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DevOps Challenges in a Highly Regulated Environment

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Introduction

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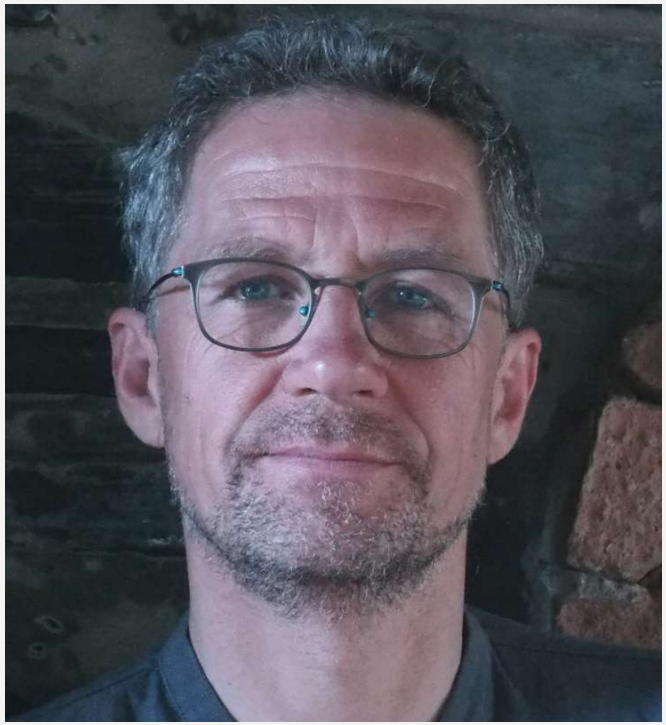
Speaker Bio – Tom Halpin

- Distinguished Engineer with DXC Technology working in an Agile/DevOps enablement role in the Innovation & Automation
- Works with teams in DXC to transform to a DevOps model in support of product aligned value streams thus facilitating the scaled adaption of DevOps culture, practices and tools across DXC

Speaker Bio – Laurent Douillet



- Senior Software Architect with DXC Technology, consultant and hands-on practitioner on all things related to software factory
- Specializes in continuous delivery through identifying value streams, creating build pipelines, and implementing effective change management strategies. His technical expertise is in DevOps tooling, cloud/container platforms, and microservice architecture

DXC Technology – Enterprise Technology Stack

DXC delivers the IT services our customers need to modernize operations and drive innovation across their entire IT estate.

- We help customers create a rich workplace experience, simplify and optimize on-premises IT, and achieve a secure, high-performance cloud environment to realize positive business outcomes
- Our services weave cyber resilience throughout the enterprise, help customers reimagine business with transformative applications, and enable data-driven decisions, automation and state-of-the-art engineering
- DXC business process outsourcing helps customers transform operations to a digital business model

DXC Platform X

- DXC Platform X is our **data-driven intelligent automation** platform that enables customers to accelerate their journey to resilient, self-healing IT across their entire IT estate. The platform empowers IT teams to detect and resolve issues quickly, and automatically predict and prevent future problems before they happen
- Systems achieve a state of "**silent operations**," putting IT operations from top of mind to out of mind, saving time and money and enabling IT to focus on what's most important: the business

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DevOps

An Imperfect Search for Perfection

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DevOps – Underlying Principles

- Three Ways – A Principle-based DevOps Framework
  - First Way
    - Principles of flow - work always flows in one direction – downstream
  - Second Way
    - Principles of feedback - create, shorten and amplify feedback loops
  - Third Way
    - Principles of continuous learning - continued experimentation, learn from mistakes, and achieve mastery

  - *The Phoenix Project - Gene Kim, Kevin Behr, George Spafford*

DevOps – Definition of Awesome

- You build it, you run it

"*Giving developers operational responsibilities has greatly enhanced the quality of the services, both from a customer and a technology point of view.*

The traditional model is that you take your software to the wall that separates development and operations and throw it over and then forget about it.

Not at Amazon. ***You build it, you run it****. This brings developers into contact with the day-to-day operation of their software. It also brings them into day-to-day contact with the customer.*

This customer feedback loop is essential for improving the quality of the service.“

– Amazon CTO Werner Vogels - 2006 Interview

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Dev-HRE-Ops

Dev – Highly Regulated Environment - Ops

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HRE – Highly Regulated Environment - Definition

- *"Highly Regulated / Restricted Environment (HRE) - a physical or digital environment characterized by: air-gapped physical spaces, air-gapped computer systems, heightened access controls, segregation of duties, inability to discuss certain topics outside of specific physical spaces, and an inability to transport certain artifacts off premise."*
  - DEVOPS BLOG - Jose Morales

Dev-HRE-Ops – Implications – Last Mile Challenge

- Implications
  - You build it, you run it remains the objective but not always possible
  - Processes tightly controlled
  - Regulatory environment drives both business investment and technical choices
  - Security controls and governance processes mandated by regulatory environment.
  - Segregation of duties often a requirement.
  - Deploying changes more frequently often viewed as a risk to security and governance controls

- Last mile challenges
  - Product development squads not allowed access to production systems
  - Air-gapped server rooms & computer systems.
  - Restrictions can include
    - In region or in country personnel required
    - Security clearance required
    - Screen sharing prohibited
    - Log sharing prohibited
    - Access via secure devices
    - Limited access to network services and associated resources

Dev-HRE-Ops - Approach

- Common misconception arises that HRE means you cannot “do” DevOps
- Dev-"HRE"-Ops is possible and desirable in support of HRE mandated processes
- Enablement of operation & support teams key to success in the last mile
- Cultural challenge as much as a technical challenge
- Important to include all stake-holders: squad members, operators, auditors, regulators & change control in Dev-HRE-Ops enablement efforts

Dev-HRE-Ops - Approach

- Automate end to end value stream – using integration & delivery pipelines
- Have an everything as code mindset
  - PRs, CI/CD, Test Automation, Security Controls, Issues, Documentation, Infrastructure & Change Controls
  - Codify compliance, access and regulatory requirements
- Make use of the available tools
  - GitHub, Jira, Jenkins & Artifactory in our case

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DXC Platform X Pipelines

Operations Team Enablement

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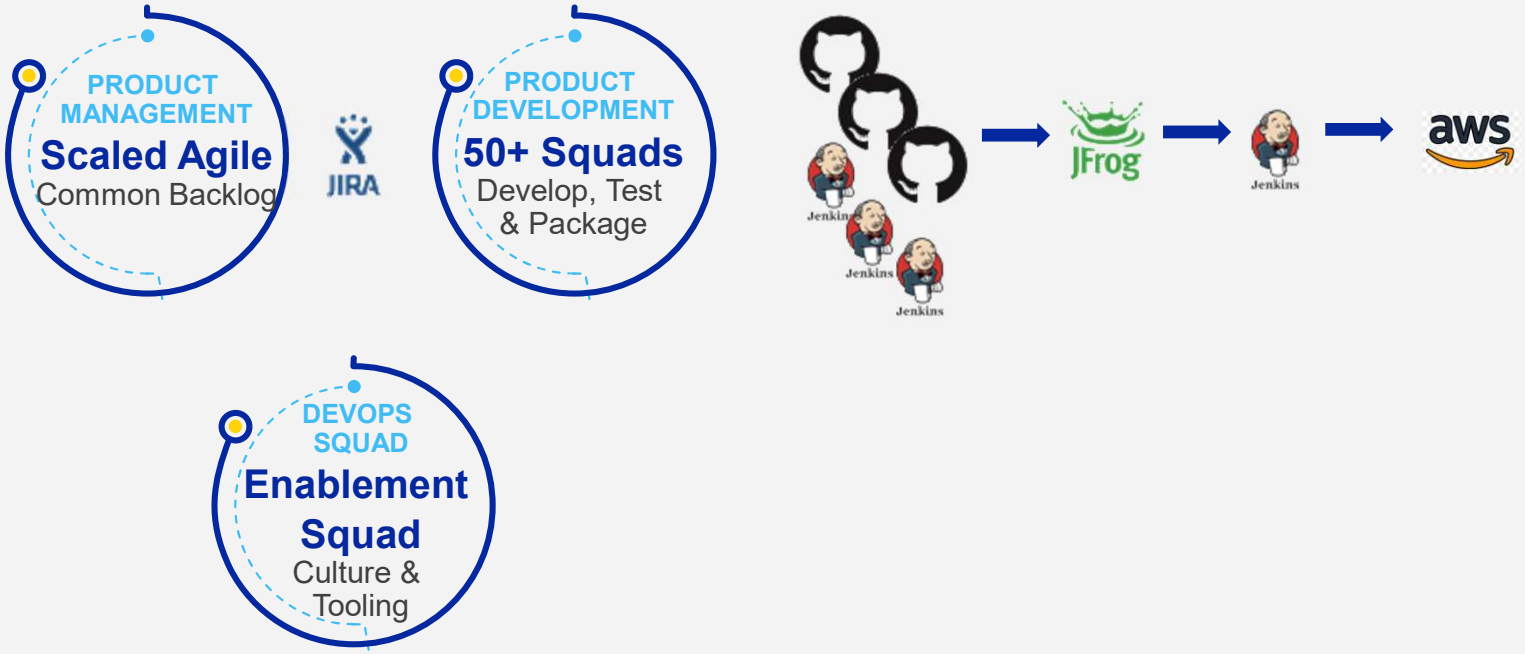
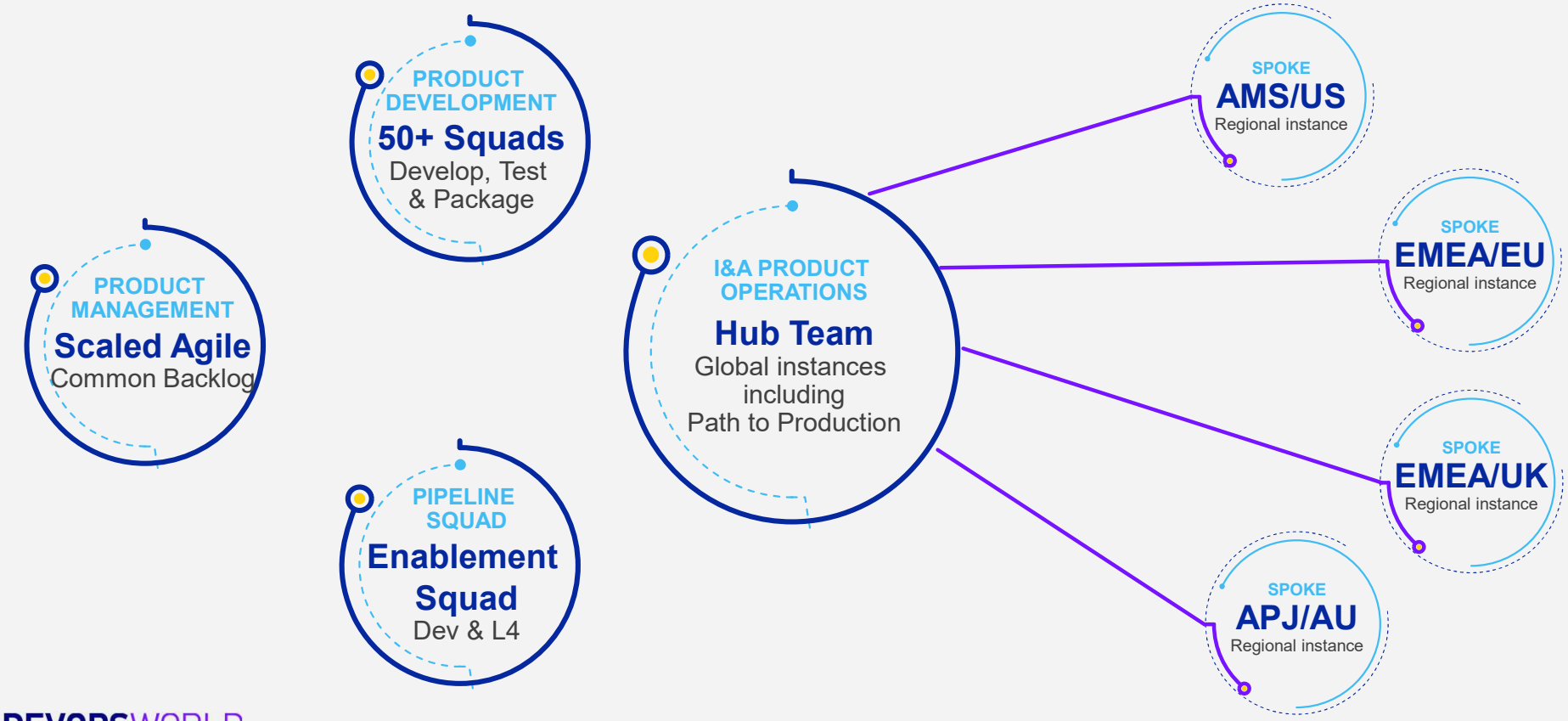
DXC Platform X - Ideal World - DevOps



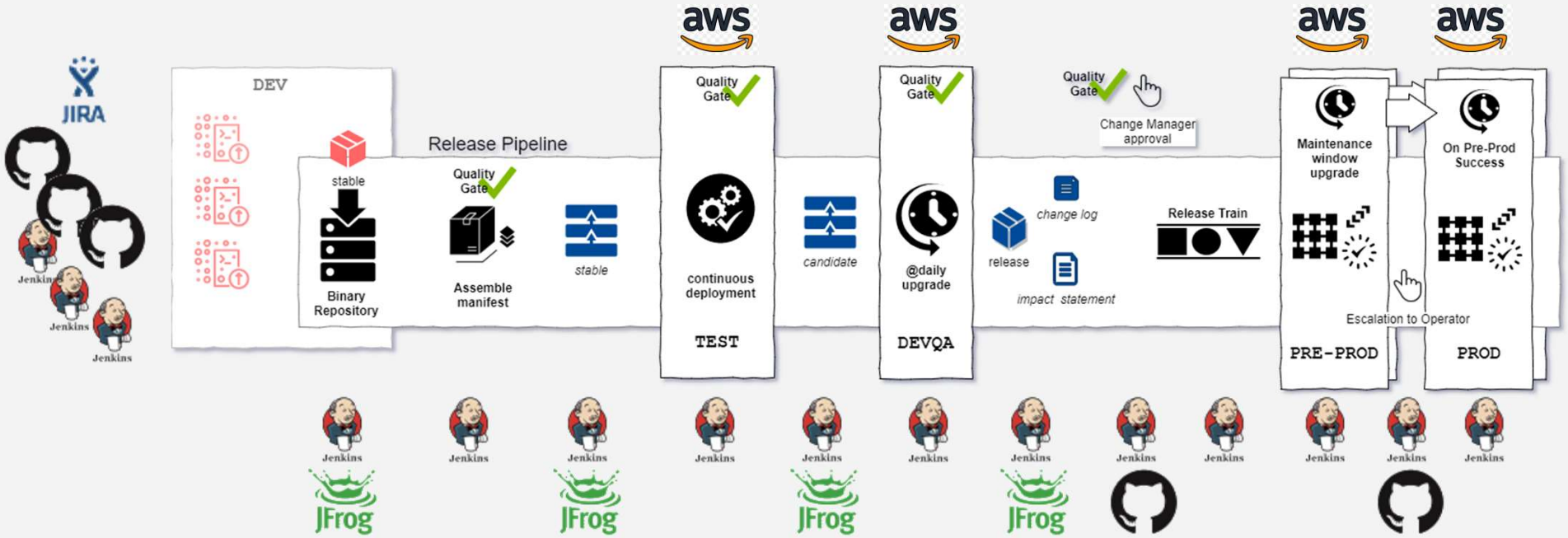
DXC Platform X - Dev-HRE-Ops – Challenges

- Only in country / in region access allowed
- Security clearance required for operators
- Access via secure laptops
- Limited access to network and associated resources
- No screen sharing
- No log sharing
- Product Squads new to HRE environments
- Operations team new to DevOps

DXC Platform X - Actual World - Dev-HRE-Ops



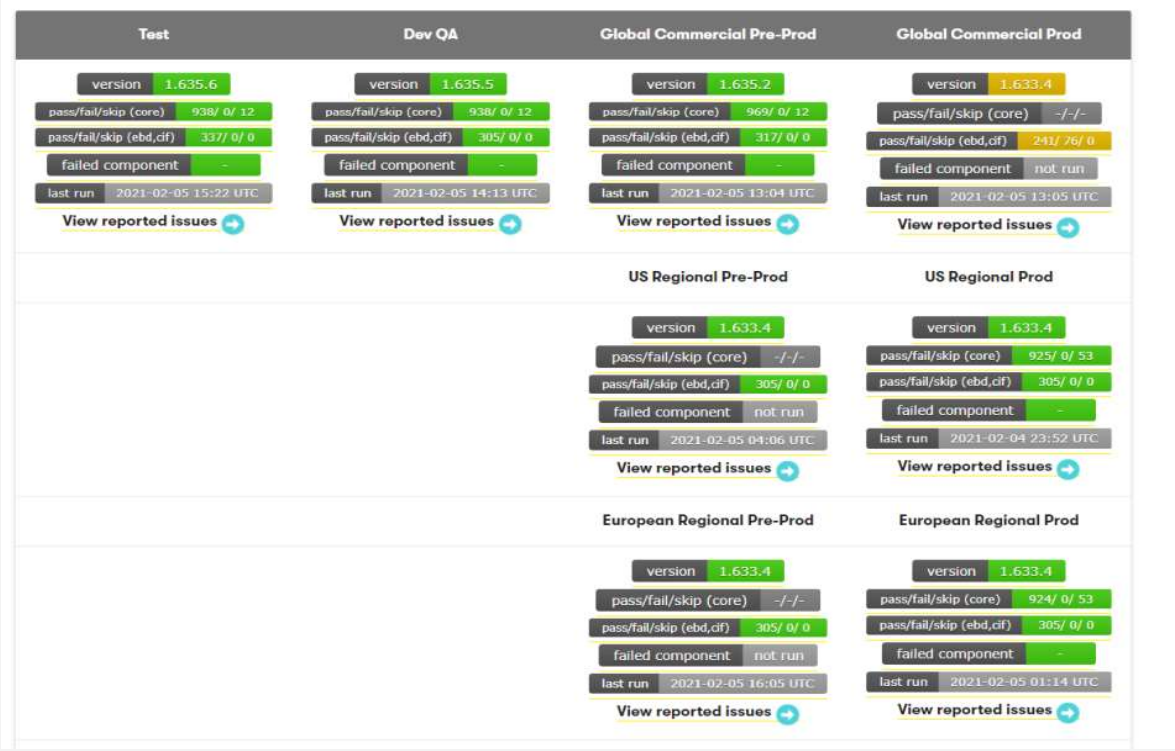
DXC Platform X - Path to Production – CI/CD Pipelines



Physical manifestation of an Agile Release Train

- designed to enforce a repeatable, high quality, consistent move to production of DXC Platform X components

DXC Platform X - Release Pipeline – Route Map



Release Pipeline - Route Map

- Components Path to Production
- Service operates 365 days a year
- Global
  - Test -> DevQA –> GC Pre-Prod -> GC Prod
- Regional Instances
  - Pre-Prod -> Prod

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Operational Team Enablement

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DXC Platform X - HRE - Operational Requirements

- To address the last mile challenge posed by HRE operational requirements needed to:
  - Enable and onboard hub & spoke operational teams
  - Design for Less Ops
  - Automate the value stream in so far as possible

- Provide Robust Operational Processes
  - Adhere to the principle of "Everything as Code"
  - Create a reusable rather than a bespoke solution
  - Allow SME's to quickly collate and/or create and share complex content
  - Provide a convenient mechanism for users to consume the operational content
  - Ensure content remains in the source repositories maintained by content owners
  - Reduce the possibility of the creation of duplicated content
  - Provide a means of versioning content

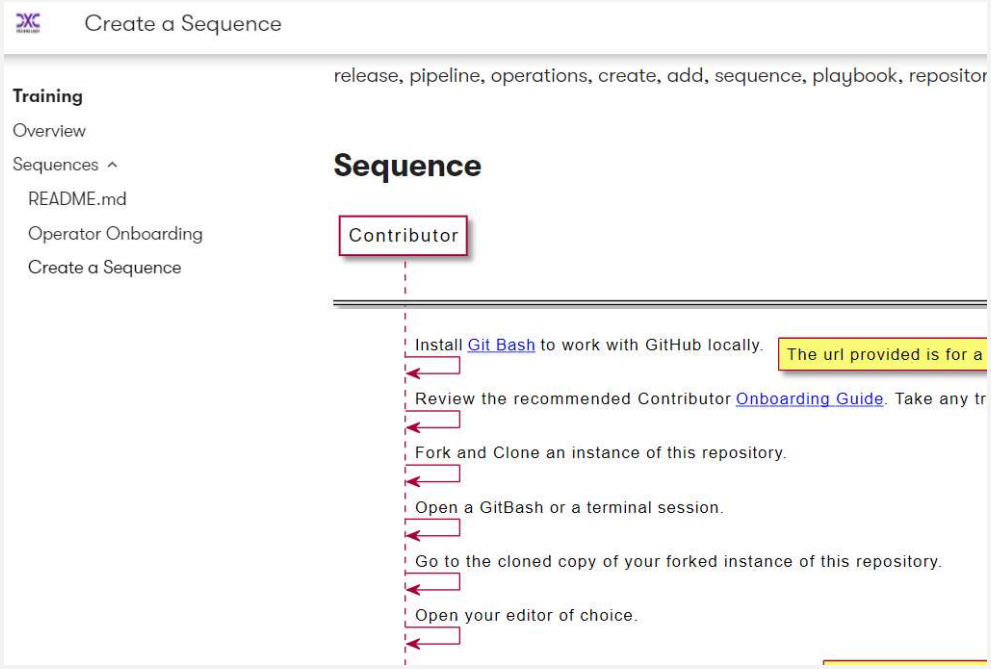
DXC Platform X - Operations Hub & Spoke Enablement

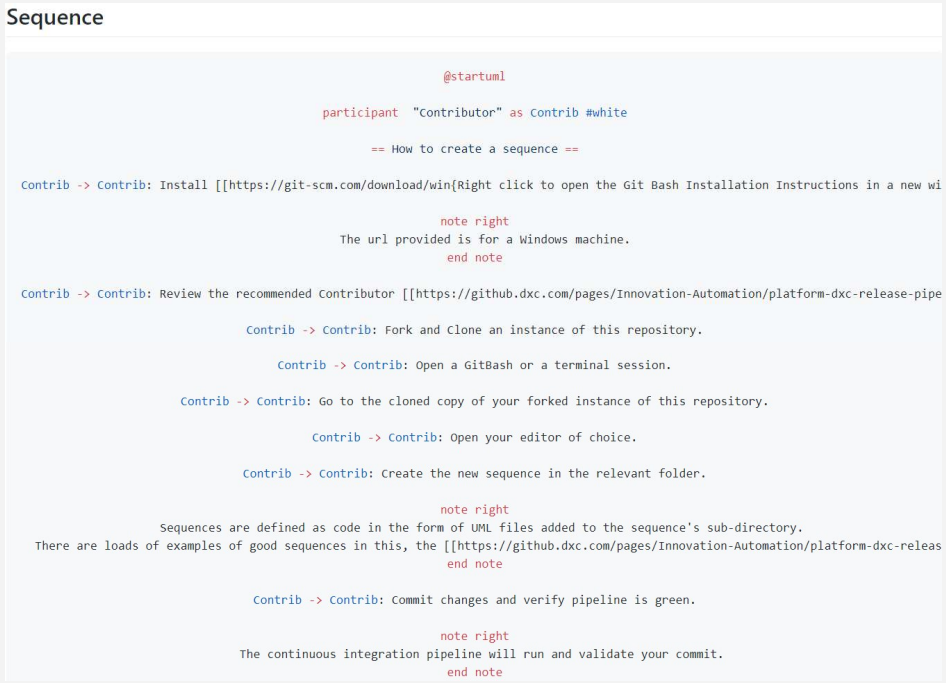
- Operation Squad Enablement included:
  - DevOps Training Plan augmented with Training Validation Exercises
    - Open Sourced - Online DevOps Dojo
    - Open Sourced - Online Product Engineering Dojo
  - Pipeline Operation - Training Needs Assessment
    - Functional Areas
    - Topics
    - Processes
    - Existing collateral reviewed, updated and augmented
    - Delivery mechanism

DXC Platform X - Operations Hub & Spoke Enablement – cont.

- Operation Squad Enablement included:
  - Operation Support Sequences - GitHub Pages
    - Sequences as Code
    - Guided process paths
  - On-boarding of HRE operations team
  - Working sessions to help HRE operations team ramp up
    - KT sessions
    - Guild – Weekly - Q&A / Brownbags
  - Off-boarding of product squad

DXC Platform X – Operational Sequences as Code





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Conclusions

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DXC Platform X - Dev-HRE-Ops Conclusion

- Dev-"HRE"-Ops is both possible and desirable
- Last mile poses challenges to traditional DevOps definition of awesome
- Operation & support team enablement essential to success
- Cultural challenge as much as a technical challenge
- Everything as code mindset important
  - Codify compliance and regulatory requirements
  - Automate delivery pipeline end to end
  - Make use of the available tools
- Key takeaway - it’s a journey - an imperfect search for perfection

Thank you!

Tom Halpin & Laurent Douillet

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Q&A

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