Welcome!

PREREQUISITES

- Wi-Fi enabled Mac or PC
- SSH client
- Internet Browser

1. Register and launch https://jfrog.orbitera.com/c2m/trial/1289
2. ssh conan@<IP>

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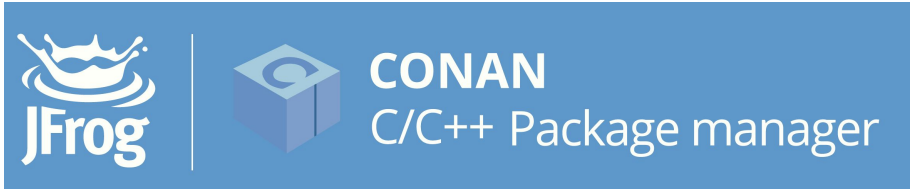

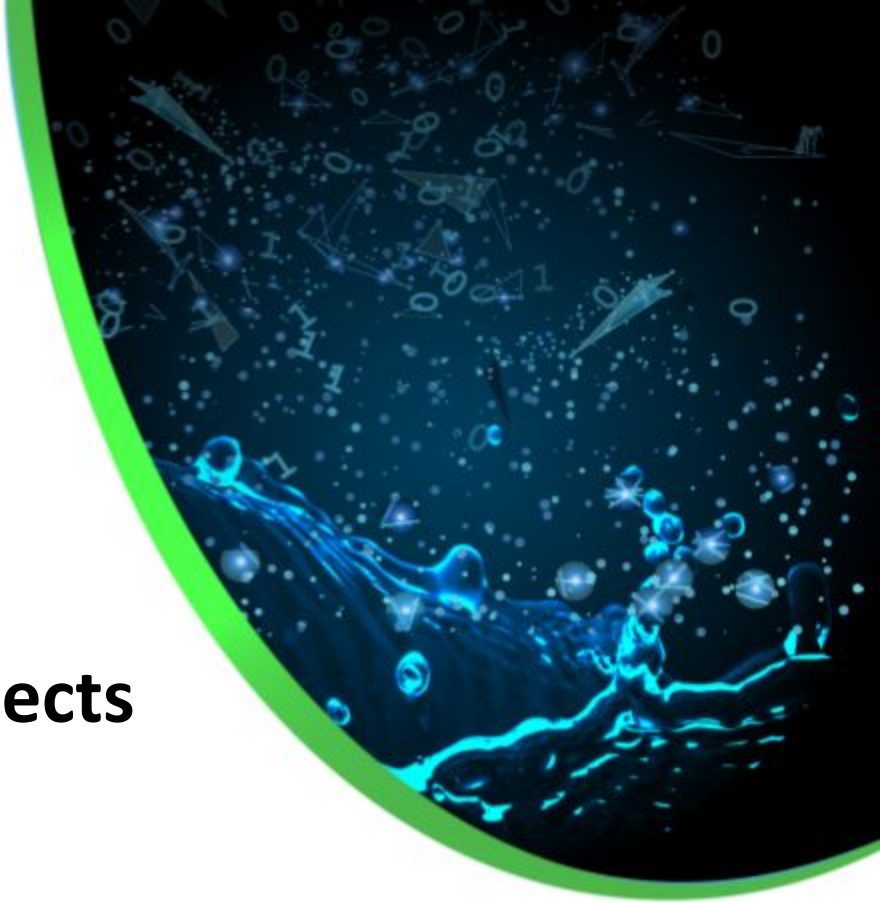

Best Practices for C/C++ Projects with Conan and Artifactory

Yann Chaysinsh, Solution Engineer @ JFrog
Carlos Zoido, Conan developer @ JFrog

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Speakers

Yann Chaysinh

Carlos Zoido

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Lab 1: Jenkins and environment bootstrapping

- Artifactory
  - Create CI user → **conan/conan2020**
  - Create repositories: conan-tmp, conan-develop, conan-metadata
  - Create permissions
- Conan
  - Download configuration from a git repo
  - Add conan remote and assign user conan
  - Build App, App2 and dependencies → upload them to Artifactory to populate the repos
- Jenkins
  - Create pipelines for all libraries in Jenkins

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Lab 1 - Setup

```
ssh conan@<orbitera-IP>
# Use password from orbitera
git clone
https://github.com/conan-ci-cd-training/conan_ci_cd.git
cd conan_ci_cd/setup_jenkins
./bootstrap.sh <artifactory_password>
<jenkins_credential>
```

```
vm-testdriveinstance-1289-88142
-------------------


------ Outputs ------
Username:
admin

Artifactory URL:
http://34.68.29.120:8082/

Password:
WEs22tORIP

IP:
34.68.29.120

SSH Username:
conan

Jenkins Credential:
zmpoqUUj8z

Jenkins URL:
http://34.68.29.120:8080/
----------------------
```

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Outline

- **Introduction**
- Conan reminder
- CI
- Build info in Artifactory
- Promotion in Artifactory
- Appendix

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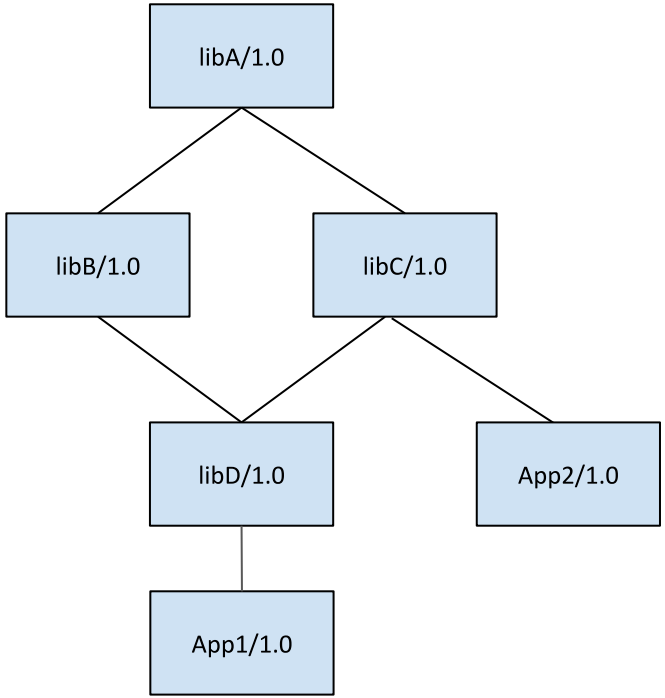
The Story: Mycompany components

- 1 project providing 2 Apps which consume modules/libs
- All modules/libs are internal to the project and some of them are shared by the Apps



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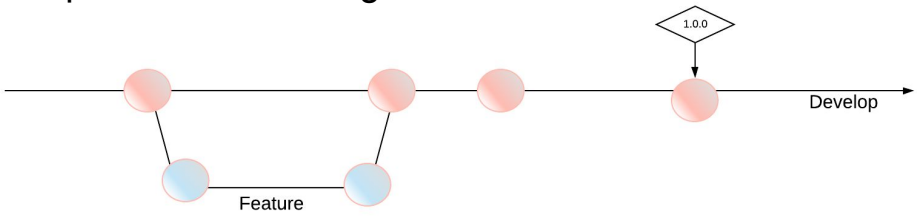
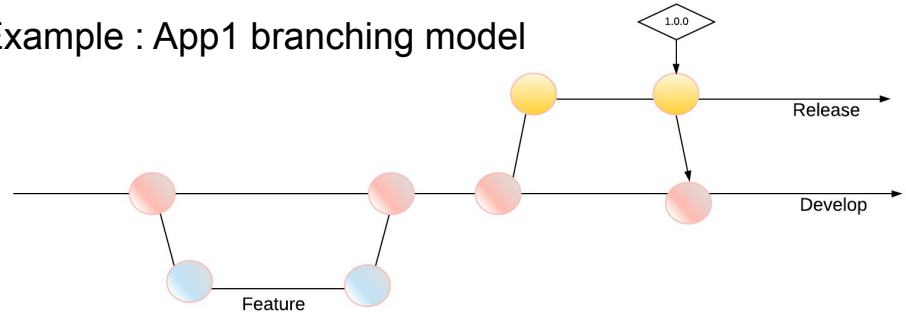
The Story: Code workflow

Example : libA branching model



* libB, libC and libD follow the same flow and have their own code repository

Example : App1 branching model



* App2 follows the same flow and has its own code repository

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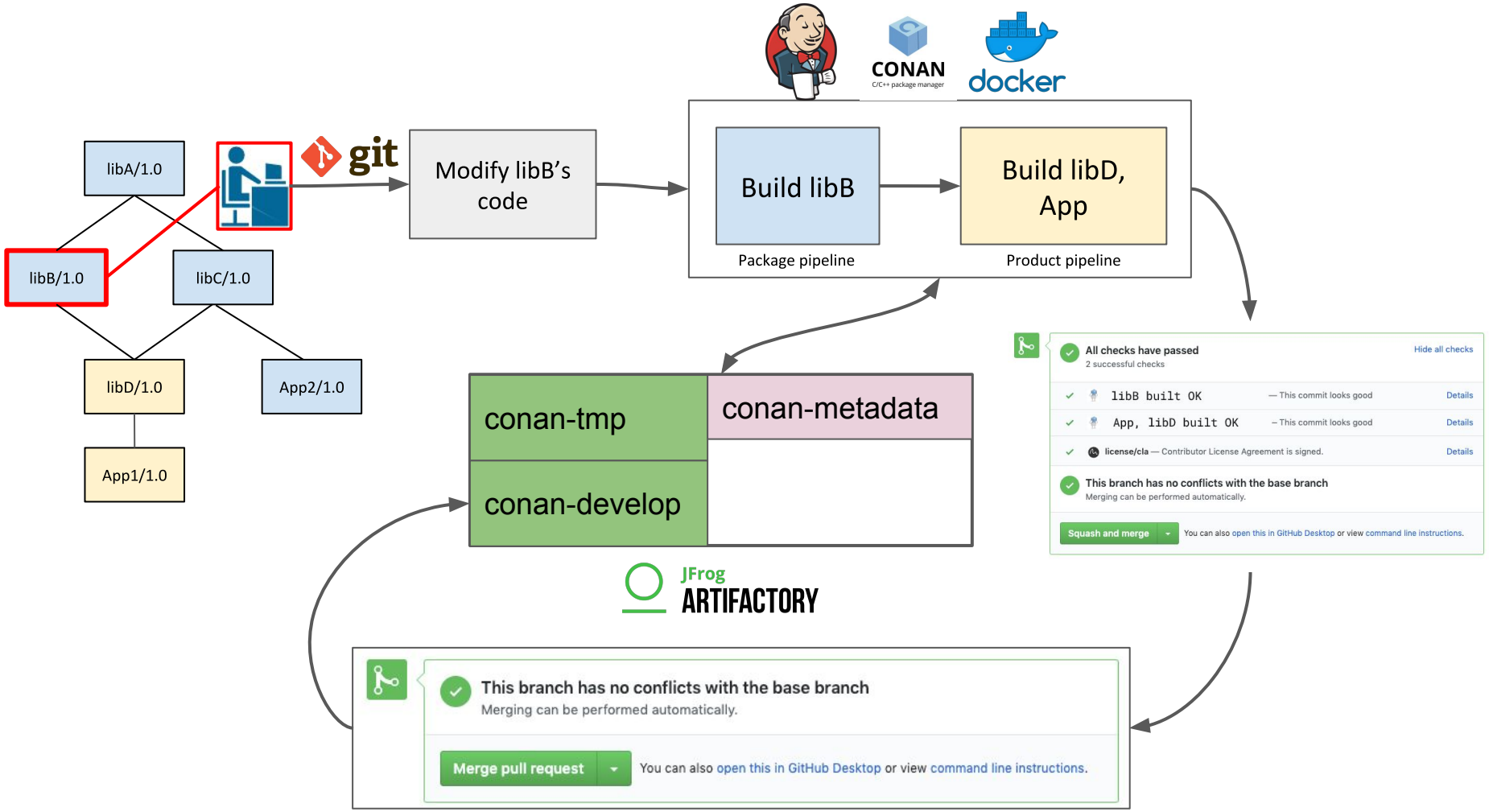
libA/1.0
libB/1.0
libC/1.0
libD/1.0
App2/1.0
App1/1.0
git
Modify libB's code
CONAN
C/C++ package manager
docker
Build libB
Build libD, App
Package pipeline
Product pipeline
conan-tmp
conan-metadata
conan-develop
JFrog
ARTIFACTORY
All checks have passed
2 successful checks
Hide all checks
libB built OK
— This commit looks good
Details
App, libD built OK
— This commit looks good
Details
license/cla — Contributor License Agreement is signed.
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.
This branch has no conflicts with the base branch
Merging can be performed automatically.
Merge pull request
You can also open this in GitHub Desktop or view command line instructions.

The Story: Goals

- Speed up build time by always having binaries available
- Consuming the latest changes
- Know in advance that changes in libraries do not break the products
- Managing and monitoring the delivery process

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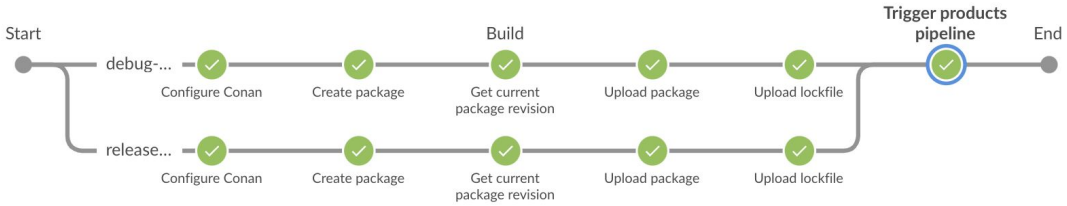
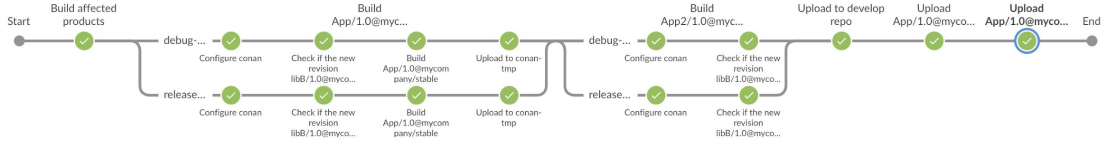
Check Jenkins





Username: **administrator**
Password: **<Jenkins Credential>**
in orbitera e-mail with JFrog Test Drive Details

Artifactory

- Universal Binary repository manager
- Checksum based storage
- Build Info : Binary dependency tracker
- Properties : metadata applied to any artifacts. Could be used for automation (search, download, move, delete)

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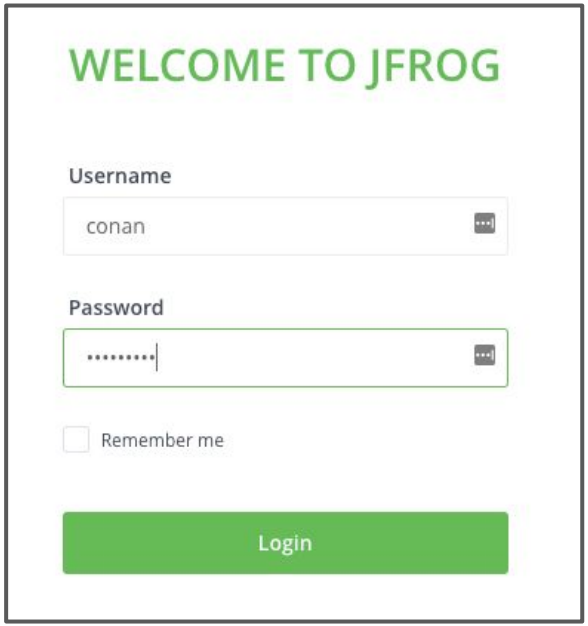
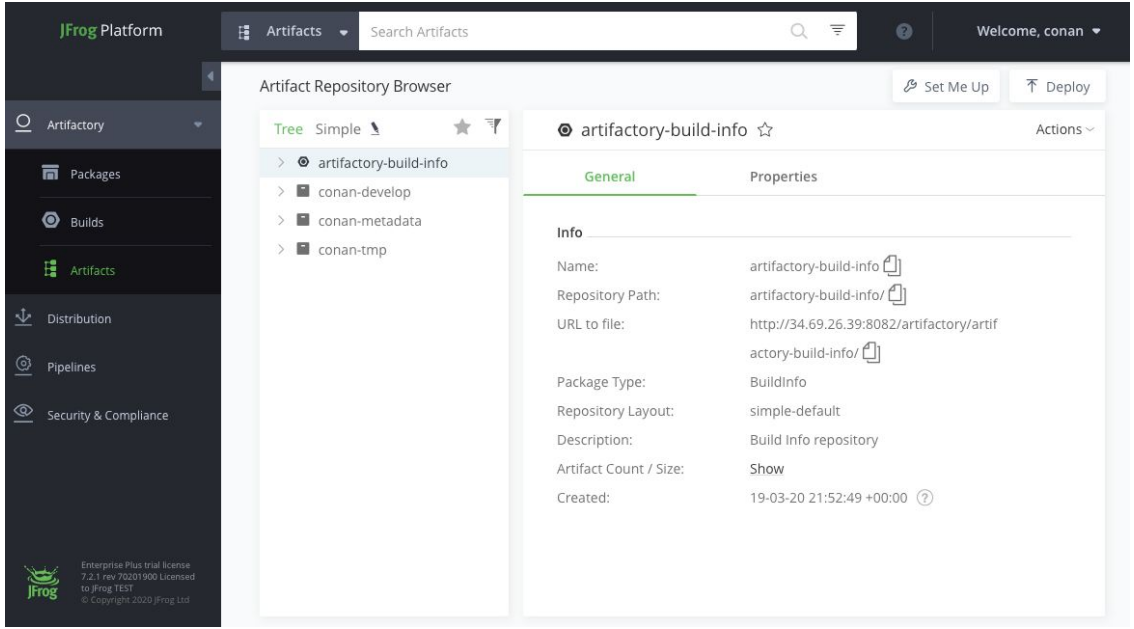
Check Artifactory





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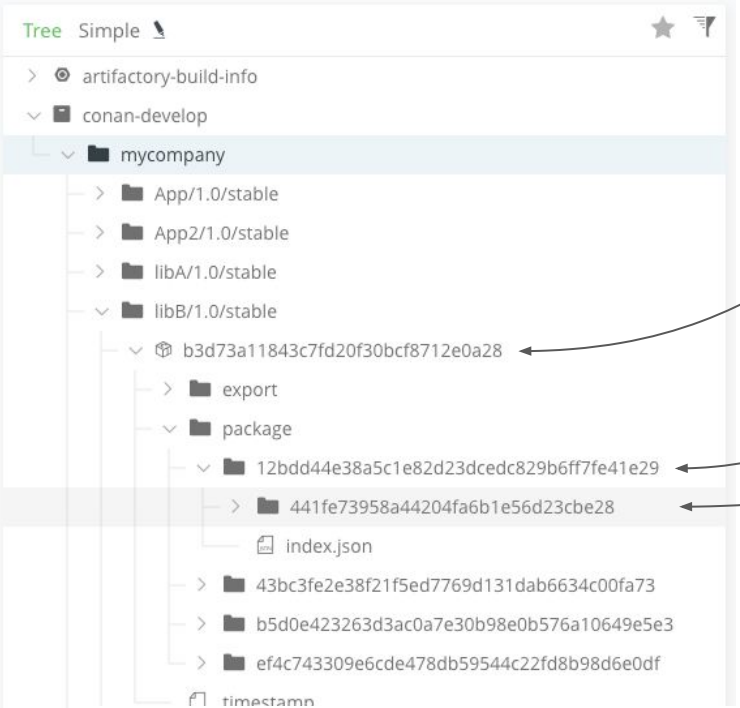
Check Artifactory



RECIPE REVISION(RREV)

PACKAGE ID

PACKAGE REVISION (PREV)

<name>/<version>@<user>/<channel>#<rrev>:<pkg_id>#<prev>

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Outline

- Introduction
- **Conan reminder:** revisions, package id mode, lockfiles
- CI
- Build info in Artifactory
- Promotion in Artifactory
- Appendix

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Conan reminder: Revisions

- 2 types :
  - **Recipe :**
    - Id for tracking down any changes at the recipe level.
    - **RREV** = hash(sources, recipe, ...)
  - **Package:**
    - Id for tracking down any changes at the binary package level
    - **PREV** = hash(all the packaged files)
- Goal : **Update packages with changes without bumping the conan package/library version**

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Conan reminder: Package ID modes

package_id = f(**settings**, **options**, **requirements**)

- **Settings**: operating systems, compilers, build types,…
- **Options**: shared, fPIC…
- **Requirements**: depending the package_id mode

Package ID modes for binary compatibility

- Can be more strict or more relaxed
- Choosing the right one is important, we will use **recipe_revision_mode** for our CI (quite strict)**, <u>new revisions will affect package id's of dependents</u>**

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Conan reminder: Lockfiles

- A snapshot of a dependency graph at a given time.


```
{
 "version": "0.3",
 "profile_host":
"[settings]\narch=x86_64\narch_build=x86_64\nbuild_type=Release\ncompiler=gcc\ncompiler.libcxx=libstdc++11\ncompiler.version=6\nos=Linux\nos_build=Linux\n[options]\n[build_requ
ires]\n[env]\n",
 "graph_lock": {
   "nodes": {
     "0": {
       "options": "shared=False\nlibA:shared=False",
       "pref": "libB/1.0:ef4c743309e6cde478db59544c22fd8b98d6e0df",
       "path": "/var/lib/jenkins/libB/conanfile.py",
       "requires": [
         "1"
       ]
     },
     "1": {
       "options": "shared=False",
       "pref": "libA/1.0@mycompany/stable#d84a023833ae8b56bd8573d05962c937:57547fe65fffc300f05aa42ee64b3b02eeabb6d7#5bafcbf5f3eb1682dcac8e6810bf6e35"
     }
   }
 }
}
```


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Conan reminder: Lockfiles use in CI

- Build with the **exact graph** of dependencies
- Use the lockfile to calculate the **build order** of a graph
- If **different nodes** in CI are building the same project, they can **update the lockfile** for the whole graph as they go building libraries
- Generate **Build Info** with the lockfiles (create and install commands will update and mark built libraries as built in the graphlock file)
- Also, lockfiles can be also stored in Artifactory, using a generic repo (conan-metadata repo)

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Lockfiles cheatsheet

command	Input lockfile	Output
create / install / export / export-pkg	Yes (optional)	Update **lockfile**
graph lock	No	**lockfile** with the graph
graph build-order	Yes	**JSON** with build order
graph update-lock	Yes (requires 2 lockfiles)	Update oldest **lockfile**

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Conan reminder: two more things

- We will use SCM mode for our examples: commits of source code will generate new RREV

```
class LibB(ConanFile):

    scm = {"type": "git",
           "url": "https://github.com/conan-ci-cd-training/libA.git",
           "revision": "auto"}
```

- Will share the Conan configuration among developers with a git repo

```
conan config install https://github.com/conan-ci-cd-training/settings.git
```

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Outline

- Introduction
- Conan reminder: revisions, package id mode, lockfiles
- **CI: workflow**
- Build info in Artifactory
- Promotion in Artifactory

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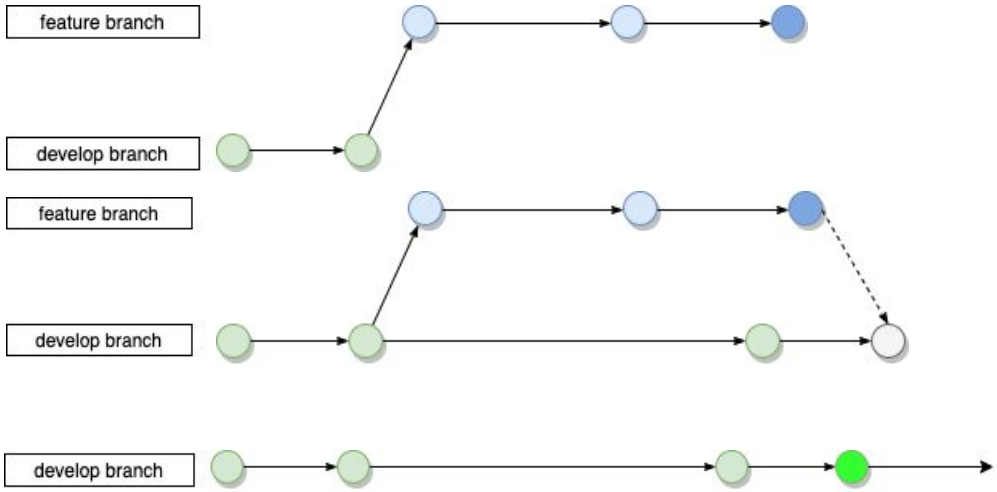
Phases in the workflow

Developers will make changes in the libraries and we want those changes to be seamlessly integrated in our products. Different phases:



Phase 1: Create the feature branch, start developing the feature.

Phase 2: Make PR. Test over temptative commit

Phase 3: Merge the PR

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Outline

- Introduction
- Conan reminder: revisions, package id mode, lockfiles
- **CI: workflow phase 1**
- Build info in Artifactory
- Promotion in Artifactory

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Phase 1: Developer works on a feature branch of libB

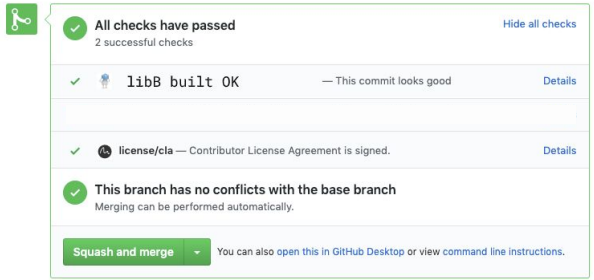
Developer is commiting changes for libB.
Will the lib build OK and pass the tests for all configurations?

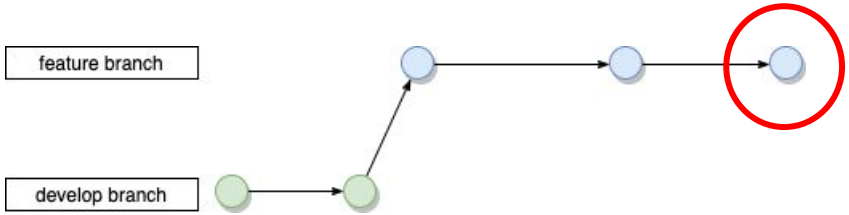
Package (libB) pipeline

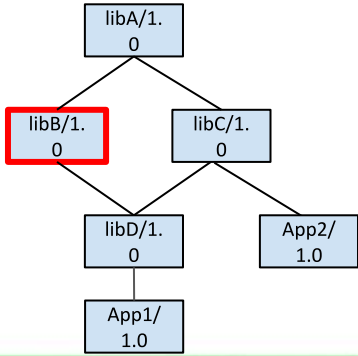
Build, test and create the package for the modified code

https://github.com/conan-ci-cd-training/libB/blob/develop/Jenkinsfile

Notify libB







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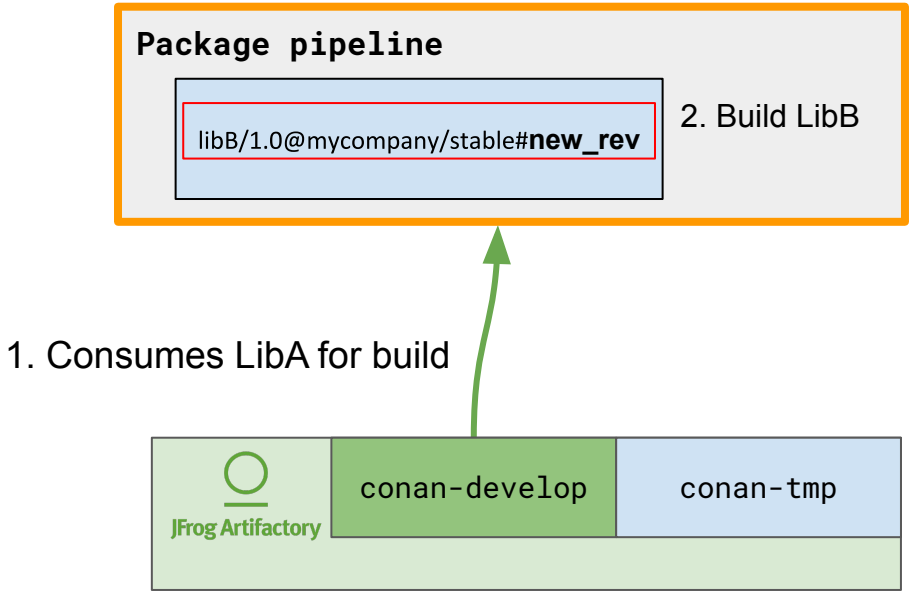
Phase 1: Developer works on a feature branch of libB



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Lab 2 - Create the library in the CI using lockfiles

Goal:

- Create a new libB with the modified sources of a developer's feature branch

Task:

- Clone libB's git repo and checkout the feature branch
- Calculate the graph for libB with all the latest requirements from conan-develop
- Build libB for different profiles using the lockfiles
- Search for libB in the local cache

Success:

- Check that the new revision of libB is in the cache using the search command

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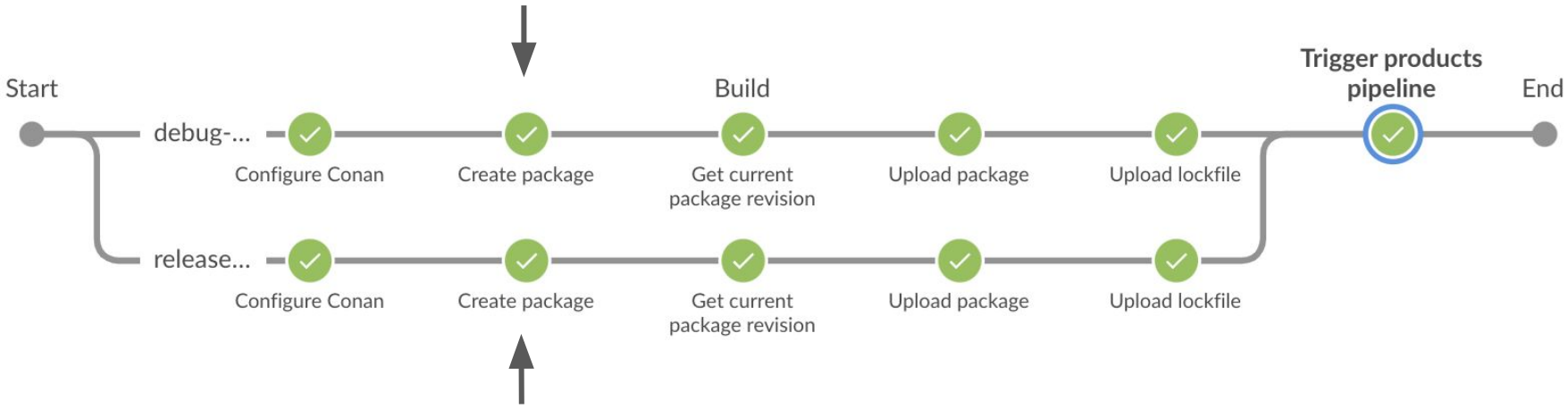
Packages pipeline



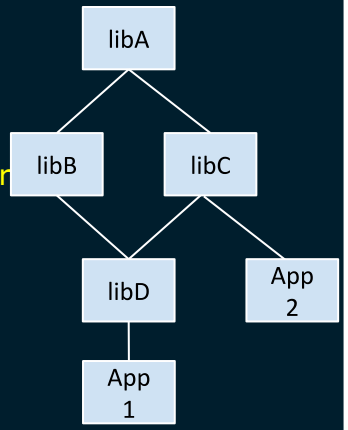
Lab 2 - Create the library in the CI using lockfiles

```
cd ../labs
git clone https://github.com/conan-ci-cd-training/libB.git
cd libB

# we work on our feature branch
git checkout feature/add_comments

# we want the library to be tested for different configurations → debug/release
# generate lockfiles for all configurations (debug and release)
conan graph lock libB/1.0@mycompany/stable --lockfile=../lockfiles/debug.lock -r
conan-develop --profile debug-gcc6
conan graph lock libB/1.0@mycompany/stable --lockfile=../lockfiles/release.lock -r
conan-develop --profile release-gcc6

# create packages with those lockfiles
conan create . mycompany/stable --lockfile=../lockfiles/debug.lock
conan create . mycompany/stable --lockfile=../lockfiles/release.lock
# check we have created a new revision of libB
conan search libB/1.0 --revisions
```



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Outline

- Introduction
- Conan reminder: revisions, package id mode, lockfiles
- **CI: workflow phase 2**
- Build info in Artifactory
- Promotion in Artifactory

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Phase 2: The developer opens a PR with a feature for libB

Developer is commiting changes in a PR for libB. **Will the libB and App build OK and pass the tests for all configurations?**

Package (libB) pipeline

Build, test and create the package for the modified code

https://github.com/conan-ci-cd-training/libB/blob/develop/Jenkinsfile

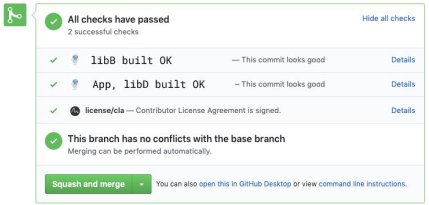
New rrev of libB

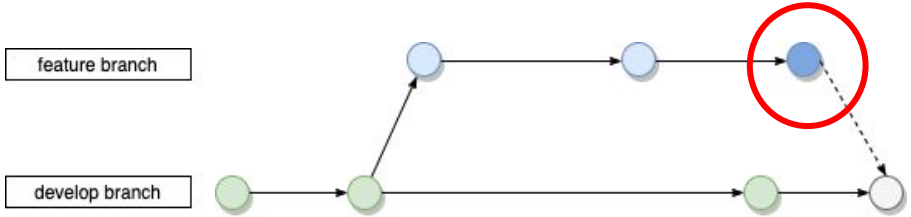
Product (App) pipeline

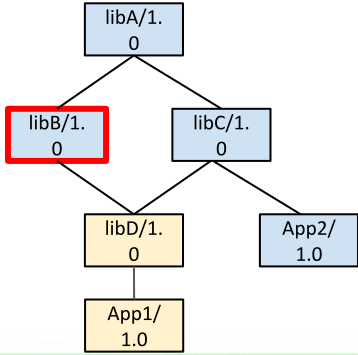
Build, test and create the affected product (App) for **the new revision of libB**. New binaries for **libD** will also be generated

https://github.com/conan-ci-cd-training/products/blob/master/Jenkinsfile

Notify:
libB
libD
App







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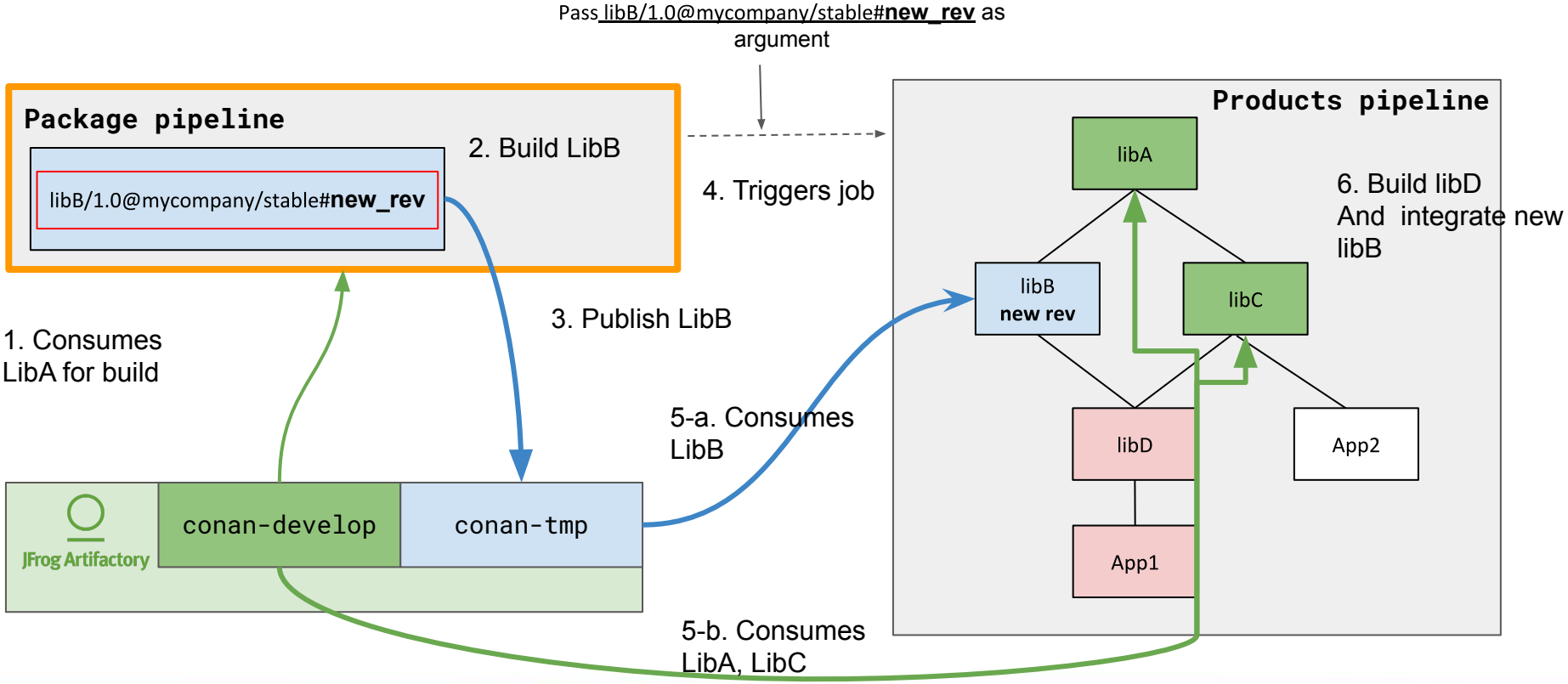
Phase 2: The developer opens a PR with a feature for libB



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Lab 3 - Get the complete reference of the new libB

Goal:

- Getting the complete reference for the Conan package we have just created to upload use it as a parameter for the package's pipeline and to upload to conan-tmp

Task:

- Get the name of the recipe
- Get the version of the recipe
- Get the revision we have just created

Success:

- Getting the complete reference for the new libB

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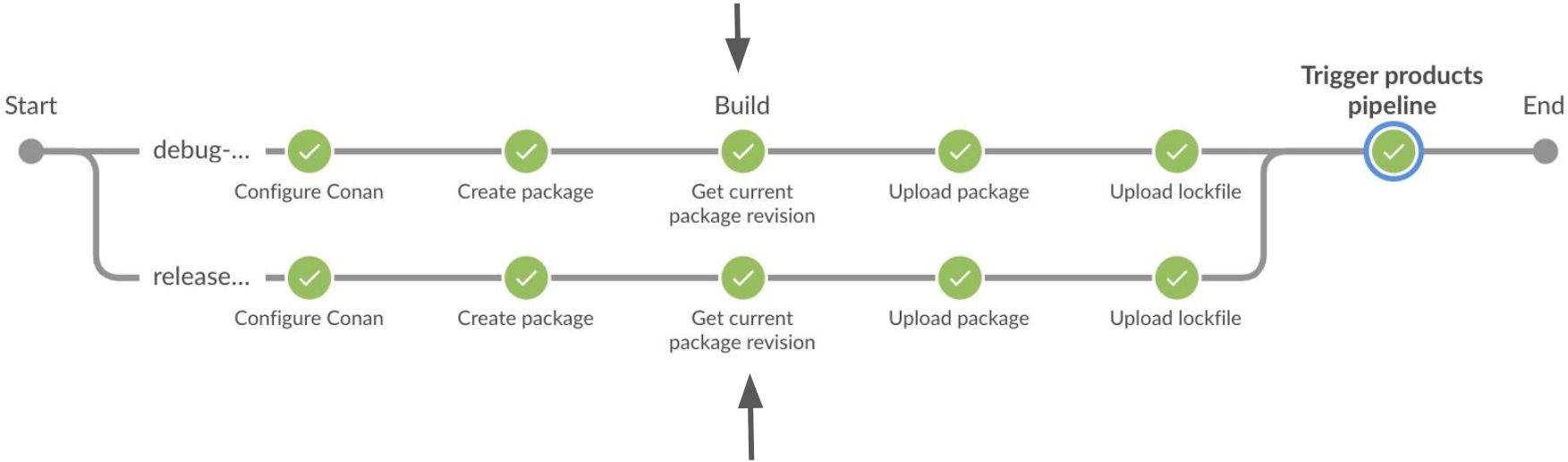
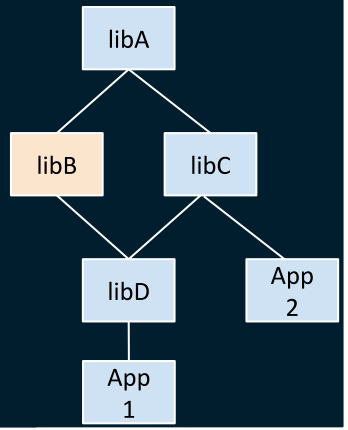
Packages pipeline



Lab 3: Get the complete reference of the new libB

```
cd ..
# get conan package <name> and <version>
conan inspect libB --raw name
conan inspect libB --raw version
# search with --revisions to get the newly created revision (remember
only one revision in the local cache)
conan search libB/1.0@mycompany/stable --revisions --raw
--json=libB_revision.json
cat libB_revision.json
```



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Lab 4 - Upload new libB to conan-tmp

Goal:

- Uploading the new revision to repository conan-tmp so that we can get this library later from the product's pipeline

Task:

- Upload libB/1.0@mycompany/stable#new_rev to conan-tmp

Success:

- Check that the new revision of libB is in conan-tmp repo

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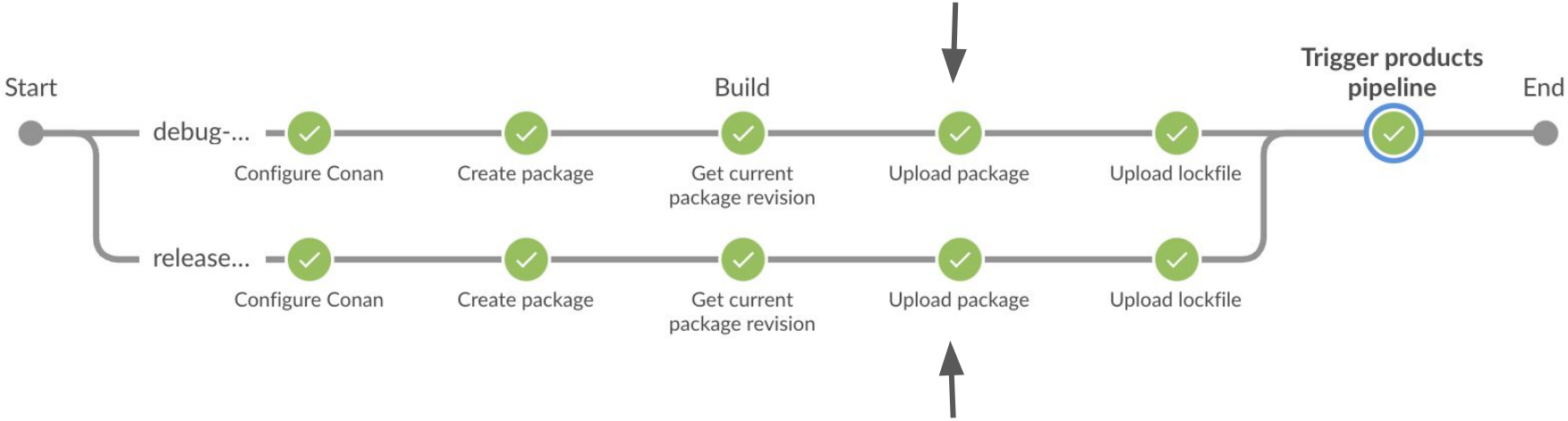
Packages pipeline

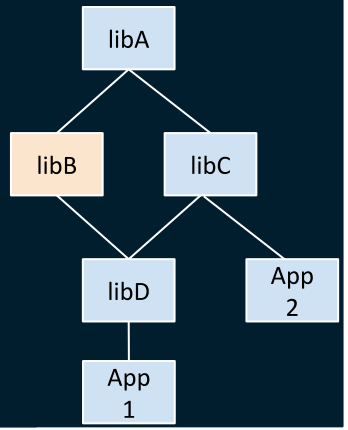


Lab 4: Upload new libB to conan-tmp

```
# upload the two generated packages for the new revisions of libB to
conan-tmp
conan upload libB/1.0@mycompany/stable#<new_revision> --all -r
conan-tmp --confirm

# now we are ready to launch the product pipeline

conan search libB/1.0@mycompany/stable -r conan-tmp --revisions
```



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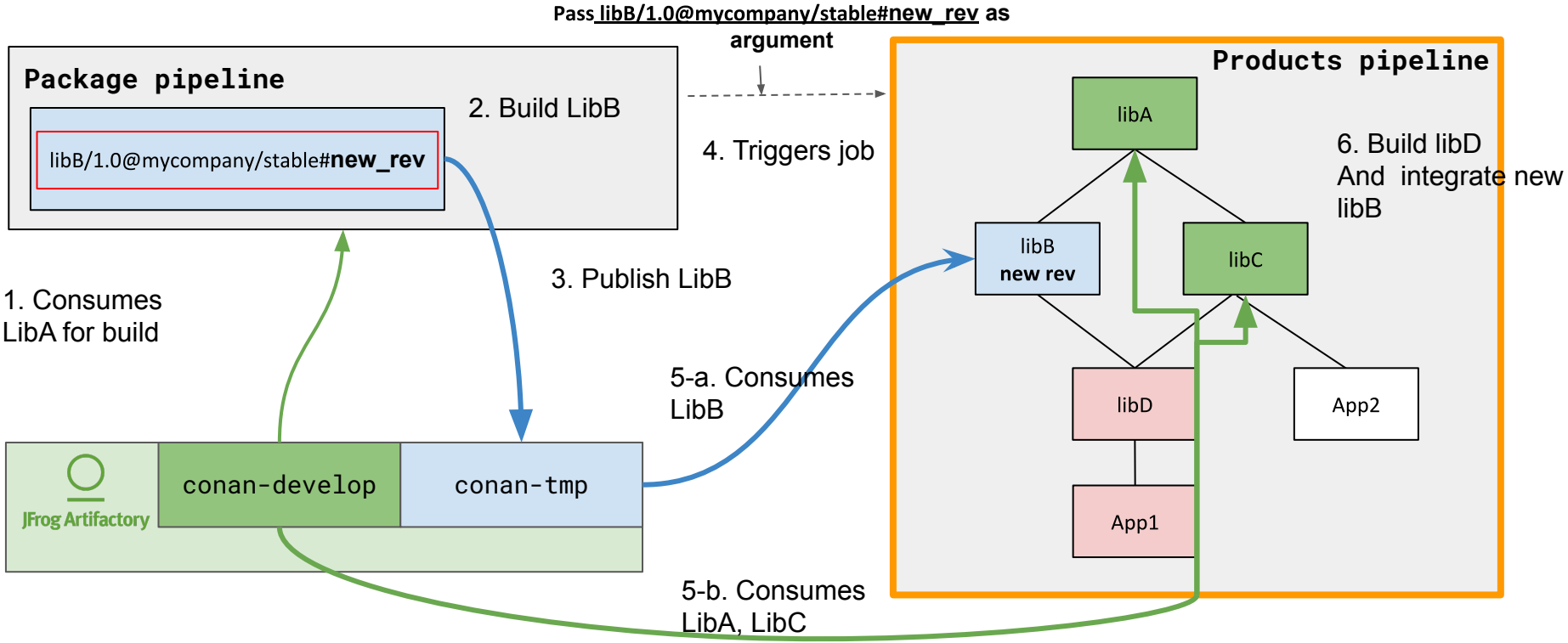
Phase 2: The developer opens a PR with a feature for libB



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Lab 5 - Check if App/App2 need to be rebuilt

Goal:

- See if the new revision of libB is affecting App or App2 so that they have to be rebuilt

Task:

- Download the recipe for the new revision of libB
- Do the graph lock for each product using the conan-develop remote (latest revisions of libs)
- Calculate the build order with --build missing, will tell us if the new revision of libB is affecting App or App2

Success:

- The build order for App contains libD and App
- The build order for App2 is empty

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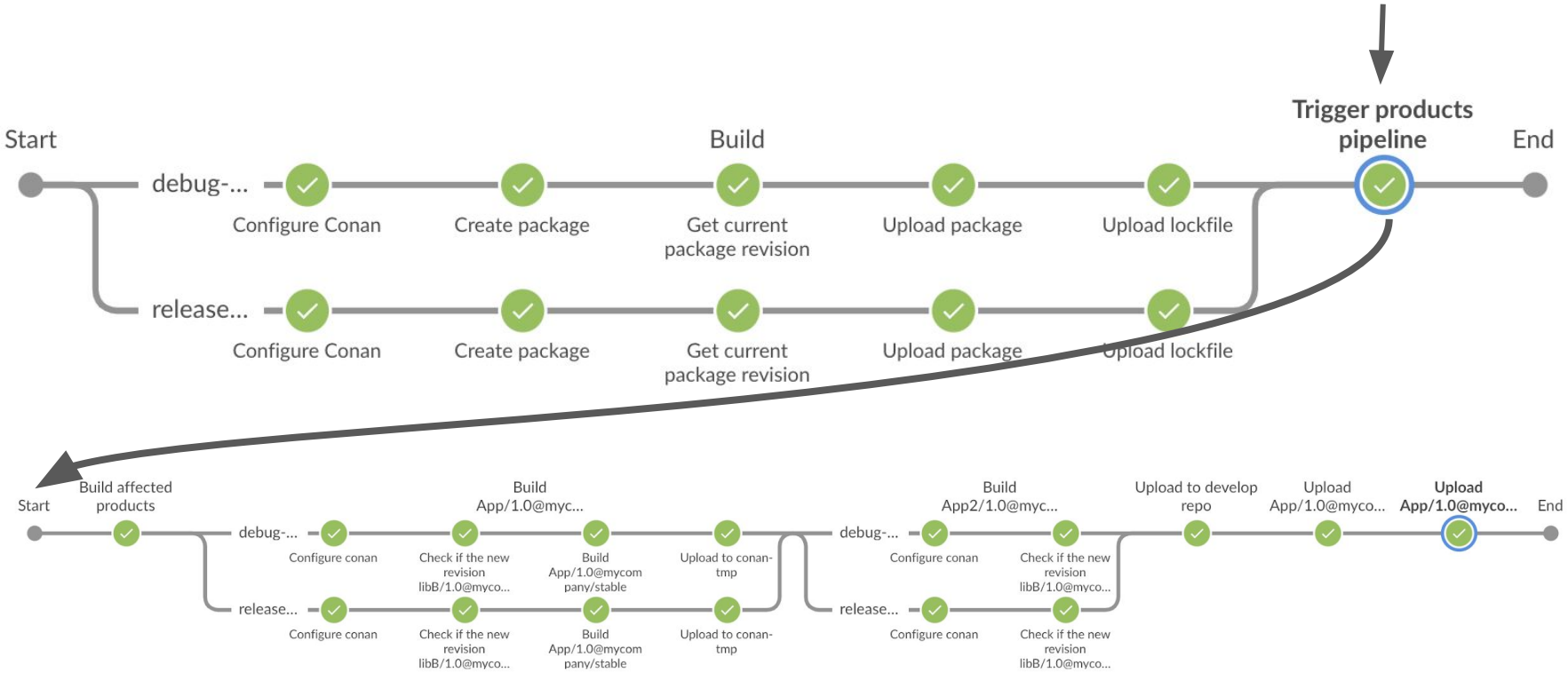
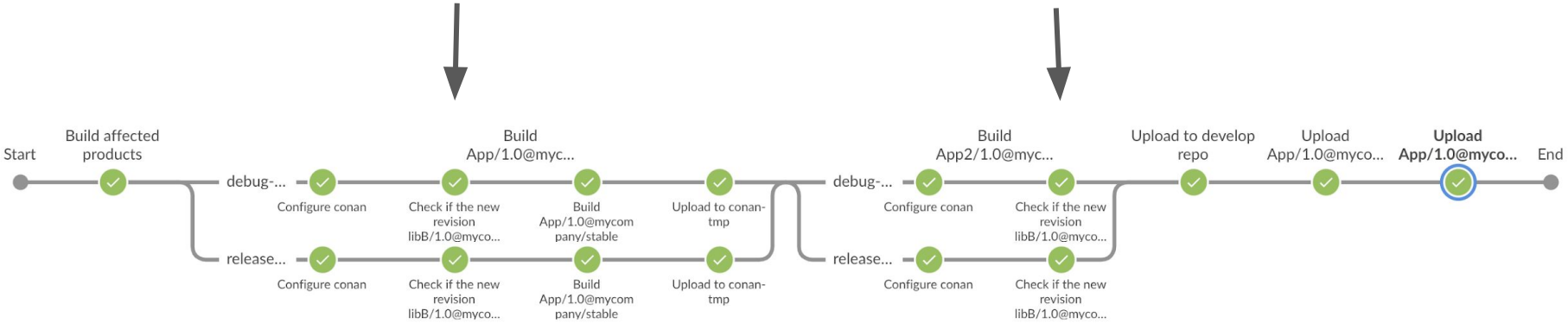

Start
Build
Trigger products pipeline
End
debug-...
Configure Conan
Create package
Get current package revision
Upload package
Upload lockfile
release...
Configure Conan
Create package
Get current package revision
Upload package
Upload lockfile
Start
Build affected products
Build App/1.0@myc...
Build App2/1.0@myc...
Upload to develop repo
Upload App/1.0@myco...
Upload App/1.0@myco...
End
debug-...
Configure conan
Check if the new revision libB/1.0@myco...
Build App/1.0@mycompany/stable
Upload to conan-tmp
release...
Configure conan
Check if the new revision libB/1.0@myco...
Build App/1.0@mycompany/stable
Upload to conan-tmp
debug-...
Configure conan
Check if the new revision libB/1.0@myco...
release...
Configure conan
Check if the new revision libB/1.0@myco...

Packages pipeline



Lab 5.a: Check if App is affected

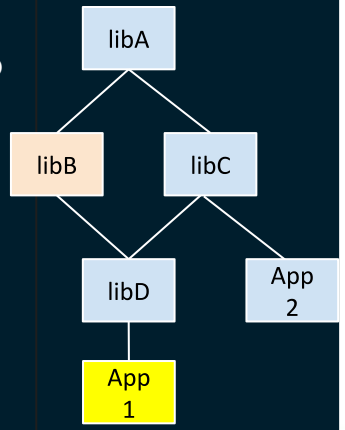
```
# update cache with a specific revision of libB (doesn't update
libA in the cache)

conan download libB/1.0@mycompany/stable#<new revision> -r
conan-tmp --recipe

# check App
conan graph lock App/1.0@mycompany/stable --profile=release-gcc6
--lockfile=app_release.lock -r conan-develop

conan graph build-order app_release.lock --build missing --json
app_bo.json

cat app_bo.json
```



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Lab 5.b: Check if App2 is affected

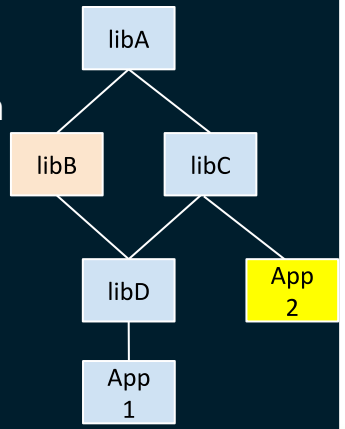
```
# we already have libB in the cache

# check App2

conan graph lock App2/1.0@mycompany/stable
--profile=release-gcc6 --lockfile=app2_release.lock -r
conan-develop

conan graph build-order app2_release.lock --build missing --json
app2_bo.json

cat app2_bo.json
```



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Lab 6 - Build the graph using the lockfile

Goal:

- Follow the build order of App we got in lab5 → build libD and App

Task:

- Calculate the build order using the lockfile
- Build libD → update lockfile
- Build App → update lockfile
- Recalculate build order

Success:

- After building App we recalculate the build order and the output is empty

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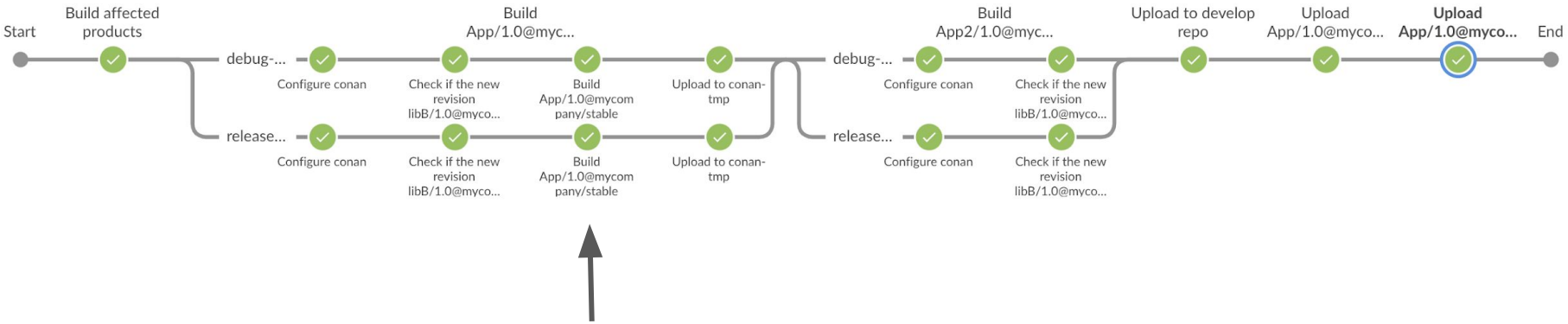
Packages pipeline



Lab 6.a - Build the graph using the lockfile

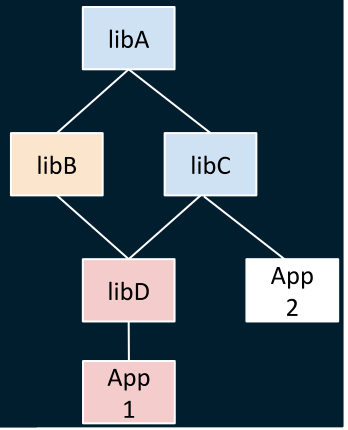
```
conan graph build-order app_release.lock --build missing --json
app_bo.json

# use the build-order → build D
cp app_release.lock conan.lock

conan install libD/1.0@mycompany/stable --build libD --lockfile
conan.lock

# lockfileD is updated with the node libD marked as built

# update the original lockfile with update-lock
conan graph update-lock app_release.lock conan.lock
```



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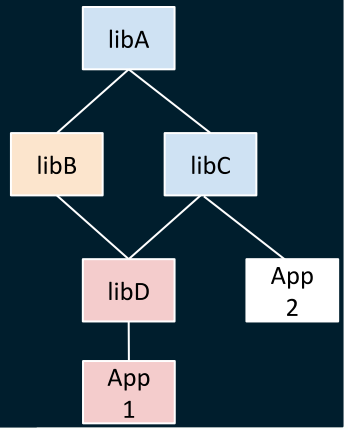
Lab 6.b - Build the graph using the lockfile

```
# the build order with the updated lockfile → build App
cp app_release.lock conan.lock

conan install App/1.0@mycompany/stable --build App --lockfile
conan.lock

conan graph update-lock app_release.lock conan.lock

conan graph build-order app_release.lock --build missing
```



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Outline

- Introduction
- Conan reminder: revisions, package id mode, lockfiles
- **CI: workflow phase 3**
- Build info in Artifactory
- Promotion in Artifactory

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Phase 3: PR is merged in the target branch

Developer is commiting changes in a PR for libB. **Will the libB and App build OK and pass the tests for all configurations?**

→

Package (libB) pipeline

Build, test and create the package for the modified code

https://github.com/conan-ci-cd-training/libB/blob/develop/Jenkinsfile

→ New rrev of libB →

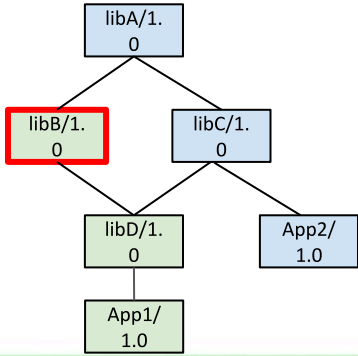
Product (App) pipeline

Build, test and create the affected product (App) for **the new revision of libB**. New binaries for **libD** will also be generated

https://github.com/conan-ci-cd-training/products/blob/master/Jenkinsfile

→

Upload the new **revision** of **libB** and new **binaries** for **App** and **libD**



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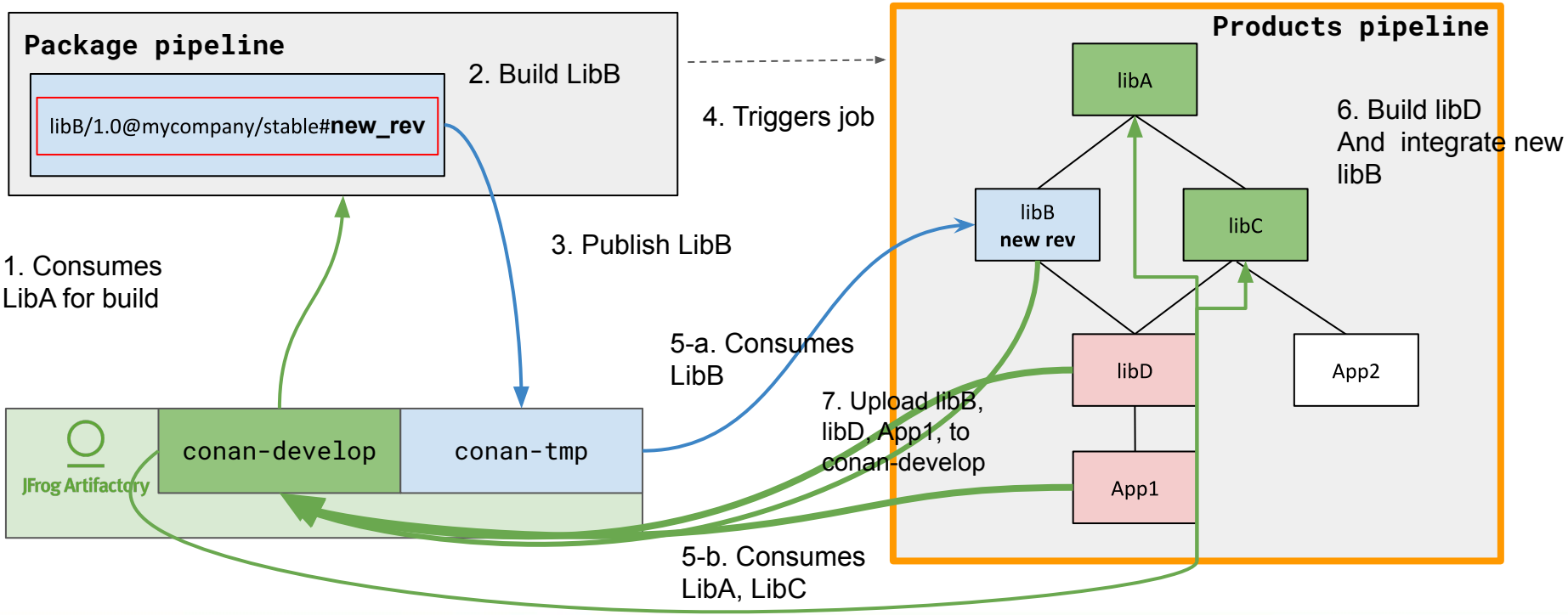
Phase 3: PR is merged in the target branch



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Lab 7 - Upload new packages to conan-develop

Goal:

- Making the new binaries available for all developers so they don't have to rebuild in their own machines

Task:

- Upload new revision of libB and new binaries of libD and App to conan-develop

Success:

- All the new binaries are uploaded

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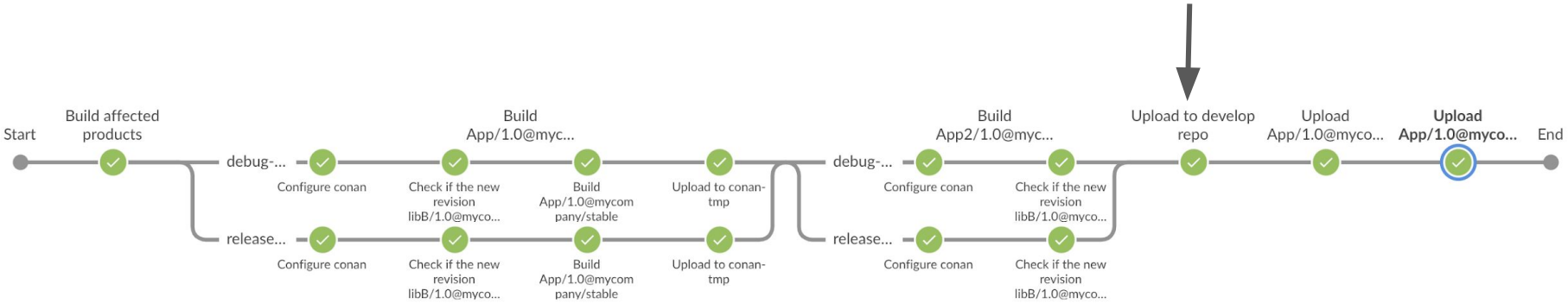
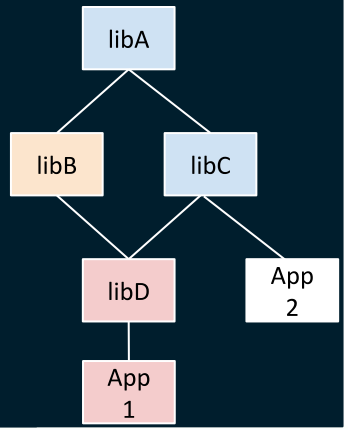
Packages pipeline



Lab 7 - Upload new packages to conan-develop

```
# all new revisions and binaries will be uploaded
conan upload "*" -r conan-develop --confirm  --all
```



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Lab 8 - Upload lockfile to conan-metadata

Goal:

- Storing lockfiles in Artifactory in case we want to use them latter to install conan packages or generating build info.

Task:

- Use the Artifactory API to upload the file to conan-metadata (generic repo)

Success:

- Check that the file has been uploaded to conan-metadata

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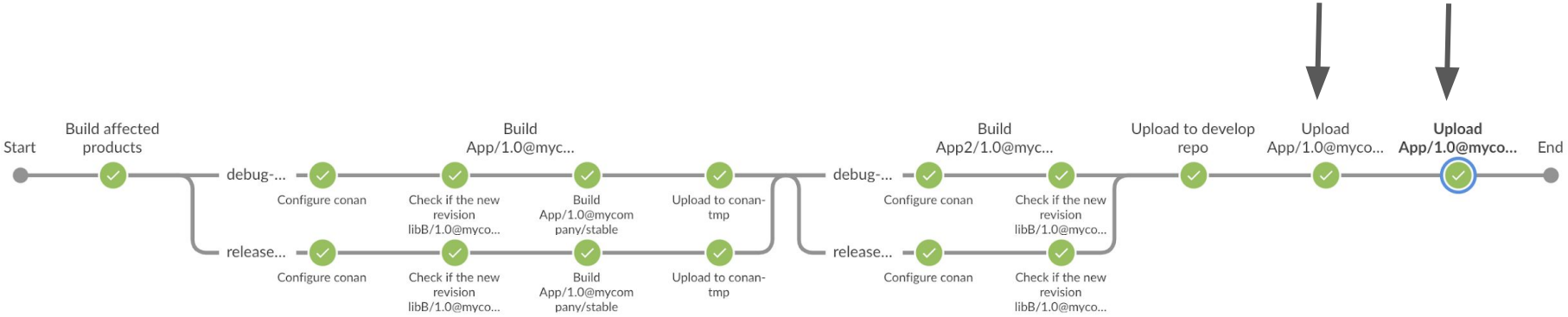
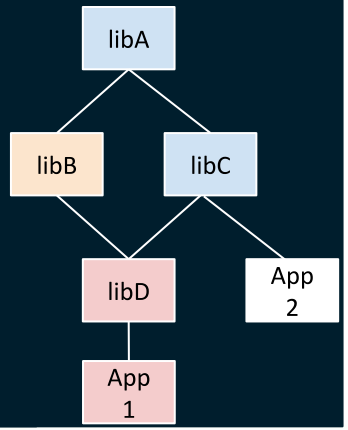
Packages pipeline



Lab 8 - Upload lockfile to conan-metadata

```
curl -u conan:conan2020 -X PUT
"http://jfrog.local:8081/artifactory/conan-metadata/App/1.0@myco
mpany/stable/gcc6-release/app_release.lock" -T app_release.lock
```



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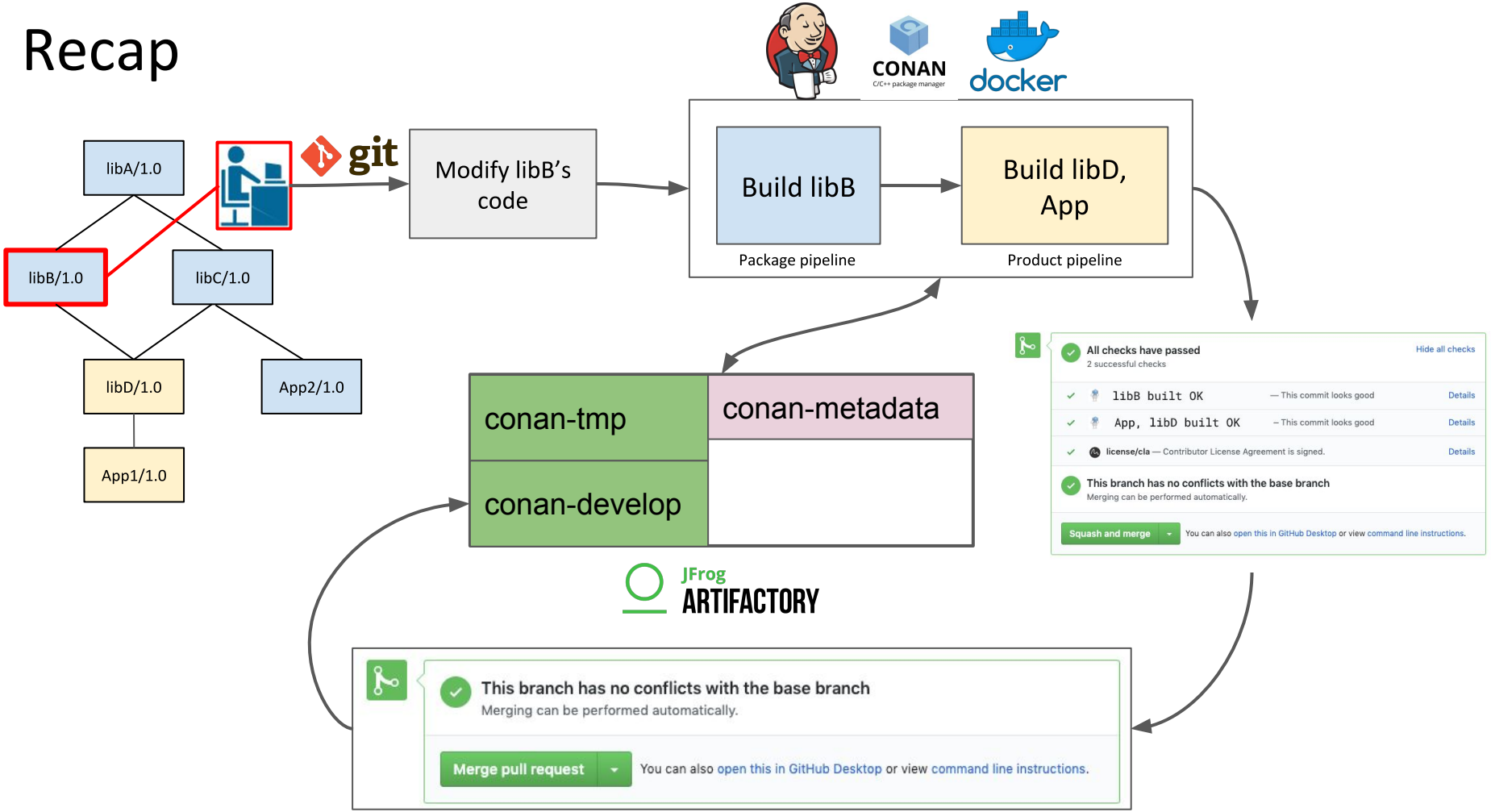
Recap


libA/1.0
libB/1.0
libC/1.0
libD/1.0
App2/1.0
App1/1.0
git
Modify libB's code
CONAN
C/C++ package manager
docker
Build libB
Build libD, App
Package pipeline
Product pipeline
conan-tmp
conan-metadata
conan-develop
JFrog
ARTIFACTORY
All checks have passed
2 successful checks
Hide all checks
libB built OK
— This commit looks good
Details
App, libD built OK
— This commit looks good
Details
license/cla — Contributor License Agreement is signed.
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.
This branch has no conflicts with the base branch
Merging can be performed automatically.
Merge pull request
You can also open this in GitHub Desktop or view command line instructions.

Too many binaries ...

- A specific revision of libA, which versions of App is using it ?
- Which CI build generated which packages ?
- Which RREV contains all the fully qualified packages
- For which architecture(s) and OS, did I build my App for ?
- ...

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Outline

- Introduction
- Conan reminder: revisions, package id mode, lockfiles
- CI
- **Build info in Artifactory**
- Promotion in Artifactory

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Build Info - Intro

- Bill Of Material (JSON file) listing **generated binaries and consumed dependencies**
- Can be built from a Lockfile (For Conan)
- Generated and published by the **conan_build_info** client, **CI plugins** and **JFrog CLI**
  - Only Jenkins and Azure devops plugins have specific instruction for Conan
- Possibility to merge multiple Build Info via the **conan_build_info** client

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Build Info - Intro

Builds > conan-app > 1

Build Name	Agent	Build Agent	Started	Duration	Principal	Artifactory Principal
conan-app		Conan Client/1.X	20-04-20 13:55:25 +0...	0.0 seconds	-	conan

Published Modules | Environment | Xray Data | Issues | Diff

3 Modules

App

Export folder (recipe, conanmanifest)

Module ID	Number Of Artifacts	Number Of Dependencies ...
App/1.0@mycompany/stable	2	8
App/1.0@mycompany/stable:5047d1057c0c45d06b11808d62295bb77a1646e7	3	12
App/1.0@mycompany/stable:6268d174e50afd7bfd3886043cdce8f0abbb229b	3	12

Package folder (binaries)

Build Info - Intro

Module Details: App/1.0@mycompany/stable:6268d174e50afd7bfd3886043cdce8f0abbb229b

Compare with Previous Build

3 Artifacts

Filter by Artifact Name

Artifact Name	Type	Repo Path
conan_package.tgz		conan-develop/mycompany/App/1.0/stable/1ccb616db7ff7812d83ec91e1fb6dadc/package/6268d174e50afd7bfd38...
conaninfo.txt		conan-develop/mycompany/App/1.0/stable/1ccb616db7ff7812d83ec91e1fb6dadc/package/6268d174e50afd7bfd38...

12 Dependencies

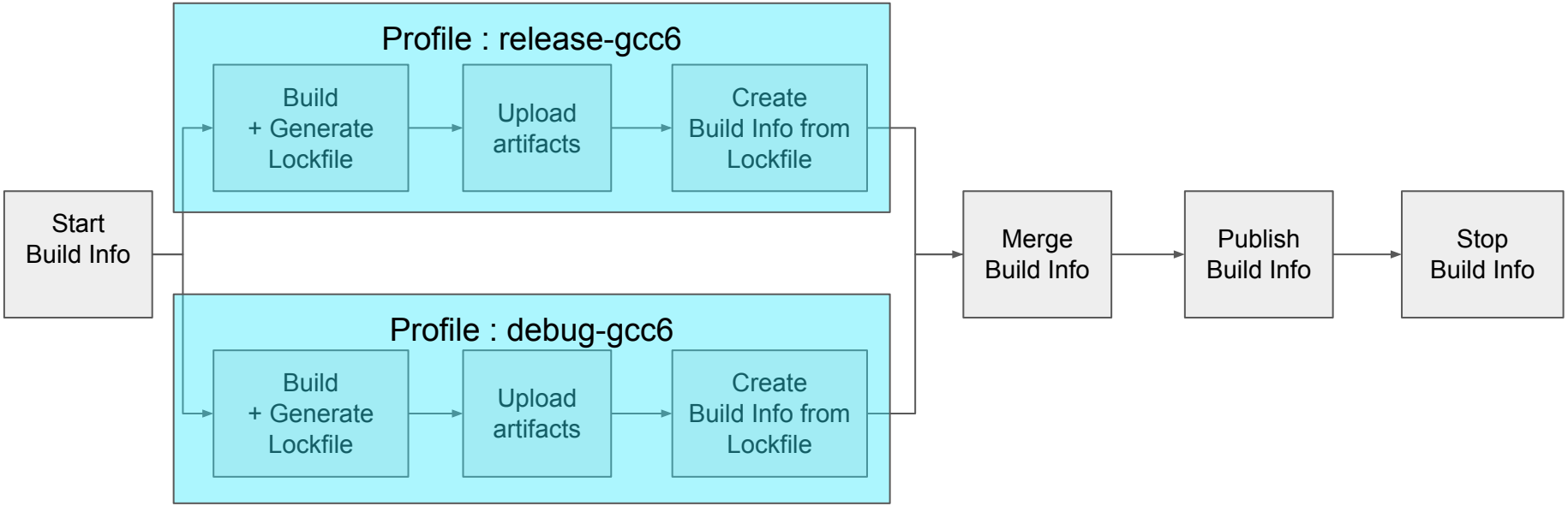
Filter by Dependency ID

Dependency ID	Sc...	Ty...	Repo Path
libA/1.0@mycompany/stable:57547fe65fff...			conan-develop/mycompany/libA/1.0/stable/13c5d4cb6adbd64dfa223e8d1775c3db/package/5...
libA/1.0@mycompany/stable:57547fe65fff...			conan-develop/mycompany/libA/1.0/stable/13c5d4cb6adbd64dfa223e8d1775c3db/package/5...
libA/1.0@mycompany/stable:57547fe65fff...			conan-develop/mycompany/libA/1.0/stable/13c5d4cb6adbd64dfa223e8d1775c3db/package/5...
libB/1.0@mycompany/stable:fdb7b014			conan-develop/mycompany/libB/1.0/stable/e736204bc19388683c3c4de92b474f5c/package/
libB/1.0@mycompany/stable:fdb7b0148ff...			conan-develop/mycompany/libB/1.0/stable/e736204bc19388683c3c4de92b474f5c/package/fd...
libB/1.0@mycompany/stable:fdb7b0148ff...			conan-develop/mycompany/libB/1.0/stable/e736204bc19388683c3c4de92b474f5c/package/fd...
libC/1.0@mycompany/stable:fdb7b0148ff...			conan-develop/mycompany/libC/1.0/stable/043241c7423a29436a1d3777f3347a15/package/fd...

conan-develop/mycompany/libC/1.0/stable/043241c7423a29436a1d3777f3347a15/package/fdb7b0148ffcfd6c47fd2e69abeddace50e2f221/01be93db323df6f788570caaa3933eb2/conaninfo.txt

All artifacts have to be in Artifactory !

Build info in parallel pipelines



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Lab9 - Generate a Build Info for App1

Goal:

- Create a Build Info for the App1 conan package using the **conan_build_info** client

Task:

- Enable Build Info recording (start/stop instruction)
- Create and upload App in Release mode + Generate the Build Info (create instruction)
- Create and upload App in Debug mode + Generate the Build Info (create instruction)

Success:

- Check the generated json files

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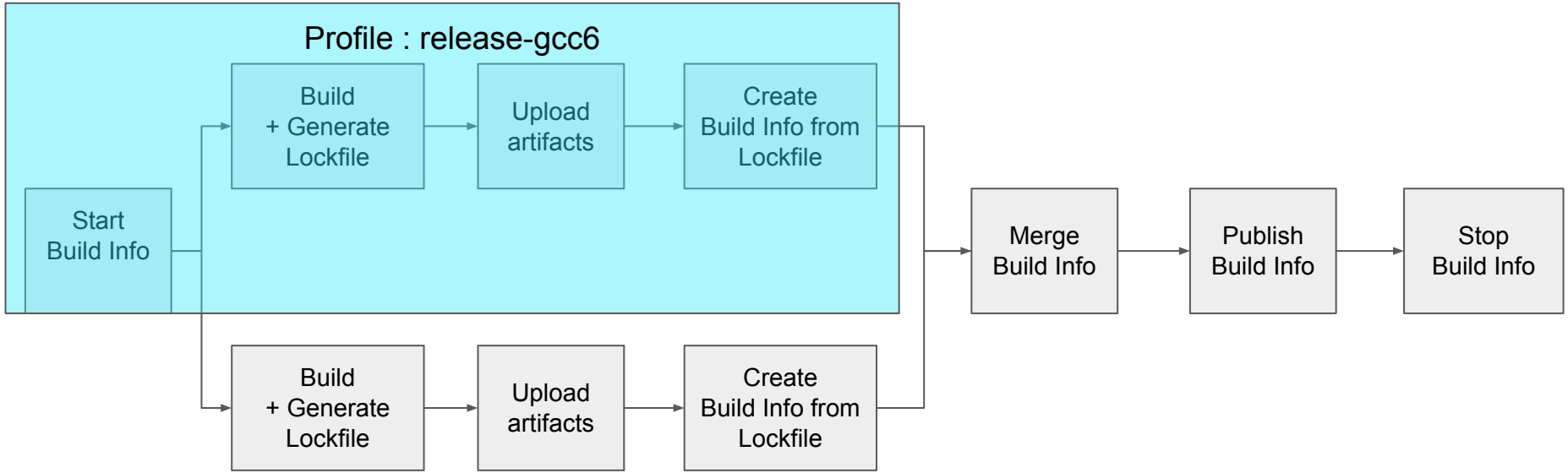
Lab9.a - Generate a Build Info for App1 for Release



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Lab9.a - Generate a Build Info for App1 for Release

```
# disable/enable build properties
conan_build_info --v2 stop && cat ~/.conan/artifacts.properties
conan_build_info --v2 start conan-app 1 && cat ~/.conan/artifacts.properties

# create build info for release from the release lockfile for App1
conan_build_info --v2 create release_bi.json --lockfile=app_release.lock
--user=conan --password=conan2020 && cat release_bi.json
```

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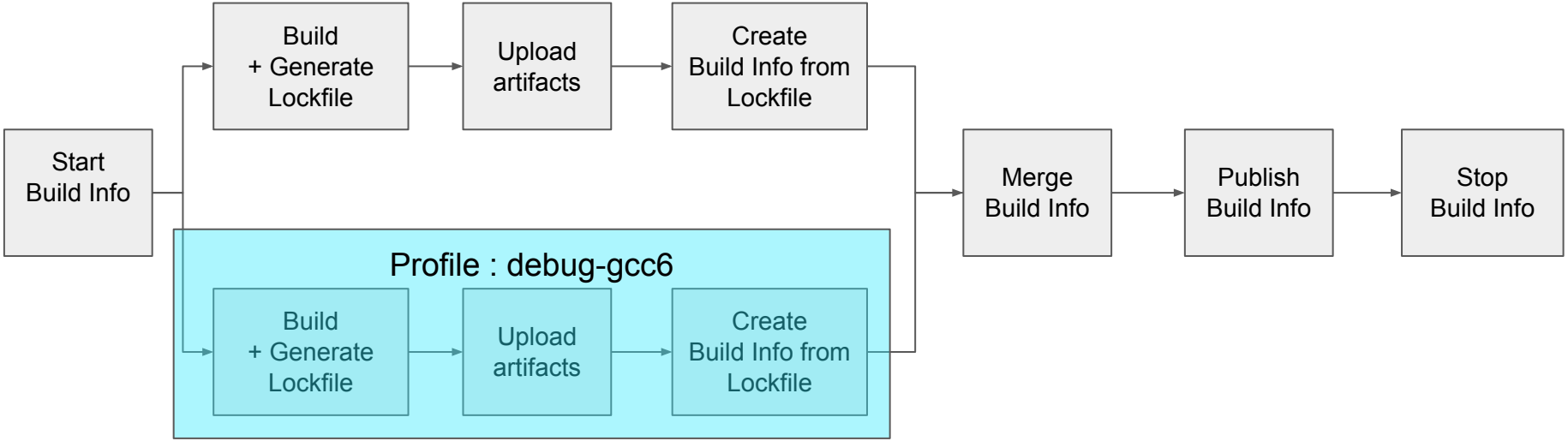
Lab9.b - Generate a Build Info for App1 for Debug



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Lab9.b - Generate a Build Info for App1 in Debug

```
# redo lab 6 to generate libs in Debug + lab 7 to upload App in Debug
# current path : ~/conan_ci_cd/labs
./genAppDebug.sh

# create build info
conan_build_info --v2 create debug_bi.json --lockfile=app_debug.lock
--user=conan --password=conan2020 && cat debug_bi.json
```

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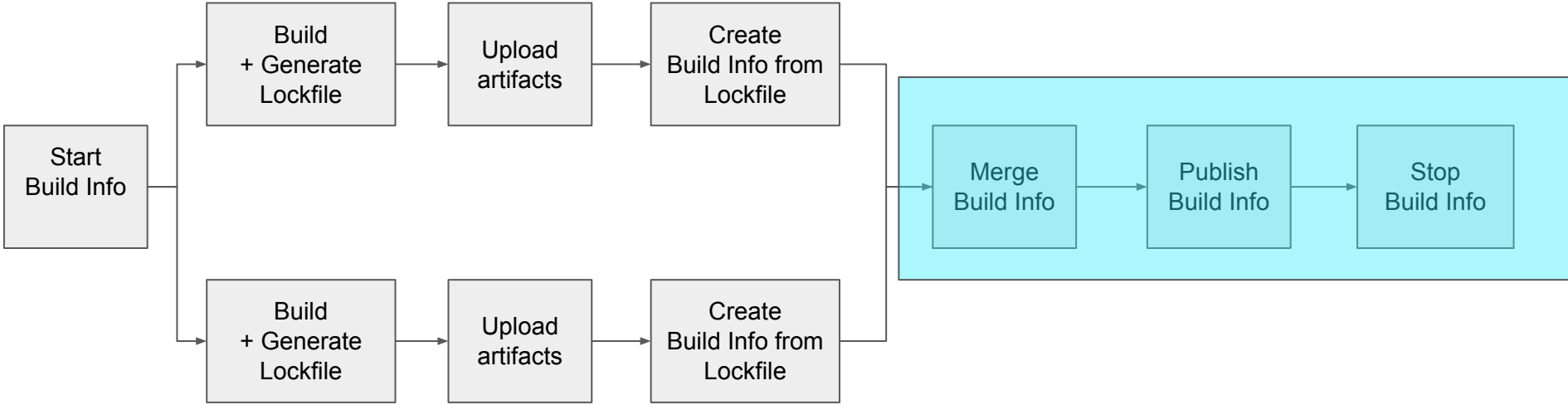
Lab10 - Merge and publish a Build Info



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Lab10 - Merge and publish a Build Info

Goal:

- Merge 2 Build Info for App1 and publish to Artifactory

Task:

- Use update and publish instructions

Success:

- See the Build Info for 2 profiles in Artifactory

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Lab10 - Merge and publish a Build Info

```
# create the aggregated build info
conan_build_info --v2 update --output-file app_bi.json debug_bi.json
release_bi.json && cat app_bi.json

# publish the build info and remove build properties
conan_build_info --v2 publish app_bi.json
--url=http://jfrog.local:8081/artifactory --user=conan --password=conan2020

conan_build_info --v2 stop && cat ~/.conan/artifacts.properties
```

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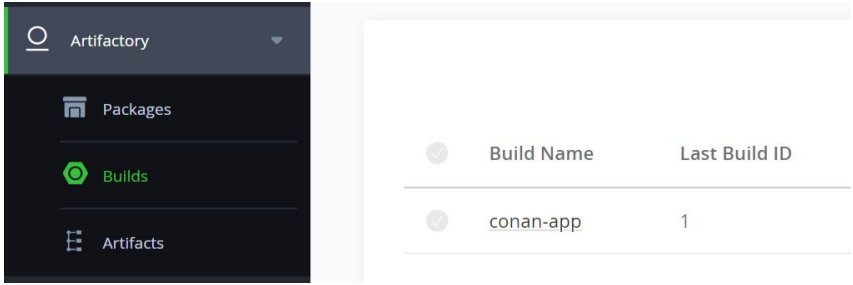
Lab10 - Merge and publish a Build Info



Go to “Build” section and select conan-app

Check the Build Info content :

Generated modules in Build Info are libD and App (built components)

Module ID	Number Of Artifacts	Number Of Dependencies ...
App/1.0@mycompany/stable	2	8
App/1.0@mycompany/stable:5047d1057c0c45d06b11808d62295bb77a1646e7	3	12
App/1.0@mycompany/stable:6268d174e50afd7bfd3886043cdce8f0abbb229b	3	12
libD/1.0@mycompany/stable	2	6
libD/1.0@mycompany/stable:62942f3d74b9b5041cacdaf5fe74d033d199f3db	3	9
libD/1.0@mycompany/stable:72e8fe50ab2d94c19f24d74586e7f2bd4eb2cc9f	3	9

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Build Info - Good to know

- An artifact in the “**Artifacts” section** is located if the following requirements are met :
  - Checksum/hash exists in the Artifactory DB
  - Build properties set on the artifacts
- An artifact in the **“Dependencies” section** is “located” if
  - its checksum/hash exists in the Artifactory DB
- No artifact upload = no Build properties assigned to the artifact

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Outline

- Introduction
- Conan reminder
- CI
- Build info in Artifactory
- **Promotion in Artifactory**

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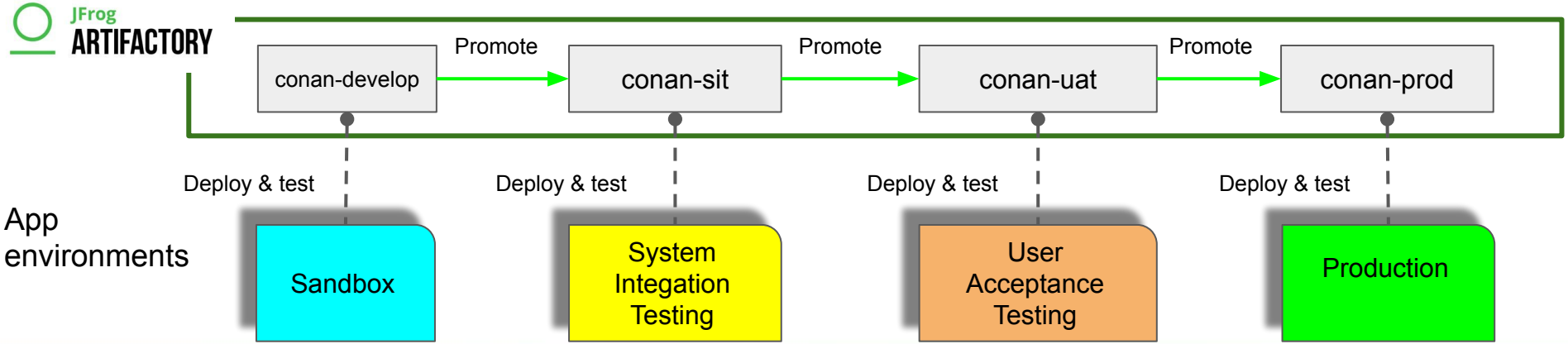
Promotion mechanism

- Monitor your binaries during the delivery process
- The component lifecycle is represented by a chain of repositories
- Consist in copying/moving a single or group of artifacts from a source repository to a target repository



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Promotion mechanism

- Triggered automatically (CI/CD tool) or manually after passing a test in the delivery process
- 2 types of promotions
  - Artifact(s) promotion = copy or move 1 or more artifact
  - Build promotion = copy or move artifacts from a Build Info
    - Promotion status
    - Promote generated artifacts with or without build info dependencies

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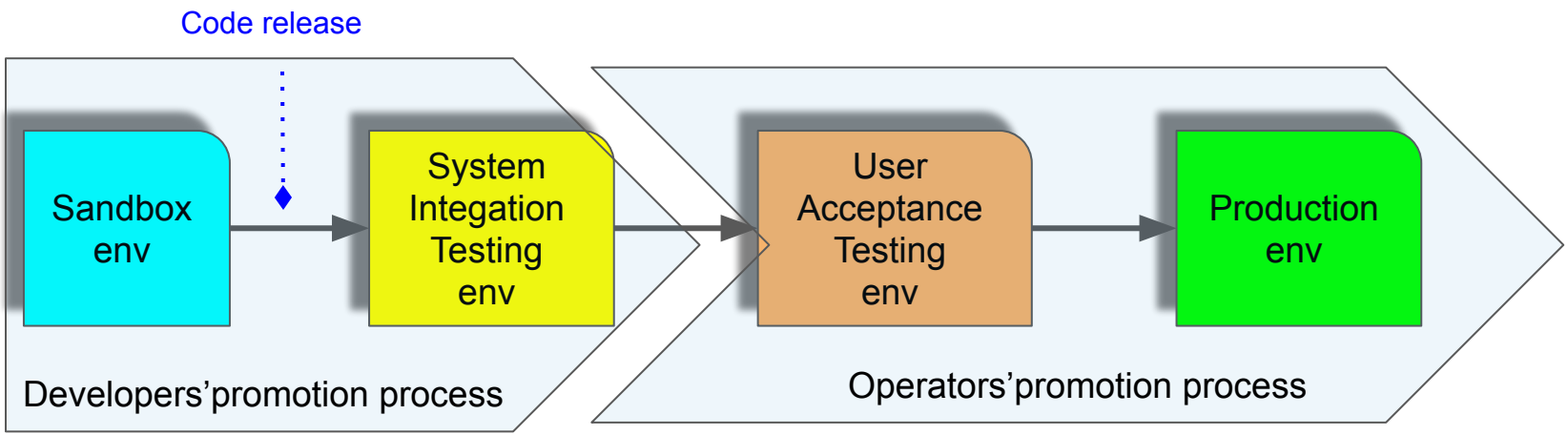
Promotion vs Release

- Artifactory doesn't generate releases, releasing is still handled by your build/release tools
- To deliver a product to production, there can be distinct promotion processes !



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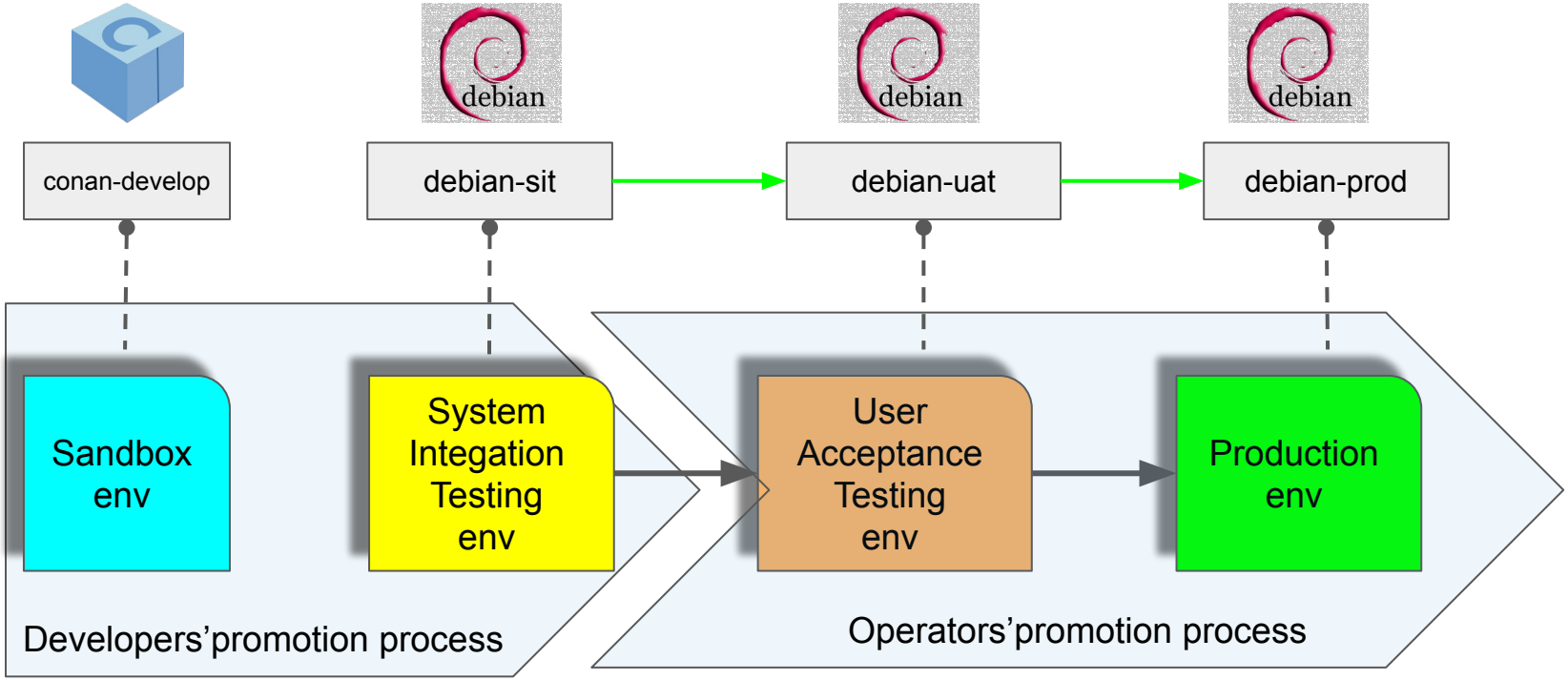
Dev and Ops promotion process



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Dev to Ops promotion process

- Goal :
  - Generate a **debian package** embedding App v1.0 (Release) for the ops and ease their promotion process with Build Info
- Implementation :
  - Retrieve App based on specific properties
  - Create a custom Build Info :
    - Artifact section : App debian package
    - Dependencies : lockfile + conan_package.tgz
  - Switching from the **conan_build_info** client to **the JFrog CLI**

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Automation with JFrog CLI

- Lightweight tool running on the following OS : linux, windows, mac
- Optimized for massive actions : upload, download, search, update, move, copy, delete
- Checksum aware on uploads and downloads:
  - compute the checksum of the binary to upload and send it in the header request
  - Only upload binaries which checksum doesn’t exist in the Artifactory DB
- Easy way to manage Build Info

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Lab11 - Configure the JFrog CLI

Goal:

- Connect the JFrog CLI to Artifactory

Task:

-

Success:

- Ping Artifactory + check read permission

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Lab11 - Configure the JFrog CLI

```
jfrog rt c --interactive=false  --url=http://jfrog.local:8081/artifactory
--user=conan --password=conan2020 art7

# show current art7 profile
jfrog rt c show

# ping doesn't require authentication
jfrog rt ping
jfrog rt search conan-metadata/
```

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Lab12 - Download App based on properties

Goal:

- Download App based on properties (build, conan.settings, …)

Task:

- Retrieve the path (PREV) to the conan_package.tgz archiving App using AQL (*)
- Use the JFrog CLI to download the conan_package.tgz

Success:

- Conan_package.tgz is downloaded

* Artifactory Query Language : see Appendix for more details

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Lab12 - Download App based on properties

Tree Simple

- app-debian-sit-local
- app-debian-uat-local
- artifactory-build-info
- conan-develop
  - mycompany
    - App/1.0/stable
      - 1ccb616db7ff7812d83ec91e1fb6dadc
        - export
        - package
          - 5047d1057c0c45d06b11808d62295bb77a
            - 3d7b141c6844e28809dc667c2324b75
              - .timestamp
              - conan_package.tgz
              - conaninfo.txt
              - conanmanifest.txt

conaninfo.txt

Download View Actions

General | Properties | Builds

Property	Value(s)
conan.settings.compiler.libcxx	libstdc++11
conan.settings.compiler.version	6
conan.settings.compiler	gcc
conan.settings.arch	x86_64
conan.settings.build_type	Debug
conan.recipe_hash	1ccb616db7ff7812d83ec91e1fb6dadc
conan.settings.os	Linux

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Lab12 - Download App based on properties

```
# AQL will return the PREV containing the conan_package.tgz
cat automation/query.aql
prev=$(jfrog rt curl -XPOST api/search/aql -T automation/query.aql | grep path
| cut -d\" -f4) && echo $prev

sed "s#PATH#${prev}#" automation/filespec_tpl.json > filespec.json &&
cat filespec.json

# download conan_package.tgz from build info + extract content into folders
jfrog rt download --spec=filespec.json && ls -l conan_package.tgz
```

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Lab12 - Download App based on properties

```
# AQL will return the PREV containing the conan_package.tgz
 cat automation/query.aql
 art_path=$(jfrog rt curl -XPOST api/search/aql -T automation/query.aql | grep path)
 rrev=$(echo $art_path | cut -d/ -f5)
 prev=$(echo $art_path | cut -d/ -f7)
 pkgid=$(echo $art_path | cut -d/ -f8)

# download conan_package.tgz using deploy generator
 conan install App/1.0@mycompany/stable#${rrev}:${pkgid}#${rrev} --profile=release-gcc6 -g
 deploy --remote=conan-develop
```

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Lab13 - Create and upload a debian package

Goal:

- Create and upload a debian package

Task:

- Create a debian package from the App binary
- Upload the debian package to Artifactory

Success:

- Check the Debian package in Artifactory

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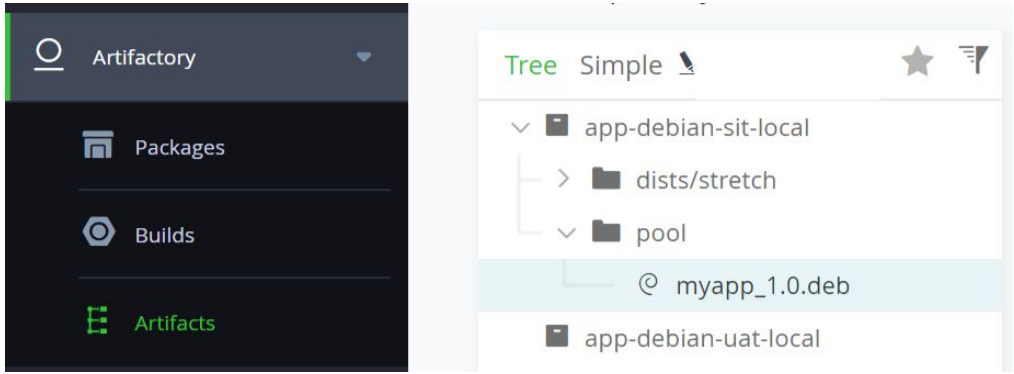
Lab13 - Create and upload a debian package

```
./generateDebianPkg.sh conan conan2020
```



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Lab14 - Create a custom Build info

Goal:

- Create a Build Info using the **JFrog CLI** which can then be promoted by the ops team

Task:

- Create and publish a **custom build info** :
  - Artifact section : debian package
  - Dependencies section : app_release.lock + conan_package.tgz
- Publish the Build Info

Success:

- Check the Build Info in Artifactory

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Lab14 - Create a custom Build info

```
# define “artifact section” in build info
# won’t be reuploaded as the JFrog CLI is checksum aware
jfrog rt u debian_gen/myapp_1.0.deb app-debian-sit-local/pool/
--build-name=debian-app --build-number=1

# define “dependency section” in build info
jfrog rt bad debian-app 1 app_release.lock
jfrog rt bad debian-app 1 conan_package.tgz

# publish build info
jfrog rt bp debian-app 1
```

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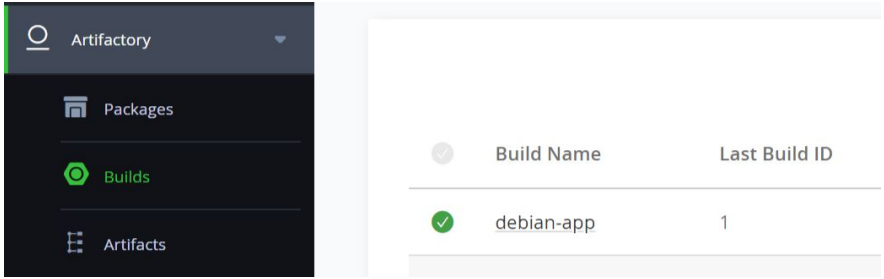
Lab14 - Create a custom Build info



Go to “Build” section and select debian-app

Check the Build Info content

Artifact Name	Type	Repo Path
myapp_1.0.deb	deb	app-debian-sit-local/pool/myapp_1.0.deb

2 Dependencies

Filter by Dependency ID

Dependency ID	Scope	Type ...	Repo Path
app_release.lock			conan-metadata/App/1.0@mycompany/stable/gcc6-release/conan.lock
conan_package.tgz			conan-develop/mycompany/App/1.0/stable/1ccb616db7ff7812d83ec91e1f

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Lab15 - Build Info Promotion

Goal:

- Promote Build Info by move without dependencies using the **JFrog CLI**

Task:

- Use bpr (build promote) instruction

Success:

- See the Build Info Promotion in Artifactory
  - Check path in “published modules” tab
  - Check “Release history” tab

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Lab15 - Build Info Promotion

```
jfrog rt bpr debian-app 1 app-debian-uat-local --status="SIT_OK"
--comment="passed integration tests" --include-dependencies=false --copy=false
```

Check the Build Info content and Release History tab

Published Modules | Environment | Xray Data | Issues | Diff | Release History

SIT_OK

Repository:	app-debian-uat-local
Comment:	passed integration tests
Artifactory User:	conan
Timestamp:	20-04-20 00:29:35 +0200

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Promotion - Good to know

- When promoting by copy :
  - This will create more artifacts (not binaries)
  - Any AQL and filespec have to target a repository name
- Build Info promotion with / without dependencies
  - Depends on your project structure and delivery process
- Limitation : A unique target repository

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Outline

- Introduction
- Conan reminder
- CI
- Build info in Artifactory
- Promotion in Artifactory
- **Appendix**
- Pipelines and optimizations?

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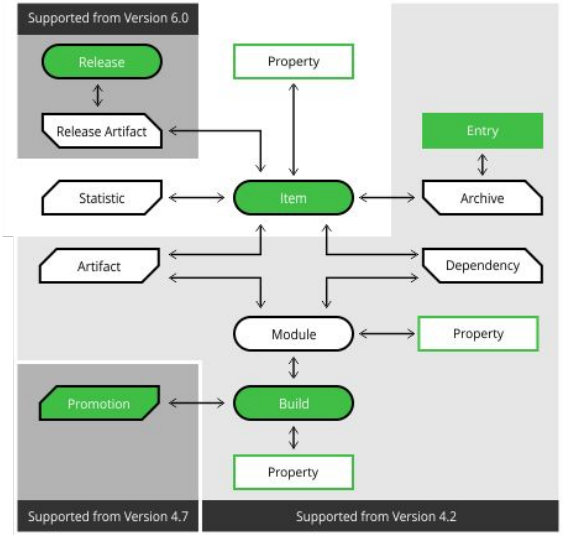
Automation with AQL

- Artifactory Query Language ~ SQL for Artifactory
- JSON formatted requests and responses
- String, Date, Time operators
- Sorting, limiting results
- Non admin can only use item domain



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List artifact of a Build Info

build_info_artifacts.json

```
builds.find({
    "name": "app1",
    "number": "2",
}).include("module.artifact.item.name", "module.artifact.item.path")
```

```
# with creds or access token
curl -uadmin:<PASS> -XPOST -T build_info_artifacts.json
http//jfrog.local:8081/artifactory/api/search/aql
```

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List dependencies filtered on property

build_info_deps.json

```
builds.find({
    "name": "app1",
    "number": "2",
    "module.artifact.dependency.@conan.settings.os" : "Linux"
}).include("module.dependency.item.name", "conan.settings.build_type",
"module.dependency.item.path")
```

```
# with creds or access token
curl -uadmin:<PASS> -XPOST -T build_info_deps.json
http//jfrog.local:8081/artifactory/api/search/aql
```

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List artifacts based on a property value

artifact_search.json

```
items.find({
    "repo": "conan-develop",
    "name": "conaninfo.txt",
    "$or": [
        { "@conan.settings.os": "Linux" }, { "@conan.settings.os": "Windows" }
    ]
}).include("repo","path","name","@conan.settings.os","@conan.settings.arch","@conan.settings.build_type")
```

```
# with creds or access token
curl -uconan:conan2020 -XPOST -T artifact_search.json
http//jfrog.local:8081/artifactory/api/search/aql
```

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Outline

- Introduction
- Conan reminder
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- Build info in Artifactory
- Promotion in Artifactory
- Appendix
- **Q&A**

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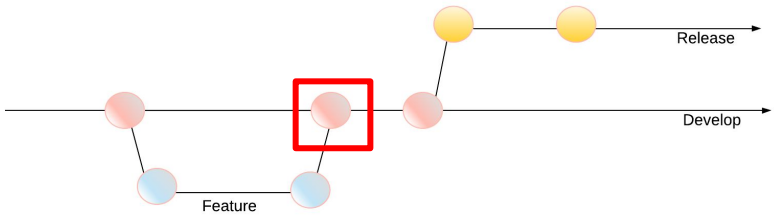
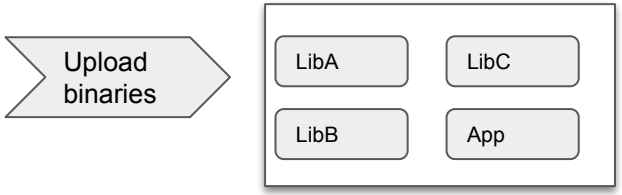
Bugs found in Sandbox



PR & Merge code from Feature to Develop branch

Code workflow

conan-develop repo



Binary workflow

Deployment to Sandbox - Test KO

Delivery status

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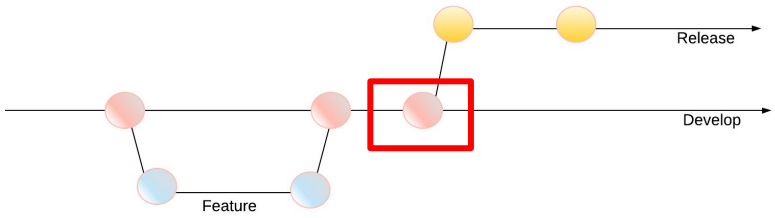
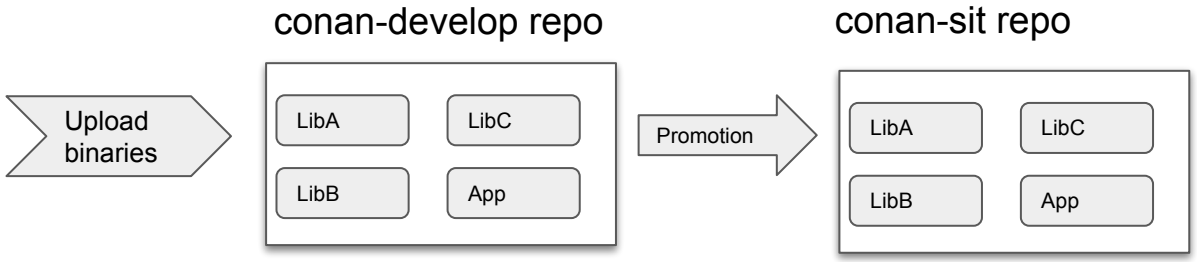
Bug fixes : App1 promoted to SIT



Code workflow



Binary workflow

Deployment to Sandbox - Test OK

Delivery status

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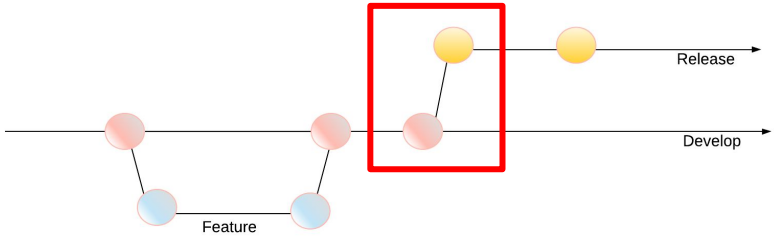
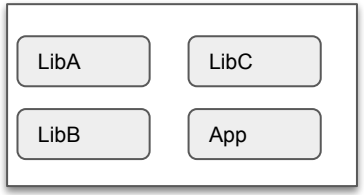
Bugs found in SIT



Create Release branch

Code workflow

conan-sit repo



Binary workflow

Deployment to SIT - Test KO

Delivery status

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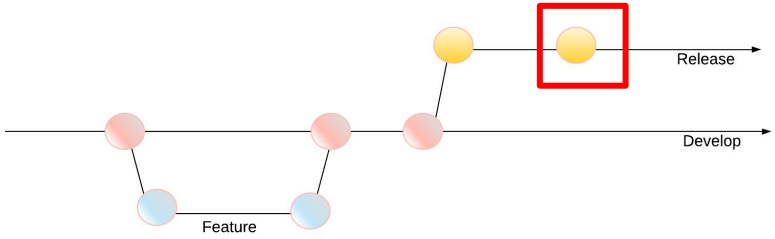
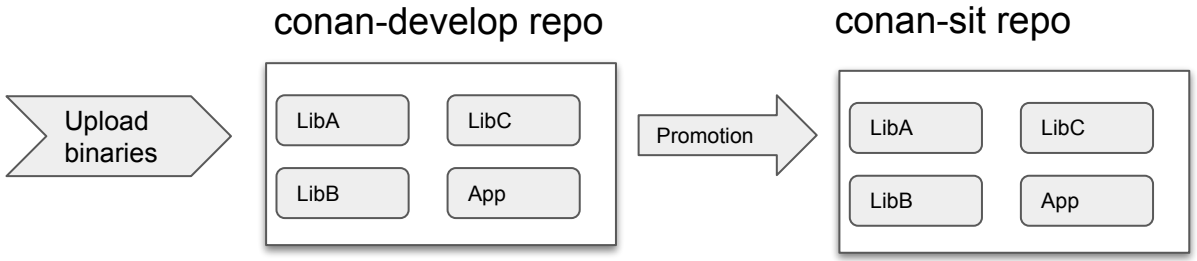
App1 : Code release



Code workflow



Binary workflow

Deployment to Sandbox - Test OK
Deployment to SIT - Test OK
Ready for Code Release

Delivery status

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