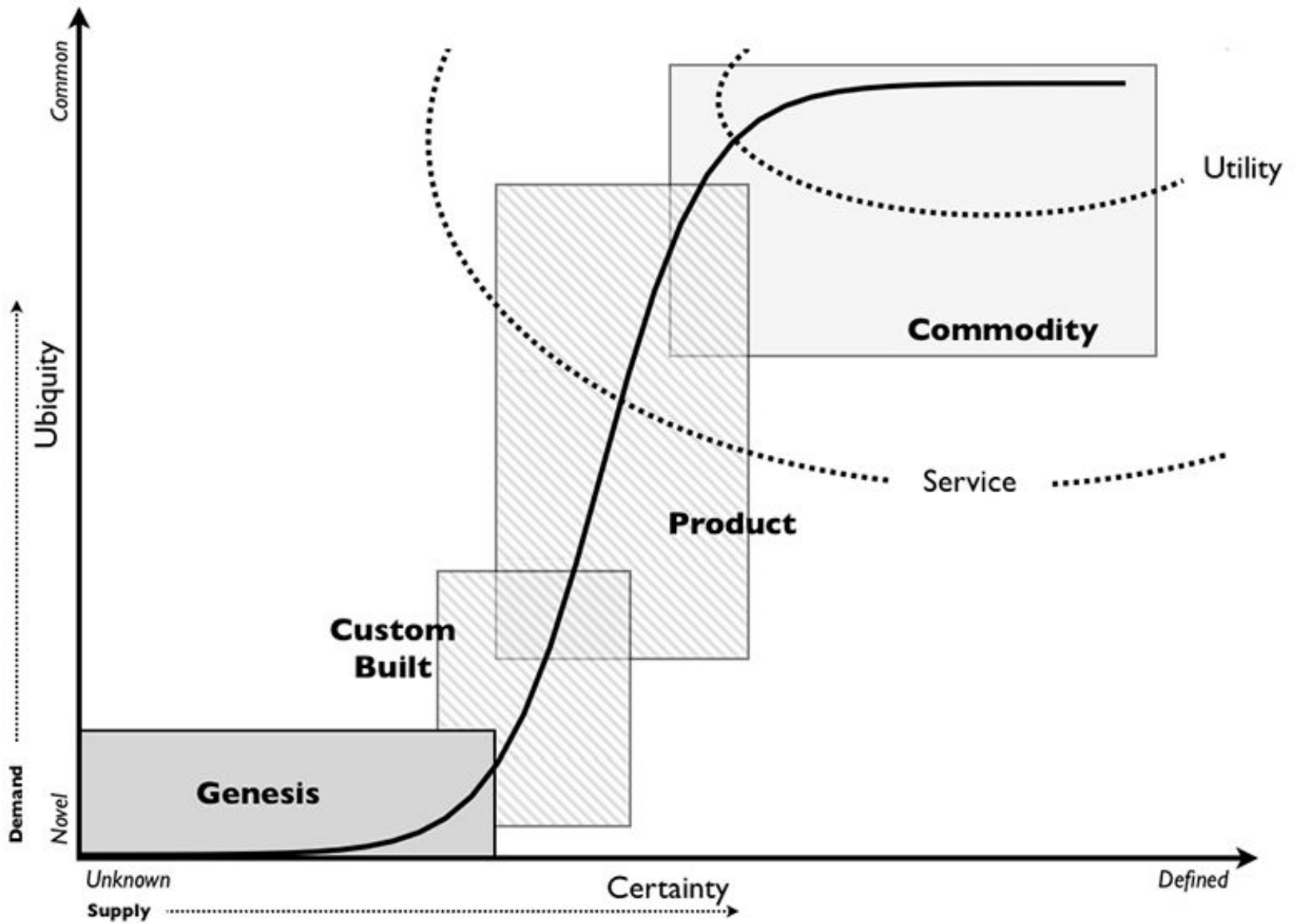


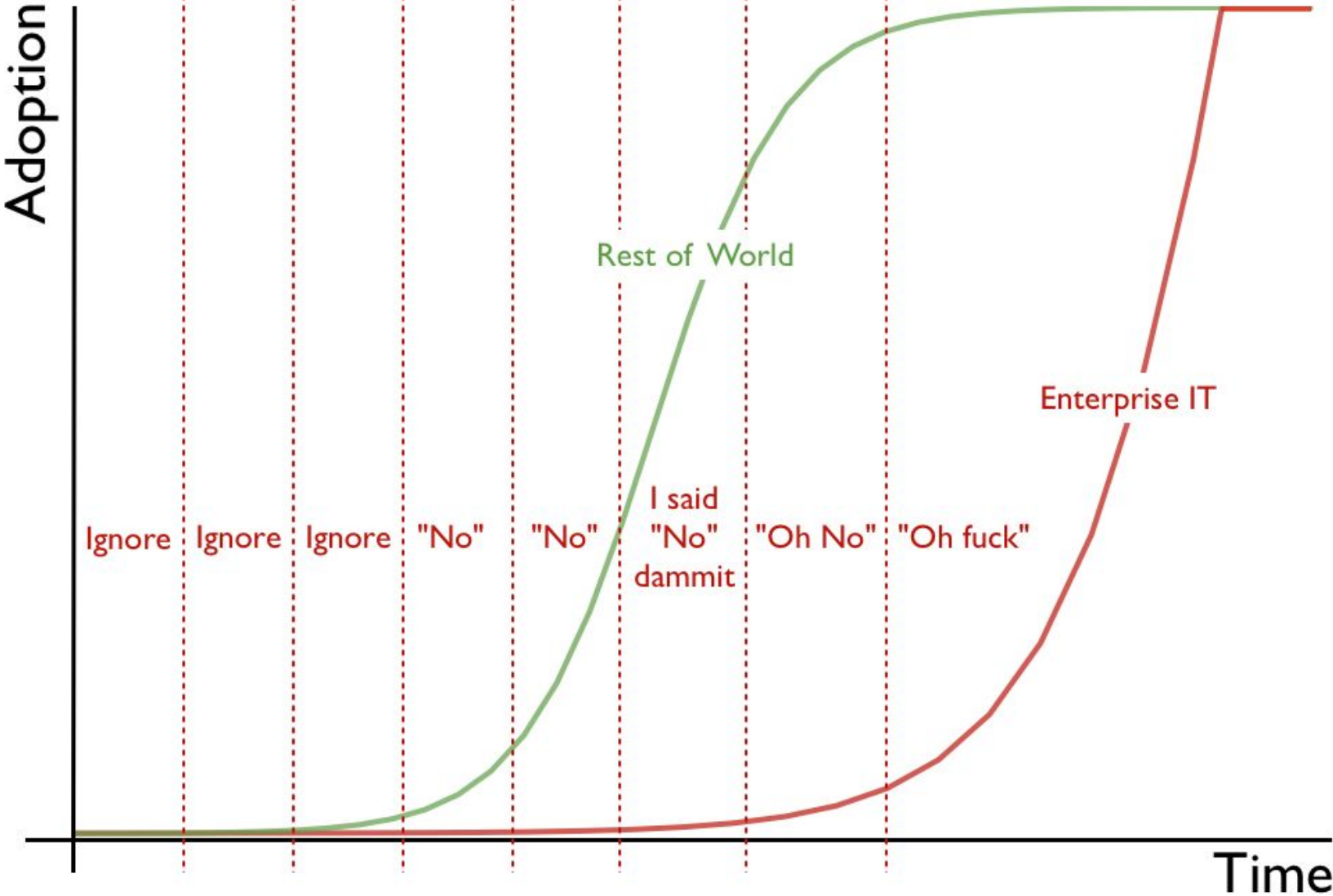
# DevOps

**Arthur Clune**  
**University of York**

**It's not the '90s any more**



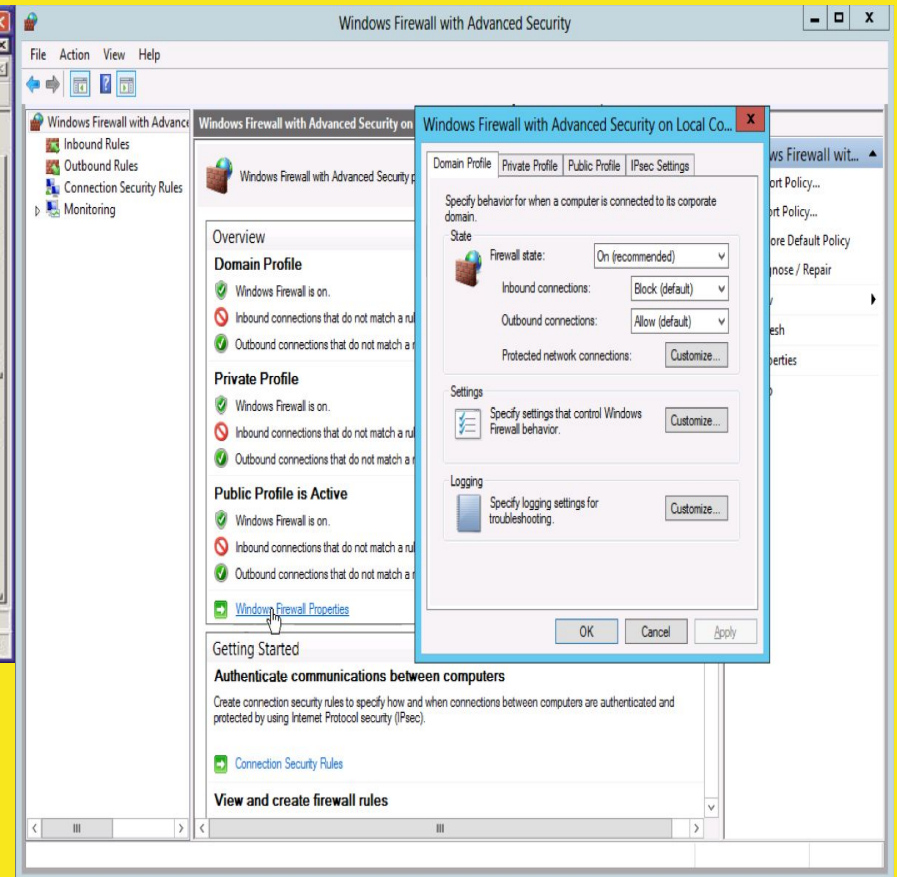
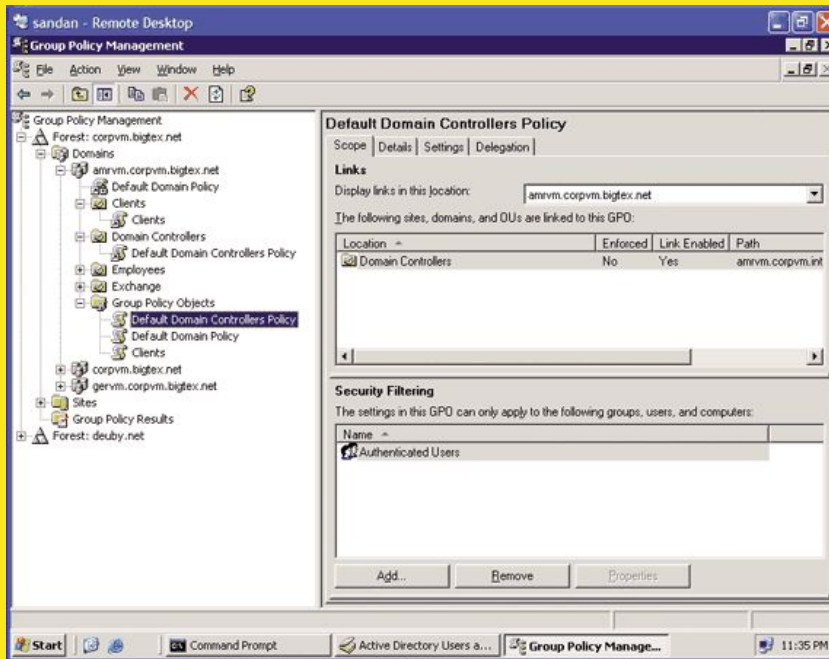
# Enterprise IT Adoption Cycle



**Infrastructure practices  
haven't changed**

**enough....**

# How fast can you click?



# “The CLI doesn’t scale”

– Greg Ferro

```
R1#show ip eigrp topology
IP-EIGRP Topology Table for AS(100)/ID(192.168.1.101)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 192.168.1.96/27, 1 successors, FD is 40512000
   via Connected, Serial1/0
P 192.168.1.0/24, 1 successors, FD is 40512000
   via Summary (40512000/0), Null0
P 172.16.0.0/16, 1 successors, FD is 28160
   via Summary (28160/0), Null0
P 172.17.0.0/16, 1 successors, FD is 40514560
   via 192.168.1.102 (40514560/28160), Serial1/0
P 172.16.1.0/24, 1 successors, FD is 28160
   via Connected, FastEthernet0/0
R1#_
```

# 2500:1



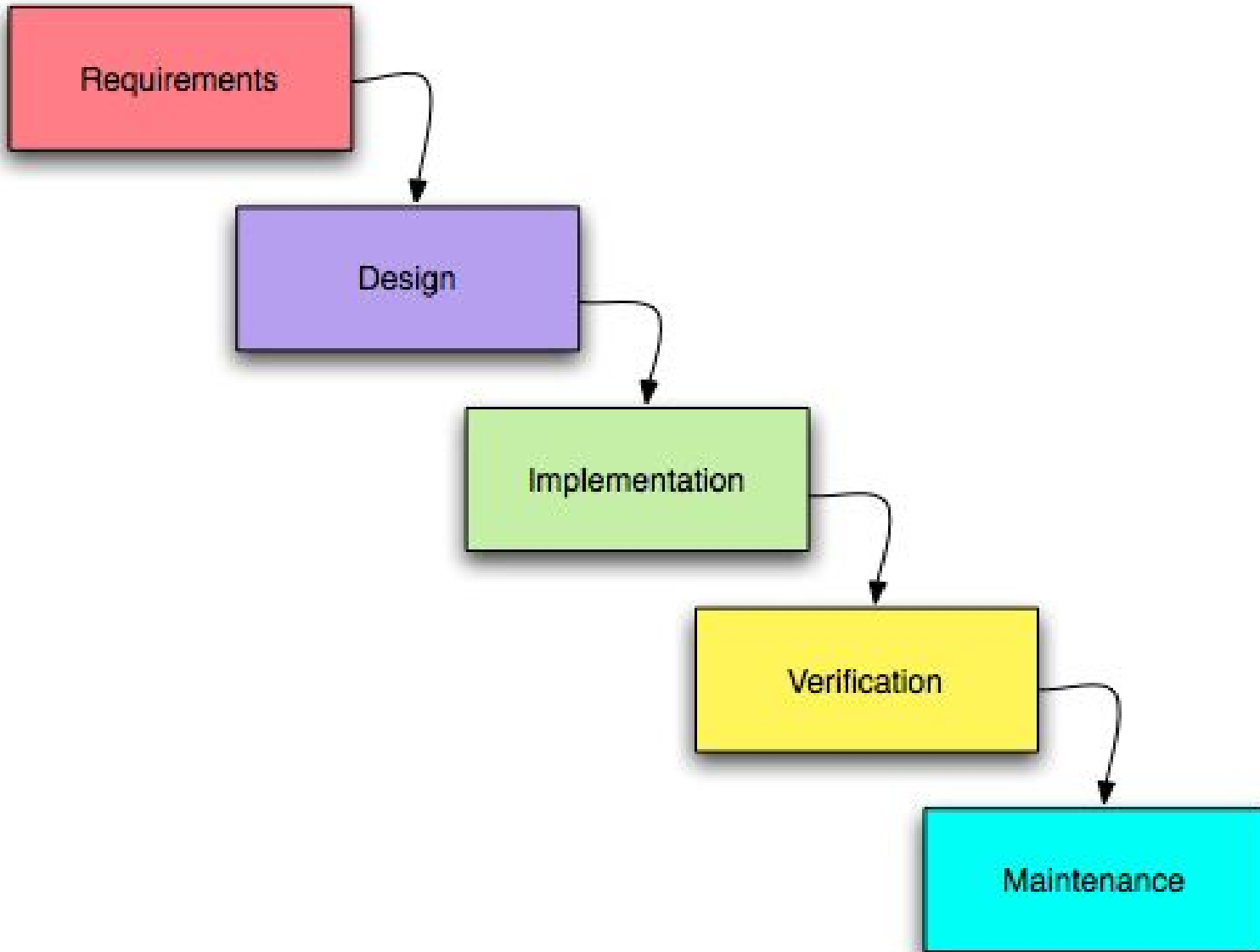
Server:admin ratio for cloud providers

(James Hamilton)



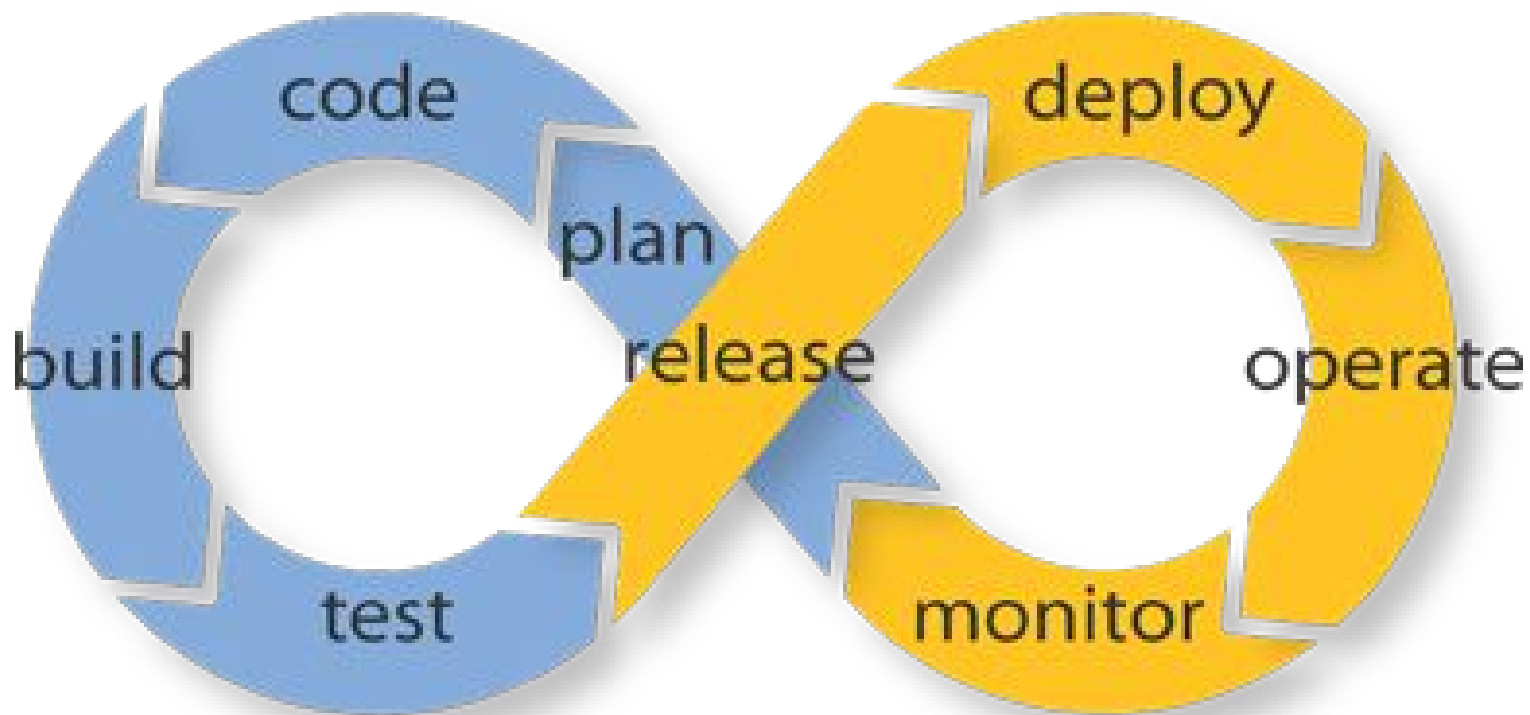
# Agile, unit tests and all that jazz

Modern software development practices



**WORKED FINE IN  
DEV**

**OPS PROBLEM NOW**



# Key features of modern software development

- Agile projects
- Revision Control
- Tests
- Continuous integration
- A/B testing

---

**#DevOps**

# Requirements for modern infrastructure management

- Declarative
- Idempotent
- Testable
- Code/Text based
- Open

---

**Master**

```
graph TD; Master[Master] --- Client1[Client]; Master --- Client2[Client]; Master --- Client3[Client]; Master --- Client4[Client]; Master --- Client5[Client];
```

The diagram illustrates a central 'Master' node, represented by a pink rounded rectangle, connected to five 'Client' nodes, represented by yellow rounded rectangles. Each 'Client' node is connected to the 'Master' node by a single line, forming a star topology.

**Client**

**Client**

**Client**

**Client**

**Client**



eos\_config:

section='router bgp {{ bgp.bgp\_as }}'

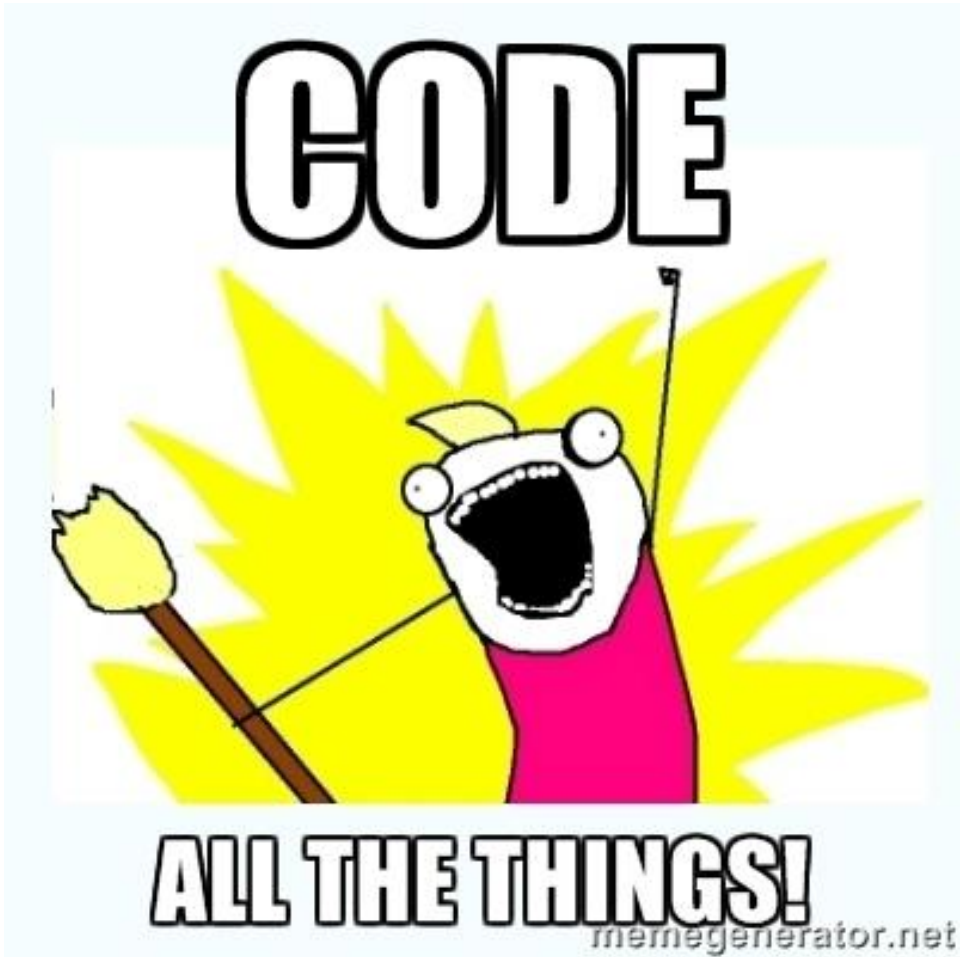
command='bgp listen range {{ item.name }}  
peer-group {{ item.peer\_group }} remote-as {{  
item.remote\_as }}'

.....

when: bgp is defined and bgp.enable and  
bgp.listeners

with\_items: bgp.listeners | default([])

Simple?



---

# Infracode in Production

**Some people, when  
confronted with a problem,  
think “I know, I’ll code”. Now  
they have two problems.**

**With apologies to JWZ**

# York

- First production Puppet commit 2008
- Deliver SITS with Puppet
- Install NSX via PowerShell
- Investigating Ansible

---

# LoC

----

75,023

Puppet

244,094

Systems

561,960

Networks

> 5,000,000

Dev

**Ops now has the issues  
dev has always had:  
code rot, dependencies,  
libraries...**

**Good problems to have!**



**Solutions:**

**Microservices, 2-pizza, code review, tests, anti-fragility .....**

# Management, ITIL and DevOps

**DevOps is cultural change**

**Infracode enables change,  
repeatability and velocity**

**Tests are your CAB**  
**Monitoring is QA**

**Q: What version is  
your infrastructure?**

**ce77b04bf92b88bb2298c356ddb6e6579edac0d1**

**Learn Python**  
**Learn Ansible**

**Thanks!**

**arthur.clune@york.ac.uk**  
**@fatrat**