Driving Digital Transformation at Speed

Microservices, APIs, and Innovation

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API Academy, CA Technologies
@mamund #mcaTravels

ca technologies

API ACADEMY

Agenda

1 **INTRODUCTION**

2 **MICROSERVICES**

3 **APIs**

4 **INNOVATION**

5 **ONE MORE THING...**

PgUp
Ctrl
Mike Amundsen
@mamund

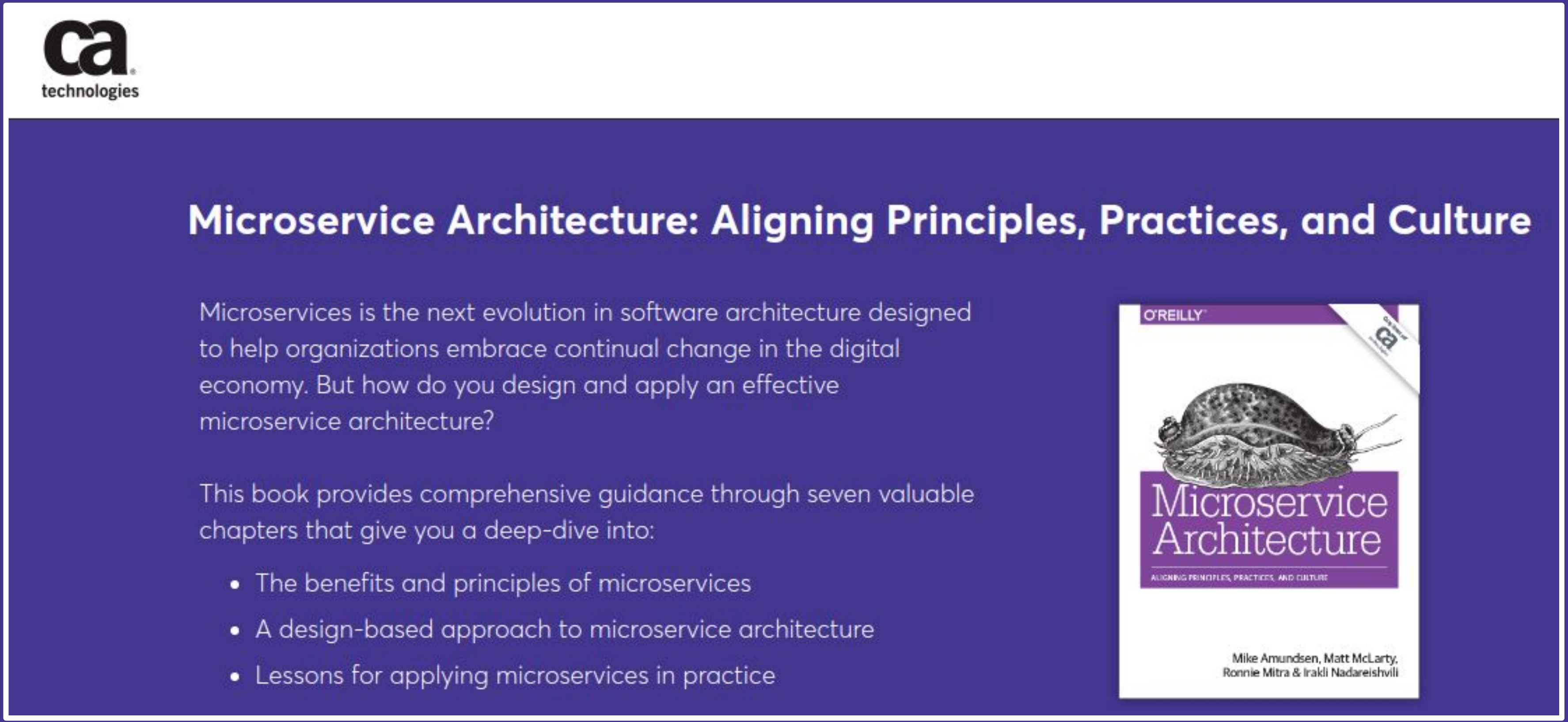
MENU
API ACADEMY
SERVICES
EVENTS
Microservice Architecture
ALIGNING PRINCIPLES, PRACTICES, AND CULTURE
READ MORE

EBOOK

MICROSERVICE ARCHITECTURE: ALIGNING PRINCIPLES, PRACTICES & CULTURE

DESIGN AND APPLY MICROSERVICES TO EMBRACE CONTINUAL CHANGE IN THE DIGITAL ECONOMY

http://g.mamund.com/msabook



Microservice Architecture: Aligning Principles, Practices, and Culture

Microservices is the next evolution in software architecture designed to help organizations embrace continual change in the digital economy. But how do you design and apply an effective microservice architecture?

This book provides comprehensive guidance through seven valuable chapters that give you a deep-dive into:

- The benefits and principles of microservices
- A design-based approach to microservice architecture
- Lessons for applying microservices in practice

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O'REILLY
Microservice Architecture
ALIGNING PRINCIPLES, PRACTICES, AND CULTURE
Mike Amundsen, Matt McLarty, Ronnie Mitra & Irakli Nadareishvili

KENTUCKY
It's that friendly.
285 PHV
KENTON
Lowe's
GRIP-RITE NAILS
GRIP-RITE FASTENERS
BOSTITCH
3M

Microservices

Microservices === Toolmaking

Tool-making

1. Make each program to one thing well
2. Expect the output of every program to be the input of another program
3. Design and build software to be tried early
4. Use tools to lighten the programming task

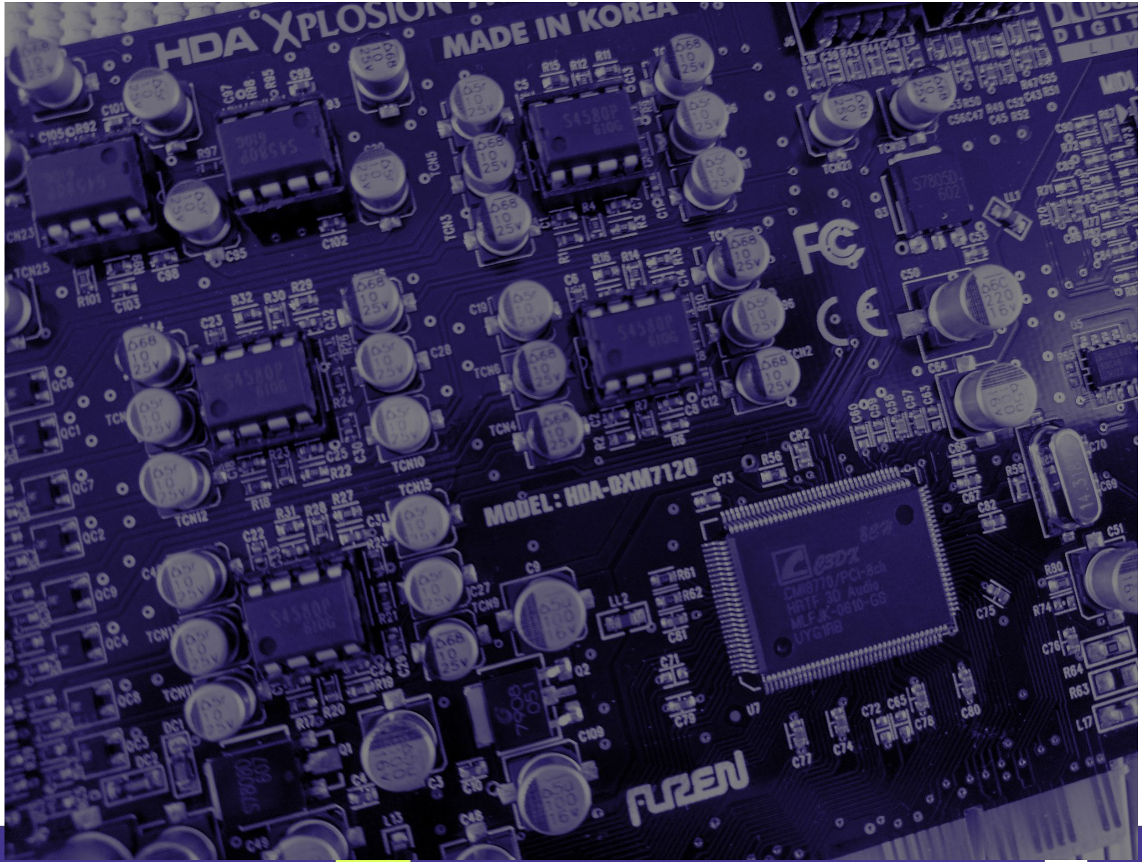
Tool-making -- **Unix operating principles (1978)**

1. Make each program to one thing well
2. Expect the output of every program to be the input of another program
3. Design and build software to be tried early
4. Use tools to lighten the programming task

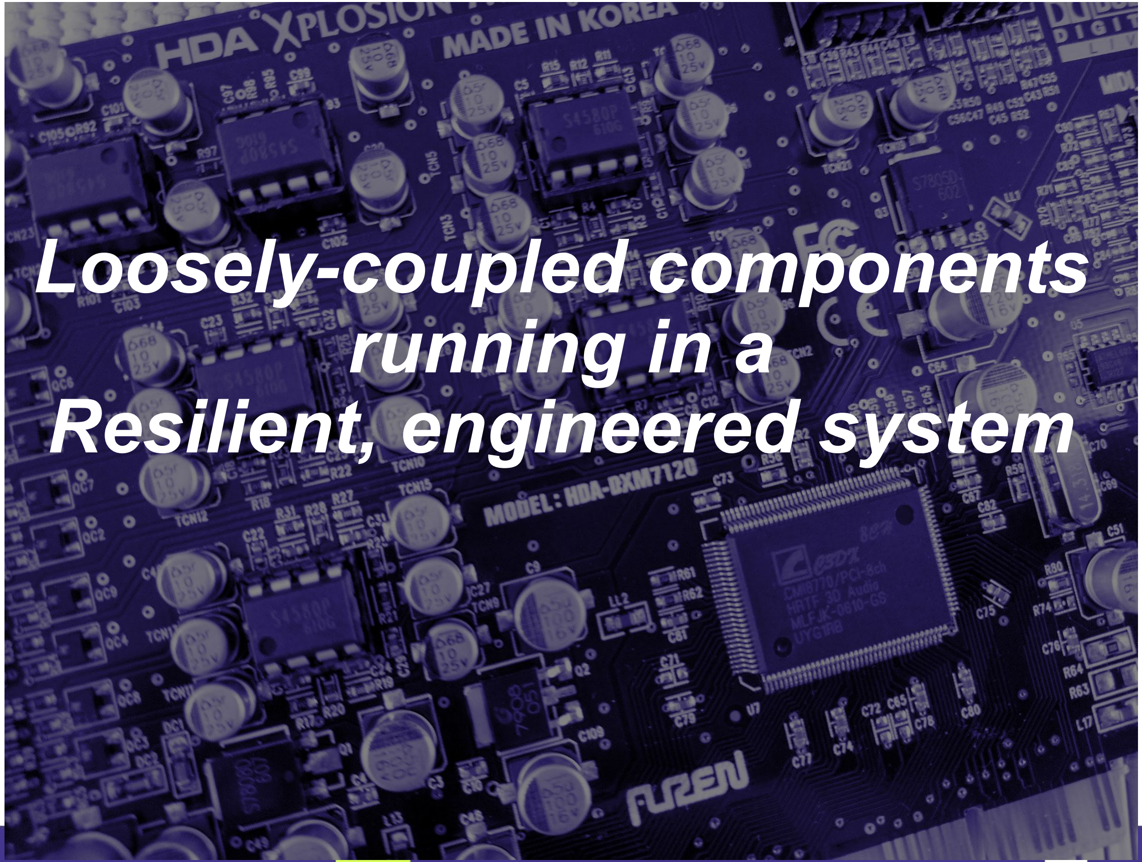
Microservices is all about tool-making

A useful definition of microservices...

A useful definition of microservices...



A useful definition of microservices...



Loosely-coupled components running in a Resilient, engineered system

Harmonizing Speed and Safety at Scale

Harmonizing Speed and Safety at Scale

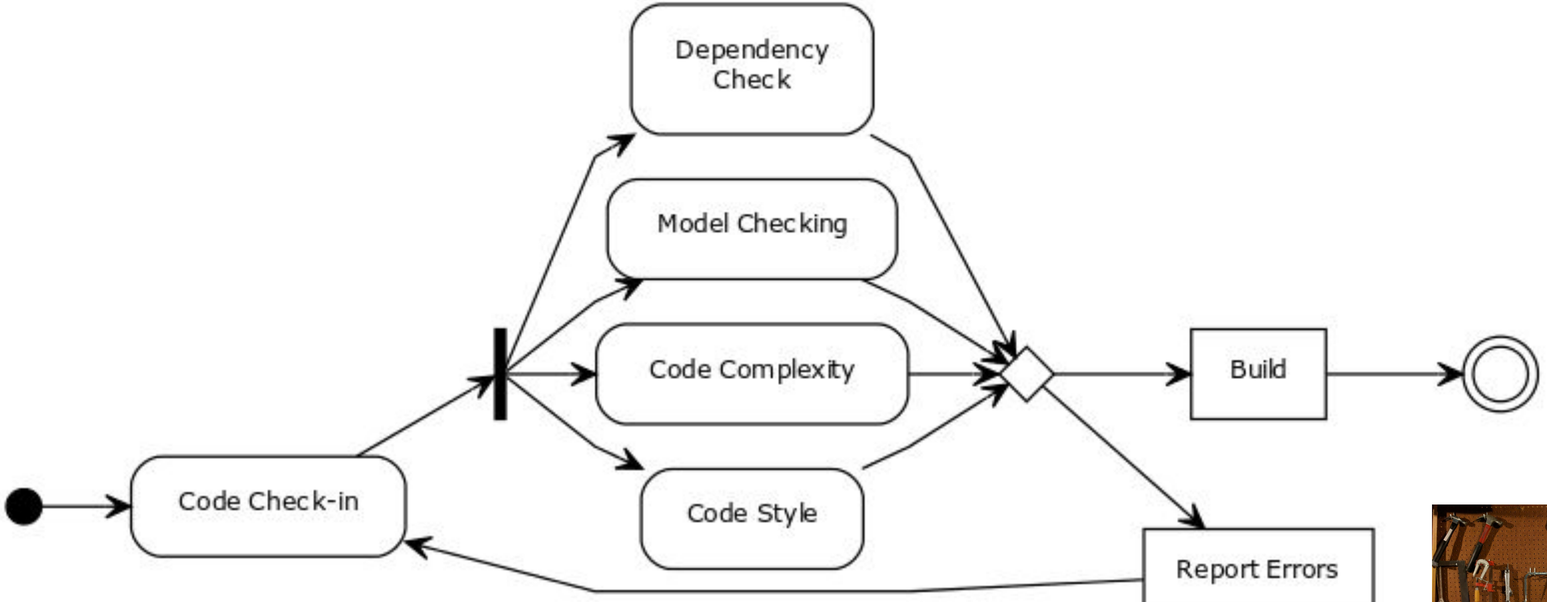
Harmonizing Speed and Safety at Scale

Three things you can do now...

1. Build Pipelines
2. Engineered Deployments
3. Reduce Work in Progress (WIP)

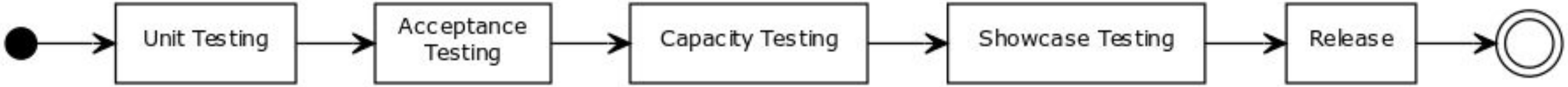
Three things you can do now...

BUILD PIPELINES



Three things you can do now...

ENGINEERED DEPLOYMENTS



Unit Testing

Acceptance Testing

Capacity Testing

Showcase Testing

Release

Three things you can do now...

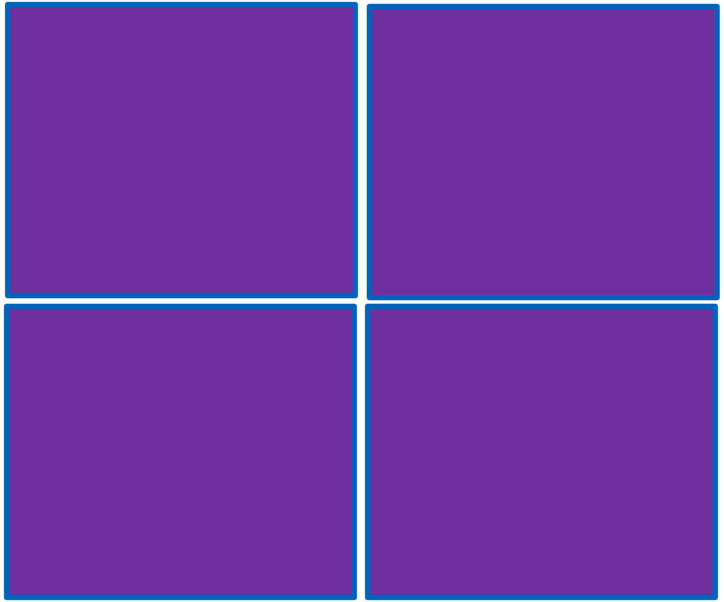
REDUCE WORK IN PROGRESS

Three things you can do now...

REDUCE WORK IN PROGRESS

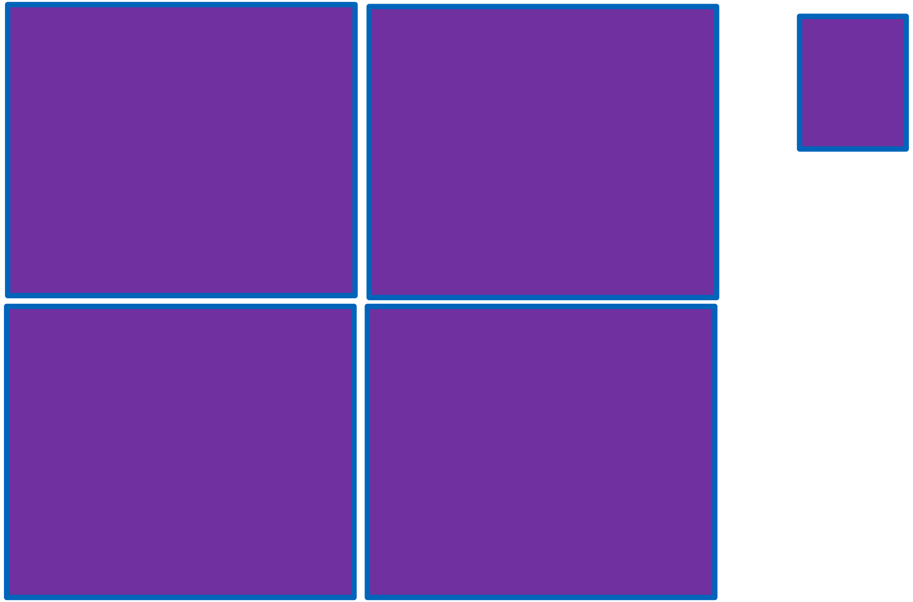
Three things you can do now...

REDUCE WORK IN PROGRESS



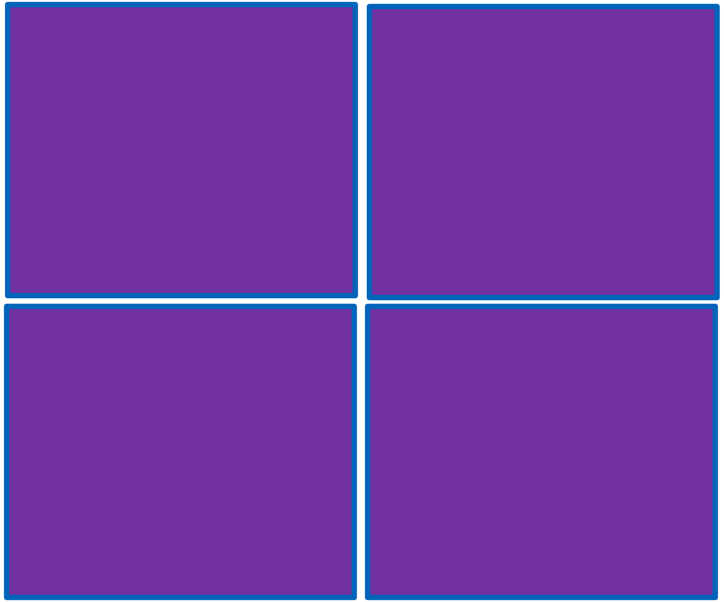
Three things you can do now...

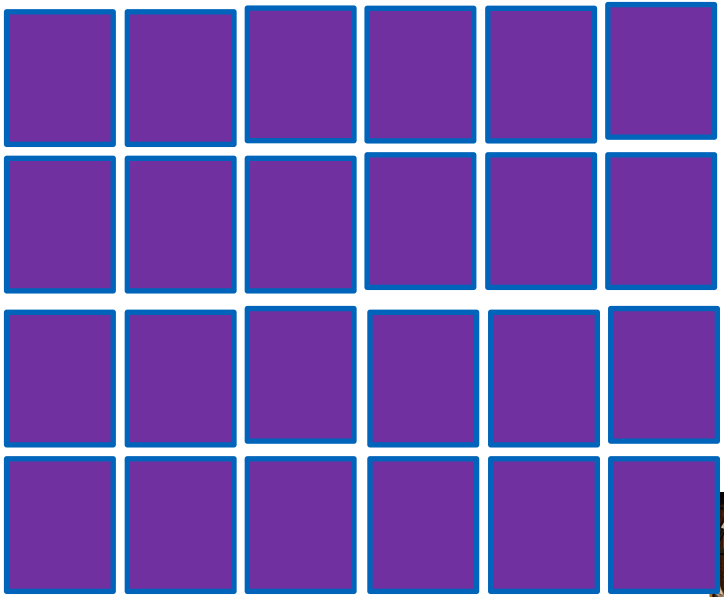
REDUCE WORK IN PROGRESS

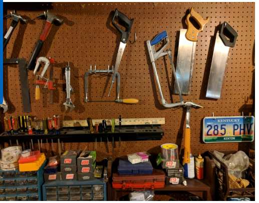


Three things you can do now...

REDUCE WORK IN PROGRESS







Ask yourself...

"How long would it take your organization to deploy a change that involved just one line of code? Do you do this on a repeatable, reliable basis?"

-- Tom and Mary Poppendieck, "Implementing Lean Software Development'

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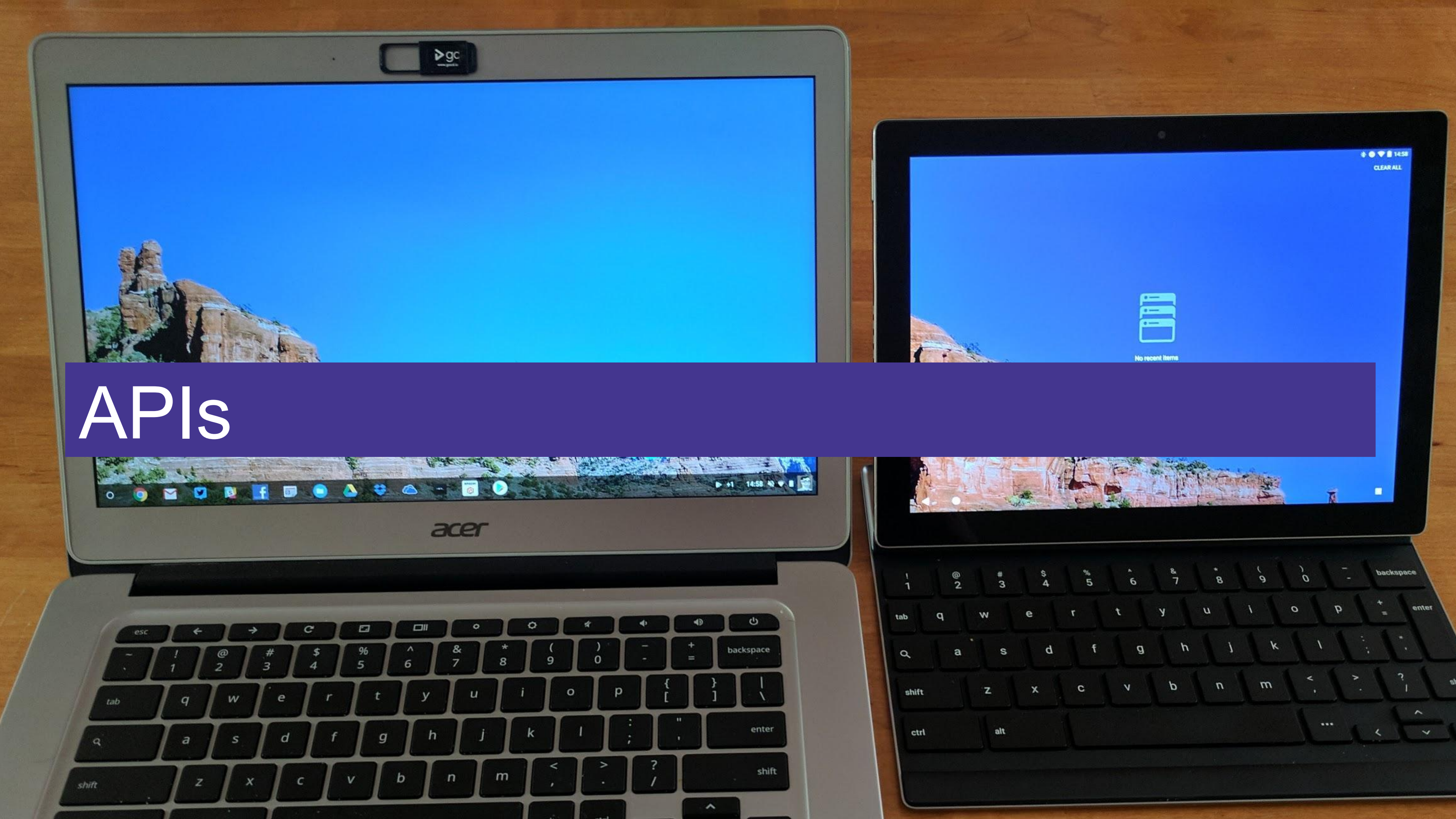
CLEAR ALL
No recent items

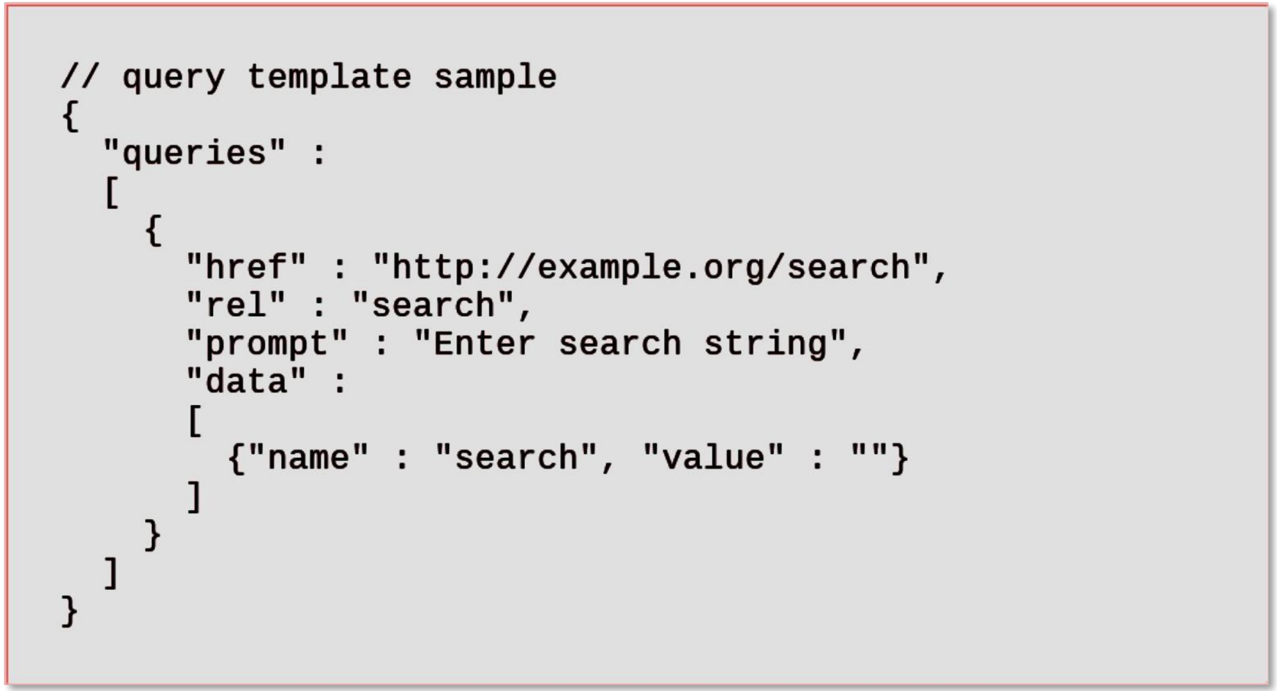
APIs



APIs === Multi-Channel

Interface Design

Interface Design



```
// query template sample
{
  "queries" :
  [
    {
      "href" : "http://example.org/search",
      "rel" : "search",
      "prompt" : "Enter search string",
      "data" :
      [
        {"name" : "search", "value" : ""}
      ]
    }
  ]
}
```

Interface Design

1. Design interfaces for the consumer (machine/human)
2. There is no single (“canonical”) API
3. Make your API design/implementation process…
    1. Safe
    2. Cheap
    3. Easy

Ask yourself…

*How long would it take your organization to release **a new API**?*

Do you do this on a repeatable, reliable basis?

Design APIs for interop, not integration

Three things you can do now…

1. Move beyond HTTP
2. Adopt machine-friendly formats
3. Support domain vocabularies

Three things you can do now…

MOVE BEYOND HTTP

1. HTTP
2. FTP
3. WebSockets
4. MQTT/CoAP

Plan to support multiple protocols

Three things you can do now…

MACHINE-FRIENDLY FORMATS

1. Atom
2. HAL
3. Siren
4. Collection+JSON

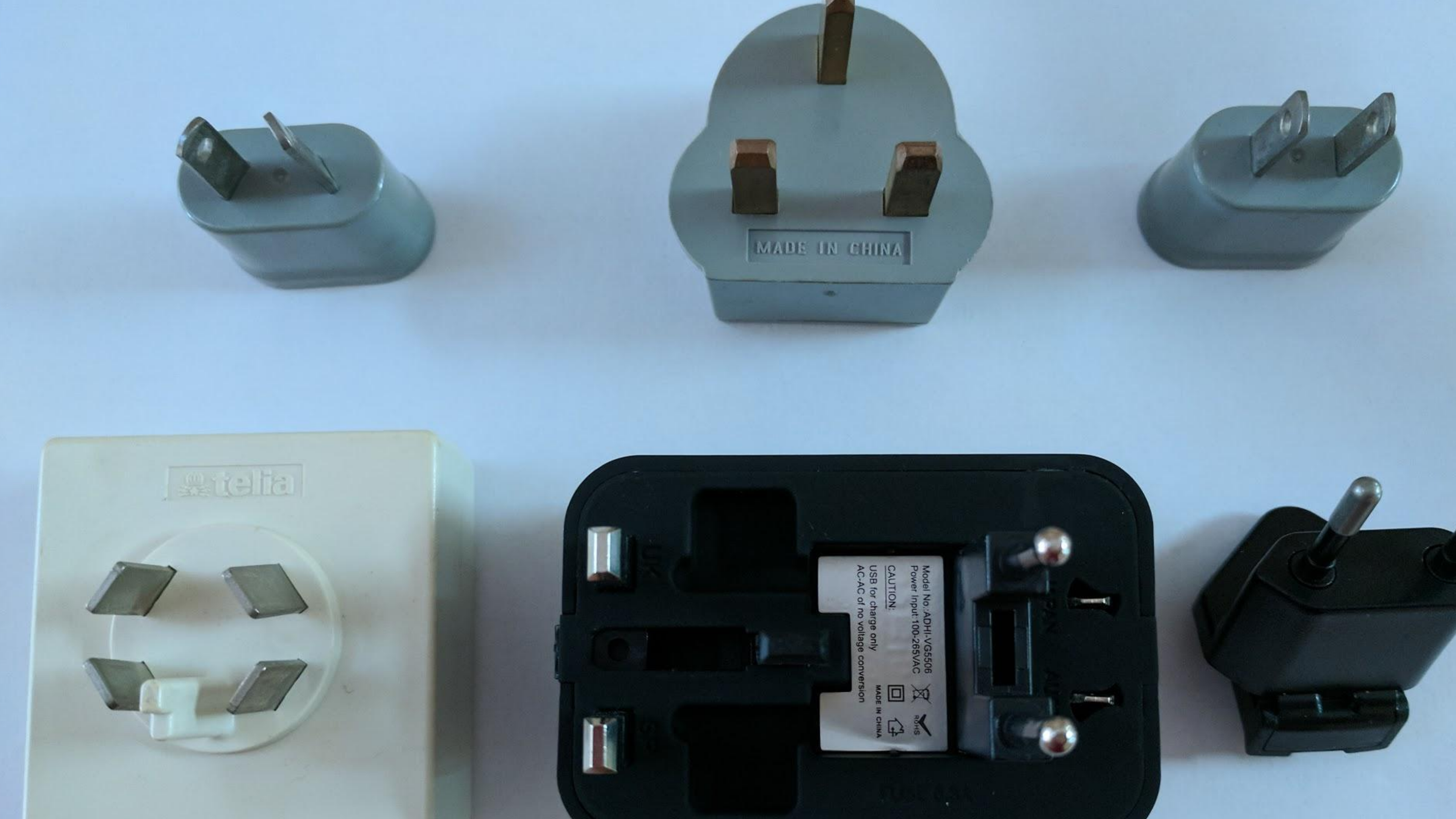
Plan to support multiple formats

Three things you can do now…

DOMAIN VOCABULARIES

1. ALPS
2. DCAP
3. JSON Home
4. RDFS/OWL

Plan to support multiple vocabularies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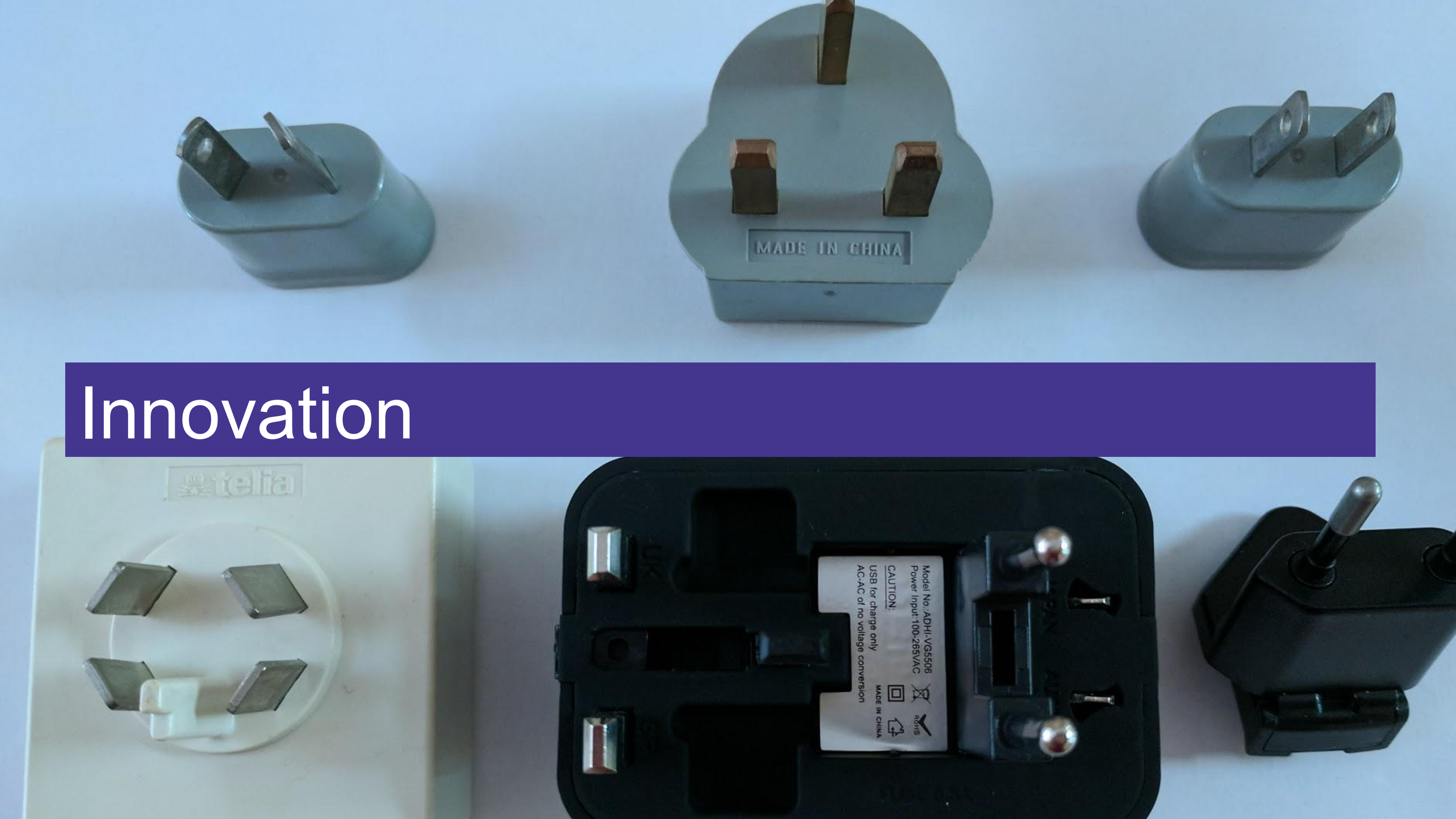
telia
UK
Model No.:ADHI-VG5506
Power Input:100-265VAC
CAUTION:
USB for charge only
AC-AC of no voltage conversion
ROHS
MADE IN CHINA

Innovation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Power Input:100-265VAC
CAUTION:
USB for charge only
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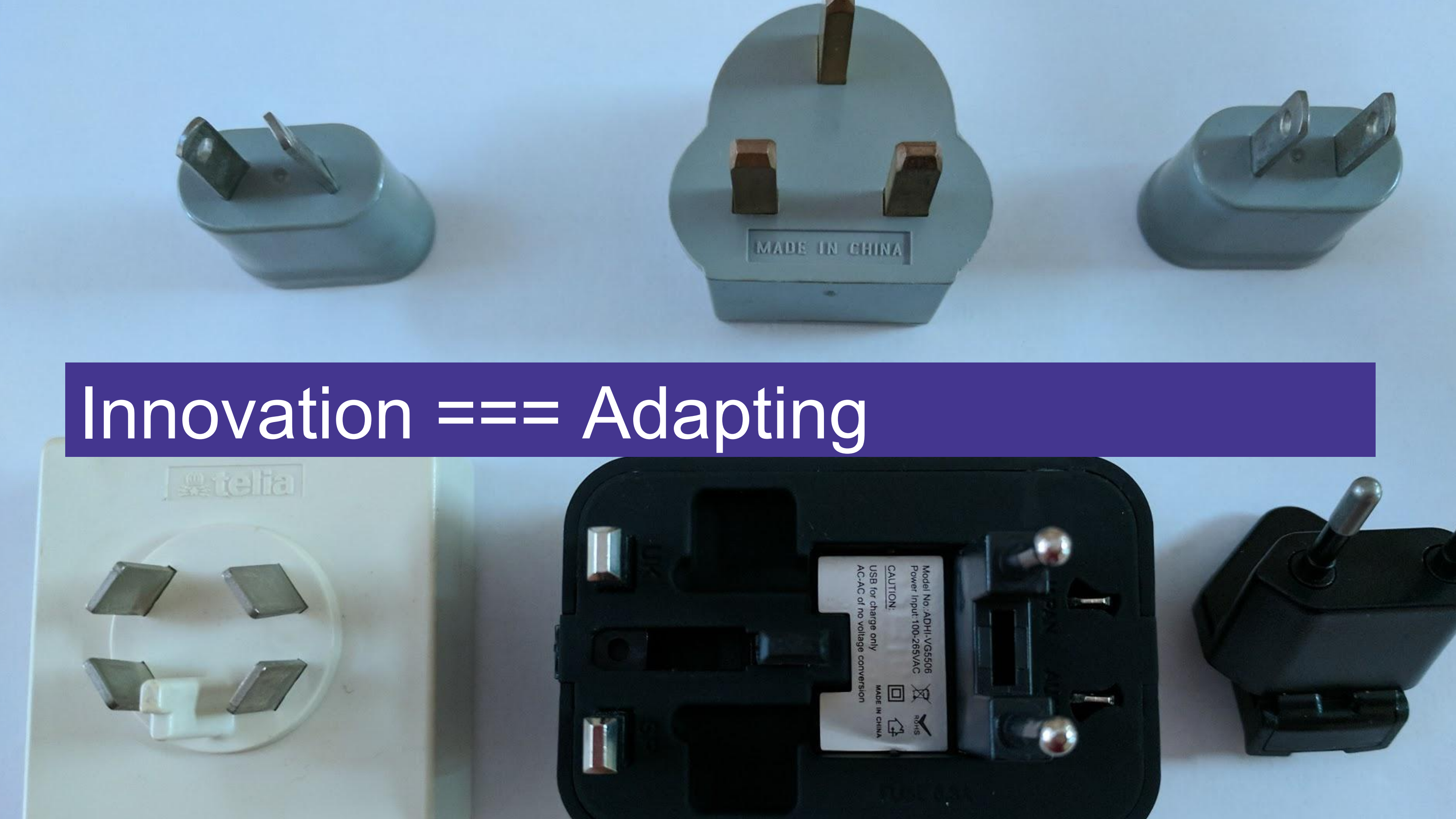
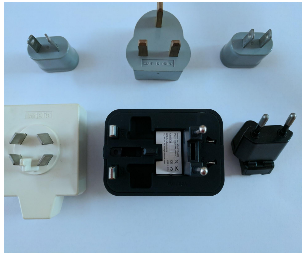
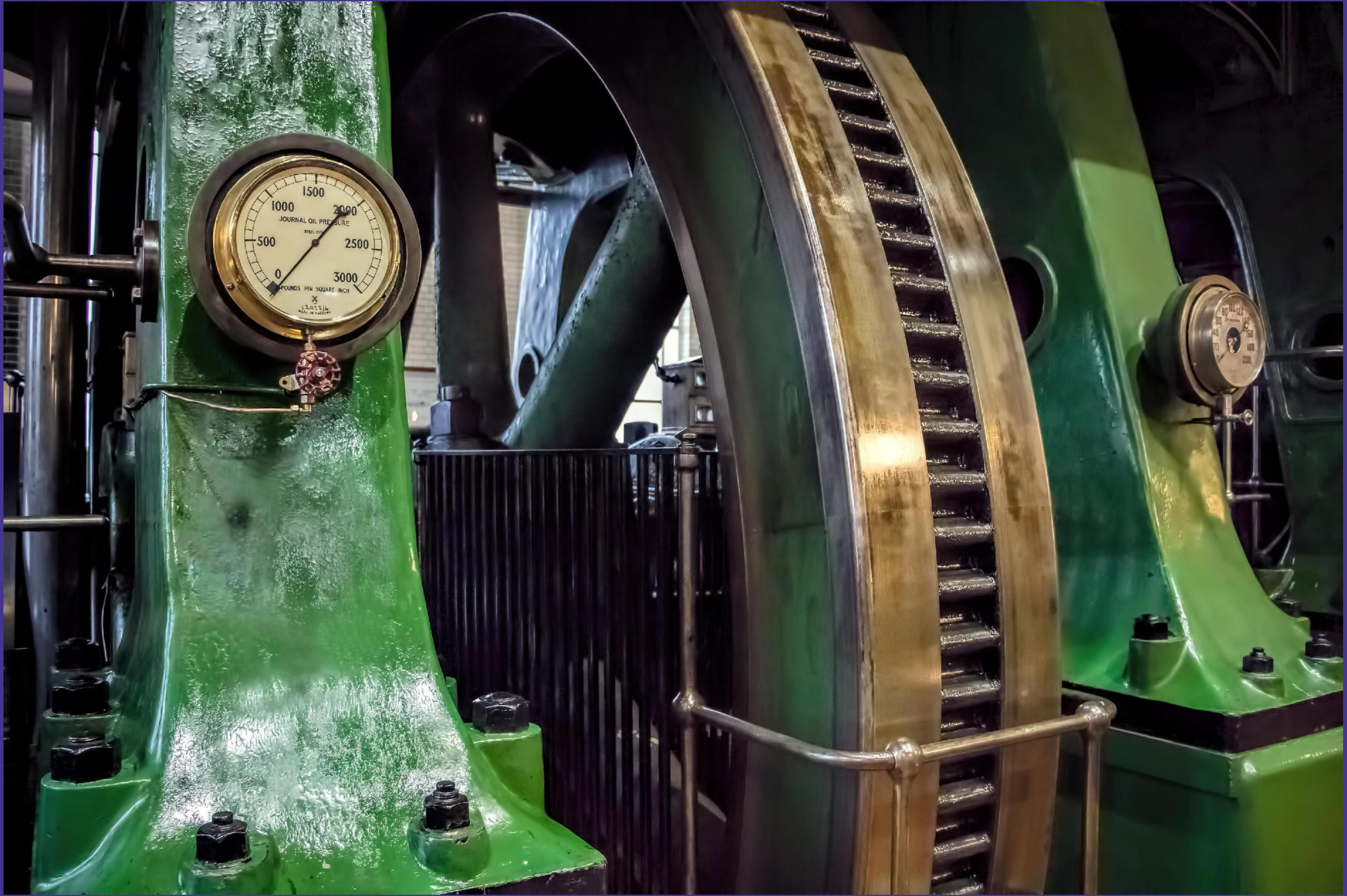
MADE IN CHINA
ROHS

Innovation === Adapting



What does innovation look like?

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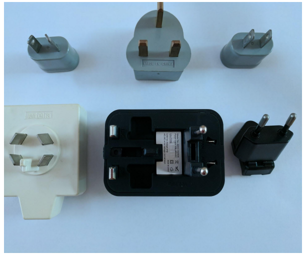
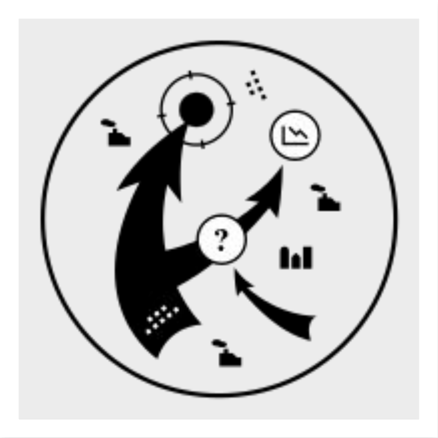
3000
POUNDS PER SQUARE INCH

Harvard Business Review

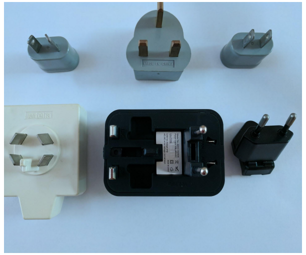
“Your Innovation Team Shouldn’t Run Like a Well-Oiled Machine”

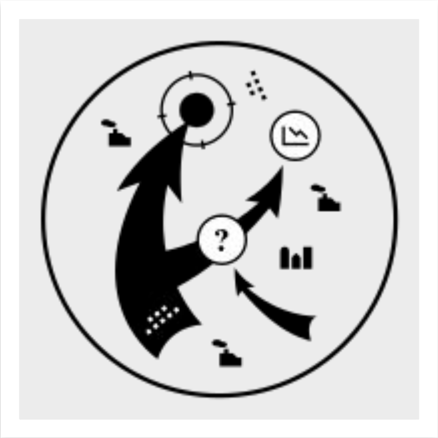
-- Ashkenas and Speigel, October 2015



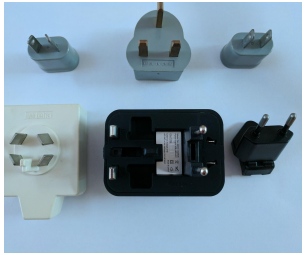


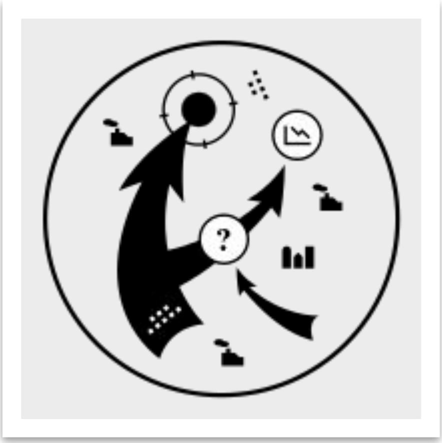
Culture beats strategy





Culture beats engineering

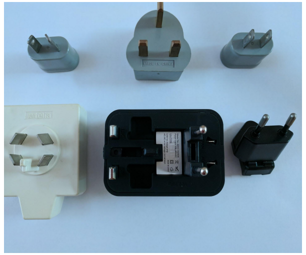


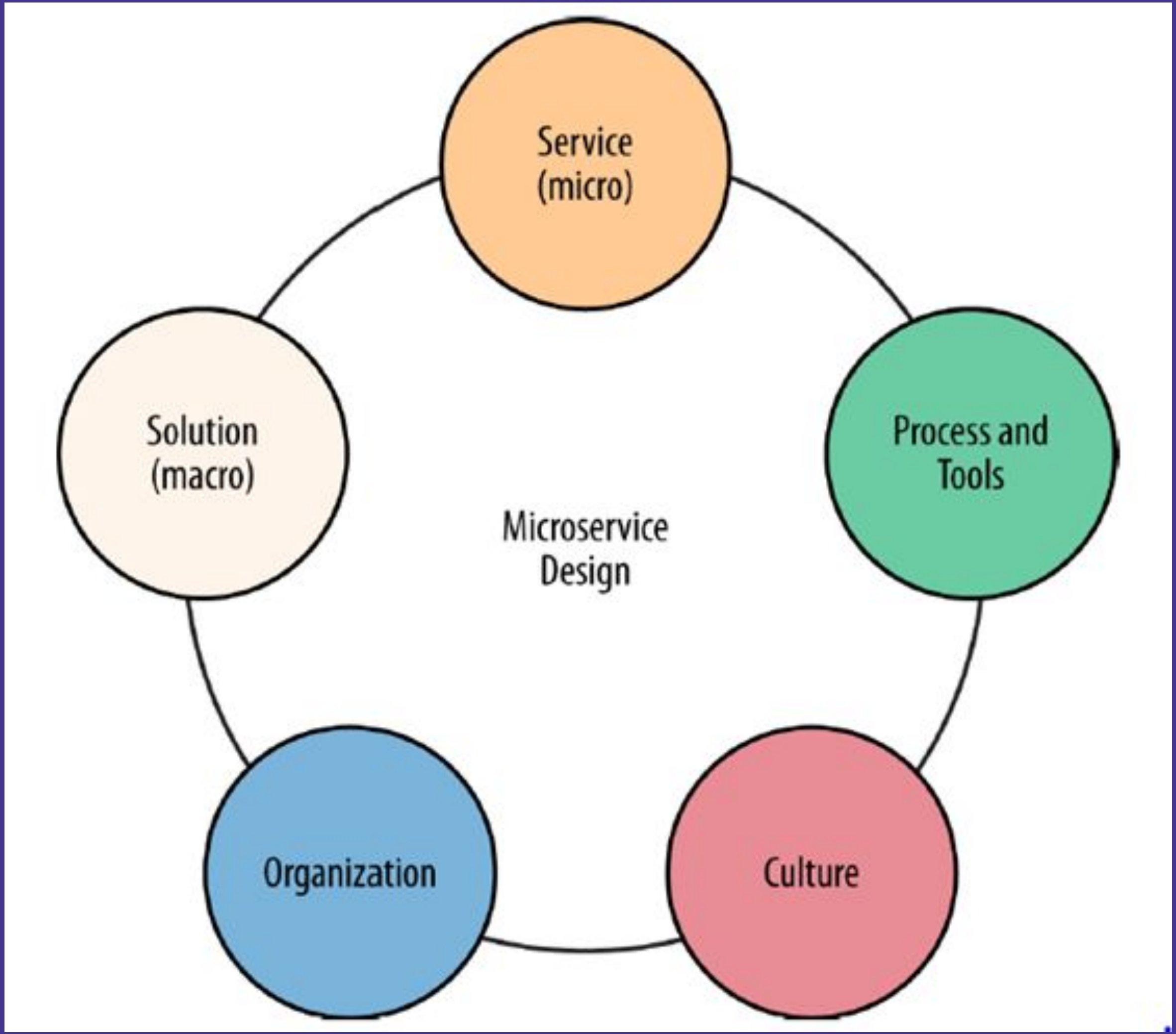


```
/**
 * Simple HelloButton() method.
 * @version 1.0
 * @author john doe <doe.j@example.com>
 */
HelloButton()
{
  JButton hello = new JButton( "Hello, wor
  hello.addActionListener( new HelloBtnList

  // use the JFrame type until support for t
  // new component is finished
  JFrame frame = new JFrame( "Hello Button"
  Container pane = frame.getContentPane();
  pane.add( hello );
  frame.pack();
  frame.show();            // display the fra
}
```

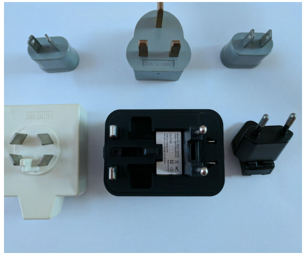
Culture beats code




Service (micro)
Solution (macro)
Process and Tools
Microservice Design
Organization
Culture

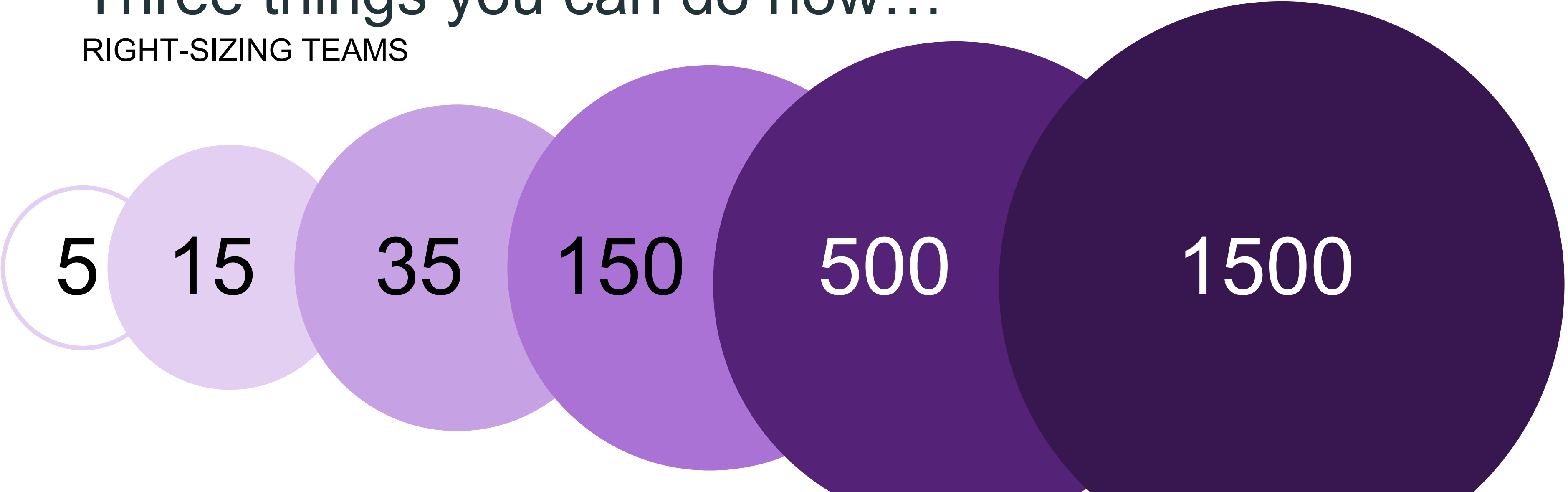
Three things you can do now…

1. Right-size your teams
2. Recognize Conway’s Law
3. Enable unplanned innovation



Three things you can do now…

RIGHT-SIZING TEAMS



5

15

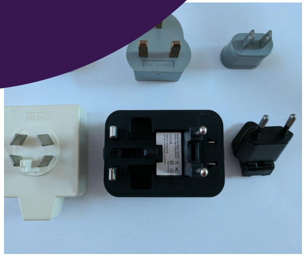
35

150

500

1500

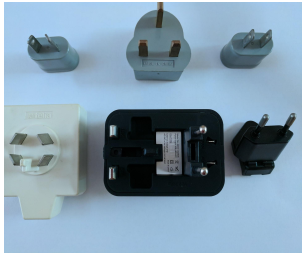
Dunbar’s Number



Three things you can do now…

RIGHT-SIZING TEAMS

Aim for a team size of Dunbar Level 1 (5), possibly Dunbar Level 2 (15)

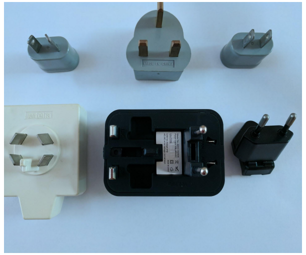


Three things you can do now

CONWAY'S LAW

"A system's design is a copy of the organization's communication structure."

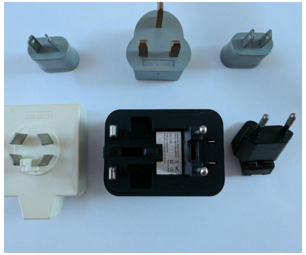
-- Mel Conway, 1967



Three things you can do now…

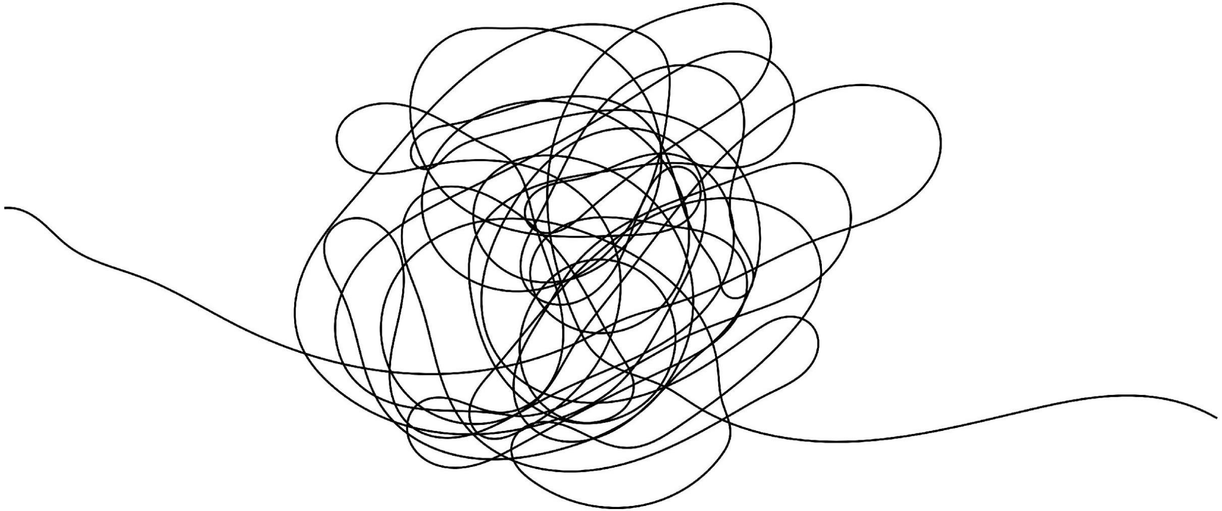
CONWAY’S LAW

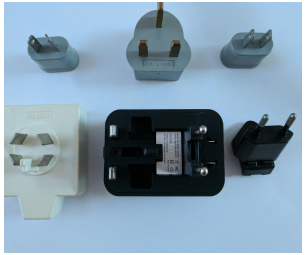
If you have to hold a release until another team is ready, you are not an independent team.



Three things you can do now…

UNPLANNED INNOVATION

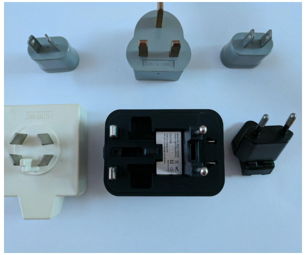




Three things you can do now…

UNPLANNED INNOVATION

“If you want to achieve greatness, stop asking for permission.”

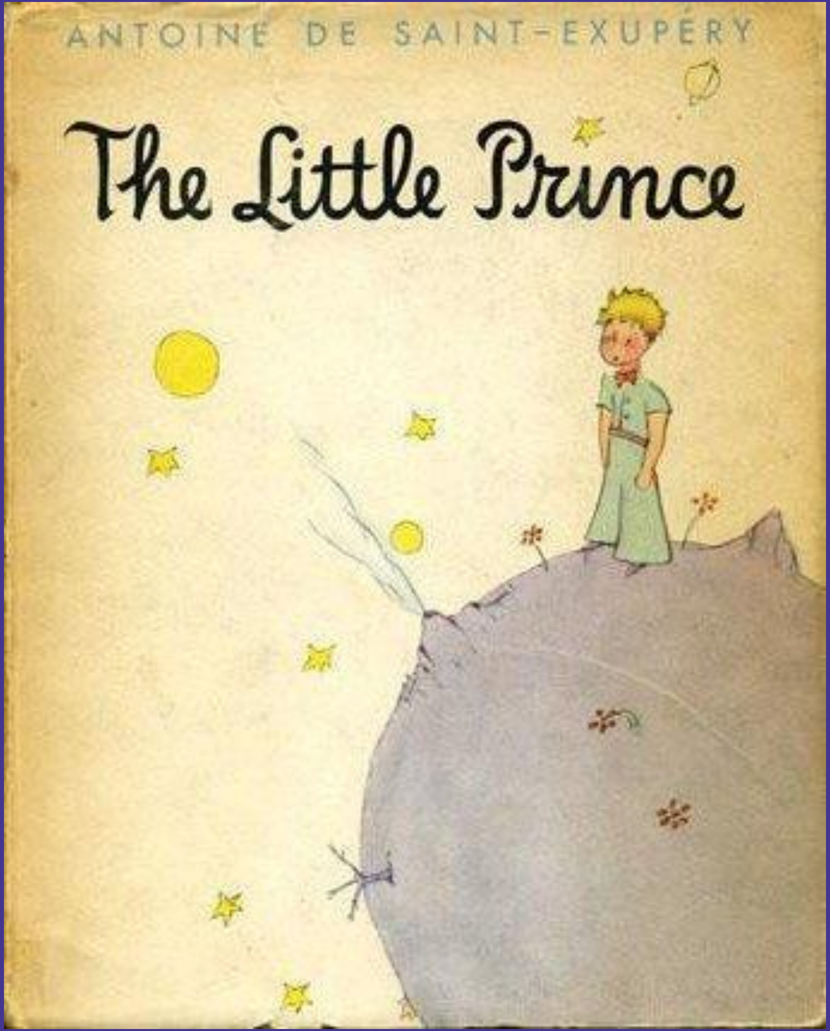


Ask yourself…

How long would it take your organization to launch ***a new product****?*

Do you do this on a repeatable, reliable basis?

One More Thing...


ANTOINE DE SAINT-EXUPÉRY
The Little Prince

Antione de Saint-Exupery (1900-1944)

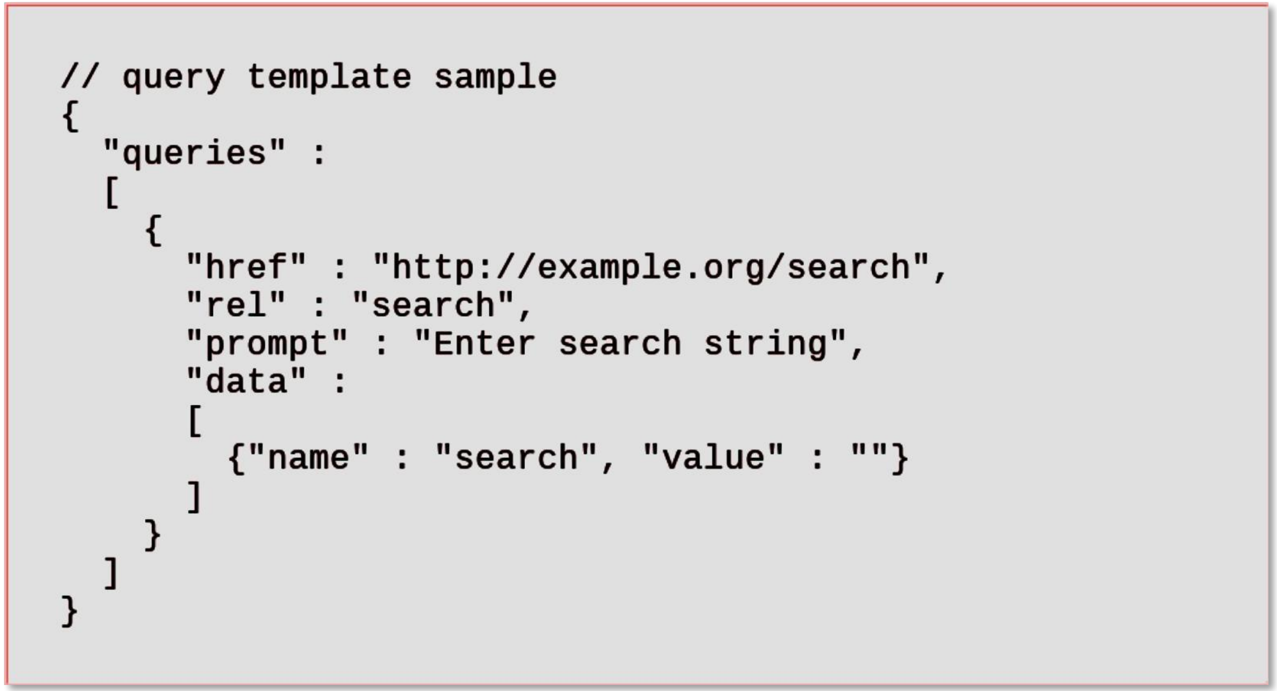
“If you want to build a ship, don’t drum up people together to collect wood and don’t assign them tasks and work, but rather teach them to long for the endless immensity of the sea.”

So…

Follow the Microservice Way

Harmonizing Speed and Safety at Scale

Leverage the power of API design



```
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      "data" :
      [
        {"name" : "search", "value" : ""}
      ]
    }
  ]
}
```
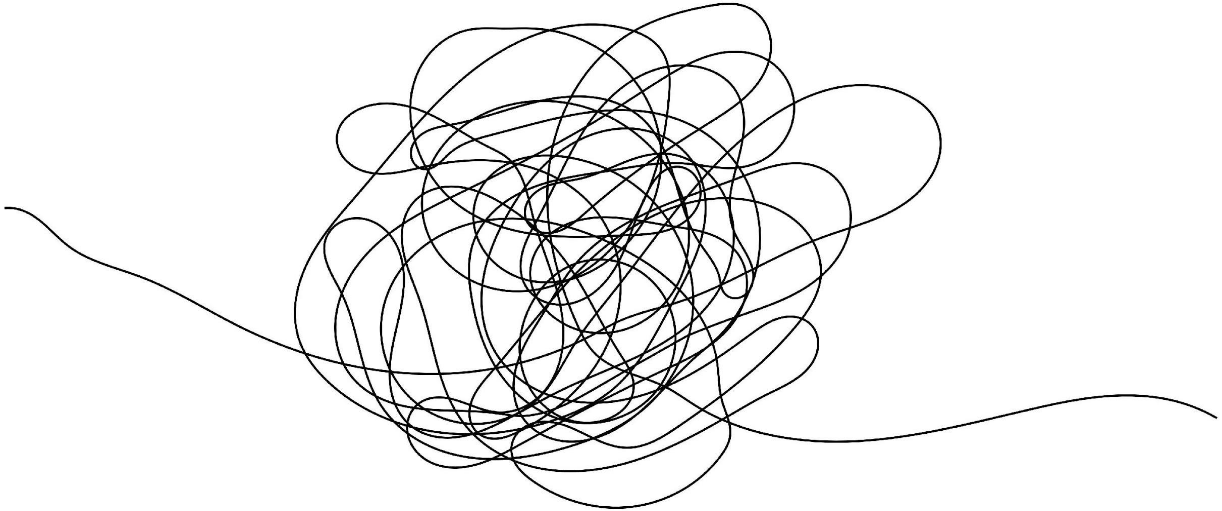
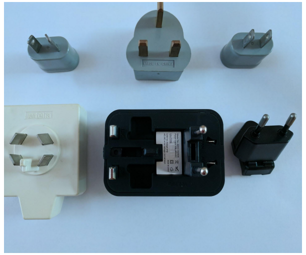

Recognize the value of unplanned innovation





Ask yourself…

Ask yourself…
How long would it take?

Driving Digital Transformation at Speed

Microservices, APIs, and Innovation

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Lead API Architect
API Academy, CA Technologies
@mamund #mcaTravels