Continuous Delivery:
Tools, Collaboration, and Conway's Law

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QCon London 2015, Weds 4th March

#qconlondon

Collaboration
Tool Automation
Learning
Singleton tools
Conway's Law

Matthew Skelton

@matthewpskelton

- Building & operating
  software systems since 1998

- Cybernetics + Neuroscience + Music
  - → control engineering
  - → psychology
  - → 'network' and group interactions

Recent clients

Legal

Payments

Tourism

Betting

Travel booking

Financial services

Healthcare data

Common themes

- Online since ~1999
- Successful in their sector
- Large, central core database(s)
- Non-aligned team goals
- Ops historically undervalued
- Need to adopt DevOps and Continuous Delivery

Common needs

- Technology selection ticklists
- Team interactions
- Collaboration opportunities
- Tools as catalysts

A MARTIN FOWLER SIGNATURE BOOK

Continuous Delivery

RELIABLE SOFTWARE RELEASES THROUGH BUILD, TEST, AND DEPLOYMENT AUTOMATION

JEZ HUMBLE

DAVID FARLEY

Foreword by Martin Fowler

'Delivery' implies
'fire and forget'

We must <u>continue to care</u>
after deployment

Continuous ~~Delivery~~

Continuous <u>Evolution</u> of software systems

Small changes

High quality

Operationally excellent

Engaged teams

Focus on value

Use flow

Continuous Delivery

Delivery ≠ Deployment

Empower product & commercial people to make features available at the right time

Pull, not Push

Continuous Delivery

Regular, rapid, repeatable, reliable changes

Automate <u>most of</u> the things

Continuous Delivery

Quality
Safety
Reliability
Psychology
Effectiveness

CONTINUOUS DELIVERY

Addison-Wesley Signature Series

A Martin Fowler Signature Book

Reliable Software Releases through Build, Test, and Deployment Automation

Jez Humble
David Farley

Foreword by Martin Fowler

From the Library of Matthew Skelton

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How well are we doing?

DevOps

"Highly effective, daily collaboration between software developers and IT operations people to produce relevant, working systems" *

*also QA/Testing, IT Service Desk, Programme Management, Commercial, Marketing, etc.

Not DevOps

"Automation"
"Build & Release"
"Infrastructure Development"
"System Administration"
"Containers"

Collaboration

1. Version Control

```
* commit 6d396b3b40998527fc7fef9ae131176324250d40
| Author: agilestevesmith <steve██████████████████████
| Date:   Mon Jun 16 16:38:51 2014 +0100
|
|     Steve - update notes
|
manuscript/steve-smith.txt
* commit fbe2f7e1f66d85727df80b9474c7031453e186b3
| Author: agilestevesmith <steve██████████████████████
| Date:   Fri Jun 13 11:19:50 2014 +0100
|
|     Steve - toggle all contributors off until first draft received
|
manuscript/Book.txt
manuscript/glossary.txt
|
*   commit 6169236c84d076aa7a4e41ca5a717a2be4159fcf
|\  Merge: 9351fd3 9747eab
| | Author: agilestevesmith <steve██████████████████
| | Date:   Thu Jun 12 10:10:41 2014 +0100
| |
| |     Merge branch 'master' of ██████████████████████build-quality-in/buildqualityin-content
| |
| *   commit 9747eab6246824a7d882c97ee1726a08134550f2
| |\  Merge: 3ca1e1a 22832ae
| | | Author: Matthew Skelton <matthew.skelton@████████████>
| | | Date:   Wed Jun 11 13:25:42 2014 +0100
| | |
| | |     Merged: Tweaks to summary to clarify purpose - "build and operate software" - and no dodgy space chars
| | |
| | * commit 22832aea4f02b1f454821a399be0ac233f42987a (origin/matthewpskelton, matthewpskelton)
| | | Author: Matthew Skelton <██████████████████>
| | | Date:   Wed Jun 11 11:27:09 2014 +0100
| | |
| | |     Removing spurious space characters
| | |
summary.txt
:■
```

This repository ▾   Search or type a command   ⊘   Explore   Gist   Blog   Help   👤 matthewskelton   + ▾   🛠   ⬕

PUBLIC 📦 **serilog** / **serilog**   👁 Unwatch ▾ 31   ★ Unstar 209   ⑂ Fork 64

← **Added support for MonoTouch and MonoAndroid** #125   **New issue**

🔀 Open   **nberardi** wants to merge 6 commits into `serilog:master` from `nberardi:master`

💬 Conversation 8   ⊙ Commits 6   📄 Files changed 17   +721 −114 ▪▪▪▪▫

⊘ Showing **6 unique commits** by **1 author**.

📅 **Apr 22, 2014**

👤 nberardi   added support for MonoTouch and MonoAndroid   💬 3e41d48

👤 nberardi   dynamic isn't supported on MonoTouch   6bfdd46

👤 nberardi   added logger configuration   a91eeda

📅 **May 16, 2014**

👤 nberardi   finished android logger   9e46e84

👤 nberardi   merge from upstream   e06d763

👤 nberardi   added nuspec files for MonoTouch and MonoAndroid   8885dac

GitHub, Inc. [US] https://github.com/serilog/serilog/pull/125

PUBLIC   serilog / **serilog**   👁 Unwatch ▾ 31   ★ Unstar 209   ⑂ Fork 64

Added support for MonoTouch and MonoAndroid #125   New issue

⑂ **Open**   **nberardi** wants to merge 6 commits into `serilog:master` from `nberardi:master`

💬 Conversation 8	⑂ Commits 6	📄 Files changed 17		+721 −114 ▮▮▮▮▯

nberardi commented on 22 Apr

I needed support for MonoTouch and MonoAndroid, so I decided to contribute back my work.

nberardi added some commits on 22 Apr

⊙   added support for MonoTouch and MonoAndroid   💬 3e41d48

⊙   dynamic isn't supported on MonoTouch   6bfdd46

⊙   added logger configuration   a91eeda

nblumhardt commented on 24 Apr   Owner

Thanks again for providing this Nick. It's a pretty big changeset and I'm not super-familiar with the platform; would you please be able to summarise:

- What's included?
- What changes were necessary to non-Mono* Serilog? (E.g. Serilog.sln has changed but I'm not sure how because of the awful .SLN file format :))
- What are the limitations?

RE the `#ifdefs` around `dynamics` - it might be possible to use generics here instead (dynamic was just a lazy way to get this off the ground) - are generics supported fully on the target platforms?

Labels
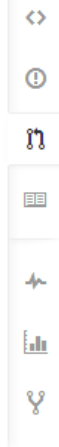None yet

Milestone
No milestone

Assignee
No one assigned

Notifications
🔇 Unsubscribe

You're receiving notifications because you're subscribed to this repository.

3 participants

🔒 GitHub, Inc. [US] | https://github.com/serilog/serilog/commit/436e958e7c9b4fef7ec0b34bc70a2a4b58e4cfc7

This repository ▾   Search or type a command   ⊘   Explore   Gist   Blog   Help   🖼 matthewskelton   +▾   🔧   ⬅

PUBLIC   📘   **serilog** / **serilog**   👁 Unwatch ▾ 31   ★ Unstar 209   🍴 Fork 64

Merge pull request #153 from ruba1987/feature/nlog-support   Browse code

`[Feature] NLog sink support`

🔀 master

🖼 **nblumhardt** authored 4 days ago   commit 436e958e7c9b4fef7ec0b34bc70a2a4b58e4cfc7

                                              2 parents 1722ae0 + 7f66a26

⊞ Showing **7 changed files** with **206 additions** and **8 deletions**.   Show diff stats

```
20 ■■■■■■  Serilog.sln                                                              View

...    ...    @@ -1,7 +1,7 @@
 1      1
 2      2     Microsoft Visual Studio Solution File, Format Version 12.00
 3      3     # Visual Studio 2013
 4         -VisualStudioVersion = 12.0.21005.1
        4  +VisualStudioVersion = 12.0.30324.0
 5      5     MinimumVisualStudioVersion = 10.0.40219.1
 6      6     Project("{2150E333-8FDC-42A3-9474-1A3956D46DE8}") = "src", "src", "{037440DE-440B-4129-9F7A-09B42D00397E}"
 7      7     EndProject
 ⇳            @@ -71,6 +71,8 @@ Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "Serilog.Sinks.MSSqlServer",
71     71     EndProject
72     72     Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "Serilog.Sinks.Raygun", "src\Serilog.Sinks.Raygun\Serilog.Sinks.R
73     73     EndProject
       74  +Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "Serilog.Sinks.NLog", "src\Serilog.Sinks.NLog\Serilog.Sinks.NLog.
       75  +EndProject
74     76     Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "Serilog.SmokeTest", "test\Serilog.SmokeTest\Serilog.SmokeTest.cs
75     77     EndProject
76     78     Project("{FAE04EC0-301F-11D3-BF4B-00C04F79EFBC}") = "Serilog.Sinks.ApplicationInsights", "src\Serilog.Sinks.Applicati
 ⇳            @@ -199,6 +201,10 @@ Global
199    201       {B4EEC1AD-6E2B-49F6-A4C0-A9D39E9C4EFA}.Debug|Any CPU.Build.0 = Debug|Any CPU
200    202       {B4EEC1AD-6E2B-49F6-A4C0-A9D39E9C4EFA}.Release|Any CPU.ActiveCfg = Release|Any CPU
201    203       {B4EEC1AD-6E2B-49F6-A4C0-A9D39E9C4EFA}.Release|Any CPU.Build.0 = Release|Any CPU
```

2. Deployment Pipeline

A large online retailer

- Travel sector
- Since ~1999
- UK market
- 'Non-core' applications

Challenges were:

- Limited Git skills in Service team
- Manual deployments
- 'Snowflake' servers
- No CI
- Risks: security, automation, etc

What we did

- Built a walking skeleton pipeline
- Modelled security roles and stages
- Included manual steps (at first)
- Walked people through steps
- Finally: opened firewall so everyone could see the UI

Results

- Security: happy
- Service team: relieved (& happy)
- Developers: won over (& happy)
- Business: surprised (& happy)

3. Log Aggregation

Log aggregation & search

ElasticSearch+ LogStash+ Kibana / NewRelic / LogEntries / Stackify

(In Production, Pre-Prod, Test)

On developer machines!!!

Event type IDs

How many discrete states exist
in your application?

Event type IDs

enum

Human-readable sets:
unique values, sparse, immutable

C#, Java, Python, node
(Ruby, PHP, …)

```
public enum EventID
    {
        // Badly-initialised logging data
        NotSet = 0,
        // An unrecognised event has occurred
        UnexpectedError = 10000,

        ApplicationStarted = 20000,
        ApplicationShutdownNoticeReceived = 20001,

        PageGenerationStarted = 30000,
        PageGenerationCompleted = 30001,

        MessageQueued = 40000,
        MessagePeeked = 40001,

        ItemAddedToBasket = 60001,
        ItemRemovedFromBasket = 60002,

        CreditCardDetailsSubmitted = 70001,

        // ...
    }
```

Technical

Domain

ItemAddedToBasket = 60001

ItemAddedToBasket = 60001

Distributed systems

Monolith to microservices:
debugger does not have the full view

Remote debugging?

Even with remote debugger, it's boring to attach and detach

(but… Glimpse)

◀

⊞ Columns

@message
@source
@source_host
@source_path
@tags
@timestamp
@type pid program
role source_host

⚙ Analysis

@message ▾
@source ▾
@source_host ▾
@source_path ▾
@tags ▾
@timestamp ▾
@type ▾
pid ▾
program ▾
role ▾
source_host ▾

| 2012-09-06T16:11:18 | to | 2012-09-08T16:11:18 |

count per 1800s

250
200
150
100
50
0

16:00:00   20:00:00   00:00:00
9/6   9/6   9/7

◀   September 2012   ▶

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

16:00:00   20:00:00   00:00:00
9/7   9/7   9/8

0 TO 50 →

Time   16:11:18

Hour   ─────────────●────

Minute ──●──────────────

Second ──────●──────────

Now   Done
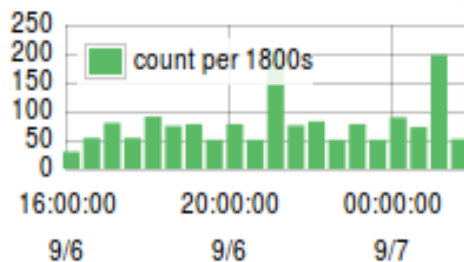
Time   **@message**
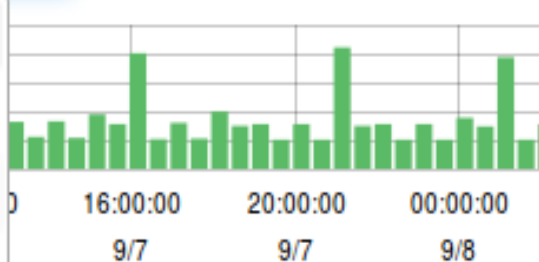
09/08 16:11:01   <13>Sep 8 16:11:01 c   [21291]: Log statistics; dropped='udp(AF_INET
                  processed='center(qu   ed)=1225', processed='destination(remote_logh

09/08 16:10:59   <13>Sep 8 16:10:59 r   ]: Log statistics; dropped='udp(AF_INET(192.1
                  processed='center(qu   ved)=26760', processed='destination(remote_lo
                  processed='source(ho

09/08 16:10:05   <13>Sep 8 16:10:05 p   429]: Adding relationship from Exec[zypper refre

09/08 16:10:01   <13>Sep 8 16:10:01 r   0108]: (root) CMD (/root/scripts/check-auxmo

09/08 16:10:01   <13>Sep 8 16:10:01 r   9391]: (root) CMD (/root/scripts/check-auxm

09/08 16:10:01   <13>Sep 8 16:10:01 r   32749]: (root) CMD (/root/scripts/check-auxm

09/08 16:10:01   <13>Sep 8 16:10:01 mem2/mem2 memcache /usr/sbin/cron[21891]: (root) CMD (/root/scripts/check-auxm

Log aggregation & search

Good logging is good communication

ELK and other log aggregation tools can build Dev + QA + Ops collaboration

4. Detect Database Drift

Want to know when a database changes? Set up email notifications

— Collapse all projects

Filter projects: **All projects**   🔶 **Updated**   🇩 **Drifted**

∨ SimpleTalk `DRIFT`

Development	Testing	Staging	Production
🗄 SimpleTalkDev 🕘 Version 9	🗄 SimpleTalkTesting 🕘 Version 8	🗄 SimpleTalkStaging Schema drifted to `DRIFT` unrecognized state Was: Version 7 **Review**	🗄 SimpleTalkProduction 🕘 Version 6

∨ Project A ✅

Development	Testing	Staging	Production
🗄 ADev 🕘 Version 3	🗄 ATest 🕘 Version 3	🗄 AStaging 🕘 Version 3	🗄 AProd 🕘 Version 3

∨ ProjectB

Database history > SimpleTalk (staging) history

Database	Project	Environment	Instance location
SimpleTalk (Staging) ▾	The Simple Talk Blog	Staging	srv-221

Version 8 ✓
Named on 14/01/2015 at 15:32
by Jonathan.Roberts

[Difference report]

Summary
"A small adjustment to one of the stored procedures. This version is now ready to be pushed to production."

👤 Jonathan.Roberts
DLM dashboard

What changed since Version 7?
1 object | ▾

Who changed it?
1 person | ▾

Version 7 ✓
Named on 14/01/2015 at 15:32
by Jerome.Smith

[Difference report]

Summary
"We've made some last minute changes to 7 of our stored procedures. Hopefully this will improve the way that the database responds to..." (more)

👤 Jerome.Smith
DLM dashboard

What changed since Version 6?
7 objects | ▾

Who changed it?
3 people | ▾

Version 6 ✓
Acknowledged on 13/01/2015 at 15:32
by Jonathan.Roberts

[Difference report]

Summary
"Rolling a production hot fix back into our up-stream environments. The change was made on production to solve the..." (more)

👤 Jonathan.Roberts
DLM dashboard

What changed since Version 5?
1 object | ▾

Who changed it?
1 person | ▾

Version 5 ✓
Named on 12/01/2015 at 15:32
by Jerome.Smith

[Difference report]

Summary
"Third set of changes to be put forward as a release candidate to support the new aplication feature"

👤 Jerome.Smith
DLM dashboard

What changed since Version 4?
9 objects | ▾

Who changed it?
2 people | ▾

Version 4 ✓
Named on 11/01/2015 at 15:32
by Jerome.Smith

[Difference report]

Summary
"Second iteration of changes - improved performance a little bit."

👤 Jerome.Smith
DLM dashboard

What changed since Version 3?
11 objects | ▾

Who changed it?
2 people | ▾

Load more ▾

Collaboration & tool choice

Value collaboration as a key criterion

Orthogonal to main tool purpose (?)

"How does this tool help people to collaborate?"

Automation

Tooling & APIs

- Prefer SaaS to begin with
- API for:
  - Important state changes & actions
  - Import/Export
  - Trigger
  - Alerting
  - …

Tooling Automation

- Avoid manual configuration of tools
- Install via packages
  - RPM, APT, Gems, Chocolatey
- Configure using Chef/Puppet/Ansible/DSC/etc.
- Insist on APIs

Tool Automation

Point-n-click is no longer acceptable

Choose tools that expose APIs

Aim for composition of new capabilities

Build and deployment are first-class concerns

Learning

```
* commit 6d396b3b40998527fc7fef9ae131176324250d40
| Author: agilestevesmith <steve
| Date:    Mon Jun 16 16:38:51 2014 +0100
|
|     Steve - update notes
|
manuscript/steve-smith.txt
|
* commit fbe2f7e1f66d85727df80b9474c7031453e186b3
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|     Steve - toggle all contributors off until first draft received
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manuscript/Book.txt
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|
*   commit 6169236c84d076aa7a4e41ca5a717a2be4159fcf
|\  Merge: 9351fd3 9747eab
| | Author: agilestevesmith <steve
| | Date:    Thu Jun 12 10:10:41 2014 +0100
| |
| |     Merge branch 'master' of                    build-quality-in/buildqualityin-content
| |
| * commit 9747eab6246824a7d882c97ee1726a08134550f2
| |\  Merge: 3ca1e1a 22832ae
| | | Author: Matthew Skelton <matthew.skelton@                >
| | | Date:    Wed Jun 11 13:25:42 2014 +0100
| | |
| | |     Merged: Tweaks to summary to clarify purpose - "build and operate software" - and no dodgy space chars
| | |
| | * commit 22832aea4f02b1f454821a399be0ac233f42987a (origin/matthewpskelton, matthewpskelton)
| | | Author: Matthew Skelton <                        >
| | | Date:    Wed Jun 11 11:27:09 2014 +0100
| | |
| | |     Removing spurious space characters
| | |
summary.txt
:
```

Learning & tool choice

Bring people with you

Appreciate current skills

Prefer achievable gains now

Avoid fear of too-scary tools

Singleton tools

(or the 'Prize Bull' approach)

Singleton tools

Special database server
Costly log aggregation
Costly monitoring
Server configuration tooling

…only in Production

"Better features"?

Optimise globally across the teams that need to collaborate

Singleton tool

Breaks feedback (learning) loop
from Production

Makes CI/CD more difficult

Underestimates value of
collaboration and learning

Conway's Law

Mel Conway, 1968

"organizations which design systems … are constrained to produce designs which are copies of the communication structures of these organizations"

Ruth Malan, 2008

"if the architecture of the system and the architecture of the organization are at odds, the architecture of the organization wins"
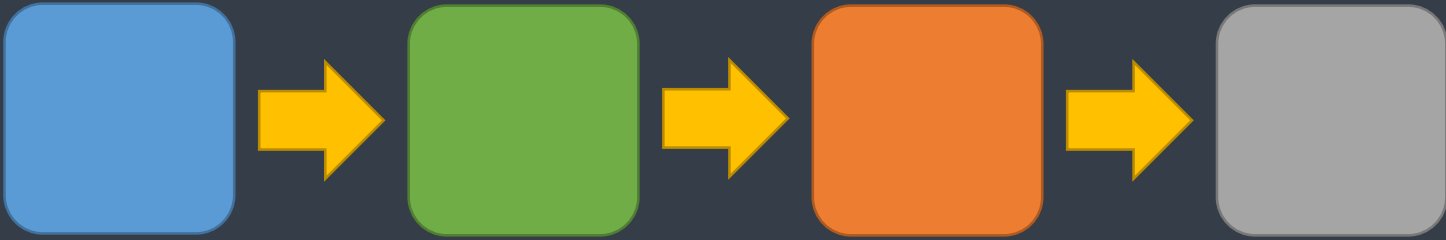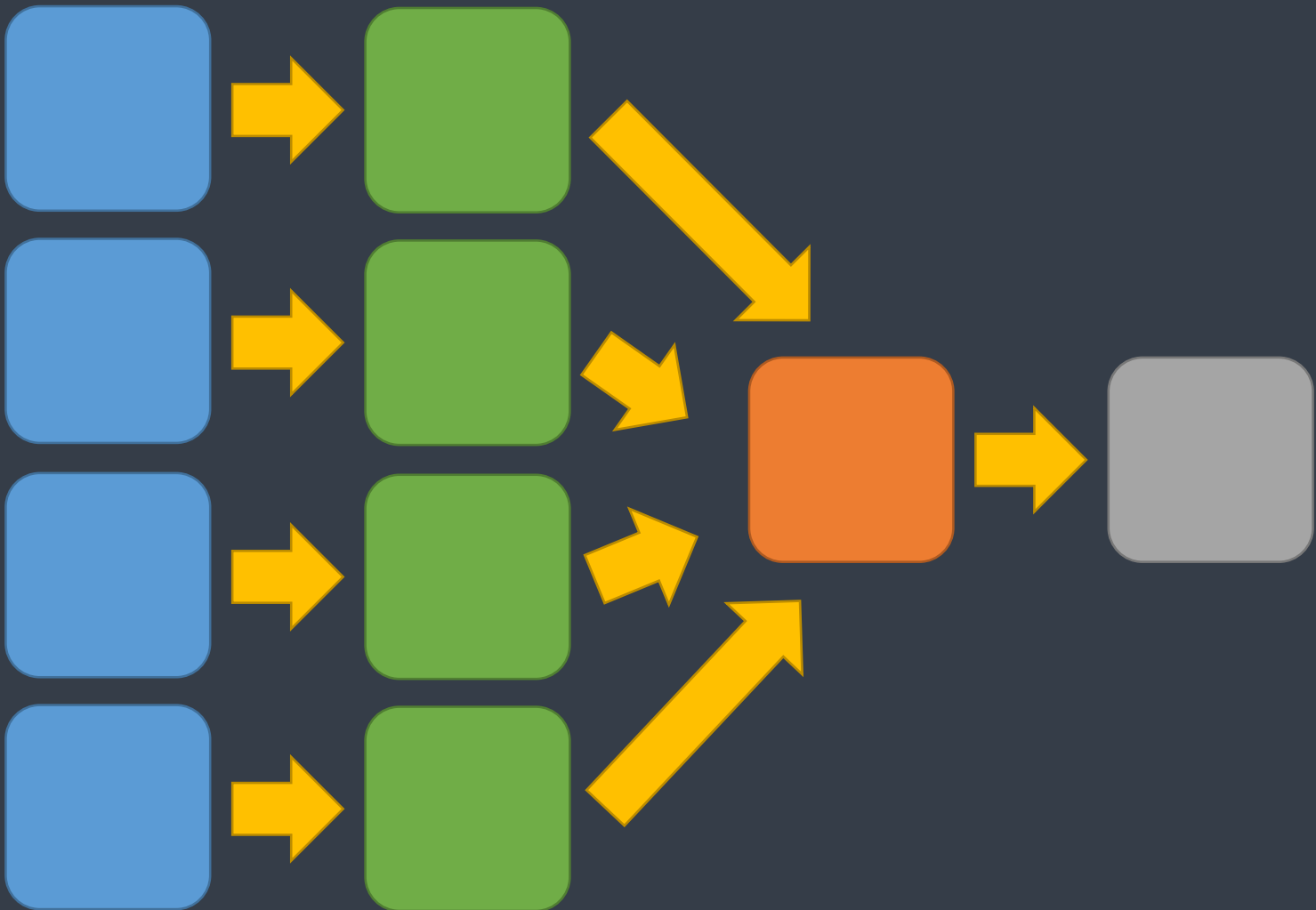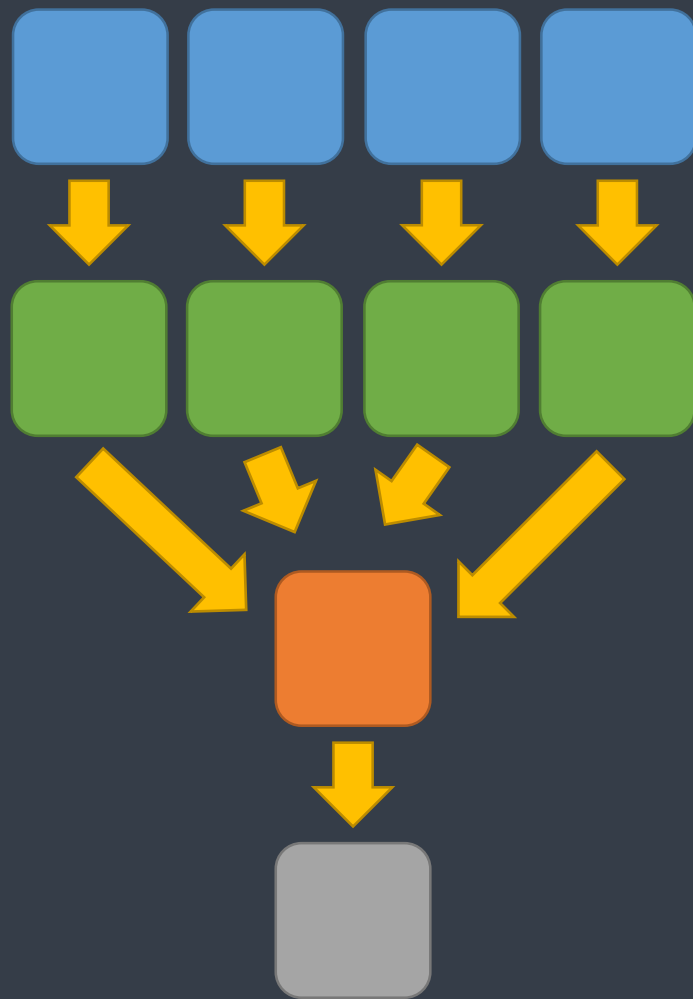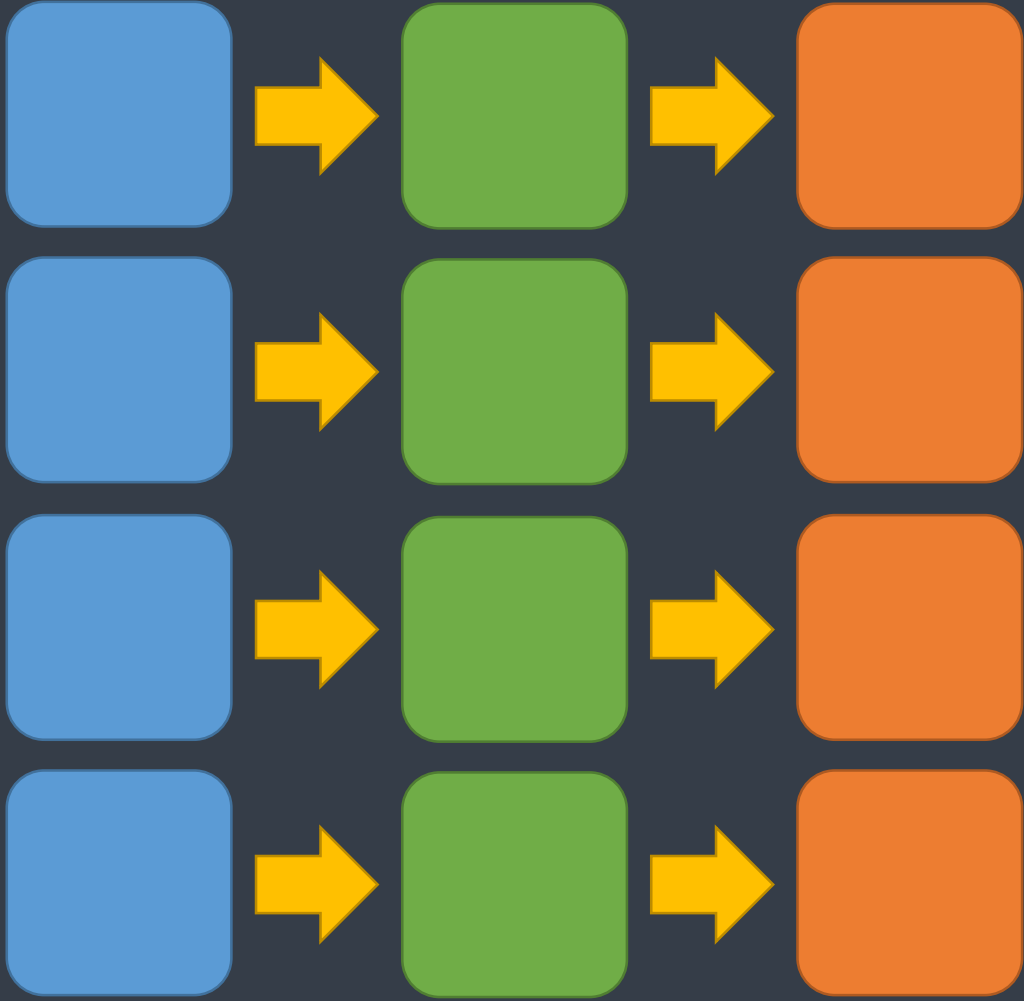
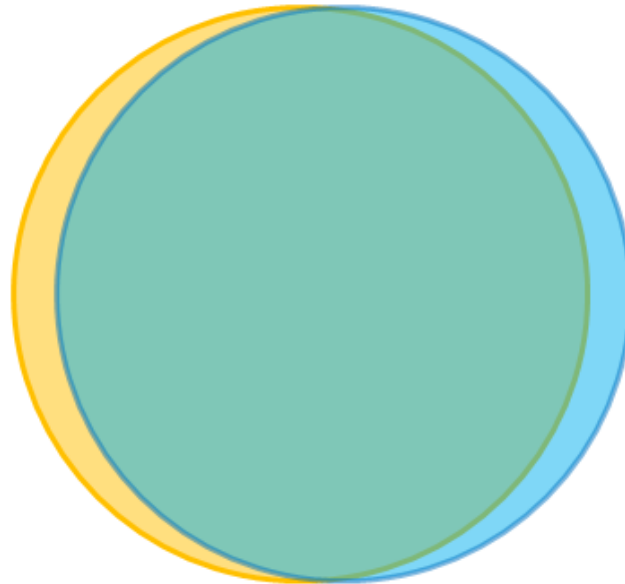# Team Topologies

`topology`: the study of places

Team Topologies:

study of the placement of teams (responsibilities, communication, shape)
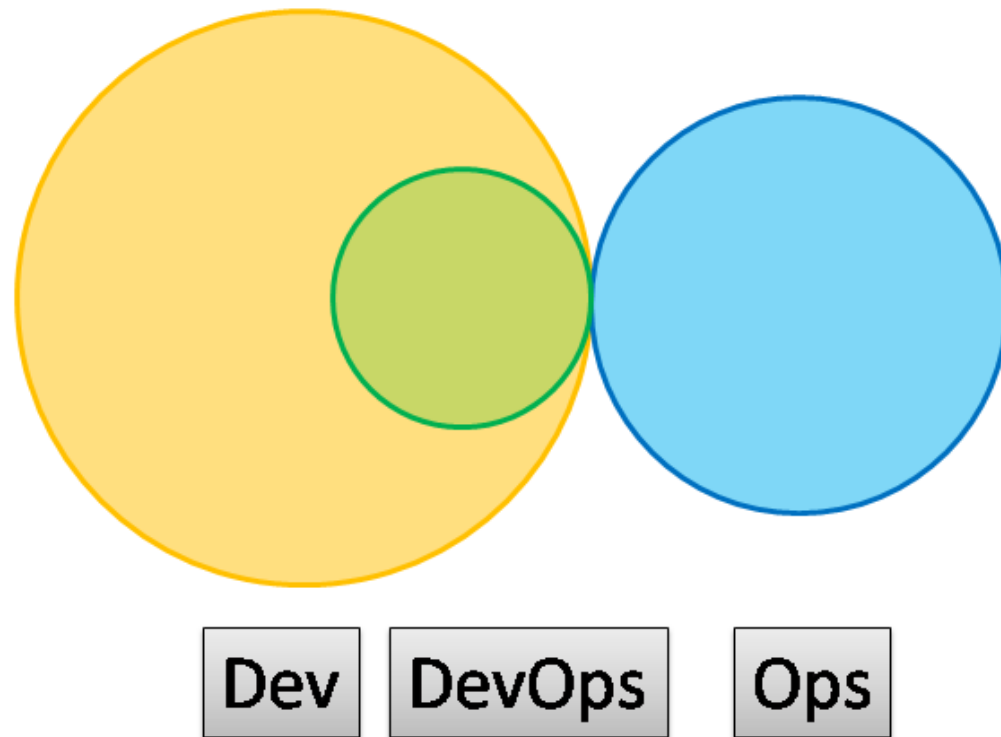
Type 1 – Smooth Collaboration
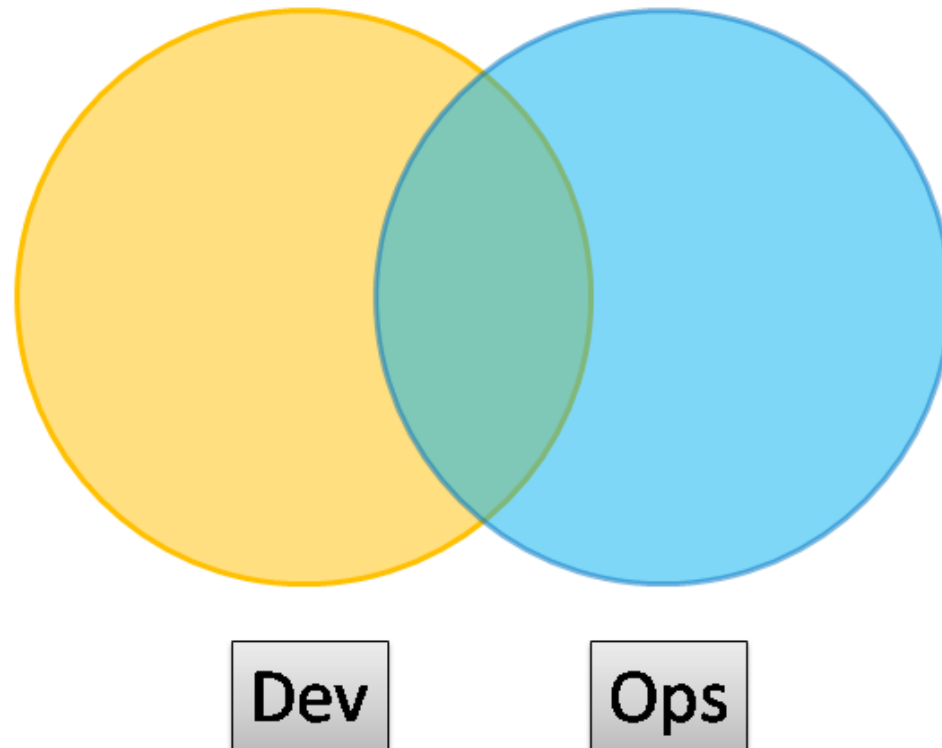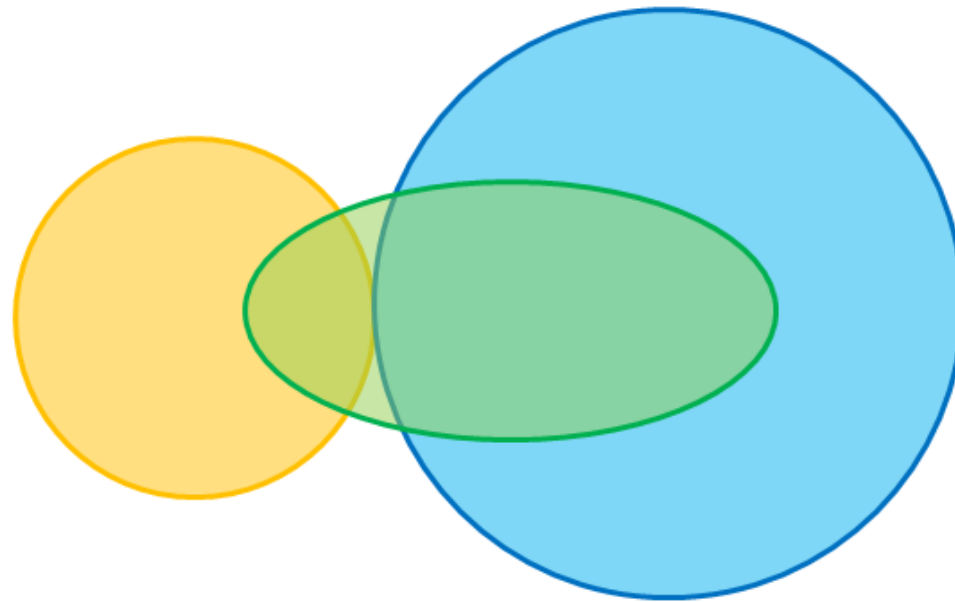

Dev   Ops

Type 2 – Fully Embedded

Type 3 – Infrastructure-as-a-Service

Dev   DevOps   Ops

Type 4 – DevOps-as-a-Service

Conway & Tool Choice

See the whole organisation as a system that we're building

Separate tools for separate teams

Shared tools for collaborative teams

http://bit.ly/DevOpsTopologies

How to choose tools for Continuous Delivery and DevOps

Value collaboration aspects
Insist on APIs and scripted deployments
Avoid a learning mountain: evolve tooling
Avoid Production-only tools
Consider Conway's Law

(this list is incomplete!)

Further reading

Build Quality In

buildqualityin.com

Continuous Delivery and DevOps experience reports from 20 authors

70% of royalties donated to Code Club

Discount for #qconlondon:
http://leanpub.com/buildqualityin/c/qconlondon2015

Six contributors from QCon London 2015 speakers:
- Dave Farley
- Rachel Laycock
- Amy Phillips
- Anna Shipman
- Matthew Skelton
- Philip Wills

- + 14 more

Further reading

DZone 2015 Guide to Continuous Delivery

http://bit.ly/DZoneCDreport

Conway's Law & Continuous Delivery

- Allan Kelly - @allankellynet

- London Continuous Delivery meetup group – January 2014

- https://vimeo.com/channels/londoncd

LONDON
CONTINUOUS
DELIVERY

Thank you

matthewskelton.net / @matthewpskelton

HT: @Squire_Matt, @alan_parkinson

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