



Implementing CI/CD for large scale micro service based programs with Jenkins pipeline

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2018.06

◆ AGENDA

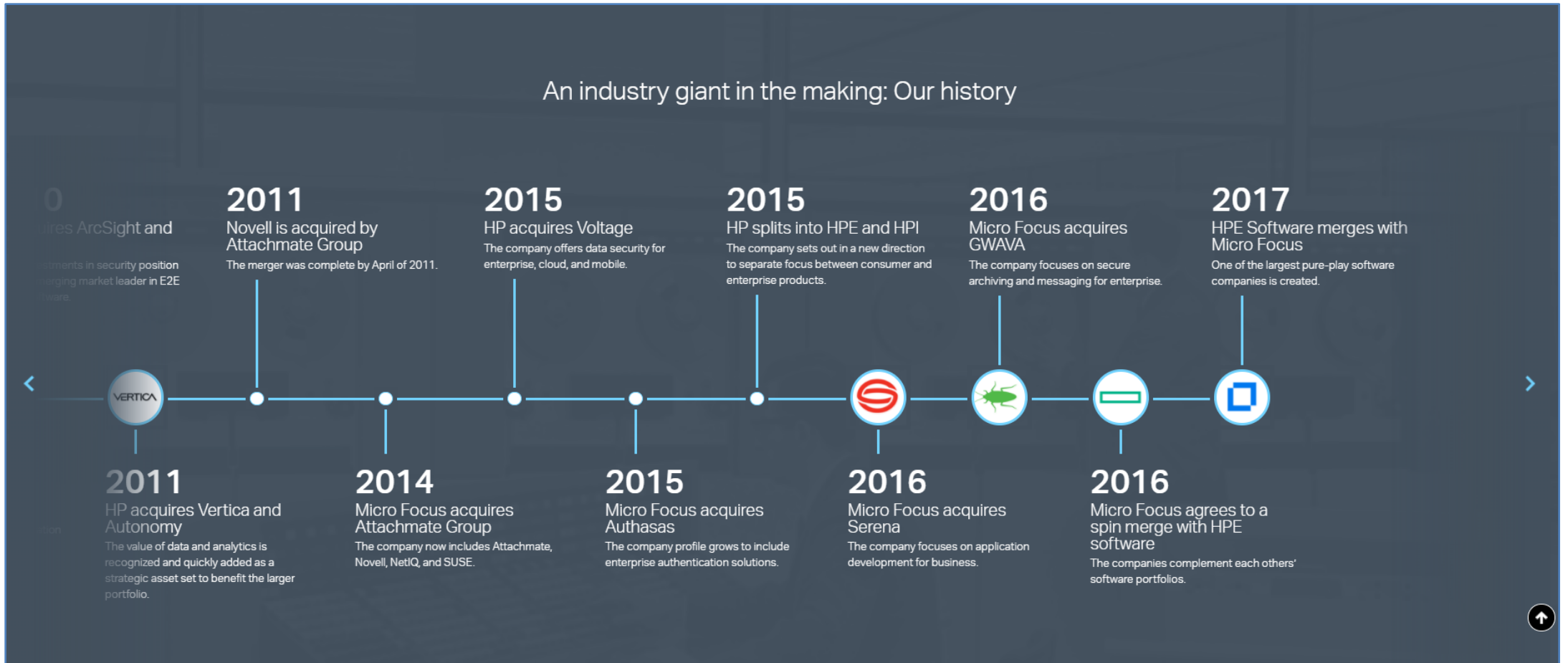
“

- Agile and DevOps Transformation
- Why Jenkins Pipeline
- Implementation CI/CD with Jenkins Pipeline
- Q&A

”

Who are we: since 1939

Build, Operate, & Secure Enterprise Software



We build enterprise-grade scalable software with analytics built in



Hybrid IT

You need to bridge the gap between legacy infrastructure and the digital enterprise. Micro Focus solutions are easy to consume and deploy in any environment, reducing IT costs and time to value. We harden the latest technologies to make them work for you.



DevOps

As a modern DevOps enterprise, you need to accelerate time to market and increase quality. Micro Focus provides an easy-to-use, seamless tool set that scales across the SDLC. From on-premises to cloud and from mainframe to mobile, we address all your DevOps needs.



Security & Risk

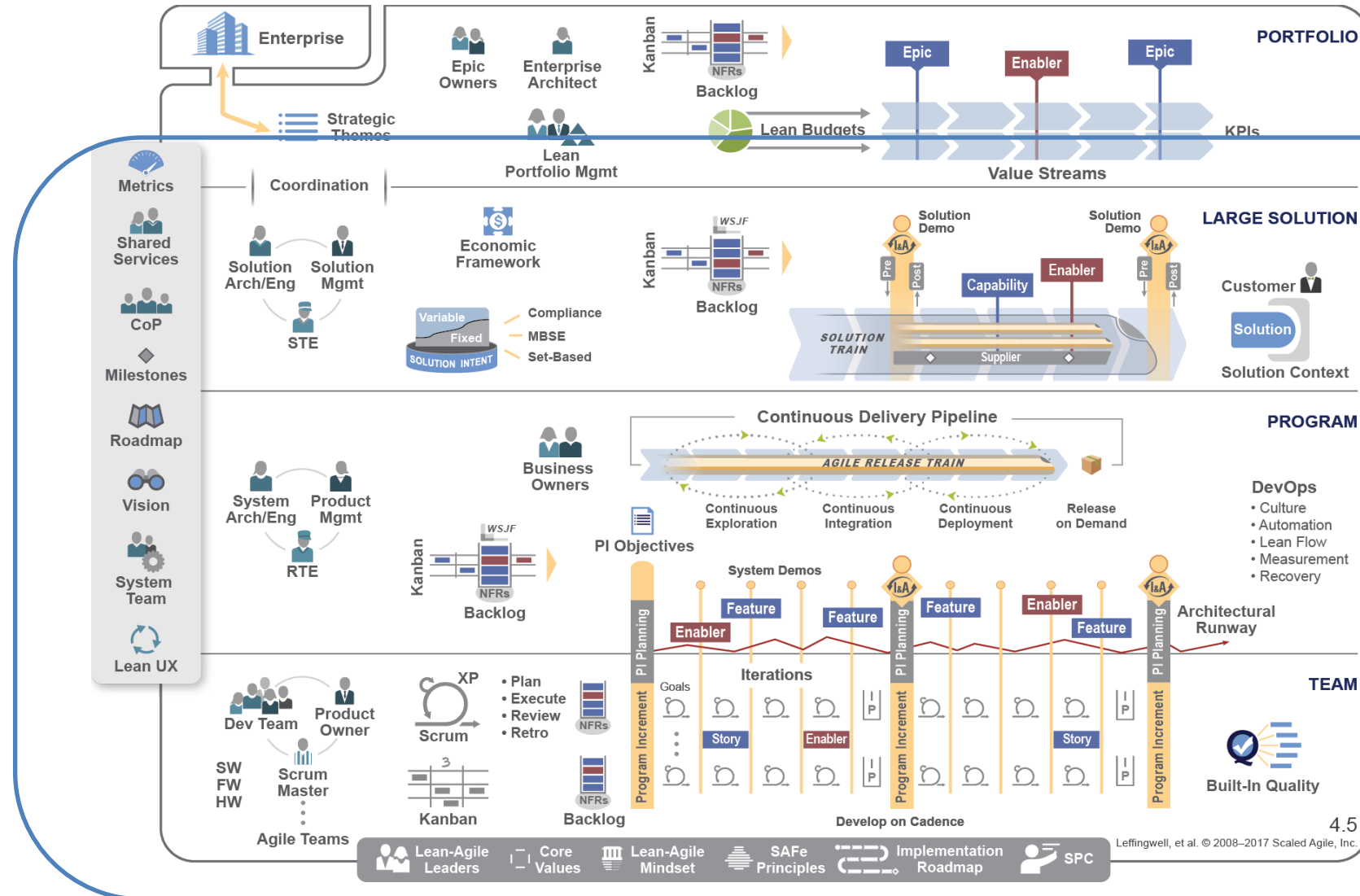
From compliance issues to the most advanced cyber threats, you need to safeguard your enterprise. Micro Focus protects what you value most: users, data, and applications.



Predictive Analytics

Everyone has data, everyone has analytics, but that's not enough. With predictive and proactive analytics, Micro Focus helps you to not only deliver insights, but drive greater intelligence and productivity across your enterprise.

DevOps transformation alignment with Scaled Agile Framework



Powered by
CI/CD

DevOps transformation: impacts the R&D & DevOps practices and operation

Suite Strategy



Agile Practices



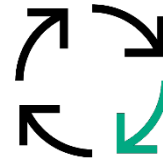
Containers Microservices



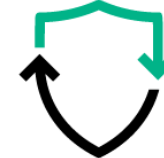
Cross Suite Execution Dependencies



Continuous Integration Delivery & Demo

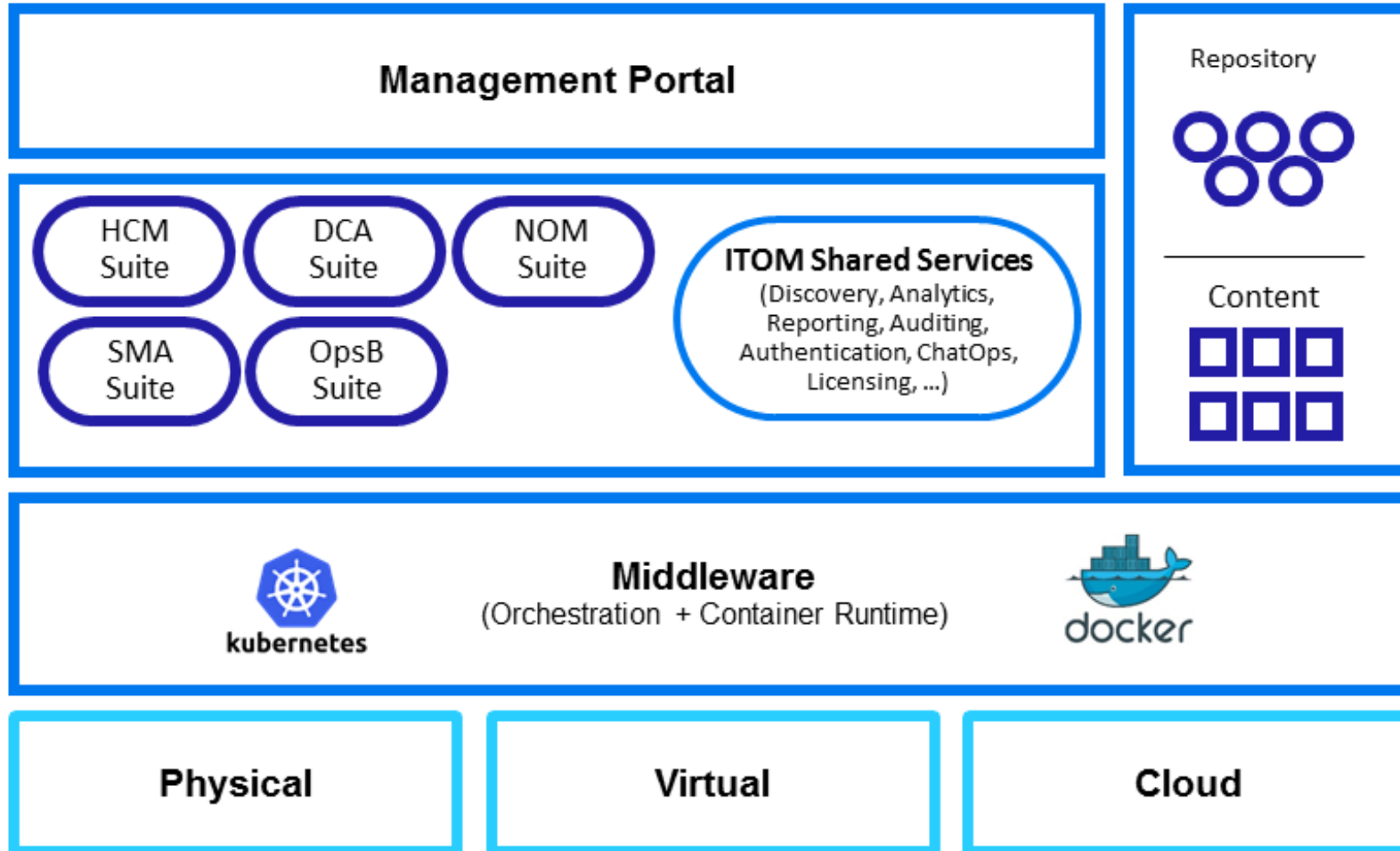


Standards for Security, Quality & Compliance



Mission

Deliver out of box solution of micro service based product suites running on top of Kubernetes on premise, public cloud or SaaS to customers and partners



Product Suite

Imperial Crew

180+ engineers
21 Scrum teams
3 ARTs



Forward Systems

150+ commit/day
150+ CI builds/day
10 Version promotion/wk



COMMAND BRIDGE
The bridge is situated at the center of the command tower, in view of any ship under attack. Grand Moff Tarkin and an Imperial officer stand at the flight consoles and tracking systems.

Defense turret

Tractor beam targeting array
Command bridge

Ship instrument and shield projector sphere
Rear of command bridge opens for access

Ion cannon (flick missile)
Firing mechanism for flick missiles

Rotating heavy turbolaser battery



Chamber

6 products/20+ services
120+ Git repos
140 Docker image
145 running pods



Escape Pod

Service: 1448 UI test, 2000 API,
26788 UT/build
Suite: 442 suite case/build

Data File
Quarterly Full Release
Monthly Patch Release
Lead time: 8H

◆ AGENDA

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- Agile and DevOps Transformation
- **Why Jenkins Pipeline**
- Implementation CI/CD with Jenkins Pipeline
- Q&A

”

Why still Jenkins



Oops!



Travis CI



circleci

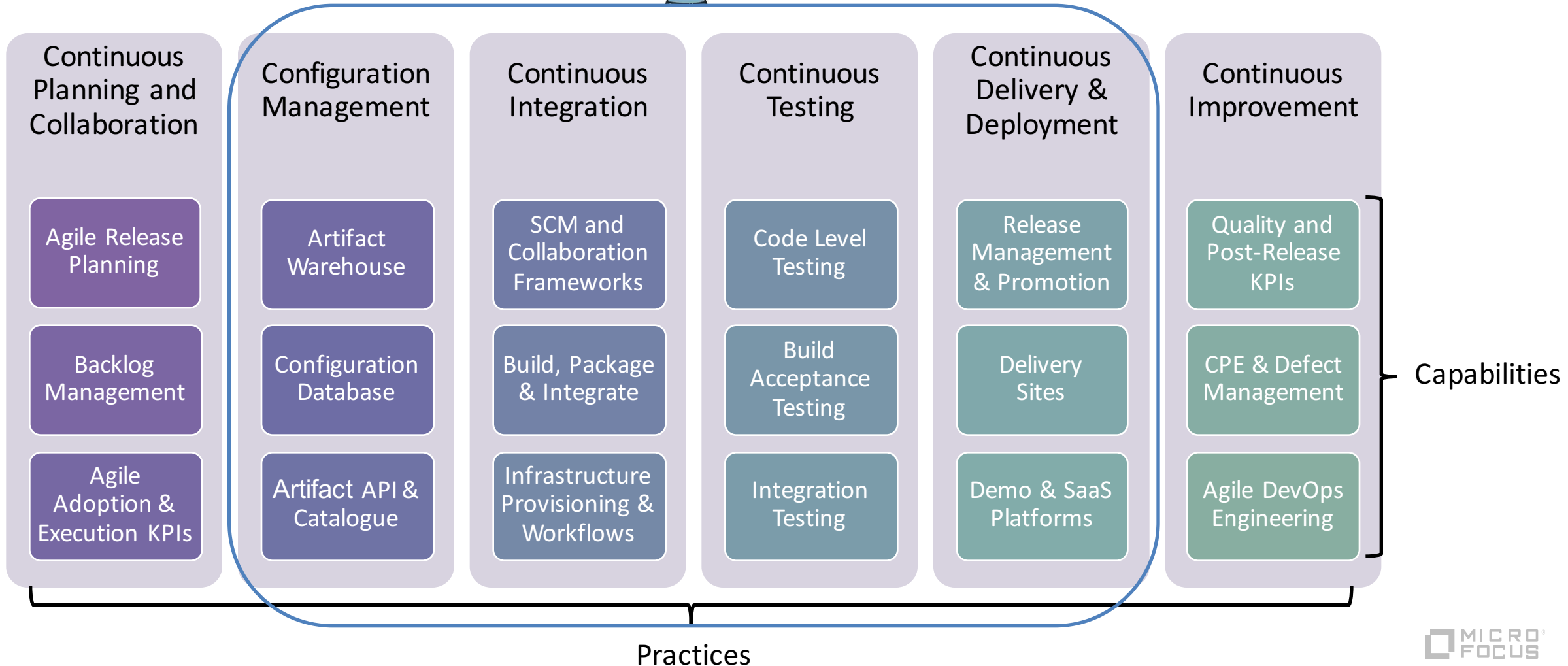


GitLab CI

Jenkins penetrates DevOps Practices and Capabilities



Powered by Jenkins



Orchestration of the DevOps toolchain

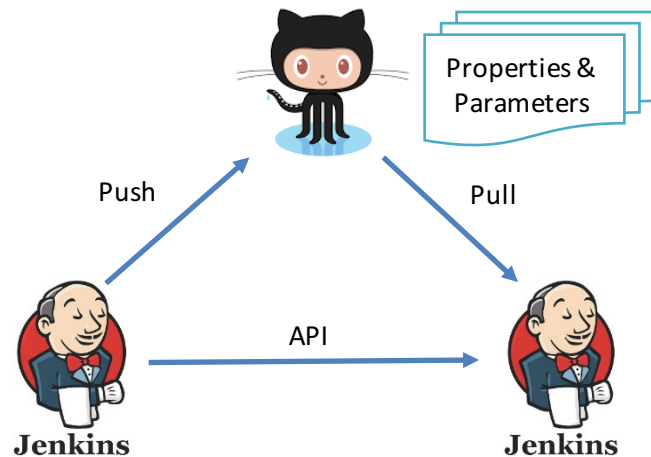


Transform to Jenkins Pipeline

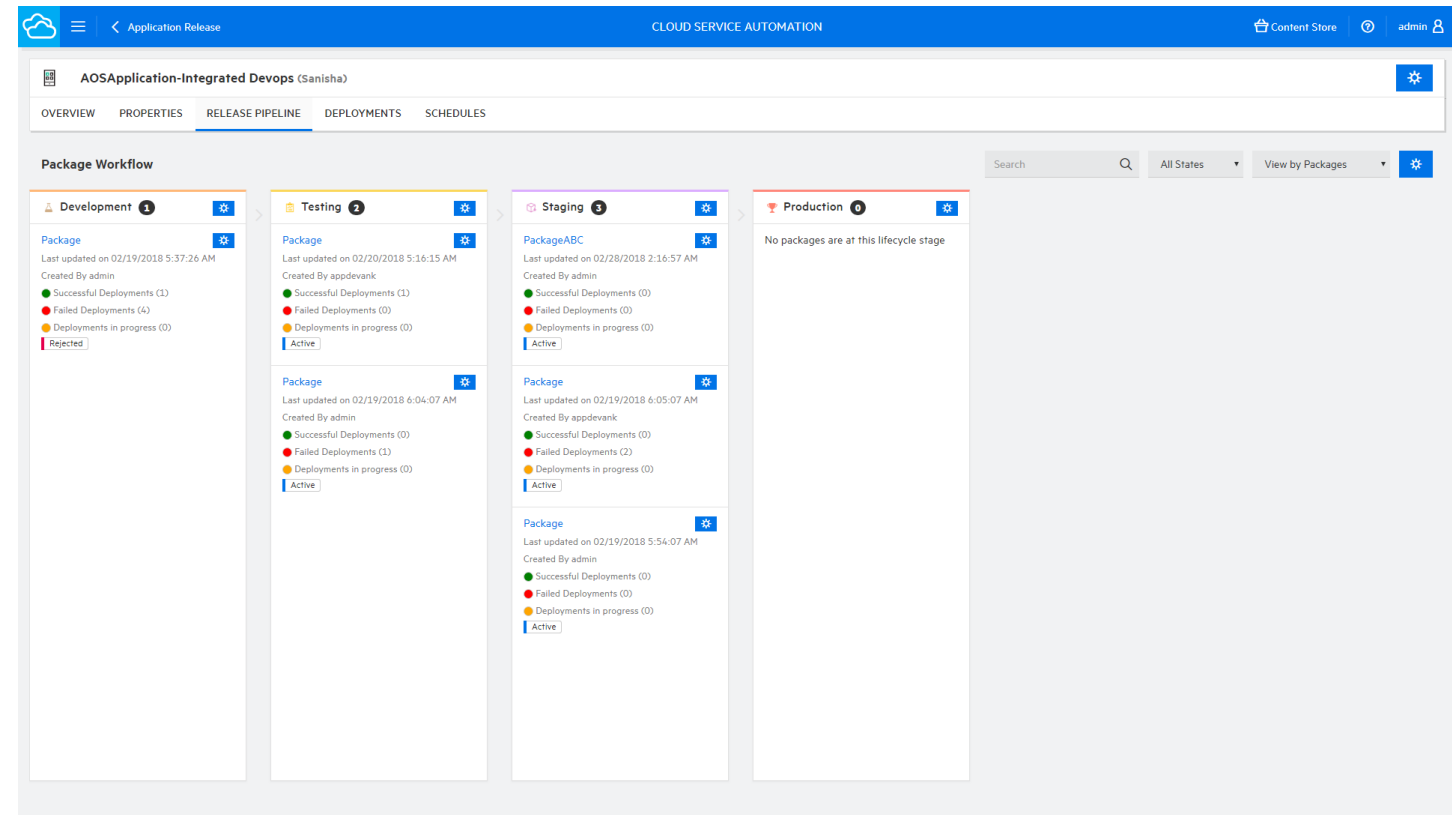
- Scenarios
 - Orchestrate complex process
 - Standardize simple process
- Make everything as code
- Programmer friendly
- Reusable
 - Load from local shared file
 - Shared library
 - Apply from URL
 - Template
- Scripted Pipeline vs Declarative Pipeline
- A standard Git repo structure of service
 - Root directory
 - Dockerfile: define the build environment
 - Jenkinsfile: define the flow
 - deploy-controller: yaml template of Kubernetes
 - manifest.yaml
 - configmap.yaml
 - ingress.yaml
 - rc.yaml
 - Docker: Dockerfile and artifacts
 - Scripts: for CI/CD
 - Config file: for CI/CD
 - Source code

Orchestrating Pipelines in multiple Jenkins masters

Solution 1



Solution 2



◆ AGENDA

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- Agile and DevOps Transformation
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Challenges and solutions



Infrastructure



- Jenkins systems owned by different teams
- Duplicate effort for operation
- Simple backup and restore strategy, no rehearsal
- No HA
- Dedicated computing resource
- No scalability

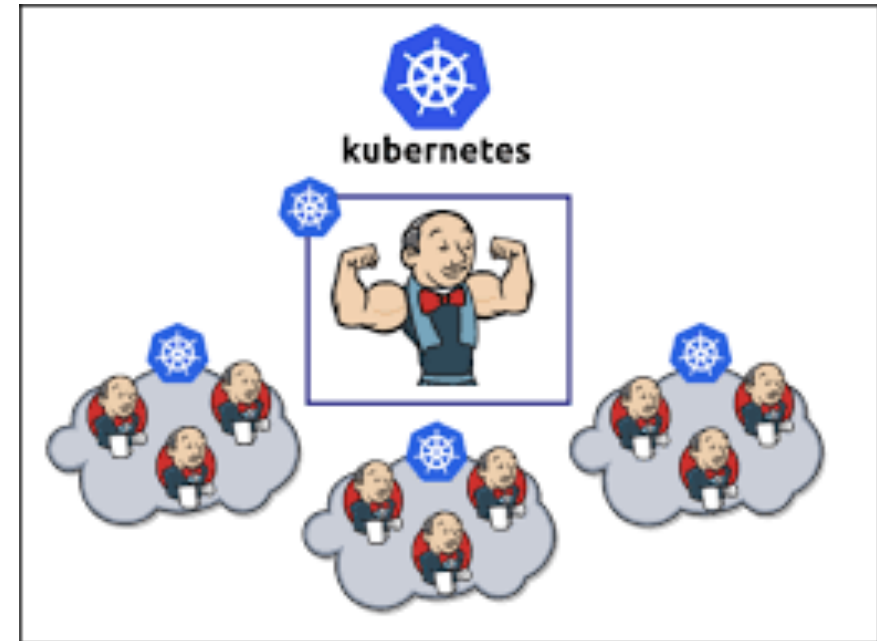
Infrastructure



Current solution

Move to modern style infrastructure

- Step1: Dockerized build environment and tools
- Step2: Dockerized Jenkins agent
- Step3: Running on top of Kubernetes



Infrastructure



Long term solution

- Centralized Jenkins farm on top of Kubernetes
- Cross geography Jenkins setup
 - Network latency
- Shared computing resource
- Auto-Scaling Jenkins with Kubernetes
- Jenkins upgrade strategy
- Self-service way of setting up Jenkins cluster
- HA, IDM enterprise features add-on

Integration



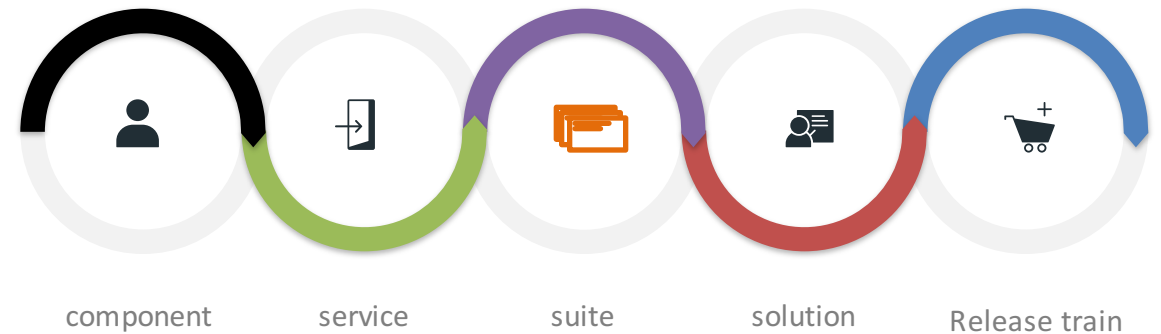
- 1000+ Git repositories
- 1000+ Jenkins jobs
- Dependencies between services
- Hybrid architecture
- Lead time
- Components -> service -> suite -> solution

Integration



Current solution

- Multiple level CI/CD pipelines
- Version declare and mapping cross levels
- Promotion and revert process using GitOps style and Jenkins mutibranch pipeline
- Contract based API testing on suite level
- Pipeline as code, define process and rules in code
- Reusable Pipeline, shared function or library
- Use Maven to unify build chain for different technical stacks or compiling tools of each micro services, simplify the logic programming of Jenkins pipeline
- Standard template, structure and Docker base image



Integration

Promote and revert process using GitOps style and Jenkins mutibranch pipeline

promote itom-smartanalytics 1.0.3-20180613-b1 #1876

Merged

cxu merged 1 commit into `SHA-RnD:master` from `smaci:itom-smartanalytics/promote-1.0.3-20180613-b1` 7 days ago

Conversation 0

Commits 1

Files changed 2

smaci commented 7 days ago

Contributor

Change list:
QCCR1E148408 - Unable to connect to the containerized Smart Analytics from external Service Manager [SMA-H Full mode] Cannot search any knowledge articles when doing a global search in Portal

Images list:
shc-harbor-dev.hpeswlab.net/itsma/itom-itsma-idol-agentstore:1.0.0-20180507-b1
shc-harbor-dev.hpeswlab.net/itsma/itom-itsma-idol-category:1.0.0-20180507-b1
shc-harbor-dev.hpeswlab.net/itsma/itom-itsma-idol-cfs:1.0.0-20180507-b1
shc-harbor-dev.hpeswlab.net/itsma/itom-itsma-idol-community:1.0.0-20180507-b1
shc-harbor-dev.hpeswlab.net/itsma/itom-itsma-idol-content:1.0.0-20180507-b1

1

suite-deployer

Branches (13)		Pull Requests (217)			
S	W	Name ↓	Last Success	Last Failure	Last Duration
		PR-1513	N/A	2 mo 5 days - # 2-suite-deployer-PR-1513	54 sec
		PR-1545	2 mo 11 days - # 10-suite-deployer-PR-1545	2 mo 8 days - # 14-suite-deployer-PR-1545	25 min

2

Changes approved

1 approved review by reviewers with write access. [Learn more.](#)

All checks have passed

1 successful check

[suite-deployer/PR-897](#) — Jenkins Build finish

Details

This branch has no conflicts with the base branch

Merging can be performed automatically.

Squash and merge

You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

3

promote itom-smartanalytics 1.0.3-20180613-b1 (#1876)

smaci authored and cxu committed 7 days ago ✓

Promte itom-sm 2018.06.13.1 (#1875)

qinxiang-zhu authored and cxu committed 7 days ago ✓

4

Integration



Long term solution

- Smart trouble shooting for failure
- Graceful roll back mechanism

Visibility and traceability



- CI/CD happens distributed
- Not easy to learn the status of pull request, promotion, testing, deployment, security scan etc.

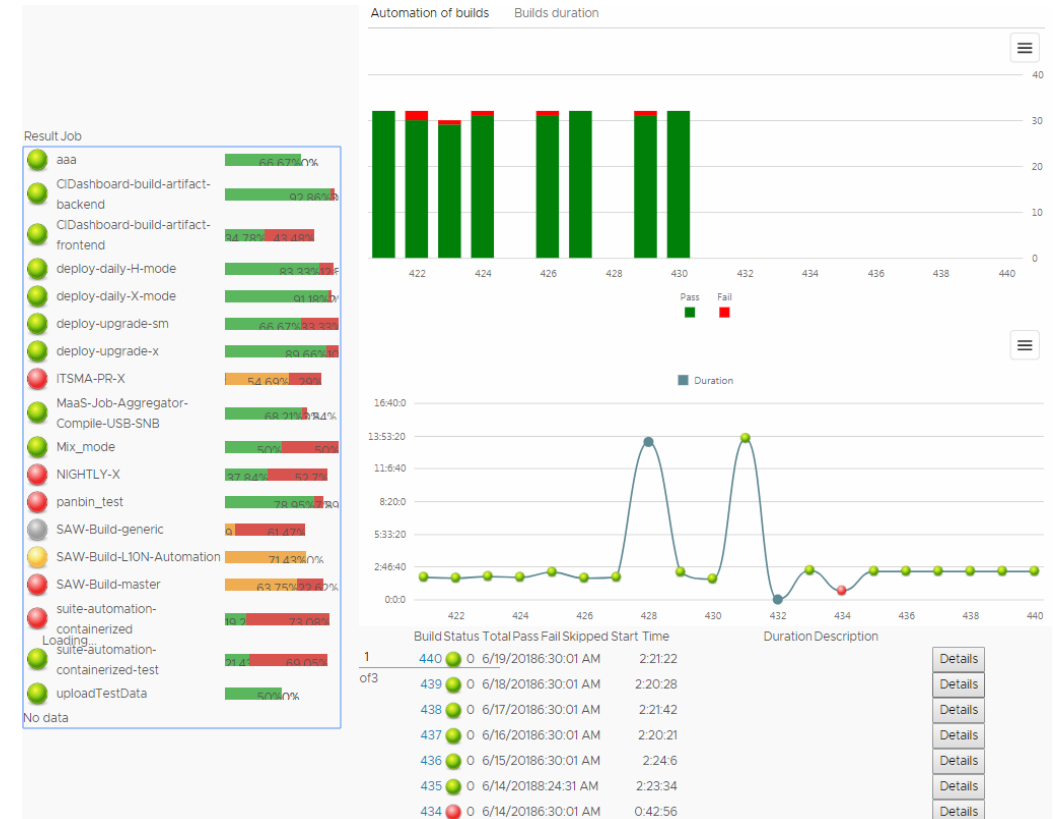
Visibility and traceability



Current solution

- Centralized Dashboard
- Light weight data center
- Jenkins notification plugin
- Request data from GitHub, VMware, kubernetes
- Teams aggregate and pop up data to dashboard

ITOM CDF CONTINUOUS DELIVERY					Last Updated : 06/18/2018 16:15
ITOM CDF 2018.08					
CDF LAST 5 BUILD STATUS					Last Promoted Build
Suite	Suite Ver	Last Run	Deployment Status (Build No)	Smoke Result (Pass/Total)	
DCA	2018.05	15/06	45	-	
SMA-SM	2018.08	18/06	45	-	
HCM	2018.08	18/06	46	-	
OpsBridge	2018.05	15/06	45	0/0	
NOM	2018.05	15/06	45	-	
SMAX	2018.08	18/06	45	-	



Visibility and traceability



Long term solution

- Powered by Micro focus solution
- Integrate dashboard with Agile and CI/CD system Octane
- Extend generic data collector COSO for CI/CD system
- Vertica for Big data store and measurement
- Auto discover of CI/CD events

Deployment



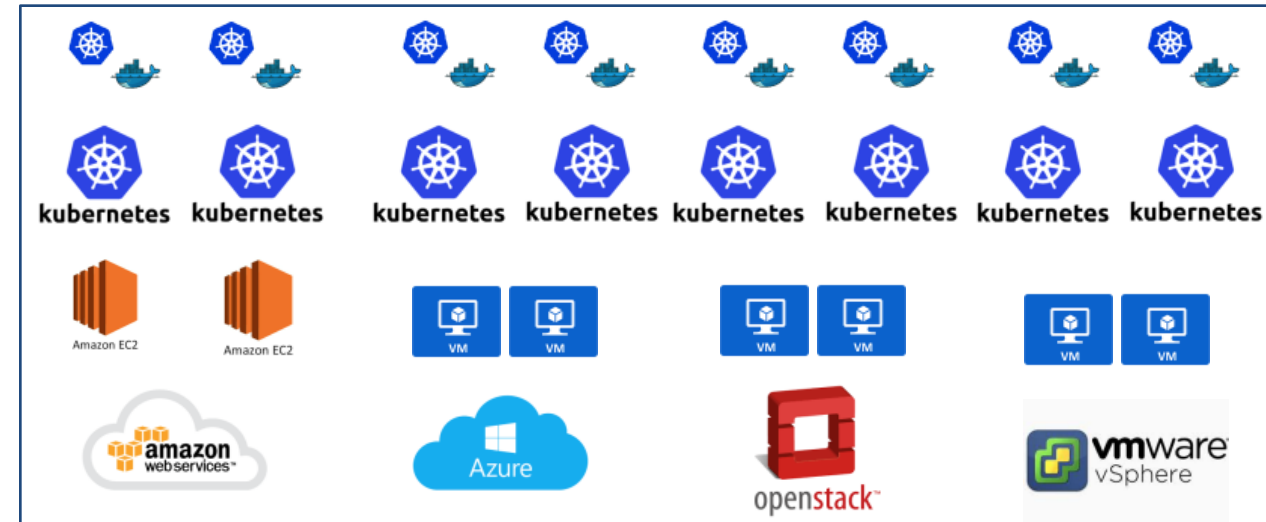
- Complexity of environment: on-premise, SaaS, public cloud
- Complexity of installation mode
- Services have dependances

Deployment



Current solution

- Standardize the VM template which are defined as code
- Unify configuration, environment, and method in each different layers
- Infrastructure provisioning: Terraform, Cloud Formation, Ansible
- Kubernetes cluster: Container Delivery Foundation
- Installation: Deploy kit (Go + Ansible)
- Deployment controller is defined in each service



Deployment



Long term solution

- Replace Ansible solution with CloudSlang and OO
- Integration with service portal Catalog and Offering
- Simulate Day 2 operation

Release automation



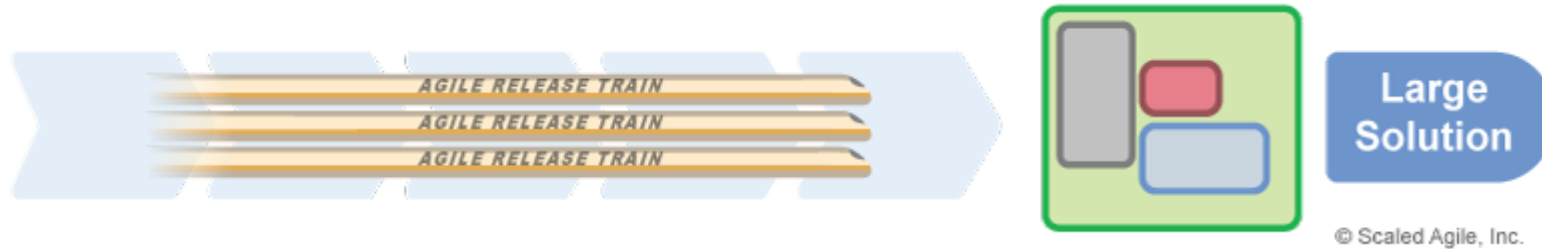
- Different release train has different timeline
- Shared service consumed by multiple release trains
- Publish hundreds Docker images on DockerHub within a small time window
- Docker images validation and governance

Release automation



Current solution

- Distribute Docker pushing tasks to multiple instances using Jenkins pipeline parallel functionality
- Provide release automation service running on kubernetes



Deployment



Long term solution

- Integration with approval process
- End to end automation

Common capability as a service



- Overhead of operation

Common capability as a service



Current solution

- Automate everything
- Provide common capability as a service running on Kubernetes cluster or as a Jenkins job
 - VM operation
 - Automation test framework
 - Monitor
 - Security scan
 - 3rd party scan
 - static code analysis
 - code signing



Common capability as a service



Long term solution

- Powered by Micro Focus solution
- Building an interface into ChatOps for any services
- Service portal Catalog Offering



Q&A
Thank You.