JenkinsX on Arm Project Deliverables

# Source codes:

**P3.1, P3.2:** <https://github.com/jenkins-x/jenkins-x-arm-support/pull/8>

# Images:

Arm64 images including lighthouse, tekton, bucketrepo, kaniko in location: <https://hub.docker.com/u/linarojenkinsx>

1. Name: distroless

○ Description: a debug distroless image of arm64 arch

○ linarojenkinsx/distroless:arm64-debug

2. Name: jx-pipelines-visualizer

○ Description: jx-pipelines-visualizer image of arm64 arch

○ linarojenkinsx/jx-pipelines-visualizer:arm-0.0.60

3. Name: lighthouse-foghorn

○ Description: lighthouse-foghorn image of arm64 arch

○ linarojenkinsx/lighthouse-foghorn:arm-v0.0.881

4. Name: lighthouse-tekton-controller

○ Description: lighthouse-tekton-controller image of arm64 arch

○ linarojenkinsx/lighthouse-tekton-controller:arm-v0.0.881

5. Name: lighthouse-gc-jobs

○ Description: lighthouse-gc-jobs image of arm64 arch

○ linarojenkinsx/lighthouse-gc-jobs:arm-v0.0.881

6. Name: lighthouse-jenkins-controller

○ Description: lighthouse-jenkins-controller image of arm64 arch

○ linarojenkinsx/lighthouse-jenkins-controller:arm-v0.0.881

7. Name: lighthouse-keeper

○ Description: lighthouse-keeper image of arm64 arch

○ linarojenkinsx/lighthouse-keeper:arm-v0.0.881

8. Name: lighthouse-webhooks

○ Description: lighthouse-webhooks image of arm64 arch

○ linarojenkinsx/lighthouse-webhooks:arm-v0.0.881

9. Name: bucketrepo

○ Description: bucketrepo image of arm64 arch

○ linarojenkinsx/bucketrepo:arm-v0.1.47

10. Name: kaniko

○ Description: kaniko image of arm64 arch

○ linarojenkinsx/kaniko:arm-v0.20.0

11. Name: tekton-creds-init

○ Description: tekton-creds-init image of arm64 arch

○ linarojenkinsx/tekto-creds-init:arm-0.15.2

12. Name: tekton-entrypoint

○ Description: tekton-entrypoint image of arm64 arch

○ linarojenkinsx/tekto-entrypoint:arm-0.15.2

13. Name: tekton-gcs-fetcher

○ Description: tekton-gcs-fetcher image of arm64 arch

○ linarojenkinsx/tekto-gcs-fetcher:arm-0.15.2

14. Name: tekton-imagedigestexporter

○ Description: tekton-imagedigestexporter image of arm64 arch

○ linarojenkinsx/tekto-imagedigestexporter:arm-0.15.2

15. Name: tekton-kubeconfigwriter

○ Description: tekton-kubeconfigwriter image of arm64 arch

○ linarojenkinsx/tekto-kubeconfigwriter:arm-0.15.2

16. Name: tekton-nop

○ Description: tekton-nop image of arm64 arch

○ linarojenkinsx/tekto-nop:arm-0.15.2

17. Name: tekton-pullrequest

○ Description: tekton-pullrequest image of arm64 arch

○ linarojenkinsx/tekto-pullrequest:arm-0.15.2

18. Name: tekton-git-init

○ Description: tekton-git-init image of arm64 arch

○ linarojenkinsx/tekto-git-init:arm-0.15.2

19. Name: tekton-webhook

○ Description: tekton-webhook image of arm64 arch

○ linarojenkinsx/tekto-webhook:arm-0.15.2

20. Name: tekton-controller

○ Description: tekton-controllerimage of arm64 arch

○ linarojenkinsx/tekto-controller:arm-0.15.2

# Bugs solved and Contributions to Jenkins X community:

Since the team started working on the task of Installing Jenkins 3 by JenkinsX 3 CLI with Jx-boot in the beginning of December, the team has encountered 22 issues. Among those issues, the team collaborated with the community and solved 18 of them. For the remaining 4 issues, the team has to rely on the community to solve them after this project ends.

## **25/Dec, Friday**

* The nginx-controller's network is EXTERNAL-IP which deployed by jx3 can not used in our cluster. And the latest jx3 template repo have webhook-admission. So we can not use the latest template repo deploy the jx3 cluster successfully.

## **21~22/Dec, Monday**

* In the current deployment Jx 3 environment (version: 7/Dec master ‘head’ of [repo](https://github.com/jx3-gitops-repositories/jx3-kubernetes).), the team kept trying to enable Quickstart pipeline on version 7/Dec JX3 environment.
* On 22nd/Dec, per James S suggestion, researched quickstart's problems of "git-image" image, updated image url in "tekton-pipelines-controller" deploy but it still failed to resolve QuickStart issue.
* Based on this finding, [James Strachan](mailto:jstrachan@cloudbees.com) confirmed this issue and reported a issue to Google:
  + <https://github.com/GoogleContainerTools/kpt/issues/1319>
  + Need a “kpt” binary release for arm64 too please

## **16~18/Dec, Wednesday & Thursday & Friday**

* The team fixed the problem of ingress, the pipeline could be run.

The team found the issue that the distroless-debug image could not run successfully on arm64.

* The team found it was the busybox that caused the distroless-debug unable to run on arm64. So he changed the busybox version from arm32 to arm64 and built it again. This time it succeeded. The image link is [here](https://hub.docker.com/r/linarojenkinsx/distroless).
* The team edited the deployment of tekton-pipeline-controller with the new distroless image. This time, the jx project quickstart init containers worked.

## **14~15/Dec, Monday & Tuesday**

* The team modified the dockerfile of jx-cli-base-image. The dockerfile is [here](https://github.com/yyunk/jx-cli-base-image/commit/b46fef9fb1a3df372fc333248d77d2ce9eb87d3f).
* The team built the arm64 image of jx-build-controller with the jx-boot as base image.
* The team tried to run ‘jx project quickstart’, but failed.
* The team updated the latest jx-cli, the quickstart cloud run. The log is [here](https://pastebin.ubuntu.com/p/pPJhZ8ZTVV/).

## **9~11/Dec, Wednesday & Thursday &Friday**

* The team built the lighthouse images of version v0.0.881 and bucketrepo images of version v0.1.47.
* The team reinstalled the kubernetes cluster and Re-deployed jx3 with the new images. The steps are list [here](https://pastebin.ubuntu.com/p/Q78yfnFZVz/)
* The team built the arm64 image of jx-pipelines-visualizer (v0.0.60)
* The team tried to build the image of jx-build-controller, but the build process heavily depends on [google cloud tools & SDK](https://cloud.google.com/cloud-build/docs/configuring-builds/use-community-and-custom-builders), which we don't have access to.

## **8/Dec, Tuesday**

* Using the image 3.0.798 of jx-boot, the team executed the ‘jx admin operator’ and installed the jx3 cluster successfully.
* Since the Lighthouse and Bucketrepo do not have the official arm64 arch images, the team replaced them with the local built arm64 version of Lighthouse and bucketrepo. With this change, the pods are in “Running” status.

## 7/Dec, Monday

* the team found the root cause of the helmfile unable to run. Because it’s being dynamically built. By converting it to be statically built, this problem was solved.
  + Fix: modify the Makefile and add 'CGO\_ENABLED=0' to do static link. Verified using 'FROM alpine:3.12' and it works. see Dockerfile [here](https://github.com/docularxu/helmfile/releases/download/v0.135.0.arm64/Dockerfile).
  + The team then managed to build a helmfile inside golang:alpine container on arm64 and for arm64. Shared with James S. [here](https://github.com/docularxu/helmfile/releases/tag/v0.135.0.arm64).
* Using [Helmfile arm64](https://github.com/docularxu/helmfile/releases/tag/v0.135.0.arm64) from Linaro, James Strachan built the image 3.0.798 of jx-boot. the team tested it. For the first time, Jx can boot on arm64. A significant achievement!.
  + The team created a new repository from jx3-kubernetes,then modifies the versionStream/git-operator/job.yaml file,and tests it.
  + The log is [here](https://pastebin.ubuntu.com/p/8vg27gN7qV/).

## 3~4/Dec, Thursday & Friday

* Assisted JX community to find this fix:
  + Show-how generating multi-arch (arm64) for jx-boot, and others： <https://github.com/jenkins-x/jx-git-operator/blob/master/cloudbuild.yaml#L21>
* Assisted JX community to find this fix:
  + adding arm64 support to helmfile: <https://github.com/roboll/helmfile/pull/1612>
* Helmfile: the team built the arm64 version of helmfile v0.135.0 locally on arm64 server, and James S published it.
  + the team found the helmfile could not run inside an alpine based container, but could run in ubuntu. What’s the following up steps?

# Documents:

1. Name: create pipeline using Tekton, lighthouse, bucketrepo and kaniko on Arm64.
   * Description: P3.1 and P3.2
   * [Link is here.](https://github.com/jenkins-x/jenkins-x-arm-support/pull/8/commits/60022b4941e81e59dbf3bf80ad05131666bd6e6d#diff-c896902599305c1769437509b5e6eef47a1400191675b14fffc5cbea05a2a165)
2. Name: documents of how to build the lighthouse, kaniko-v0.20.0, Tekton v0.15.2, and Bucketrepo-0.1.12 on Arm64
   * Description: on Arm64
   * Link is [here](https://github.com/jenkins-x/jenkins-x-arm-support/commit/87aa0173a7c4f879fa3b7a8bd9650ffbf44b7ebe#diff-258fe998d77aa2fe6b6147574008e23684917a4676cc9cdcb7c333c3b27f56f8).
3. Note: (the team has written some Jenkins X study materials. Append them here later.)

<https://docs.google.com/document/d/1sRNr81D4uD3m8Kcbbb8elAfVRGk-rebTYfFHp7BuSqA/edit>

<https://docs.google.com/document/d/1F7fiSGmtmQqQIkj49NUvcRjLhHOMhGeFJU_NZkhTMAA/edit>

<https://docs.google.com/document/d/1H8ZmUBZrlEsSewZkwBBXHL8Rw1nW8V7U/edit>

1. The team wrote a doc about BDD. Append [here.](https://docs.google.com/document/d/1bMxe3KYPKlqIj9Xva-zjDJl-FXlvFsuHJOfLyrVmoms/edit)

# Working Environment

* Memory : 32 G
* CPU : 32 cores
* kubectl version: v1.18.6
* OS: Linux version 4.15.0-128-generic (buildd@bos02-arm64-005) (gcc version 7.5.0 (Ubuntu/Linaro 7.5.0-3ubuntu1~18.04))
* The kubernetes cluster has one master and two workers.