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

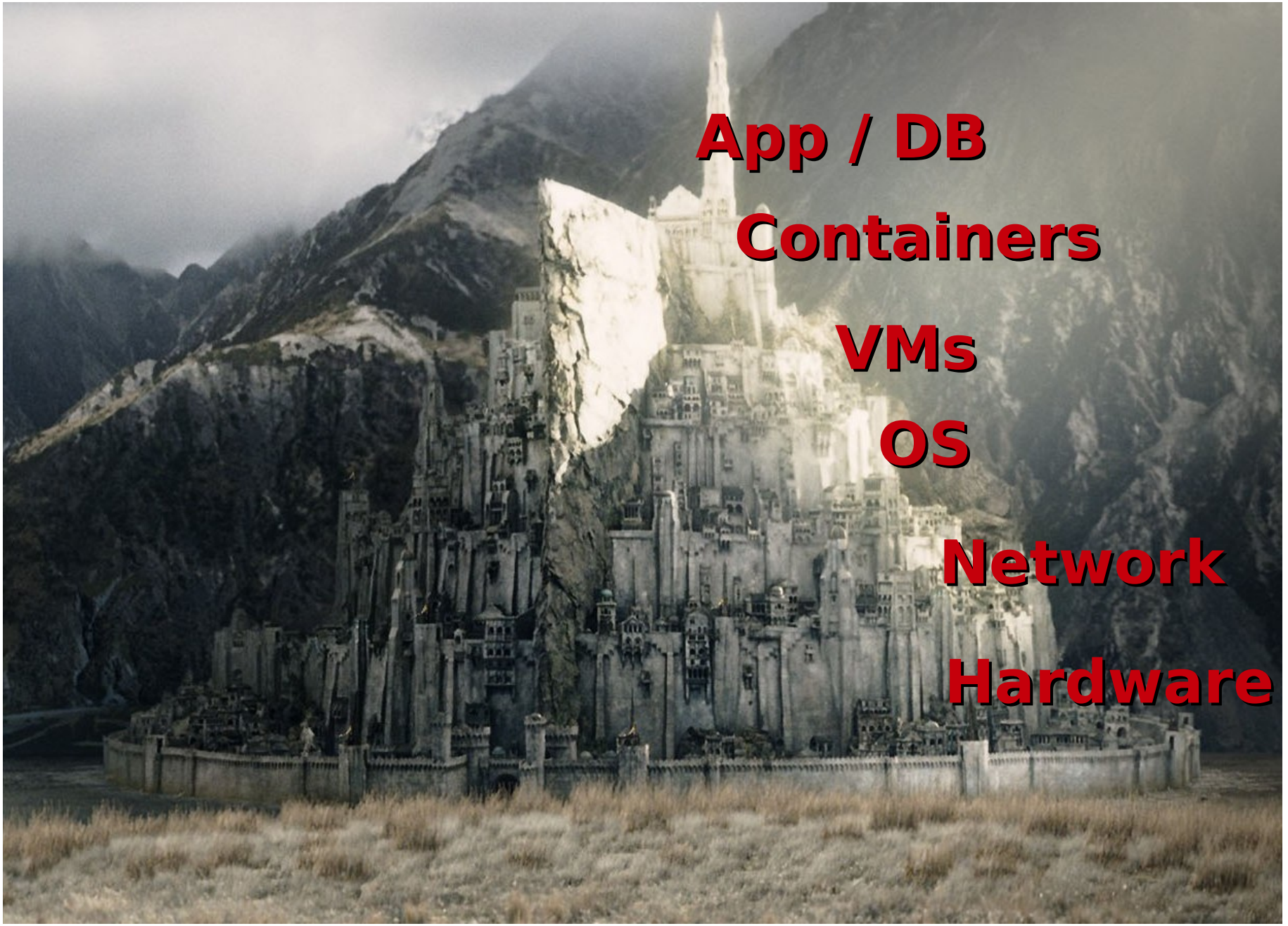
passionate about security & quality

“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



General security rule in IT: security is based on layers

DevOps Anti-Types & patterns

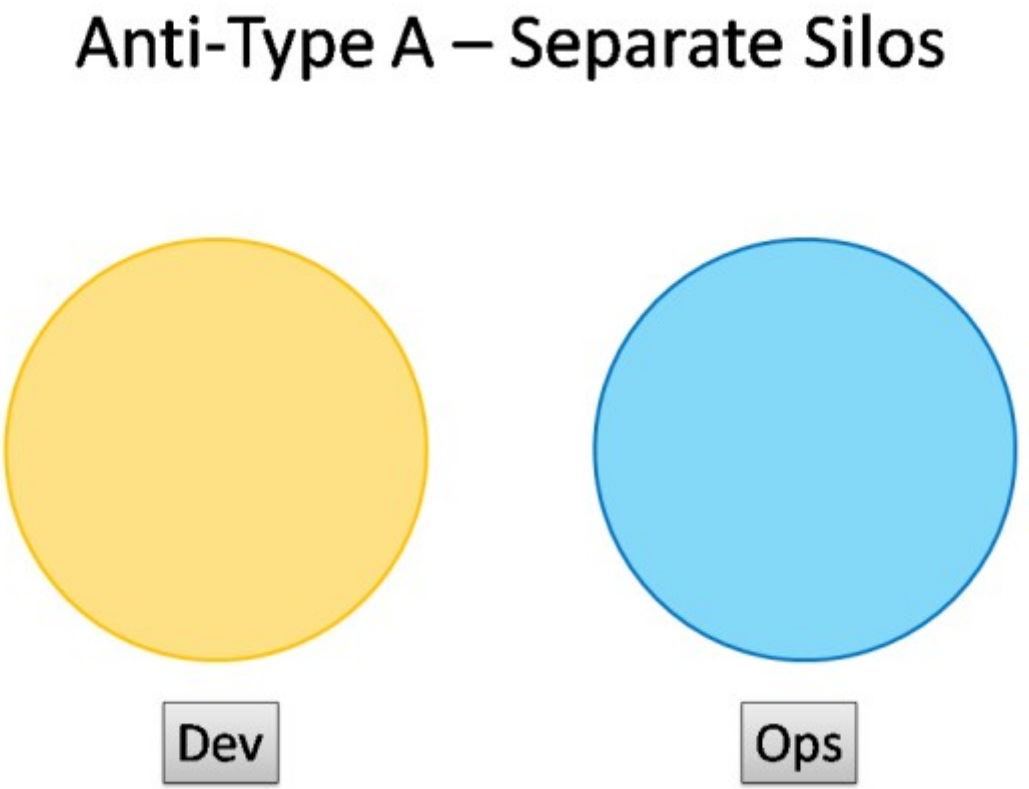
This is a copy/paste from

http://blog.matthewskelton.net/

w/my comments included and InfoSec layer added

Great job Matthew! Thanks!

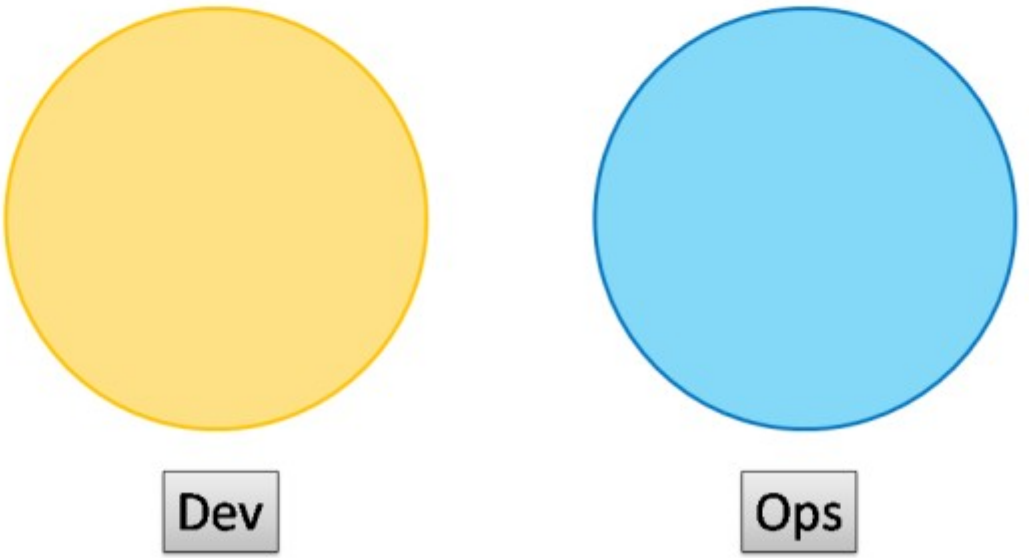
DevOps Anti-Types



http://blog.matthewskelton.net/2013/10/22/what-team-structure-is-right-for-devops-to-flourish/

DevOps Anti-Types

Anti-Type A – Separate Silos



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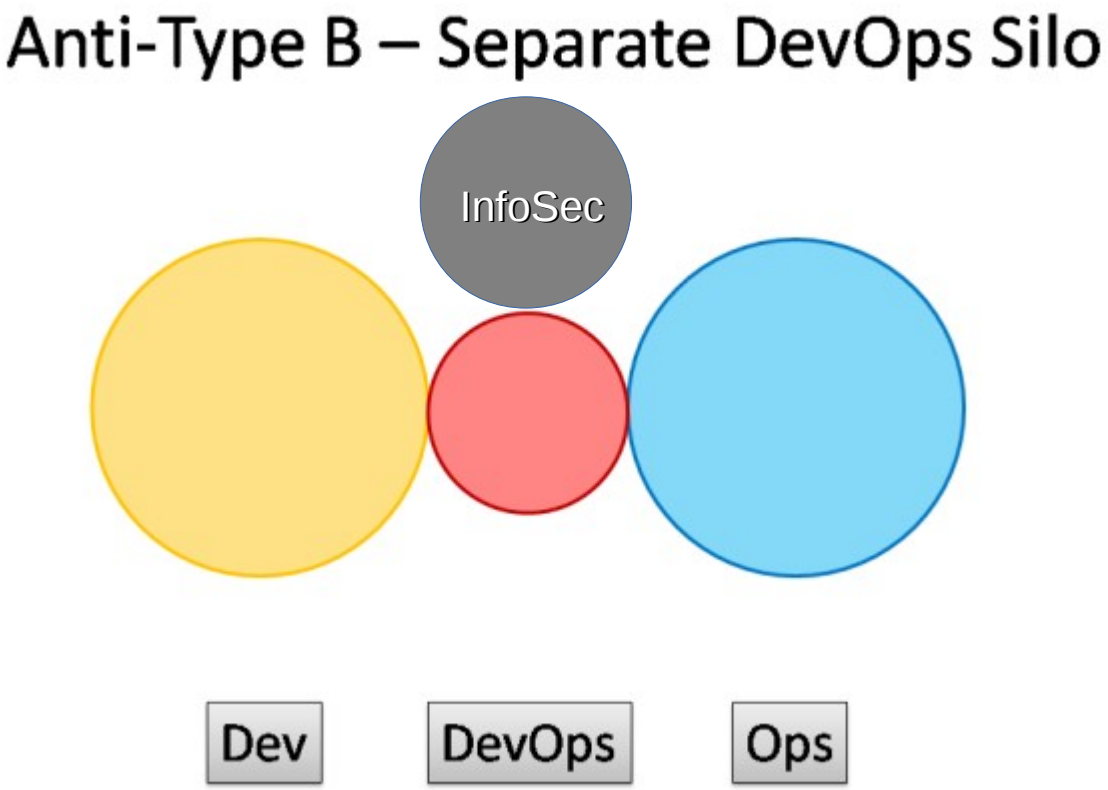
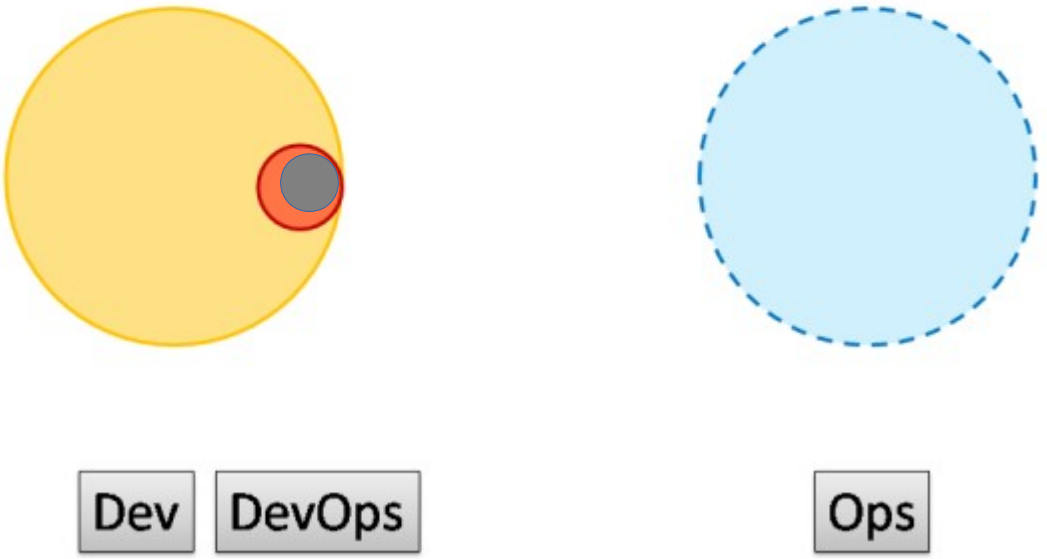
DevOps Anti-Types



http://blog.matthewskelton.net/2013/10/22/what-team-structure-is-right-for-devops-to-flourish/

DevOps Anti-Types

Anti-Type C – “We Don’t Need Ops”



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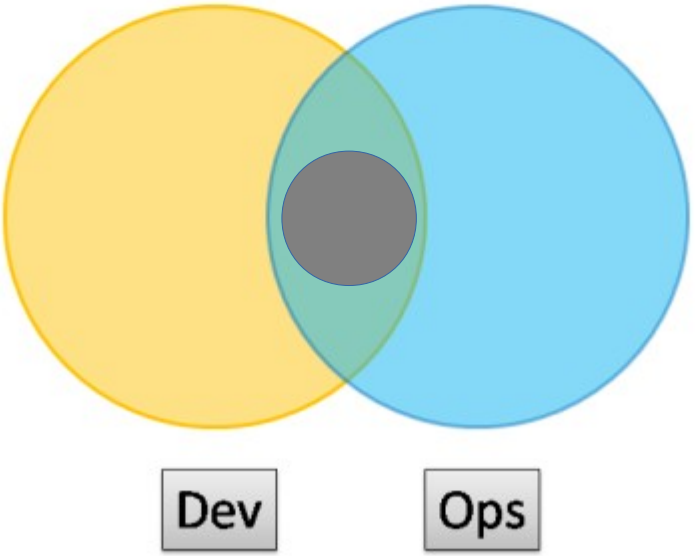
DevOps Patterns

Type 1 – Smooth Collaboration



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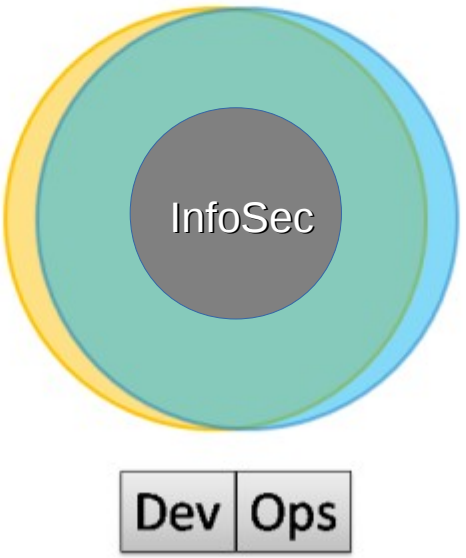
DevOps Patterns

Type 2 – Fully Embedded



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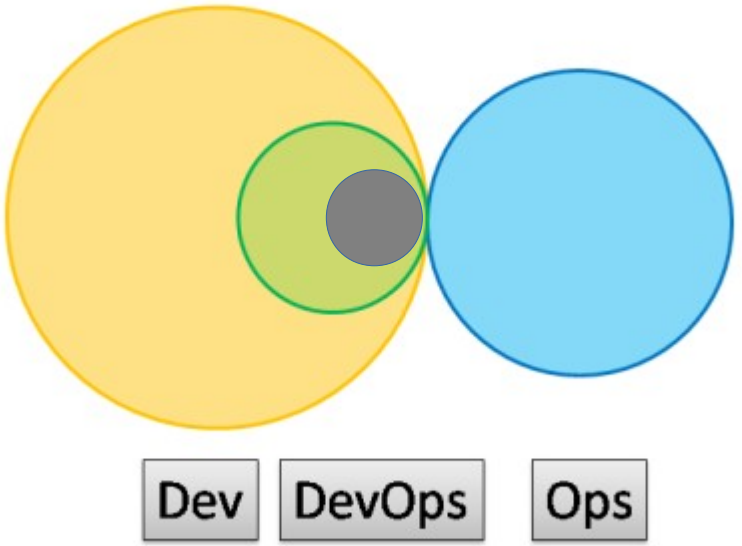
DevOps Patterns

Type 3 – Infrastructure-as-a-Service



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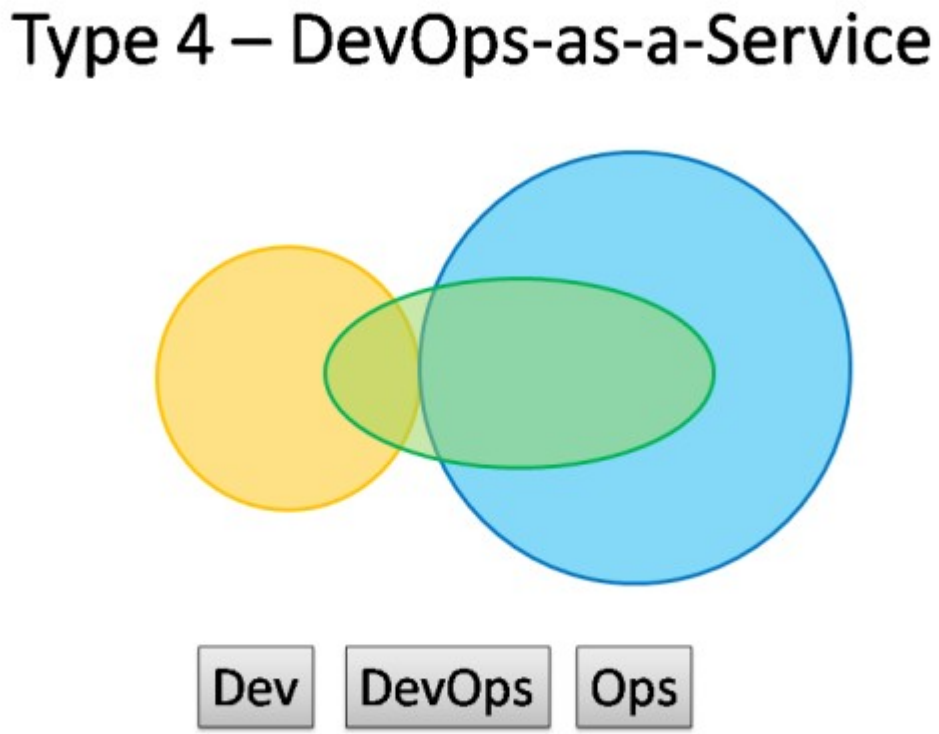
DevOps Patterns



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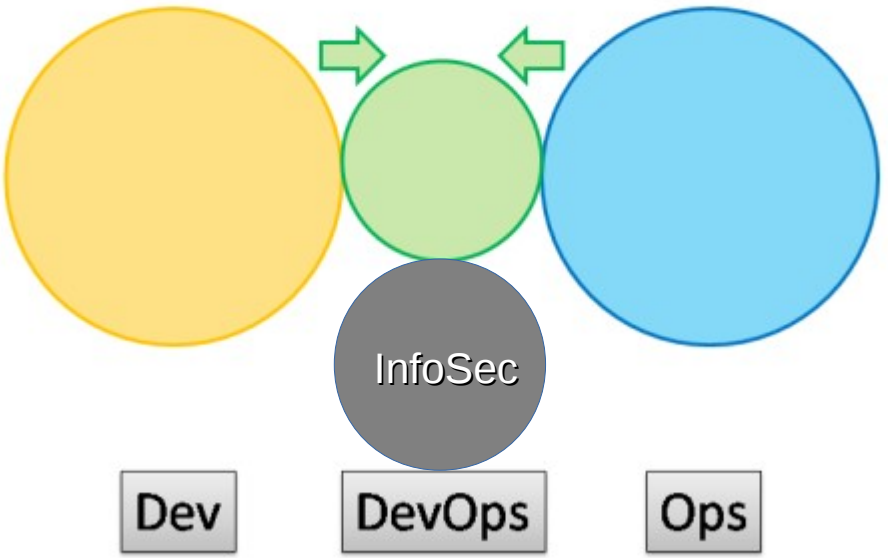
DevOps Patterns

Type 5 – Temporary DevOps Team



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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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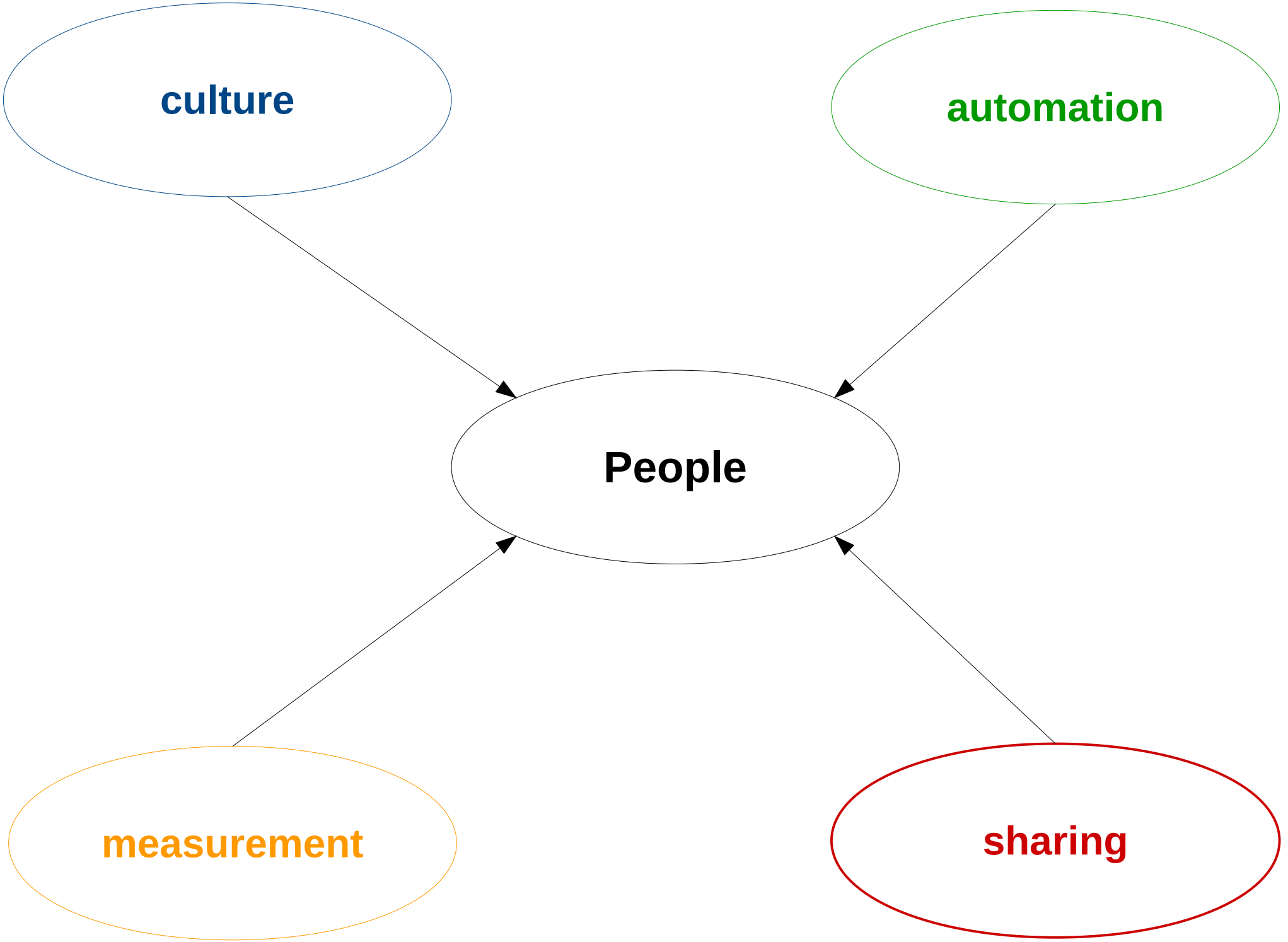
DevOPS ?== CAMS

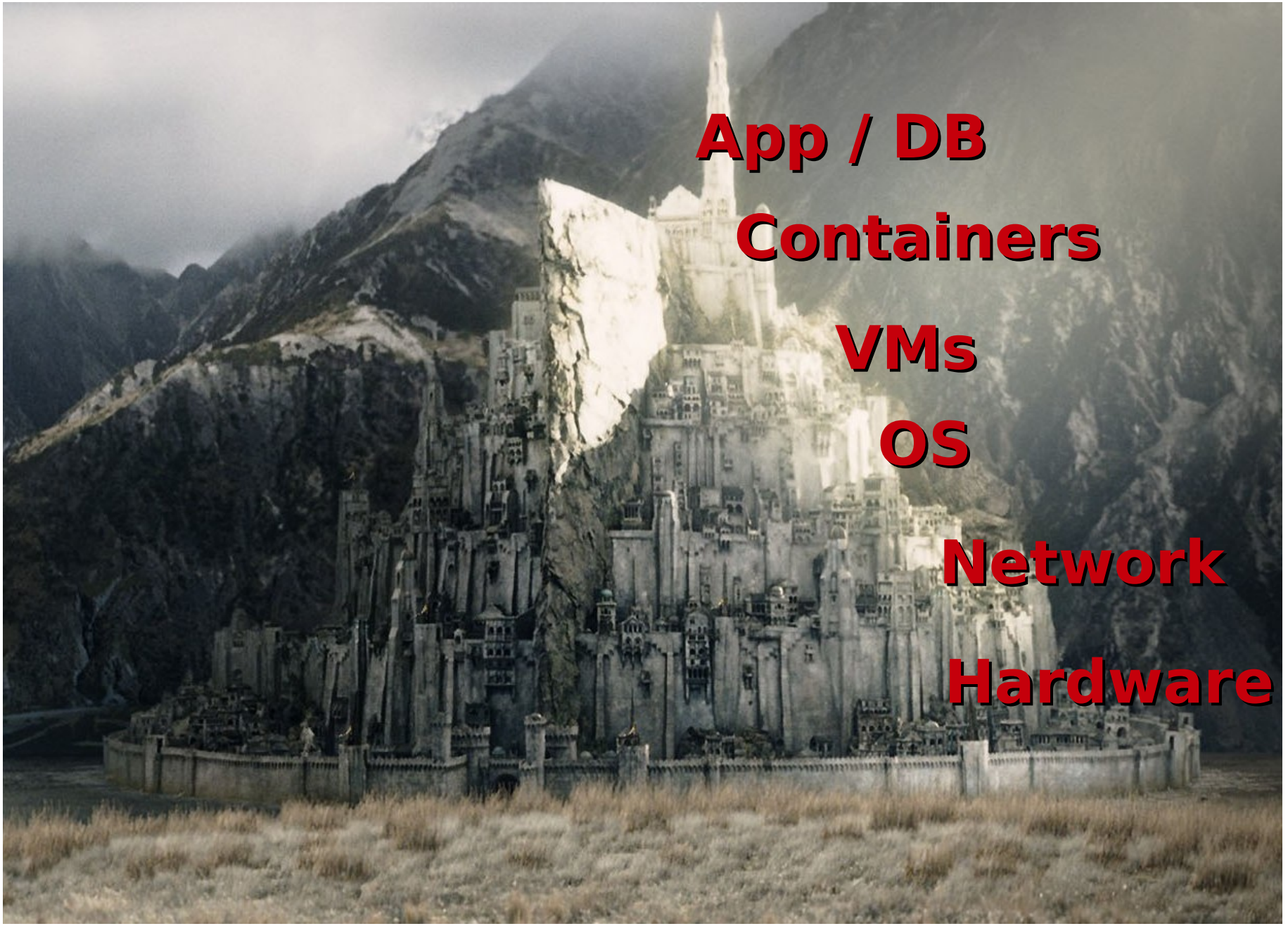
(culture, automation, measurement, sharing)

DevOPS !== CAMS

DevOPS === people!


culture
automation
People
measurement
sharing

General security rule in IT: security is based on layers



General security rule in IT: security is based on layers

C for Culture

A for Automation

M for Monitoring

S for Sharing

→ focus on delivery

→ close collaboration

→ lightweight environment and components

→ lightweight processes

→ focus on delivery

→ close collaboration

→ lightweight environment and components

→ lightweight processes

→ focus on delivery

→ close collaboration

→ lightweight environment and components

→ lightweight processes

→ focus on delivery

→ close collaboration

→ lightweight environment and components

→ lightweight processes

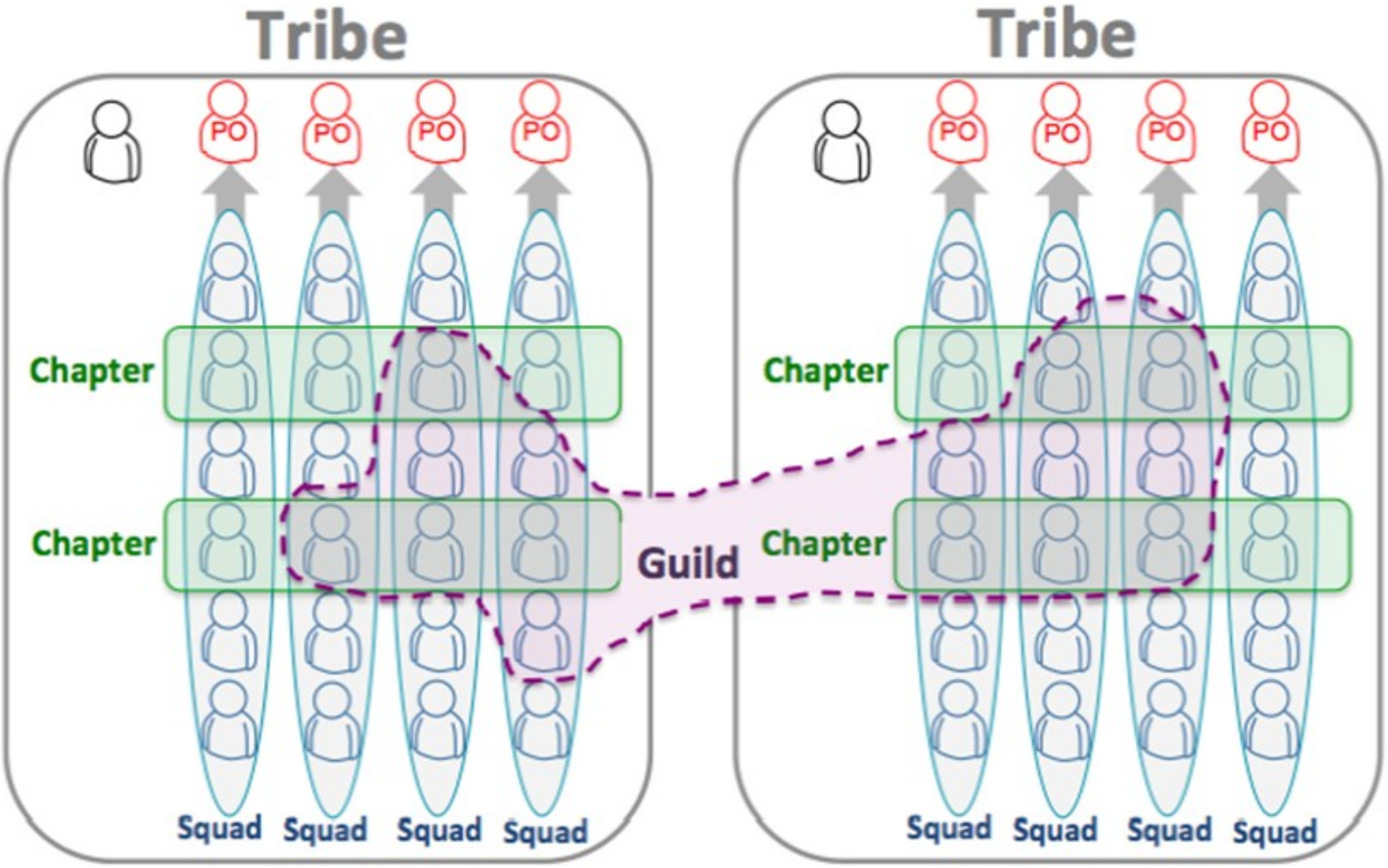
cultural change

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



C for Culture

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→ repeatable tasks leads to automation

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→ automation leads to consistency

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→ consistency reduces errors

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→ stable environment leads to less unplanned work

→ repeatable tasks leads to automation

→ 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

- → 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
       srv_group1
       srv_group2
    group_vars/
       srv_group1
       srv_group2
    host_vars/
       server1
       server2
    roles/
        webserver/
        monitoring/
        app1/
        app2/
        security/
            portscan/
    master.yml
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       app2/
       security/
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```

```
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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C for Culture

A for Automation

M for Monitoring

S for Sharing

→ 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

C for Culture

A for Automation

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S for Sharing

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

locked drawer

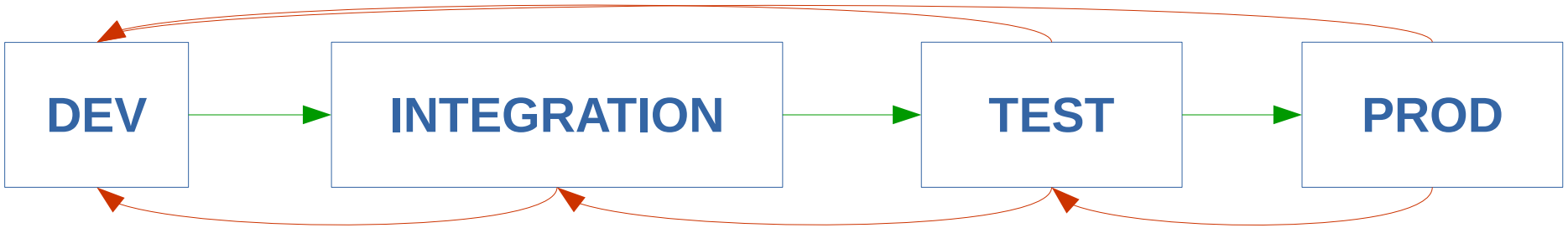
Let other learn: think continuous improvement!

Share the knowledge about mistakes


DEV
INTEGRATION
TEST
PROD

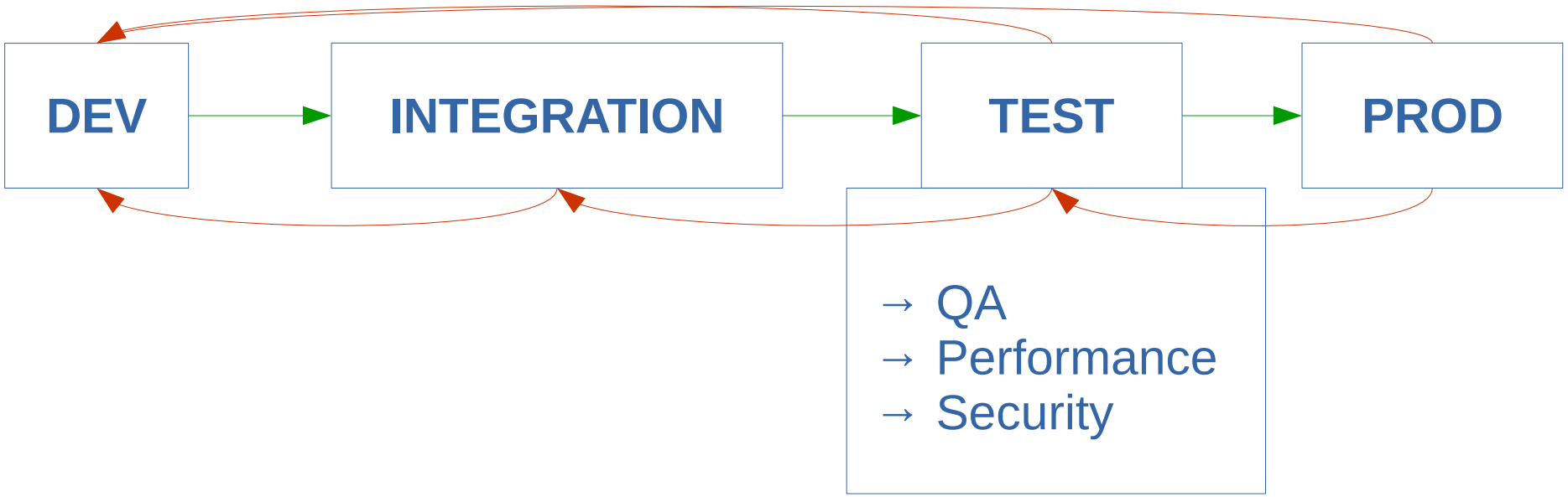
Delivery Pipeline!

Delivery Pipeline!



Feedback loop!

Delivery Pipeline!



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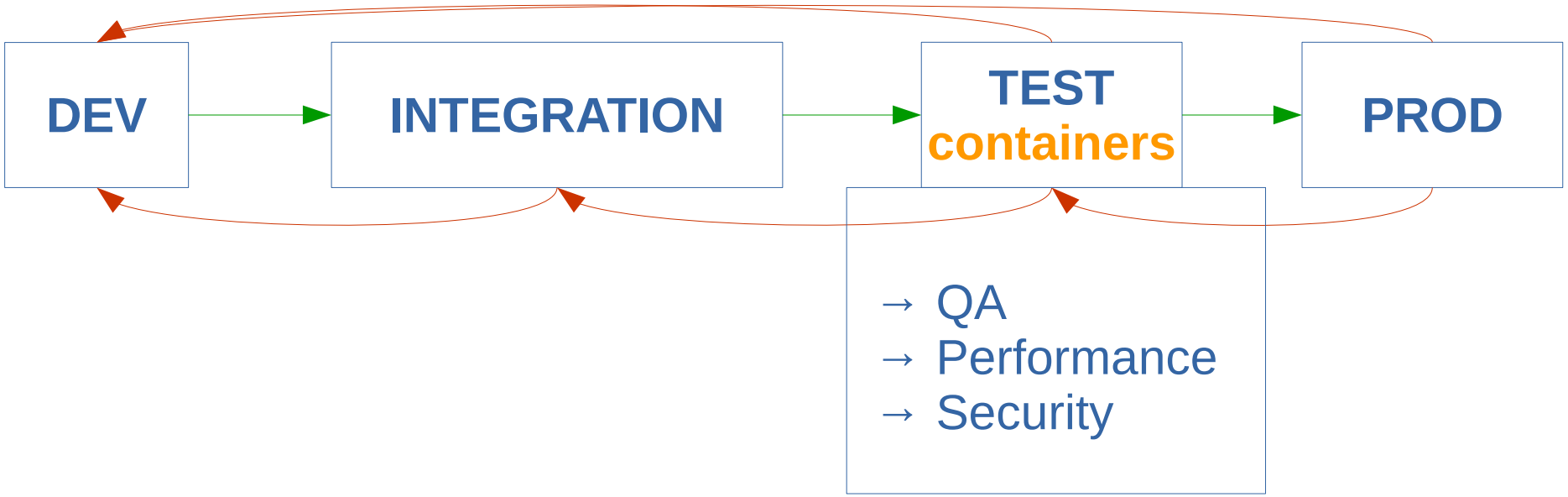

Feedback loop!

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 decission; involve business in devops!

→ security doesn't have to slow the CD pipeline

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→ security doesn't have to slow the CD pipeline

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

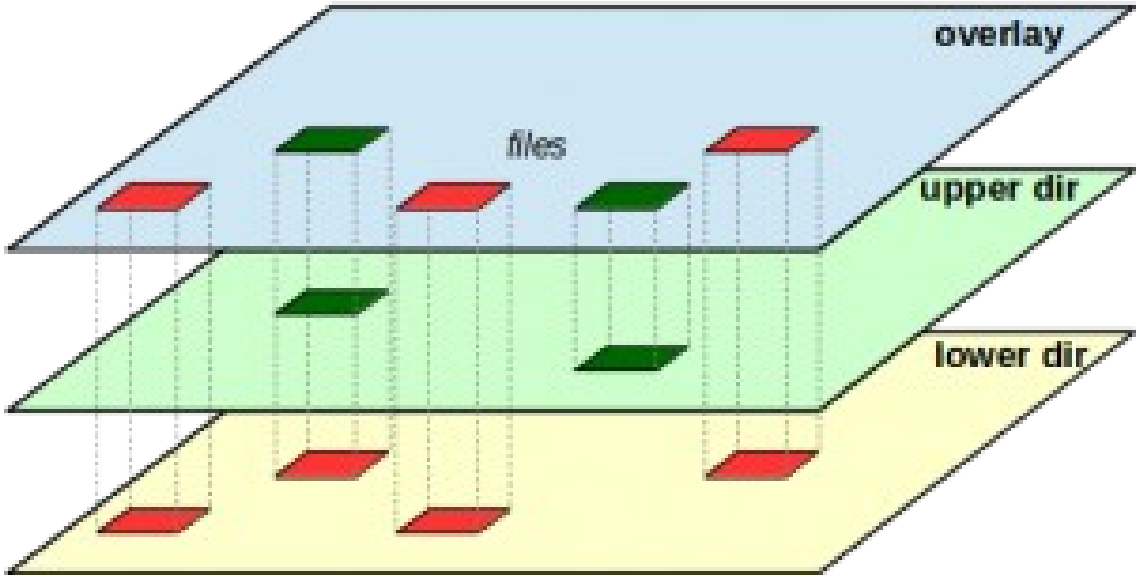
→ OS installation

→ libraries

→ application

→ apps updates

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



http://www.blaess.fr/christophe/2014/12/14/le-systeme-overlayfs-de-linux-3-18/

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-Krakow-Poland/

http://www.meetup.com/Krakow-DevOps/

http://www.meetup.com/Infosec-Krakow/

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

Maciej Lasyk

@docent-net

http://maciej.lasyk.info

4developers – Warsaw

2015-04-20