The Joy of Real-Time Collaboration

Erik Moeller and C. Scott Ananian / Designs by Pau Giner - Wikimania 2014
With thanks to Dario Taraborelli, Ori Livneh, and Erik Zachte
Real-time editing today

Example article: “2014 pro-Russian unrest in Ukraine” on English Wikipedia
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- (cur | prev) 20:29, 9 May 2014 RGlouchester (talk | contribs | block) . . (153,656 bytes) (-629) . . (Reactions: clarify statement) (undo | thank)
- (cur | prev) 20:28, 9 May 2014 EkoGraf (talk | contribs | block) . . (154,285 bytes) (+656) . . (undo | thank)
- (cur | prev) 20:23, 9 May 2014 RGlouchester (talk | contribs | block) . . (153,629 bytes) (-6) . . (fix spacing) (undo | thank)
- (cur | prev) 20:21, 9 May 2014 RGlouchester (talk | contribs | block) . . (153,635 bytes) (-671) . . (Undid revision 607859439 by Aleksandr Grigoryev (talk) Wrong article, once again. Make an edit request at 2 May 2014 Odessa clashes. WP:SOAP also applies.) (undo | thank)
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Excerpt from https://meta.wikimedia.org/wiki/IRC/Channels

<table>
<thead>
<tr>
<th>#wikipedia-*connect</th>
<th>Language</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#wikipedia-ar^connect</td>
<td>Afrikaans</td>
<td>Afrikaans.</td>
</tr>
<tr>
<td>#wikipedia-als^connect</td>
<td>Alemannisch</td>
<td>Alemannic, may be logged if necessary.</td>
</tr>
<tr>
<td>#wikipedia-ar</td>
<td>العربية</td>
<td>Arabic.</td>
</tr>
<tr>
<td>#wikipedia-as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-ay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-balkan^connect</td>
<td>Balkan</td>
<td>Balkan, publicly logged, UTF-8/ASCII encoding.</td>
</tr>
<tr>
<td>#wikipedia-be^connect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-br</td>
<td>বাংলা</td>
<td>This is primarily for Wikipedia, but other Bengali projects are also welcome.</td>
</tr>
<tr>
<td>#wikipedia-be-tarask^connect</td>
<td>Беларуская (тарашкевіца)</td>
<td>Belarusian (Taraškievica).</td>
</tr>
<tr>
<td>#wikipedia-bg</td>
<td>Български</td>
<td>Bulgarian.</td>
</tr>
<tr>
<td>#wikipedia-by^connect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-bs^connect</td>
<td>Bosanski</td>
<td>Bosanski.</td>
</tr>
<tr>
<td>#wikipedia-ca</td>
<td>Català</td>
<td>Catalan.</td>
</tr>
<tr>
<td>#wikipedia-ca-vandalisme^connect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-ch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-ckb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#cs.wikipedia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-cs-rc^connect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-cs-social^connect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#wikipedia-ce^connect</td>
<td>Русский</td>
<td></td>
</tr>
<tr>
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Pop quiz time!
Which kinds of articles are most frequently subject to high velocity editing?

A. Controversial topics
B. Crime
C. Deaths
D. Disasters
E. Entertainment
F. Politics/War
E. Entertainment
Top 50 high velocity articles
(English Wikipedia, ranked by frequency of adjacent edits, May 2014)

Entertainment - 32 articles
  Movies and TV shows: 13 articles
  Sports: 12 articles
  Music: 6 articles
  Video games: 1 article
Politics/War - 11 articles
Disasters - 4 articles
Controversial topics - 1 article
Crime - 1 article
Deaths - 1 article
Edit conflict: Red Randell Series

Someone else has changed this page since you started editing, resulting in an edit conflict.

The edit conflict pageReset the page to your current version, or merge your changes with the version on the lower text area.

You cannot view the source code of the upper text area. To view the code, please use your browser's "View source" feature.

Your version of the page is shown in the upper text area. You can now merge your changes with the version on the lower text area. You may need to view the source code of the lower text area. To do this, please use your browser's "View source" feature.

If you need to make changes to the page, you may want to click the "Cancel" button to return to the previous version of the page.

You may also want to delete the conflict page and start over.

The current version of the page is shown in the upper text area. You can now merge your changes with the version on the lower text area.

Please note that you may not be able to edit the pages from the lower text area. You may need to view the source code of the lower text area. To do this, please use your browser's "View source" feature.

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Edit conflicts
English Wikipedia, July 2014

● >120,000 edit conflicts
● 23,000 registered users encountered a conflict
● Top conflicting articles:
  ○ Malaysia Airlines Flight 17 - 289 conflicts
  ○ Twitch (website) - 207 conflicts
  ○ Operation Protective Edge - 102 conflicts
  ○ Germany national football team - 72 conflicts
  ○ FIFA World Cup records - 71 conflicts
Wikimania real-time collaboration session

Structure

Wikipedia is already a real-time collaboration tool

Possible data to get

Edit conflict instrumentation would be useful to show hot spots
Near-collaborative edits. Histogram? # articles/day getting >X edits?
IRC usage

How we currently collaborate: etherpads, talk pages, irc channels, etc

How can we reduce friction of this process?

But: Maintaining focus

(possible UX exploration) “Find collaborators”

Directory
Advertisement via Flow boards
Metadata about sessions

“We’re collaborating on the military history topic of the day”

Issues to work on

Mentorship (“Teahouse”)

Real-time notifications
Focus / collaboration mode
Edit conflict/merge UI

(possible UX exploration)
Chat: On-the-record vs. off-the-record

Although not a very good one!
N. Agas starts a new article and asks other members of the Astronomy WikiProject to join editing together.
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Jane joins the session to edit “274301 Wikipedia” (asteroid) in real-time mode

Welcome to the astronomy WikiProject! If you enjoy gazing at the night sky, watching the Moon, stars and planets, or reading about the latest astronomical discoveries, then this is the project for you.

Activity

1. 274301 Wikipedia
   - Main belt asteroid
   - Let’s expand this article
   - New edit session
   - Join the session

2. Io (Moon)
   - Galilean moon of Jupiter
   - 5 editors working on it
   - Join the session

3. Curiosity
   - Curiosity (Rover)
   - Car-sized robotic rover exploring Gale Crater on Mars
   - Redirect
   - Discussion

4. Pillars of Creation
   - Astrophotograph
Jane joins the session to edit “274301 Wikipedia” (asteroid) in real-time mode.

274301 Wikipedia

274301 Wikipedia (provisional designations: 2008 QH₉, 2007 FK₁₀, 1997 RO₁) is a main belt asteroid. It was discovered by the Andrukhivka Astronomical Observatory in August 2008. The asteroid was named after the online encyclopedia Wikipedia in January 2013.
Other users add content to the article at the same time. Jane wants to find out who they are..

274301 Wikipedia

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Discovery

The asteroid was discovered by astronomers from the Andrushivka Astronomical Observatory (A50) in Ukraine. It was also observed on the next night and it received provisional designation 2008 QH₂₄ by Carl Jules-Tr.
Jane can view who is participating in the article...

274301 Wikipedia

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Discovery

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...and what are they working on.

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With the live history view, Jane can see changes as they happen, and navigate a timeline of changes.

**Curiosity (rover)**

*Curiosity* is a car-sized robotic rover exploring Gale Crater on Mars as part of NASA's Mars Science Laboratory mission (MSL).

Curiosity was launched from Cape Canaveral on November 26, 2011, at 10:02 EST aboard the MSL spacecraft and successfully landed on Aeolis Palus in Gale Crater on Mars on August 6, 2012, 05:17 UTC.[1][2] The Bradbury Landing site[3] was less than 2.4 km (1.5 mi) from the center of the rover's touchdown target after a 563,000,000 km (350,000,000 mi) journey.[4]

On June 24, 2014, Curiosity completed a Martian year—687 Earth days—after finding that Mars once had environmental conditions favorable for microbial life.[5]

**Goals and objectives**

As established by the Mars Exploration Program, the main scientific goals of the MSL mission are to find martians help determine whether Mars could ever have supported life, as well as determining the role of water, and to study the climate and geology of Mars.[6][14] The mission will also help prepare for human exploration.[15]
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Key challenges

- One version - multiple authors
- One “version”?
- Real-time vandalism
- Co-existence of real-time and non-real-time
  - Focused writing
  - Unsupported browsers
  - Social reasons
- Chat misuse
- Wikitext itself
Key applications

● Current events
● Conflict resolution
● Mentoring
● Targeted collaborations
● ... and some we can’t imagine
WGLNA Season 4

Watch the top North American teams from World of Tanks go head to head as they fight for their share of a $100,000 prize.

Click here to watch and chat!
Real-time Collaborative Editing with TogetherJS

C. Scott Ananian <cananian@wikimedia.org> [[User:cscott]]
Edit conflict! Someone else has changed this page since you started editing it.
Demo.
What the heck is this?

https://www.mediawiki.org/wiki/Extension:TogetherJS

...which is based on TogetherJS from Mozilla labs:

https://togetherjs.com/

You can install TogetherJS on an arbitrary webpage. The TogetherJS *extension* includes additional code to integrate TogetherJS, Visual Editor, and the MediaWiki account system.
How does it work?
How does it work?

magic
Fat client, thin hub

The hub is a very small site-independent node.js server. It does exactly one thing: order messages from the clients and rebroadcast them.
Operational Transformation (OT)

TRANSPOSE(A,B) \Rightarrow (A',B')

Insert “foo”

Apply boldface
Hub is responsible for ordering

Everyone sees the same ordered stream of edits:

\[
A_1 B_1 B_2 C_3 D_4 A_3 A_5 \ldots
\]

Subscript indicates the version of the document which the edit applies to. [*]
Hub is responsible for ordering

Everyone sees the same ordered stream of edits:

A₁₃ B₂₁ C₃₄ D₄₅ X₃₃ A₅ ...  

Subscript indicates the version of the document which the edit applies to. [∗]  

Everyone can see which of these are invalid.  
When one of your edits is invalid, use the transpose algorithm to update it, and resend.
Transactions for WikiText edits

1. Insert a string of characters
2. Delete a string of characters
3. Replace a string of characters with a different one.
Transactions for Wikitext edits

1. Insert a string of characters
2. Delete a string of characters
3. Replace a string of characters with a different one.

*(really only one type)*
Transactions for Visual Editor

Alternating metadata and data:

\[ m_{0,0} \ m_{0,1} \ d_0 \ m_{1,0} \ d_1 \ d_2 \ m_{3,0} \ m_{3,1} \ d_3 \ m_{4,0} \]

HTML matching this sequence of metadata and data:

```html
<!-- comment! -->
<meta ... />
<p><!-- sigh -->ab<!--yes--><!--no--></p>
<!-- eof -->
```
Transactions for Visual Editor

1. Replace elements from the linear model
   ○ Either squashing metadata or deleting it
2. Replace metadata from the linear model
3. Insert (a portion of a) document
4. Set/clear attributes on an element
   ○ For example, list style from ‘bullet’ to ‘number’
5. Set/clear annotations on a range of elements
   ○ For example, “bold” or “italic”
OK, just make it work!

https://www.mediawiki.org/wiki/Extension:TogetherJS

...but at the moment requires a patched copy of Visual Editor.
OK, just make it work!

https://www.mediawiki.org/wiki/Extension:TogetherJS

...but at the moment requires a patched copy of Visual Editor. ...and it’s not actually deployed on Wikipedia.
OK, just make it work!

https://www.mediawiki.org/wiki/Extension:TogetherJS

...but at the moment requires a patched copy of Visual Editor.
...and it’s not actually deployed on Wikipedia.

Alternatively, add:

```javascript
importScript( 'User:cscott/TogetherJS-demo.js' );
```

to [[Special:MyPage/common.js]] on your favorite wiki (and have your friends do the same).
Some open questions (and unimplemented features)

- How do we find other editors?
- Do we need “user groups”?
- How to record/display who wrote what in a collaborative session?
- When is a collaborative edit “done”?
Social impact

Teahouse / new user walkthroughs

Do we need friends lists? “Circles”?  
(Do we become Facebook?)

Making visible the community behind the wiki.  
(Are we a social forum, or a sober & canonical reference?)
Discuss!

C. Scott Ananian
cananian@wikipedia.org
[[User:cscott]]