

# Creating Imaginary Things

[https://commons.wikimedia.org/wiki/File:Mandel\\_zoom\\_08\\_satellite\\_antenna.jpg](https://commons.wikimedia.org/wiki/File:Mandel_zoom_08_satellite_antenna.jpg)

# I'm Damien



- Senior Software Development Manager at Amazon Brisbane
- Responsible for Amazon Grocery Post-Order Customer Interaction
  - When things go wrong my teams fix it
- UQ Software Engineering Grad (2002)
- Used to do a lot with rich text editors and open source
- R&D Exec, Dev Manager, Product Manager, (Very Rusty) Developer
- Just completed Horizon Forbidden West
- Find me on LinkedIn - [linkedin.com/in/dpfitzpatrick](https://linkedin.com/in/dpfitzpatrick)

# About Amazon Brisbane

- Yes Amazon does development in Brisbane
- ...yes Brisbane, yes really!
- World-wide (but not Australia) Grocery
- Groceries are tricky
  - Meltable, squishable, crackable, perishable
  - Rapid and *local* delivery
  - High standards – because people eat it
  - Low margin products
- Amazon now has several dev teams in Brisbane



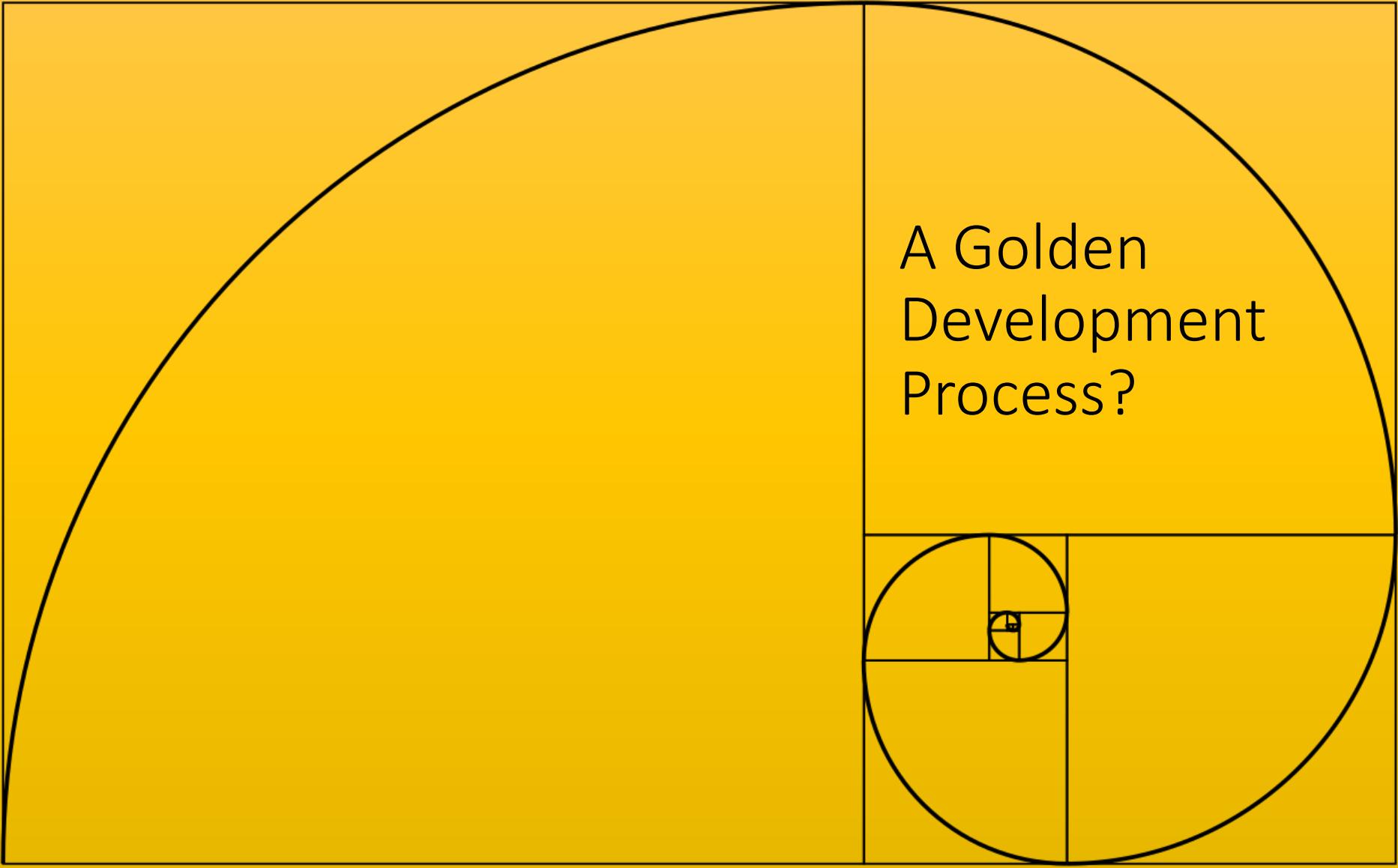
A photograph of a complex wooden mechanical device, possibly a Rube Goldberg machine or a large-scale wooden gear system. It features numerous wooden beams, gears, and a small red bird figurine perched on one of the tracks. The device is set against a background of more wooden structures and a circular emblem with a gear and a bird.

Why Have a Dev Process?

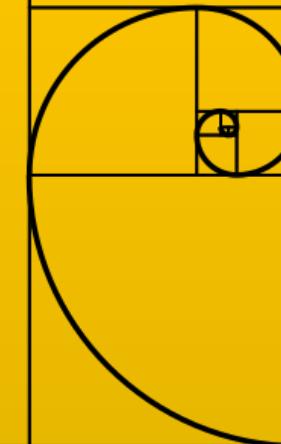
A detailed photograph of a complex wooden mechanical model, likely a clock or a gear train. The model is composed of numerous interlocking wooden gears of various sizes and shapes, all mounted on a light-colored wooden frame. A prominent feature is a large circular gear in the center. A small red button is visible on one of the wooden beams. The background is slightly blurred, emphasizing the intricate details of the wooden mechanism.

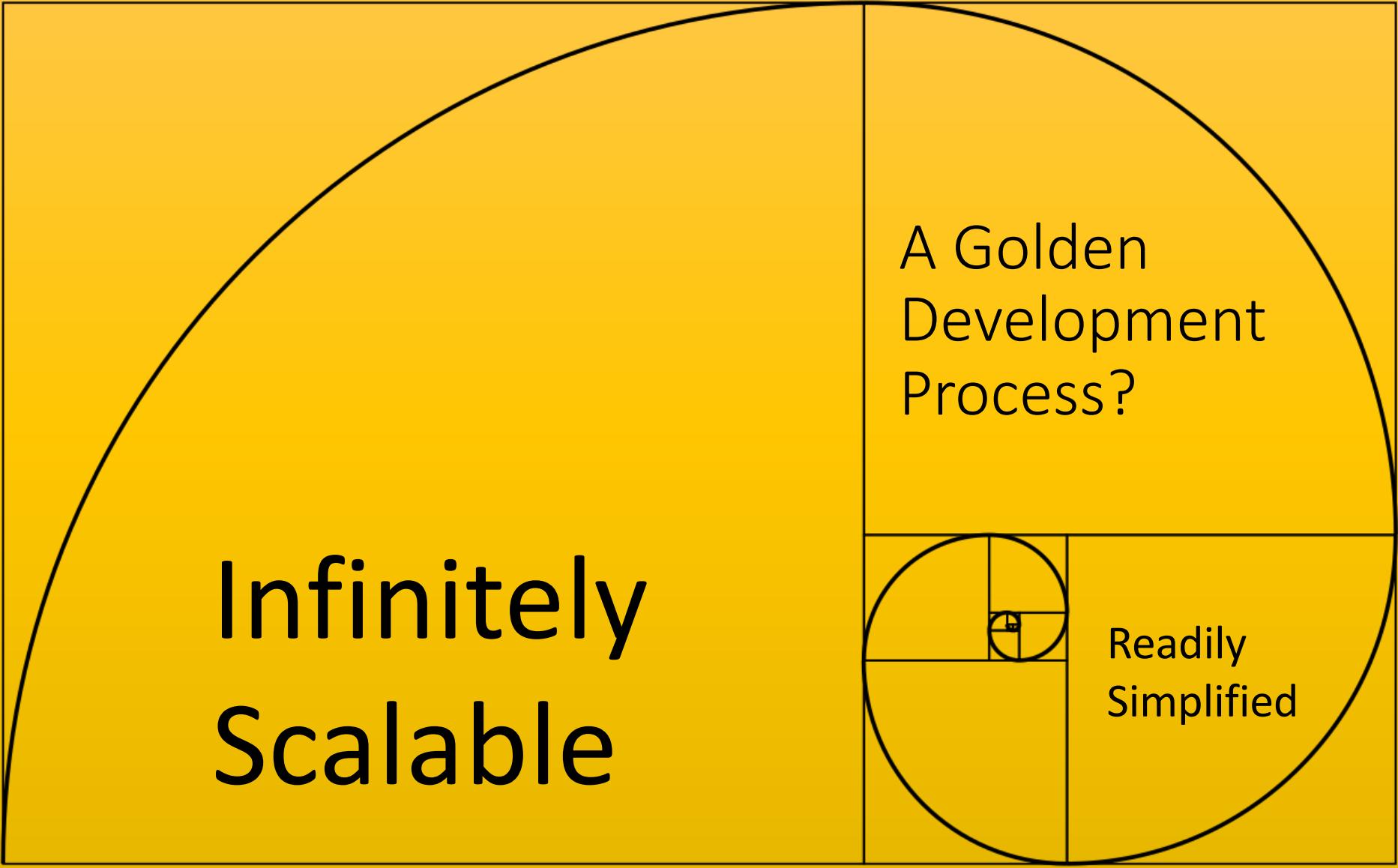
Why Have a Dev Process?

Enable teams to repeatably build  
complex, quality software



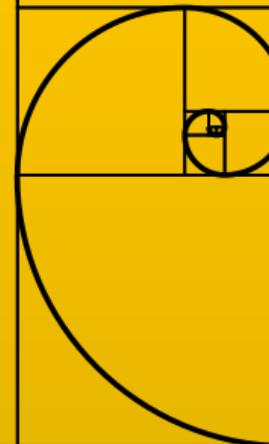
A Golden  
Development  
Process?





Infinitely  
Scalable

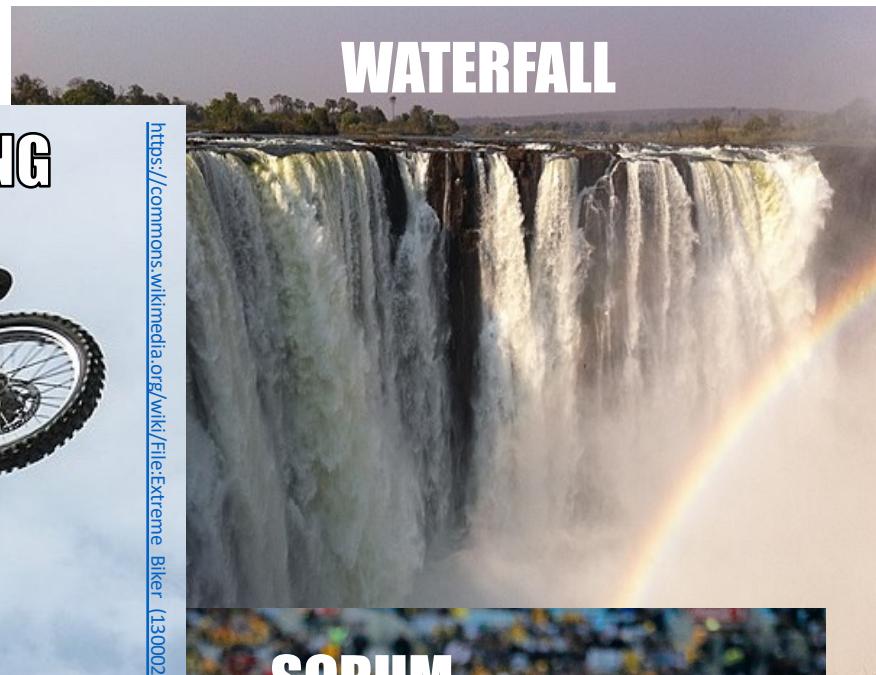
A Golden  
Development  
Process?



Readily  
Simplified



## EXTREME PROGRAMMING

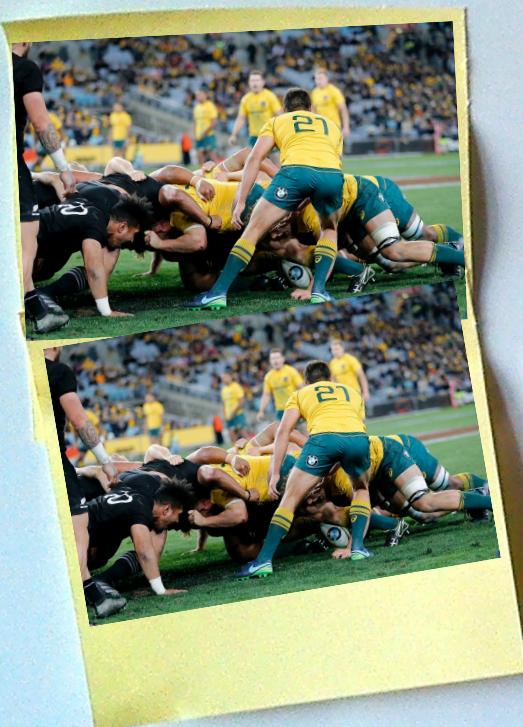


# Our Dev Process...

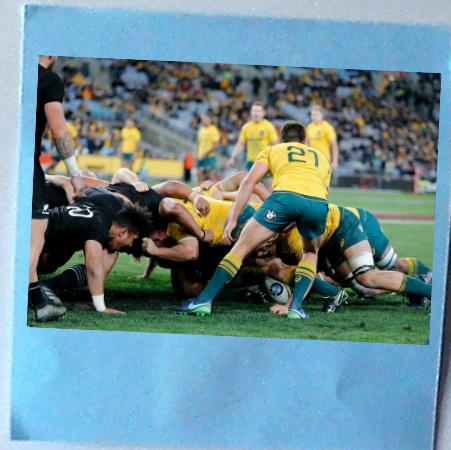
## Until We Think of a Better One

- No Amazon-wide mandate on:
  - How to design software
  - Coding language
  - Code Reviews
  - Testing
  - Monitoring
  - Project Management
  - Documentation
  - Architecture
- Ownership let's people believe in their work.

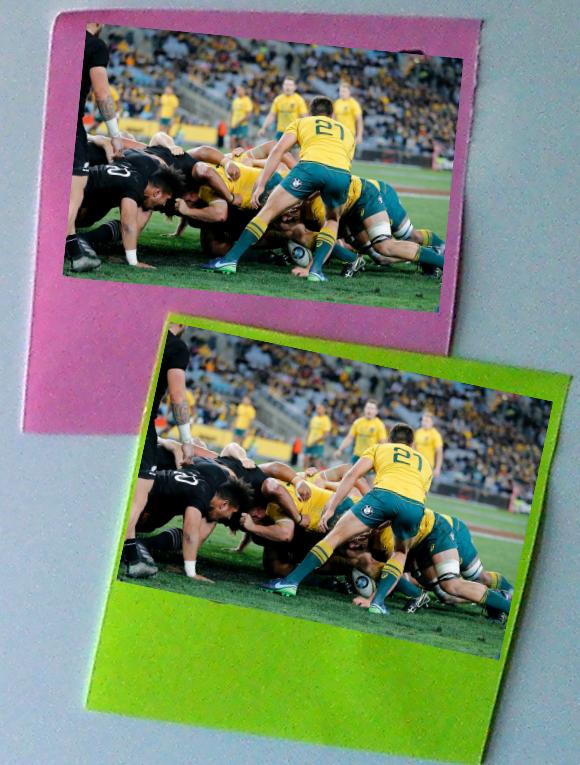
To Do



Doing



Done



ScrumBan?  
KanScrum?

<https://commons.wikimedia.org/wiki/File:Simple-kanban-board-.jpg>

# Signs of a Good Process

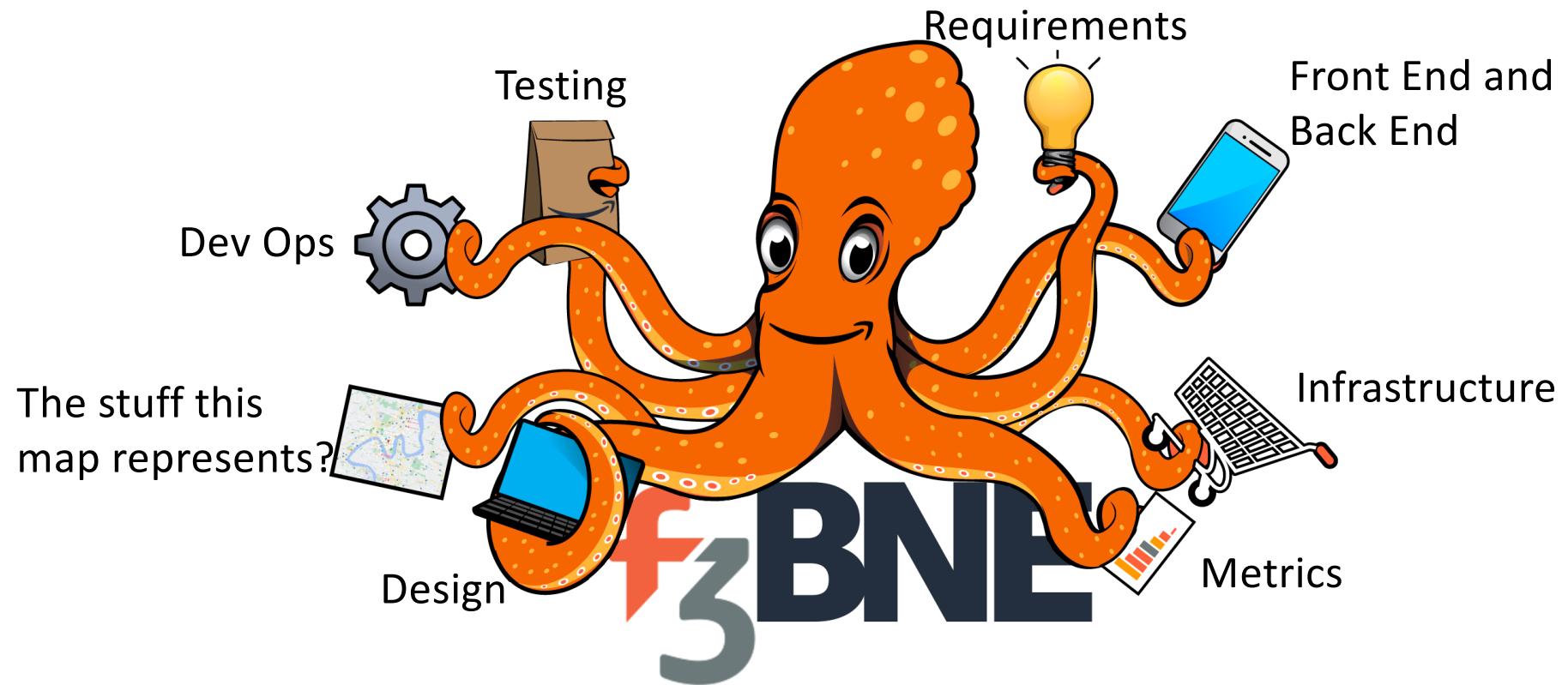
- It's repeatable
- It's adaptable
- Doing the right thing is easy
  - Easy builds
  - Test automation
  - Deployment automation
- It continually improves using metrics and feedback loops

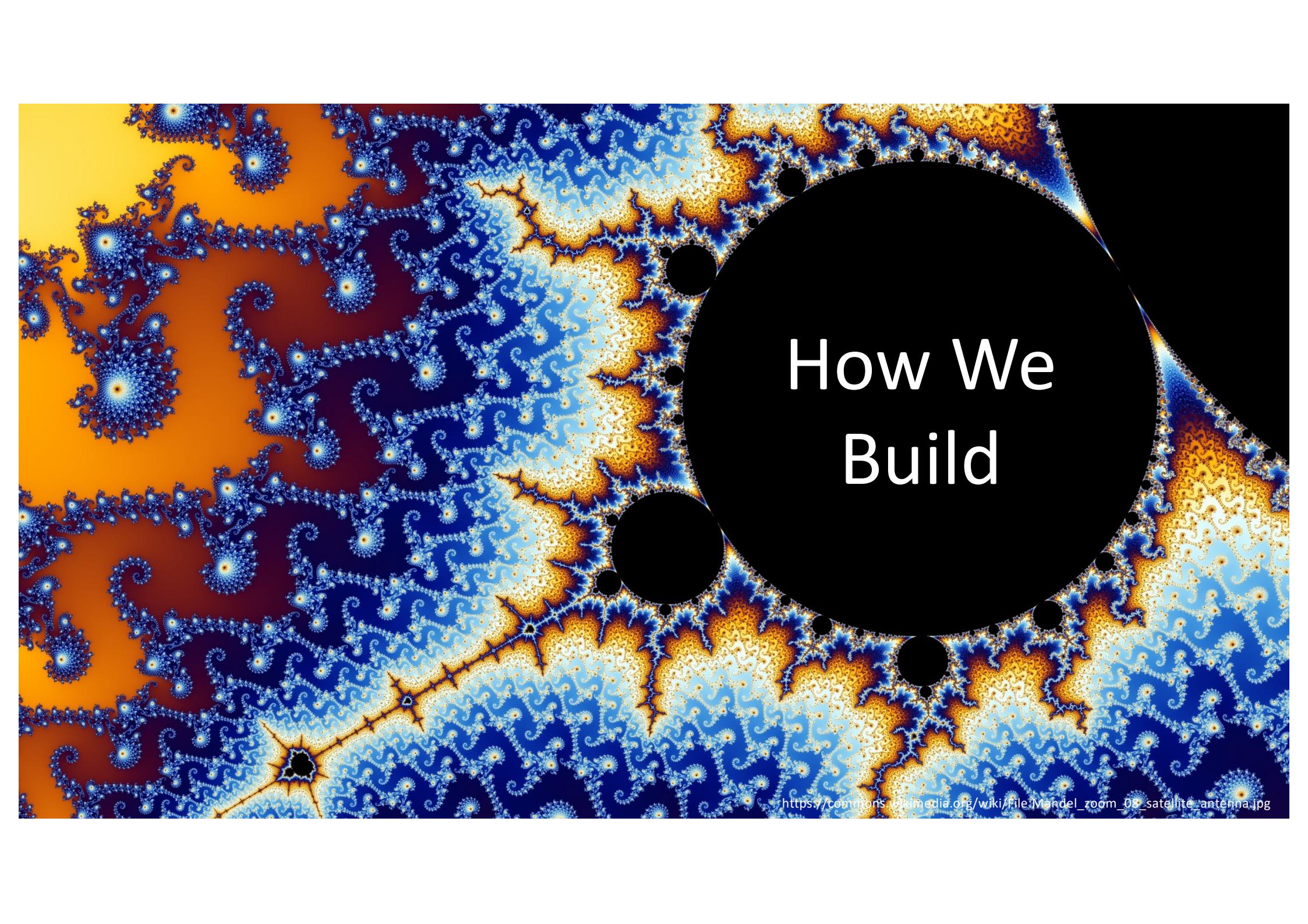
Not the “Right” Way



Just Our Way

# Teams Do All The Things



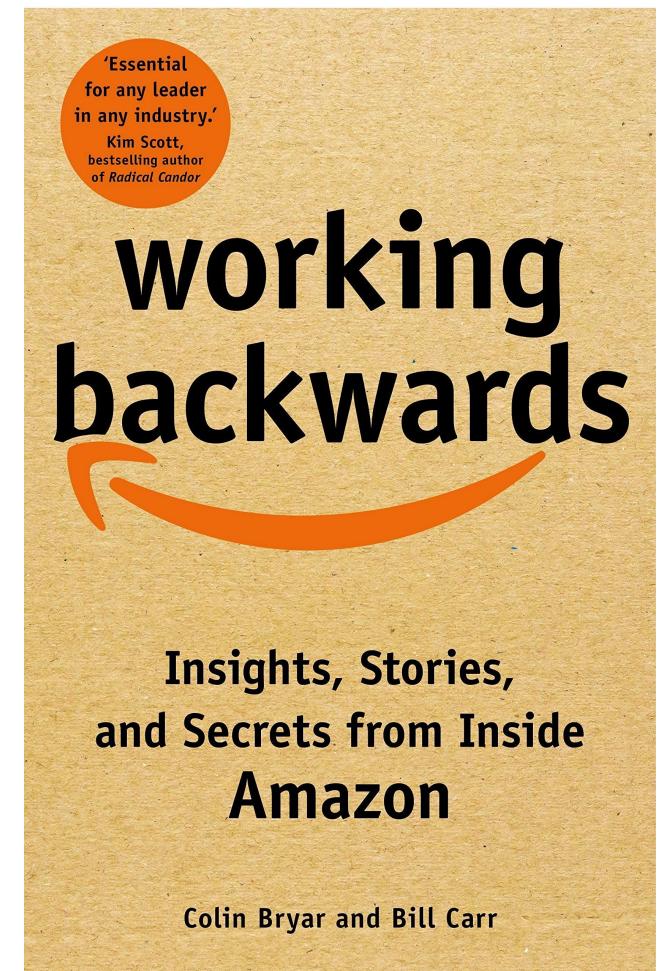
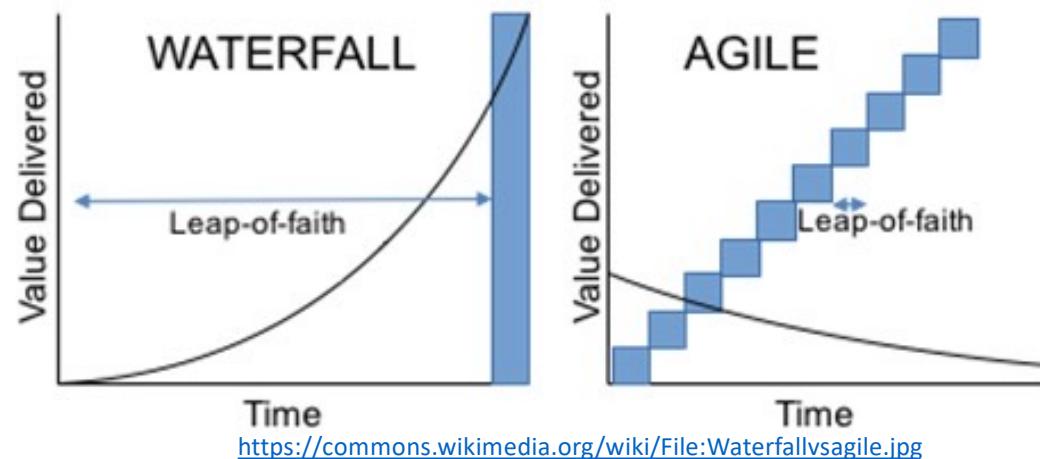


# How We Build

[https://commons.wikimedia.org/wiki/File:Mandel\\_zoom\\_08\\_satellite\\_antenna.jpg](https://commons.wikimedia.org/wiki/File:Mandel_zoom_08_satellite_antenna.jpg)

# Working Backwards from the Customer

- How do we want the customer to benefit?
- No fancy pitch - we start with a document
- Focus on delivering value sooner than later
- Understand what result we expect and how to measure it

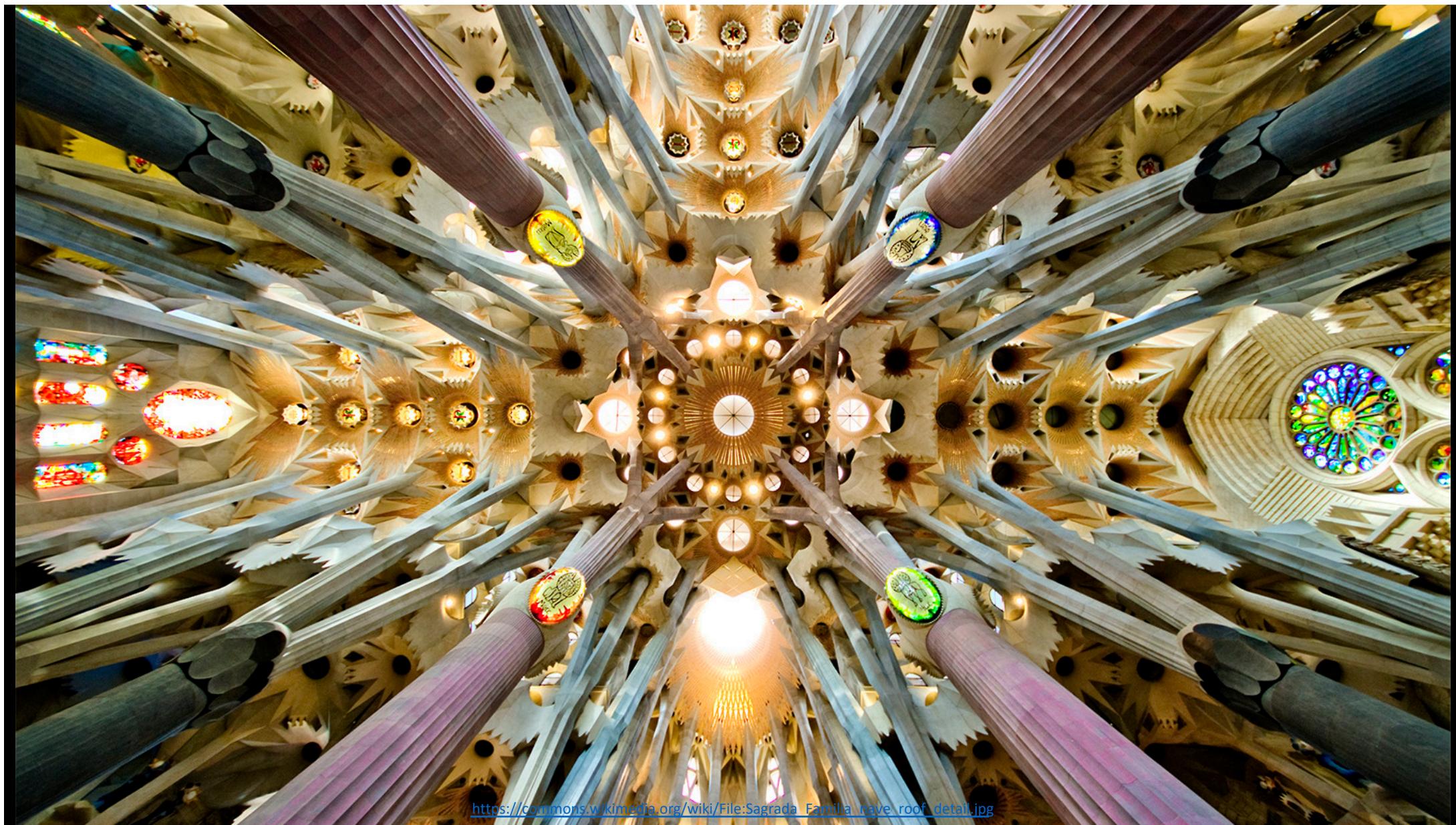


# Software Requirements via Experiments

- Hypothesis - If we build this users will do that
- Instrument software to measure result
  - Historical analysis of current data
  - Exploratory data analysis for ML models
  - A/B test with split user populations
- Reason about functionality in a scientific way
- Verifies that you're building the right thing
- This approach requires data driven by usage
  - i.e. you have to reach statistical significance

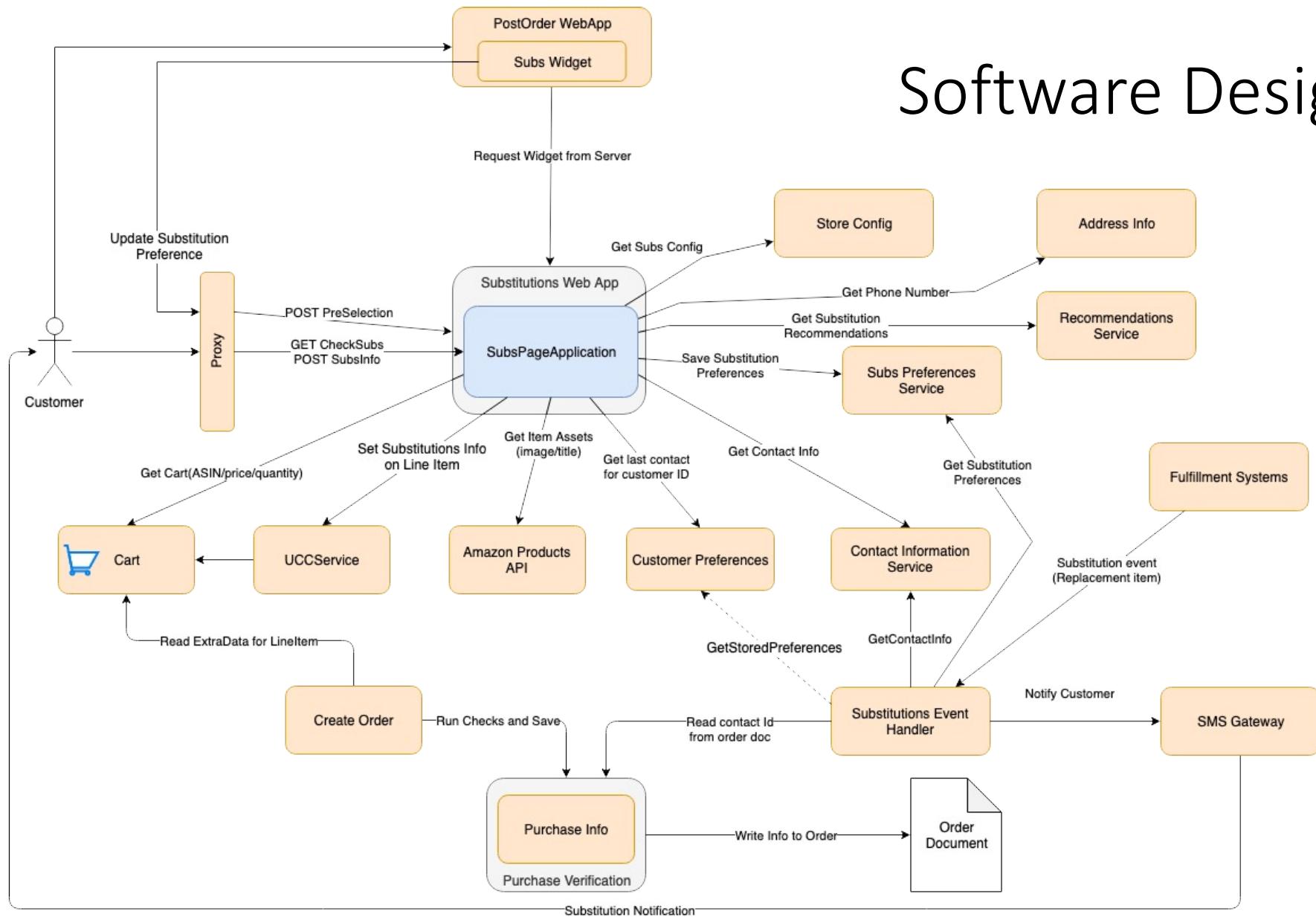


CMS Experiment at the LHC, CERN  
Data recorded: 2012-May-13 20:08:14.621490 GMT  
Run/Event: 194108 / 564224000

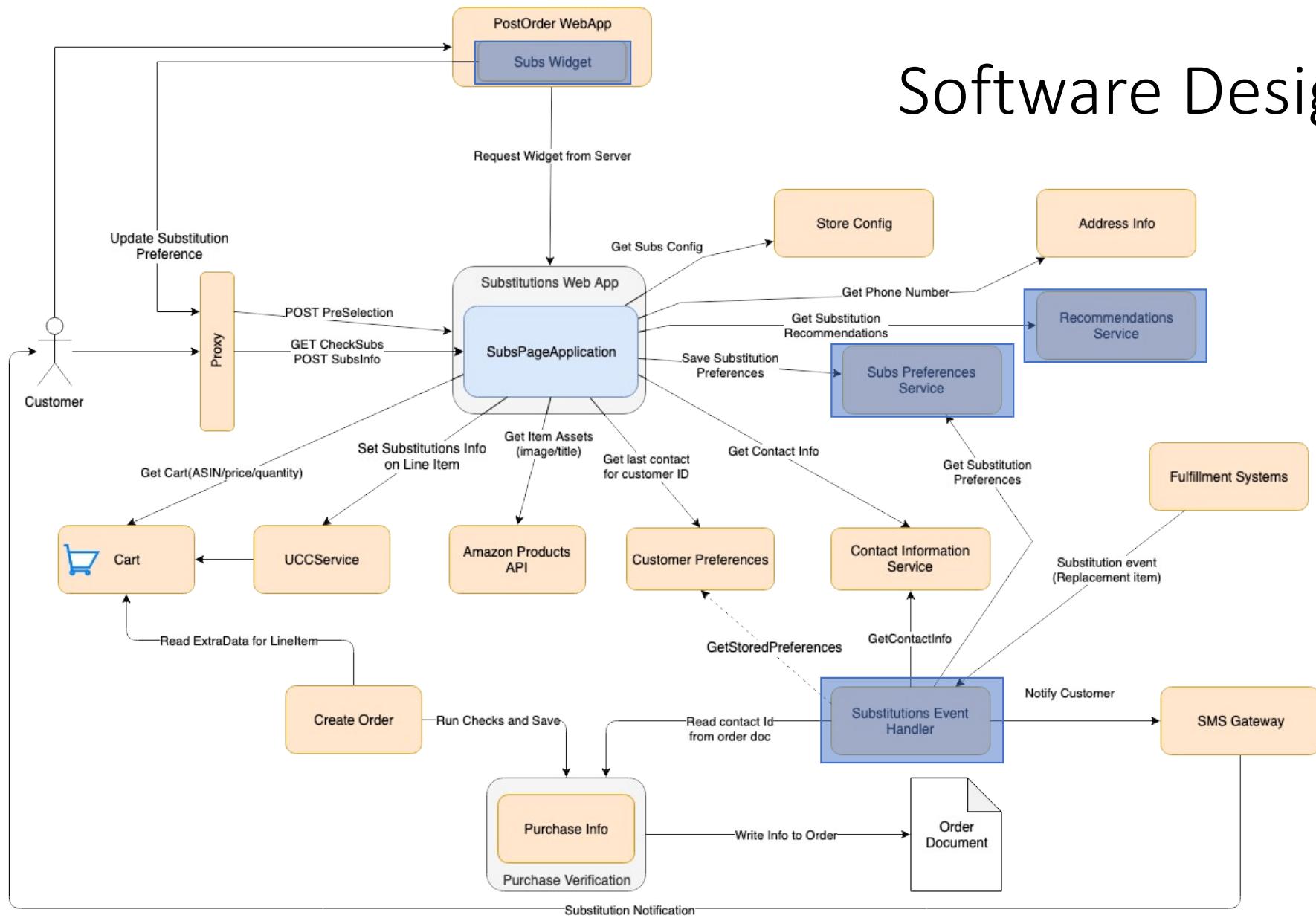


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# Software Design



# Software Design



# Why Do We Design?

- It resolves ambiguity and creates a shared understanding
  - Within our team and beyond
- Interaction with other components, classes or services
- Information flows around the system
- Think ahead to the first 3 use cases
- What we need to build and what we can reuse
- Start to understand the task breakdown for development

# OK, Can We Write Code Yet...?

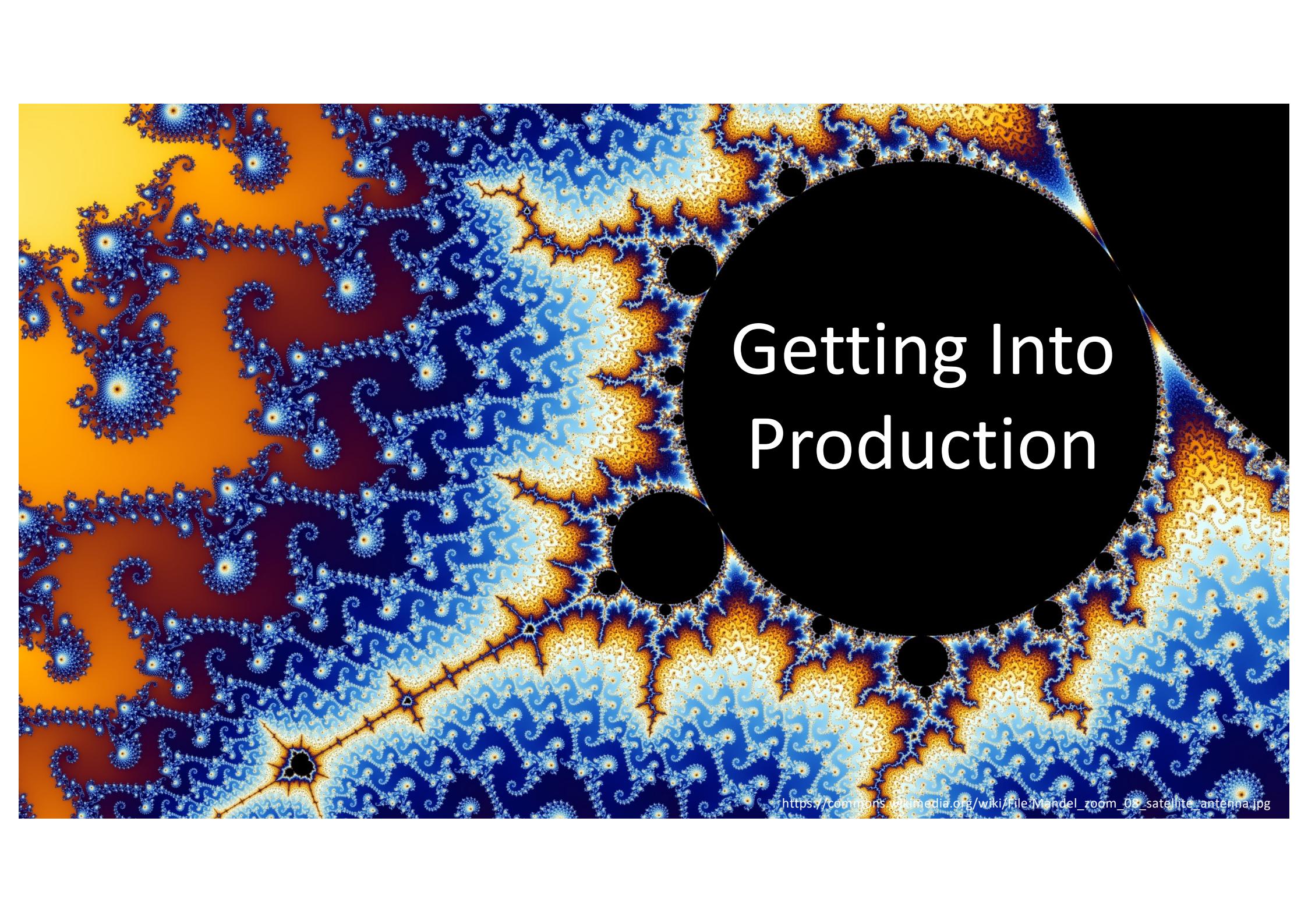
## Not Quite - Task Generation Time

- Inputs to “The Board”
- Break down into discrete units of work
- Determine what can be done in parallel and in what order
- Estimate each task – 1,1,2,3,5,8,13?
- Any task longer than 3 days needs further breakdown
- Enough to keep the team busy



# Code Quality and Testing

- Write unit tests and integration tests
- Run these on every checkin
- Verifies that your code is doing as you expect
- ...and continues to do what you expect
- Tests can be written ahead of code
  - Integration tests useful when developing in parallel



# Getting Into Production

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# Finishing Your Code Is the End of the Beginning

## From Pull Request to Production – May 19th

Charles O'Farrell, Amazon Software Development Engineer

- How do you maintain code quality in a team?
- Can you automate code quality?
- How do you deploy code at scale?
- How do you ensure your changes haven't broken something else?



# Feedback Loops and Requirements Verification

How do we know we have built the right thing?

- Interaction metrics – clicks, time on page, time to interact
- Business metrics – what needle do we expect to move?

How do we know that what we built is working?

- Is the service running? – API calls, operations performed
- Do we have a problem? – Error rates, resource utilization
- If we can monitor we can automate

Monitor as we release to production

- A/B test if we have built the right thing
- Verify operational metrics with progressive launches



# Sub-ststantial Learnings

We thought...

- Customers always want a sub (they don't)
- Customers would be unhappy without (they aren't)
- Opt out rates would be very low (they're not)
- The perfect substitute exists (it's subjective)

**Ensure your process has feedback loops and adapt!**

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## Substitution preferences

Continue

We use your number to text about your order with status updates or substitutions when an item is unavailable.

(980) 428-4881 [Change](#)

**How substitutions work**  
If an item is unavailable your shopper will suggest a similar item or substitute it with your selected item.

 You can accept or decline the substitution.

If you don't want substitutions, set your preferences below.

 Beckmanns Old World Bakery, Bread California Sourdough Large, 24 Ounce \$1.12  
[Substitute with best available](#) [Change](#)

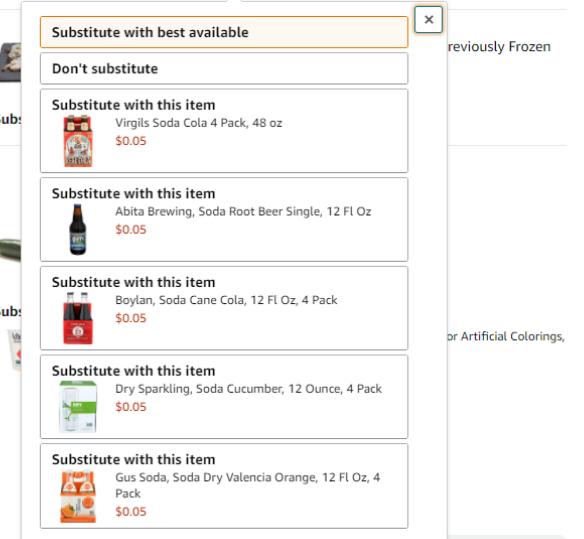
 Applegate Great Organic Beef Hot Dog Uncured, 14oz \$2.00  
[Substitute with best available](#) [Change](#)

 Organic Mixed Variety Heirloom Tomatoes \$1.00/lb  
[Substitute with this item](#) [Change](#)

 Organic Heirloom Tomato \$0.50  
[Substitute with this item](#) [Change](#)

 Bagged Small Avocados, 6 Count Bag \$2.50  
[Don't substitute](#) [Change](#)

 Virgil's, Soda Cream, 12 Fl Oz, 4 Pack \$0.05  
[Substitute with best available](#) [Change](#)

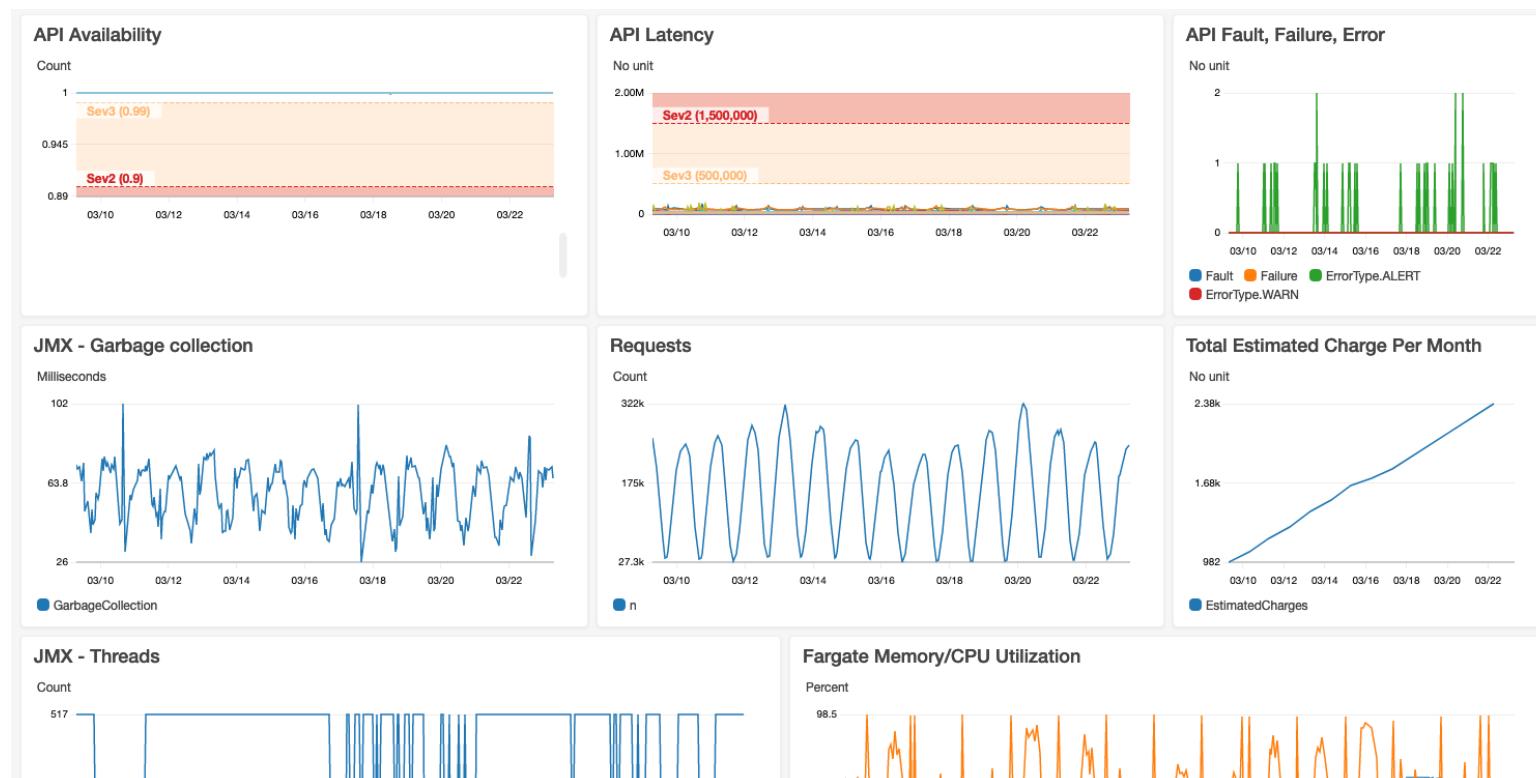
  
Previously Frozen  
Substitution preferences:  
Substitute with best available  Don't substitute Substitute with this item Virgil's Soda Cola 4 Pack, 48 oz \$0.05  
Substitute with this item Abita Brewing, Soda Root Beer Single, 12 Fl Oz \$0.05  
Substitute with this item Boylan, Soda Cane Cola, 12 Fl Oz, 4 Pack \$0.05  
Substitute with this item Dry Sparkling, Soda Cucumber, 12 Ounce, 4 Pack \$0.05  
Substitute with this item Gus Soda, Soda Dry Valencia Orange, 12 Fl Oz, 4 Pack \$0.05

Continue

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# Knowing What Healthy Looks Like





### Summer Intern Program

Penultimate Year Students  
Applications are open now

Internship commences on December through to  
February 2023.

- **Work on production systems**

- 9-10 weeks full time paid work placement
- Network within the business and gain valuable experience
- Challenging projects, impactful projects
- Opportunity to pipeline as priority to a graduate offer!



### Graduate Program

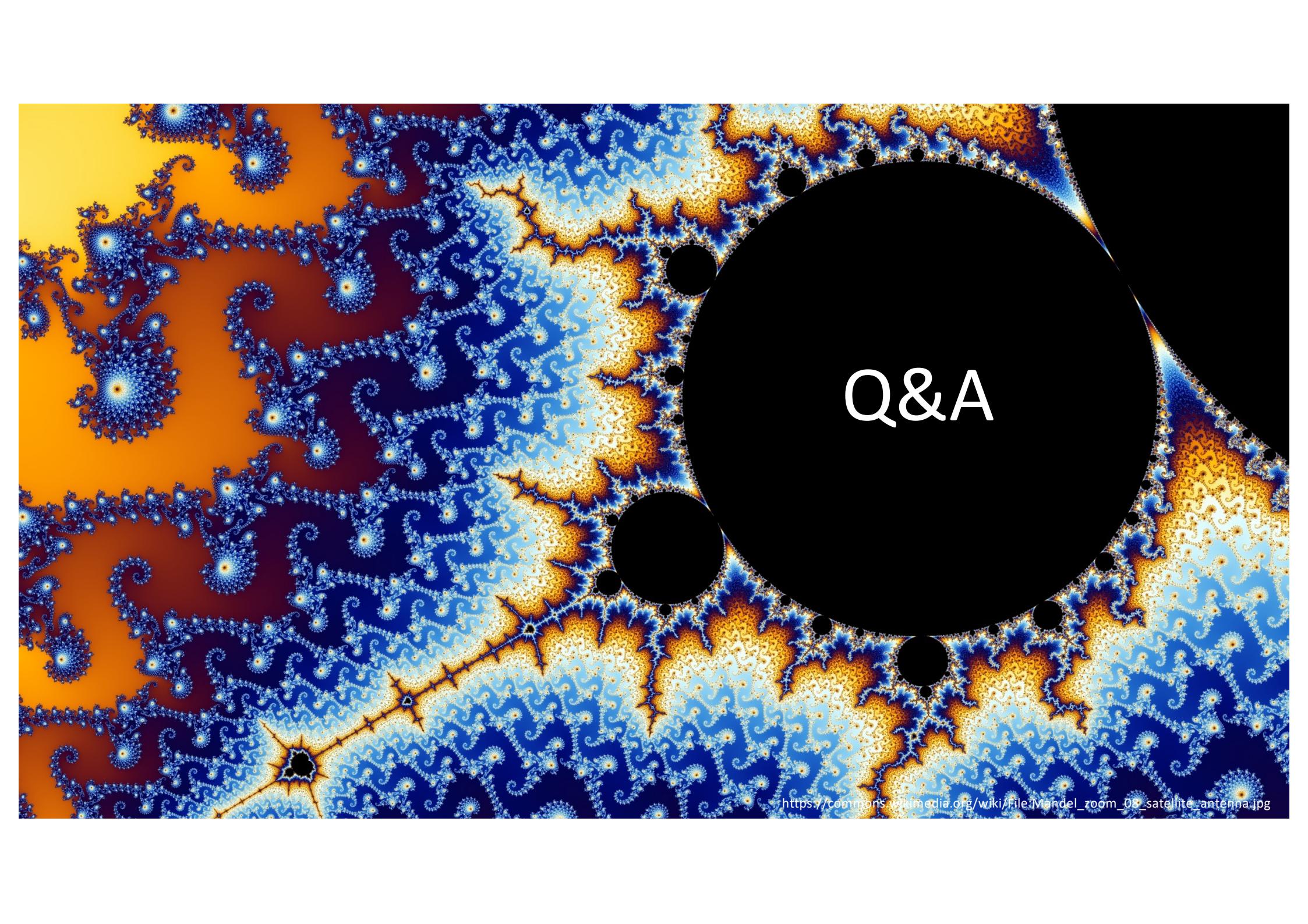
Final Year Students

Applications are open now for 2023, closing April 12th

3 intakes for Graduate roles – January, March and  
August every year

- Graduate offer is a full-time permanent role
- Business Unit specific certifications to gain technical skills to succeed in your role.
- Competitive salary and staff benefits!





Q&A

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