# Mercurial Tutorial

Mark Gates
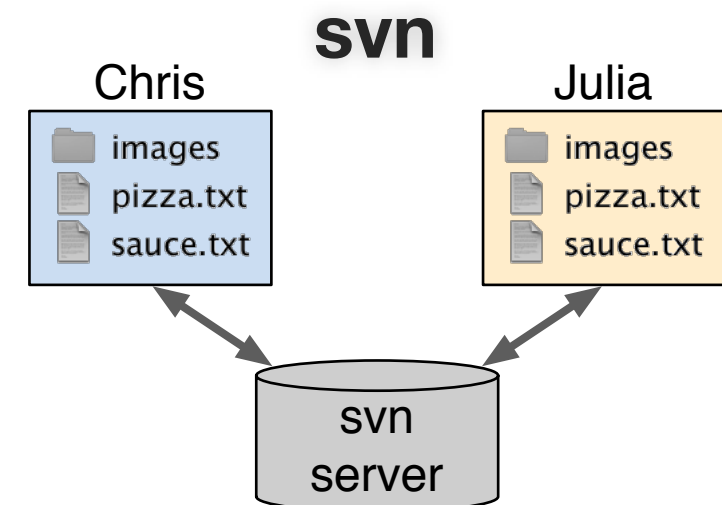
Nov 2016

Outline

- Basic commands in single repository
  - Creating repo
  - Add & edit files
  - Viewing history
  - Fixing last commit

- Multiple users / branches
  - Simple case
  - Merge without conflicts
  - Merge with conflicts
  - Bookmarks
  - Branches

- BitBucket
  - Fork
  - Pull requests

- Final thoughts

Overview of Mercurial

- Distributed source control management
  - Each user has copy of entire repository
  - Commits go to local repo
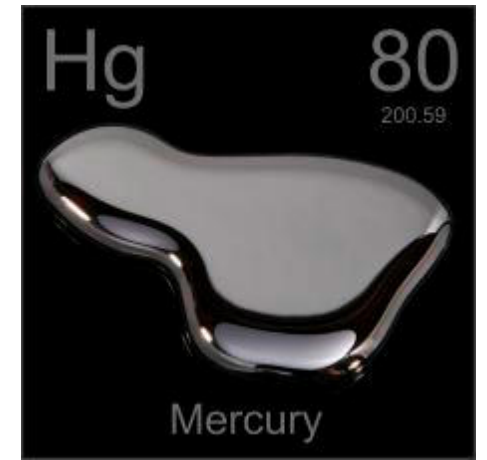 - Push & pull between repos

- Similar to git
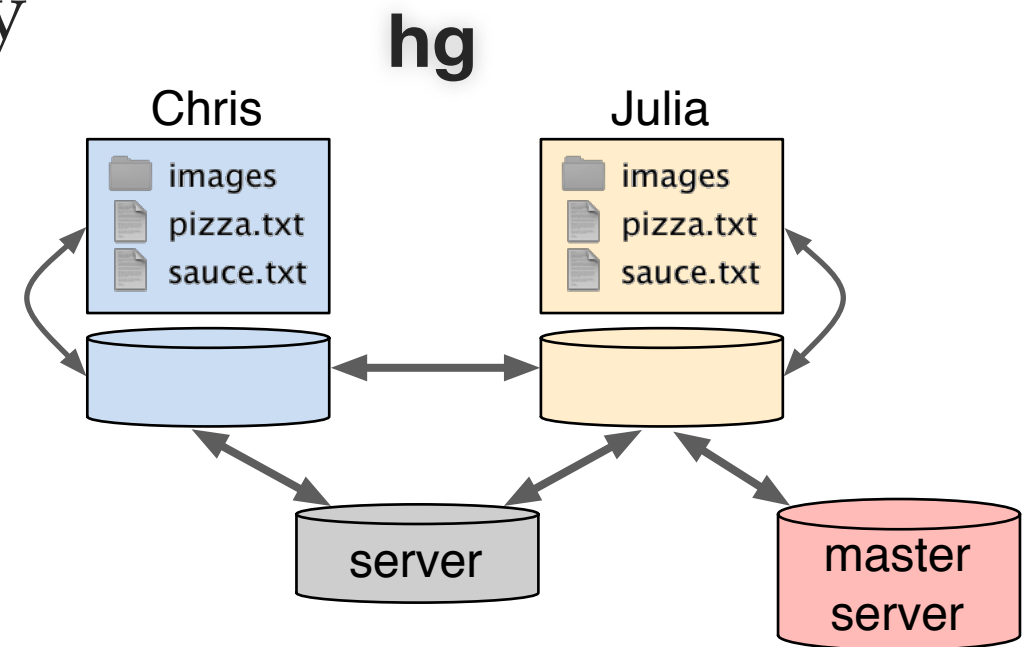
- We use central repo on BitBucket to synchronize
  - Nothing special about BitBucket repo!

- Unlike svn, where all commits go to server

hg

Chris
- images
- pizza.txt
- sauce.txt

Julia
- images
- pizza.txt
- sauce.txt

server

master server

svn

Chris
- images
- pizza.txt
- sauce.txt

Julia
- images
- pizza.txt
- sauce.txt

svn server

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Help!

- Extensive help
- hg   # basic commands
- hg help [-v]   # all commands
- hg help *command* [-v]   # specific command

```
>> hg
Mer
bas
  lis
  ad
  ar
  cl
  co
  di
  ex
  fo
  in
...
  br
  br
(us bu
  ca
...

   (so
```

```
>> hg help
Mer
hg

 add

  ad
  ad
  an
  ar
  ba
  bi
  bo
opt
  br
  br
  -I
  -X
  -n
```

```
>> hg help add
hg

add
```

```
>> hg --version
Mercurial Distributed SCM (version 3.9.2)
(see https://mercurial-scm.org for more information)
```

* throughout, output is abbreviated to fit on slides

Configuration

- User: ~/.hgrc

- Repo: .hg/hgrc

- Suggested items
  - **~/.hgignore** hides files in hg status output
  - **ext**ernal **diff** (e.g., graphical)
  - **git diff** output nicer when renaming files
  - **color** extension colors diff and status output
  - **shelve** saves changes temporarily
  - **alias** to shorten commands

```
~/.hgrc

[ui]
ignore = ~/.hgignore

[extensions]
hgext.extdiff =
color =
shelve =

[extdiff]
cmd.opendiff = fmdiff

[diff]
git = True

# https://www.mercurial-scm.org/wi
[color]
status.ignored  = black
status.modified = bold blue
status.added    = bold green
status.removed  = bold magenta
status.deleted  = bold red
status.unknown  = black

diff.tab               = red_bac
diff.trailingwhitespace = red_bac

[alias]
glog = log -G
slog = log --template=short
```

```
~/.hgignore

syntax: glob

# latex output files
*.aux
*.bbl
*.blg
*.fff
*.idx
*.log
*.marks
*.nav
*.out
*.snm
*.synctex.gz
*.toc

# compiled files
*.a
*.d
*.o
*.pyc
*.so

# hg backup files
*.orig

# misc files
.DS_Store
```

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Creating repo

- hg init [*directory*]

- Creates repo directory (if needed) and .hg directory

- By default uses current "." directory

```
home> hg init recipes
home> cd recipes/
recipes> ls -a
./   ../  .hg/
```

Adding files

- hg add [*files*]

- hg status [-acm] [-q]   # hg st
  - -a added
  - -c clean
  - -m modified
  - -q quiet (hide unknown files)

- hg commit [-m "*message*"]

```
recipes> jedit pizza.txt
recipes> hg add pizza.txt
recipes> hg st
A pizza.txt    # A = added

recipes> hg commit -m 'start pizza'
```

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Editing files

- hg diff [*files*]

```
recipes> jedit pizza.txt
recipes> hg st
M pizza.txt   # M = modified

recipes> hg diff
diff -r 9ab04aa4c434 pizza.txt
--- a/pizza.txt Tue Oct 25 07:58:39 2016 -0400
+++ b/pizza.txt Tue Oct 25 08:03:53 2016 -0400
@@ -1,7 +1,7 @@
 Dough
-1 1/2 cups warm water (105 °F–115 °F)
+1.5 cups warm water (105 °F–115 °F)
 1 package active dry yeast
-3 1/2 cups bread flour
+3.5 cups bread flour
 2 Tbsp olive oil
 2 tsp salt
 1 tsp sugar

recipes> hg commit -m 'use decimal'
```

pizza.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

History

- hg diff -r revision
  - Working files compared to that revision

- hg diff -c revision
  - Changes that occurred in that revision

```
recipes> hg diff -c 1
diff -r 9ab04aa4c434 -r 0b85839d8a57 pizza.txt
--- a/pizza.txt  Tue Oct 25 07:58:39 2016 -0400
+++ b/pizza.txt  Tue Oct 25 08:05:45 2016 -0400
@@ -1,7 +1,7 @@
 Dough
-1 1/2 cups warm water (105 °F–115 °F)
+1.5 cups warm water (105 °F–115 °F)
 1 package active dry yeast
-3 1/2 cups bread flour
+3.5 cups bread flour
 2 Tbsp olive oil
 2 tsp salt
 1 tsp sugar
@@ -11,7 +11,7 @@
 2/3 cup mozzarella cheese, grated
```

```
recipes> hg diff
# or
recipes> hg diff -r 1
diff -r 0b85839d8a57 pizza.txt
--- a/pizza.txt  Tue Oct 25 08:05:45 2016 -0400
+++ b/pizza.txt  Tue Oct 25 11:42:24 2016 -0400
@@ -9,6 +9,7 @@
 2/3 cup tomato sauce
 2/3 cup mozzarella cheese, grated
+1/3 cup feta cheese, crumbled

 Mix dough ingredients; knead for 10 minutes.
```

History

- hg log [-l *num*] [-G] [--stat]
  - -l limit to last *num* commits
  - -G graph
  - --stat show files changed

- commits identified 2 ways
  - Local version number (0, 1, 2, ...)
    - Local only! Different for different users
  - Global unique hash (e.g., 0b85839d8a57)

- Terminology: commits == revisions == changesets

```
recipes> hg log
changeset:   1:0b85839d8a57
user:        mgates3@utk.edu
date:        Tue Oct 25 08:05:45 2016 -0400
summary:     use decimal

changeset:   0:9ab04aa4c434
user:        mgates3@utk.edu
date:        Tue Oct 25 07:58:39 2016 -0400
summary:     start pizza
```

```
recipes> hg log --stat
changeset:   1:0b85839d8a57
user:        mgates3@utk.edu
date:        Tue Oct 25 08:05:45 2016 -0400
summary:     use decimal

 pizza.txt |   6 +++---
 1 files changed, 3 insertions(+), 3 deletions(-)

changeset:   0:9ab04aa4c434
user:        mgates3@utk.edu
date:        Tue Oct 25 07:58:39 2016 -0400
summary:     start pizza

 pizza.txt |  17 +++++++++++++++++
 1 files changed, 17 insertions(+), 0 deletions(-)
```

History

- Customizable log templates

  - hg log --template list # show available templates

  - Examples

    - http://hgtip.com/tips/advanced/2010-01-15-styling-mercurials-cli/

  - Custom

```
recipes> hg log --template=custom
 9    5231fa16d647   2016-10-28 13:16   misc          mgates3    default
 8    b1047ddb7fca   2016-10-28 11:57   grind         mgates3    sauce
@7    90b0579b4629   2016-10-28 11:57   onion         mgates3    sauce       [*main]
 6    83c38f1e80dd   2016-10-28 11:22   merge sauce   mgates3    default     3,5 [saucier]
 5    ff3b0aca8e36   2016-10-28 11:21   saute         mgates3    sauce       (v1.1)
 4    f82b641f9506   2016-10-28 11:20   brand         mgates3    sauce
 3    1119625a9723   2016-10-28 11:20   preheat       mgates3    default
 2    d82ee94655b3   2016-10-28 11:19   meat          mgates3    default     (v1.0)
 1    49bb5328310f   2016-10-28 11:19   start sauce   mgates3    sauce
 0    6ec9bb1d6c4c   2016-10-28 11:17   start pizza   mgates3    default

recipes> hg slog   # alias in ~/.hgrc
```

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Copy, move files

- hg cp *source destination* [-A]

- hg mv *source destination* [-A]

```
recipes> hg cp pizza.txt veggie.txt
recipes> jedit veggie.txt
recipes> hg st
A veggie.txt

recipes> hg diff   # git option in ~/.hgrc
diff --git a/pizza.txt b/veg.txt
copy from pizza.txt
copy to veggie.txt
--- a/pizza.txt
+++ b/veggie.txt
 2/3 cup mozzarella cheese, grated
+1/2 cup bell peppers, thinly sliced
+1/2 cup chopped fresh basil
+1/2 cup onions, diced

recipes> hg commit -m 'add veggie'
```

pizza.txt

Dou
1.5 c
1 pa
3.5 c
2 Tl
2 ts
1 ts

Top
2/3
2/3

Mix
Cov
Div
Spr
Bak

veggie.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/2 cup bell peppers, thinly sliced
1/2 cup chopped fresh basil
1/2 cup onions, diced

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1.5 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Copy, move files

- hg cp *source destination* [-A]

- hg mv *source destination* [-A]

```
recipes> hg mv pizza.txt veggie.txt
recipes> hg st
A veggie.txt     # A = added
R pizza.txt      # R = removed
recipes> hg commit -m 'rename to veggie'
```

```
recipes> mv pizza.txt veggie.txt
recipes> hg st
! pizza.txt      # ! = tracked file missing
? veggie.txt     # ? = untracked file
recipes> hg mv pizza.txt veggie.txt -A
recipes> hg st
A veggie.txt
R pizza.txt
recipes> hg commit -m 'rename to veggie'
```

pizza.txt

Dou
1.5 c
1 pa
3.5 c
2 Tb
2 tsp
1 tsp

Top
2/3
2/3

Mix
Cov
Div
Spr
Bak

veggie.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/2 cup bell peppers, thinly sliced
1/2 cup chopped fresh basil
1/2 cup onions, diced

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1.5 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Remove files

- hg rm *files* [-f] [-A]

```
recipes> hg rm veggie.txt
recipes> hg st
R veggie.txt
recipes> hg commit -m 'remove veggie'
```

```
recipes> rm veggie.txt
recipes> hg st
! veggie.txt
recipes> hg rm veggie.txt [-A]
recipes> hg st
R veggie.txt
recipes> hg commit -m 'remove veggie'
```

```
recipes> jedit veggie.txt
recipes> hg st
M veggie.txt
recipes> hg rm veggie.txt
not removing veggie.txt: file is modified (use -f to force removal)
recipes> hg rm veggie.txt -f
recipes> hg st
R veggie.txt
recipes> hg commit -m 'remove veggie'
```

pizza.txt

Dou
1.5 c
1 pa
3.5 c
2 Th
2 ts
1 ts

Top
2/3
2/3

Mix

veggie.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
mozzarella cheese, grated
bell peppers, thinly sliced
chopped fresh basil
onions, diced

h ingredients; knead for 10 minutes.
se until double, about 1–1.5 hours.
ough in half; roll out to 10–12 inches diameter.
with tomato sauce & sprinkle with toppings.
at 450 °F for 10–15 minutes until golden.

Reverting changes

- hg revert *files*

```
recipes> hg cp pizza.txt supreme.txt
recipes> hg rm veggie.txt
recipes> jedit pizza.txt
recipes> hg st
M pizza.txt
A supreme.txt
R veggie.txt

recipes> hg revert pizza.txt
recipes> hg st
A supreme.txt
R veggie.txt

recipes> hg revert .      # "." directory
forgetting supreme.txt
undeleting veggie.txt

recipes> hg st
? supreme.txt

recipes> ls -1
pizza.txt
pizza.txt.orig    # backup
supreme.txt       # backup
veggie.txt
```

veggie.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast

pizza.txt

Dough
1.5 cups warm water (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1.5 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Mix dough ingredients, knead for 10 minutes.
Cover; rise until double, about 1–1.5 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Fixing last commit (only last!)

- hg rollback

```
recipes> jedit veggie.txt
recipes> jedit pizza.txt
recipes> hg st
M pizza.txt
M veggie.txt
recipes> hg commit -m 'H20'
recipes> hg log -l 2
changeset:   5:22456188656d
tag:         tip
summary:     H20

changeset:   4:7a81b46fbf59
summary:     rename to veggie

recipes> hg rollback
repository tip rolled back to revision 4 (undo commit)
working directory now based on revision 4

recipes> hg log -l 2
changeset:   4:7a81b46fbf59
tag:         tip
summary:     rename to veggie

recipes> hg st
M pizza.txt
M veggie.txt
```

pizza.txt

Dough
1.5 cups warm H20 (105 °F–115 °F)
1 package active dry yeast
3.5
2 T
2 ts
1 ts

To
2/
2/

Mi
Co
Di
Sp
Ba

veggie.txt

Dough
1.5 cups warm H20 (105 °F–115 °F)
1 package active dry yeast
3.5 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/2 cup bell peppers, thinly sliced
1/2 cup chopped fresh basil
1/2 cup onions, diced

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1.5 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

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Fixing last commit (only last!)

- hg commit --amend
- Destroys rollback information
- Changes global hash identifier, but not date
- Can change message

```
recipes> jedit veggie.txt
recipes> jedit pizza.txt
recipes> hg st
M pizza.txt
M veggie.txt
recipes> hg commit -m 'H20' pizza.txt
recipes> hg st
M veggie.txt

recipes> hg log -l 1 --stat
changeset:   5:167f86be8569
tag:         tip
date:        Tue Oct 25 11:01:21 2016 -0400
summary:     H20

 pizza.txt |  2 +-
 1 files changed, 1 insertions(+), 1 deletions(-)
```

```
recipes> hg commit --amend veggie.txt
saved backup bundle to /Users/mgates/Documents/
writing/2016/mercurial/recipes/.hg/strip-backup/
167f86be8569-954506e9-amend-backup.hg

recipes> hg st
recipes>


recipes> hg log -l 1 --stat
changeset:   5:65d210f5f675
tag:         tip
date:        Tue Oct 25 11:01:21 2016 -0400
summary:     H20

 pizza.txt |  2 +-
 veggie.txt |  2 +-
 2 files changed, 2 insertions(+), 2 deletions(-)
```

Outline

- Basic commands in single repository

  - Creating repo
  - Add & edit files
  - Viewing history
  - Fixing last commit

- **Multiple users / branches**

  - Simple case
  - Merge without conflicts
  - Merge with conflicts
  - Bookmarks
  - Branches
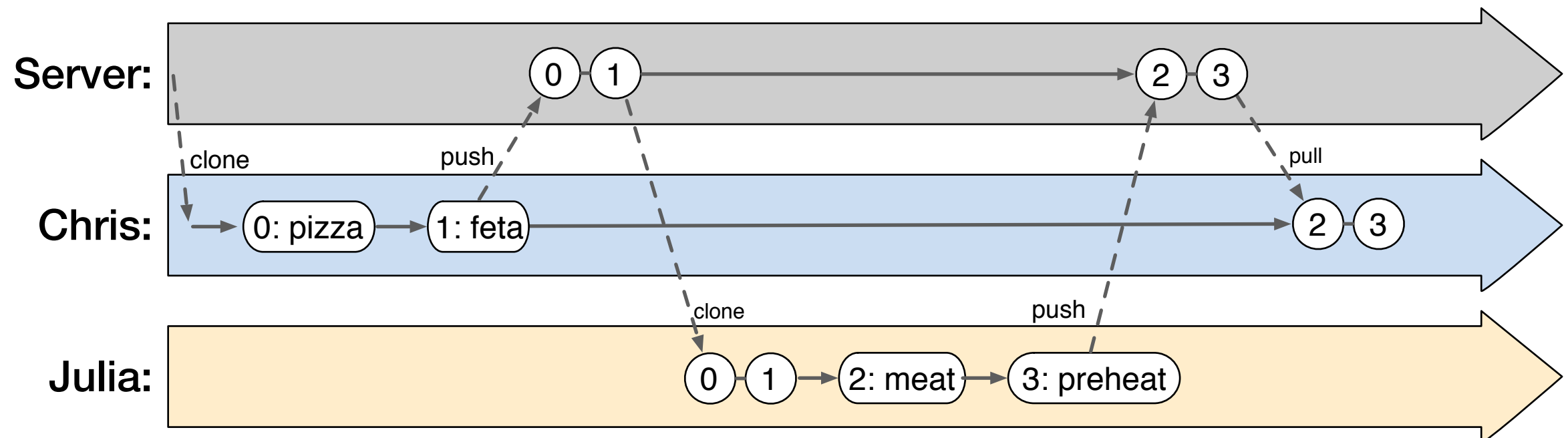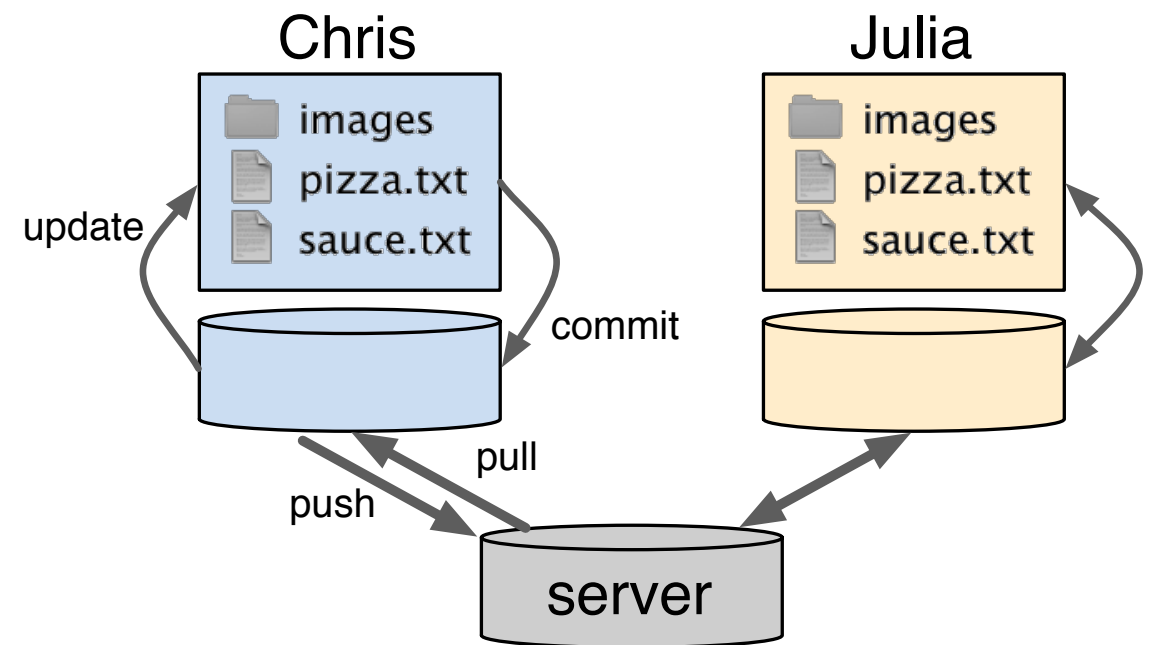
- BitBucket

  - Fork
  - Pull requests

- Final thoughts

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3 kinds of branches

- Forks (or clones) — copies of repo
  - Every copy is a fork! You cannot avoid branching!
  - Typically for development; periodically synchronize
  - Same as git forking

- Bookmarks
  - Typically short-lived for feature development
  - Same as git's branches

- Named branches
  - Typically long-lived branches like "stable" and "devel"
  - Branch name permanently recorded in commit log

Simple example —
one person editing at a time

Basic server interaction

- Simple example with only one person editing at a time

- hg clone *url* [*directory*]

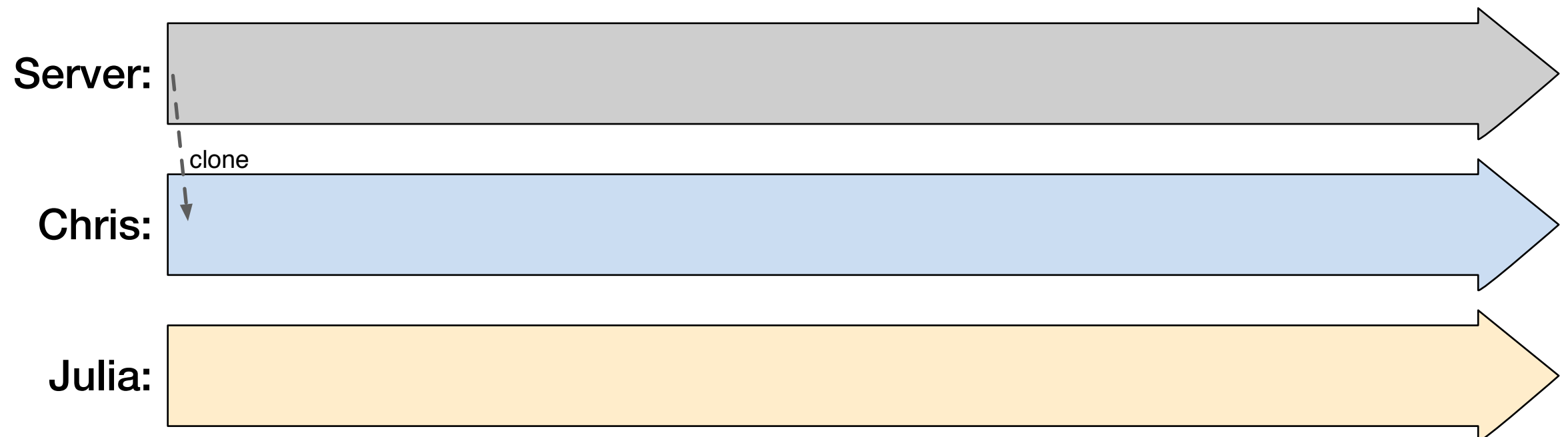- hg push [*url*]

- hg pull [*url*] [-u]

- hg update   # hg up

Chris

images
pizza.txt
sauce.txt

Julia

images
pizza.txt
sauce.txt

update

commit

pull

push

server

Server: 0 1 2 3

clone   push   pull

Chris: 0: pizza 1: feta   2 3

                clone   push

Julia: 0 1 2: meat 3: preheat

dashed lines are copies   solid lines are dependencies

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Basic server interaction

```
home> hg clone ssh://server/recipes chris
home> cd chris
chris> ls -a
./          ../          .hg/
```

.hg/hgrc
[paths] default = ssh://server/recipes

Server:

Chris:

clone

Julia:

dashed lines are copies   solid lines are dependencies

Basic server interaction

```
home> hg clone ssh://server/recipes chris
home> cd chris

chris> jedit pizza.txt
chris> hg commit -m 'start pizza'
chris> jedit pizza.txt
chris> hg commit -m 'feta'
chris> hg push
pushing to ssh://server/recipes
mercurial/recipes
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files
```

pizza.txt

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
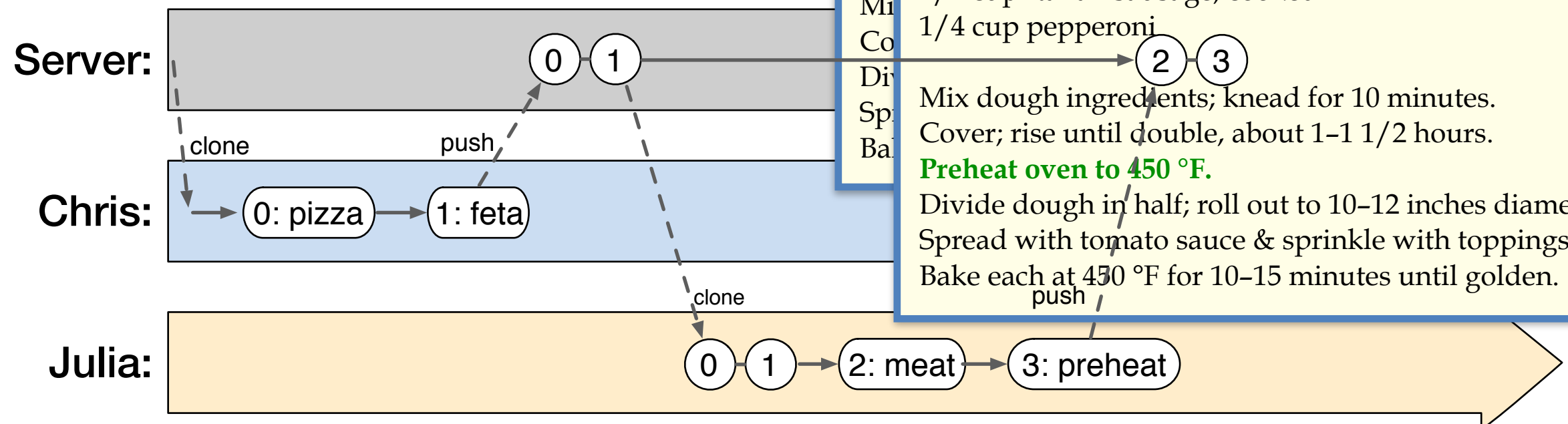**1/3 cup feta cheese, crumbled**

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Server: 0 1

clone   push

Chris: 0: pizza → 1: feta

Julia:

dashed lines are copies   solid lines are dependencies

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Basic server interaction

```
home> hg clone ssh://server/recipes julia
home> cd julia

julia> jedit pizza.txt
julia> hg commit -m 'meat'
julia> hg commit -m 'preheat'
julia> hg push
pushing to ssh://server/recipes
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files
```

pizza.txt

pizza.txt

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/3 cup feta cheese, crumbled
1/2 cup Italian sausage, cooked
1/4 cup pepperoni

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Preheat oven to 450 °F.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Server: (0) (1) ⟶ (2) (3)

clone   push

Chris: ⟶ (0: pizza) ⟶ (1: feta)

clone

push

Julia: (0) (1) ⟶ (2: meat) ⟶ (3: preheat)

dashed lines are copies   solid lines are dependencies

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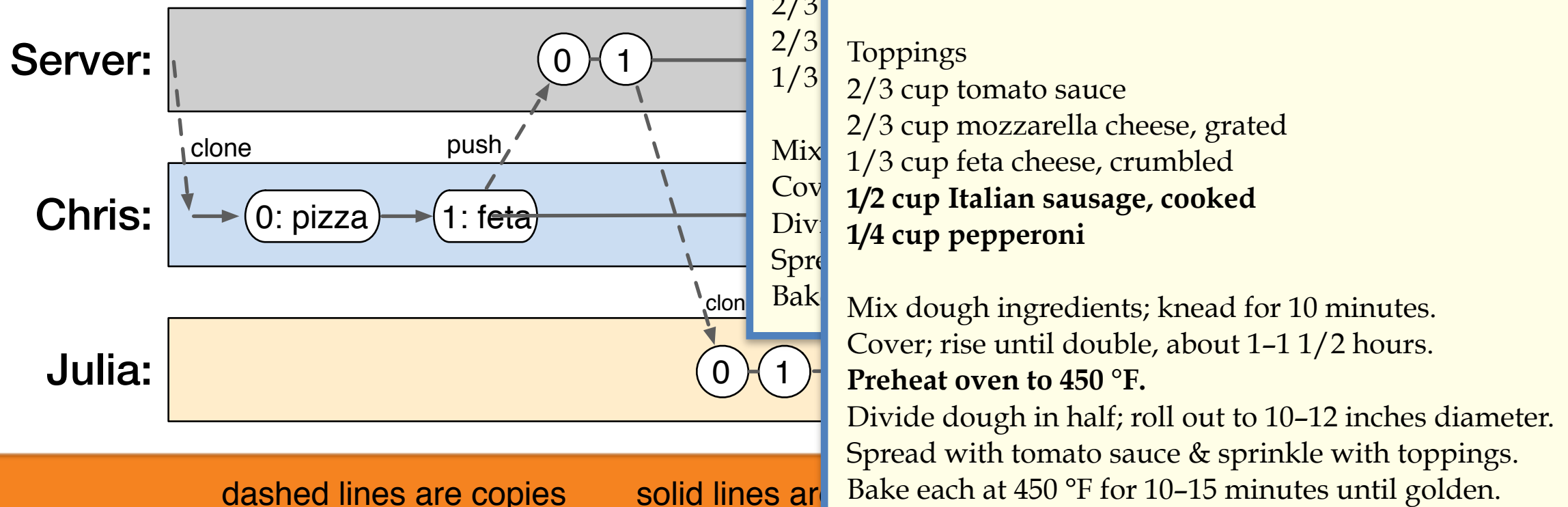
Basic server interaction

```
chris> hg pull
pulling from ssh://server/recipes
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files
(run 'hg update' to get a working copy)
```

– or –

```
chris> hg pull -u
pulling from ssh://server/recipes
searching for changes
adding changesets
adding manifests
adding file changes
```

Note that working copy not yet updated!

```
chris> hg up
1 files updated, 0 files merged, 0 files
removed, 0 files unresolved
```

Server: (0) (1)

clone   push

Chris: → (0: pizza) → (1: feta)
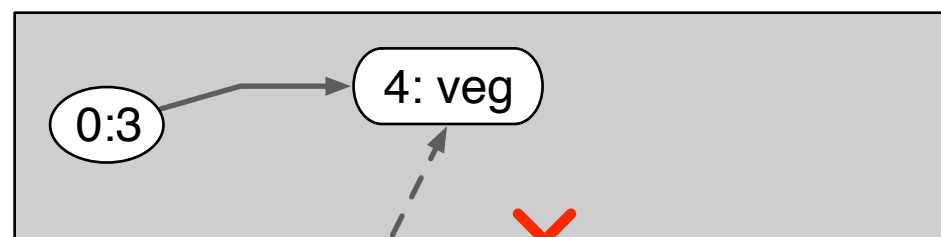
clon

Julia: (0) (1)

pizza.txt

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/3 cup feta cheese, crumbled
1/2 cup Italian sausage, cooked
1/4 cup pepperoni

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Preheat oven to 450 °F.
Divide dough in half; roll out to 10–12 inches diameter.
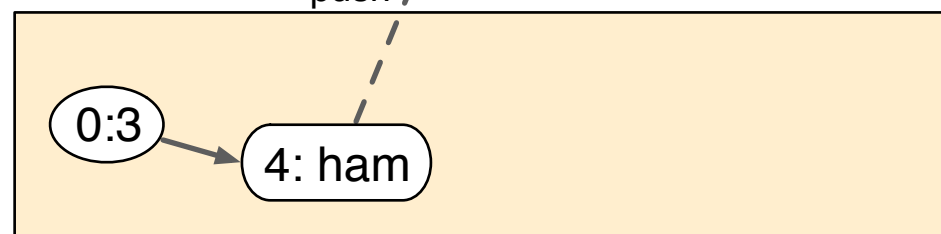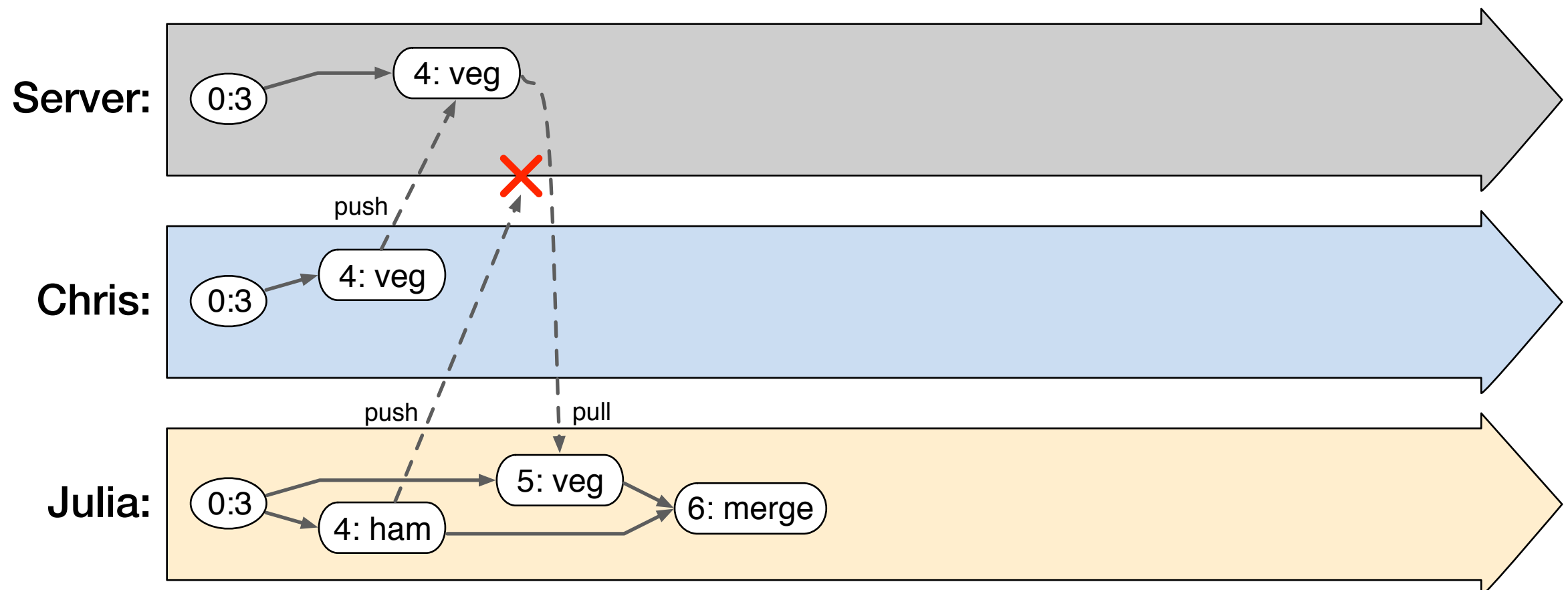Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

dashed lines are copies   solid lines ar

Simple merge —
two simultaneous edits,
without conflicts

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Merge without conflicts

- Merge is required if edits happen in parallel

- Local commit numbers differ

- hg merge

dashed lines are copies   solid lines are dependencies
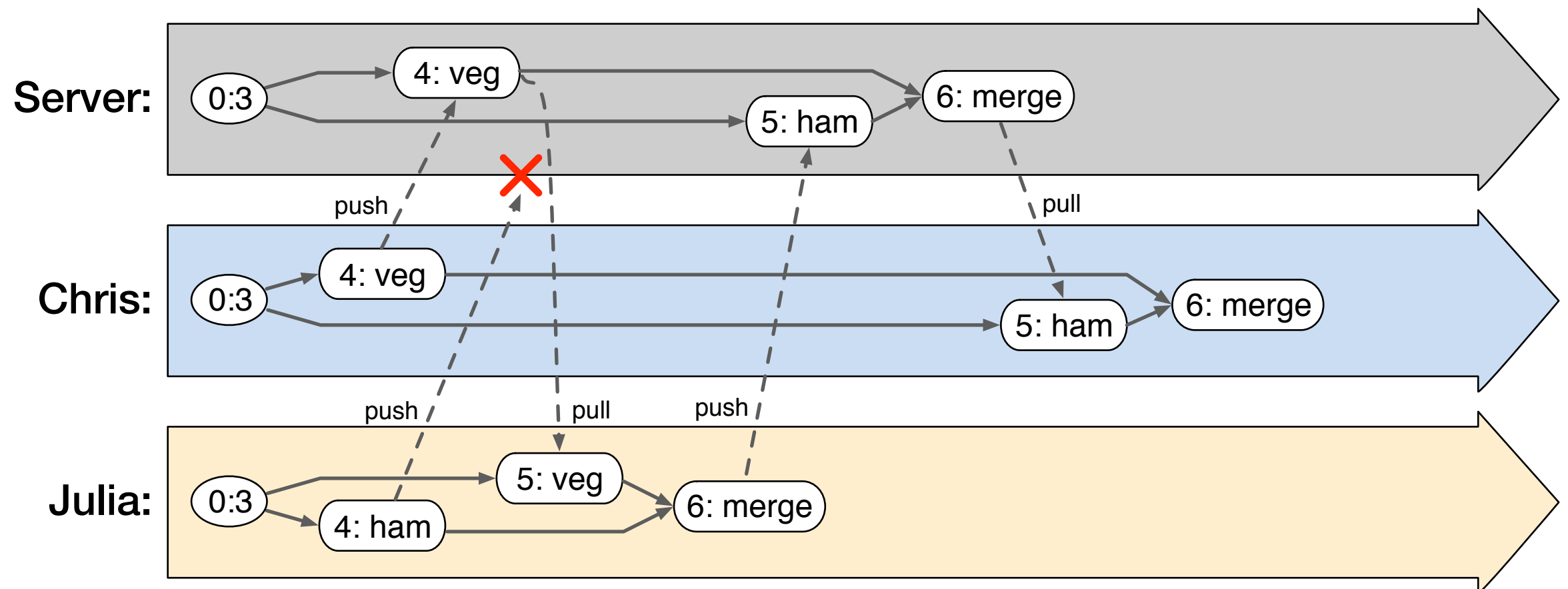
Merge

```
chris> jedit pizza.txt
chris> hg commit -m 'veggies'
chris> hg push
```

```
julia> jedit pizza.txt
julia> hg commit -m 'ham'
julia> hg push
pushing to ssh://server/recipes
searching for changes
remote has heads on branch 'default' that are not known
abort: push creates new remote head c7f726f74e9a!
(pull and merge or see "hg help push" for details about
```

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/3 cup feta cheese, crumbled
1/2 cup Italian sausage, cooked
1/4 cup pepperoni
1/4 cup ham

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Preheat oven to 450 °F.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.

Server: 0:3 → 4: veg

push ✗

Chris: 0:3 → 4: veg

push

Julia: 0:3 → 4: ham

dashed lines are copies   solid lines are dependencies

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Merge

```
julia> hg pull
pulling from ssh://server/recipes
searching for changes
adding changesets
adding manifests
adding file changes
added 1 changesets with 1 changes to 1 files (+1 heads)
(run 'hg heads' to see heads, 'hg merge' to merge)

julia> hg up   # warning, does nothing
0 files updated, 0 files merged, 0 files removed, 0 files unresolved
1 other heads for branch "default"
```

```
julia> hg merge
merging pizza.txt
0 files updated, 1 files merged, 0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
```


Server: 0:3 → 4: veg

Chris: 0:3 → 4: veg   push

Julia: 0:3 → 4: ham → 5: veg → 6: merge   push   pull

dashed lines are copies   solid lines are dependencies

Merge — verify & commit!

```
julia> hg heads
changeset:    5:962db491f9ca
summary:      veggies

changeset:    4:b1473e48944e
summary:      ham

julia> hg diff -r 4
@@ -10,8 +10,6 @@
 1/3 cup feta cheese, crumbled
+1/4 cup mushrooms, thinly sliced
+1/4 cup bell peppers, thinly sliced
 1/2 cup Italian sausage, cooked
```

```
julia> hg diff -r 5
@@ -14,7 +14,6 @@
 1/2 cup Italian sausage, cooked
 1/4 cup pepperoni
+1/4 cup ham

julia> hg commit -m 'merge'
julia> hg push    # optional
pushing to ssh://server/recipes
searching for changes
adding changesets
adding file changes
added 2 changesets with 2 changes to 1 files
```


Server: 0:3 → 4: veg → 6: merge ; 0:3 → 5: ham → 6: merge

Chris: 0:3 → 4: veg

push ✕

Julia: 0:3 → 5: veg → 6: merge ; 0:3 → 4: ham → 6: merge

push   pull   push

dashed lines are copies   solid lines are dependencies

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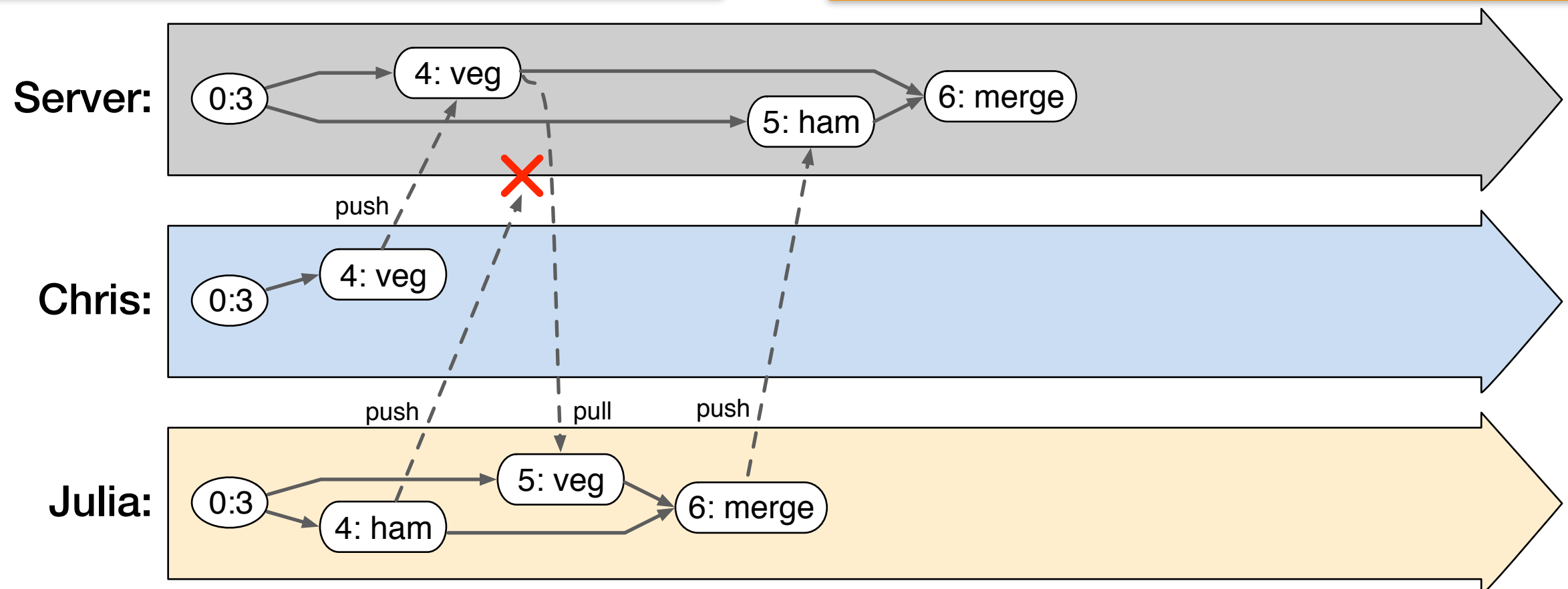
Merge

```
chris> hg pull
pulling from /Users/mgates/Documents/writing/2016/mercurial/recipes
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files
(run 'hg update' to get a working copy)

chris> hg up
1 files updated, 0 files merged, 0 files removed, 0 files unresolved
```

dashed lines are copies   solid lines are dependencies
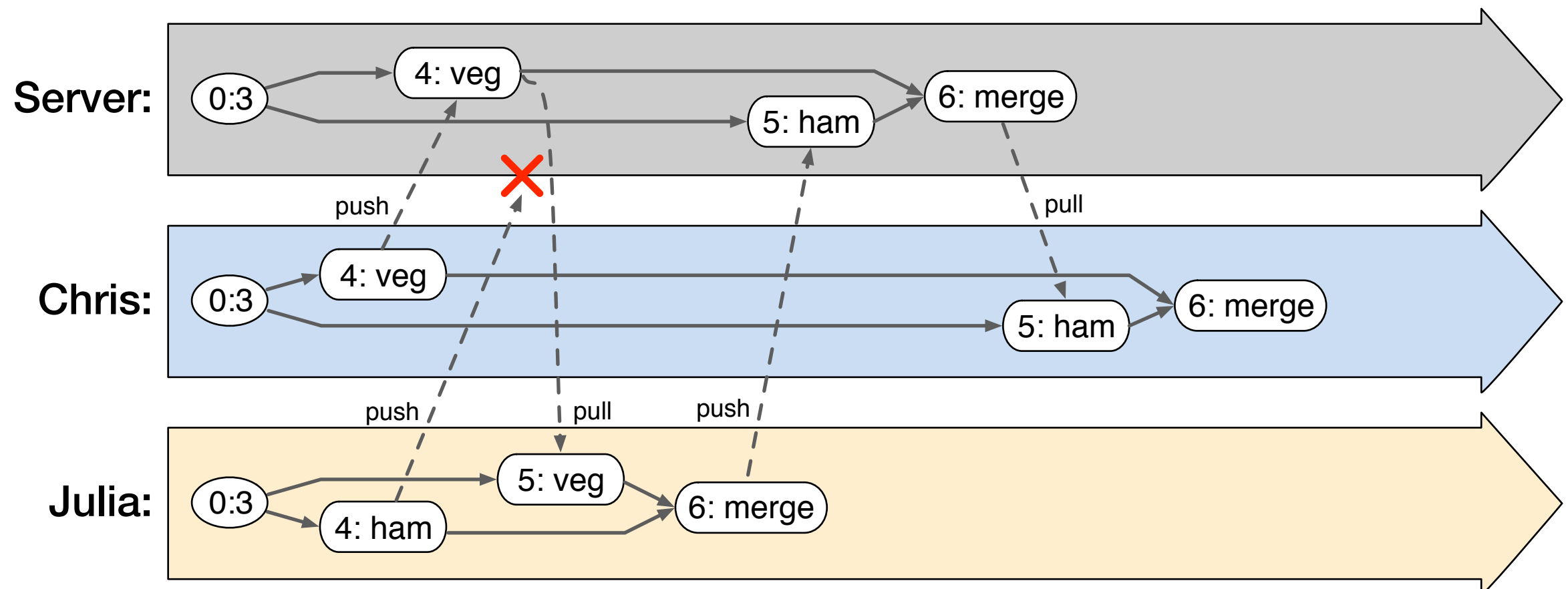
Conflict merge —
two simultaneous edits to same text

Merge with conflict

- Simplify recipe slightly, then add ingredients in same spot

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp extra virgin olive oil
2 tsp sea salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/2 cup bell peppers, thinly sliced
1/3 cup mushrooms
1/2 cup Italian sausage, cooked

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Preheat oven to 450 °F.
Divide dough in half; roll out to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp olive oil
2 tsp salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
1/4 cup mushrooms, sliced
1/4 cup onions, diced
1/2 cup Italian sausage, cooked

Mix dough ingredients; knead for 10 minutes.
Cover; rise until double, about 1–1 1/2 hours.
Preheat oven to 450 °F.
Divide dough in half; spin in air to 10–12 inches diameter.
Spread with tomato sauce & sprinkle with toppings.
Bake each at 450 °F for 10–15 minutes until golden.

Merge with conflict: graphical

- Graphical diff (here, Apple's FileMerge, i.e., opendiff)

- Non-conflicting portions merged automatically

- Manually resolve conflicting portions
  - Choose left, right, both, or neither
  - See & edit final text in bottom pane

- Save file & quit

```
julia> hg merge
merging pizza.txt
0 files updated, 1 files merged, 0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
```

- Save file & quit

Merge with conflict: verify & commit!

```
julia> hg heads
changeset:   9:f41d23390194
summary:     peppers

changeset:   8:791c8abf0a1d
summary:     onions

julia> hg diff -r 8
 3 1/2 cups bread flour
-2 Tbsp olive oil
-2 tsp salt
+2 Tbsp extra virgin olive oil
+2 tsp sea salt
 1 tsp sugar

 2/3 cup mozzarella cheese, grated
-1/4 cup mushrooms, sliced
+1/2 cup bell peppers, thinly sliced
+1/3 cup mushrooms, sliced
 1/4 cup onions, diced
```

```
julia> hg diff -r 9
 1/2 cup bell peppers, thinly sliced
-1/3 cup mushrooms
+1/3 cup mushrooms, sliced
+1/4 cup onions, diced
 1/2 cup Italian sausage, cooked

 Preheat oven to 450 °F.
-Divide dough in half; roll out to 10–12 inches diameter.
+Divide dough in half; spin in air to 10–12 inches diameter.
 Spread with tomato sauce & sprinkle with toppings.

julia> hg commit -m 'merge'
```

Merge with conflict: manual

- hg resolve [-l, -m, -u] [*files*]
  - -l list resolved status
  - -m mark as resolved
  - -u mark as unresolved

```
julia> hg merge --tool internal:merge
merging pizza.txt
warning: conflicts while merging pizza.txt! (edit, then use 'h
0 files updated, 0 files merged, 0 files removed, 1 files unre
use 'hg resolve' to retry unresolved file merges or 'hg update

julia> hg commit -m 'merge'
abort: unresolved merge conflicts (see "hg help resolve")

julia> hg resolve -l    # list resolved status
U pizza.txt             # U = unresolved

julia> jedit pizza.txt
julia> hg resolve -m pizza.txt    # mark as resolved
(no more unresolved files)

julia> hg resolve -l
R pizza.txt             # R = resolved

julia> hg commit -m 'merge'
```

pizza.txt

Dough
1 1/2 cups warm water (105 °F–115 °F)
1 package active dry yeast
3 1/2 cups bread flour
2 Tbsp extra virgin olive oil
2 tsp sea salt
1 tsp sugar

Toppings
2/3 cup tomato sauce
2/3 cup mozzarella cheese, grated
<<<<<<< local
1/4 cup mushrooms, sliced
1/4 cup onions, diced
=======
1/2 cup bell peppers, thinly sliced
1/3 cup mushrooms
>>>>>>> other
1/2 cup Italian sausage, cooked

Mix dough ingredients; knead for 10 minutes.

History

- hg log -G   # graph branches

- hg glog   # alias in ~/.hgrc

```
chris> hg log -G                             |
@     changeset:   10:10ae7218a2bd          o     changeset:   6:800444945b16
|\    tag:         tip                       |\    parent:      5:b1473e48944e
| |   parent:      9:791c8abf0a1d            | |   parent:      4:962db491f9ca
| |   parent:      8:f41d23390194            | |   summary:     merge
| |   summary:     merge                     | |
| |                                          | o   changeset:   5:b1473e48944e
| o   changeset:   9:791c8abf0a1d            | |   parent:      3:0f66f034fa18
| |   parent:      7:1b946d5db238            | |   summary:     ham
| |   summary:     onions                    | |
| |                                          o |   changeset:   4:962db491f9ca
o |   changeset:   8:f41d23390194            |/    summary:     veggies
|/    summary:     peppers                   |
|                                            o   changeset:   3:0f66f034fa18
o   changeset:   7:1b946d5db238              |   summary:     preheat
|   summary:     basic                       |
|                                            o   changeset:   2:7d60311ab431
.                                            |   summary:     meat
.                                            |
.                                            o   changeset:   1:92dafa80df69
                                             |   summary:     feta
                                             |
                                             o   changeset:   0:9ab04aa4c434
                                                 summary:     start pizza
```

Solving merge problems

Fixing bad merge (option 1)

- hg update --clean
  - Reverts all files to state before "hg merge" command

```
julia> hg merge
merging pizza.txt
2016-11-04 01:24:24.700 FileMerge[21657:d07] Invalid color System, labelColor
(warning given only once)
0 files updated, 1 files merged, 0 files removed, 0 files unresolved
(branch merge, don't forget to commit)

# utter confusion entails!
julia> hg up
abort: outstanding uncommitted merge

julia> hg st
M pizza.txt

julia> hg update --clean
1 files updated, 0 files merged, 0 files removed, 0 files unresolved
1 other heads for branch "default"

julia> hg st
julia>
```

- Can then do "hg merge" again

Fixing bad merge (option 2)

- Alternatively, redo merge of specific files

  - hg resolve -u *files*   # mark files as unresolved

  - hg resolve *files*   # re-merge files

```
julia> hg merge
merging pizza.txt
2016-11-04 01:26:51.567 FileMerge[21675:d07] Invalid color System, labelColor
(warning given only once)
0 files updated, 1 files merged, 0 files removed, 0 files unresolved
(branch merge, don't forget to commit)

julia> hg resolve -l
R pizza.txt  # R = resolved
julia> hg resolve -u pizza.txt
julia> hg resolve -l
U pizza.txt  # U = unresolved

julia> hg resolve pizza.txt
merging pizza.txt
2016-11-04 01:28:11.805 FileMerge[21690:d07] Invalid color System, labelColor
(warning given only once)
(no more unresolved files)
julia> hg st
M pizza.txt
julia> hg commit -m 'merge'
```

Merge with uncommitted changes

- hg won't merge if there are uncommitted changes

- Either commit them, or shelve them temporarily

- hg shelve [-n *name*] [-l]

- hg unshelve [*name*]

- Extension in ~/.hgrc

- (Similar to git stash)

```
recipes> hg st
M pizza.txt

recipes> hg merge
abort: uncommitted changes
(use 'hg status' to list changes)

recipes> hg shelve -n peppers
shelved as peppers
1 files updated, 0 files merged, 0 files removed,
0 files unresolved

recipes> hg st
recipes> hg shelve -l
peppers          (4s ago)     changes to: meat

recipes> hg merge
merging pizza.txt
0 files updated, 1 files merged, 0 files removed,
0 files unresolved
(branch merge, don't forget to commit)
recipes> hg commit -m 'merge'

recipes> hg unshelve [peppers]
unshelving change 'peppers'
rebasing shelved changes
rebasing 4:8be446f41b74 "changes to: meat" (tip)
merging pizza.txt
recipes> hg st
M pizza.txt
```

Bookmarks

Branching with Bookmarks

- Bookmark is label that tracks head of a branch

- Add, delete, and rename at any time

- Typically for short-lived feature or bug-fix branches

- Essentially same as git's branches

main

15: merge

main

13: spin

14: chop — **sauce**

main

12: ham

11: merge **sauce**

10: peel **sauce**

main

8: parm.

9: onion **sauce**

main

7: merge

main

5: preheat

6: sauté **sauce**

3: brand **sauce**

main

4: meat

2: sauce **sauce**

sauce
main

1: feta
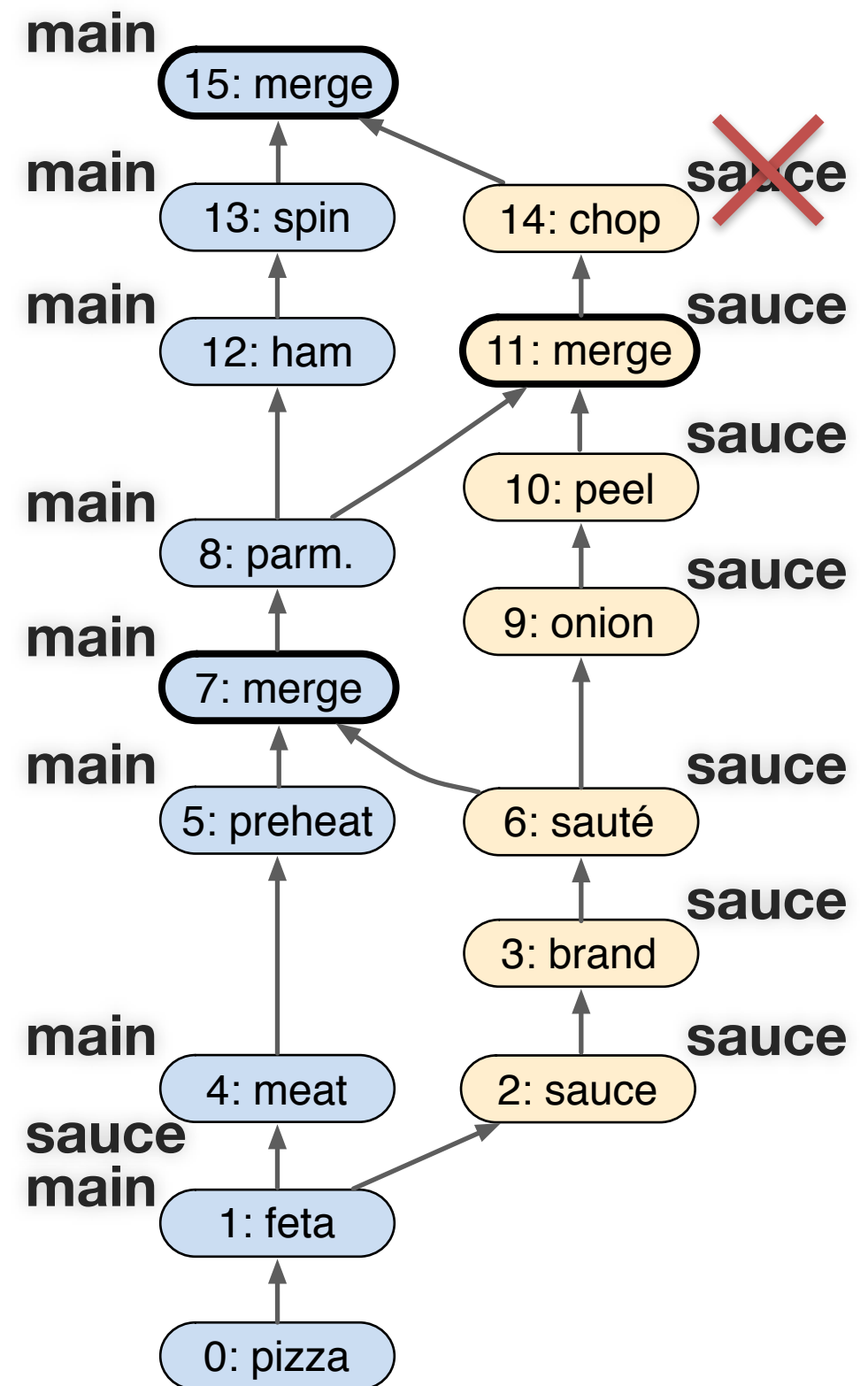
0: pizza

Branching with Bookmarks

- hg bookmark[s]   # lists bookmarks

- hg bookmark *name*   # creates bookmark

- hg update *name*   # updates working copy to bookmark

```
recipes> jedit pizza.txt
recipes> hg add pizza.txt
recipes> hg commit -m 'pizza'

recipes> jedit pizza.txt
recipes> hg commit -m 'feta'

recipes> hg bookmark main
recipes> hg bookmark sauce
recipes> hg bookmarks
    main      1:a1f2a82ea6e0
 * sauce      1:a1f2a82ea6e0
```
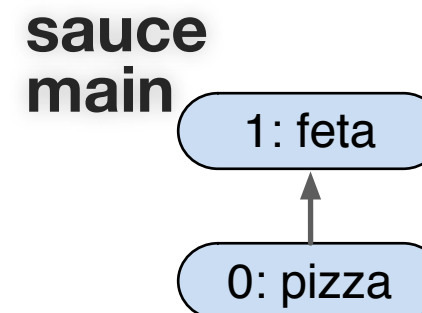
sauce
main

1: feta

0: pizza

Branching with Bookmarks

```
recipes> jedit sauce.txt
recipes> hg add sauce.txt
recipes> hg commit -m 'sauce'

recipes> jedit sauce.txt
recipes> hg commit -m 'brand'
recipes> ls
pizza.txt  sauce.txt

recipes> hg slog -G
@   @3    brand          default      [*sauce]  (tip)
|
o   2     sauce          default
|
o   1     feta           default      [main]
|
o   0     pizza          default
```

sauce

3: brand

sauce

2: sauce

sauce
main

1: feta
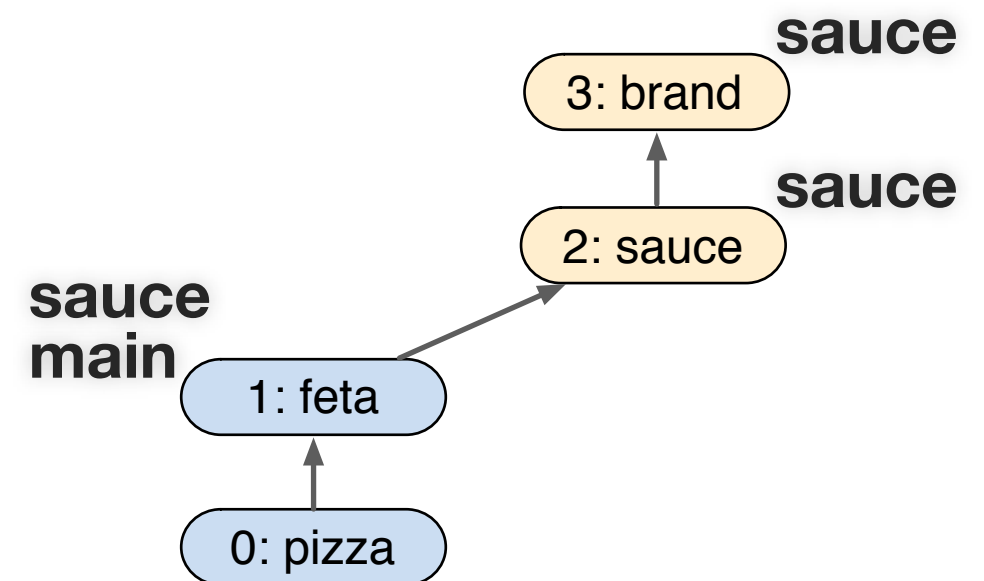
0: pizza

Branching with Bookmarks

```
recipes> hg up main
0 files updated, 0 files merged,
1 files removed, 0 files unresolved
(activating bookmark main)
recipes> ls
pizza.txt

recipes> jedit pizza.txt
recipes> hg commit -m 'meat'
created new head

recipes> hg commit -m 'preheat'
recipes> hg slog -G
@     @5    preheat    default    [*main]  (tip)
|
o      4    meat       default
|
| o    3    brand      default    [sauce]
| |
| o    2    sauce      default
|/
o      1    feta       default
|
o      0    pizza      default
```

Branching with Bookmarks

```
recipes> hg up sauce
2 files updated, 0 files merged,
0 files removed, 0 files unresolved
(activating bookmark sauce)
recipes> hg slog -G
o     5     preheat          default      [main]
|
o     4     meat             default
|
| @   @3    brand            default      [*sauce]
| |
| o   2     sauce            default
|/
o     1     feta             default
|
o     0     pizza            default

recipes> jedit sauce.txt
recipes> hg commit -m 'saute'
recipes> hg slog -G
@     @6    saute            default      [*sauce]
|
| o   5     preheat          default      [main]
| |
| o   4     meat             default
| |
o |   3     brand            default
| |
o |   2     sauce            default
|/
o     1     feta             default
|
o     0     pizza            default
```

main

sauce

sauce

5: preheat

6: sauté

4: meat

3: brand

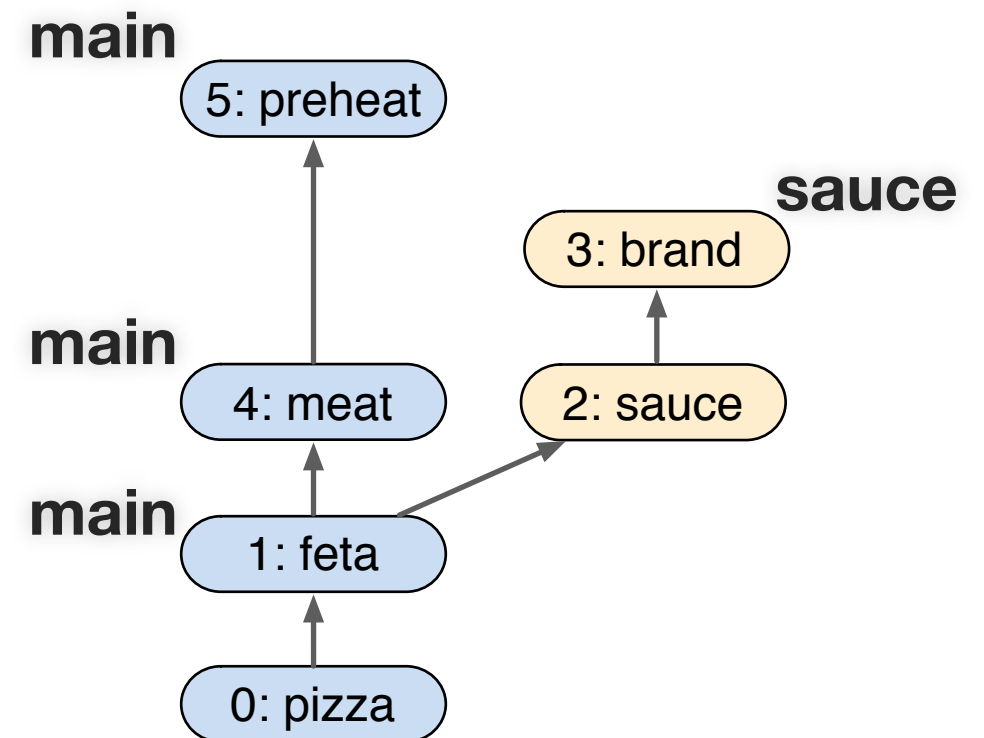1: feta

2: sauce

0: pizza

Branching with Bookmarks

```
recipes> hg up main
1 files updated, 0 files merged,
1 files removed, 0 files unresolved
(activating bookmark main)
recipes> hg slog -G
o      6    saute              default    [sauce]
|
| @  @5     preheat            default    [*main]
| |

recipes> hg merge sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> st
M sauce.txt
recipes> hg commit -m 'merge sauce'
recipes> hg slog -G
@      @7    merge sauce        default    5,6  [*main]
|\
| o    6     saute             default    [sauce]
| |
o |    5     preheat           default
| |
o |    4     meat              default
| |
| o    3     brand             default
| |
| o    2     sauce             default
|/
o      1     feta              default
|
o      0     pizza             default
```
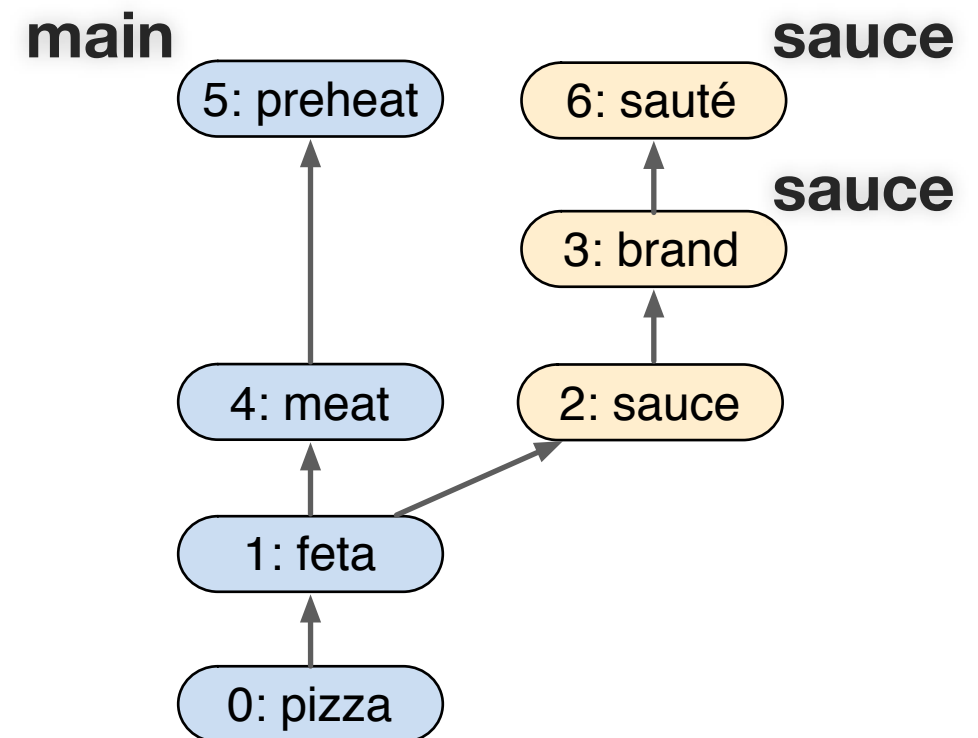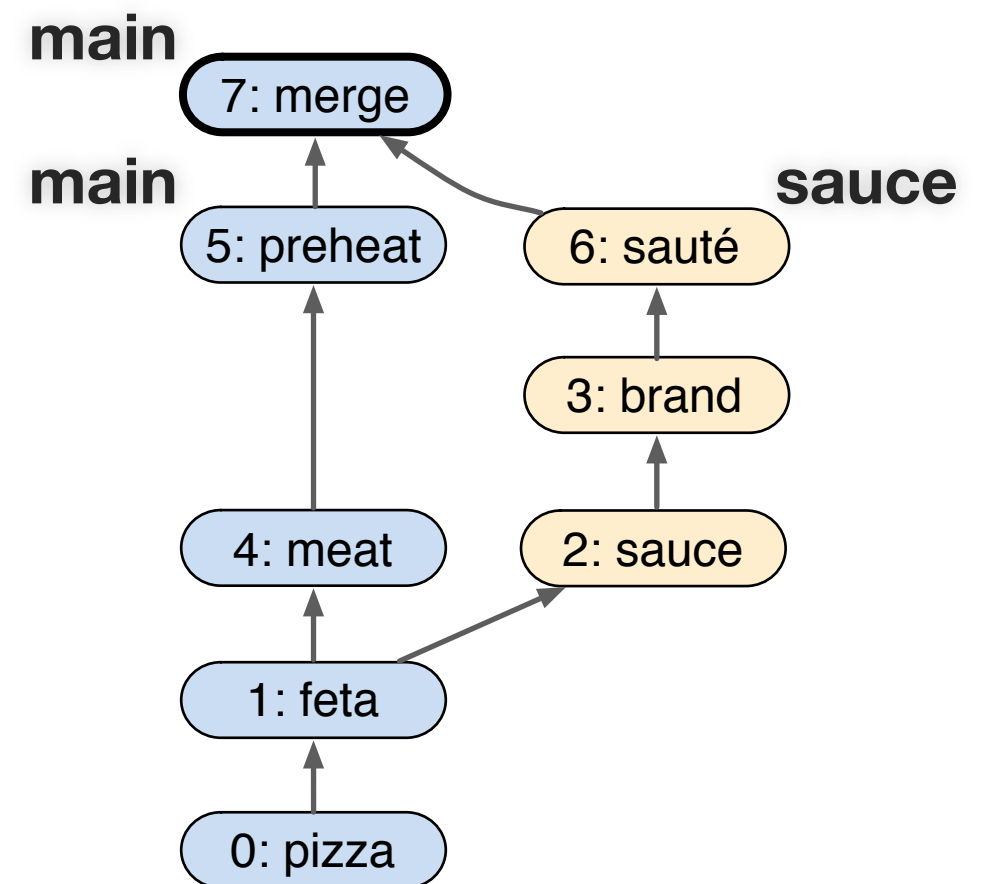
main

7: merge

main

5: preheat   6: sauté   **sauce**

3: brand

4: meat   2: sauce

1: feta

0: pizza

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Branching with Bookmarks

```
recipes> hg bookmark
 * main       7:92bf22ea6bd9
   sauce      6:058a19c7aec7
recipes> jedit pizza.txt
recipes> hg commit -m 'parmesan'

recipes> hg up sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(activating bookmark sauce)
recipes> jedit sauce.txt
recipes> hg commit -m 'onion'
created new head

recipes> hg commit -m 'peeled'
recipes> hg slog -G
@     @10    peeled              default        [*sauce]
|
o      9     onion               default
|
| o    8     parmesan            default        [main]
| |
| o    7     merge sauce         default        5,6
|/|
o |    6     saute               default
| |
| o    5     preheat             default
| |
| o    4     meat                default
| |
```

Branching with Bookmarks

```
recipes> hg merge main
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> hg st
M pizza.txt
recipes> hg commit -m 'merge main'
recipes> hg slog -G
@    @11   merge main        default      10,8  [*sauce]
|\
| o   10   peeled            default
| |
| o   9    onion             default
| |
o |   8    parmesan          default            [main]
| |
o |   7    merge sauce       default      5,6
|\|
| o   6    saute             default
| |
o |   5    preheat           default
| |
o |   4    meat              default
| |
| o   3    brand             default
| |
| o   2    sauce             default
|/
o     1    feta              default
|
o     0    pizza             default
```
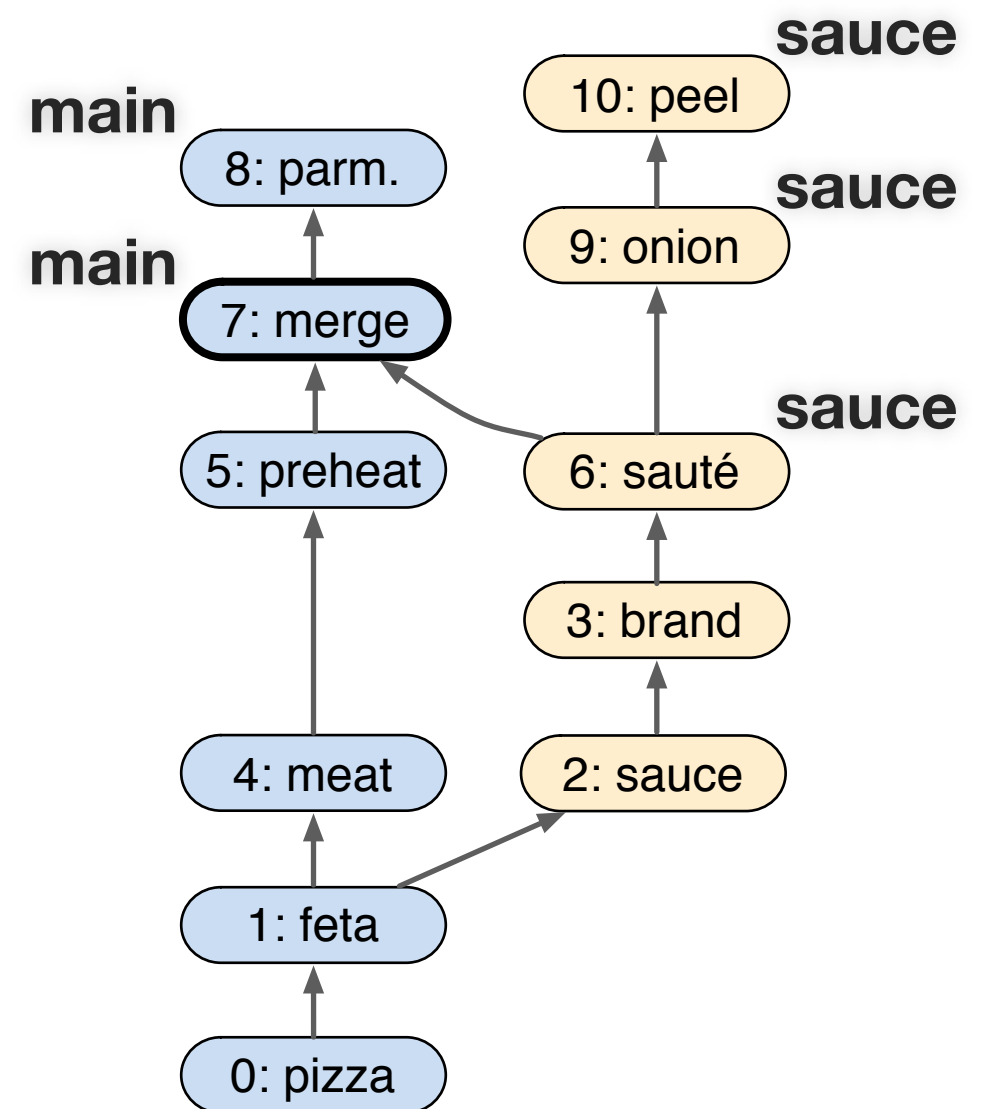
Branching with Bookmarks

```
recipes> hg up main
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(activating bookmark main)

recipes> jedit pizza.txt
recipes> hg commit -m 'ham'
created new head

recipes> jedit pizza.txt
recipes> hg commit -m 'spin'

recipes> hg up sauce
2 files updated, 0 files merged,
0 files removed, 0 files unresolved
(activating bookmark sauce)
recipes> jedit sauce.txt
recipes> hg commit -m 'chop'

recipes> hg up main
2 files updated, 0 files merged,
0 files removed, 0 files unresolved
(activating bookmark main)

recipes> hg merge sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> hg commit -m 'merge sauce'
```
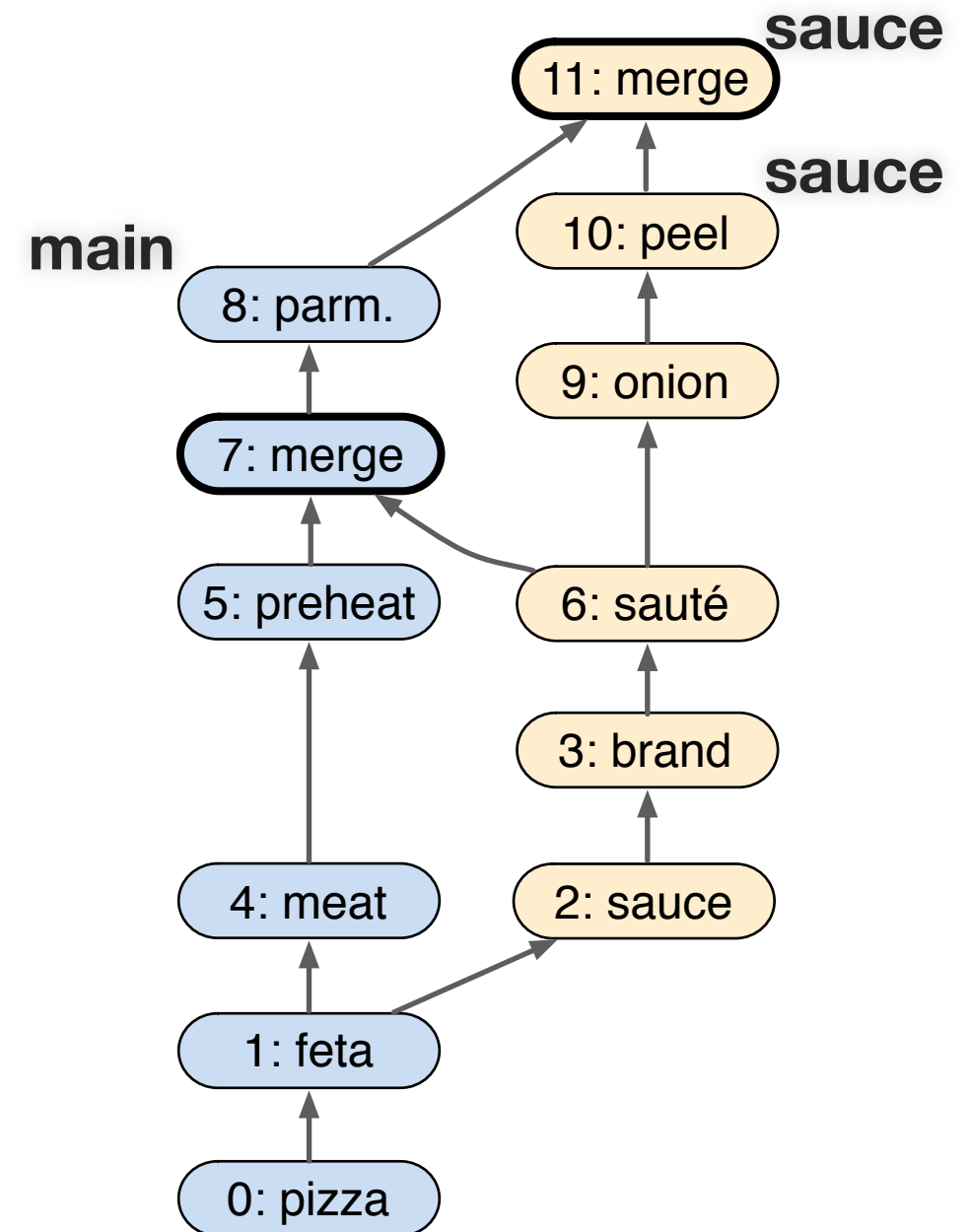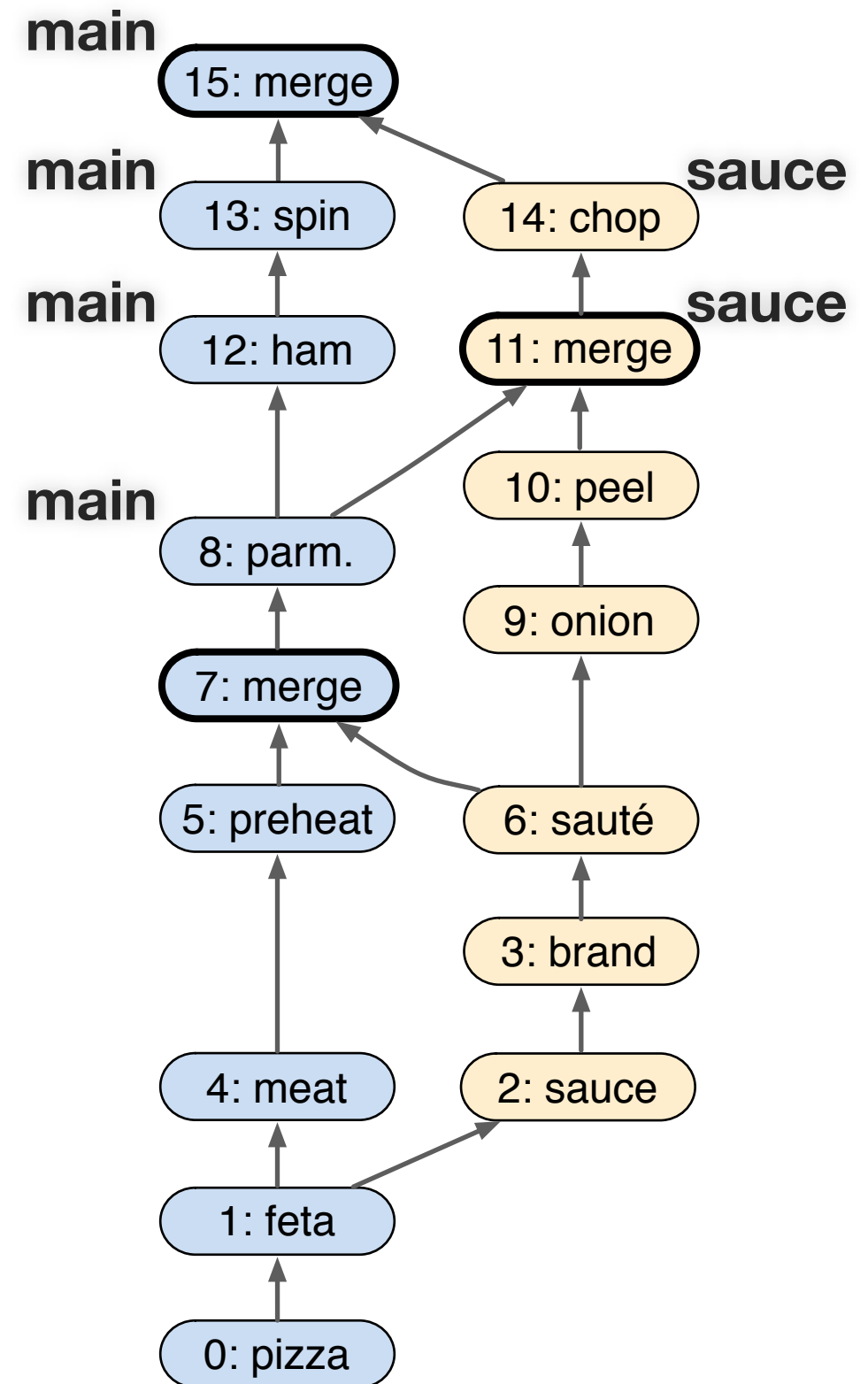
Branching with Bookmarks

```
recipes> hg bookmark --delete sauce
recipes> hg slog -G
@      @15    merge sauce      default      13,14   [*main]
|\
| o    14     chop             default
| |
o |    13     spin             default
| |
o |    12     ham              default
| |
| o    11     merge main       default      10,8
|/|
| o    10     peeled           default
| |
| o    9      onion            default
| |
o |    8      parmesan         default
| |
o |    7      merge sauce      default      5,6
|\|
| o    6      saute            default
| |
o |    5      preheat          default
| |
o |    4      meat             default
| |
| o    3      brand            default
| |
| o    2      sauce            default
|/
o      1      feta             default
|
o      0      pizza            default
```

main

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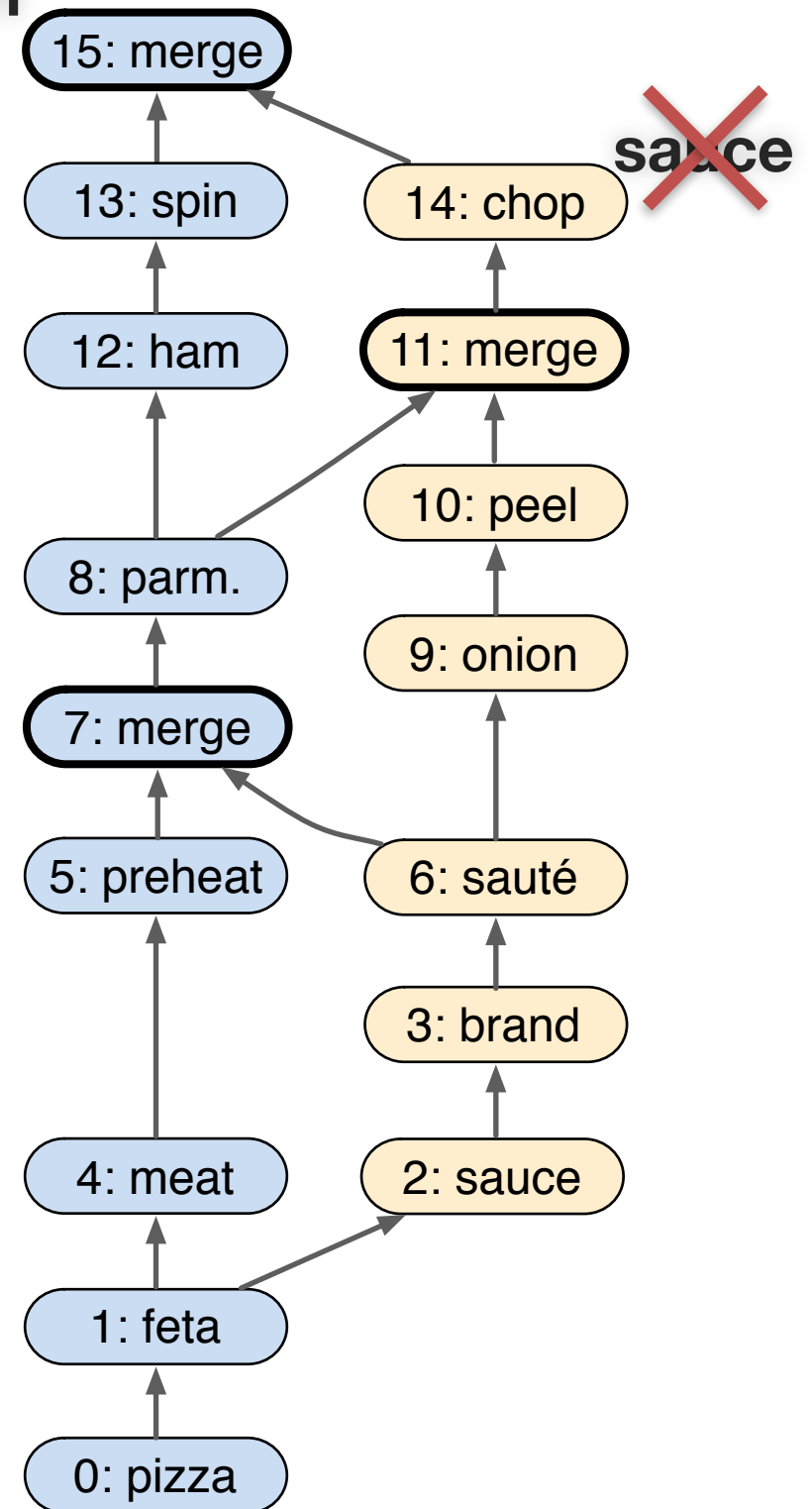
Pushing bookmarks

- hg doesn't push new bookmarks by default

- hg push {--bookmark|-B} *bookmark*

```
recipes> hg push
pushing to server
searching for changes
abort: push creates new remote head 42ca2b91c349 with bookmark 'sauce'!
(merge or see "hg help push" for details about pushing new heads)

recipes> hg push --bookmark main   # or -B
pushing to ../c2
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files
exporting bookmark main

recipes> hg push --bookmark sauce   # or -B
pushing to ../c2
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files (+1 heads)
exporting bookmark sauce
```

Merging divergent bookmarks

- Chris & Julia both make changes in sauce branch, Julia pulls in new head as **sauce@default**

```
julia> hg pull -u
pulling from server
searching for changes
adding changesets
adding manifests
adding file changes
added 1 changesets with 1 changes to 1 files (+1 heads)
divergent bookmark sauce stored as sauce@default
0 files updated, 0 files merged,
0 files removed, 0 files unresolved
1 other divergent bookmarks for "sauce"

julia> hg heads
changeset:   10:207f29b01f7b
bookmark:    sauce@default
parent:      8:b6b112e27e33
summary:     finely

changeset:   9:566cd34821bc
bookmark:    sauce
summary:     vidalia

changeset:   2:8f439fe17062
bookmark:    main
summary:     pepperoni
```

```
julia> hg merge
abort: no matching bookmark to merge - please
merge with an explicit rev or bookmark
(run 'hg heads' to see all heads)

julia> hg up sauce
2 files updated, 0 files merged, 0 files
removed, 0 files unresolved
(activating bookmark sauce)

julia> hg bookmarks
   main                      4:8f439fe17062
 * sauce                     12:4d0841e8279d
   sauce@default             13:bd2c99f8da7f

julia> hg merge
merging sauce.txt
0 files updated, 1 files merged, 0 files
removed, 0 files unresolved
(branch merge, don't forget to commit)

julia> hg commit -m 'merge'
```

Named Branches

Branching with Named Branches

- Branch is permanent name attached to each commit

- "default" branch

- Typically for long-lived branches like "stable" and "devel"

- Operate similarly to bookmarks
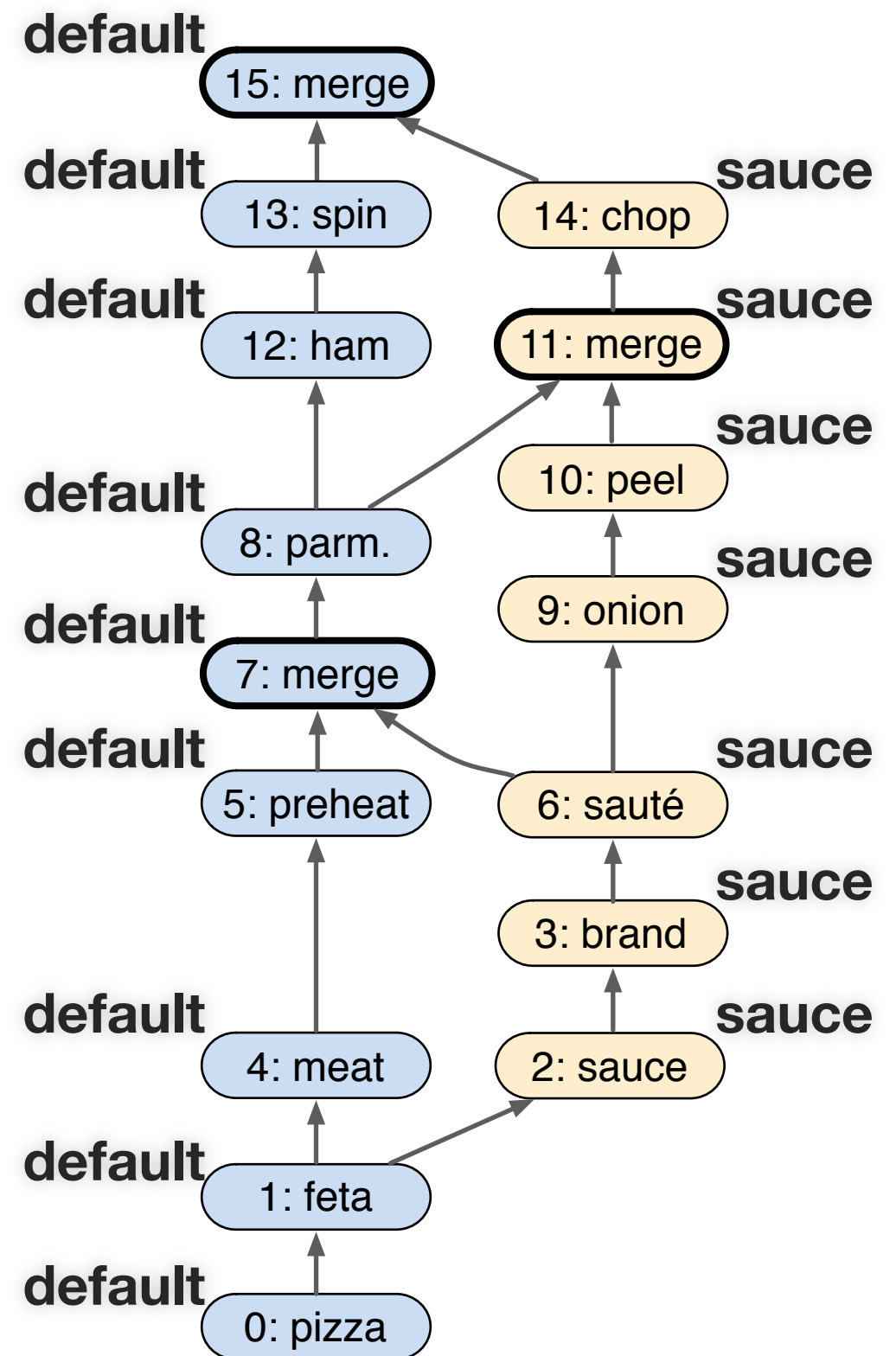
Branching with Named Branches

- hg branches   # lists branches

- hg branch *name*   # creates branch

- hg update *name*   # updates working copy to branch

- hg commit --close-branch [-m *"message"*]

```
recipes> jedit pizza.txt
recipes> hg add pizza.txt
recipes> hg commit -m pizza

recipes> jedit pizza.txt
recipes> hg commit -m feta

recipes> hg branch sauce
marked working directory as branch sauce
(branches are permanent and global, did you want a
bookmark?)

recipes> hg branches   # new branch not yet visible
default                    1:98b3df1d5afe
```
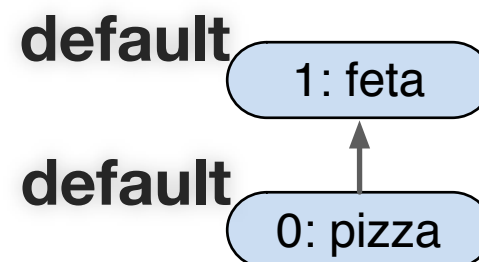
default
(1: feta)

default
(0: pizza)

Branching with Bookmarks

```
recipes> jedit sauce.txt
recipes> hg add sauce.txt
recipes> hg commit -m start sauce
recipes> hg branches  # new branch visible
sauce     2:2a5c5e403030
default   1:98b3df1d5afe (inactive)

recipes> jedit sauce.txt
recipes> hg commit -m 'brand'
recipes> ls
pizza.txt  sauce.txt

recipes> hg slog -G
@  @3      brand       sauce
|
o   2      start       sauce
|
o   1      feta        default
|
o   0      pizza       default
```

sauce

3: brand

sauce

2: sauce

default

1: feta
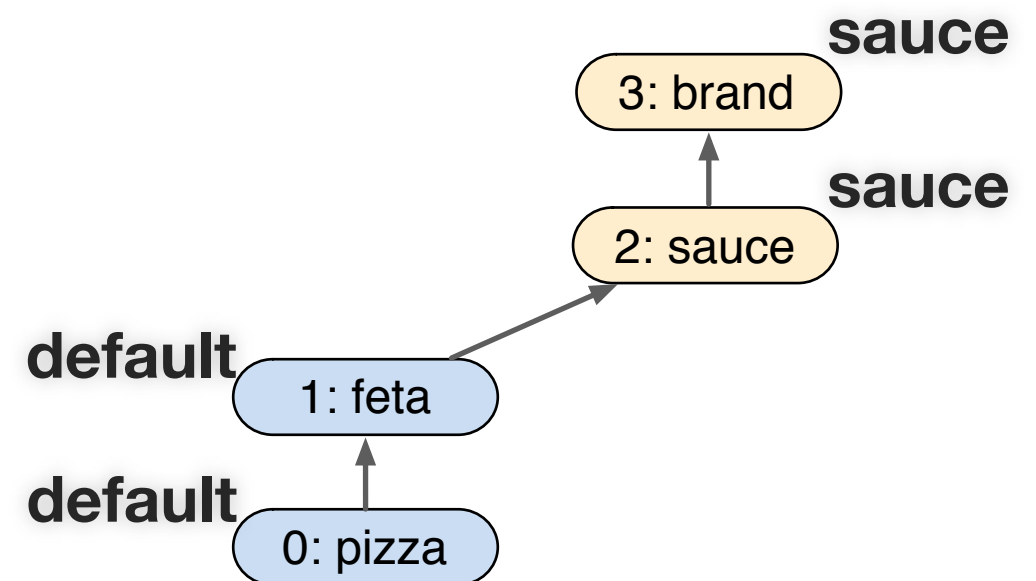
default

0: pizza

Branching with Named Branches

```
recipes> hg up default
0 files updated, 0 files merged,
1 files removed, 0 files unresolved

recipes> ls
pizza.txt

recipes> jedit pizza.txt
recipes> hg commit -m 'meat'

recipes> hg commit -m 'preheat'
recipes> hg slog -G
@    @5      preheat      default
|
o     4      meat         default
|
| o   3      brand        sauce
| |
| o   2      start        sauce
|/
o     1      feta         default
|
o     0      pizza        default
```

Branching with Named Branches

```
recipes> hg up sauce
2 files updated, 0 files merged,
0 files removed, 0 files unresolved

recipes> hg slog -G
o       5       preheat     default
|
o       4       meat        default
|
| @   @3        brand       sauce
| |
| o   2         start       sauce
|/
o       1       feta        default
|
o       0       pizza       default

recipes> jedit sauce.txt
recipes> hg commit -m 'saute'
recipes> hg slog -G
@       @6      saute       sauce
|
| o   5         preheat     default
| |
| o   4         meat        default
| |
o |   3         brand       sauce
| |
o |   2         start       sauce
|/
o       1       feta        default
|
o       0       pizza       default
```

default   **sauce**

5: preheat   6: sauté

sauce

3: brand

default   **sauce**

4: meat   2: sauce

default

1: feta

default

0: pizza

Branching with Named Branches

```
recipes> hg up default
1 files updated, 0 files merged,
1 files removed, 0 files unresolved

recipes> hg slog -G
o       6      saute                 sauce
|
| @  @5       preheat               default
| |

recipes> hg merge sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> hg st
M sauce.txt
recipes> hg commit -m 'merge sauce'
recipes> hg slog -G
@      @7       merge sauce default      5,6
|\
| o    6       saute         sauce
| |
o |    5       preheat       default
| |
o |    4       meat          default
| |
| o    3       brand         sauce
| |
| o    2       start         sauce
|/
o      1       feta          default
|
o      0       pizza         default
```
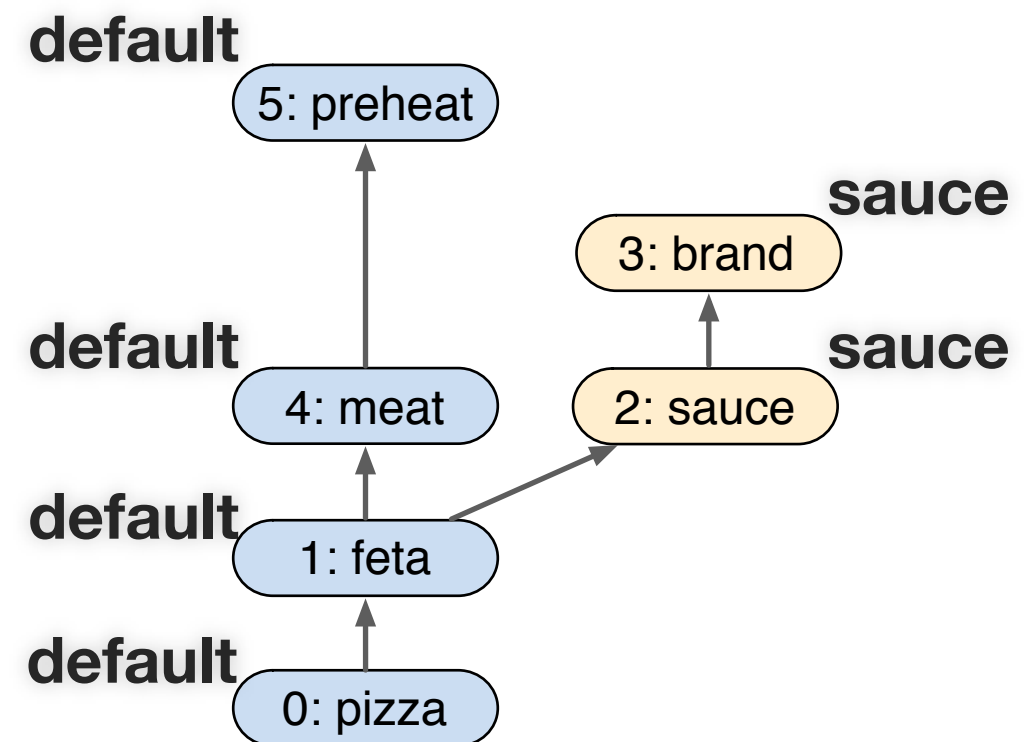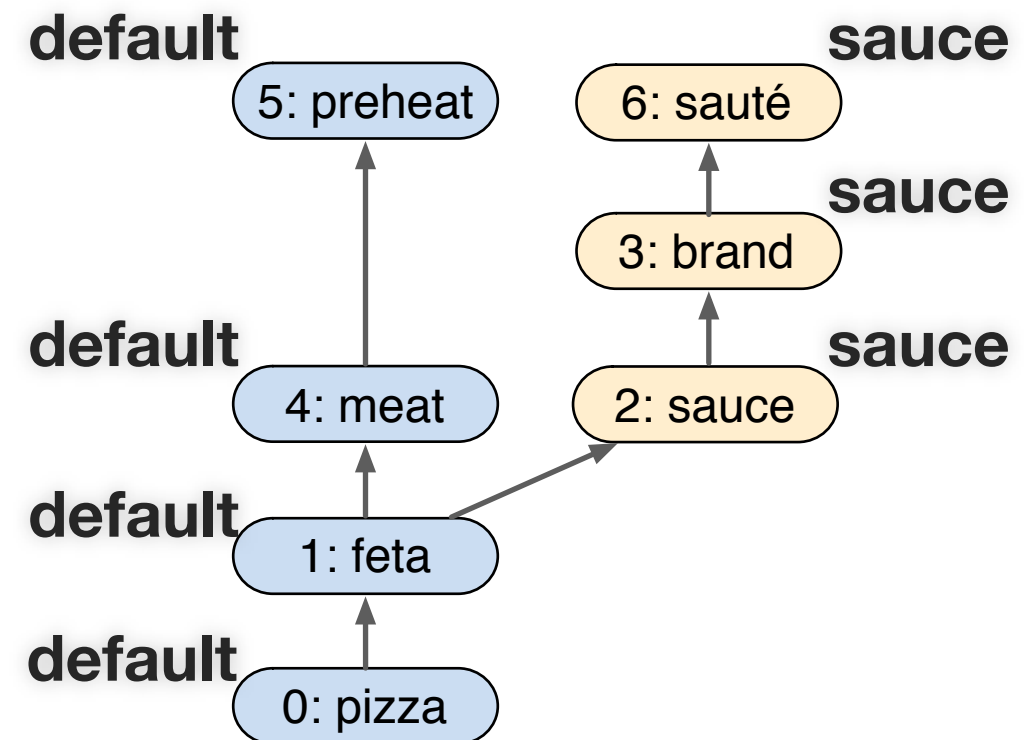
default

7: merge

default   **sauce**

5: preheat   6: sauté

sauce

3: brand

default   **sauce**

4: meat   2: sauce

default

1: feta

default

0: pizza

Branching with Named Branches

```
recipes> hg branches
sauce      2:2a5c5e403030 (inactive)
default    1:98b3df1d5afe
recipes> jedit pizza.txt
recipes> hg commit -m 'parmesan'

recipes> hg up sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved

recipes> jedit sauce.txt
recipes> hg commit -m 'onion'

recipes> hg commit -m 'peeled'
recipes> hg slog -G
@    @10     peeled      sauce
|
o     9      onion       sauce
|
| o   8      parmesan    default
| |
| o   7      merge       default    5,6
|/|
o |   6      saute       sauce
| |
| o   5      preheat     default
| |
| o   4      meat        default
| |
```
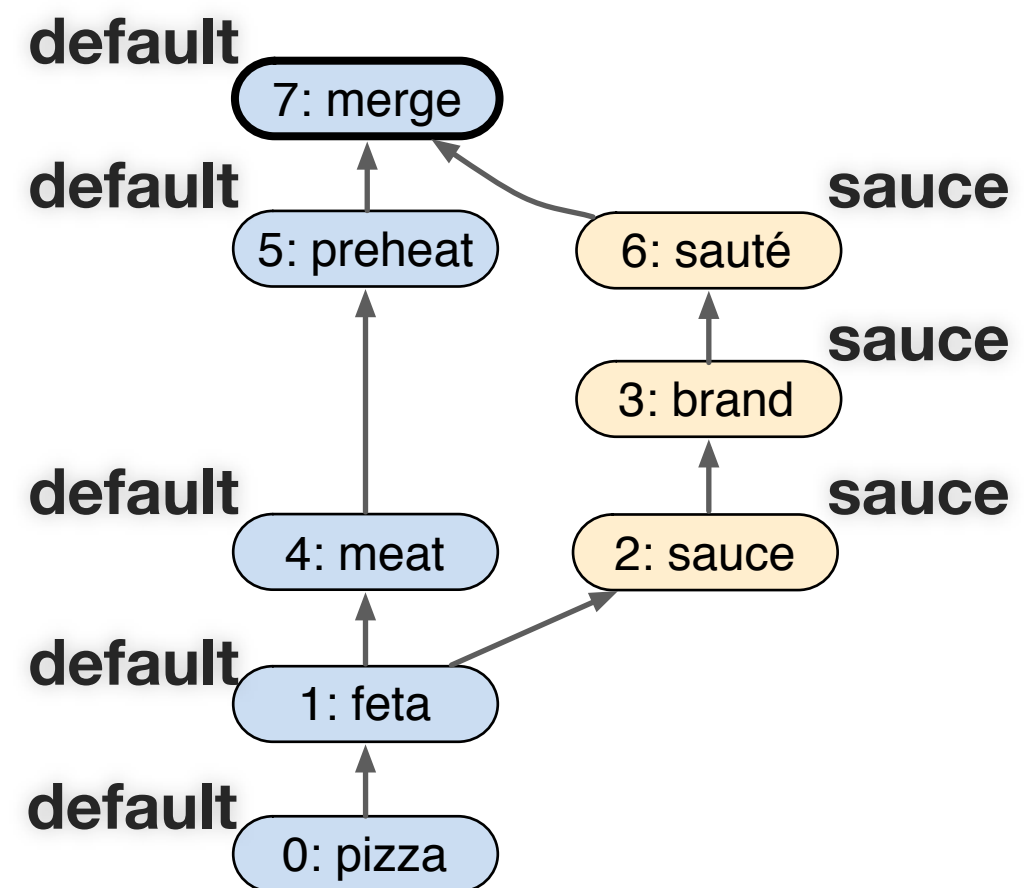
Branching with Named Branches

```
recipes> hg merge default
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> hg st
M pizza.txt
recipes> hg commit -m 'merge default'
recipes> hg slog -G
@    @11     merge        sauce        10,8
|\
| o   10     peeled       sauce
| |
| o    9     onion        sauce
| |
o |    8     parmesan     default
| |
o |    7     merge        default       5,6
|\|
| o    6     saute        sauce
| |
o |    5     preheat      default
| |
o |    4     meat         default
| |
| o    3     brand        sauce
| |
| o    2     start        sauce
|/
o    1     feta         default
|
o    0     pizza        default
```
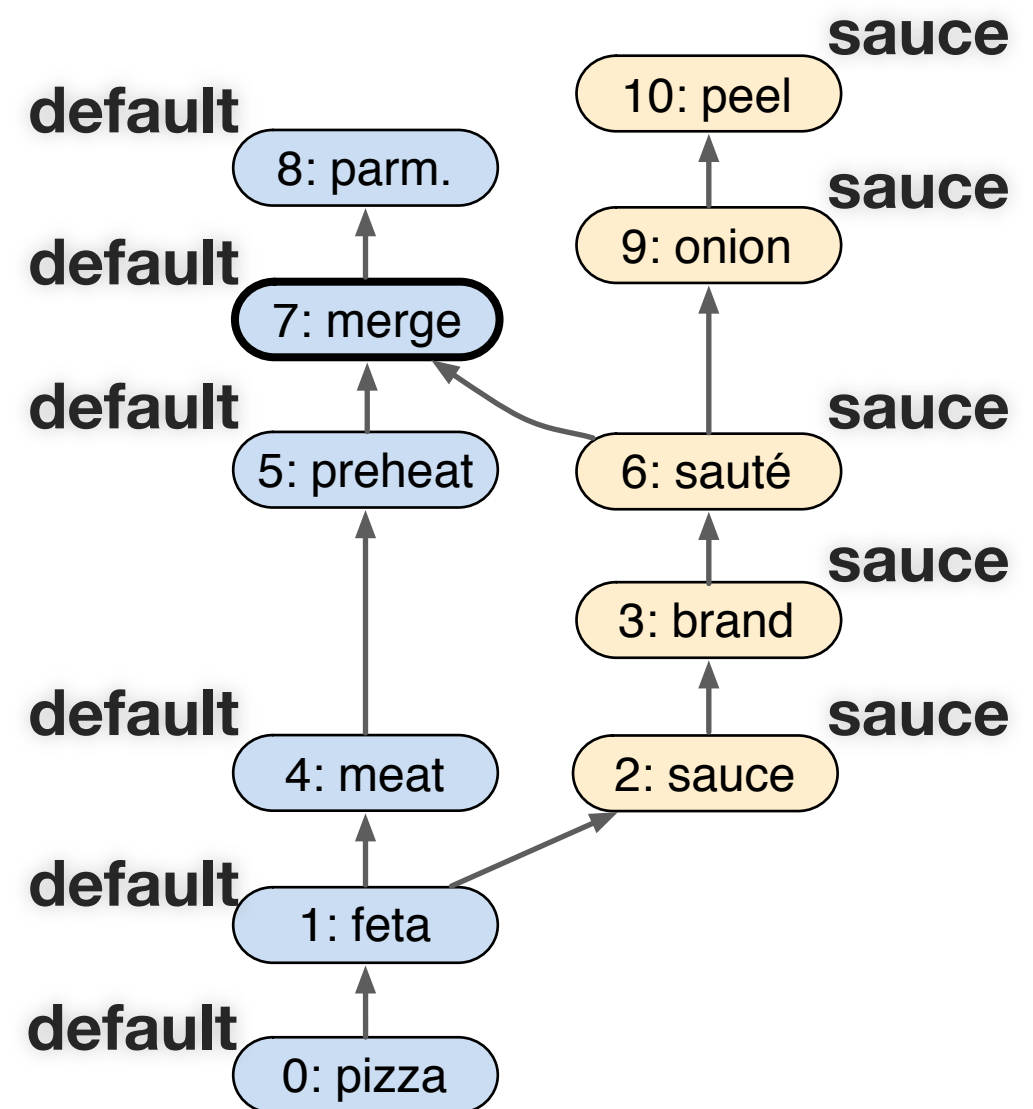
Branching with Named Branches

```
recipes> hg up default
1 files updated, 0 files merged,
0 files removed, 0 files unresolved

recipes> jedit pizza.txt
recipes> hg commit -m 'ham'

recipes> jedit pizza.txt
recipes> hg commit -m 'spin'

recipes> hg up sauce
2 files updated, 0 files merged,
0 files removed, 0 files unresolved
recipes> jedit sauce.txt
recipes> hg commit -m 'chop' --close-branch

recipes> hg branches
default    15:dd9a3e61378b

recipes> hg branches --closed  # or -c
default    15:dd9a3e61378b
sauce      14:c6e4f6cf0870 (closed)

recipes> hg up default
2 files updated, 0 files merged,
0 files removed, 0 files unresolved

recipes> hg merge sauce
1 files updated, 0 files merged,
0 files removed, 0 files unresolved
(branch merge, don't forget to commit)
recipes> hg commit -m 'merge sauce'
```
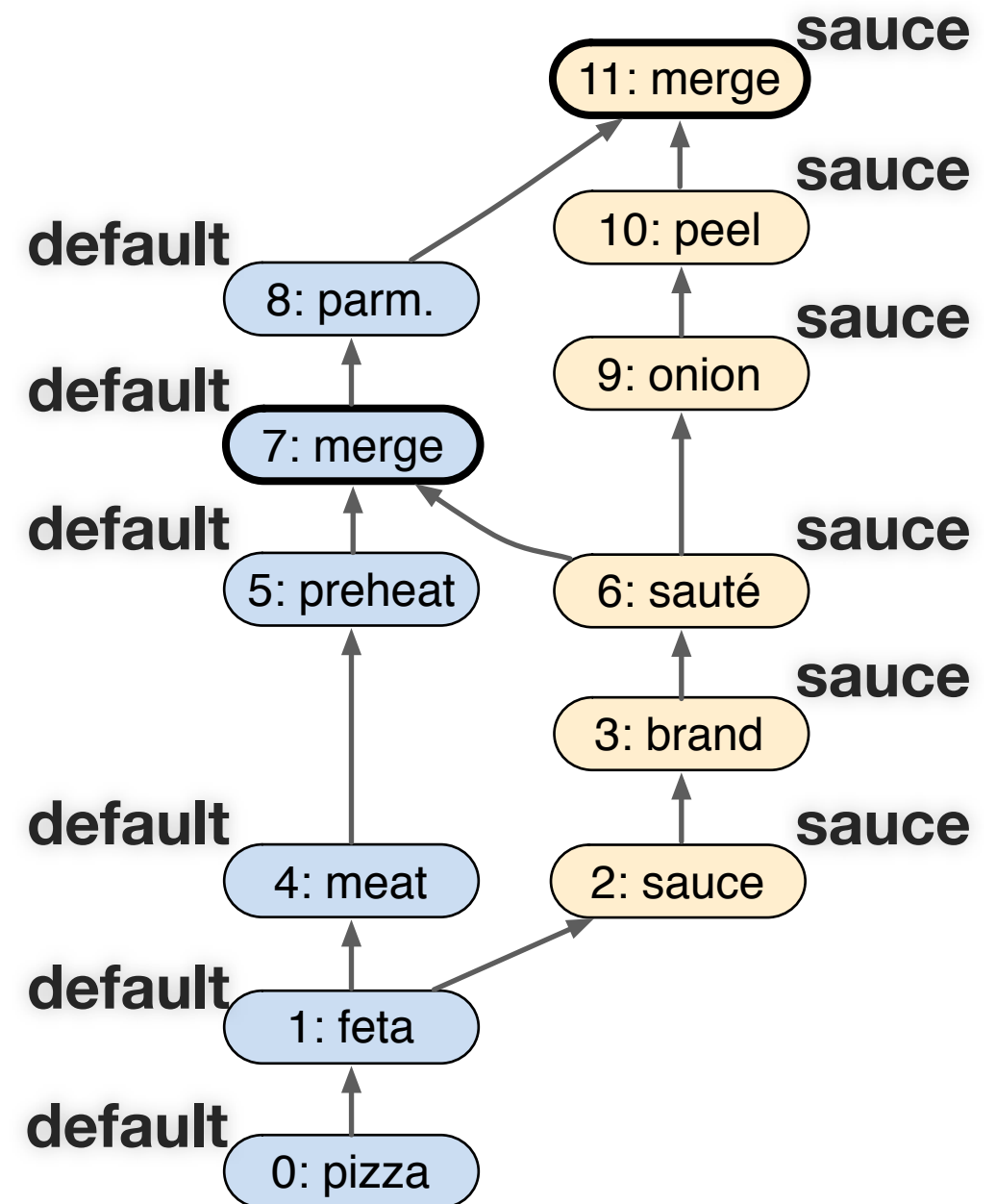
default 15: merge

default 13: spin   14: chop **sauce**

default 12: ham   11: merge **sauce**

default 8: parm.   10: peel **sauce**

default 7: merge   9: onion **sauce**

default 5: preheat   6: sauté **sauce**

default   3: brand **sauce**

default 4: meat   2: sauce **sauce**

default 1: feta

default 0: pizza
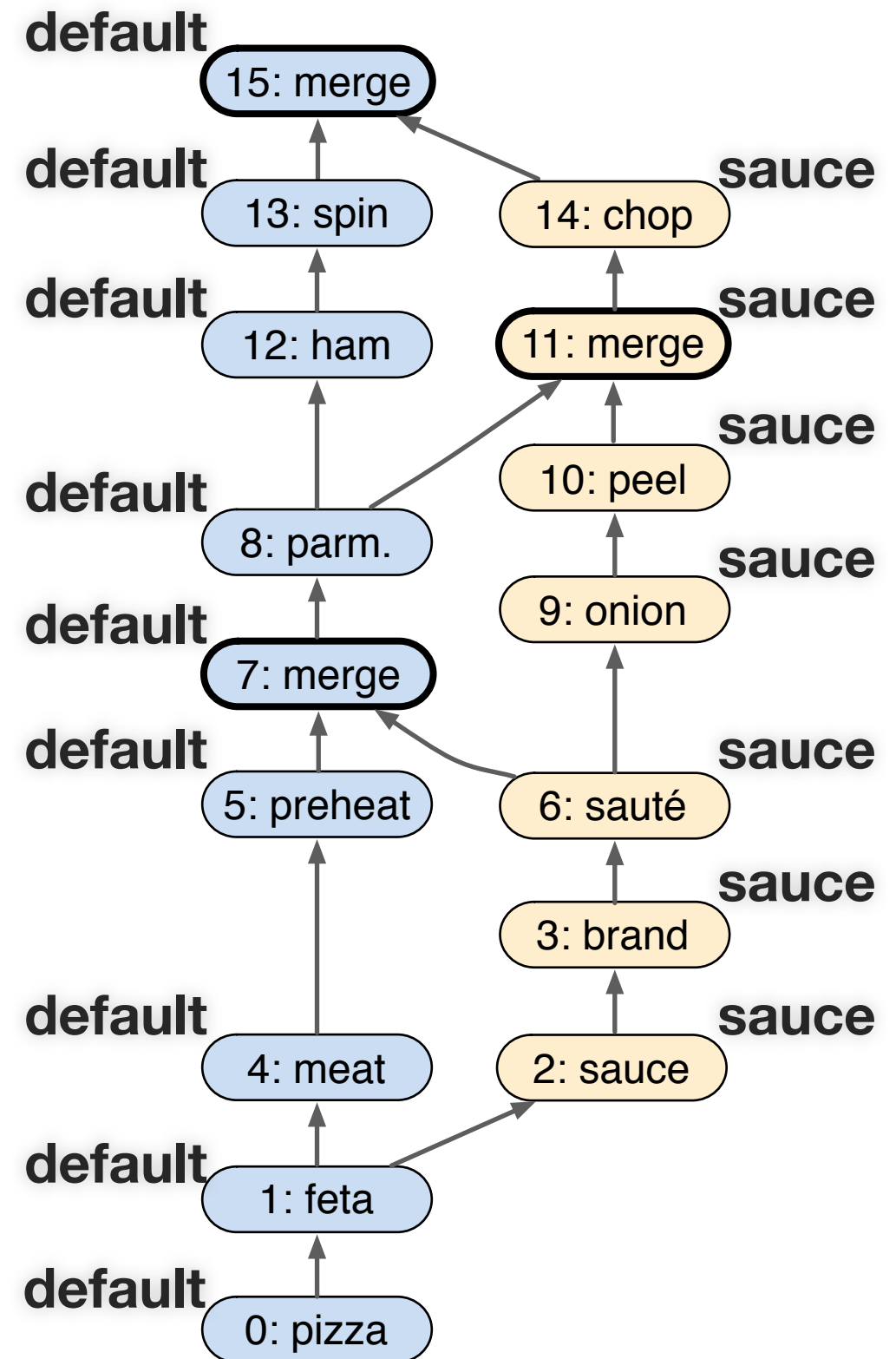
Branching with Named Branches

```
recipes> hg slog -G
@     @15    merge       default    13,14
|\
| _   14     chop        sauce              ← closed branch
| |
o |   13     spin        default
| |
o |   12     ham         default
| |
| o   11     merge       sauce      10,8
|/|
| o   10     peeled      sauce
| |
| o    9     onion       sauce
| |
o |    8     parmesan    default
| |
o |    7     merge       default    5,6
|\|
| o    6     saute       sauce
| |
o |    5     preheat     default
| |
o |    4     meat        default
| |
| o    3     brand       sauce
| |
| o    2     start       sauce
|/
o      1     feta        default
|
o      0     pizza       default
```


default 15: merge

default 13: spin   14: chop **sauce**

default 12: ham   11: merge **sauce**

sauce 10: peel

default 8: parm.   9: onion **sauce**

default 7: merge   6: sauté **sauce**

default 5: preheat

sauce 3: brand

default 4: meat   2: sauce **sauce**

default 1: feta

default 0: pizza

Pushing branches

- hg doesn't push *new* branches by default

- hg pushes *all* branches by default
  - (git pushes only the current branch, which makes more sense to me)

- hg push [-b *branch*] [--new-branch]

```
recipes> hg push
pushing to server
searching for changes
abort: push creates new remote branches: sauce!
(use 'hg push --new-branch' to create new remote branches)

recipes> hg push -b default
pushing to server
searching for changes
adding changesets
adding manifests
adding file changes
added 1 changesets with 1 changes to 1 files

recipes> hg push -b sauce --new-branch
pushing to server
searching for changes
adding changesets
adding manifests
adding file changes
added 2 changesets with 2 changes to 1 files (+1 heads)
```

Merging branch heads

```
julia> hg pull
pulling from server
searching for changes
adding changesets
adding manifests
adding file changes
added 1 changesets with 1 changes to 1 files
(+1 heads)
(run 'hg heads' to see heads, 'hg merge' to merge)

julia> hg branches
sauce        4:75a9cc02c946
default      1:df75056e704f
julia> hg heads
changeset:   5:0cc37f014583
branch:      sauce
parent:      3:23cdd918e993
summary:     finely diced

changeset:   4:75a9cc02c946
branch:      sauce
parent:      3:23cdd918e993
summary:     diced

changeset:   1:df75056e704f
summary:     meat
```

```
julia> hg up default
1 files updated, 0 files merged, 1 files removed,
0 files unresolved
julia> hg merge
abort: branch 'default' has one head - please
merge with an explicit rev
(run 'hg heads' to see all heads)

julia> hg up sauce
2 files updated, 0 files merged, 0 files removed,
0 files unresolved
julia> hg merge
merging sauce.txt
0 files updated, 1 files merged, 0 files removed,
0 files unresolved
(branch merge, don't forget to commit)
julia> hg commit -m 'merge'

julia> hg slog -G
@ |     @6      merge       sauce      5,4
|\ \
| o |   5       fine diced  sauce
| | |
o | |   4       diced       sauce
|/ /
o |     3       onion       sauce
| |
o |     2       start       sauce
| |
| o     1       meat        default
|/
o       0       pizza       default
```

Outline

- Basic commands in single repository

  - Creating repo

  - Add & edit files

  - Viewing history

  - Fixing last commit

- Multiple users / branches

  - Simple case

  - Merge without conflicts

  - Merge with conflicts

  - Bookmarks

  - Branches

- **BitBucket**

  - Fork

  - Pull requests

- Final thoughts

BitBucket

- SSH key setup
  - View profile > BitBucket settings > SSH keys > Add key

- Creating repository
  - Repositories > Create Repository

- Fork
  - In main repo: "…" > Fork > Fork Repository

- Pull request
  - In forked repo: Pull requests > Create a pull request > Create

- Approving pull request
  - In main repo: Pull requests > *select pull request* > Merge

Outline

- Basic commands in single repository

    - Creating repo

    - Add & edit files

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- Multiple users / branches

    - Simple case

    - Merge without conflicts

    - Merge with conflicts

    - Bookmarks

    - Branches

- BitBucket

    - Fork

    - Pull requests

- **Final thoughts**

Hooks

- Run on actions (commit, push, pull, …)

- Run on client (under user's control) or on server

- Can verify that action is allowed

<div style="border:1px solid">

.hg/hgrc

```
[hooks]
# disallow tab anywhere or trailing whitespace
# run before commit transaction finishes
# see http://hgbook.red-bean.com/read/handling-repository-events-with-hooks.html
# (here matching \t fixed using GNU's --perl-regexp option)
pretxncommit = hg export tip | (! grep --perl-regexp '^\+.*(\t| $)')
```

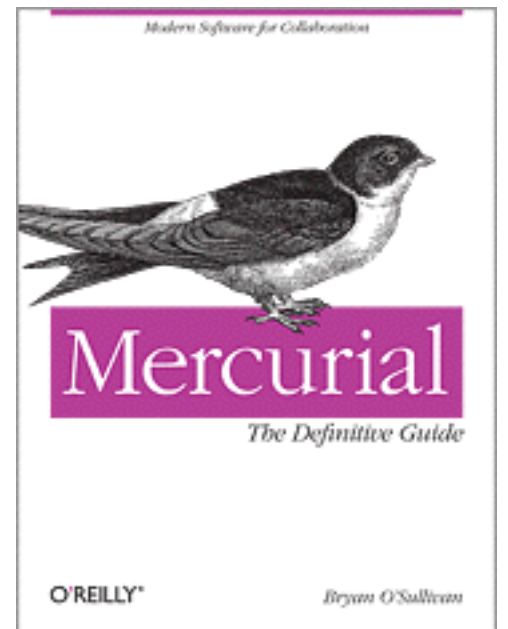</div>

- Can run scripts, such as emailing notifications, posting to bugzilla, testing compilation, etc.
  - BitBucket handles many of these features for us

Other useful commands

- hg outgoing   # hg out

- hg incoming   # hg in
  - Tells what commits would be pushed or pulled, respectively

- hg update --rebase
  - Rewrite history to avoid merge

- hg commit --interactive # or -i
  - Allows committing some portion of changes

Further resources

- Mercurial website
  - https://www.mercurial-scm.org/guide
  - https://www.mercurial-scm.org/wiki/BeginnersGuides

- Mercurial: The Definitive Guide (2009)
  - Online book
  - http://hgbook.red-bean.com/

- hginit tutorial
  - http://hginit.com/

- A Guide to Branching in Mercurial (2009)
  - http://stevelosh.com/blog/2009/08/a-guide-to-branching-in-mercurial/

Mercurial Quick Reference

- Create
  hg init [*dir*]
  hg clone url [*dir*]

- Files
  hg add *files*
  hg mv [-A] *source dest*
  hg cp [-A] *source dest*
  hg rm [-A] *files*
  hg revert *files*

- Commits
  hg commit [-m "*message*"] [--amend] [*files*]
          [--close-branch]
  hg pull [*url*] [-u]
  hg push [*url*] [-b *branch* | -B *bookmark* | -r *rev*]
  hg rollback
  hg outgoing [*url*]
  hg incoming [*url*]

- Branching & merging
  hg merge [*rev* | *branch* | *bookmark*]
  hg update [*rev* | *branch* | *bookmark* | *tag*]   # hg up
      (alias hg checkout)
  hg update --clean .   # cancel uncommitted merge
  hg resolve [-l | -m *files*]
  hg bookmark [--delete] [*name*]
  hg branch [*name*]
  hg branches
  hg tag [-r *rev*] [--local] *name*

- Viewing changes & history
  hg diff [-c *rev*] [-r *rev*] [-w -b -B] [*files*]
  hg log [-l *num*] [-G] [--stat] [*files*]
  hg status [-acmq] [*files*]   # hg st
  hg blame [-un] [*files*]
  hg heads

- Configuration files
  ~/.hgrc   # user
  ~/.hgignore   # user, set in ~/.hgrc
  .hg/hgrc   # repo
  .hgignore   # repo

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