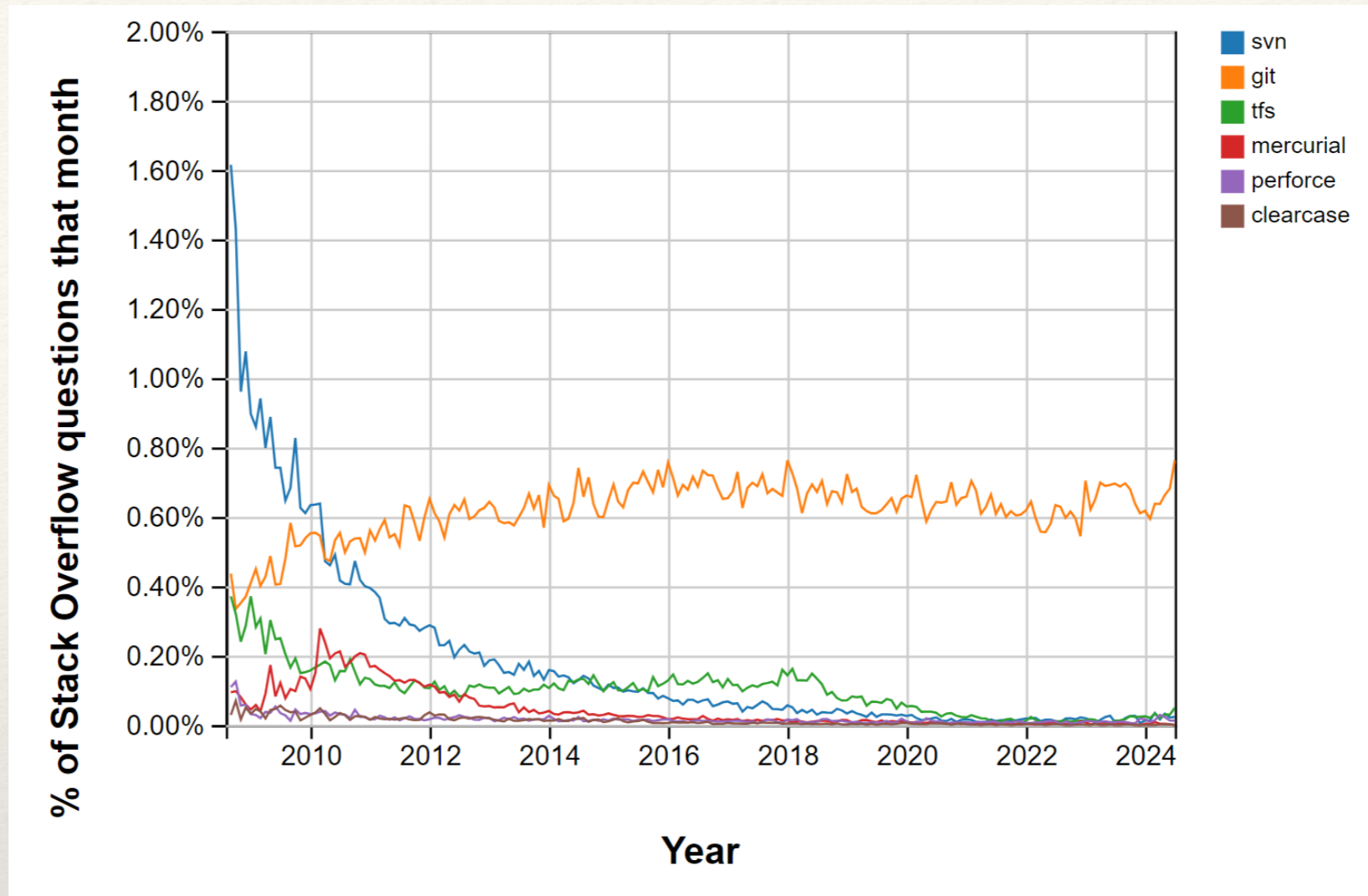


*Gilles Querret • Riverside Software*

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# Git • Introduction

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From 2010 to 2024

StackOverflow trends



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# From Bitkeeper To Git

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# StackOverflow

THIS IS GIT. IT TRACKS COLLABORATIVE WORK ON PROJECTS THROUGH A BEAUTIFUL DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZE THESE SHELL COMMANDS AND TYPE THEM TO SYNC UP. IF YOU GET ERRORS, SAVE YOUR WORK ELSEWHERE, DELETE THE PROJECT, AND DOWNLOAD A FRESH COPY.





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# Tip #1 - Things to remember

---

- ❖ Commit is a snapshot of all the files
- ❖ A commit only has parents ; it doesn't know about children
- ❖ Git commands are graph manipulation commands

# Snapshot

```
gquerret@MBP16 ~/dev/test ↗ main ➤ cat file1
Hello World
gquerret@MBP16 ~/dev/test ↗ main ➤ cat file2
Hello World
gquerret@MBP16 ~/dev/test ↗ main ➤ mv file1 file4
gquerret@MBP16 ~/dev/test ↗ main ● ➤ mv file2 file3
gquerret@MBP16 ~/dev/test ↗ main ● ➤ git add .
gquerret@MBP16 ~/dev/test ↗ main + ➤ git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    renamed:    file1 -> file3
    renamed:    file2 -> file4

gquerret@MBP16 ~/dev/test ↗ main + ➤
```



# Snapshot

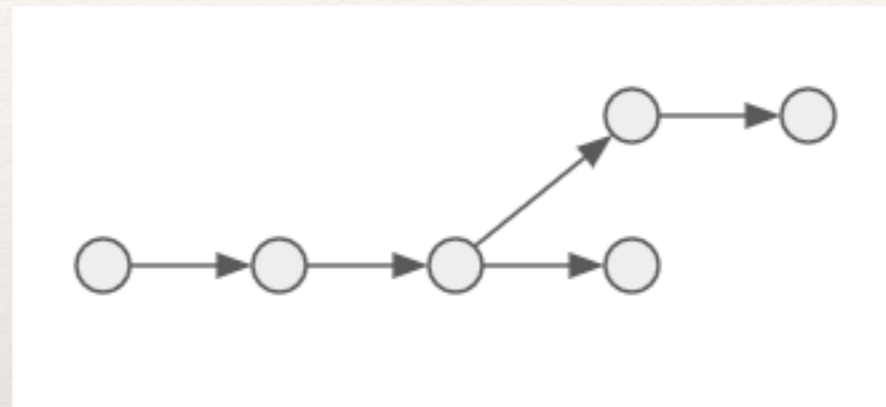
```
gquerret@MBP16 ~/dev/test ↪ main cat file1
Hello World
gquerret@MBP16 ~/dev/test ↪ main cat file2
Hello World
Hello World
Hello World
gquerret@MBP16 ~/dev/test ↪ main > file1 echo Hello Gilles
gquerret@MBP16 ~/dev/test ↪ main ● >> file2 echo Hello Gilles
gquerret@MBP16 ~/dev/test ↪ main ● mv file1 file3
gquerret@MBP16 ~/dev/test ↪ main ● mv file2 file4
gquerret@MBP16 ~/dev/test ↪ main ● git add .
gquerret@MBP16 ~/dev/test ↪ main + git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    deleted:    file1
    new file:   file3
    renamed:   file2 -> file4

gquerret@MBP16 ~/dev/test ↪ main +
```

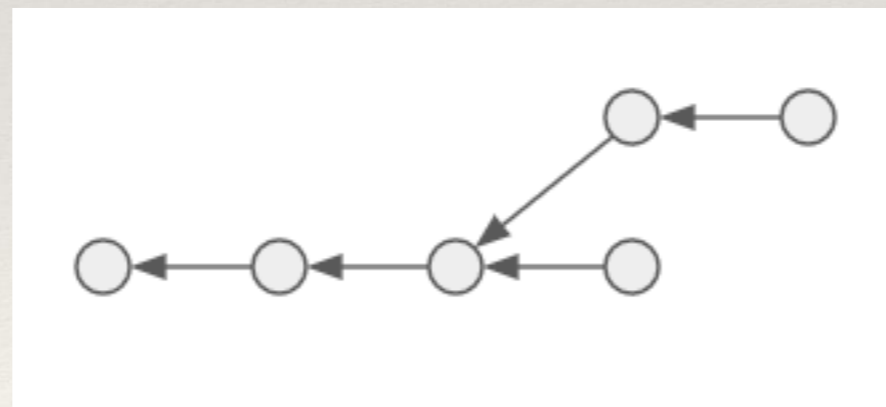
---

# Directed Acyclic Graph

---



TIME





---

# Graph manipulation

---



**Kent Beck** ✓  
@KentBeck



finally figuring out that git commands are strangely named graph manipulation commands--  
creating/deleting nodes, moving pointers around



---

# Tip #2 – Use the right tool

---





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# Tip #2 – Client-side

---

- ❖ SourceTree
- ❖ GitHub Desktop
- ❖ VSCode + plugins (e.g. GitLens)
- ❖ Fork → <https://www.fork.dev>



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# Tip #2 – Client-side (cmd)

---

- ❖ Zsh + Oh my zsh!
- ❖ Cmdr
- ❖ Windows Terminal + extensions
  - ❖ <https://www.hanselman.com/blog/my-ultimate-powershell-prompt-with-oh-my-posh-and-the-windows-terminal>



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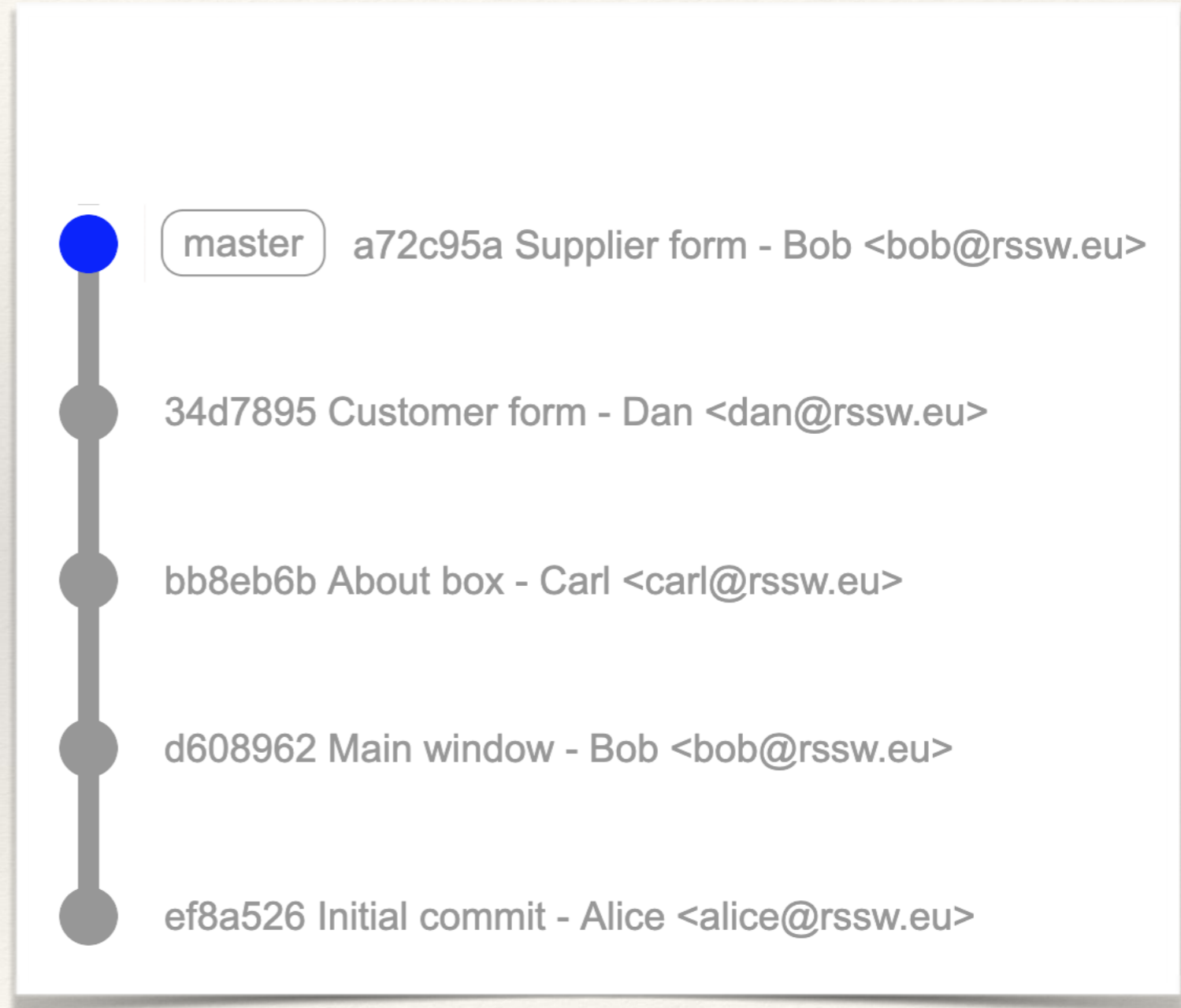
# Tip #2 – Server side

---

- ❖ GitHub
- ❖ BitBucket
- ❖ GitLab

# Tip #3 – Understand branches

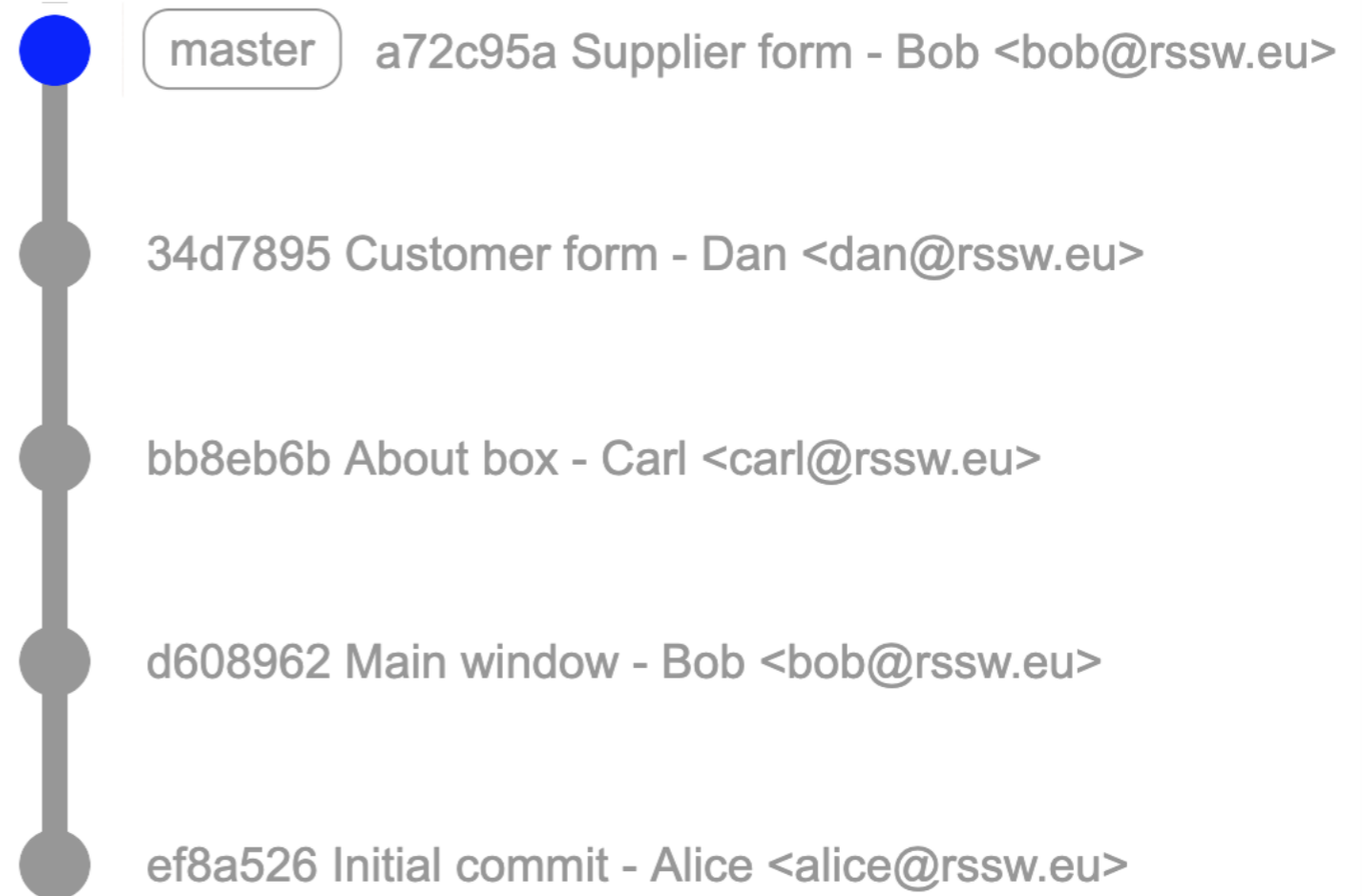
- ❖ Each commit is a snapshot of all the files
- ❖ Each commit has an ID and author
- ❖ Each commit has exactly one parent





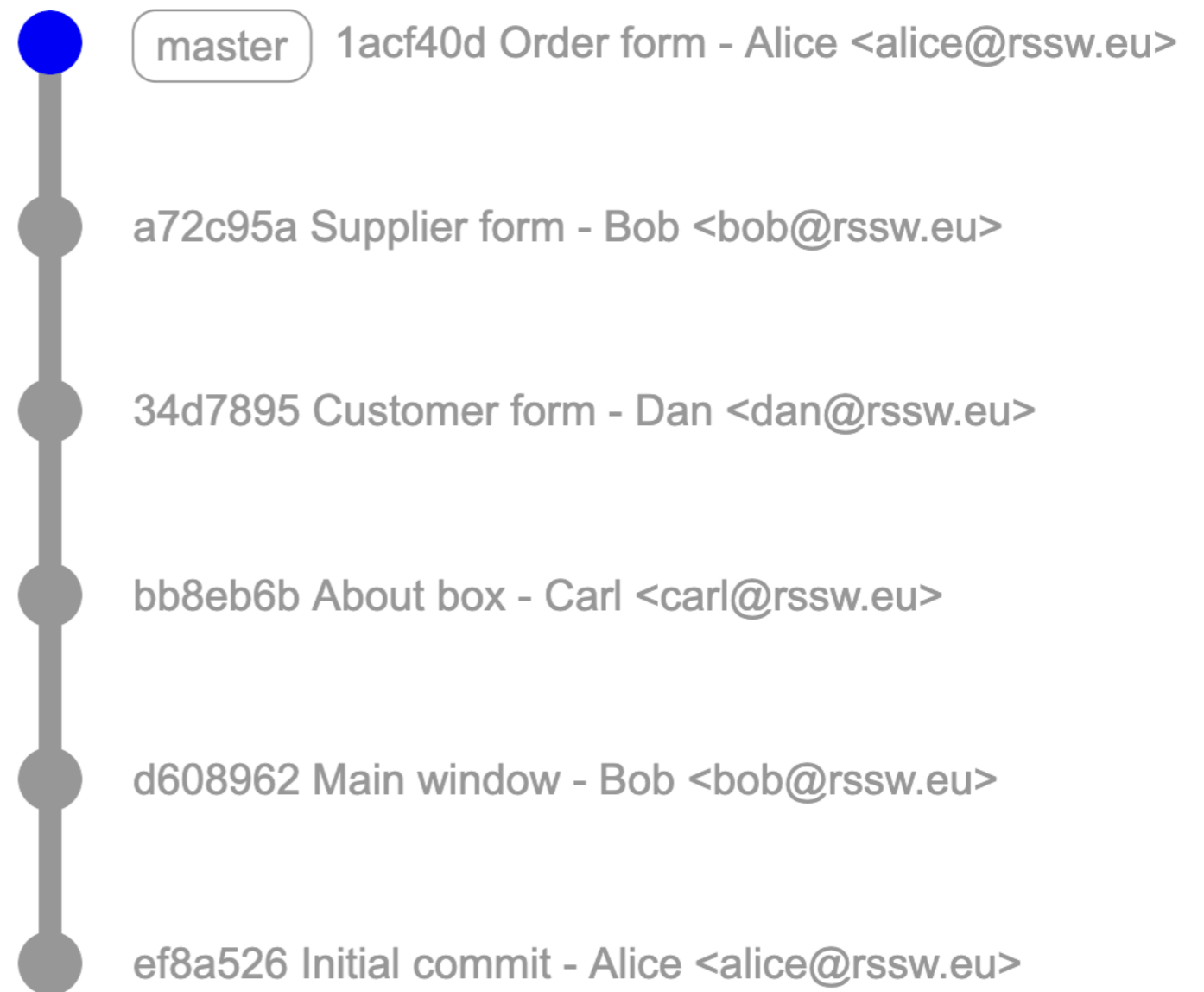
# Branching

❖ Branch is just a tag...



# Branching

- ❖ Branch is just a tag...
- ❖ ... which moves when you 'git commit'





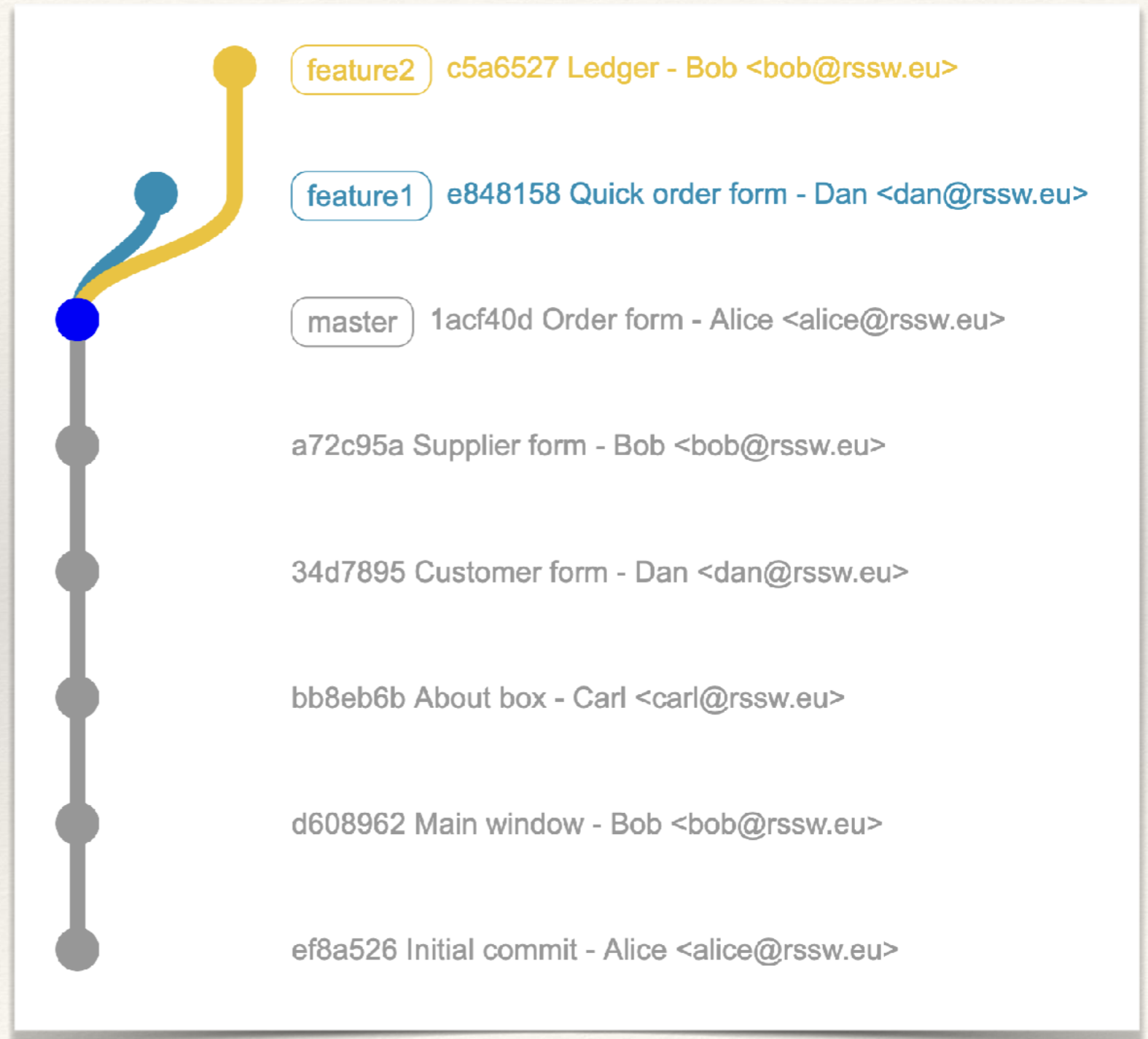
# Branching

- ❖ Creating a new branch is extremely cheap



# Branching

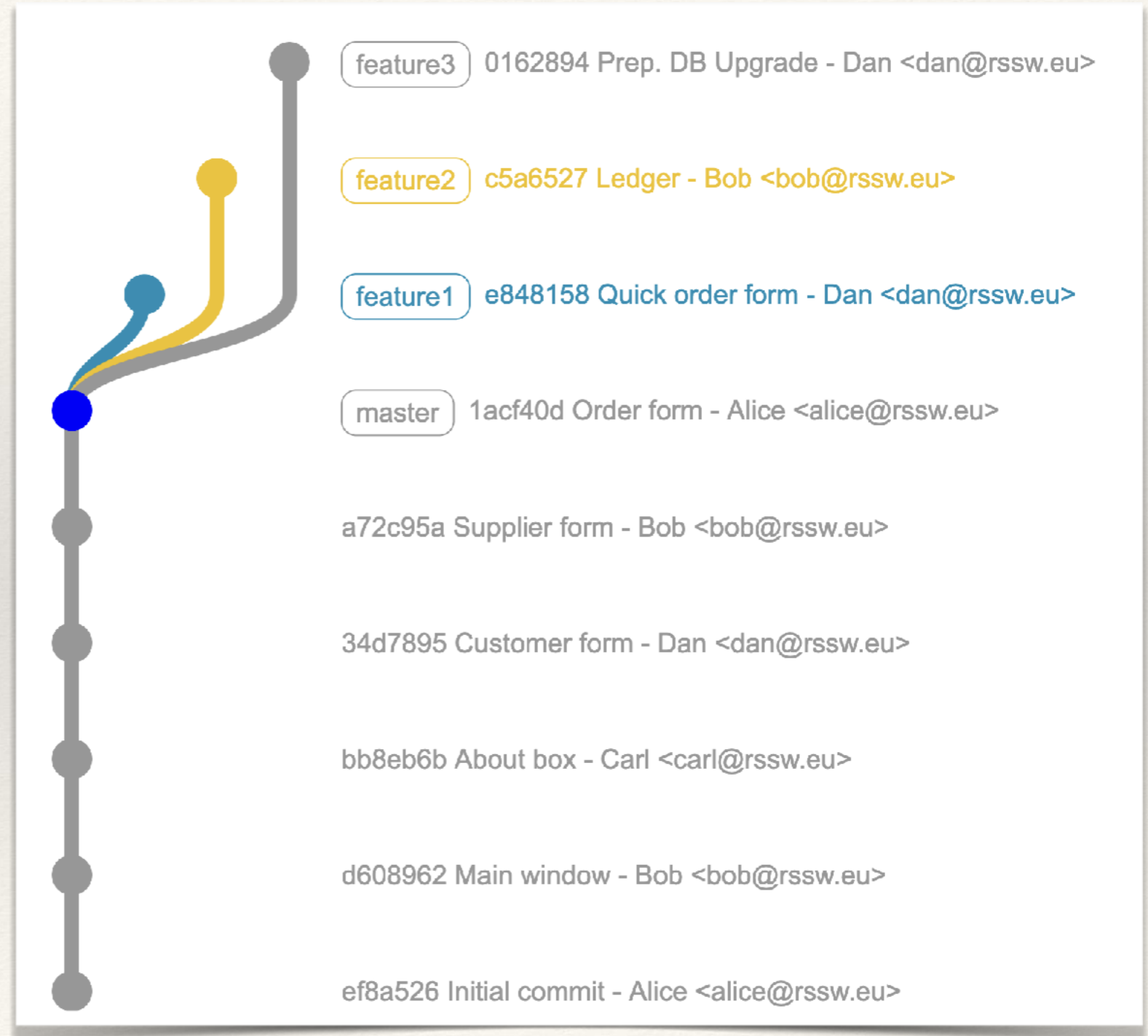
- ❖ And new features should always be added on a separate branch





# Branching

❖ ALWAYS



# Tip #4 – Where's my HEAD?

```
* dd8957cf - (2 weeks ago) Next dev cycle - Gilles QUERRET (HEAD → master, origin/master, origin/HEAD)
* 371bf899 - (2 weeks ago) Version 213 - Gilles QUERRET (tag: V213)
* aaeb518e - (2 weeks ago) Build with 12.1 - Gilles QUERRET
* 56e5c9dc - (6 weeks ago) Add Option node to PCTBinaryDump / PCTBinaryLoad (#378) - Gilles QUERRET
* 7ff870ce - (6 weeks ago) Set RCodeInfo buffer size from a Java property (#377) - Gilles QUERRET
* a4c35c89 - (6 weeks ago) Handle white spaces in Profiler:outputFile property (#376) - Gilles QUERRET
* c814cba6 - (6 weeks ago) Fix PCTDynamicRun issues (#375) - Gilles QUERRET
* da1eb340 - (7 weeks ago) BackgroundWorker thread fix - Bill Wang
* 0055bfb0 - (4 months ago) Test case - Gilles QUERRET (origin/bugfix/PCT-366)
* 30770550 - (4 months ago) Test with Corretto 11 and Ant 1.10 - Gilles QUERRET (origin/Ant110Corretto11)
* f459acc0 - (8 weeks ago) Support for OpenEdge 12.1 - Gilles QUERRET
```

HEAD~0 → dd8957cf

HEAD~1 → 371bf899



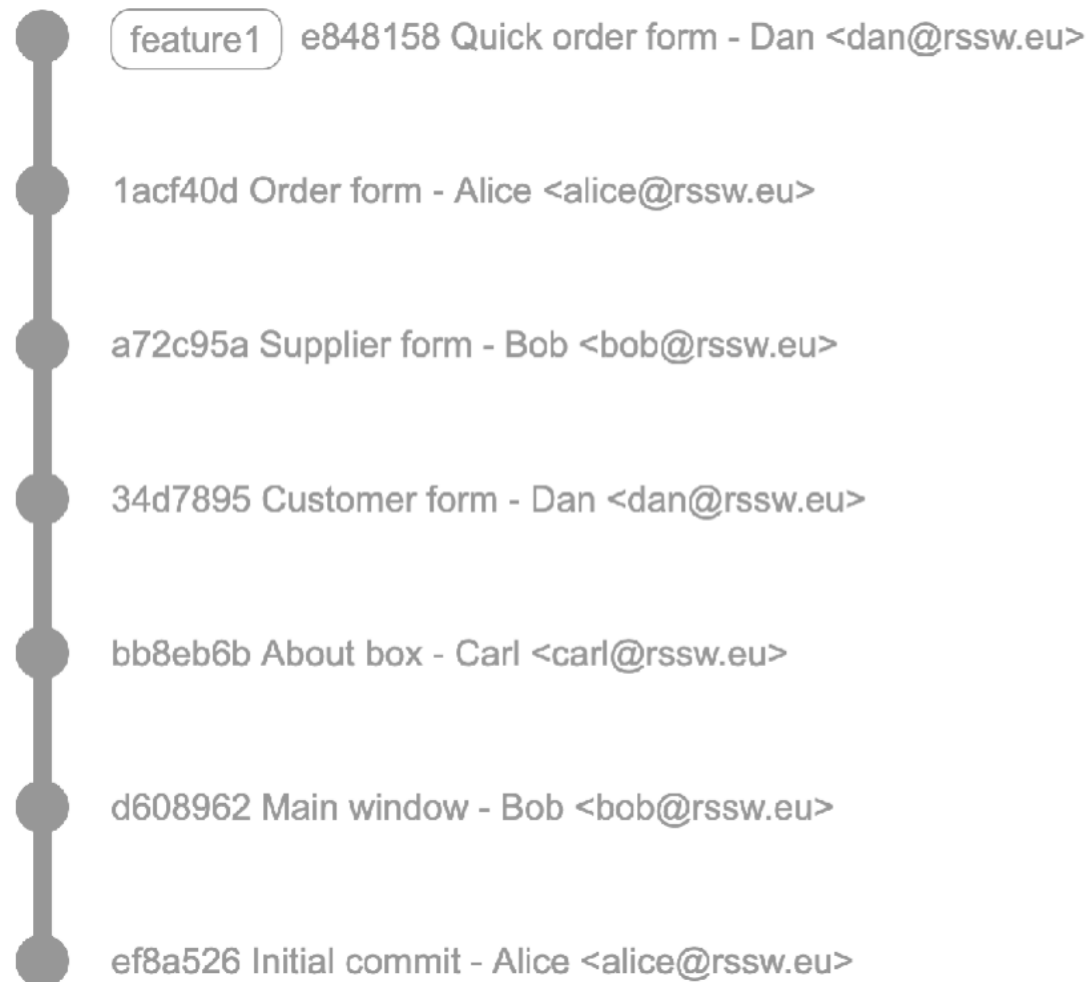
# HEAD tag

```
* dd8957cf - (2 weeks ago) Next dev cycle - Gilles QUERRET (origin/master, origin/HEAD, master)
* 371bf899 - (2 weeks ago) Version 213 - Gilles QUERRET (tag: V213)
* aaeb518e - (2 weeks ago) Build with 12.1 - Gilles QUERRET
* 56e5c9dc - (6 weeks ago) Add Option node to PCTBinaryDump / PCTBinaryLoad (#378) - Gilles QUERRET
* 7ff870ce - (6 weeks ago) Set RCodeInfo buffer size from a Java property (#377) - Gilles QUERRET
* a4c35c89 - (6 weeks ago) Handle white spaces in Profiler:outputFile property (#376) - Gilles QUERRET
* c814cba6 - (6 weeks ago) Fix PCTDynamicRun issues (#375) - Gilles QUERRET
* da1eb340 - (7 weeks ago) BackgroundWorker thread fix - Bill Wang
* 0055bfb0 - (4 months ago) Test case - Gilles QUERRET (HEAD → bugfix/PCT-366, origin/bugfix/PCT-366)
* 30770550 - (4 months ago) Test with Corretto 11 and Ant 1.10 - Gilles QUERRET (origin/Ant110Corretto11)
* f459acc0 - (8 weeks ago) Support for OpenEdge 12.1 - Gilles QUERRET
```

HEAD~0 → 0055bfb0

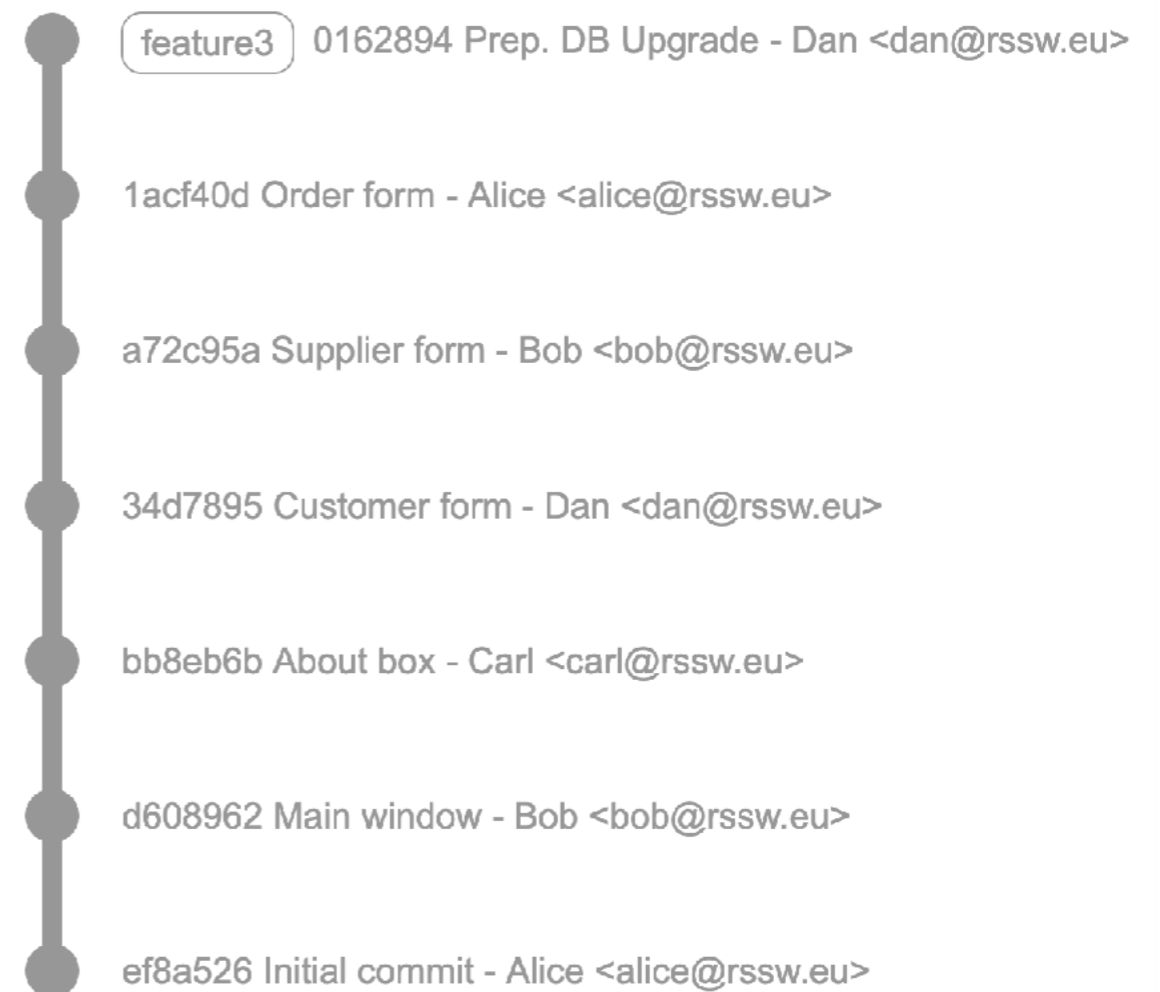
HEAD~1 → f459acc0

# Tip #5 – Understand Merge



A vertical line of seven black circles on the left side of the box, connected by a vertical line, representing a sequence of commits. The text to the right of each circle is a commit hash followed by a description and author information.

- feature1 e848158 Quick order form - Dan <dan@rsw.eu>
- 1acf40d Order form - Alice <alice@rsw.eu>
- a72c95a Supplier form - Bob <bob@rsw.eu>
- 34d7895 Customer form - Dan <dan@rsw.eu>
- bb8eb6b About box - Carl <carl@rsw.eu>
- d608962 Main window - Bob <bob@rsw.eu>
- ef8a526 Initial commit - Alice <alice@rsw.eu>

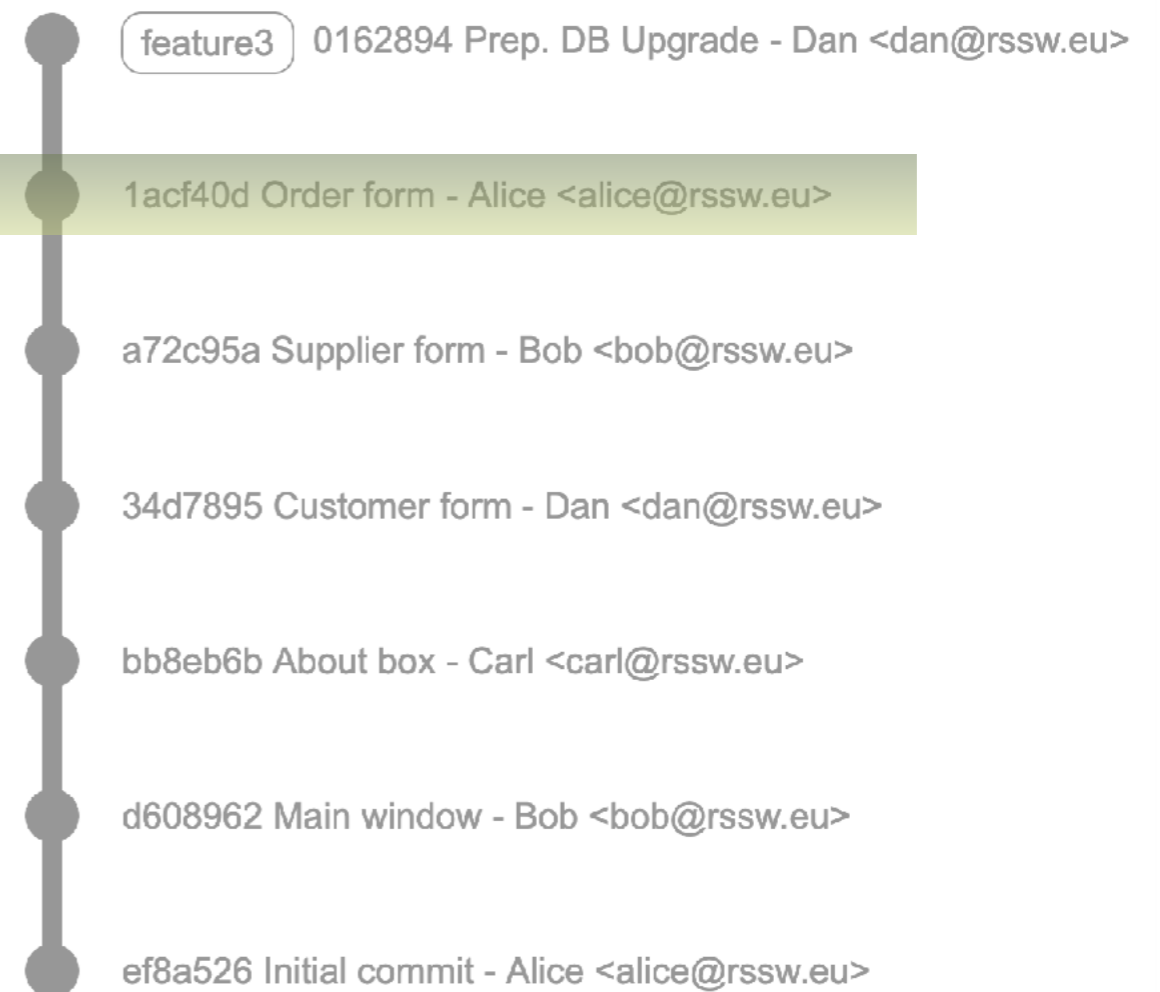
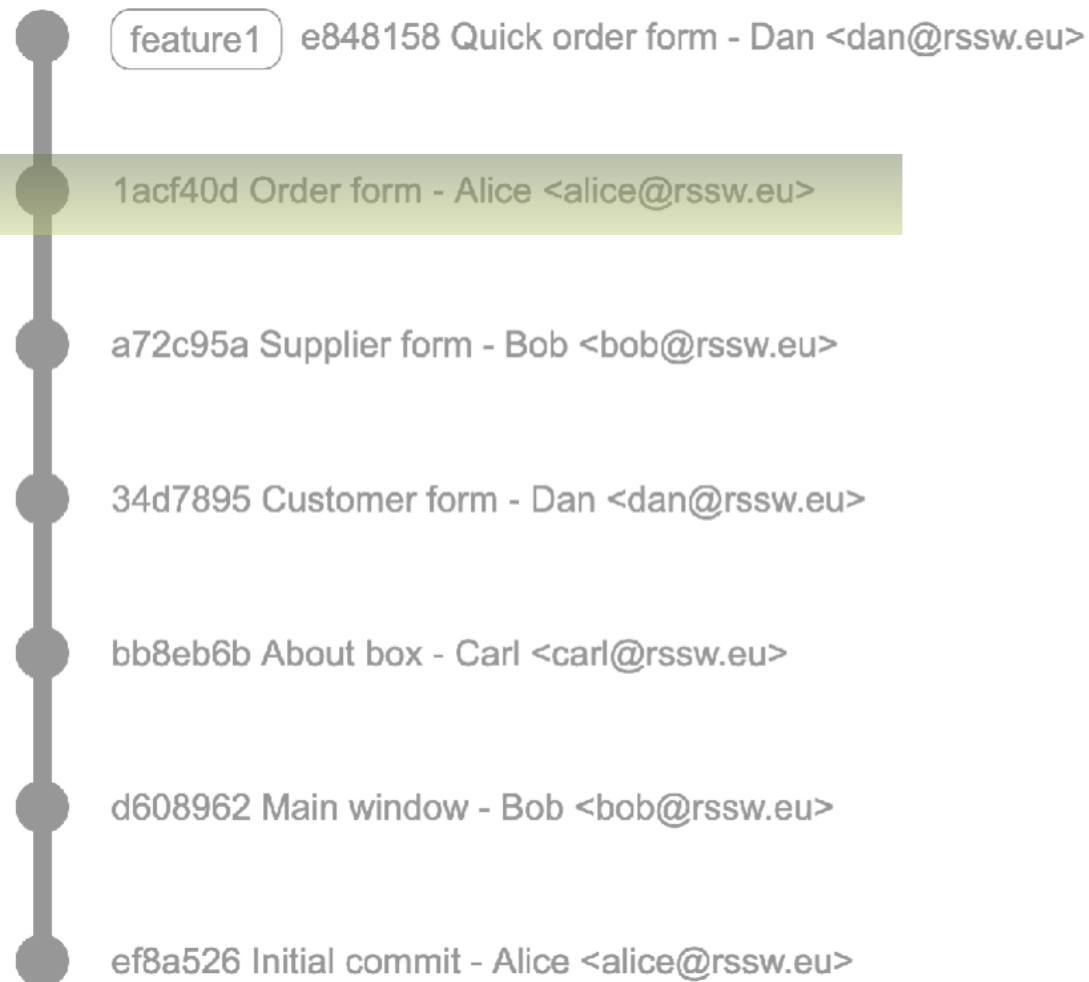


A vertical line of seven black circles on the left side of the box, connected by a vertical line, representing a sequence of commits. The text to the right of each circle is a commit hash followed by a description and author information.

- feature3 0162894 Prep. DB Upgrade - Dan <dan@rsw.eu>
- 1acf40d Order form - Alice <alice@rsw.eu>
- a72c95a Supplier form - Bob <bob@rsw.eu>
- 34d7895 Customer form - Dan <dan@rsw.eu>
- bb8eb6b About box - Carl <carl@rsw.eu>
- d608962 Main window - Bob <bob@rsw.eu>
- ef8a526 Initial commit - Alice <alice@rsw.eu>

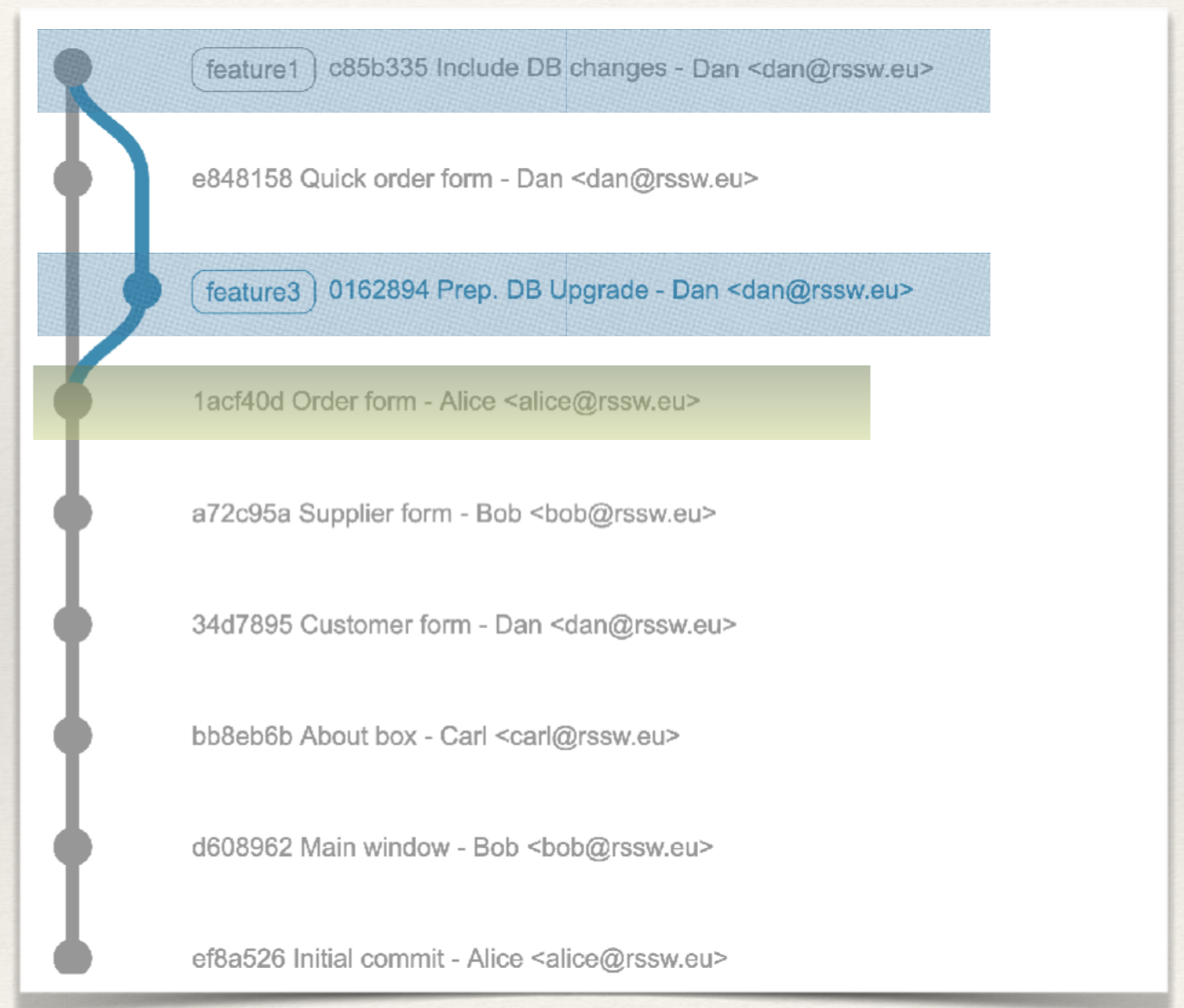


# Merging Step 1 - Common Ancestor



# Merging Step 2 - New Commit

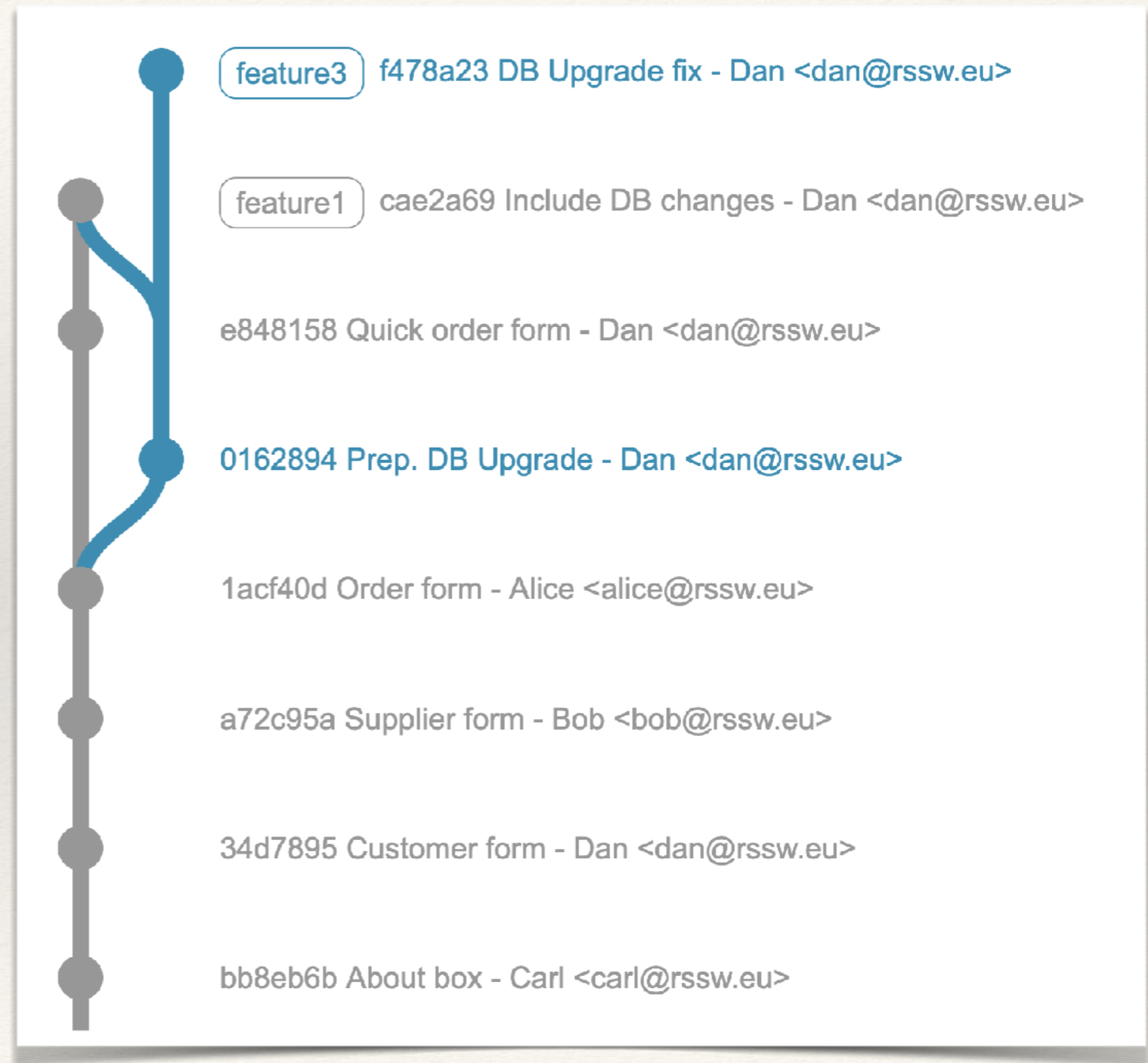
- ❖ 1 new merge commit, with two parents
- ❖ No impact on 0162894
- ❖ This commit doesn't know it has been merged





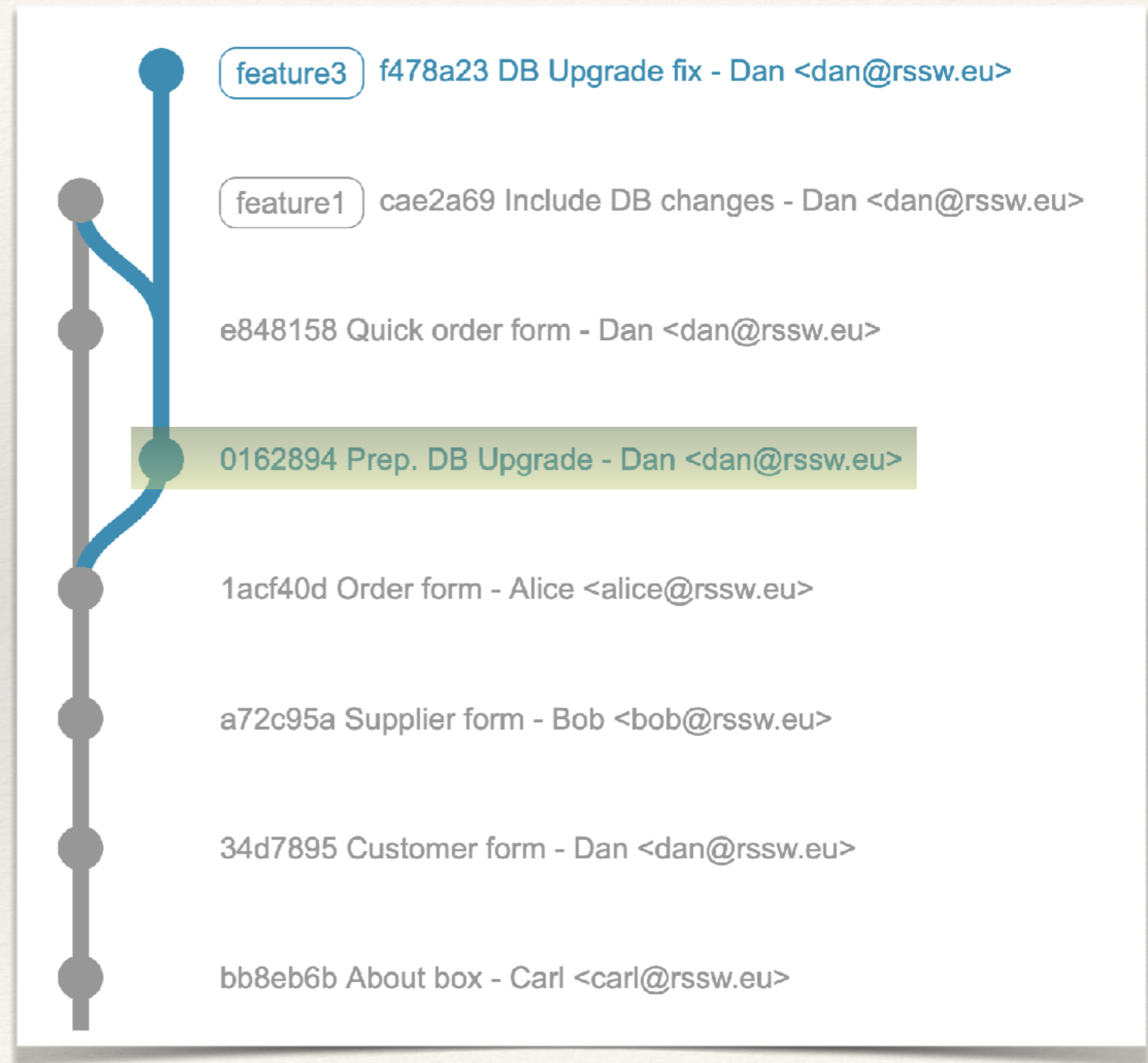
# Merging - Cont'd

- ❖ New commit on feature3



# Merging - Cont'd

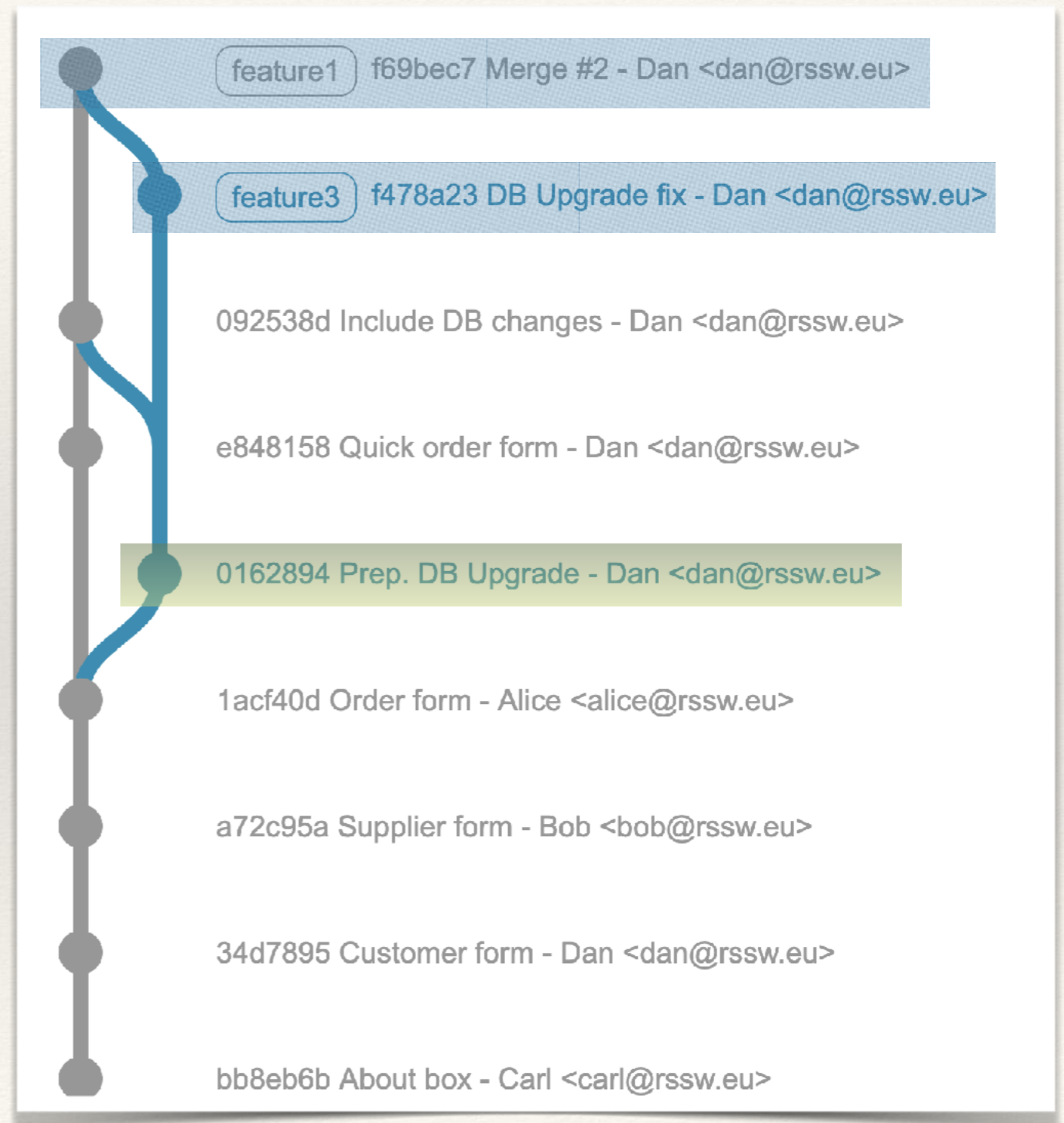
- ❖ Look for common ancestor





# Merging - Cont'd

- ❖ Look for common ancestor



---

# Tip #5 – Branching model

---

- ❖ GitFlow
- ❖ Trunk based development
- ❖ Other



---

# Tip #6 – Pull / Merge Requests

---

❖ Optional



---

# Tip #7 - Aliases

---

- ❖ Git alias is your friend – Content of .gitconfig:
  - ❖ `lg1-spe = log --graph --abbrev-commit --decorate --format=format:'%C(bold blue)%h%C(reset) - %C(bold green)(%ar)%C(reset) %C(white)%s%C(reset) %C(dim white)- %an%C(reset)%C(bold yellow)%d%C(reset)'`
  - ❖ `lg1=!git lg1-spe --all`



# Tip #7 - Aliases

```
* 44555af0 - (10 days ago) Merge remote-tracking branch 'origin/hotfix/V2.16.1' into develop
|\
* | ec94b0ab - (2 weeks ago) ClumsySyntax rule - FP on FUNCTION ... IN - Gilles Querret
* | 836754da - (2 weeks ago) Store NCLOC in OEComponents instance - Gilles Querret
* | b365b018 - (2 weeks ago) Remove SQ version from analytics string - Gilles Querret
| | * 083c3a4c - (10 days ago) Merge remote-tracking branch 'origin/hotfix/V2.16.1' - Gilles Querret
| | |\
| | |/\
| | |/\
| | |/\
| | * 4e8f4f53 - (5 weeks ago) Remove reference to String#isBlank() which is only available in Java 8
| | * 23017b6d - (5 weeks ago) Prepare 2.16.1 hotfix - Gilles Querret
| | /\
| | * 93e1c62f - (5 weeks ago) Merge branch 'release/V2.16' - Gilles Querret (tag: V2.16.0)
| | |\
| | |/\
| | * 4ac96932 - (9 weeks ago) GitHub action: Wiki is still using master branch - Gilles Querret
| | * 6c8c57bf - (5 months ago) Merge branch 'release/V2.15.0' - Gilles Querret (tag: V2.15.0)
| | |\
| | |/\
| | * 1491709d - (6 months ago) Merge branch 'hotfix/2.14.10' - Gilles Querret (tag: V2.14.10)
| | |\
| | |/\
| | | * 3843ced2 - (2 weeks ago) Test case - Gilles Querret (origin/bugfix/SOE-987-NameDoesNotExist)
| | |/\
| | |/\
| | |/\
| | * 5ecc5840 - (4 weeks ago) Missing defineNode on TableBuffer created in CAN-FIND node
| | * 294d8ec8 - (5 months ago) Inline variables can also be defined in UPDATE / DISPLAY
| | * 9b0af4c3 - (4 weeks ago) Better message when LIKE datatype can't be resolved - Gilles Querret
| | * 3c669f40 - (4 weeks ago) Expression in block iterator now correctly flagged as expression
| | * a6c42092 - (5 months ago) FunctionArgs and OptionalFunctionArgs accept parameters (optional)
| | * 14014870 - (4 weeks ago) VSCode keywords - Gilles Querret
| | * 369e0f73 - (5 weeks ago) CONSTRUCTORS can be PACKAGE-PRIVATE/PROTECTED (#978) - Gilles Querret
| | * f4c8f03d - (5 weeks ago) Add method to retrieve unnamed buffers from a scope - Gilles Querret
| | * 478fe13f - (5 weeks ago) Additional context in IProparseEnvironment - Gilles Querret
| | * 4d13ba18 - (9 months ago) Upgrade SonarQube dependency to 8.9.9 - Gilles Querret
| | _/_/_/_/_/
```

---

# Tip #7 - Aliases

---

- ❖ `git config --global alias.last 'show HEAD~0'`
- ❖ `git config --global alias.last2 'show HEAD~0 --stat'`



# Tip #7 - Aliases

```
gquerret@MBP16 ~/dev/sonar-openedge develop git last
commit 766896767982d7fdddfcda072d6d85362fcdc04d (HEAD -> develop)
Author: Gilles Querret <g.querret@riverside-software.fr>
Date: Tue Jul 26 17:40:12 2022 +0200

    Next dev cycle

diff --git a/coverage-report/pom.xml b/coverage-report/pom.xml
index 0131580e..79200b87 100644
--- a/coverage-report/pom.xml
+++ b/coverage-report/pom.xml
@@ -4,7 +4,7 @@

    <groupId>eu.rssw.openedge.parsers</groupId>
    <artifactId>coverage-report</artifactId>
-   <version>2.16.0</version>
+   <version>2.17.0-SNAPSHOT</version>

    <name>JaCoCo report</name>
    <description>Fake module for code coverage report in SonarQube</des
@@ -20,37 +20,37 @@
    <dependency>
      <groupId>eu.rssw.openedge.rcode</groupId>
      <artifactId>rcode-reader</artifactId>
-     <version>2.16.0</version>
+     <version>2.17.0-SNAPSHOT</version>
    </dependency>
    <dependency>
      <groupId>eu.rssw.sonar.openedge</groupId>
      <artifactId>sonar-openedge-plugin</artifactId>
-     <version>2.16.0</version>
+     <version>2.17.0-SNAPSHOT</version>
    </dependency>
```

---

# Tip #7 - Aliases

---

```
commit 766896767982d7fdddfcda072d6d85362fc04d (HEAD -> develop)
Author: Gilles Querret <g.querret@riverside-software.fr>
Date: Tue Jul 26 17:40:12 2022 +0200

    Next dev cycle

coverage-report/pom.xml | 16 ++++++-----
database-parser/pom.xml |  2 +-
listing-parser/pom.xml  |  2 +-
openedge-checks/pom.xml |  6 +++--
openedge-plugin/pom.xml |  8 ++++----
pom.xml                  |  2 +-
profiler-parser/pom.xml |  2 +-
proparse/pom.xml        |  4 ++--
rcode-reader/pom.xml    |  2 +-
9 files changed, 22 insertions(+), 22 deletions(-)
```



---

# Tip #8 - Stash

---

- ❖ `git stash save` or `git stash push`
- ❖ `git stash pop` or `git stash apply`
- ❖ `git stash list`
- ❖ `git stash show -p <number>`



---

# Tip #9 - Reset

---

- ❖ Reset DAG to a specific location (e.g. HEAD~1 → previous commit)
- ❖ Mode:
  - ❖ Soft → Modifications stay in the staging area
  - ❖ Hard → Modifications are discarded
  - ❖ Mixed → Keep modifications, but not staged
- ❖ Only on branches that have not been pushed yet



---

# Tip #10 - LFS

---

- ❖ Distributed repositories mean that the entire content (including history) is copied to your local disk
- ❖ Large binary assets should not be committed to the repo
- ❖ If required, use LFS

# Tip #11 - Squash

	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAAAAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS	2 HOURS AGO
○	HAAAAAAAAAANDS	2 HOURS AGO

AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.



---

# Tip #12 – Rebase

---

- ❖ Move a set of commits to a different starting point
- ❖ In case of long feature branch:
  - ❖ Merge from main -> limited impact for user
  - ❖ Rebase feature branch
- ❖ Before accepting feature branch in main branch



---

# Tip #13 – Sign commits with SSH

---

- ❖ Easy to impersonate any user...
- ❖ GPG signature is hard to set up
- ❖ Use SSH to sign commits
  - ❖ <https://docs.github.com/en/authentication/managing-commit-signature-verification/signing-commits>
  - ❖ <https://developer.1password.com/docs/ssh/git-commit-signing/>



Questions ?