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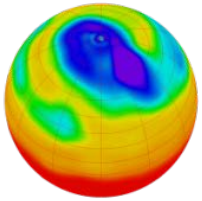

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Module 7: Managing your code

Thanks to all contributors:

Alison Pamment, Sam Pepler, Ag Stephens, Stephen Pascoe, Kevin Marsh, Anabelle Guillory, Graham Parton, Esther Conway, Eduardo Damasio Da Costa, Wendy Garland, Alan Iwi and Matt Pritchard.

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Overview

- Introduction to **the basics**: repositories, adding, committing, handling conflicts and rolling back
- Subversion (**SVN**) in action at the command-line
- SVN conventions: the trunk, branches and tags
- Introducing **GIT**
- GIT in action at the command-line
- SVN versus GIT
- **Tools** that help you work with Version Control Systems

Managing code in the olden days

- Create “working_dir”...add some code
- Write some outputs...change the code
- Publish a paper...change the code
- Copy “working_dir” to “working_dir2”
- Change the code
- Copy a version to a CD

...now which version is current? Is it “working_dir” or “working_dir2”? And which one relates to that paper?

But those days are gone!

- Scientists are typically required to keep and publish their data and code (by their funders/institutions).
- Collaboration between scientists requires data-sharing; this implicitly relies on code-sharing.
- There are tools that make it easy to record our changes, document our workflow and “fix” releases of our code at important steps along the way.

Introducing Version Control Systems

“**Revision control**, also known as **version control** and **source control** is the management of changes to documents [and] computer programs. Changes are usually identified by a number or letter code, termed the "revision number" or simply "revision".

For example, an initial set of files is "revision 1". When the first change is made, the resulting set is "revision 2", and so on. Each revision is associated with a timestamp and the person making the change. Revisions can be compared, restored, and with some types of files, merged.” (from Wikipedia!)

SVN: Basic Operation

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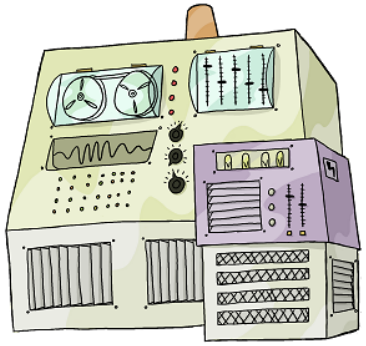

universal.software-carpentry.org

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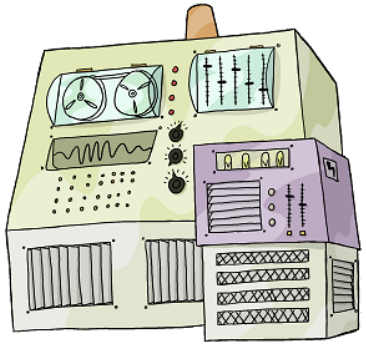
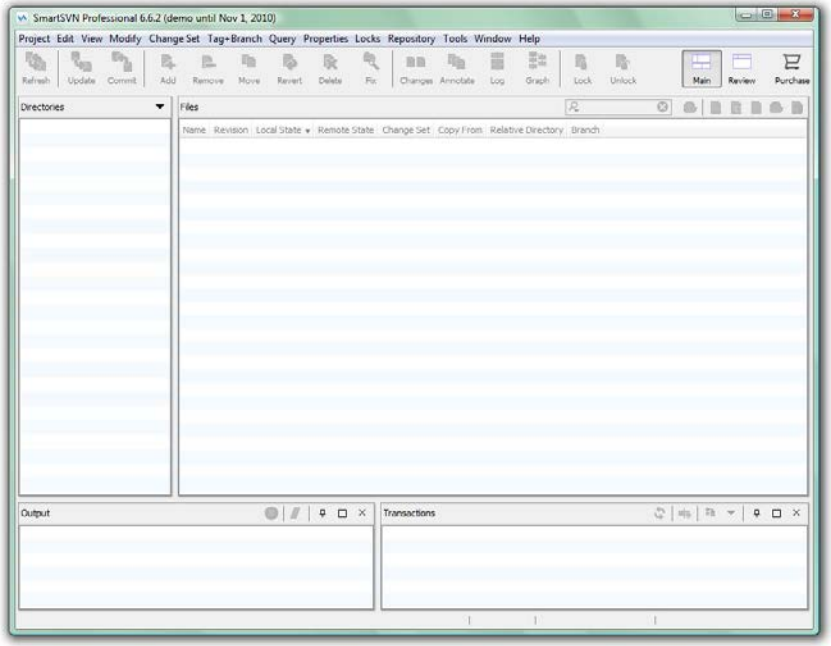
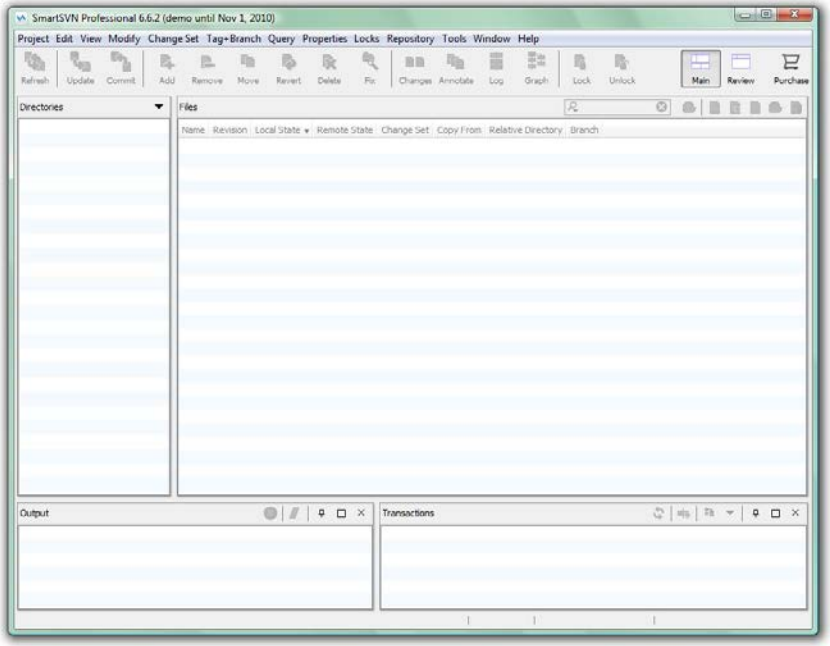


https://universal.software-carpentry.org/monsters

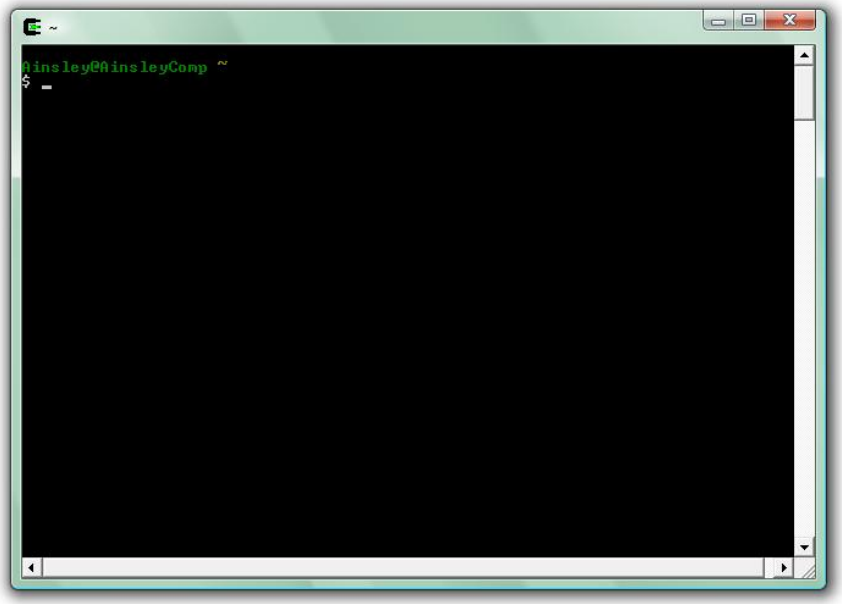
SmartSVN


SmartSVN Professional 6.6.2 (demo until Nov 1, 2010)
Project Edit View Modify Change Set Tag+Branch Query Properties Locks Repository Tools Window Help
Refresh Update Commit Add Remove Move Revert Delete Fix Changes Annotate Log Graph Lock Unlock Main Review Purchase
Directories
Files
Name Revision Local State Remote State Change Set Copy From Relative Directory Branch
Output
Transactions

SmartSVN



Command Line



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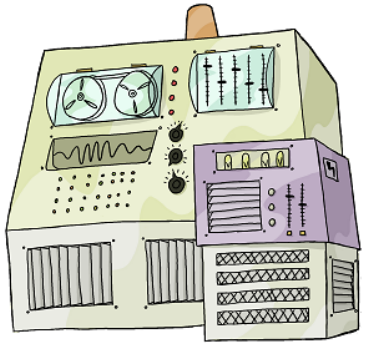
It's fast.

It's fast.

It's simple.



revision 6

$ svn checkout

```
$ svn co
```

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```
$ svn co https://universal.software-carpentry.org
  /cygwin/home/dracula/monsters
```

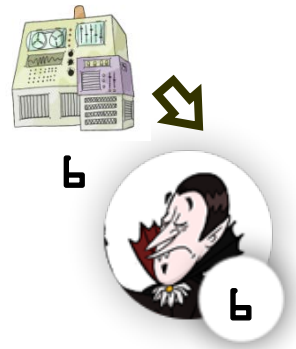
```
$ svn co https://universal.software-carpentry.org
  /cygwin/home/dracula/monsters
```

repository

```
$ svn co https://universal.software-carpentry.org
/cygwin/home/dracula/monsters
```

working copy

```
$ svn co https://universal.software-carpentry.org
  /cygwin/home/dracula/monsters
A  earth/carlsbad.txt
A  earth/antarctica.txt
...
Checked out revision 6.
$
```



```
$ svn co https://universal.software-carpentry.org
  /cygwin/home/dracula/monsters
A  earth/carlsbad.txt
A  earth/antarctica.txt
...
Checked out revision 6.
$ cd /cygwin/home/dracula/monsters
$
```

```
$ svn co https://universal.software-carpentry.org
  /cygwin/home/dracula/monsters
A  earth/carlsbad.txt
A  earth/antarctica.txt
...
Checked out revision 6.
$ cd /cygwin/home/dracula/monsters
$ ls
earth   mars   jupiter   ...
$
```

```
$ svn log
```

```
$ svn log
Damn the budget - the Jovian moons would be …
------------------------------------------------
r6 | mummy | 2010-07-26 09:21:39 | 1 lines

The budget might not even stretch to a deep…
------------------------------------------------
r5 | mummy | 2010-07-26 09:19:18 | 1 lines
…

$
```

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```
$ cd jupiter
$
```

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```
$ cd jupiter
$ nano moons.txt
GNU Nano
Name        Orbital Radius     Orbital Period     Mass
Io          421.6                  1.769138           893.2
Europa      670.9                  3.551181           480.0
Ganymede    1070.4                 7.154553           1481.9
Callisto1882.7                 16.689018          1075.9
...
$
```

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$ cd jupiter
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GNU Nano
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Io          421.6                  1.769138           893.2
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Ganymede    1070.4                 7.154553           1481.9
Callisto1882.7                 16.689018          1075.9
...
$ svn add
```

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Callisto1882.7                 16.689018              1075.9
...
$ svn add moons.txt
```

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Ganymede    1070.4                 7.154553           1481.9
Callisto1882.7                 16.689018          1075.9
...
$ svn add moons.txt
A  moons.txt
$
```

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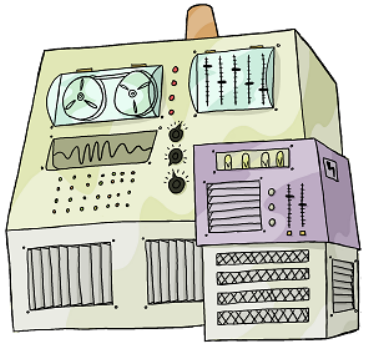

revision 6

revision 6+

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```
$ svn commit -m "Some basic facts about the
  Galilean moons of Jupiter."
```

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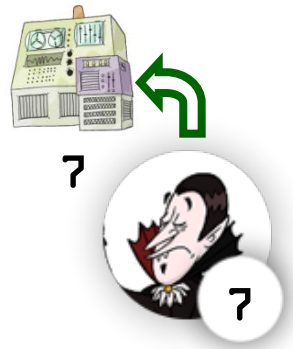
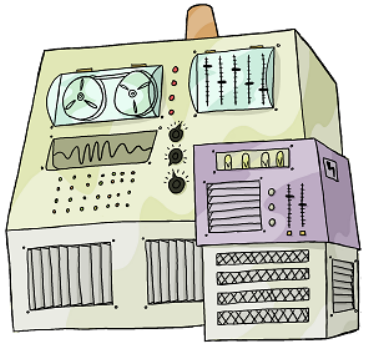
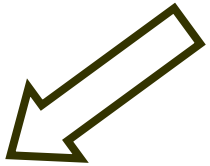
```
$ svn commit -m "Some basic facts about the
  Galilean moons of Jupiter."
Adding       moons.txt
Transmitting file data . .
Committed revision 7.
$
```





revision 7



revision 6

```
$ cd /cygwin/home/wolfman/monsters
```

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```
$ cd /cygwin/home/wolfman/monsters
$ svn update
```

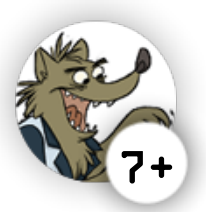
```
$ cd /cygwin/home/wolfman/monsters
$ svn update
A  jupiter/moons.txt
Updated to revision 7.
$
```

```
$ cd /cygwin/home/wolfman/monsters
$ svn update
A  jupiter/moons.txt
Updated to revision 7.
$ cd jupiter
$ less moons.txt
```

Name	Orbital Radius	Orbital Period	Mass
Amalthea	181.4	0.498179	0.075
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Calisto	1882.7	16.689018	1075.9

```
$ cd /cygwin/home/wolfman/monsters
$ svn update
A  jupiter/moons.txt
Updated to revision 7.
$ cd jupiter
$ less moons.txt
Name        Orbital Radius     Orbital Period     Mass
Amalthea    181.4                  0.498179           0.075
Io          421.6                  1.769138           893.2
Europa      670.9                  3.551181           480.0
Ganymede    1070.4                 7.154553           1481.9
Callisto1882.7                 16.689018          1075.9
```

```
$ nano moons.txt
GNU Nano
Name        Orbital Radius      Orbital Period      Mass
Io          421.6                 1.769138            893.2
Europa      670.9                 3.551181            480.0
Ganymede    1070.4                7.154553            1481.9
Callisto    1882.7                16.689018           1075.9
```



```
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GNU Nano
Name        Orbital Radius      Orbital Period      Mass
Amalthea    181.4                   0.498179            0.075
Io          421.6                   1.769138            893.2
Europa      670.9                   3.551181            480.0
Ganymede    1070.4                  7.154553            1481.9
Callisto    1882.7                  16.689018           1075.9
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GNU Nano
Name        Orbital Radius     Orbital Period     Mass
Amalthea    181.4                  0.498179             0.075
Io          421.6                  1.769138             893.2
Europa      670.9                  3.551181             480.0
Ganymede    1070.4                 7.154553             1481.9
Callisto    1882.7                 16.689018            1075.9
...
$ svn commit -m "1. Fixed typo Calisto->Callisto.
  2. Added info about Amalthea."
Sending        jupiter/moons.txt
Transmitting file data .
Committed revision 8.
```

```
$ cd /cygwin/home/dracula/monsters
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
Index: jupiter/moons.txt
===================================================================
--- jupiter/moons.txt     (revision 8)
+++ jupiter/moons.txt     (working copy)
@@ -1,6 +1,5 @@
 Name            Orbital Radius Orbital Period Mass
-Amalthea        181.4                0.498179          0.075
 Io              421.6                1.769138          893.2
 Europa      670.9                3.551181          480.0
 Ganymede        1070.4               7.154553          1481.9
-Callisto            1882.7               16.689018         1075.9
+Calisto             1882.7               16.689018         1075.9
$
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
Index: jupiter/moons.txt
===================================================================
--- jupiter/moons.txt    (revision 8)
+++ jupiter/moons.txt    (working copy)
@@ -1,6 +1,5 @@
 Name            Orbital Radius Orbital Period Mass
-Amalthea        181.4          0.498179       0.075
 Io              421.6          1.769138       893.2
 Europa      670.9          3.551181       480.0
 Ganymede        1070.4         7.154553       1481.9
-Callisto        1882.7         16.689018      1075.9
+Calisto         1882.7         16.689018      1075.9
$
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
Index: jupiter/moons.txt
===================================================================
--- jupiter/moons.txt     (revision 8)
+++ jupiter/moons.txt     (working copy)
@@ -1,6 +1,5 @@
 Name            Orbital Radius Orbital Period Mass
-Amalthea        181.4                0.498179        0.075
 Io              421.6                1.769138        893.2
 Europa      670.9                3.551181        480.0
 Ganymede        1070.4               7.154553        1481.9
-Callisto            1882.7               16.689018       1075.9
+Calisto             1882.7               16.689018       1075.9
$
```

```
$ cd /cygwin/home/dracula/monsters
$ svn diff -r HEAD
Index: jupiter/moons.txt
===================================================================
--- jupiter/moons.txt     (revision 8)
+++ jupiter/moons.txt     (working copy)
@@ -1,6 +1,5 @@
 Name            Orbital Radius Orbital Period Mass
-Amalthea        181.4          0.498179       0.075
 Io              421.6          1.769138       893.2
 Europa      670.9          3.551181       480.0
 Ganymede        1070.4         7.154553       1481.9
-Callisto        1882.7         16.689018      1075.9
+Calisto         1882.7         16.689018      1075.9
$ svn update
G    jupiter/moons.txt
Updated to revision 8.
```

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revision 8

revision 8

revision 8

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Dealing with Conflicts

revision 8

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius	Orbital Period	Mass
Amalthea	181.4	0.498179	0.075
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius	Orbital Period	Mass
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9

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revision 9

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius	Orbital Period	Mass
Amalthea	181.4	0.498179	0.075
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius	Orbital Period	Mass
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Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9

revision 8+

revision 9

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```
$ svn commit -m  “Added data for Himalia, Elara"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$
```

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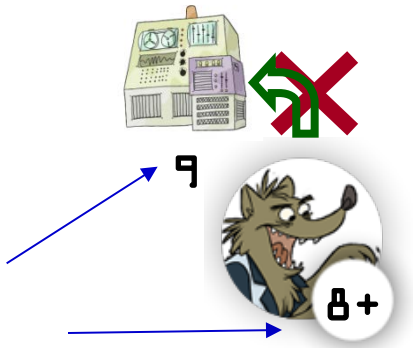
```
$ svn commit -m  “Added data for Himalia, Elara"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$
```



```
$ svn commit -m  “Added data for Himalia, Elara"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$ svn update
G    jupiter/moons.txt
Updated to revision 9.
$
```

```
$ svn commit -m  “Added data for Himalia, Elara"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$ svn update
G    jupiter/moons.txt
Updated to revision 9.
$ svn commit -m  “Added data for Himalia, Elara"
Sending        jupiter/moons.txt
Transmitting file data .
Committed revision 10.
$
```

revision 10

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius (10**3 km)	Orbital Period (days)	Mass (10**20 kg)
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius * 10^3 km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

revision 10+

revision 9+

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revision 11

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius (10**3 km)	Orbital Period (days)	Mass (10**20 kg)
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius * 10^3 km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9
Himalia	11460	250.5662	0.095
Elara	11740	259.6528	0.008

revision 11

revision 9+

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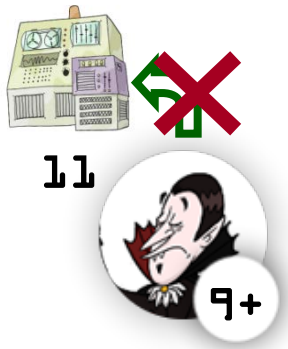
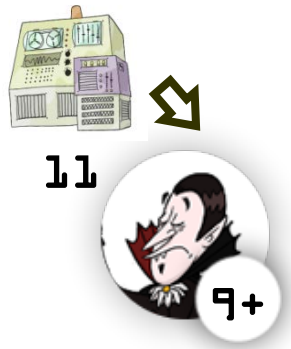
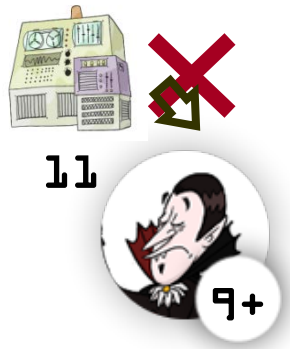
```
$ svn commit -m  “Added measurement units"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$
```



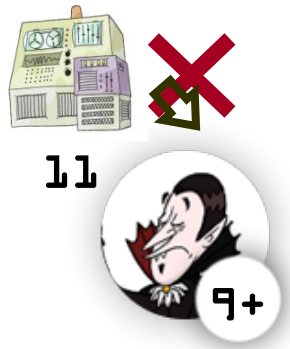
```
$ svn commit -m  “Added measurement units"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$ svn update
```



```
$ svn commit -m  “Added measurement units"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory 'moons.txt' is out of date;
     try updating
svn: resource out of date; try updating
$ svn update
Conflict discovered in  'jupiter/moons.txt'.
Select: (p) postpone, (df) diff-full, (e) edit,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options:
```



```
$ svn commit -m  “Added measurement units"
Sending        jupiter/moons.txt
svn: Commit failed (details follow):
svn: File or directory ’moons.txt’ is out of date;
     try updating
svn: resource out of date; try updating
$ svn update
Conflict discovered in  ‘jupiter/moons.txt’.
Select: (p) postpone, (df) diff-full, (e) edit,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options:  df
```



```
--- jupiter/.svn/text-base/moons.txt.svn-base   Fri Oct  1 21:08
+++ jupiter/.svn/tmp/moons.txt.tmp              Fri Oct  1 22:59
@@ -1,6 +1,11 @@
 Name              Orbital Radius  Orbital Period  Mass
+<<<<<<< .mine
+                  * 10^3 km       * days            * 10^20 kg
+=======
+                  (10**3 km)      (days)          (10**20 kg)
+>>>>>>> .r11
 Amalthea          181.4           0.498179          0.074
 Io                421.6           1.769138          893.2
 Europa            670.9           3.551181          480.0
 Ganymede          1070.4          7.154553          1481.9
 Callisto          1882.7          16.689018         1075.9
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options:
```

```
--- jupiter/.svn/text-base/moons.txt.svn-base  Fri Oct  1 21:08
+++ jupiter/.svn/tmp/moons.txt.tmp             Fri Oct  1 22:59
@@ -1,6 +1,11 @@
 Name            Orbital Radius  Orbital Period  Mass
+<<<<<<< .mine
+              * 10^3 km       * days            * 10^20 kg
+=======
+              (10**3 km)      (days)          (10**20 kg)
+>>>>>>> .r11
 Amalthea        181.4           0.498179        0.074
 Io              421.6           1.769138        893.2
 Europa          670.9           3.551181        480.0
 Ganymede        1070.4          7.154553        1481.9
 Callisto        1882.7          16.689018       1075.9
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options:
```

```
--- jupiter/.svn/text-base/moons.txt.svn-base  Fri Oct  1 21:08
+++ jupiter/.svn/tmp/moons.txt.tmp             Fri Oct  1 22:59
@@ -1,6 +1,11 @@
 Name            Orbital Radius  Orbital Period  Mass
+<<<<<<< .mine
+               * 10^3 km       * days            * 10^20 kg
+=======
+               (10**3 km)      (days)          (10**20 kg)
+>>>>>>> .r11
 Amalthea        181.4           0.498179         0.074
 Io              421.6           1.769138         893.2
 Europa          670.9           3.551181         480.0
 Ganymede        1070.4          7.154553         1481.9
 Callisto        1882.7          16.689018        1075.9
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options:
```

```
--- jupiter/.svn/text-base/moons.txt.svn-base  Fri Oct  1 21:08
+++ jupiter/.svn/tmp/moons.txt.tmp             Fri Oct  1 22:59
@@ -1,6 +1,11 @@
 Name            Orbital Radius  Orbital Period  Mass
+<<<<<<< .mine
+                 * 10^3 km       * days           * 10^20 kg
+=======
+                 (10**3 km)      (days)          (10**20 kg)
+>>>>>>> .r11
 Amalthea        181.4           0.498179         0.074
 Io              421.6           1.769138         893.2
 Europa          670.9           3.551181         480.0
 Ganymede        1070.4          7.154553         1481.9
 Callisto        1882.7          16.689018        1075.9
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options: e
```

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```
GNU Nano
Name            Orbital Radius  Orbital Period  Mass
<<<<<<< .mine
+                * 10^3 km       * days            * 10^20 kg
+=======
+                (10**3 km)      (days)          (10**20 kg)
+>>>>>>> .r11
Amalthea        181.4           0.498179        0.074
Io              421.6           1.769138        893.2
Europa          670.9           3.551181        480.0
Ganymede        1070.4          7.154553        1481.9
Callisto        1882.7          16.689018       1075.9

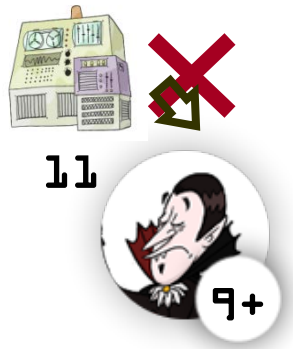
...
```

GNU Nano

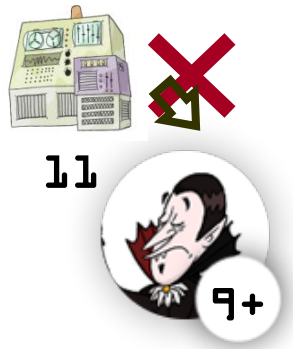
Name	Orbital Radius	Orbital Period	Mass
	* 10^3 km	* days	* 10^20 kg
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9

...

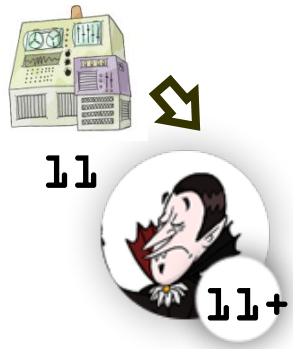
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
(mc) mine-conflict, (tc) theirs-conflict,
(s) show all options:



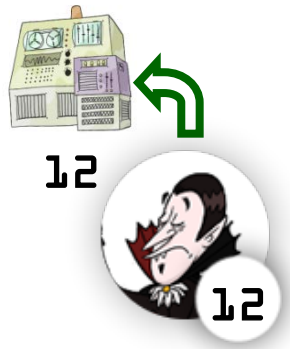
Select: (p) postpone, (df) diff-full, (e) edit, ***(r) resolved,***
(mc) mine-conflict, (tc) theirs-conflict,
(s) show all options: r



```
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options: r
Updated to revision 11.
$
```



```
Select: (p) postpone, (df) diff-full, (e) edit, (r) resolved,
        (mc) mine-conflict, (tc) theirs-conflict,
        (s) show all options: r
Updated to revision 11.
$ svn commit -m  “Added measurement units “
Sending        jupiter/moons.txt
Transmitting file data .
Committed revision 12.
```



Rollback with SVN

revision 12

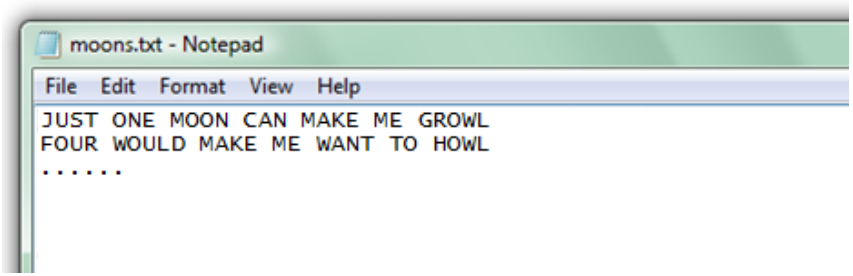
moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius * 10^3 km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9

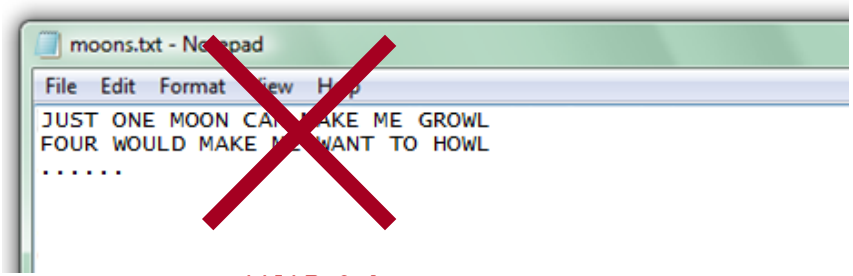
revision 12

revision 12



revision 12+

revision 12



UNDO!

revision 12+

```
$ cd /cygwin/home/wolfman/monsters/jupiter
$
```

```
$ cd /cygwin/home/wolfman/monsters/jupiter
$ svn revert
```

```
$ cd /cygwin/home/wolfman/monsters/jupiter
$ svn revert moons.txt
```

```
$ cd /cygwin/home/wolfman/monsters/jupiter
$ svn revert moons.txt
Reverted    moons.txt
$
```

revision 12

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius * 10^3 km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181.4	0.498179	0.074
Io	421.6	1.769138	893.2
Europa	670.9	3.551181	480.0
Ganymede	1070.4	7.154553	1481.9
Callisto	1882.7	16.689018	1075.9

revision 12

revision 12

moons.txt - Notepad

File Edit Format View Help

Name	Orbital Radius * km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181,400	0.498179	0.074
Io	421,600	1.769138	893.2
Europa	670,900	3.551181	480.0
Ganymede	1070,400	7.154553	1481.9
Callisto	1882,700	16.689018	1075.9

revision 12+

revision 13

moons.txt - Notepad

File Edit Format View Help

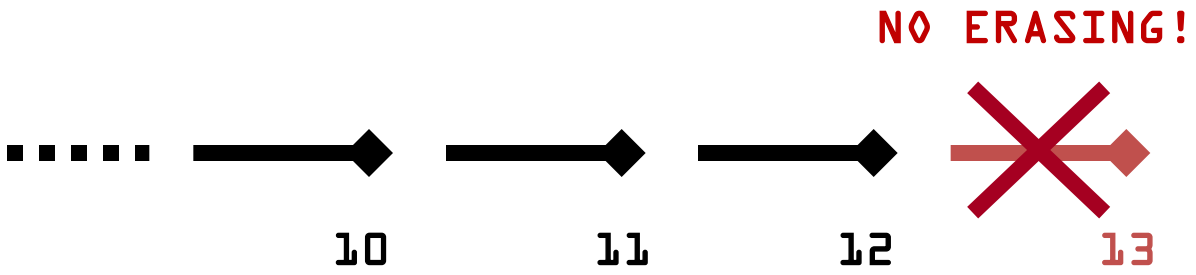
Name	Orbital Radius * km	Orbital Period * days	Mass * 10^20 kg
Amalthea	181,400	0.498179	0.074
Io	421,600	1.769138	893.2
Europa	670,900	3.551181	480.0
Ganymede	1070,400	7.154553	1481.9
Callisto	1882,700	16.689018	1075.9

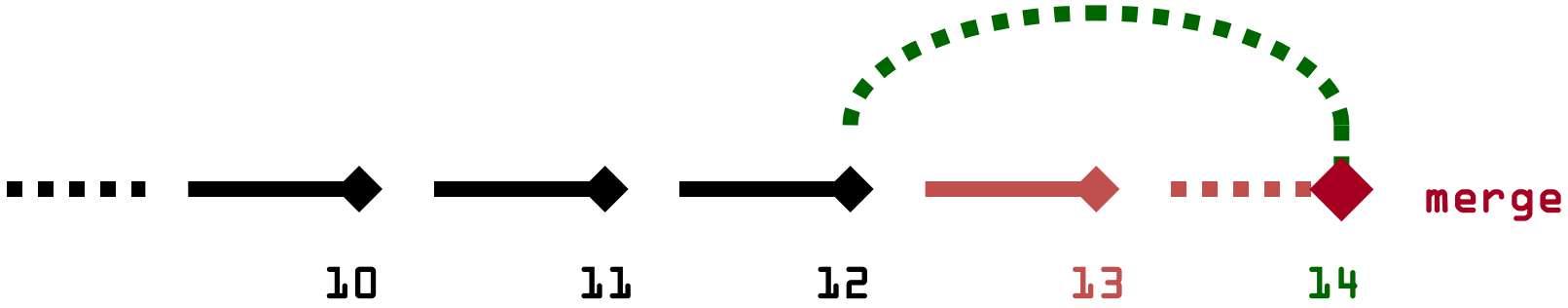
revision 13

revision 13

I want to reverse!

revision 13


NO ERASING!
10
11
12
13


merge
10
11
12
13
14

```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge
```

```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge -r
```

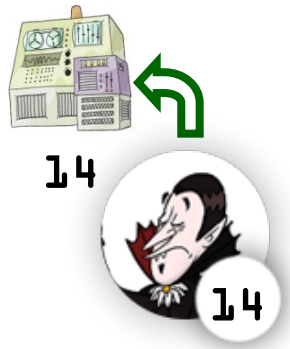
```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge -r HEAD:12
```

```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge  -r HEAD:12 moons.txt
```

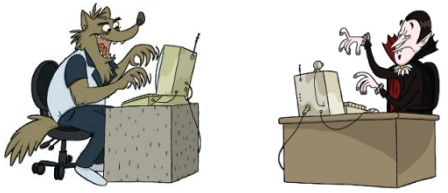
```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge  -r HEAD:12 moons.txt
-- Reverse-merging r13 into  'moons.txt'
U  moons.txt
$
```

```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge  -r HEAD:12 moons.txt
-- Reverse-merging r13 into  'moons.txt'
U  moons.txt
$ svn diff
...
$
```

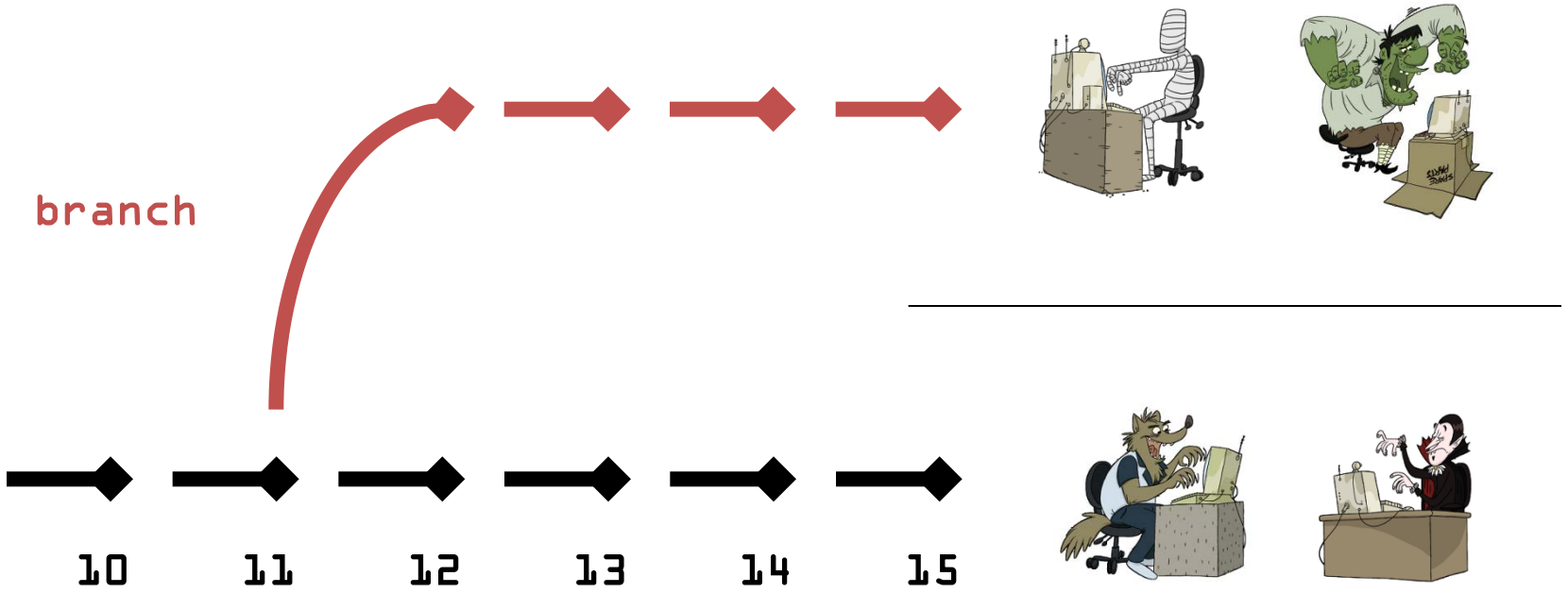
```
$ cd /cygwin/home/dracula/monsters/jupiter
$ svn merge -r HEAD:12 moons.txt
-- Reverse-merging r13 into 'moons.txt'
U  moons.txt
$ svn diff
...
$ svn commit -m "Alright, no commas."
Sending        jupiter/moons.txt
Transmitting file data .
Committed revision 14.
```

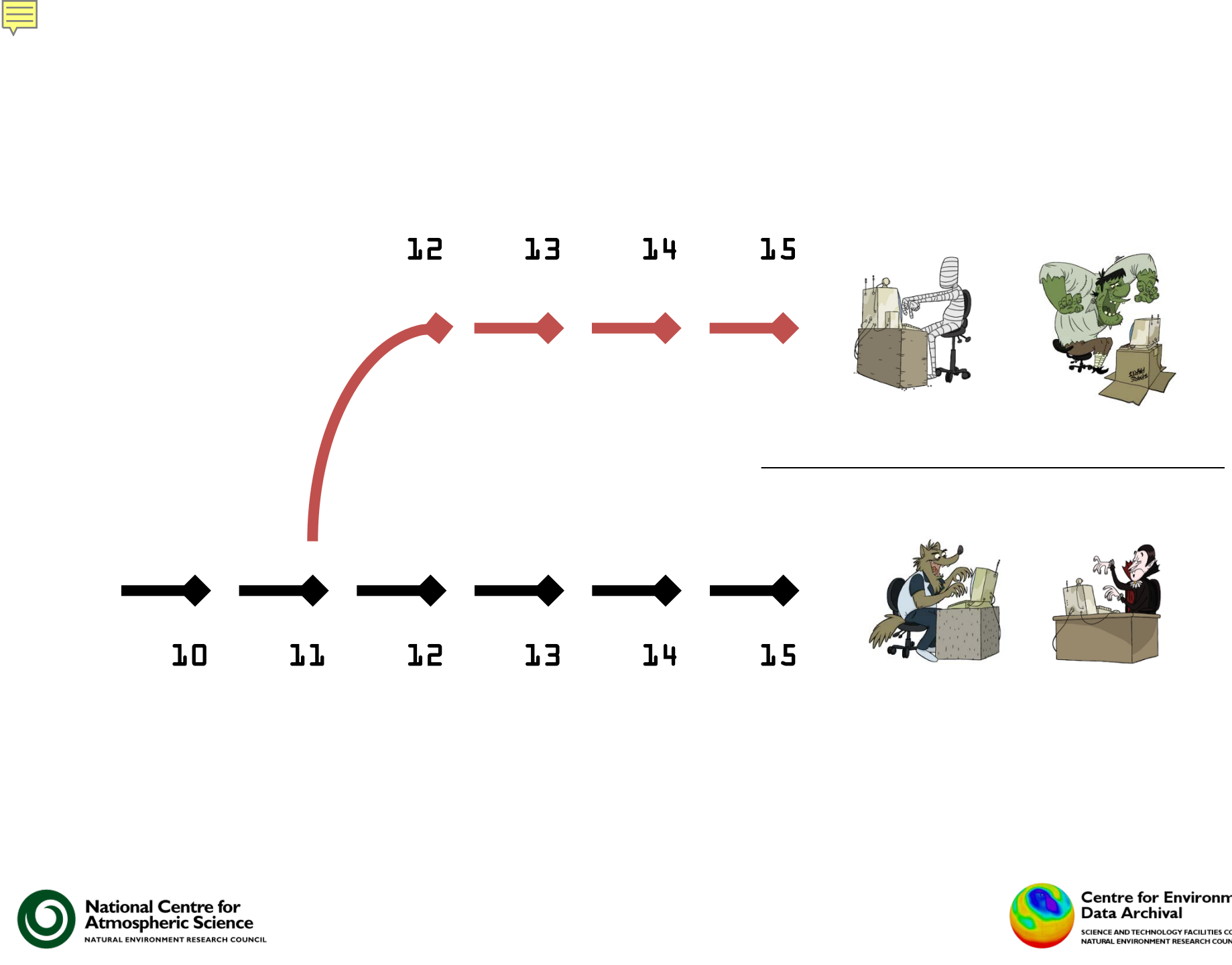


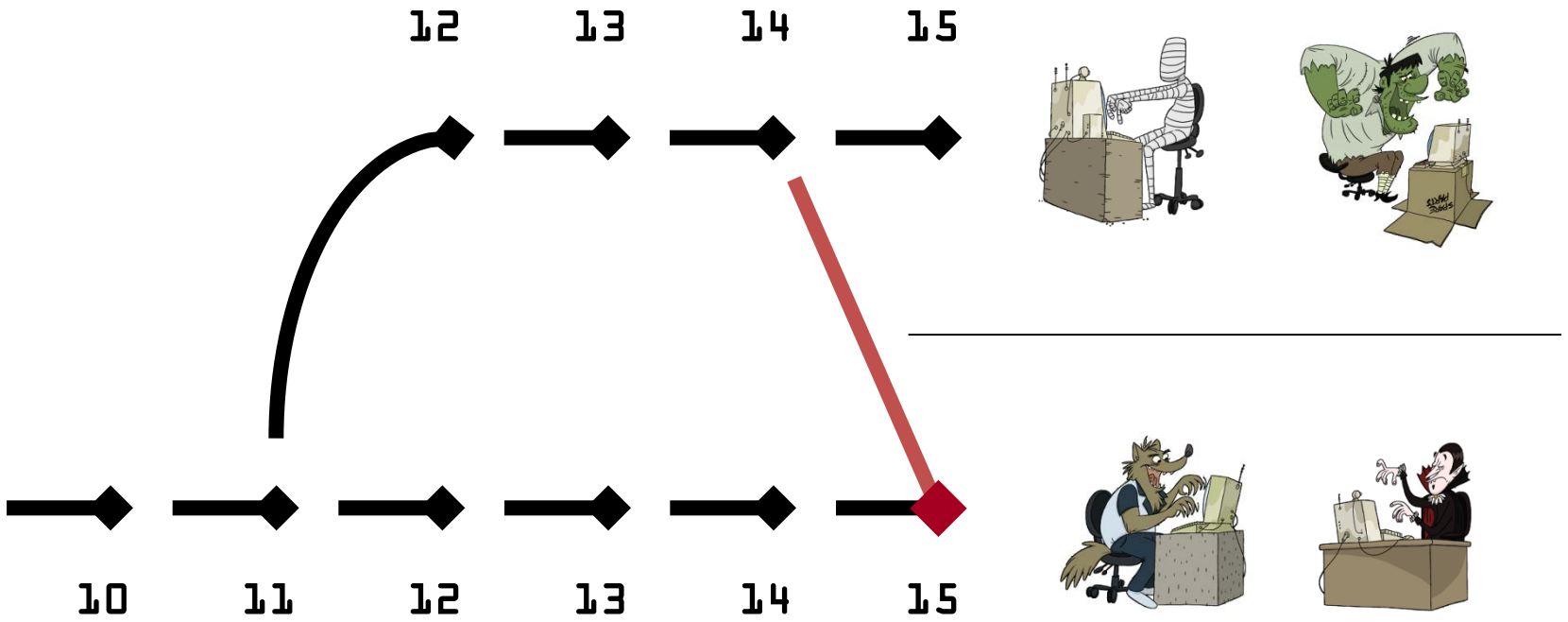
branching



10 11 12 13 14 15


branch
10
11
12
13
14
15


12
13
14
15
10
11
12
13
14
15



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`svn co`	check out repository
`svn log`	view change history
`svn add`	add file
`svn commit`	commit file
`svn update`	update to most recent revision
`svn diff`	view differences between revisions
`svn merge`	merge revisions

SVN Conventions

- These are not mandatory...but they are useful

SVN Conventions

The (unenforced) convention for SVN is to set up a repository as follows:

trunk/

branches/

tags/

SVN Conventions: example

You might see something like:

trunk/simple_app.py

branches/**fix_issue1**/simple_app.py

branches/**ag_test**/simple_app.py

tags/**v0.1**/simple_app.py

tags/**v0.2**/simple_app.py

tags/**v1.0**/simple_app.py

Introducing GIT

Introducing GIT (1)

There are many different Version Control tools:

- SVN is very popular and (relatively) easy to grasp
- GIT is also very popular but takes longer to understand. GIT is also:
  - More useful for collaboration
  - Distributed: there is no definitive server
  - Very well supported in terms of tools

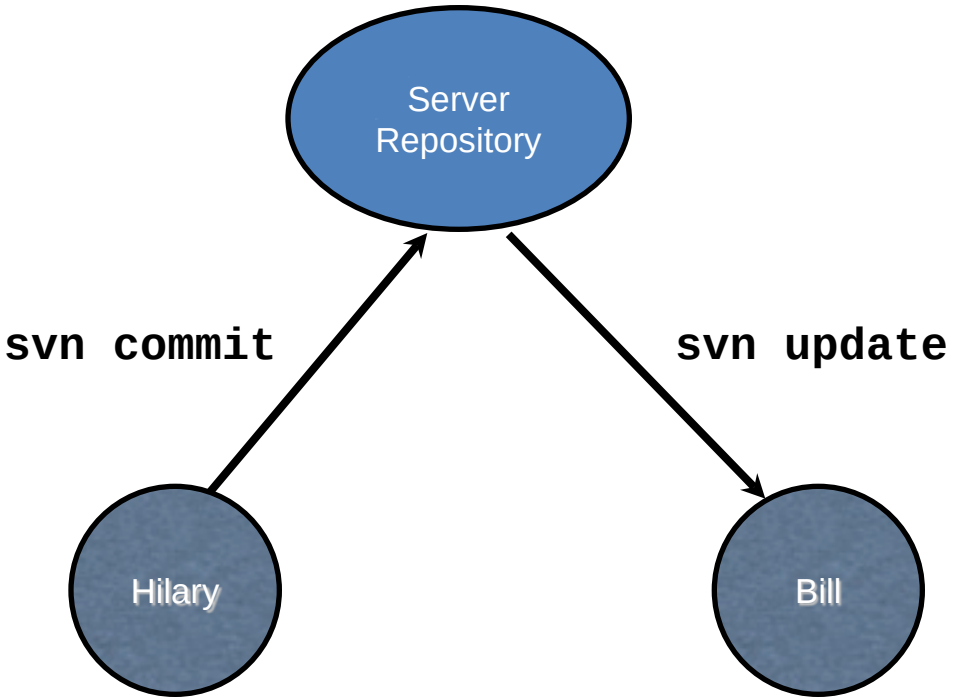
Introducing GIT (2)

GIT is a distributed Version Control System:

- you store a complete copy of a repository within your working copy
- this means you can work offline
  - there is no default 'central' server - if you want one, you (and your team) just nominate where it is (i.e. a github)

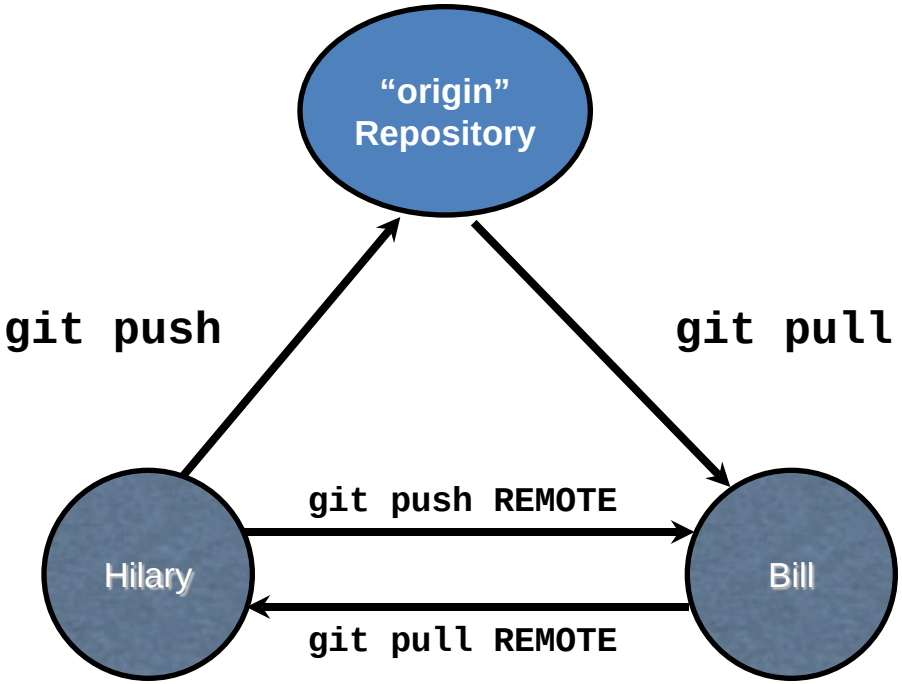
Other distributed VCSs are *Mercurial* and *Bazaar*

The SVN model



There is a single server that all clients talk to.

The Git model



You can push/pull commits to any remote repository, there is no difference between server and client.

Git: Getting started

- Move to a directory containing code you would like to manage with git:

```
$ git init
```

- Now you have your first git repository.

Staging files

```
$ git add [filenames]
```

- adds all the changed files in [filenames] to the staging area
- They are NOT committed yet

What is the “staging area”?

- The staging area is where you put the changes you intend to commit:
  - Stage all your intended changes
  - When ready and happy with them: commit

- *“Isn’t that more work?”* you say...
  - YES: but you can package up each commit exactly as you want it.

Committing

```
$ git commit -m “Fixed typo in line 2”
```

OR, with the “add” process implicit in the commit (i.e. ignore the staging phase):

```
$ git commit -a -m “Fixed typo in line 2”
```

Branching

- To create a new branch:

```
$ git branch [new_branch_name]
```

- Switching to a different branch:

```
$ git checkout [other_branch_name]
```

NOTE: When you are on a branch all other branches disappear! Git overrides the file system structure in this sense – which is very confusing at first!

BUT: branching/merging is very cheap/quick!!!

Merging content from another branch

- Sometimes you want to merge changes from another branch into the current branch:

```
$ git checkout [target branch]
$ git merge [branch to merge in]
```

- Git will attempt the merge automatically. If conflicts are found it will explain them and ask you to resolve them.

Remote repositories

- In order to interact with remote repositories you either “push” or “pull”:

```
$ git push [repository] [repository branch]
$ git pull [repository] [repository branch]
```

NOTE: Pulling content from a remote branch does not imply merging with your current branch. Typically you pull content and then merge as a separate step.

Take a local copy of a remote repository

```
$ git clone
```

It creates a local repository for you, copying and tracking the master branch from the specified location.

```
$ git clone git@github.com:lfittl/browscap.git
        ruby-browscap
```

Remote interactions

- By default you'll only have the "origin" remote repository, which is the repository you did `git clone` from.
- List existing remotes using: `git remote`
- Show details with
  `$ git remote show NAME`
- Add new remotes using
  `$ git remote add NAME URL`

GIT vs SVN

So, which VCS should you use?

- SVN is easier to comprehend
- GIT is more powerful (and better for collaboration)

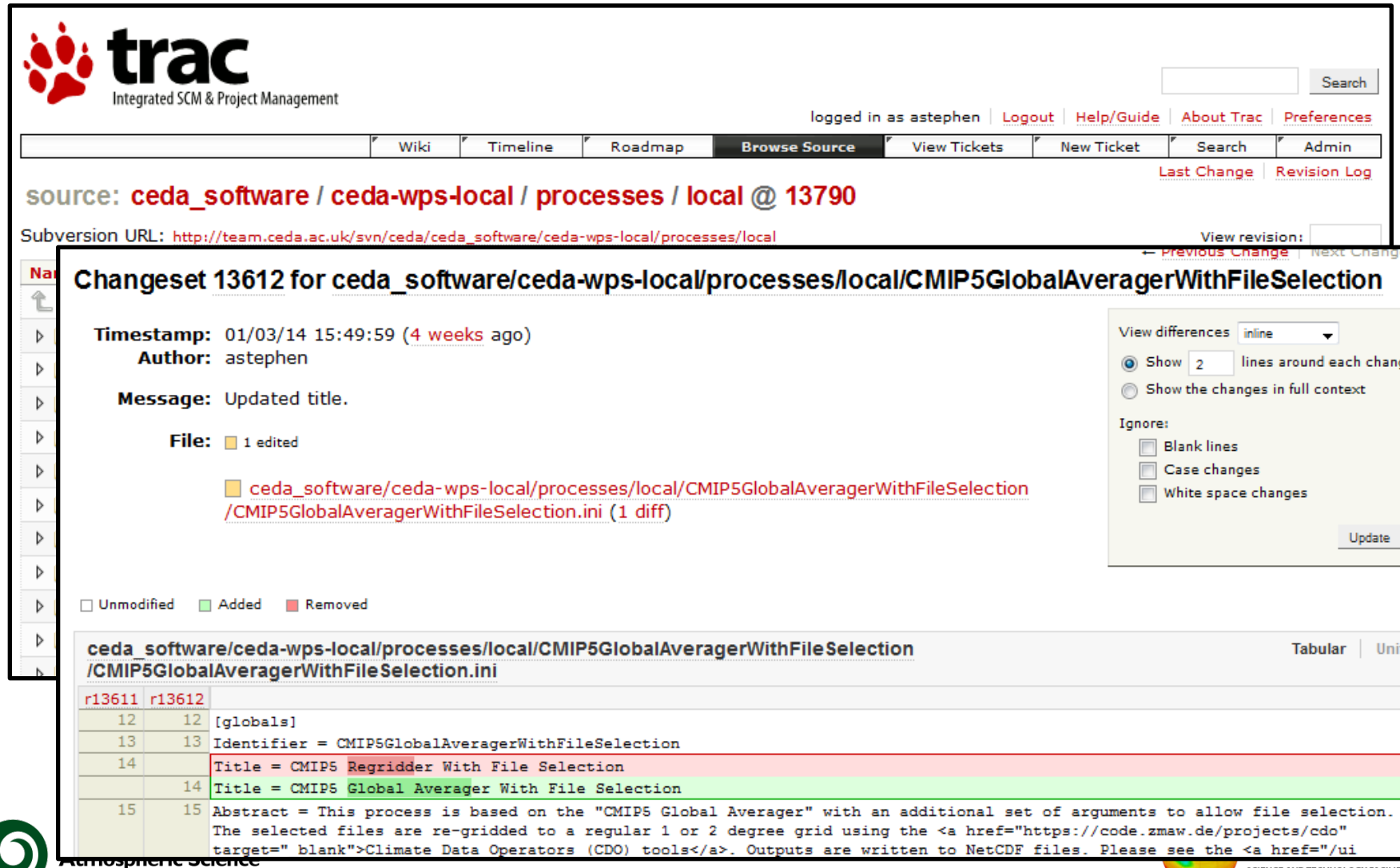
Keep it simple:

- What do your colleagues/collaborators use?
- What do your administrators support?

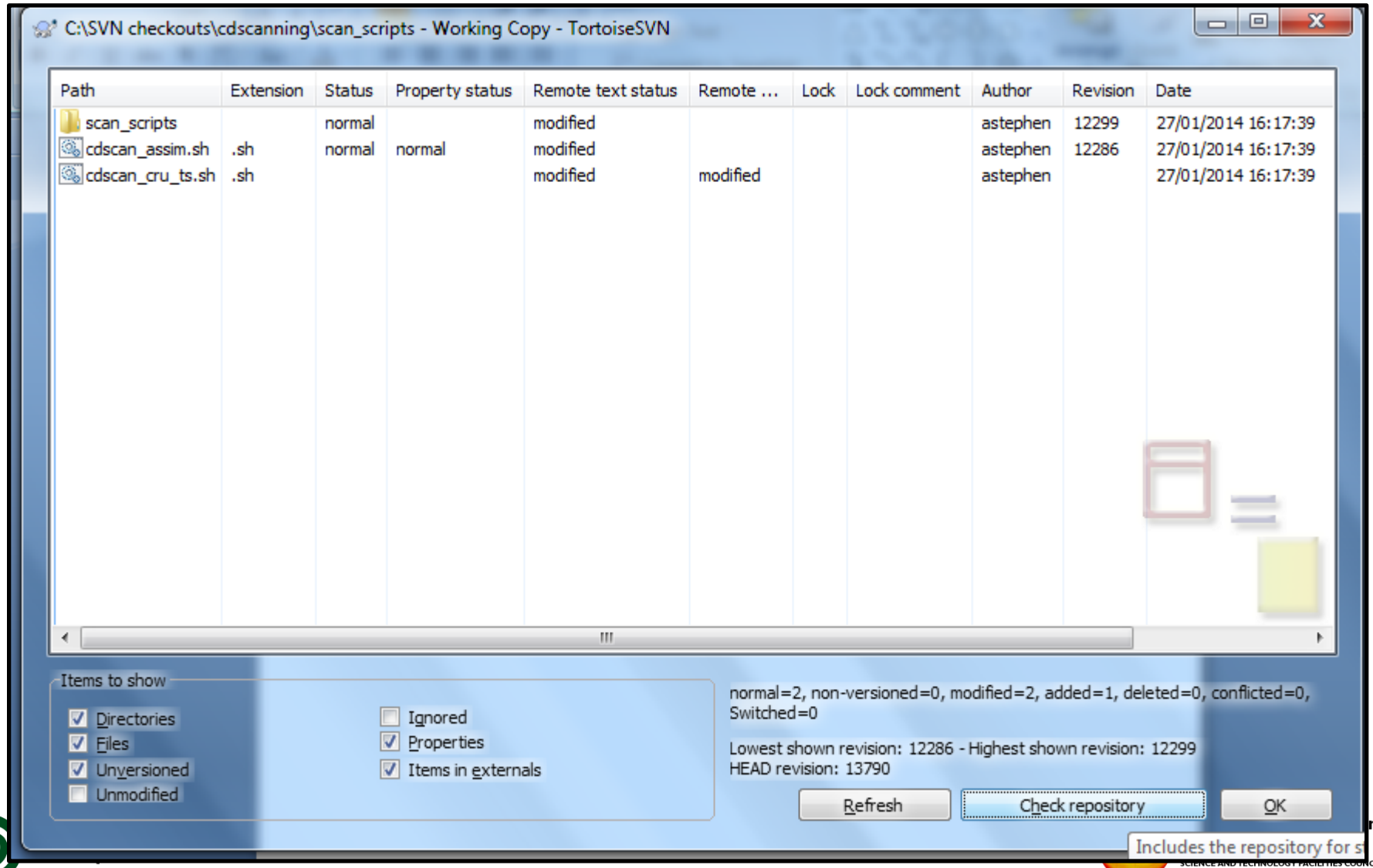
Hence, we use both at CEDA!

Tools to help with SVN & GIT

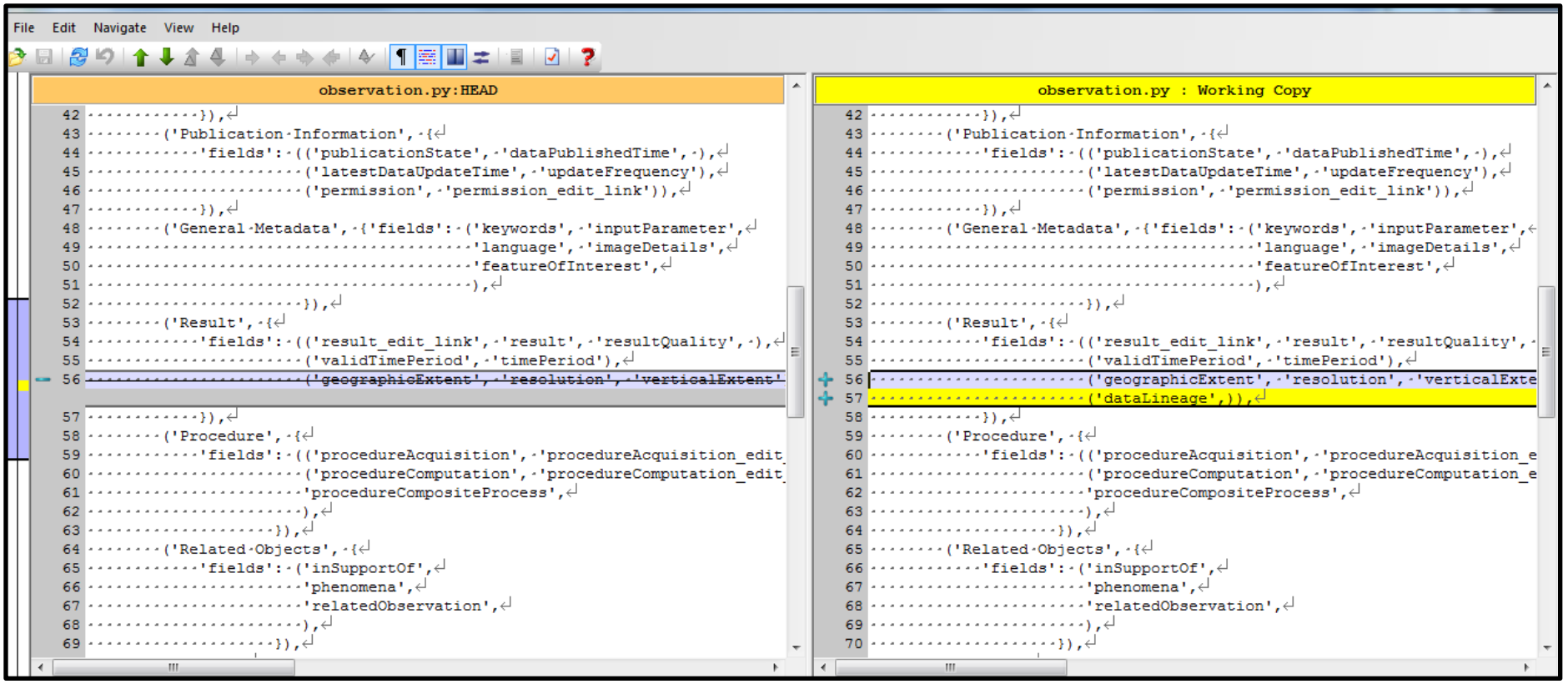
SVN + Trac


trac
Integrated SCM & Project Management
Search
logged in as astephen | Logout | Help/Guide | About Trac | Preferences
Wiki | Timeline | Roadmap | Browse Source | View Tickets | New Ticket | Search | Admin
Last Change | Revision Log
source: ceda_software / ceda-wps-local / processes / local @ 13790
Subversion URL: http://team.ceda.ac.uk/svn/ceda/ceda_software/ceda-wps-local/processes/local
View revision:
← Previous Change | Next Change →
Changeset 13612 for ceda_software/ceda-wps-local/processes/local/CMIP5GlobalAveragerWithFileSelection
Timestamp: 01/03/14 15:49:59 (4 weeks ago)
Author: astephen
Message: Updated title.
File: 1 edited
ceda_software/ceda-wps-local/processes/local/CMIP5GlobalAveragerWithFileSelection/CMIP5GlobalAveragerWithFileSelection.ini (1 diff)
View differences inline
Show 2 lines around each change
Show the changes in full context
Ignore:
Blank lines
Case changes
White space changes
Update
Unmodified Added Removed
ceda_software/ceda-wps-local/processes/local/CMIP5GlobalAveragerWithFileSelection/CMIP5GlobalAveragerWithFileSelection.ini
Tabular | Unified
r13611 r13612
12 12 [globals]
13 13 Identifier = CMIP5GlobalAveragerWithFileSelection
14 Title = CMIP5 Regridder With File Selection
14 Title = CMIP5 Global Averager With File Selection
15 15 Abstract = This process is based on the "CMIP5 Global Averager" with an additional set of arguments to allow file selection.
The selected files are re-gridded to a regular 1 or 2 degree grid using the <a href="https://code.zmaw.de/projects/cdo"
target=" blank">Climate Data Operators (CDO) tools. Outputs are written to NetCDF files. Please see the <a href="/ui

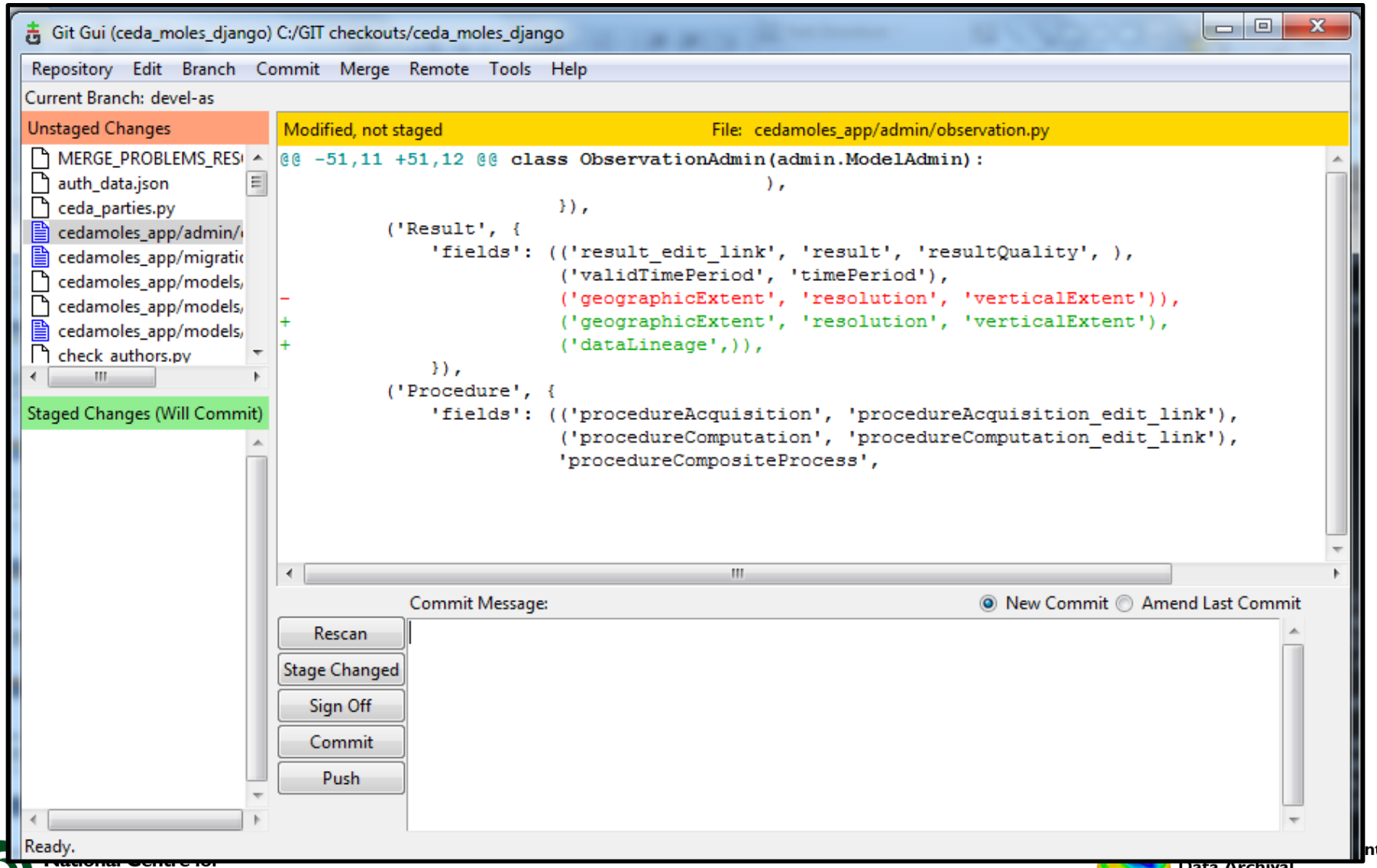
TortoiseSVN (for Windows)



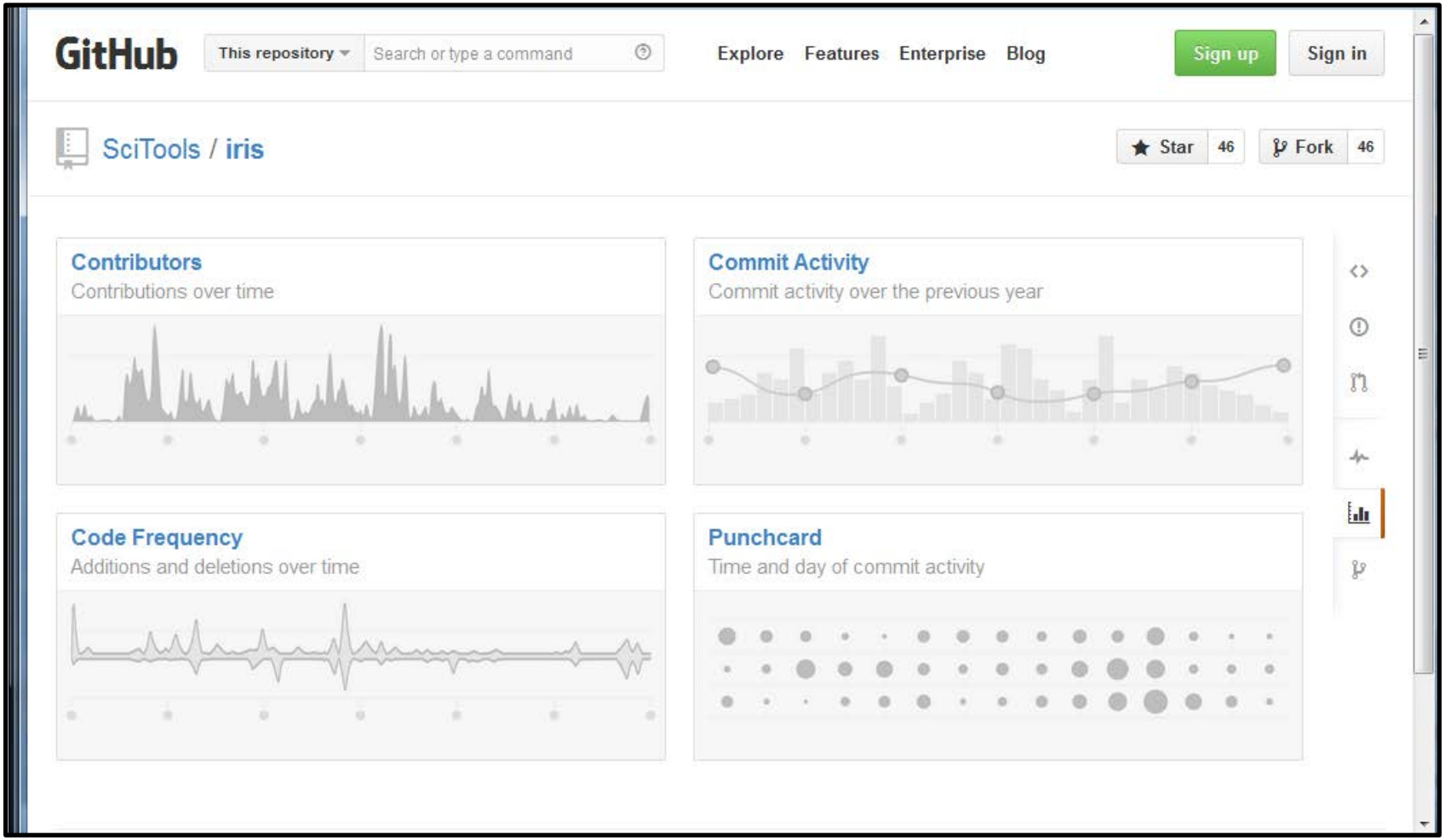
TortoiseGIT (for Windows)



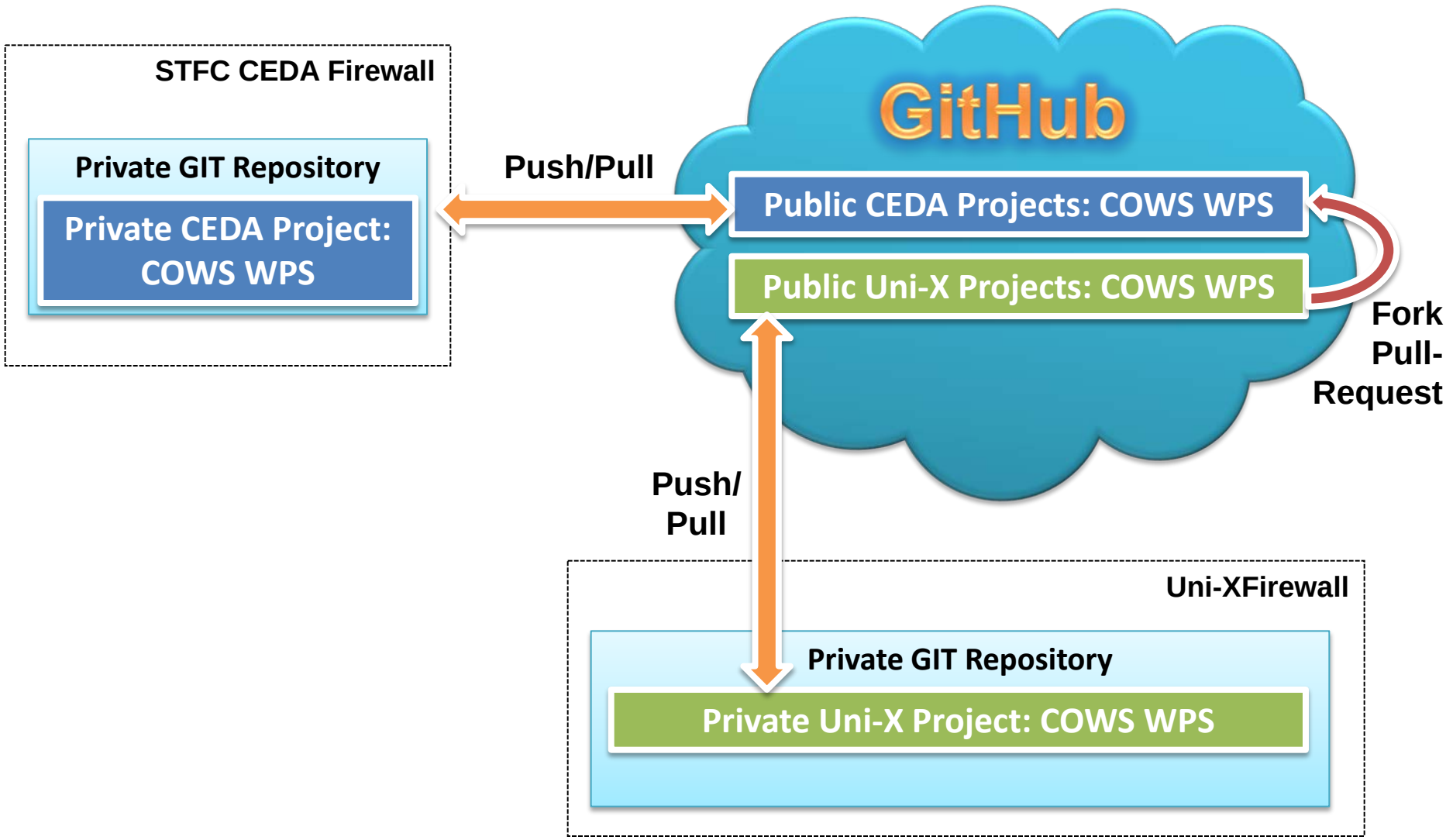
git gui


Git Gui (ceda_moles_django) C:/GIT checkouts/ceda_moles_django
Repository Edit Branch Commit Merge Remote Tools Help
Current Branch: devel-as
Unstaged Changes
MERGE_PROBLEMS_RES
auth_data.json
ceda_parties.py
cedamoles_app/admin/
cedamoles_app/migrati
cedamoles_app/models/
cedamoles_app/models/
cedamoles_app/models/
check_authors.py
Staged Changes (Will Commit)
Modified, not staged
File: cedamoles_app/admin/observation.py
@@ -51,11 +51,12 @@ class ObservationAdmin(admin.ModelAdmin):
),
}),
('Result', {
'fields': (('result_edit_link', 'result', 'resultQuality',),
('validTimePeriod', 'timePeriod'),
- ('geographicExtent', 'resolution', 'verticalExtent')),
+ ('geographicExtent', 'resolution', 'verticalExtent'),
+ ('dataLineage',)),
}),
('Procedure', {
'fields': (('procedureAcquisition', 'procedureAcquisition_edit_link'),
('procedureComputation', 'procedureComputation_edit_link'),
'procedureCompositeProcess',
Commit Message:
New Commit
Amend Last Commit
Rescan
Stage Changed
Sign Off
Commit
Push
Ready.

GitHub


GitHub
This repository
Search or type a command
Explore
Features
Enterprise
Blog
Sign up
Sign in
SciTools / iris
Star 46
Fork 46
Contributors
Contributions over time
Commit Activity
Commit activity over the previous year
Code Frequency
Additions and deletions over time
Punchcard
Time and day of commit activity

GitHub Code-Sharing Example



Please use Version Control

- It will **save you time** – *No more accidentally deleting your workspace, or working on the wrong version of a file.*
- It will **make you a better programmer** – *It encourages good working practices: such as documenting change.*
- It will help you **collaborate more effectively** – *Others can access tagged releases of your code.*
- It will **boost your scientific integrity** – *Helping you document your work; aiding reproducibility.*
- It will **make you feel safe** – *No more waking up at 3 a.m. wondering if you backed up your work!*

Further information (1)

Subversion web site:

http://subversion.apache.org/

Subversion documentation:

http://svnbook.red-bean.com/

Definitive guide to GIT:

http://git-scm.com/

Git documentation:

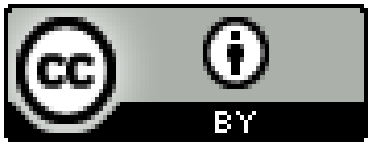
http://git-scm.com/documentation

Further information (2)

- Git Crash Course for people who know SVN:
  http://git.or.cz/course/svn.html
- GitHub: a social source-code sharing site:
  http://github.com/

Acknowledgements

We would like to Acknowledge the following authors for some of the content presented here:



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"Introduction to GIT". Lukas Fittl (http://fittl.com).

"*Git and GitHub*". Darren Oakley.