

# How we Build Software

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The IBM logo, consisting of the word "IBM" in its signature blue sans-serif font.

## Agenda

Introduction

Project lifecycle

– Vision

– Plan

– Develop

– Deliver

– Support

– Manage Evolution

Key considerations

Summary

# Introduction

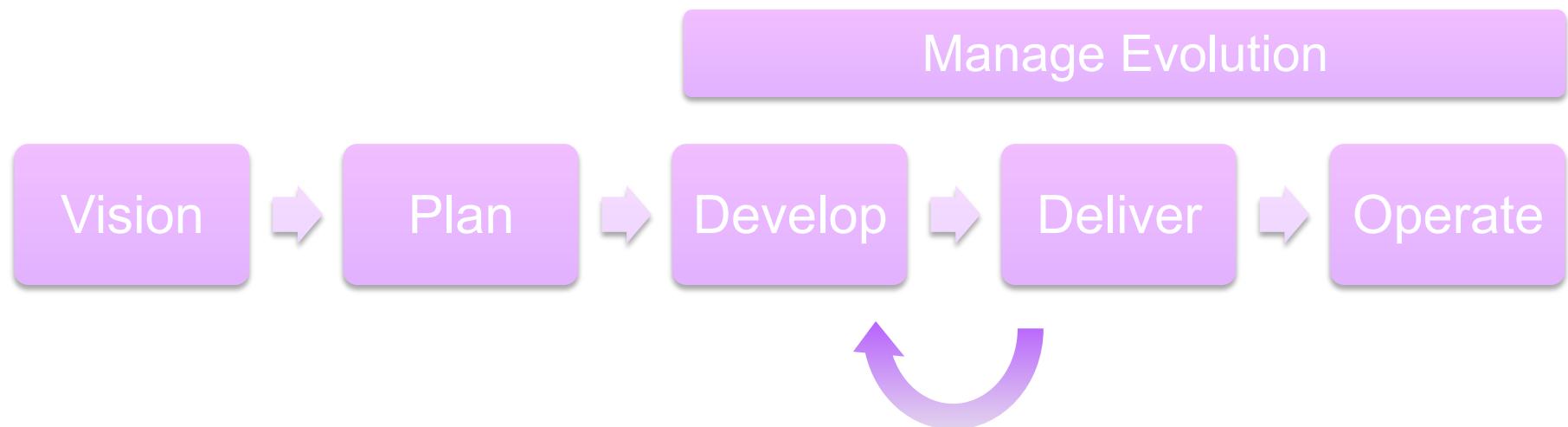
- **Me**
  - Paddy Fagan, BSc Advanced Software Engineering, UCD (and BA Computer Electronic Engineering, TCD)
  - 20+ years in software industry, 15 years in Cúram Software, 5+ years in IBM
  - Career path: Developer, Team Leader, Manager, Architect, Senior Technical Staff Member (STSM)
- **IBM**
  - Over 100 years old, operates in 170+ countries, 350,000+ employees, annual revenues approx. \$79 billion.
- **Watson Health**
  - Our purpose is to improve lives and give hope by delivering innovation to address the world's most pressing health challenges through data and cognitive insights.
- **Watson Care Manager**
  - SaaS offering, business application used to manage care across clinical, human services and judicial organizations.

# Project Lifecycle

# Project

- **More than software**
  - A successful project is about more than the software, its about
    - Having the right offering
    - Getting it to market
    - Selling it
    - Operating it
    - Supporting it
    - Evolving it
- **More than engineering**
  - A successful project team draws on many professions/disciplines
    - Offering Management, Project Management, Business, Design, Test, Operations, Support, Sales & Marketing, Pricing, Legal....

# Lifecycle



## Vision

- From expressed or assumed need(s) to a clear vision
  - IBM has a process called Design Thinking
  - Engineering, Business, Marketing and Design teams collaborate to produce a clear vision
  - The aim is to produce a ‘to be’ vision of how the users of the software should work
  - They use wiki's, Post Its™, screen mock ups, docs, presentations, etc
  - This phase also includes a ‘Technical Foundation’ where we start to elaborate the high-level technical activities that are needed.
- Understand and express the architectural risks, via an Architectural Description (AD)
- A ‘Hills Playback’ is used to share and agree this vision with all stakeholders.

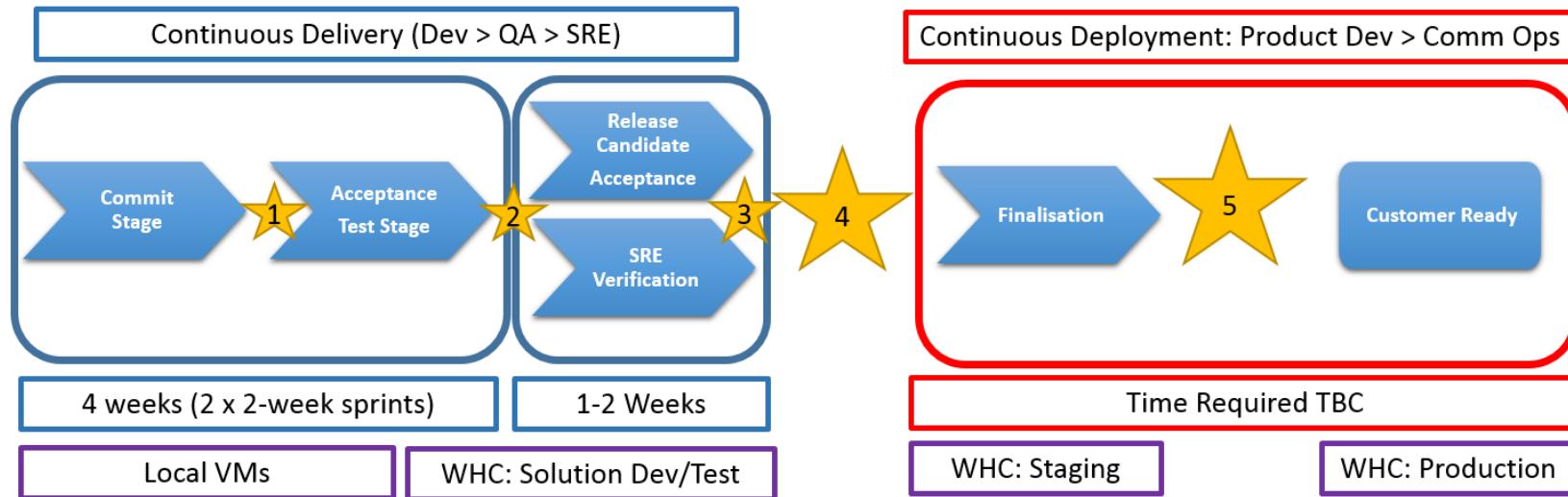
## Plan

- From the vision to a set of activities
  - We map the vision down to story boards, folding in activities identified in the AD and in that identify the following ([link](#))
    - EPICs (theme's, sub-hills)
    - Features (user identifiable features)
    - Plan Items (development iterations)
    - Stories (development sprints)
  - These get recorded in Rational Team Concert (Jazz)
  - This process also includes Test, Documentation (Information Development) and Deployment.
- A ‘Playback 0’ is used to share and agree this elaborated vision and plan with all stakeholders.

## Develop

- Stories get developed, tested and business verified
  - Developers use: Eclipse (Java), Ration Software Architect (UML), RTC, tomcat, DB2, JUnit, Selenium, CheckStyle, SonarCube, etc
  - Builders run using Jenkins/Build Forge
    - Automated progression criteria, test pass, test coverage, policing
    - Scripting (Gradle) & Artifact repositories (Artifactory)
  - Deployed for testing (WebSphere & DB2)
  - Functional Verification Test (FVT - does it do what we said it would)
  - System Verification Test (SVT - have the non functional requirements been met)
  - Business verification – can a user meet their business need.
  - Peer code reviews, sample reviews by senior developers.
- For each iteration there is a ‘Playback N’ to share and agree the content developed so far with all stakeholders.

# Deliver



## Events & Checkpoints:

- 1: Automated development test gates (nightly)
- 2: Release Candidate published (internal to ABPD)
- 3: Release Candidate quality checkpoint – internal prep for handshake
- 4: Product Development to Commercial Operations Handshake
- 5: Deployment Readiness Review

## Operate

- Deploy
  - Software, Configuration, documentation
- Monitor
  - What's logged, where, who's monitoring it, what's the escalation process?
- Support
  - What's an Issue, what's a Defect...?
    - Who has the knowledge to respond?
    - How can we change things to reduce the rate of issues?
    - What happens when things go badly wrong?
  - Support organizations (L1/L2/L3)
  - Common IBM structures and processes: Service Requests (SR), Problem Management Records (PMR), Critical Situations (CritSits)

## Manage Evolution

- Scheduled releases (monthly)
- Separate streams for parallel development (as needed)
  - Means separate ‘instances’ of: Vision, Plan, Develop, Deploy, Support
  - Merging of streams
- Check-points for
  - Legal clearances (open source use, export regulations, third party licenses)
  - Patentable Content (25 years as leading recipient of US patents - [link](#))
  - Translation and globalization of content

## Key considerations

- Scale: Doing it once in isolation is one thing, but each release has its own 'copy' of this life cycle.
- Today, one version is running, the next is on-route to production and the next is in development.
- Everything is moving, all the time
- More people, means more 'lost' time managing and communicating among them

## Summary

- IBM is a very large company
- There are processes, standards and checkpoints to support standardization
- But, each project is an ‘instance’ of all these things.
- A project is more than software and needs more than engineering and engineers
- But even when there was a roomful of people in Cúram, the life-cycle, process and distinct disciplines were still needed.
  - Even if we didn’t always know it, and sometimes learnt the hard way.

## References

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- Brooks, The Mythical Man-month: Essays on Software Engineering – Addison Wesley, ISBN 0201835959
- That story about the hospital and their failing systems  
“How Complex Systems Fail”
- IBM Revenue figures from IBM 4Q17 Earnings Press Release

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