News from Git in Eclipse

Matthias Sohn (SAP)
merge strategy extension point

JGit 4.0, EGit 4.1

- enables external merge strategy
- used by EMF Compare to provide model merge (Neon)
EMF Compare provides model merge strategy

Computes the logical model for each version

Compares / merges complete logical model
e4 smart project import wizard

- clone repository
- invoke e4 smart project import
- auto-detects projects and their types
- Since Neon it's the default

wiki e4 smart import
e4 smart project import
Staging View

EGit

- better support non-workspace files (4.2)
- enable sorting files by status (4.3)
- "Commit" opens staging view (4.3)
- auto-switch to vertical layout (4.3)
Better support non-workspace files
Sorting files by status
"Commit" opens Staging View
Auto-switch to vertical layout
History View

EGit

- auto-select branch (4.2)
- new search widget (4.5)
Auto-select branch
New search widget
Usability Improvements

EGit

- dirty decorator in repositories view
- most git actions enabled on working sets
- configure date format
- view stash in commit viewer (4.4)
dirty decorator in repositories view
enable most git actions on working sets
configure date format
View Stash in Commit Viewer
Gerrit integration

EGit 4.3

- auto-configure repository cloned from Gerrit
- auto-fill "Fetch from Gerrit" wizard from clipboard
- "Commit and push" opens "Push to Gerrit" wizard
- Set topic on push for review (4.4)
Misc Improvements

EGit

- improved support for submodules / nested repositories (4.3)
- configurable pull options (4.3)
- rebase modes (4.6)
- check for running launches before modifying the workspace (4.5)
- auto-gc (4.6)
- Oomph setup for contributors (4.5)
hooks support

JGit

- pre-push (4.2)
- post-commit (4.5)
.gitattributes

JGit 4.3

fixed most wanted JGit bug (108 votes)

- filter attributes (4.2)
- text attributes
- eol attributes
- macros
LFS
Large File Storage

JGit, EGit

client
- integrate git-lfs extension in client (4.2)
- built-in JGit LFS extension (4.6)

server
- basic JGit LFS server (4.3)
  - file system or S3 storage
- Gerrit lfs plugin (Gerrit 2.13)
Versioning large binaries in Git

large binary files can't be packed by Git efficiently

- Git repository growing quickly
- gc more expensive and less efficient
- slows down transport
- Git server load grows
Large File Storage (LFS) extension

.gitattributes
slides.pdf
X.java

.git
-- objects

.lfs

-- lfs

git server

Ifs server
LFS configuration

.LFS configuration

which files to store in LFS?

.gitattributes

*.pdf filter=lfs diff=lfs merge=lfs -text

.gitconfig

[filter "lfs"]

  clean = git-lfs clean %f
  smudge = git-lfs smudge %f

Lfs clean filter intercepts add

Lfs smudge filter intercepts checkout
git add slides.pdf

store meta data in **objects**
store big file in **lfs objects**

version git-lfs/spec/v1
id sha256:5891b5b522...
size 6

lfs clean filter
git push origin

push

version git-lfs/spec/v1
id sha256:5891b5b522...
size 6

pre-push hook

slides.pdf
git fetch/clone,  git checkout

fetch

version git-lfs/spec/v1
id sha256:5891b5b522...
size 6

fetch

git server

lfs server

fetch

fetch

-- objects

.slides.pdf

-- lfs

.git

slides.pdf

Lfs server

Lfs smudge

filter

downloads large object lazily
LFS server with JGit filesystem/S3 storage

- EGit
  - JGit
    - JGit LFS client
- Gerrit
  - .gitattributes
    - slides.pdf
    - X.java
  - .git
    - -- objects
  - -- lfs
- Gerrit plugin
  - JGit LFS server
- LFS storage
  - (filesystem / S3)
The quest for distributed JGit

JGit

JGit

RefTree (4.2)
- version refs as git objects
- repository state described by RefTree
- commit containing ref updates
- enables atomic push

Ketch (4.3)
- distributed transaction log based on RefTree
- Raft distributed consensus for leader election
- basis for distributed JGit server
RefTree: Versioning branches in git

store refs in git tree objects

push can update many refs -> stored in one RefTree commit

-> enable transactional ref updates when receiving a pack
-> compare single SHA1 to compare repository states
**jgit**
- clone with worktree
- standard refs

**jgit.git**
- bare repository
- refs stored in RefTree

**spy**
- empty, used for introspection

Commit, push

Bootstrap branch

RefTree

Versions

Objects

Objects linked via alternates

Bootstrap branch symlinked
Ketch: multi-master git repository

- leader election (Raft)
Ketch: multi-master git repository

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- push arrives on any server
Ketch: multi-master git repository

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- queue proposal to leader
- leader creates new RefTree describing target state
Ketch: multi-master git repository

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- queue proposal to leader
- leader creates new RefTree describing target state
- replicate objects and RefTree to majority of servers
- commit transaction
Evaluate the Sessions

Sign in and vote at eclipsecon.org