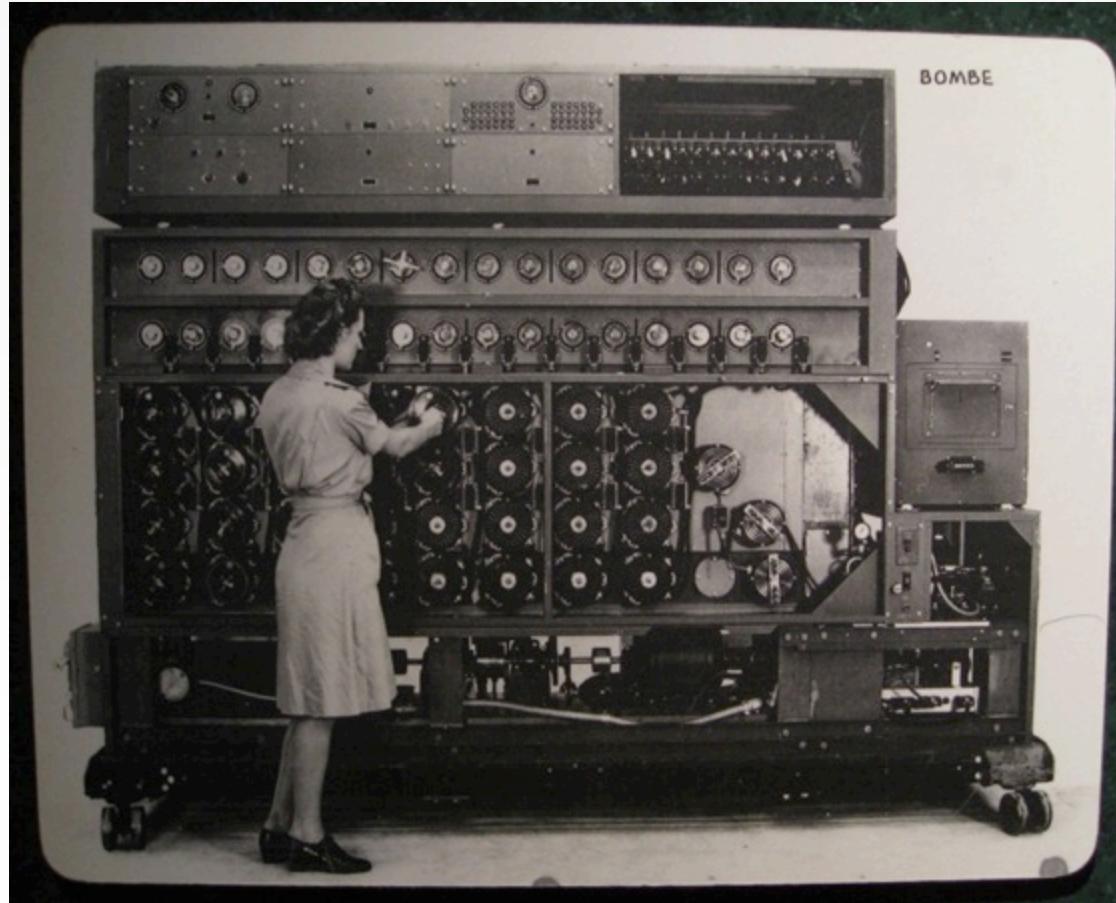
- Programmatically provision and configure components



<http://www.flickr.com/photos/louisb/4555295187/>

Infrastructure as Code

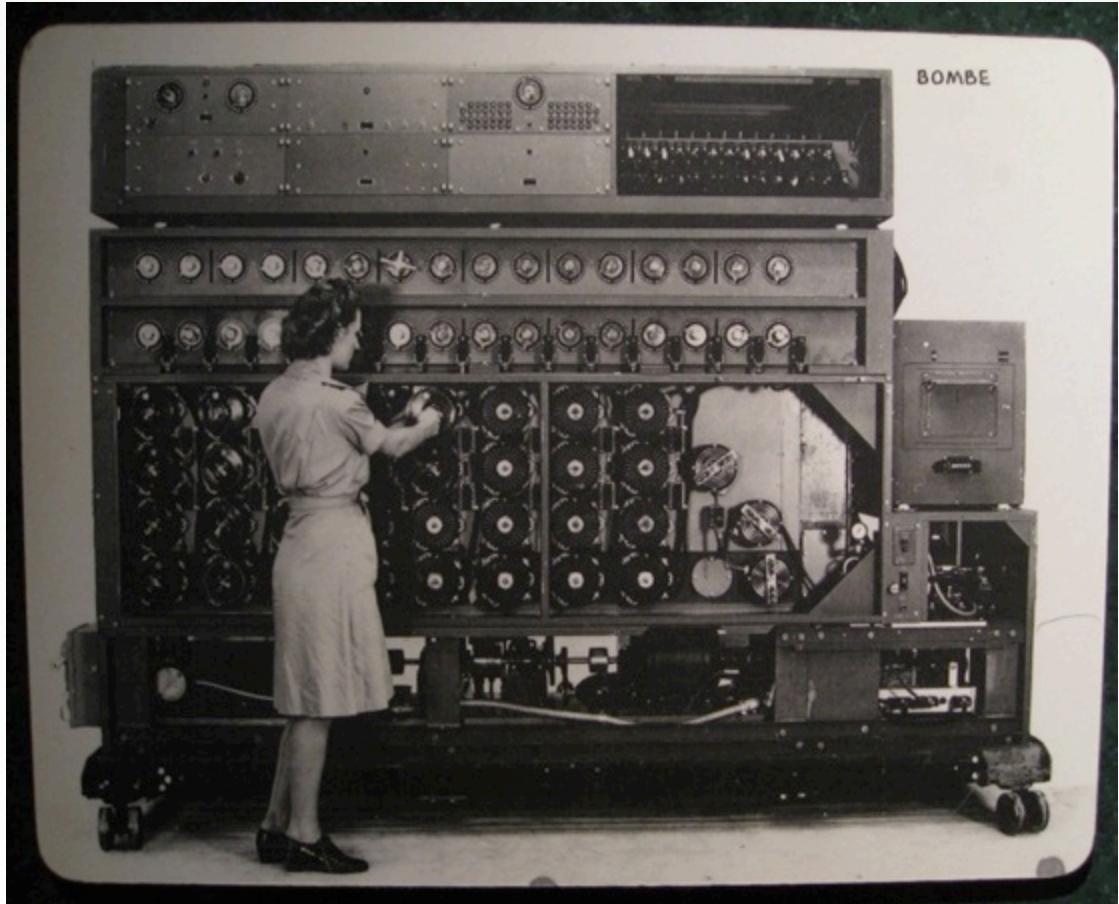
- Treat like any other code base



<http://www.flickr.com/photos/louisb/4555295187/>

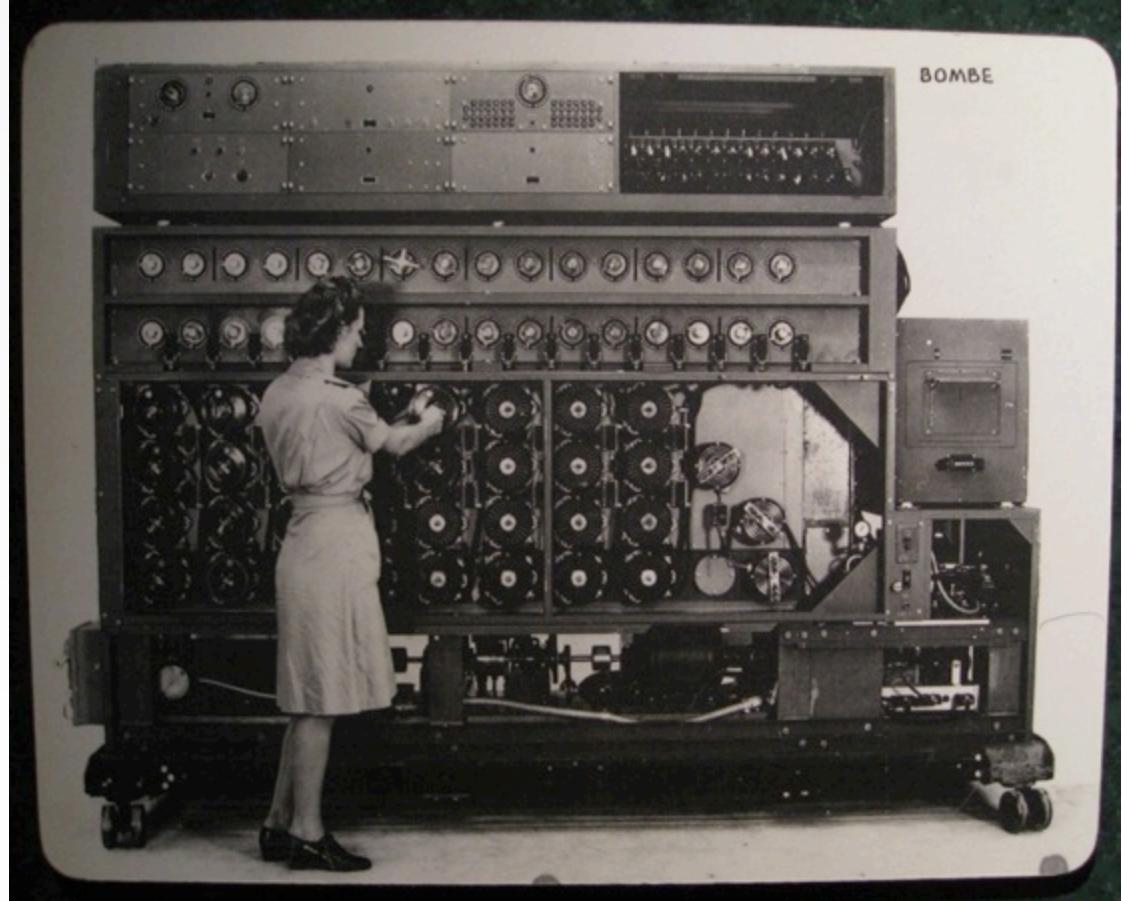
Infrastructure as Code

- Reconstruct business from code repository, data backup, and compute resources



<http://www.flickr.com/photos/louisb/4555295187/>

Infrastructure as Code



<http://www.flickr.com/photos/louisb/4555295187/>

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Stages of Learning

Shuhari

- First learn, then detach, and finally transcend
 - shu - "obey" - traditional wisdom
 - ha - "detach" - break with tradition
 - ri - "separate" - transcend

守破離

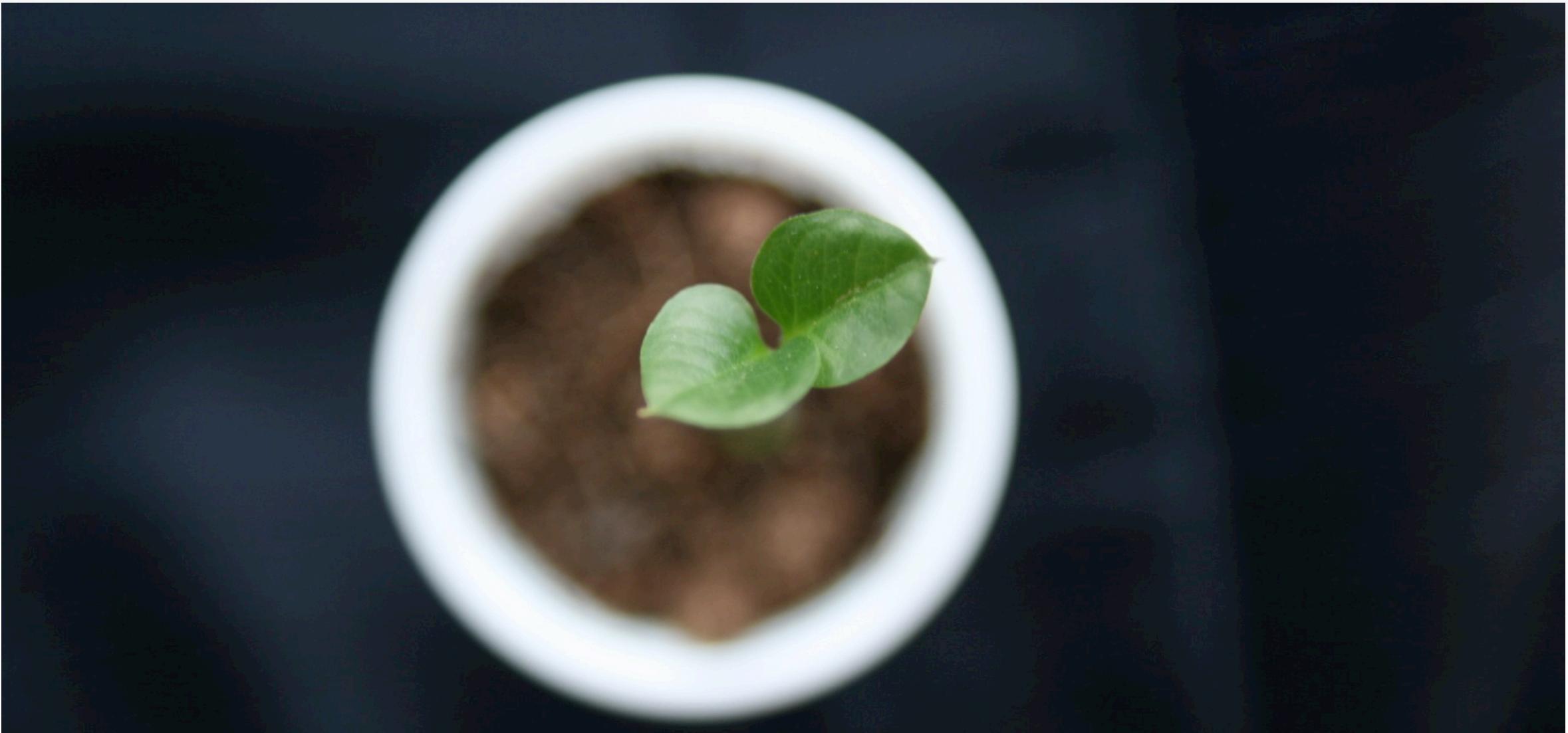
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Hiring DevOps



Grow your own!



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