Visma on AWS

Release/deployment

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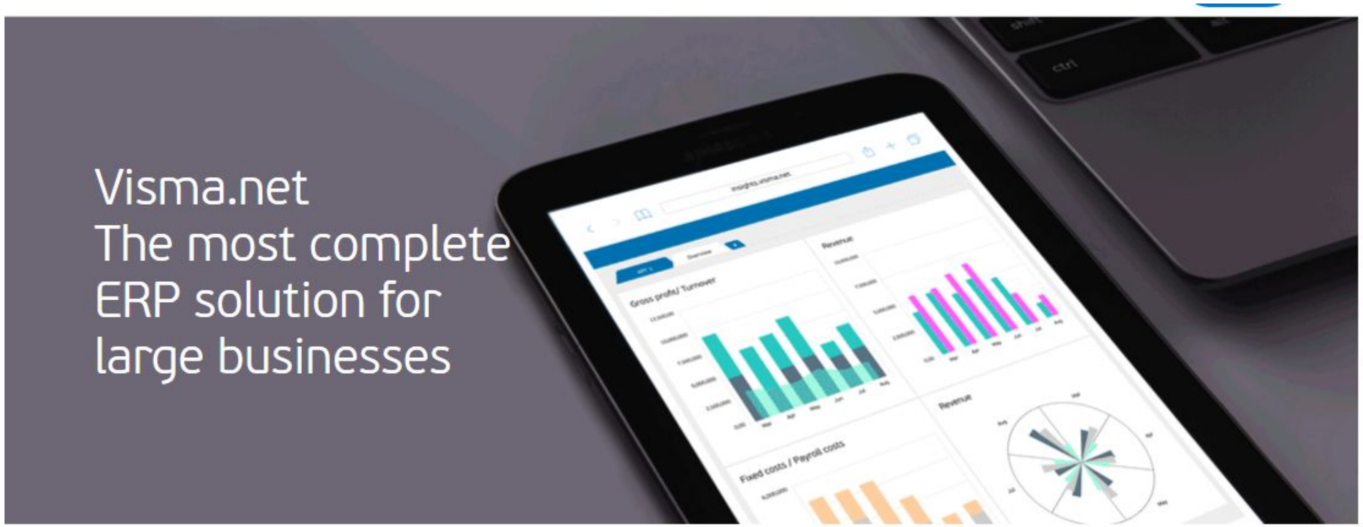
Agenda

Introduction

About me

- Håkon Eriksen Drange
- Infrastructure Engineer
- Visma.net HRM program, team Payroll Management

About Visma.net



About Visma.net HRM

- 8 main services
- 15-ish teams
- About 160-ish people

About Visma.net HRM

- Small and large customer segments
- 1 - 6000 employees
- Eating our own dog food

About Visma.net HRM

- Consolidate legacy on-premise solutions to the modern SaaS offering
- Exponential growth in customer base
    - Customer migrations, acquisitions, new signups etc ..

Release strategy

Release strategy

- One predictable/fixed main release the first Tuesday every month
- Additional releases when necessary
  - Patches/bugfixes, specific functionality
- New functionality is feature toggled
- Continuous Delivery for microservices
  - Continuous deployment, feature toggle relevant functionality

Technology & Architecture

VISMA

Technology stack - present

- C# .NET framework 4.7.1
- EC2 instances, AWS Windows Server AMIs
- RDS Aurora MySQL

Technology stack - future

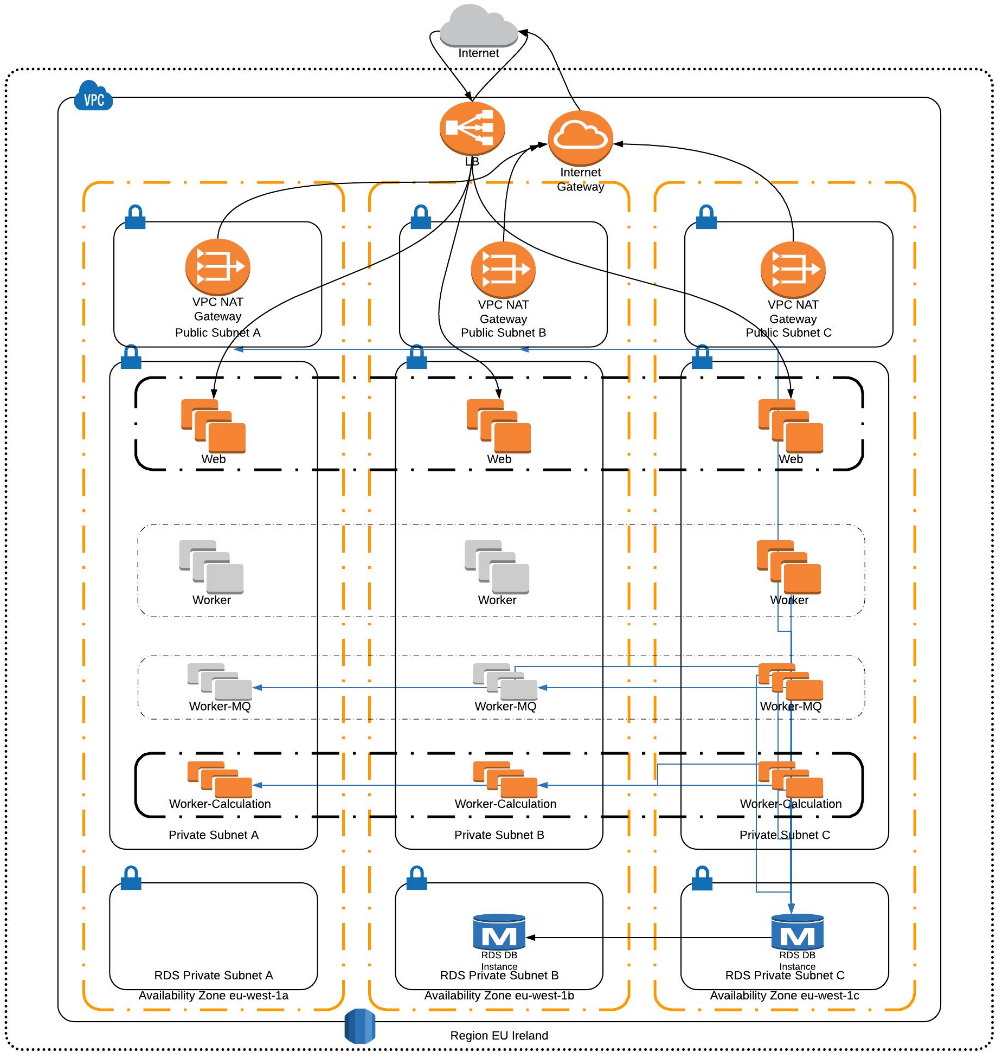
- C# .NET Core 2 framework
- Linux instances and containers
- RDS Aurora MySQL/PostgreSQL
- DynamoDB

Payroll architecture

- Payroll consists of 4 application tiers in separate Auto Scaling Groups:
    - Web (t2.2xlarge)
    - Worker (t2.2xlarge)
    - Worker-MQ (c5.xlarge)
    - Worker-Calculation (t2.2xlarge)

Payroll architecture

- Database: AWS RDS Aurora MySQL
    - Encryption at rest + snapshots
- ELBs/ALBs + AWS Certificate Manager
    - Encryption in transit


Internet
VPC
LB
Internet Gateway
VPC NAT Gateway Public Subnet A
VPC NAT Gateway Public Subnet B
VPC NAT Gateway Public Subnet C
Web
Web
Web
Worker
Worker
Worker
Worker-MQ
Worker-MQ
Worker-MQ
Worker-Calculation
Worker-Calculation
Worker-Calculation
Private Subnet A
Private Subnet B
Private Subnet C
RDS DB Instance
RDS DB Instance
RDS Private Subnet A
RDS Private Subnet B
RDS Private Subnet C
Availability Zone eu-west-1a
Availability Zone eu-west-1b
Availability Zone eu-west-1c
Region EU Ireland

VISMA

AWS resource management strategy

- One account per team per environment
  - InternalTest
  - Acceptance
  - Stage
  - Production
  - Dev/sandbox
  - Backup

AWS resource management strategy

- Cloudformation templates per tier and AWS resource/service
    - Web, Worker, Worker-MQ, Worker-Calculation
    - Core (VPC), ALB, BastionHost
    - CloudTrail, Config, GuardDuty
    - Route53, SNS, SSM
    - RDS

AWS resource management strategy

- Cloudformation templates per tier and AWS resource
- Environment specifics are defined in parameter files, templates completely reusable

AWS resource management strategy

- Immutable infrastructure
- Fully baked AMIs

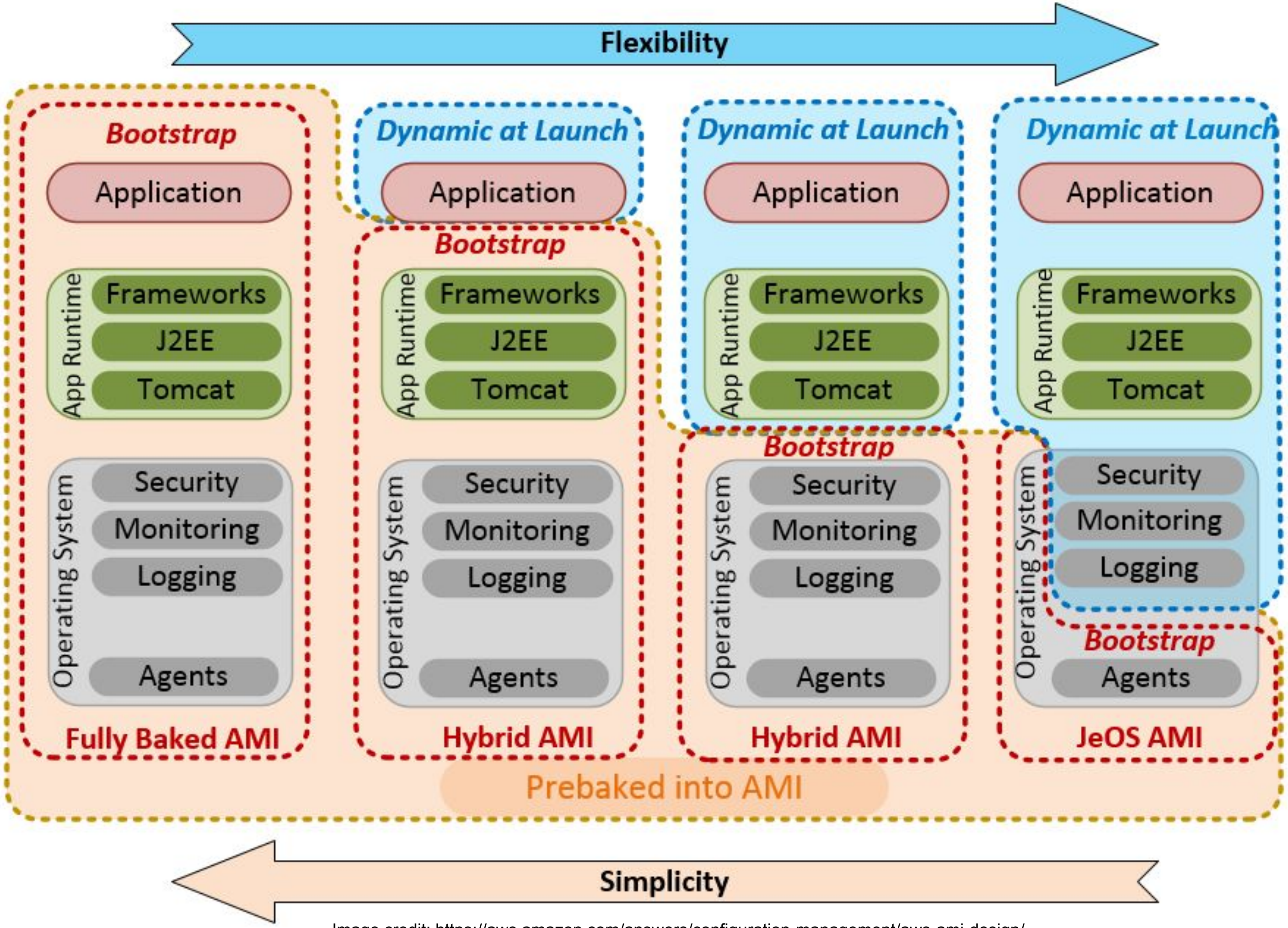


Image credit: https://aws.amazon.com/answers/configuration-management/aws-ami-design/

VISMA

Toolbox

Toolbox

- VCS: Git
  - Bitbucket by Atlassian
  - Hosted in-house by Visma IT

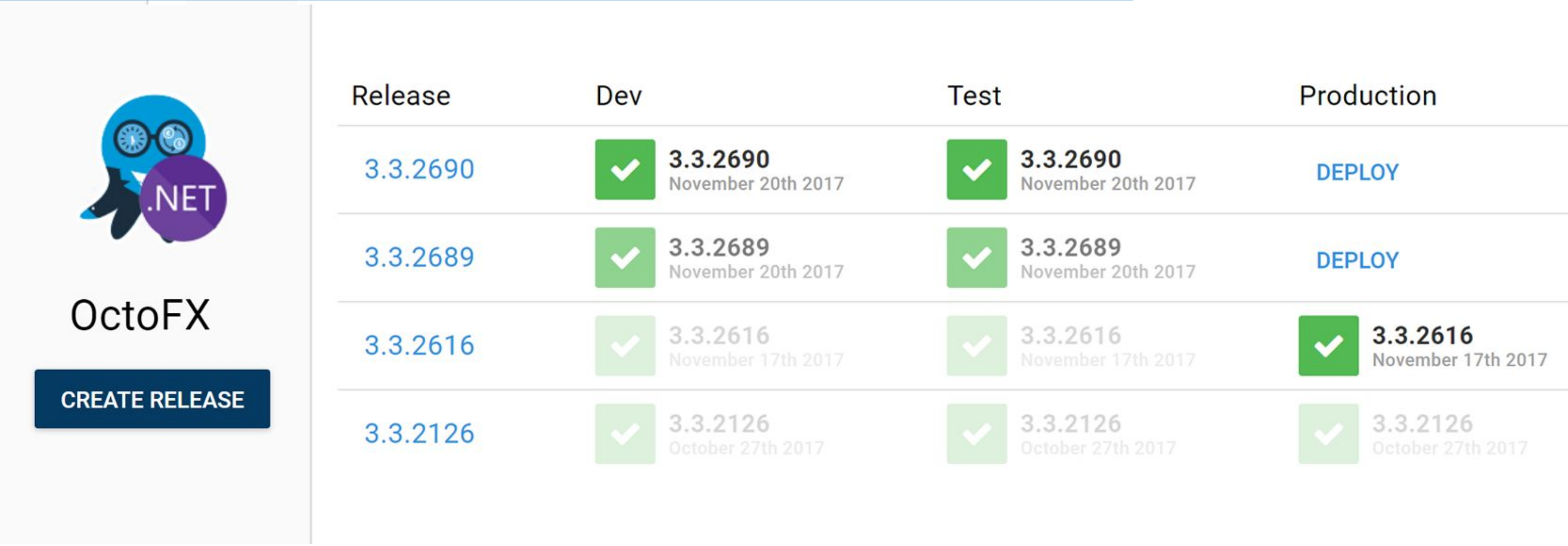
Toolbox

- Continuous Integration: TeamCity
  - Jenkins equivalent
  - Proprietary offering by JetBrains
  - Hosted in-house by Visma IT

Toolbox

- Deployment: Octopus Deploy
    - A proprietary offering from the company .. Octopus Deploy
    - Hosted in-house by Visma IT

Toolbox - Octopus Deploy



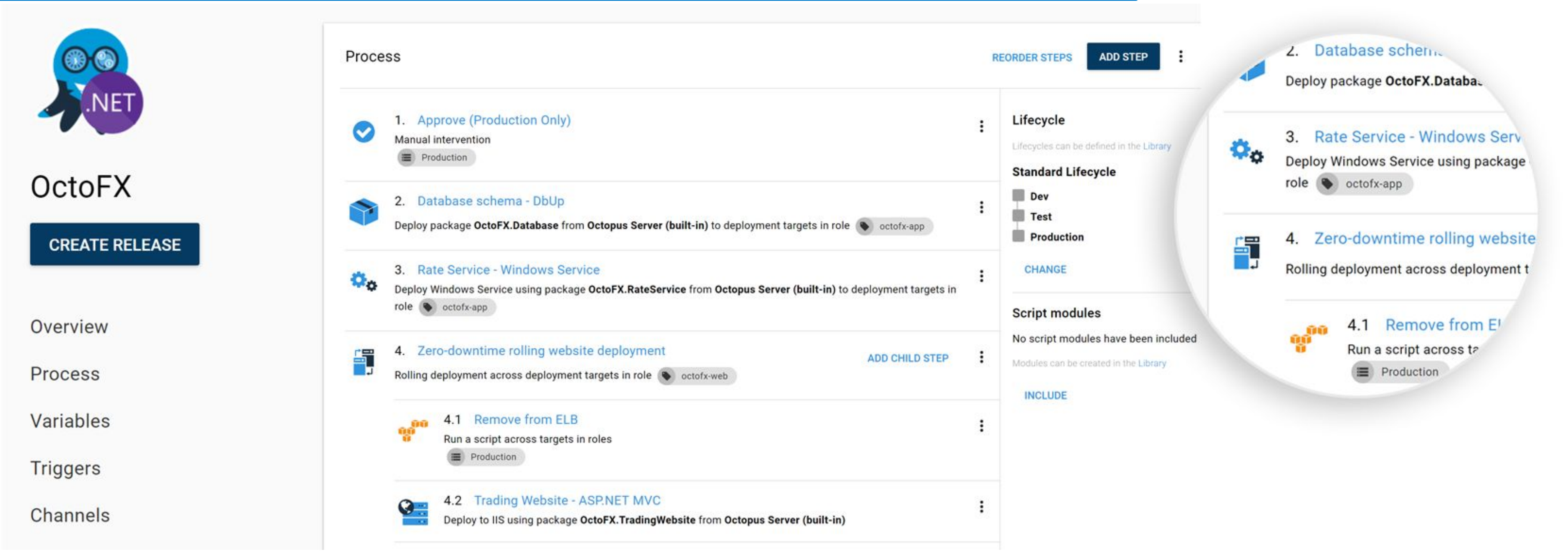
OctoFX

CREATE RELEASE

Release	Dev	Test	Production
3.3.2690	✓ 3.3.2690 November 20th 2017	✓ 3.3.2690 November 20th 2017	DEPLOY
3.3.2689	✓ 3.3.2689 November 20th 2017	✓ 3.3.2689 November 20th 2017	DEPLOY
3.3.2616	✓ 3.3.2616 November 17th 2017	✓ 3.3.2616 November 17th 2017	✓ 3.3.2616 November 17th 2017
3.3.2126	✓ 3.3.2126 October 27th 2017	✓ 3.3.2126 October 27th 2017	✓ 3.3.2126 October 27th 2017

Image credit: https://octopus.com/images/landing/(home)/feature-1.png

Toolbox - Octopus Deploy



OctoFX

CREATE RELEASE

Overview

Process

Variables

Triggers

Channels

Process — REORDER STEPS — ADD STEP

1. Approve (Production Only)
   Manual intervention
   Production

2. Database schema - DbUp
   Deploy package **OctoFX.Database** from **Octopus Server (built-in)** to deployment targets in role octofx-app

3. Rate Service - Windows Service
   Deploy Windows Service using package **OctoFX.RateService** from **Octopus Server (built-in)** to deployment targets in role octofx-app

4. Zero-downtime rolling website deployment — ADD CHILD STEP
   Rolling deployment across deployment targets in role octofx-web

   4.1 Remove from ELB
   Run a script across targets in roles
   Production

   4.2 Trading Website - ASP.NET MVC
   Deploy to IIS using package **OctoFX.TradingWebsite** from **Octopus Server (built-in)**

Lifecycle

Lifecycles can be defined in the Library

Standard Lifecycle

- Dev
- Test
- Production

CHANGE

Script modules

No script modules have been included

Modules can be created in the Library

INCLUDE

2. Database schem
Deploy package **OctoFX.Databa**

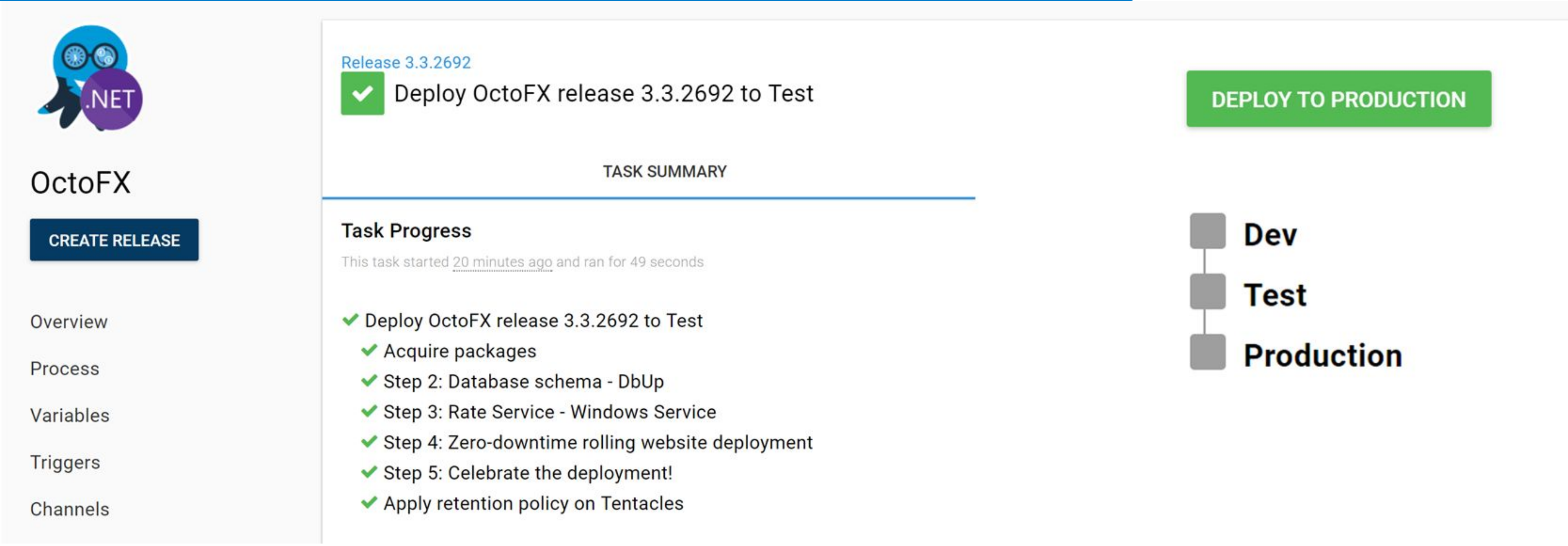
3. Rate Service - Windows Serv
Deploy Windows Service using package
role octofx-app

4. Zero-downtime rolling website
Rolling deployment across deployment t

4.1 Remove from El
Run a script across ta
Production

Image credit: https://octopus.com/images/landing/(home)/feature-3.png

Toolbox - Octopus Deploy



OctoFX

CREATE RELEASE

Overview

Process

Variables

Triggers

Channels

Release 3.3.2692

✓ Deploy OctoFX release 3.3.2692 to Test

DEPLOY TO PRODUCTION

TASK SUMMARY

Task Progress

This task started 20 minutes ago and ran for 49 seconds

- ✓ Deploy OctoFX release 3.3.2692 to Test
  - ✓ Acquire packages
  - ✓ Step 2: Database schema - DbUp
  - ✓ Step 3: Rate Service - Windows Service
  - ✓ Step 4: Zero-downtime rolling website deployment
  - ✓ Step 5: Celebrate the deployment!
  - ✓ Apply retention policy on Tentacles

Dev

Test

Production

Image credit: https://octopus.com/images/landing/(home)/feature-2.png

Toolbox - Octopus Deploy

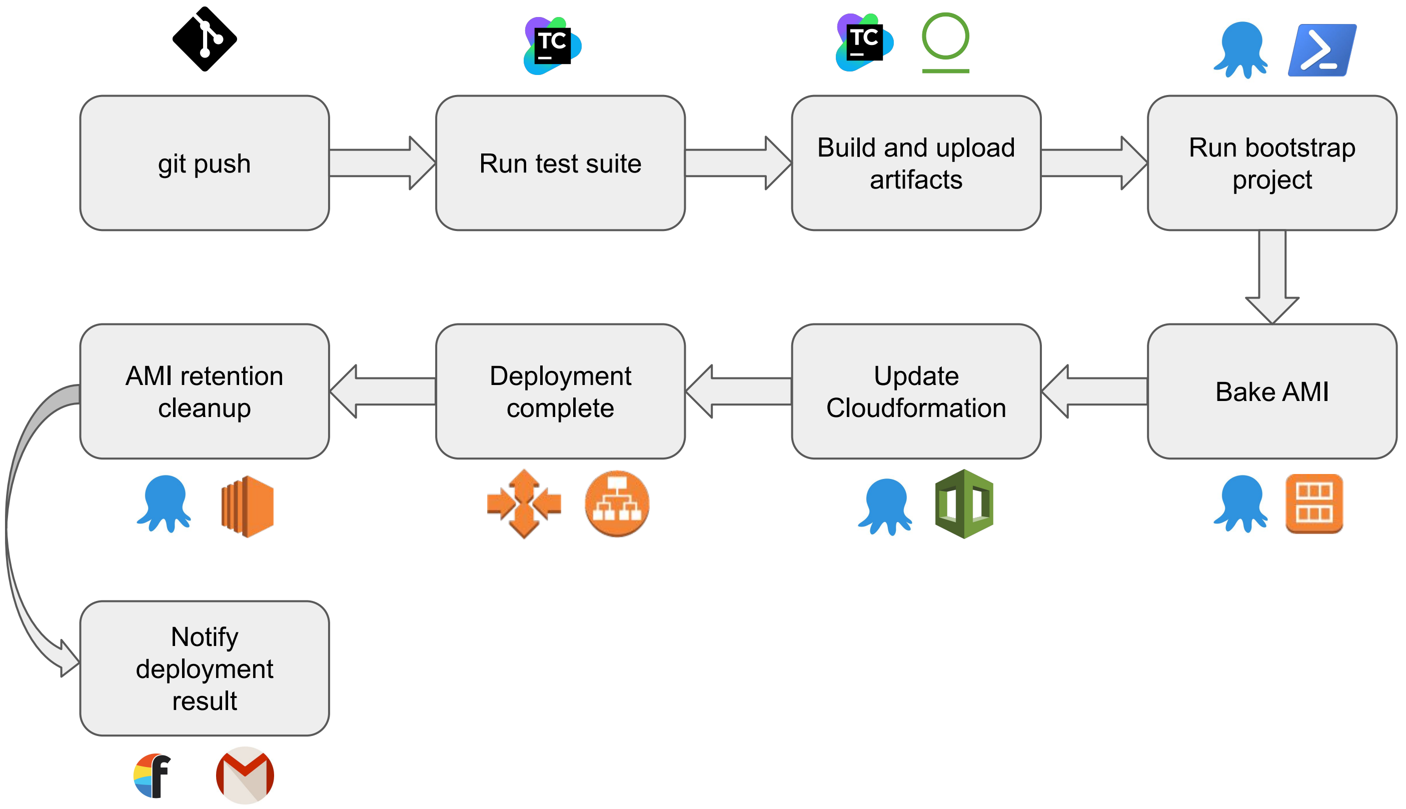
- Centralized resource management on multiple AWS accounts
- Pre-defined action templates
  - OD + AWS Cloudformation + AWS Systems Manager
  - Developers does not need access to servers or AWS accounts to:
    - Check the status of or restart a service
    - Retrieve log files
    - Update a Cloudformation stack
    - Deploy something

Toolbox - Octopus Deploy

- OD AWSResources project
  - Creates or updates Cloudformation stacks for AWS resources independent of application
  - Core/VPC, RDS, SSM, GuardDuty etc.
- OD Application bootstrap project
  - Creates or updates Cloudformation stacks for each tier of applications
  - Starts temp instances for AMI baking
  - Cleans up resources
- OD Application instance setup project
  - Installs and configures instances
  - Roles applied to differentiate configurations for the different tiers
- OD RestartService project
  - Can trigger restart of services on specific instances or a group based on tags

Deployment workflow

Deployment workflow



Deployment workflow - experiences

Pros:

- Full control, no manual changes, known state
- Safe, no custom bootstrapping at boot that can fail with full AMIs
- Fastest Auto Scaling with instances
- Easy to reuse same AMIs for temporary environments for debugging
- Easy to promote across environments and accounts

Deployment workflow - experiences

Cons:

- Deployments can take some time.
    - ~20 - 30 minutes per environment x 4 = ~2 hours to get a change to production
    - TeamCity CI process in addition
- Higher costs to build temporary + new resources every time
- At first glance, can look complicated

Future plans

- About 80% of all paychecks in Norway comes from a Visma system
- Goal: Visma.net HRM SaaS to replace all on premises solutions
- To support this we need must be upfront with architecture and infrastructure

Future plans

- Cloudformation rollback triggers
- EC2 SpotFleet/Fleet
- .NET Core 2.x on Linux
  - The services must be ready, work in progress
  - Massive cost reductions and modern tech
- Lightweight services deployed in containers
  - Deployment slightly quicker, scaling much faster
- Serverless
  - Candidates: async processes, generate wagerun, generate payslip etc.
  - First class citizen deployment pipeline for Lambda?
- DynamoDB
- Cloudfront

Questions?

Comments?

Also, we’re hiring!

visma.com/jointheambition

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