External Workspace Manager Plugin for Jenkins Pipeline

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Jenkins World

2016

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About myself

- GSoC Student at Jenkins project
- >2 years experience in Software Development
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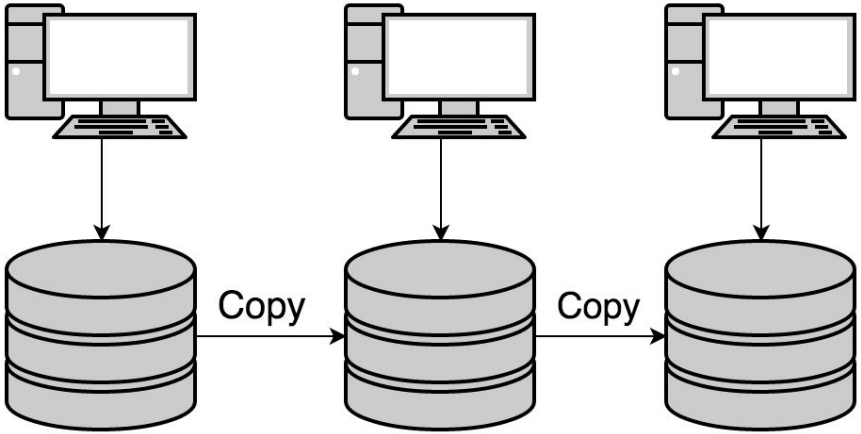
The problem

- Difficult to reuse the same workspace for multiple jobs
- e.g. Running parallel testing across nodes



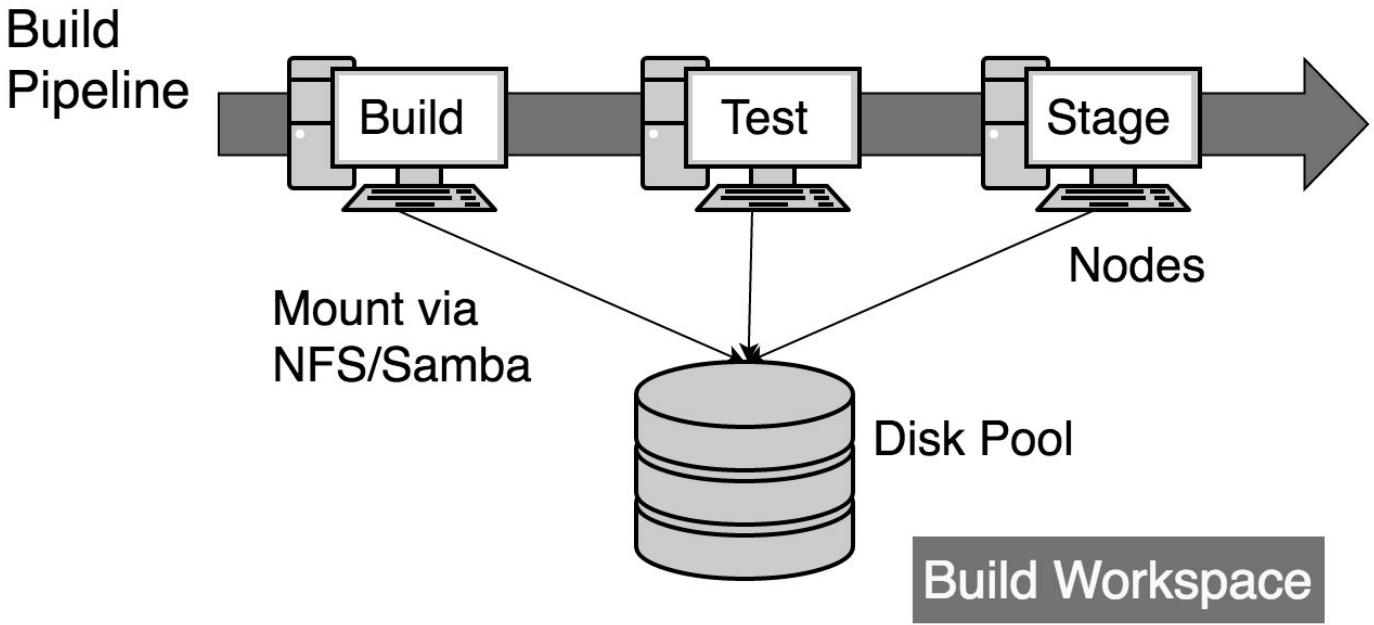
Possible solutions

- Stash/unstash pre-made artifacts (single pipeline)
- Copy Artifacts plugin
- Advanced job setting
  - custom workspace (freestyle)
  - ws (pipeline)

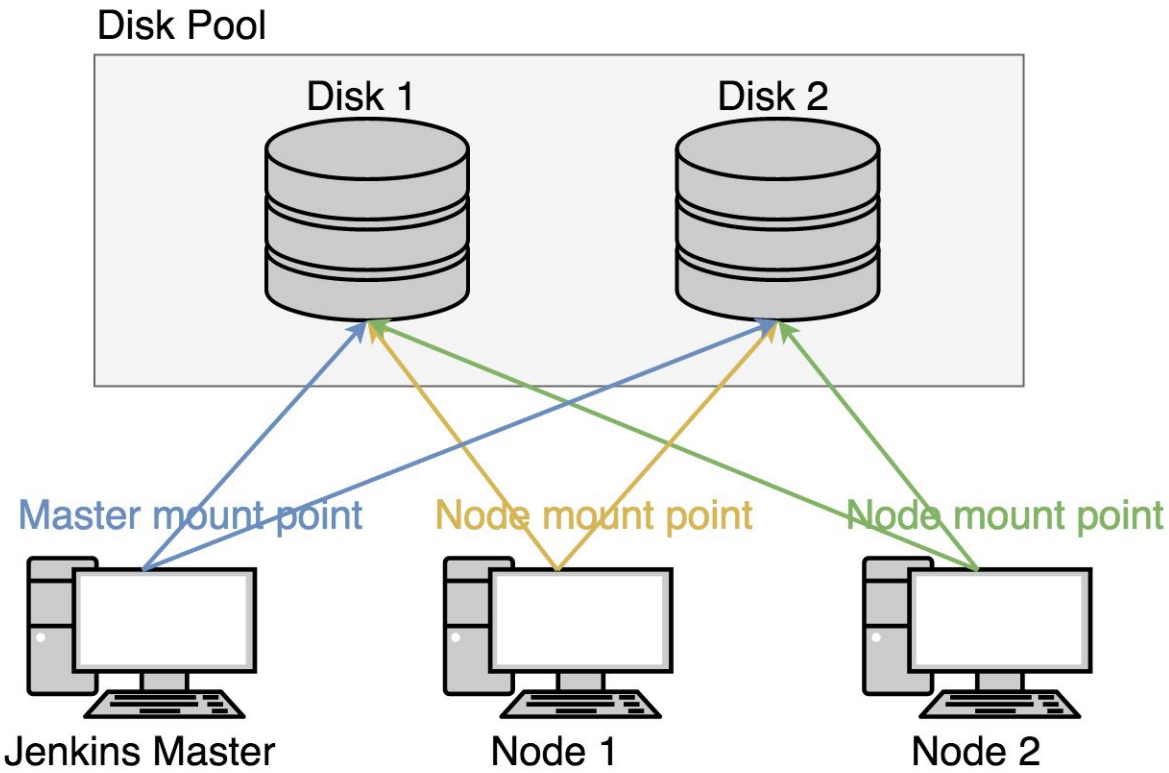
About the project

- Google Summer of Code 2016 project
  - Mentors: Oleg Nenashev & Martin d'Anjou
- Jenkins plugin
- Focus on Pipeline jobs
- Share and reuse workspaces across multiple jobs
  - No need to copy, archive or move files

Concept


Build
Pipeline
Build
Test
Stage
Nodes
Mount via
NFS/Samba
Disk Pool
Build Workspace

Infrastructure



External Workspace Definitions

Jenkins global config

Disk Pool

Disk Pool ID: diskpool1

Display Name: Disk Pool One

Description: A summary description of this Disk Pool

Workspace path template:

Disk Pool Restriction: No restriction (take any)

Disk Allocation Strategy: Select the Disk with the most usable space

Disk 1

Disk

Disk ID: disk1

Display Name: Disk One

Master mount point: /mount-from-master/to/disk-one

Physical path on disk: jenkins-project/disk1

Disk Information: No Disk Info

Delete Disk

Disk 2

Disk

Disk ID: disk2

Display Name: Disk Two

Master mount point: /mount-from-master/to/disk-two

Physical path on disk: jenkins-project/disk2

Disk Information: No Disk Info

Delete Disk

External Workspace Definitions

Node 1 config

Labels: linux

Usage: Use this node as much as possible

Launch method: Launch agent via Java Web Start

Availability: Keep this agent online as much as possible

Node Properties

- [ ] Environment variables
- [x] External Workspace

Disk Pool

Disk Pool Ref ID: diskpool1

Disk

Disk Ref ID: disk1

Node mount point: /mount-from-linux-node/to/disk-one

Disk

Disk Ref ID: disk2

Node mount point: /mount-from-linux-node/to/disk-two

Add Disk

Jenkins global config

Disk Pool

Disk Pool ID: diskpool1

Display Name: Disk Pool One

A summary description of this Disk Pool

No restriction (take any)

Select the Disk with the most usable space

Disk

Disk ID: disk1

Display Name: Disk One

Master mount point: /mount-from-master/to/disk-one

Physical path on disk: jenkins-project/disk1

Disk Information: No Disk Info

Delete Disk

Disk

Disk ID: disk2

Display Name: Disk Two

Master mount point: /mount-from-master/to/disk-two

Physical path on disk: jenkins-project/disk2

Disk Information: No Disk Info

Delete Disk

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External Workspace Definitions

Node 2 config

Labels: test

Usage: Use this node as much as possible

Launch method: Launch agent via Java Web Start

Availability: Keep this agent online as much as possible

Node Properties

- [ ] Environment variables
- [x] External Workspace

Disk Pool

Disk Pool Ref ID: diskpool1

Disk

Disk Ref ID: disk1

Node mount point: E:\mount-from-test-node\to\disk-one

Disk

Disk Ref ID: disk2

Node mount point: E:\mount-from-test-node\to\disk-two

Add Disk

Jenkins global config

Disk Pool

Disk Pool ID: diskpool1

Display Name: Disk Pool One

A summary description of this Disk Pool

No restriction (take any)

Select the Disk with the most usable space

Disk

Disk ID: disk1

Display Name: Disk One

Master mount point: /mount-from-master/to/disk-one

Physical path on disk: jenkins-project/disk1

Disk Information: No Disk Info

Delete Disk

Disk

Disk ID: disk2

Display Name: Disk Two

Master mount point: /mount-from-master/to/disk-two

Physical path on disk: jenkins-project/disk2

Disk Information: No Disk Info

Delete Disk

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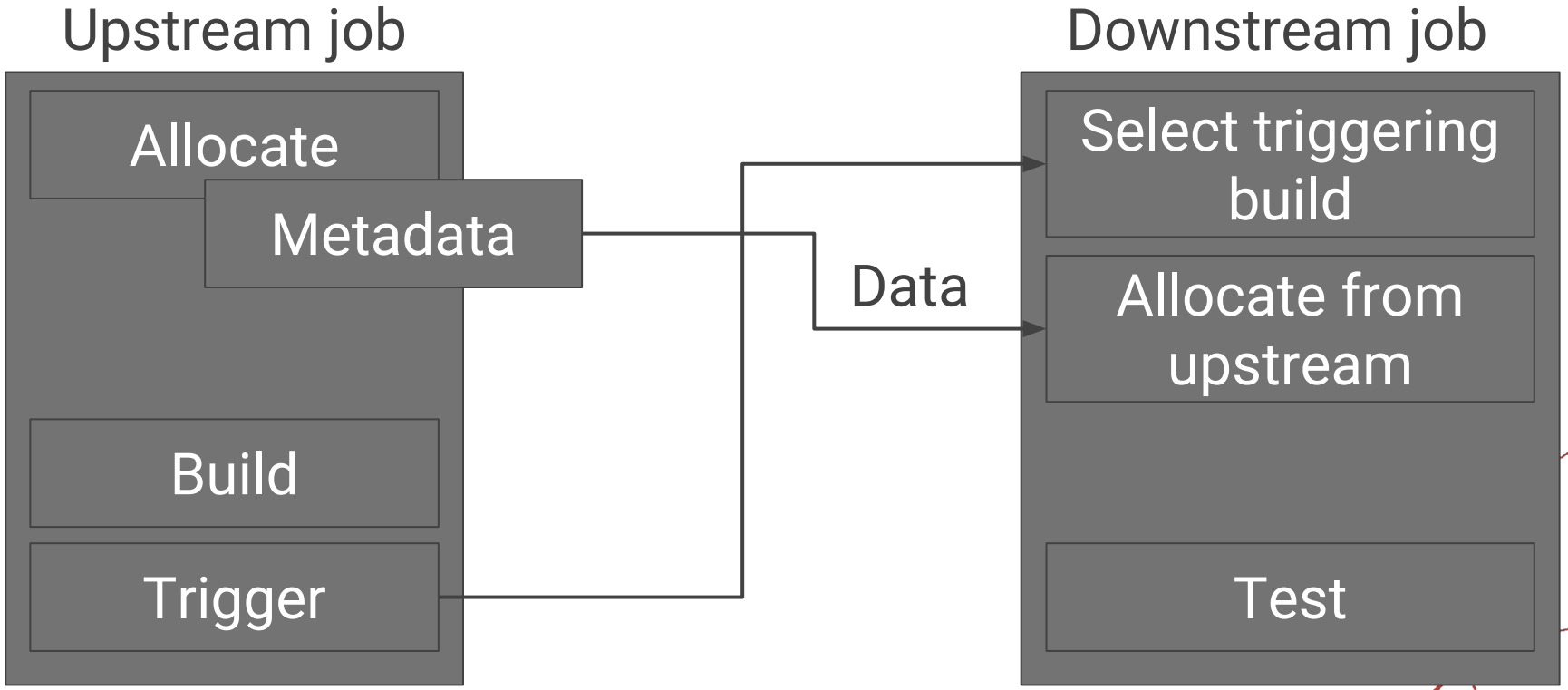
Example 1. Usage in a single job

```
def extWorkspace = exwsAllocate 'diskpool1'
node ('linux') {
    exws (extWorkspace) {
       checkout scm
       sh 'mvn clean install -DskipTests'
    }
}
node ('test') {
    exws (extWorkspace) {
        sh 'mvn test'
    }
}
```

Example 2. Upstream/Downstream



Example 2. Upstream job

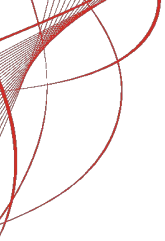
- No changes in External Workspace commands!

```
def extWorkspace = exwsAllocate 'diskpool1'
node ('linux') {
    exws (extWorkspace) {
        checkout scm
        sh 'mvn clean install -DskipTests'
    }
}
build job: 'downstream-job',
    parameters: [string(
        name: 'BUILD_NUMBER_PARAM',
        value: "${currentBuild.number}")]
```

Example 2. Downstream job

- *Run Selector Plugin* picks the upstream build

```
def run = selectRun job: 'upstream-job',
  selector: buildNumber(BUILD_NUMBER_PARAM)
def extWorkspace = exwsAllocate selectedRun: run
node ('test') {
    exws (extWorkspace) {
        sh 'mvn test'
    }
}
```



Demo

Advanced features

- Workspace cleanup
  - Uses *Workspace Cleanup Plugin*
- Provide custom workspace path
  - By default */mountPoint/pathOnDisk/$JOB_NAME/$BUILD_NUMBER*
  - Override
    - Jenkins global config, for each Disk Pool
    - In the Pipeline script

More features

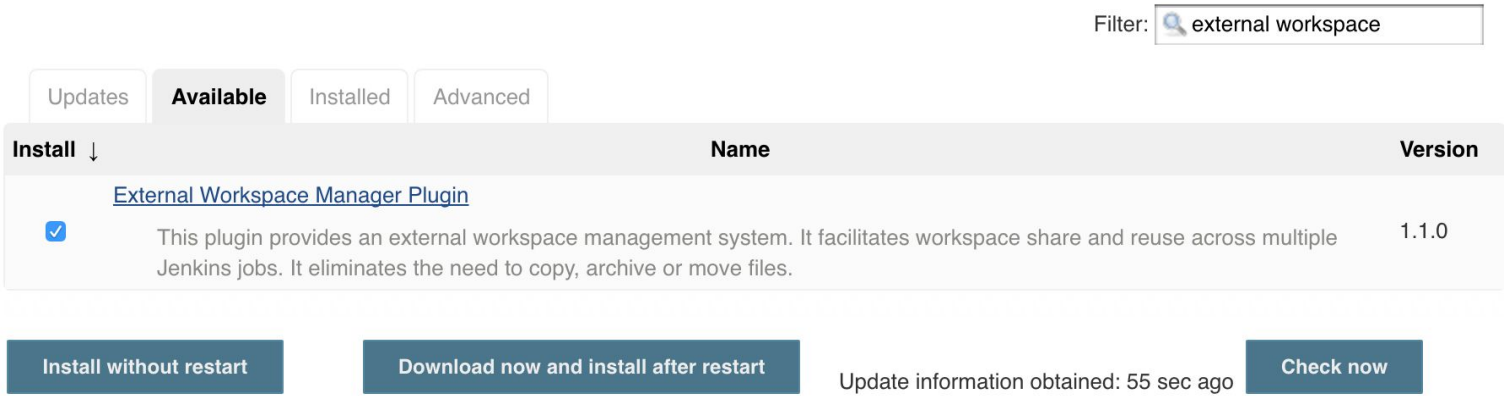
- Disk Pool restrictions
  - Restrict a Disk Pool to be allocated only for specific jobs
  - Integrates *Job Restrictions Plugin*
- Flexible Disk allocation strategies
  - Select the disk with the most usable space
  - Select the disk with the fastest write/read speed

Demos

- Jenkins Open Source Hub
  - Thursday 12:45 - 13:00

Stable release

- Stable version is released!



- Usage guidelines on the plugin's README page
- Feedback is welcome on Jira and Gitter

Links

- Repository

github.com/jenkinsci/external-workspace-manager-plugin

- Gitter chat

gitter.im/jenkinsci/external-workspace-manager-plugin

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