

# Forward Looking Statements



This presentation contains forward-looking statements about, among other things, trend analyses and future events, future financial performance, anticipated growth, industry prospects, environmental, social and governance goals, and the anticipated benefits of acquired companies. The achievement or success of the matters covered by such forward-looking statements involves risks, uncertainties and assumptions. If any such risks or uncertainties materialize or if any of the assumptions prove incorrect, Salesforce's results could differ materially from the results expressed or implied by these forward-looking statements. 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# How Salesforce is using Argo Workflows for provisioning add-ons

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# World's Largest Enterprise Apps Company

Leader in Philanthropy

Top 100 Companies that Care

6 years in a row

People

Leader in Innovation

#1 Most Innovative Companies

Forbes

Leader in Culture

#1 Best Workplaces

Japan, Argentina, France  
Spain, Germany, the UK & the Netherlands



\*High end of FY23 revenue guide of \$30.9B to \$31.0B

\$26.5B

FY22

\$21.3B

FY21

\$17.1B

FY20

\$13.3B

FY19

\$10.5B

FY18

\$8.4B

FY17

\$6.7B

FY16

\$5.4B

FY15

\$4.1B

FY14

\$3.1B

FY13

\$2.3B

FY12



# Salesforce Hyperforce

The trusted cloud platform. Loved by developers, trusted by CIOs



## Data Residency



Choose where in the world your Salesforce apps run with residency and compliance built-in

## Scalability



Architect with flexibility to scale reliably

## Security



Build with next generation security

## Privacy



Transparency and control of your data

## Agility



Drive velocity with zero downtime updates and instantaneous dev/test environments

# Who are we?

## Hyperforce Kubernetes platform

Internal managed Kubernetes based compute platform with Hyperforce integrations (add-ons) and the following capabilities for Salesforce teams:



**24/7 availability**

**Cluster lifecycle management**

**Trusted Application Platform**

**Economies of scale**

This platform is running majority of our Hyperforce services using thousands of managed K8s clusters spread across various regions.

# What are add-ons ?

aka Kubernetes Integrations

*Not to be confused with EKS add-ons*

Per cluster services required to integrate with the rest of the Salesforce infrastructure.

Examples:

1. Sidecar injectors for certificates and secrets.
2. Per node agents for logs and metrics
3. Cluster level controllers for patching



## K8s integrations

- PKI injector
- Secrets
- Kerberos
- Node patching
- Image validation
- CTS
- Logging & metrics
- Identity
- OPA
- and more...

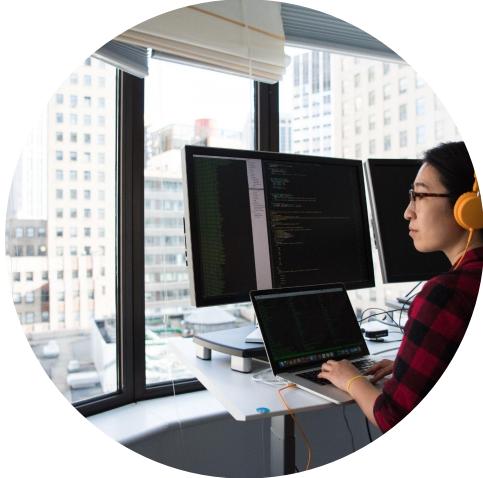
## EKS add-ons

- kube-proxy
- CNI
- CSI
- core-dns
- cluster autoscaler



# Improve the lifecycle management of add-ons

Managing clusters as pets ... (1000s of them)



Better Dev-Ex, fast  
inner-loop



Faster, reliable CD  
pipelines  
(meets SLO's)



container-native  
pipelines as Control  
Plane



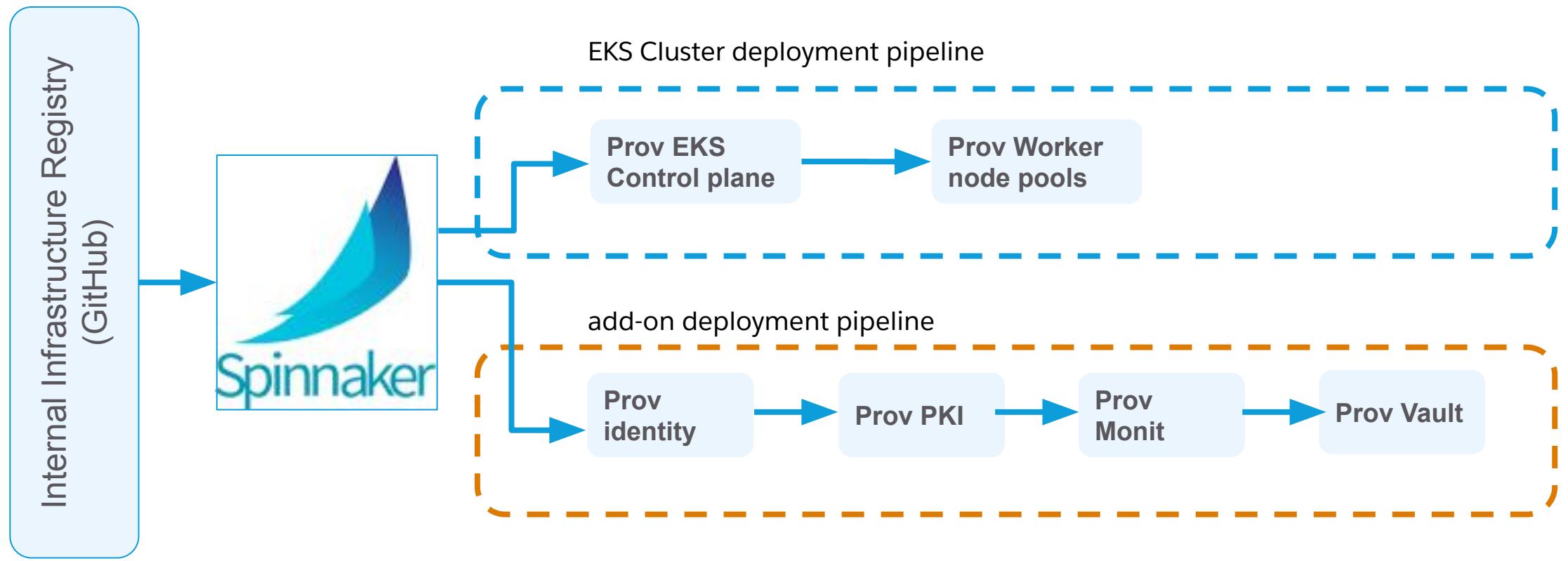
off-load last mile  
delivery



# EKS cluster and add-on deployment pipelines

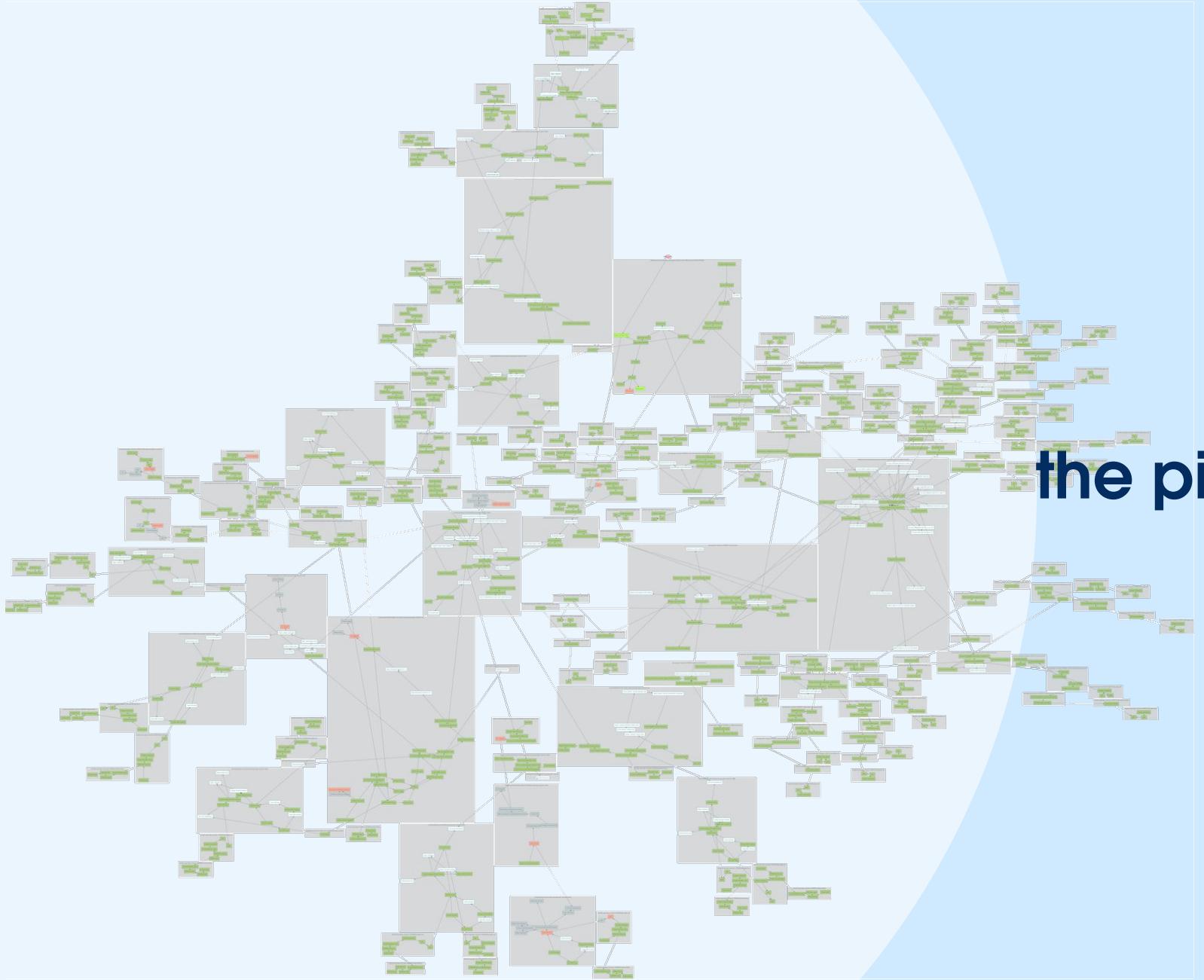


Spinnaker and Terraform





# the pipeline mesh (mess?)



# CD pipelines SLI's for add-ons

Treat your CD pipelines as production workloads and measure them

Inner loop developer velocity on one add-on: ~30min

Total Spinnaker pipelines for all add-ons: ~90

Total pipeline executions to deploy add-ons globally: 300K

Time to release to one EKS cluster: ~60-70 min

Time to release to all environments: ~8-12 days



# Problems with LCM of add-ons



CD pipelines SLI's for add-ons are telling us a story

Developer experience

- No inner loop (slow developer velocity), complex UI
- hard to learn and maintain templating
- debuggability is hard (nesting, # of pipelines)

Performance

UI slowness, execution time, responsiveness, throughput

Extensibility

Limited stage types(Deploy Manifest, Patch Manifest)

Reliability

- intermittent failures & mutable pipelines
- no native retries

Visibility

limited insight into per stage and per pipeline metrics

# Solution

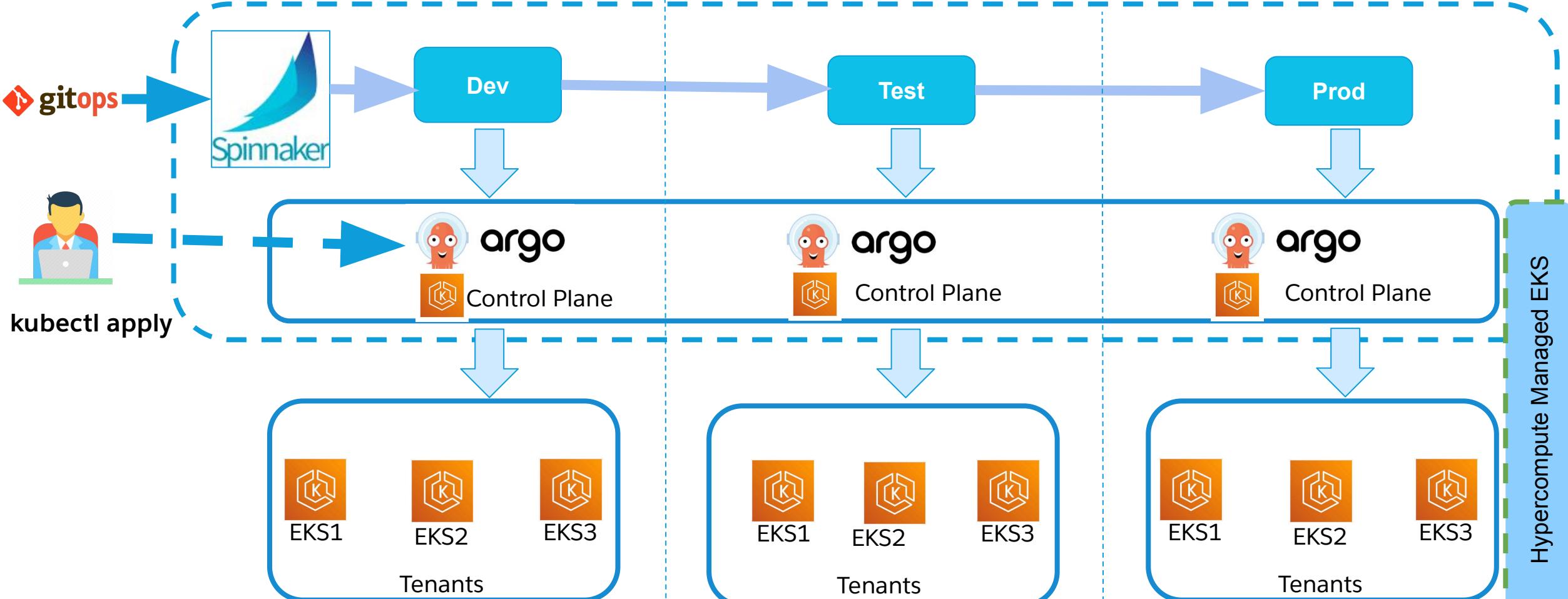
Spinnaker and Kubernetes  
join forces with Argo



# Argo Workflow for last mile delivery



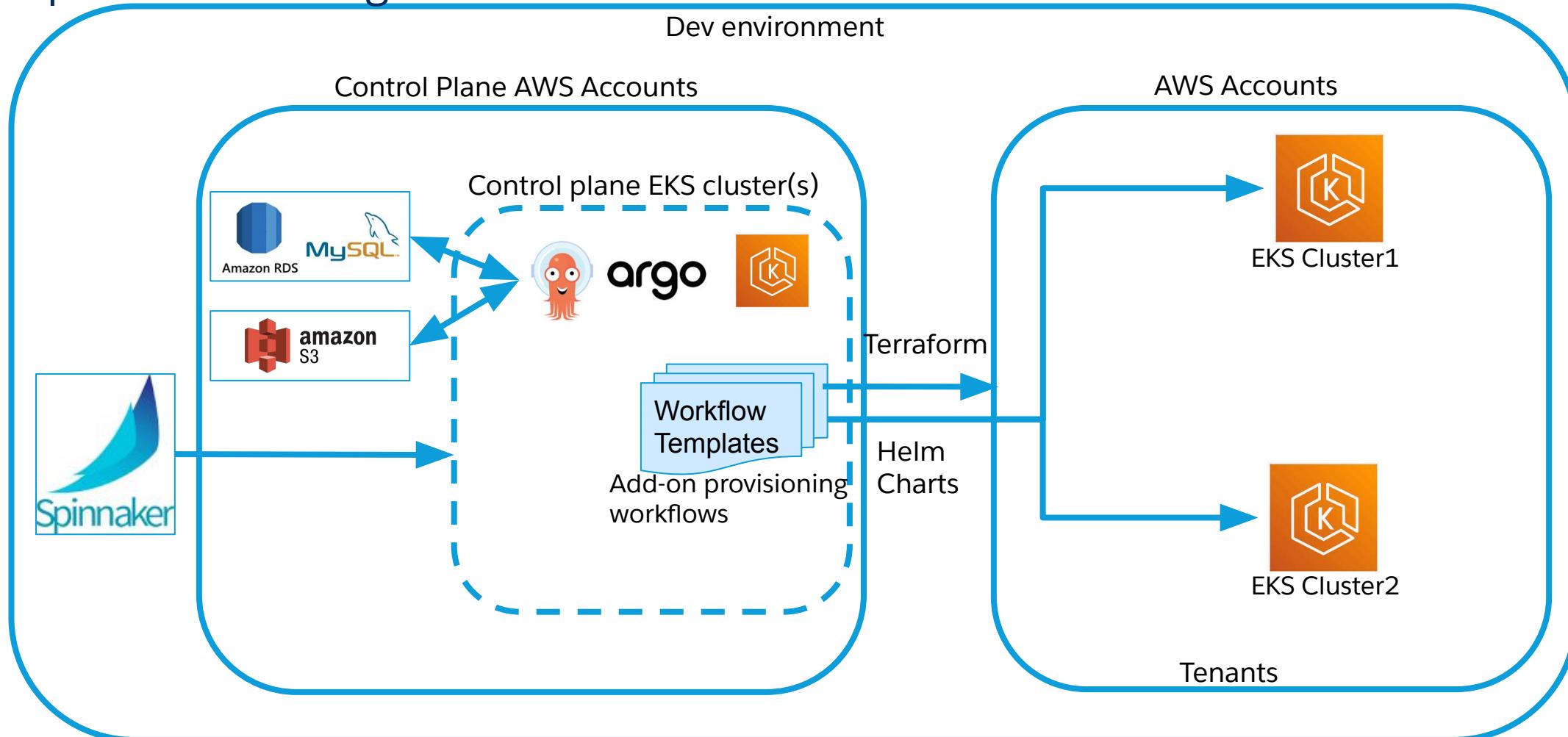
Offload last mile delivery to a horizontally scalable dedicated system



# Dev Environment Details



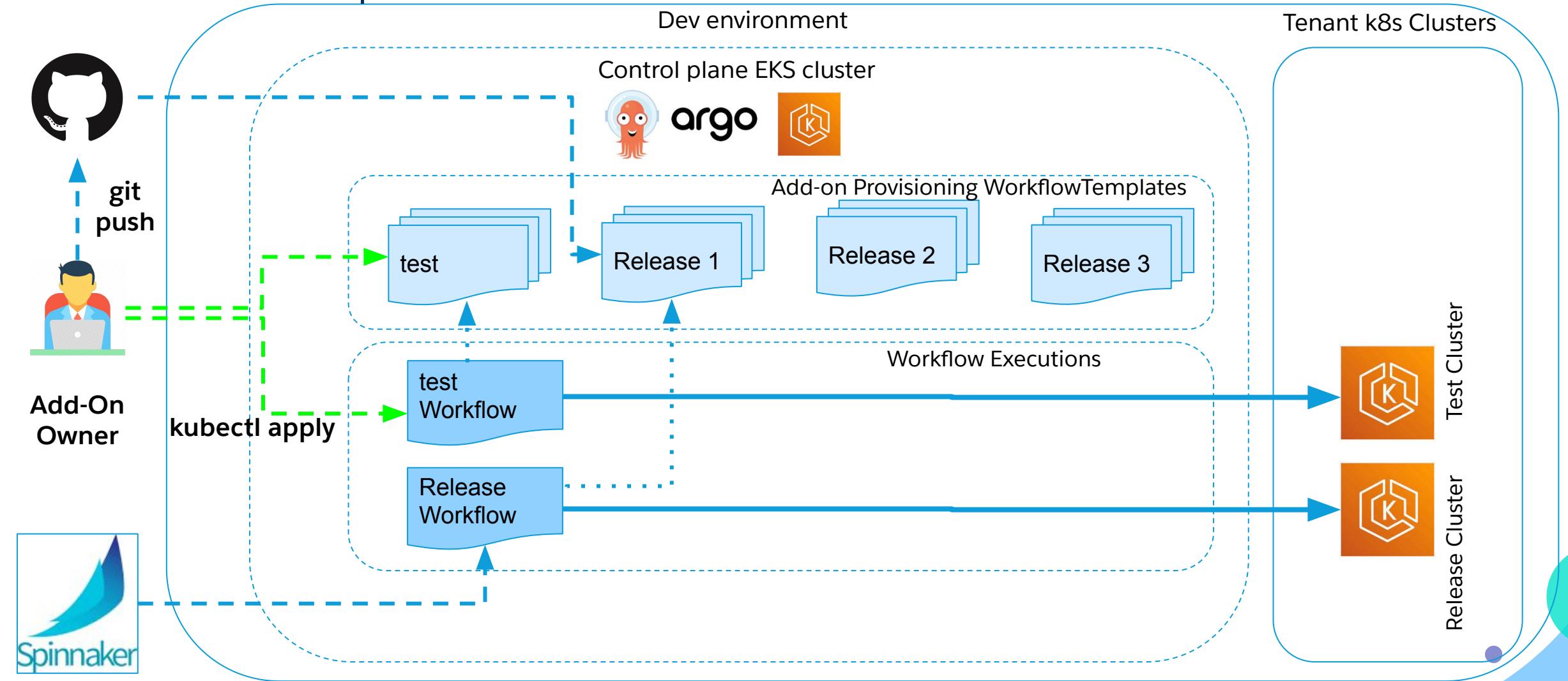
## Spinnaker and Argo Workflows in multi cluster mode



# Workflow Updates and Releases



## Faster Inner Loop



# Argo Workflow features



1. Overall feature parity with our current implementation
  - a. stage execution
  - b. Conditionals and expressions
  - c. Limit parallelism
  - d. Greater extensibility
2. Kubernetes native
3. Support for retrying failed steps
4. Memoization and caching
5. Immutable workflows and simplified nesting of nodes
6. Powerful visualization/UI

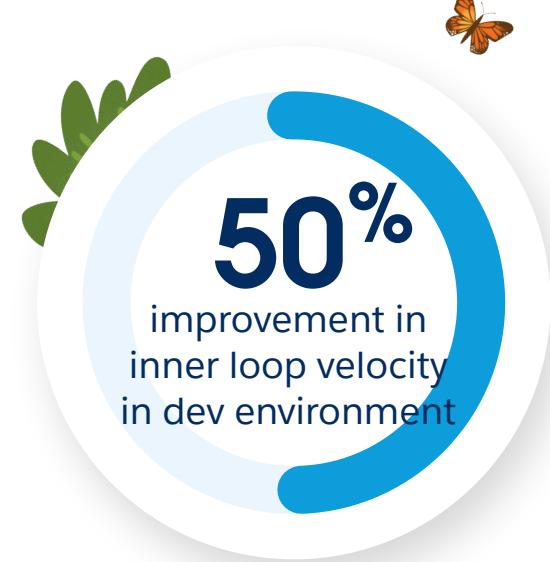


# Preliminary results



# Conversion Results - Where we are Now

Preliminary results based on our current conversions





# Learnings



# Recipe for conversion to Argo Workflows



1

Enable Argo Workflow clusters per environment (dev, test,...)

2

Enable archival, offloading and Pod GC for scale

3

Enable control plane model for Helm and IAC deployment

4

Enable sharding to handle large number of workflows

5

Create a library of reusable workflow templates

# Recipe for conversion to Argo Workflows



6

Convert add-ons pipelines to ArgoWorkflows

7

Integrate Argo Workflow deployment with Spinnaker

8

Enable monitoring dashboards(per stage and per workflow)

9

Enable extensive memoization/caching across stages

10

Expose k8s native scaling per workflow (resource, priority)

# Key takeaways



## Focus on improving the DevEx for your developers

Improve the developer experience of the service owners in your organisation. We focussed on add-on owners.

## CD pipelines are production services

Treat your CD pipelines as production service and spend time measuring their SLI's and improving them. We focussed on add-ons CD pipelines.

## Container-native workflows as IDP

Adopt Argo Workflow or Tekton and run CD pipelines natively on Kubernetes. These tools can also be used for building your IDP. We converted add-on spinnaker pipelines to Argo.

## Adopt open source Kubernetes ecosystem tools

Tools which adopt KRM, meet the developers where they are by extending their existing tools to work for more scenarios and leverages public know-how.

“



**Familiar industry standard tooling  
is easier to learn, maintain and  
hire for and also improves the  
ecosystem.**

**KRM is the language that will  
bind the next generation of  
industry standard tooling.**



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# Thank you





Please scan the QR Code above to  
leave feedback on this session

# Reference



1. [AWS re:Invent 2021 - Kubernetes at AWS: Strategy, road map, and vision](#) that also introduces Salesforce use of EKS to provide a managed K8s offering for internal Salesforce developers.
2. KubeCon EU 2020 talk on [Operating Enterprise grade Kubernetes clusters at Salesforce on bare metal](#).
3. KubeCon EU 2021- [Operationalizing Kubernetes Sidecars in Production at Salesforce](#)



# Why control plane model ?



1. Per cluster Argo Workflow is operational tool and under utilization of its capability
2. Total number of workflows executing at a time within an EKS cluster is limited by the throughput of a single etcd and eks cluster
3. Requires more permissions on the EKS clusters to enable helm and terraform apply



# UI Examples



Workflows / argo-workflows / deploy-eks-cluster-monitoring-vhccf

v3.3.6

RESUBMIT DELETE LOGS SHARE

Search

Node Type

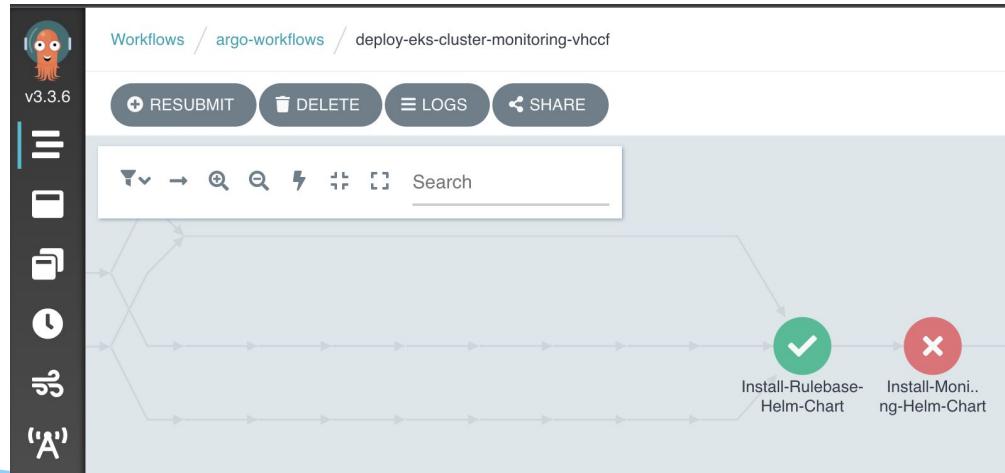
- Collapsed
- Container
- DAG
- HTTP
- Plugin
- Pod
- Retry
- Skipped

Template

- Configure
- Configure-Service-ID
- Run-Terraform-Container-As-IAC-Job
- Run-Terraform-Container-As-IAC-Job/terraform-iac-spinnaker
- bootstrap-permission-fg/bootstrap-permission-fg
- collection-util/global-pre-deploy-eks/collectionutil/global-pre-deploy-eks
- deploy-eks-cluster-monitoring
- deploy-injector-validator/deploy-injector-validator
- evaluate-firebom/evaluate-firebom-iac-spinnaker
- evaluate-oidc-variables
- evaluate-tagging-variables/evaluate-tagging-variables
- evaluate-variables
- extract-firebom-vars-service
- fit-validator-directif/validator-direct
- get-oidc-issuer
- helm-install/helm-install
- helm-install/helm-install-large-overrides
- instant-dummy/fkp-utilities
- kubectl-apply/fkp-utilities
- kubectl-delete/fkp-utilities
- manual-judgment/fkp-utilities
- no-template
- pre-deploy-eks-02-stable/pre-deploy-eks-02-stable
- provision-identity-eks/provision-identity-eks
- terraform-plan-apply/terraform-iac-spinnaker

Node Phase

- Collapsed
- Error



Workflows / argo-workflows

v3.3.6

+ SUBMIT NEW WORKFLOW

Search

NAME

NAME	NAMESPACE	STARTED	FINISHED	DURATION	PROGRESS
deploy-eks-cluster-monitoring-vhccf	argo-workfl...	43s ago	-	43s	4/7

FIRST PAGE NEXT PAGE >

NAMESPACE

argo-workflows

LABELS

service\_name=sam2

WORKFLOW TEMPLATE

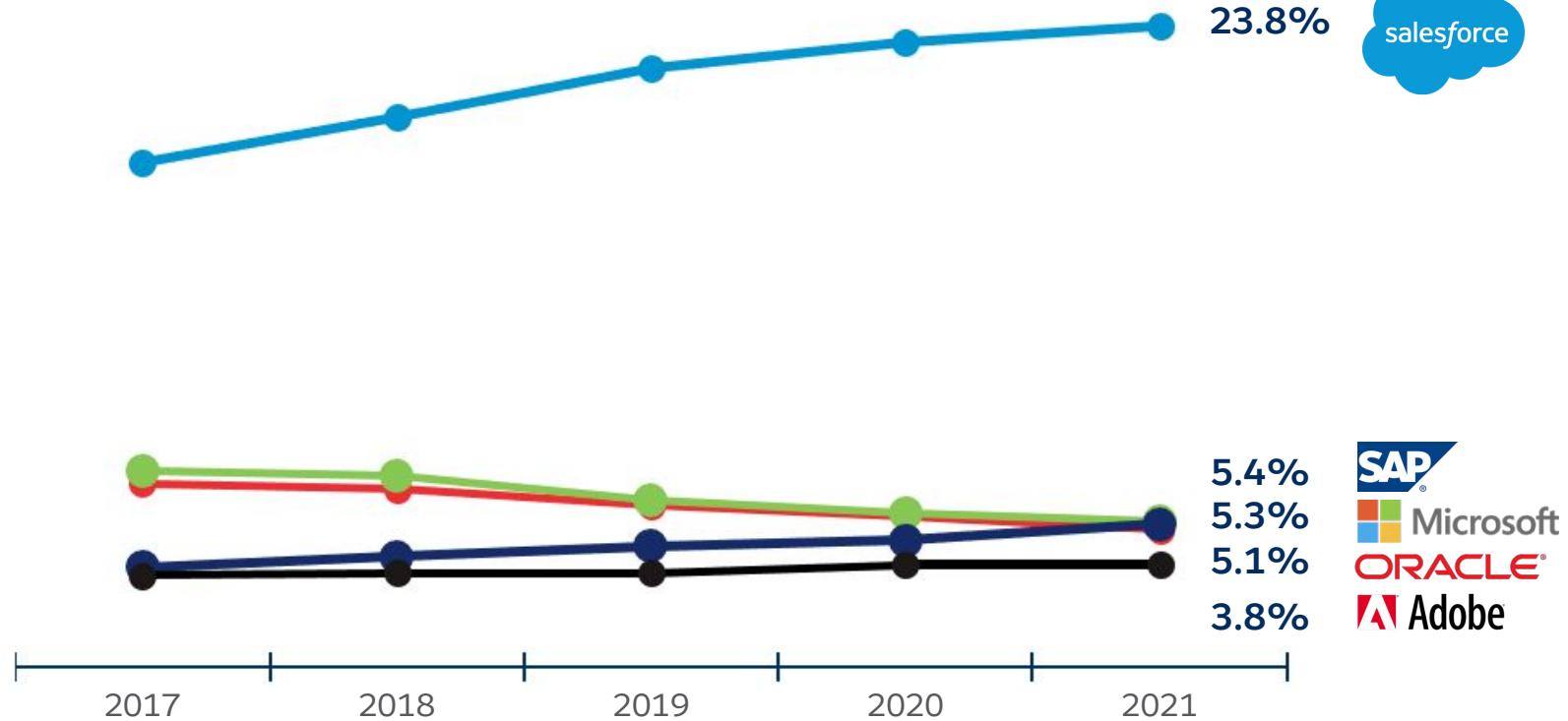
CRON WORKFLOW

PHASES

- Pending
- Running
- Succeeded
- Failed
- Error

# Salesforce. #1 CRM.

Ranked #1 for CRM Applications based on  
IDC 2021 Revenue Market Share Worldwide.



Source: IDC, Worldwide Semiannual Software Tracker, April 2022. CRM market includes the following IDC-defined functional markets: Sales Force Productivity and Management, Marketing Campaign Management, Customer Service, Contact Center, Advertising, and Digital Commerce Applications.

