



Continuous Security in DevOps

Maciej Lasyk

4developers – Warsaw

2015-04-20



Join Fedora Infrastructure!

- learn Ansible
- join the security team!
- use Fedora Security Lab (spin)

<http://fedoraproject.org/en/join-fedora>

Agenda?

- **DevOps indoctrination**
- technical infrastructure stuff
- continuous delivery considerations
- finally infosec tools & automation
- working demo (hopefully) ;)

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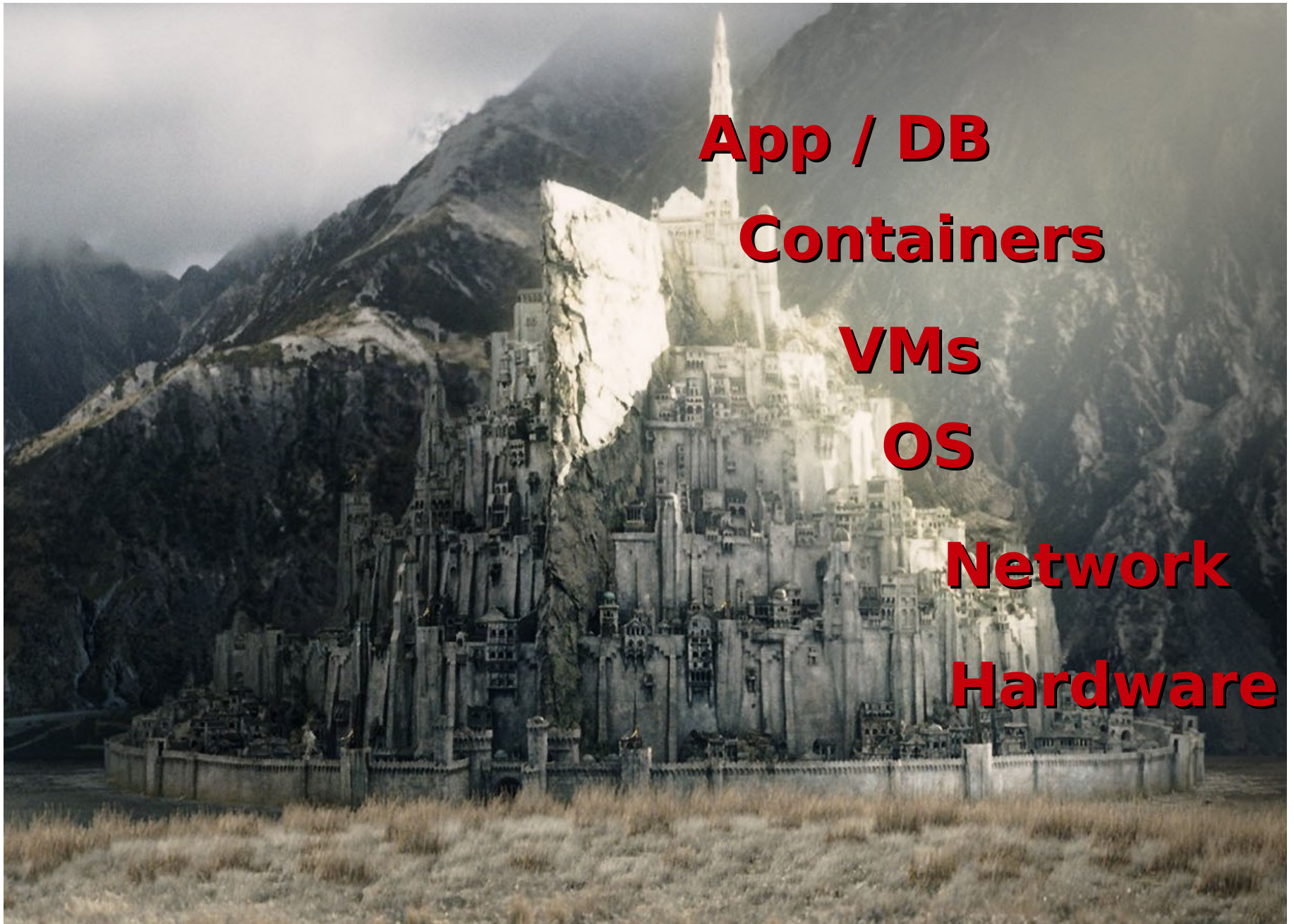
I'm not a security expert but an engineer
passionate about security & quality

“The only thing more dangerous than a developer is a developer conspiring with Security. The two working together gives means, motive and opportunity.”

“The Phoenix Project”

by Gene Kim, Kevin Behr and George Spafford

General security rule in IT: security is based on layers



App / DB

Containers

VMs

OS

Network

Hardware

General security rule in IT: security is based on layers



DevOps Anti-Types & patterns

This is a copy/paste from

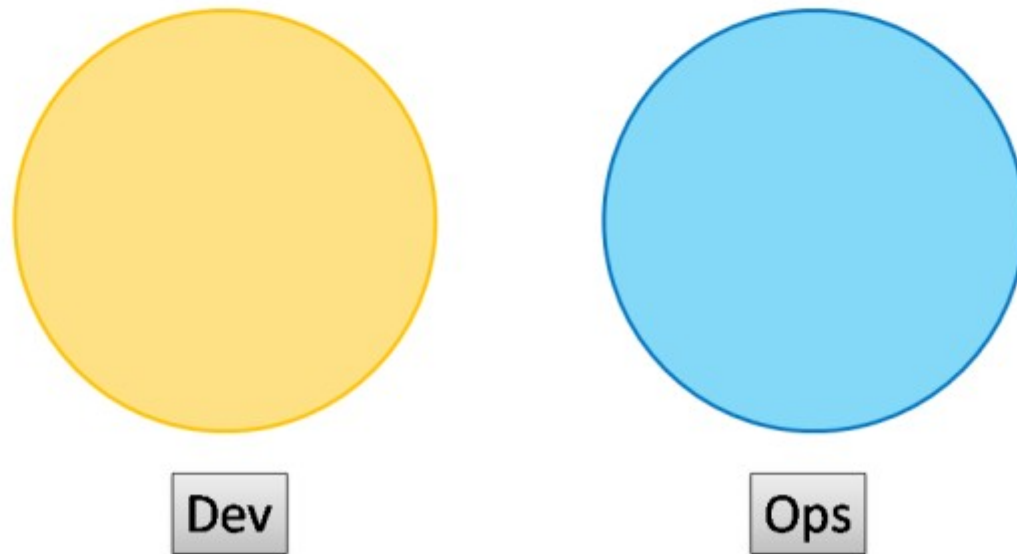
<http://blog.matthewskelton.net/>

w/my comments included and InfoSec layer added

Great job Matthew! Thanks!

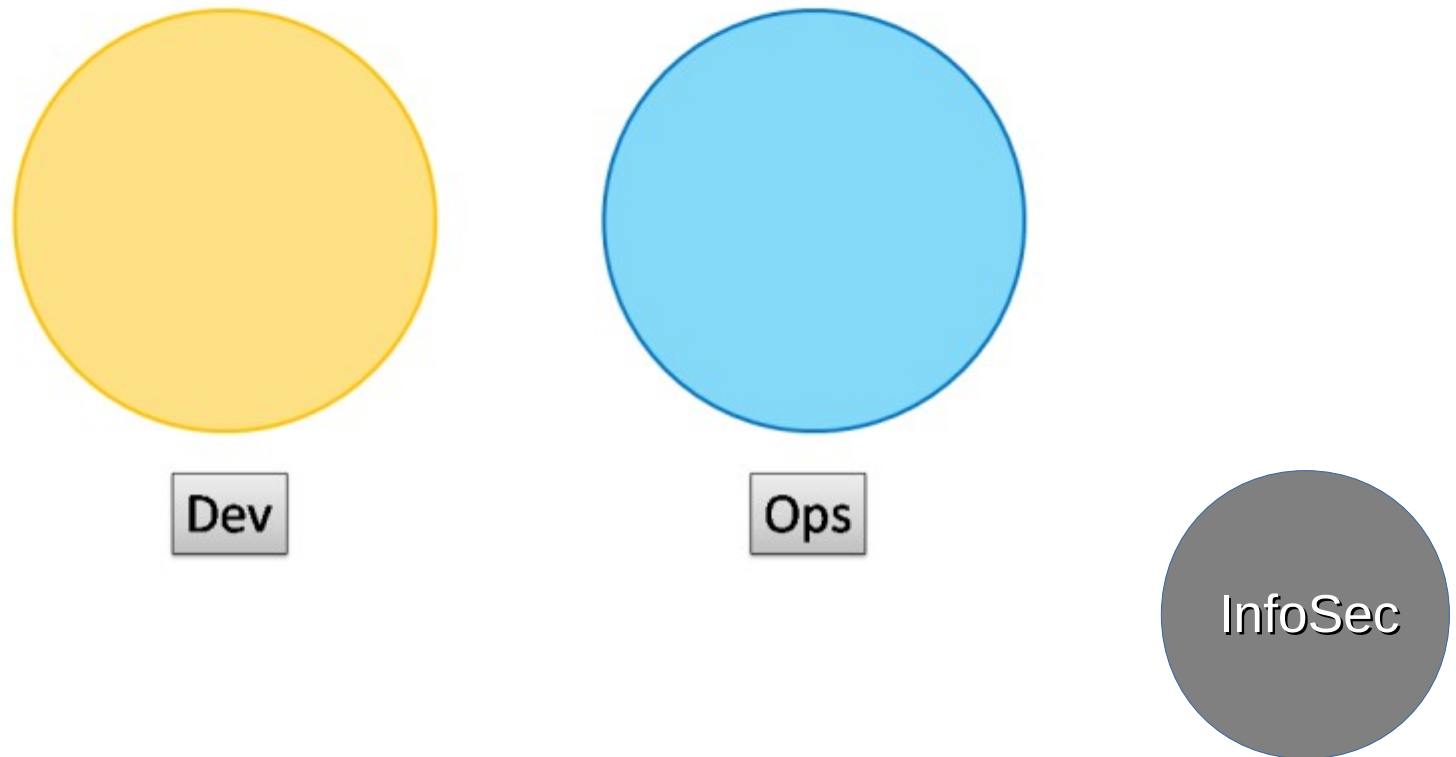
DevOps Anti-Types

Anti-Type A – Separate Silos



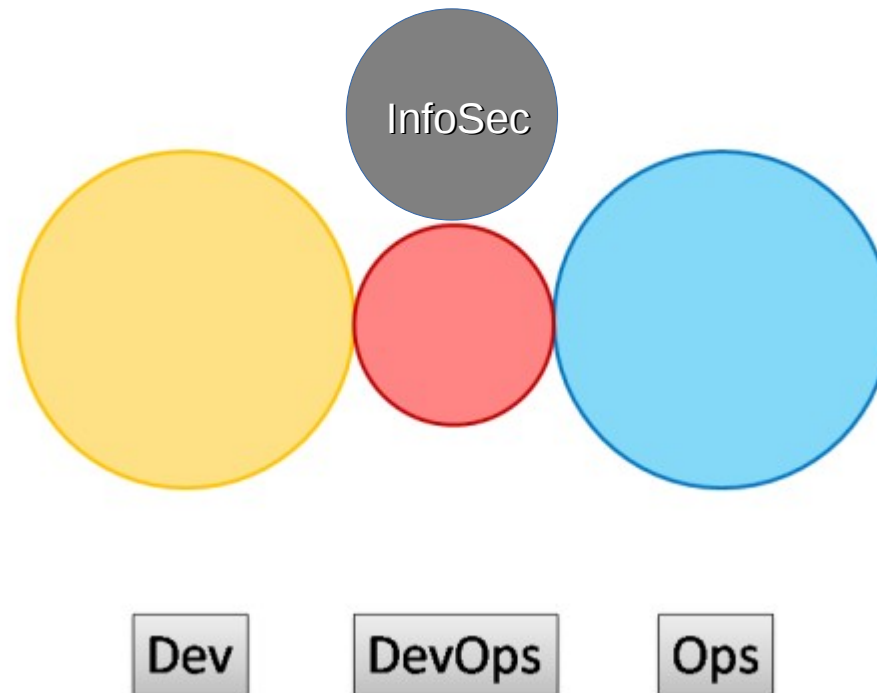
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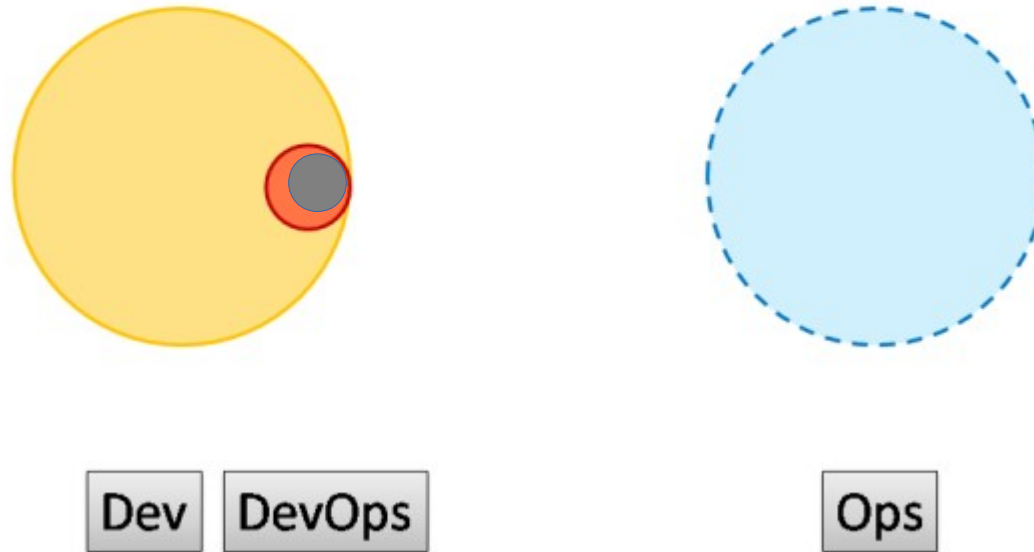
DevOps Anti-Types

Anti-Type B – Separate DevOps Silo



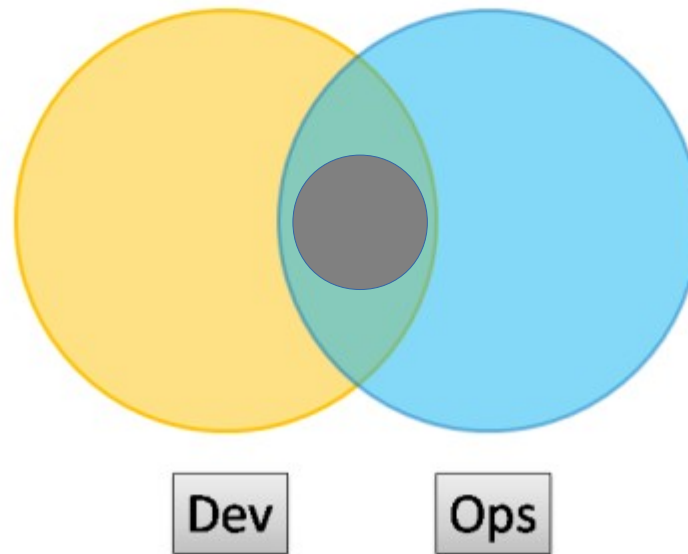
DevOps Anti-Types

Anti-Type C – “We Don’t Need Ops”



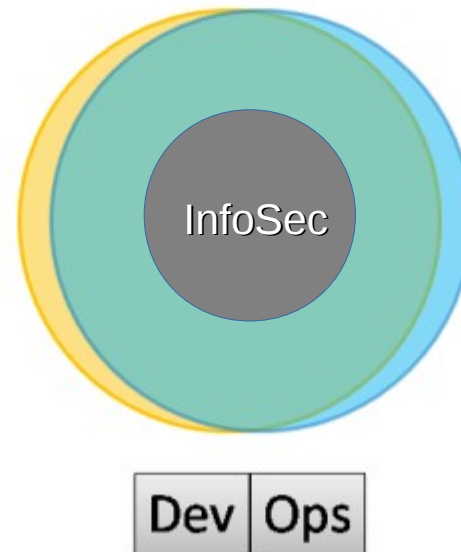
DevOps Patterns

Type 1 – Smooth Collaboration



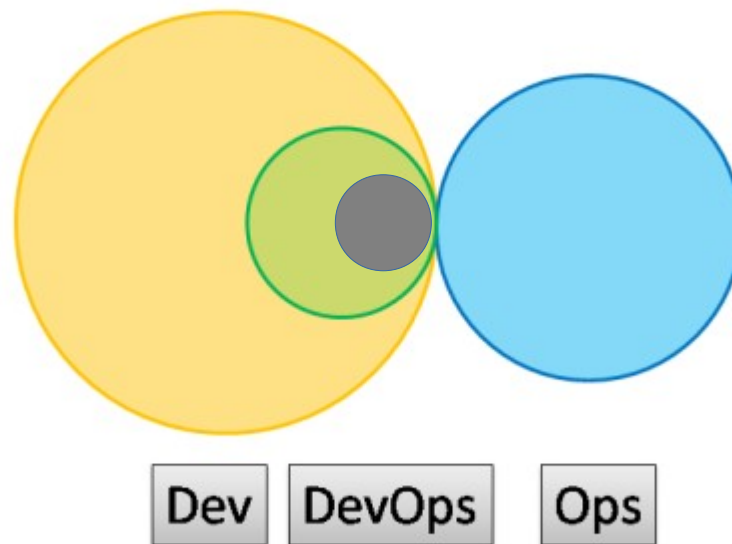
DevOps Patterns

Type 2 – Fully Embedded



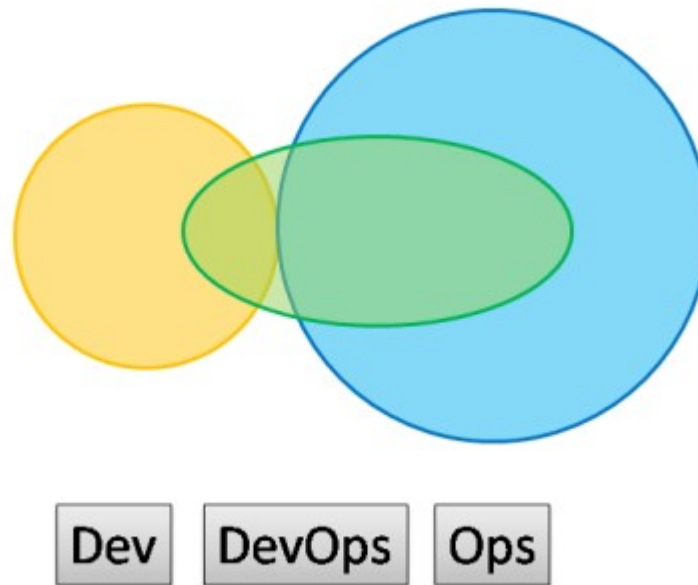
DevOps Patterns

Type 3 – Infrastructure-as-a-Service



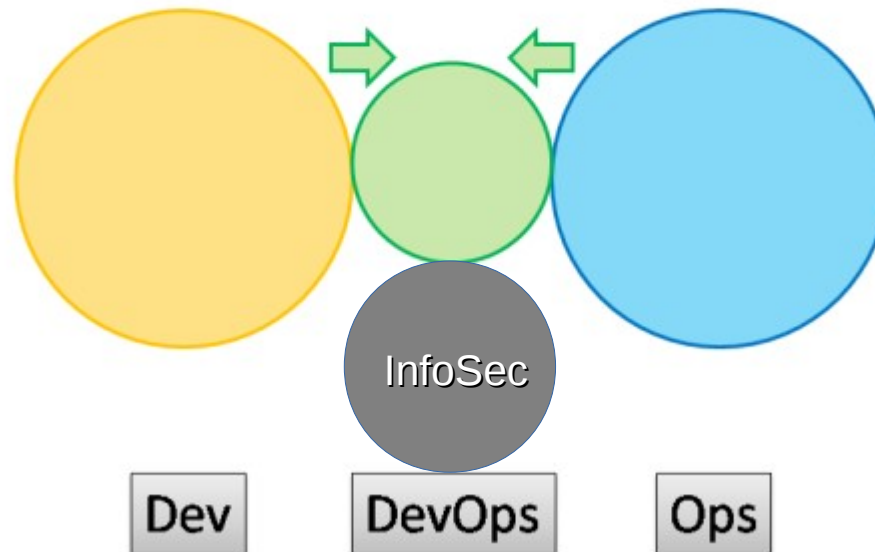
DevOps Patterns

Type 4 – DevOps-as-a-Service



DevOps Patterns

Type 5 – Temporary DevOps Team



Deciding about InfoSec strategy w/devops remember:

- security ninjas (just like admins) are expensive and rare
- virtual teams might cut this problem
- wandering experts

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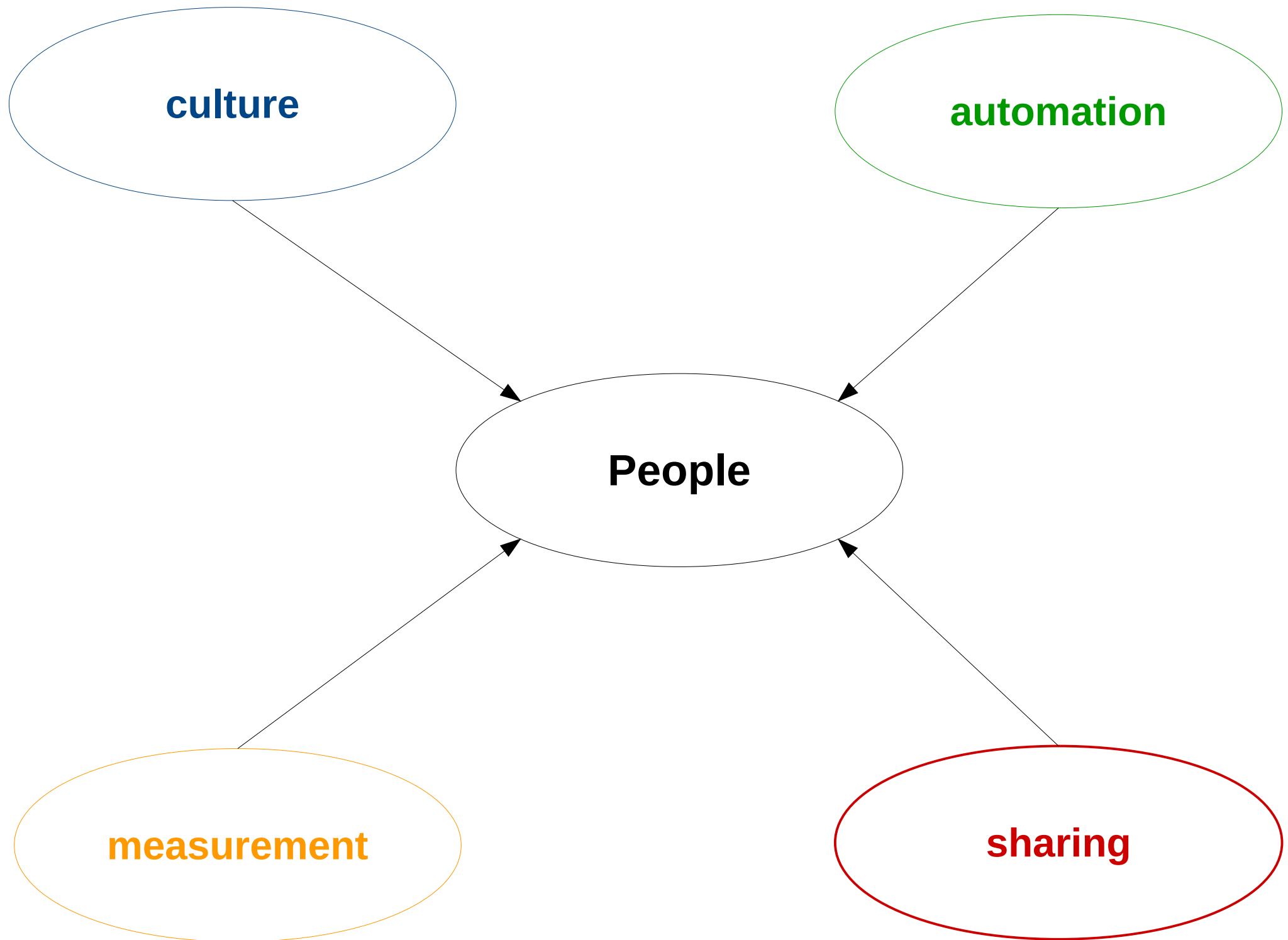
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DevOPS ?== CAMS

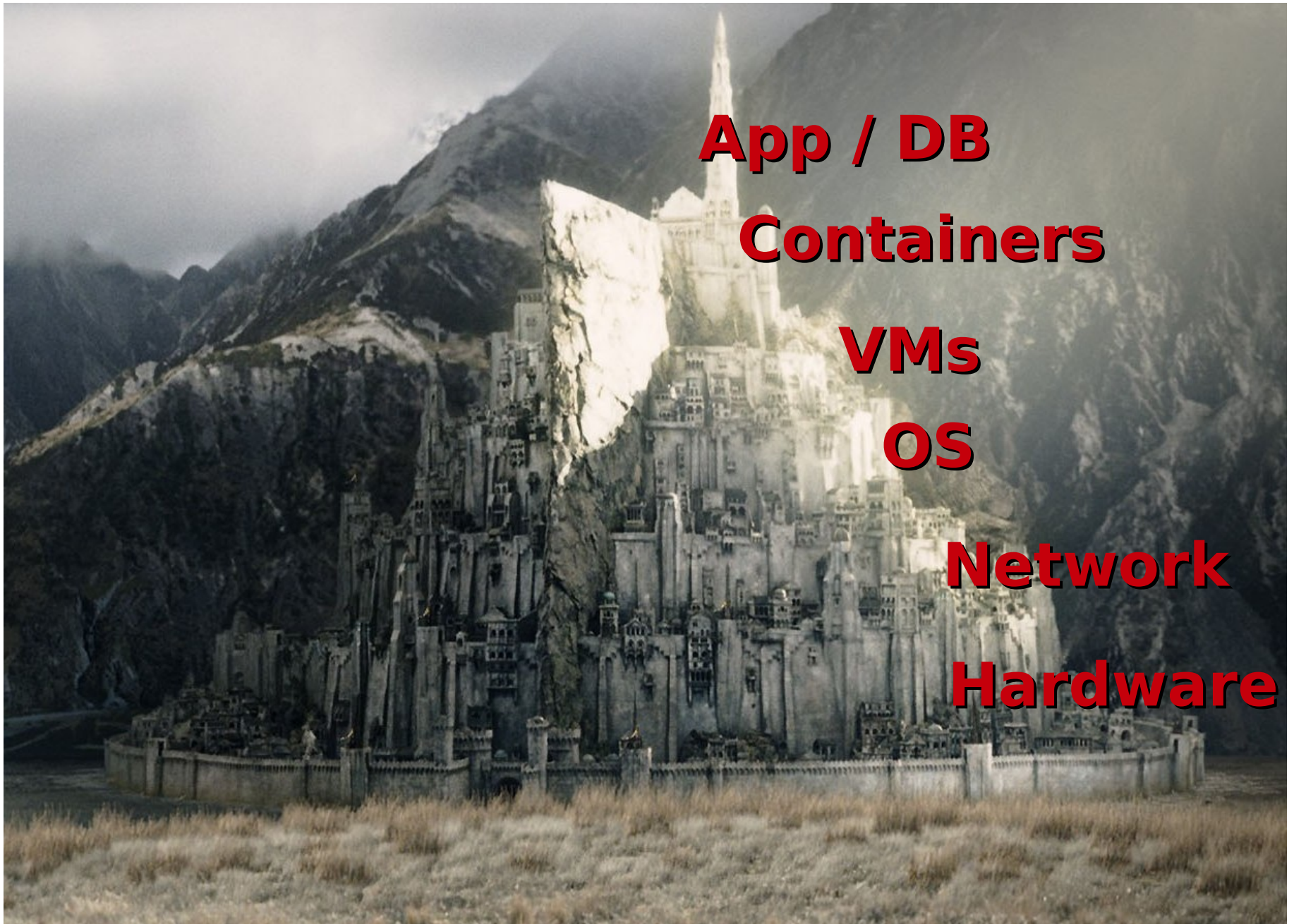
(culture, automation, measurement, sharing)

DevOPS !== CAMS

DevOPS === people!



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C for Culture

A for Automation

M for Monitoring

S for Sharing

→ **focus on delivery**

→ close collaboration

→ lightweight environment and components

→ lightweight processes

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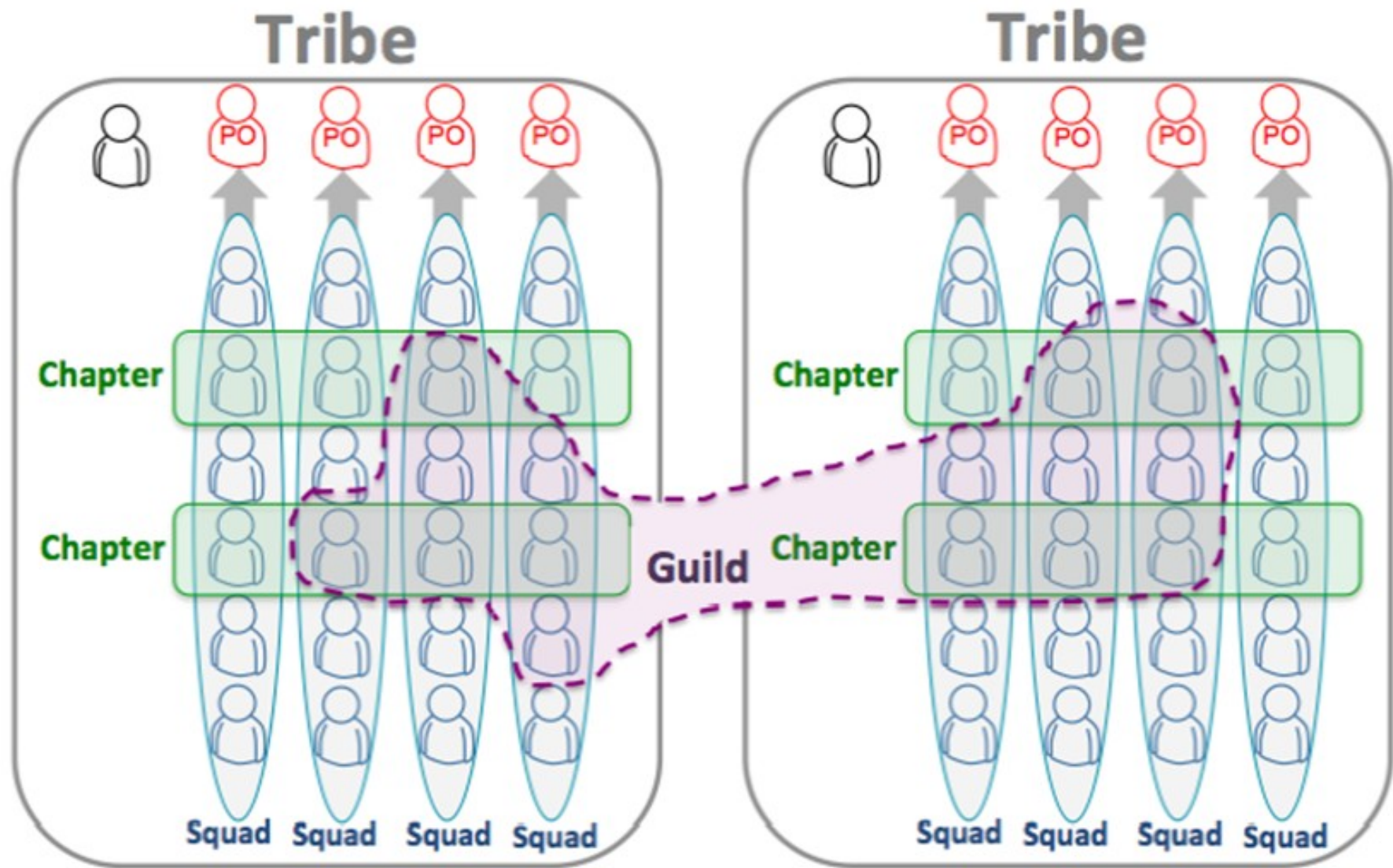
cultural change

modification of a society through innovation,
invention, discovery, or contact with other
societies

Scaling Agile @ Spotify

with Tribes, Squads, Chapters & Guilds

Henrik Kniberg & Anders Ivarsson
Oct 2012



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→ repeatable tasks leads to automation



- repeatable tasks leads to automation
 - automation leads to consistency



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 - consistency reduces errors



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 - automation leads to consistency
 - consistency reduces errors
- reducing errors leads to stable environment
- stable environment leads to less unplanned work
- less unplanned work leads to focus on delivery



≡ ANSIBLEWORKS

- flat learning curve
- doesn't required additional resources
- fit for maintenance jobs / procedures
- great for any containers as non-daemon
- might be easily adopted as universal language
- ansible-galaxy

/

inventory

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 srv_group2

group_vars/

 srv_group1

 srv_group2

host_vars/

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 server2

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master.yml

ansible-playbook master.yml \
-tags app2,portscan

- name: run portscan
shell: /usr/bin/nmap -sS -p- > wide_scan_results

vars in e.g. group_vars

ports:

tcp:

- 80

- 443

--exclude-ports="{{ ports.tcp | join(",") }}"

async, pool, fire & forget

- name: Parse results
shell: python parse.py {{ ports.tcp }}
- register: parse_results

- name: Notify

- shell: echo "{{ parse_results.stdout }}" | mail -s "results" a@b.com

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- Visualization – graph everything (or make it possible)
- Same monitoring interfaces for all
- Logfiles lines number (e.g. audit.log) as a metric
- False negs / pos number as a metric

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S for **Sharing**

It's simple as: stop hiding security incidents reports in the
locked drawer

Let other learn: think continuous improvement!

Share the knowledge about mistakes

DEV

INTEGRATION

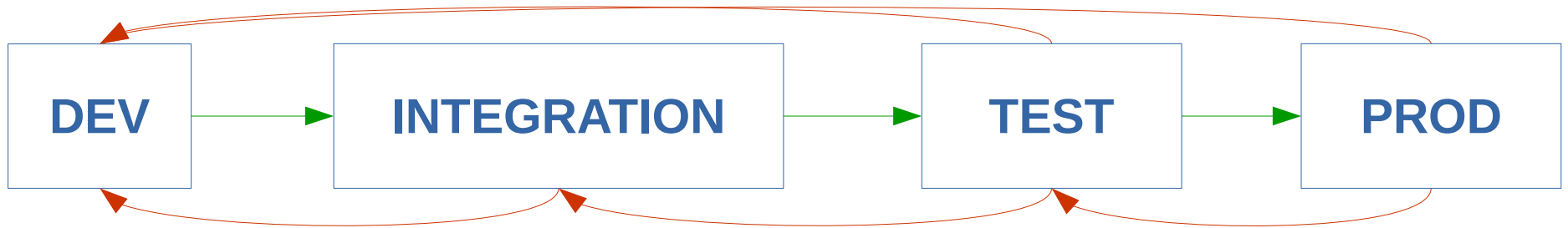
TEST

PROD

Delivery Pipeline!

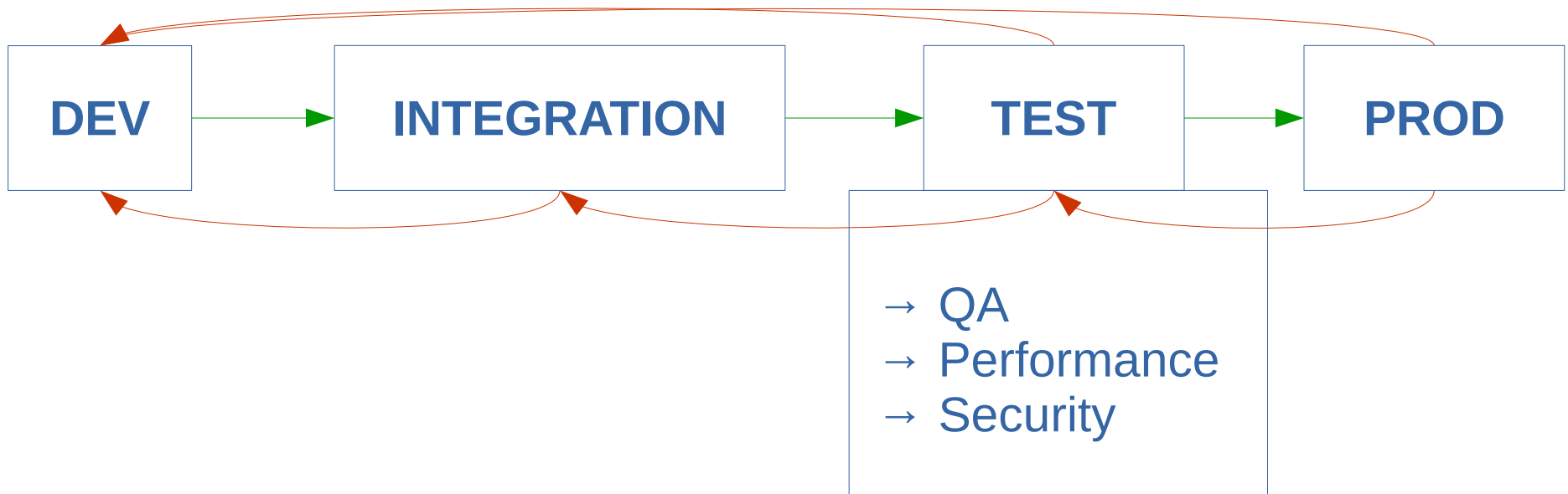


Delivery Pipeline!



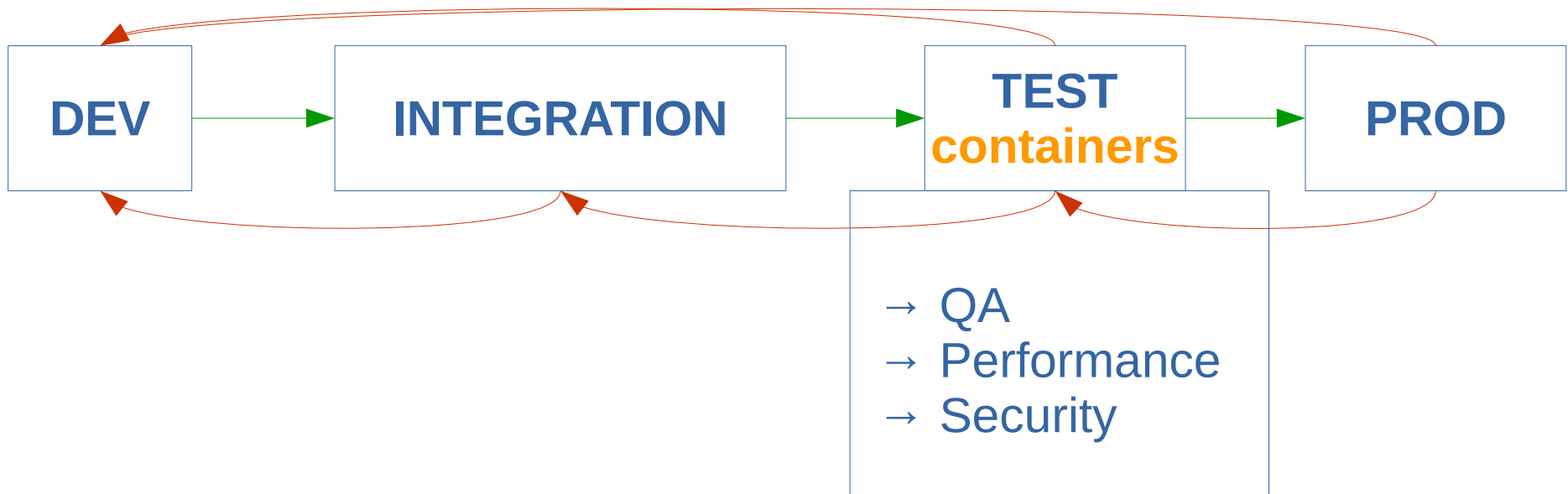
Feedback loop!

Delivery Pipeline!



Feedback loop!

Delivery Pipeline!



Feedback loop!

Experimentation gives you improvements!

Continuous security scanning

Let's wrap this up

- security is about providing quality – it must be the part of delivery
- including security in CD is a business decision; involve business in devops!
- security doesn't have to slow the CD pipeline

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Deep dive into technical infra
(briefly, more in my arch presentation today)

Linux Containers

why InfoSec should bother about infra?

→ because infra is a code

→ because infra might be a tool

control groups (cgroups)

- grouping processes
- allocating resources to particular groups
 - memory
 - network
 - CPU
 - storage bandwidth (I/O throttling)
 - device whitelisting

Kernel Namespaces

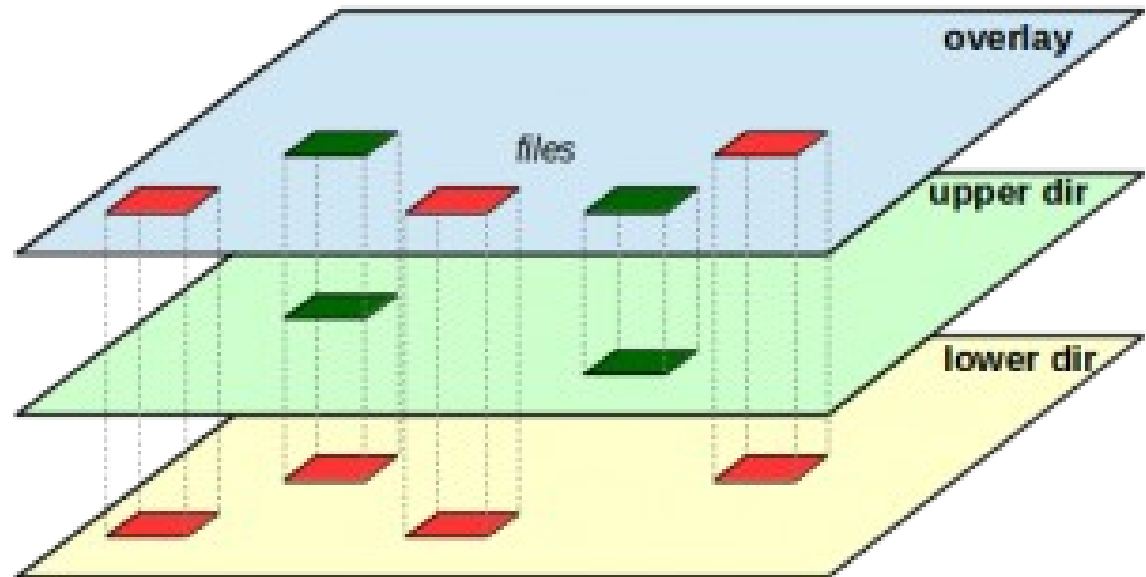
Providing a unique views of the system for processes.

- PID – PIDs isolation
- NET – network isolation (via virt-ifaces; demo @arch)
- IPC – won't use this
- MNT – chroot like; deals w/mountpoints
- UTS – deals w/hostname

Layered filesystems

- OS installation
- libraries
- application
- apps updates

We ship this as one package – container
It has to be lightweight!



Docker in a nutshell – installing WP in seconds demo

Docker in a nutshell – installing WP in seconds demo
remember #DockerKrk & infosec & devops meetups

<http://www.meetup.com/Docker-Krakov-Poland/>

<http://www.meetup.com/Krakov-DevOps/>

<http://www.meetup.com/Infosec-Krakov/>

It doesn't have to be docker

LXC, LXD, systemd-nspawn etc

Just make sure it does its job

Summing this up – learn how to use containers
so you can focus on InfoSec work not on infrastructure
mojo

You'll see how this repays :)

Tools overview

GAUNTLT - <http://gauntlt.org/>

- Hooks for sectools (nmap, sslyze, sqlmap)
- Output formatting (json and others)
- see yourself (demo)

nikto - <https://www.cirt.net/Nikto2>

- webapp sec scanner
- customizable reports (templates)
- logging to metasploit
- save full requests for positive tests
- ...
- see yourself (demo)

nikto - <https://www.cirt.net/Nikto2>

And docker maybe? (demo)

<https://registry.hub.docker.com/u/activeshadow/nikto/dockerfile/>

Remember to verify those images..

nikto - <https://www.cirt.net/Nikto2>

FROM debian:jessie

RUN apt-get update && apt-get install -y libtimedate-perl libnet-ssleay-perl \
 && rm -rf /var/lib/apt/lists/*

ADD <https://cirt.net/nikto/nikto-2.1.5.tar.gz> /root/
WORKDIR /opt

RUN tar xzf /root/nikto-2.1.5.tar.gz && rm /root/nikto-2.1.5.tar.gz \
 && echo "EXECDIR=/opt/nikto-2.1.5" >> nikto-2.1.5/nikto.conf \
 && ln -s /opt/nikto-2.1.5/nikto.conf /etc/nikto.conf \
 && chmod +x nikto-2.1.5/nikto.pl && ln -s /opt/nikto-
2.1.5/nikto.pl /usr/local/bin/nikto \
 && nikto -update

WORKDIR /root
CMD ["nikto"]

wapiti - <http://wapiti.sourceforge.net/>

- webapp sec scanner
- rich vulns detection (see docs)
- JSON reports (and some other formats)
- suspend / resume attack
- modular
- ...
- see yourself (demo)

skipfish - <https://code.google.com/p/skipfish>

- webapp sec scanner
- high performance
- easy to use
- rich vulns detection (see docs)
- ...
- see yourself (demo)

mittn - <https://github.com/F-Secure/mittn>

- high level testing suite
- alternative for Gauntlt
- no required low-level knowledge about tools
- Python / Behave (BDD)
- automated web scanning w/Burp (BSPAS)
- tls w/sslyze
- HTTP api fuzzing w/Radamsa

OWASP + DevOps (by Mateusz Olejarka)

https://www.owasp.org/images/d/df/Owasp_plus_devops.pptx

- OWASP dependency check
- OWASP dependency track
- OWASP ESAPI
- OWASP AppSensor
- OWASP Zed Attack Proxy
- O-Saft

How to deal with false negs / pos?

- actually human analysis is always required
- before “feedback loop” check yourself if it's red
- mark, hide, automate

Demo

- install docker
- install jenkins
- install owasp-zap container
- install wordpress container
- configure scan job
- run it
- try w/docker inside docker:

<http://www.jayway.com/2015/03/14/docker-in-docker-with-jenkins-and-supervisord/>

Looking for a job?

Information Security Manager

Catch me: maciek@lasyk.info



Continuous Security in DevOps

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