

# Introduction

# Service Oriented Architecture

Oxford University  
Software Engineering  
Programme  
December 2018



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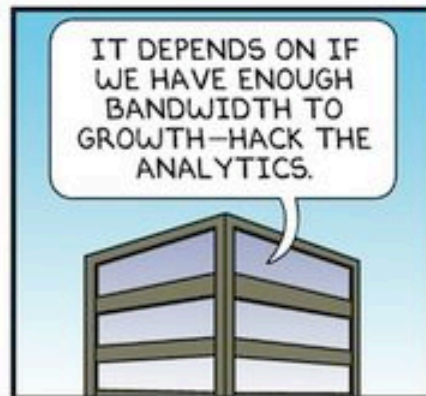
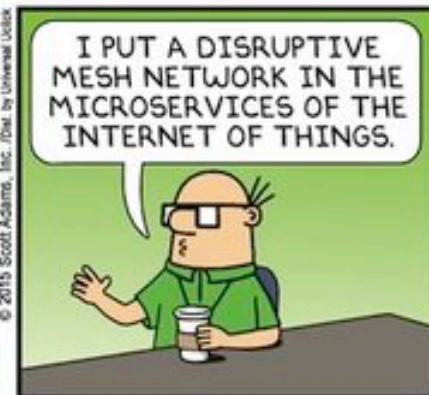
# Introduction

- Aims
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- Rules of Engagement
- Introductions



# DILBERT

BY SCOTT ADAMS



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# Apologies for the Jargon

- There is a lot!
  - Microservices, SOA, DevOps, REST, SOAP, WSDL, Swagger, JSON, XML, OAuth2, TLS, etc
  - Please ask if I fail to explain an acronym



# Aims

- To understand:
  - Benefits and challenges of SOA
  - Services, Microservices and APIs
  - Security models
  - Mediation, Composition, Governance
- Implementation of
  - REST based services
  - Event based architectures
  - gRPC and binary protocol based services
  - Microservices
  - Mediation and BPMN flows
  - OAuth2 and SSL secured services
  - API Gateways and clients



# Pre-requisites

(Some familiarity required)

- Languages: Java, Node, Python
- Data formats: JSON and XML
- Tools: Unix shell, Eclipse, Text editors



# Contents

- Overview and course outline
- Case studies and motivations
- REST introduction
- REST example flows
- Advanced REST
- SOAP and WSDL
- Microservices architecture
- Event Architectures
- gRPC and binary protocols
- Deployment, DevOps, containers and cloud-native applications
- Integration and ESBs
- Security
- API and API Management
- Orchestration and Choreography
- Governance
- Overview, futures, recap



# Practicals

- A. My aim is to have **more** practicals than is reasonable:
- Some people finish early, so there are extensions and bonus practicals for them.
  - You might even wish to do more at home?!?
- B. The practicals are quite directive to start with:
- This is a complex area with a lot to cover.
  - Extensions are more freeform.
  - *You need to **think** and not just do as I say to get the most out of them.*







**"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."**

# Practicals

- Basic HTTP server and client
- HTTP service in Java
- Evolving the Richardson Maturity Model towards a RESTful service
- Microservice and Docker deployment
- SOAP interaction
- Mediation flow with SOAP
- SSL and OAuth2 security
- API Management and Analytics
- BPMN workflows
  - Plus some bonus exercises



# Resources

- Weerawarana et al, *Web Services Platform Architecture*, (Pearson, 2005)
- Erl, *SOA* (Prentice-Hall, 2005)
- Richardson and Ruby, *RESTful Web Services* (O'Reilly, 2007)
- Webber et al, *REST in Practice* (O'Reilly, 2010)
- Fielding, *Architectural Styles and the Design of Network-based Software Architectures*, (University of California, 2000)
- Various W3C, OASIS, IETF, OMG standards



# Rules of Engagement

- Ask questions as we go along
  - We will “park” any that are better answered later
  - **Don’t wait till the end to ask or raise concerns**
- Timings are flexible
- Please keep mobile phones silent or better still turned off
- If you have improvements or bug reports, please submit issues or pull requests:
  - <https://github.com/pzfreo/ox-soa2/issues/new>



# Paul Fremantle

- CTO and Co-Founder of WSO2
  - An Open Source SOA and API focused company
- Previously Senior Technical Staff Member, IBM WebSphere architecture
- Co-Chair Web Services Reliable eXchange at OASIS (WSRM)
- VP, Apache Synapse and Member of ASF
- MA in Maths and Philosophy
- MSc in Computation (here)
- PhD in Computing – IoT privacy and security



# You?



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# Approximate Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
Introduction	Evolving REST practicals	Docker and DevOps	API Management	Design Exercise
Case Studies and motivation	REST Description  Advanced REST	Async and Events	Integration	Conclusions
REST Introduction	SOAP and XML	Binary / gRPC	Composition	
REST example flow	Microservices	Security	Governance and Org	



# Let's get started



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