Introduction to Git

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ISG We build general capability

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Outline

- What is Git?
- Why is everyone using Git?
- Git concepts
- Git commands

What is Git?

- A distributed revision control system
- Designed and developed by Linus Torvalds
- British English slang meaning "unpleasant person"

Why is everyone using Git?

Branching

Local

Fast

Distributed

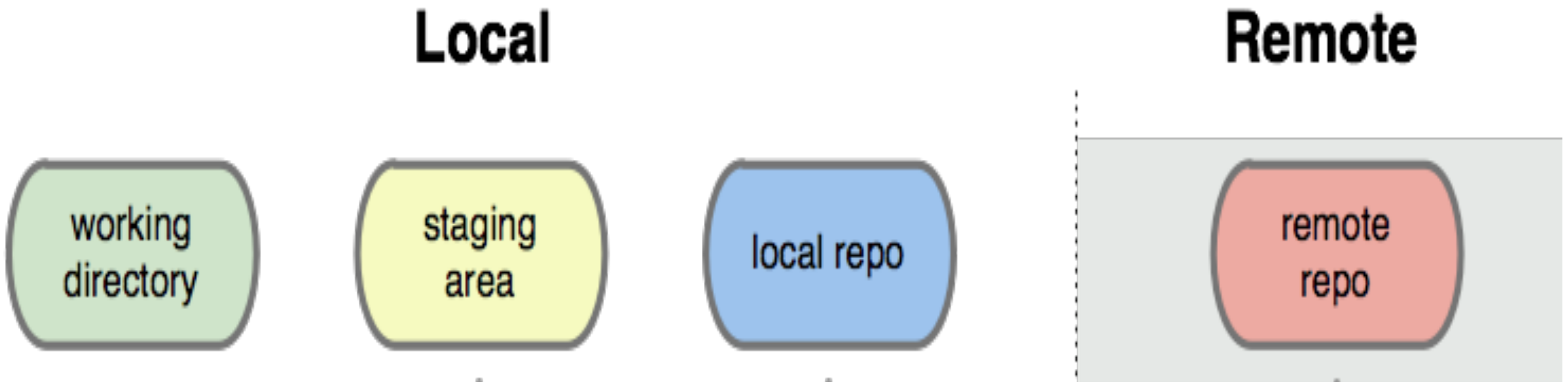
Small

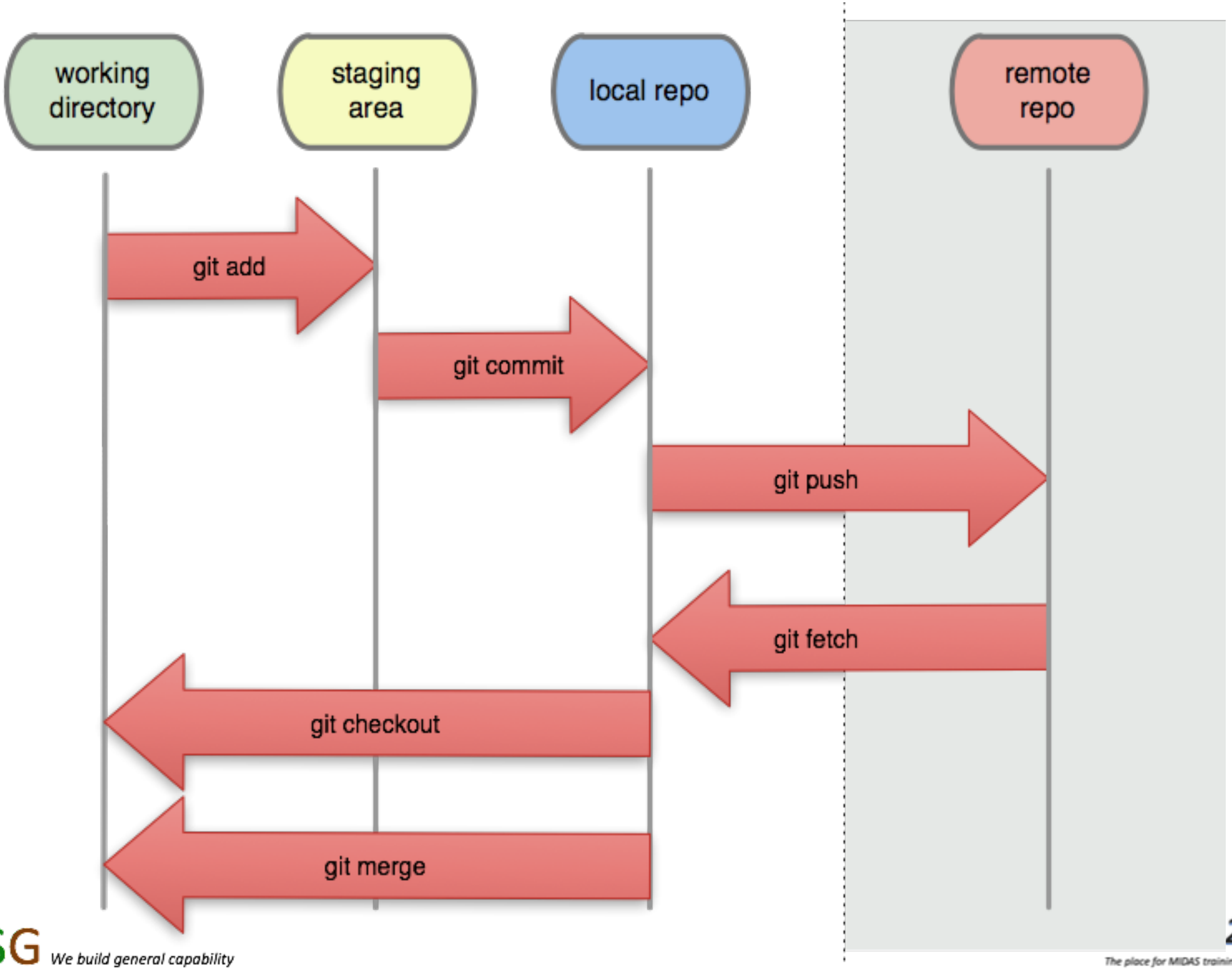
Staging Area

Workflows

Popularity - Github, Bitbucket

Git concepts




working directory
staging area
local repo
remote repo
git add
git commit
git push
git fetch
git checkout
git merge

Common Git Commands

add	Add file contents to the index
bisect	Find by binary search the change that introduced a bug
branch	List, create, or delete branches
checkout	Checkout a branch or paths to the working tree
clone	Clone a repository into a new directory
commit	Record changes to the repository
diff	Show changes between commits, commit and working tree, etc
fetch	Download objects and refs from another repository
grep	Print lines matching a pattern
init	Create an empty Git repository or reinitialize an existing one
log	Show commit logs
merge	Join two or more development histories together
mv	Move or rename a file, a directory, or a symlink
pull	Fetch from and integrate with another repository or a local branch
push	Update remote refs along with associated objects
rebase	Forward-port local commits to the updated upstream head
reset	Reset current HEAD to the specified state
rm	Remove files from the working tree and from the index
show	Show various types of objects
status	Show the working tree status
tag	Create, list, delete or verify a tag object signed with GPG

hey why are you trying to read this small text?

Common Git Commands We'll Cover

add	Add file contents to the index
branch	List, create, or delete branches
checkout	Checkout a branch or paths to the working tree
clone	Clone a repository into a new directory
commit	Record changes to the repository
fetch	Download objects and refs from another repository
push	Update remote refs along with associated objects
status	Show the working tree status

Hands on with Gitlab

Using Git in Agile development

- Tasks are defined units of work - a branch
- Peer Code Review - merge (pull) request
- Frequent Releases - tagging

Feature Branch Workflow

- Tom and Jerry are coding partners
- Tom implements new feature as a branch
- Tom makes a pull request to Jerry
- Jerry reviews Tom’s code
- After review, Jerry merges Tom’s code to master

Hands on exercise

- Grab the cheat sheet
- Obtain a copy of a repository
- Create a branch and check it out
- Do some programming on your branch
- Push the branch to the server
- Make a merge request
- Respond to merge requests
- Checkout the project master

Steps in the exercise conventions

```
command1 to type in <variable>
command2 to type in <variable>
command3 to type in <variable>

[username@olympus ~]$ command1 to type in <variable>
result1
[username@olympus ~]$ command2 to type in <variable>
result2
[username@olympus ~]$ command3 to type in <variable>
result3
```

Obtain a copy of the repository

```
git clone https://<git username>@git.isg.pitt.edu/mission/gitlab-tutorial.git
```

```
[jespino@olympus ~]$ git clone https://juest4@git.isg.pitt.edu/mission/gitlab-
tutorial.git
Initialized empty Git repository in /home/jespino/gitlab-tutorial/.git/
Password:
remote: Counting objects: 9, done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 9 (delta 0), reused 0 (delta 0)
Unpacking objects: 100% (9/9), done.
```

Create a branch

```
git branch <branch name>
```

```
[jespino@olympus ~]$ cd gitlab-tutorial/
[jespino@olympus gitlab-tutorial]$ git branch helloToJeremy
[jespino@olympus gitlab-tutorial]$ git checkout helloToJeremy
Switched to branch 'helloToJeremy'
```

Do some “programming”

```
echo "<your name>" > <your name>.txt
git add <your name>.txt
git commit -m "adding the <your name> file"

[jespino@olympus gitlab-tutorial]$ echo "Jeremy" > jeremy.txt
[jespino@olympus gitlab-tutorial]$ git add jeremy.txt
[jespino@olympus gitlab-tutorial]$ git commit -m "adding the jeremy file"
[helloToJeremy c769076] adding the jeremy file
 1 files changed, 1 insertions(+), 0 deletions(-)
 create mode 100644 jeremy.txt
```

Upload your branch to Gitlab

```
git push origin <branch name>
```

```
[jespino@olympus gitlab-tutorial]$ git push origin helloToJeremy
Password:
Counting objects: 4, done.
Delta compression using up to 64 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 315 bytes, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://juest4@git.isg.pitt.edu/mission/gitlab-tutorial.git
 * [new branch]      helloToJeremy -> helloToJeremy
```

Make a merge request

- https://git.isg.pitt.edu/mission/gitlab-tutorial/merge_requests
- Click on “+New Merge Request”
- In From field, select your branch
- In To field, select master
- Click Submit
- Assign the request to your co programmer
- Your co-programmer will get an email notification saying a merge request is waiting for them

Respond to merge requests

- https://git.isg.pitt.edu/mission/gitlab-tutorial/merge_requests
- Browse the code and make comments
- Optionally fetch the branch, check it out and run it in your working directory
- Accept the merge when you are satisfied

Checkout the project master

```
git checkout master
git pull origin master
./run.sh
```

```
[jespino@olympus gitlab-tutorial]$ git checkout master
Switched to branch 'master'
[jespino@olympus gitlab-tutorial]$ ls
MISSION.txt  README  run.sh
[jespino@olympus gitlab-tutorial]$ git pull origin master
...
[jespino@olympus gitlab-tutorial]$ ls
jeremy.txt  john.txt  MISSION.txt  README  run.sh
[jespino@olympus gitlab-tutorial]$ ./run.sh
Hello, Jeremy!
Hello, John!
Hello, MISSION!
```

Other great Git resources

Tutorials

https://www.codeschool.com/courses/git-real

https://www.atlassian.com/git/tutorials/

Cheatsheet

https://training.github.com/kit/downloads/github-git-cheat-sheet.pdf

If you have extra time...

Do work on someone else’s branch

```
#Fetch all the branches from remote
git fetch --all

#Show a list of all branches
git branch -a

#Create a local branch from remote
git branch --track <branchName> remotes/origin/<branchName>

#Check out the branch
git checkout <branchName>
```