

Improving the Scalability of Interactive Visualization Systems for Exploring Threaded Conversations

Andrew McNutt, Gordon Kindlmann



1. PROBLEMS

Much of the web is comprised of forum-structured discussion or asynchronous threaded conversations.

Interfaces to these forums can drown out interesting or expert opinions and mask larger trends or themes.

Prior forum exploration tools generally don't scale well to larger conversations and typically aren't available in an online/real-time manner.

2. FEATURES

This work modifies HackerNews through a Chrome extension that reorganizes the comment structure of threads into graphical trees.

Our key contribution is a *Forested Tree View* that facilitates exploration of larger conversations (see below).

We display conversation summaries via LDA topic modeling (cloud hosted), zooming into subtrees, and free text searching.

3. RESULTS

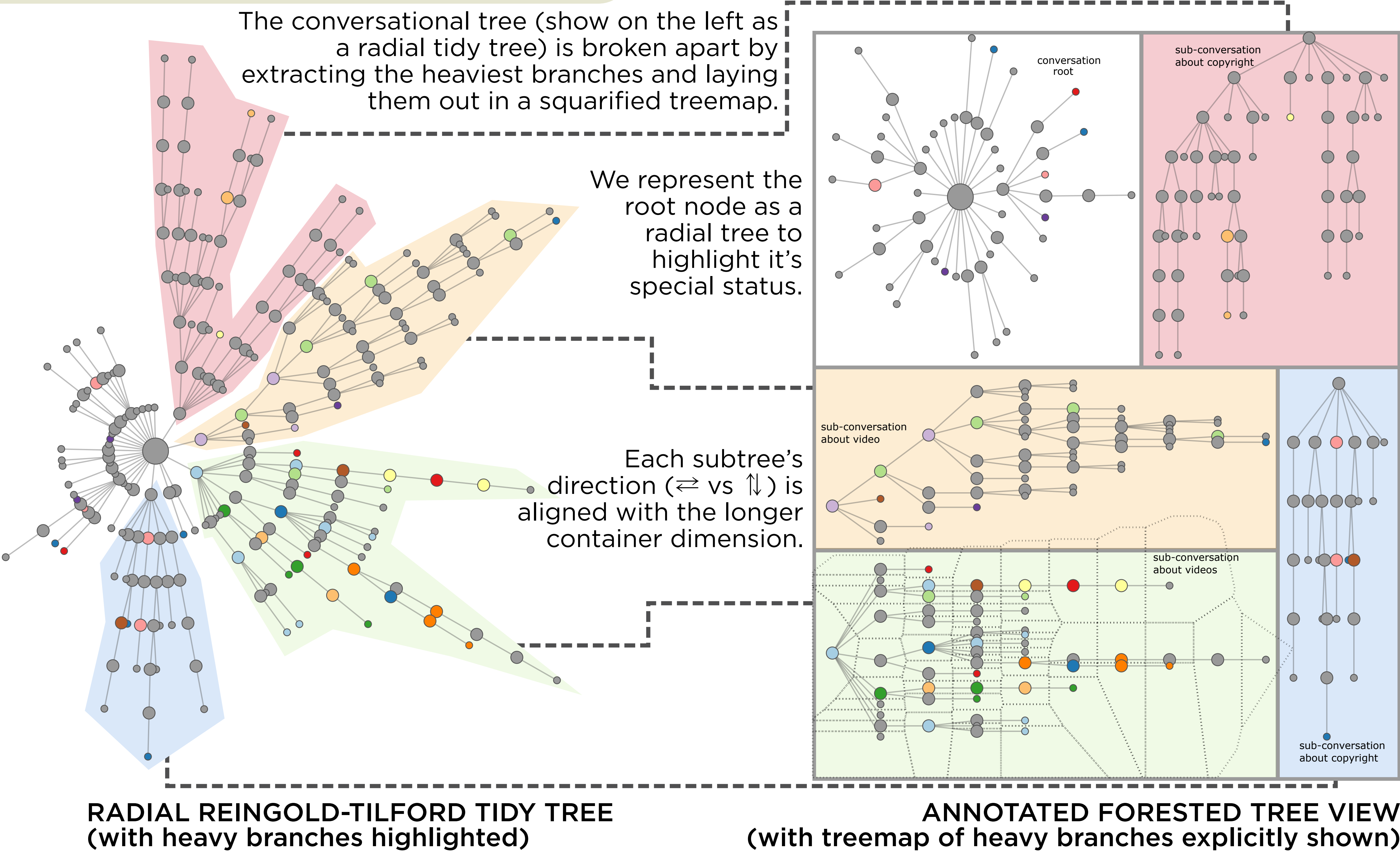
Our approach scales well and stays responsive on even the largest HackerNews threads.

With our online implementation we are in a good place to conduct a field study which would help determine the real-world utility of this class of tool.

The layout techniques from this work could applied to other tree based displays (such as the scholarship graph) or mobile contexts.

FORESTED TREE VIEW

A visual summary of the technique



Our knowledge of the problem domain (reading threads is pseudo-fractal, as each subtree is understandable independently) allows us to make a radical reorganization of the tree into a collection of trees, a forest.

We conduct this reorganization by separating the largest branches and organizing them in a treemap. Treemap-based layouts are easily recalculable and responsive, helping each subtree remain legible.

Interactions are mediated by hovering over a Voronoi diagram (shown in the green cell as dotted lines) which provides an easy interface to a complex structure while allowing ample space to logically place topic models about subtrees.

UI OVERVIEW

A graphical overview of our application

ARTICLE TITLE & TOPIC MODELING

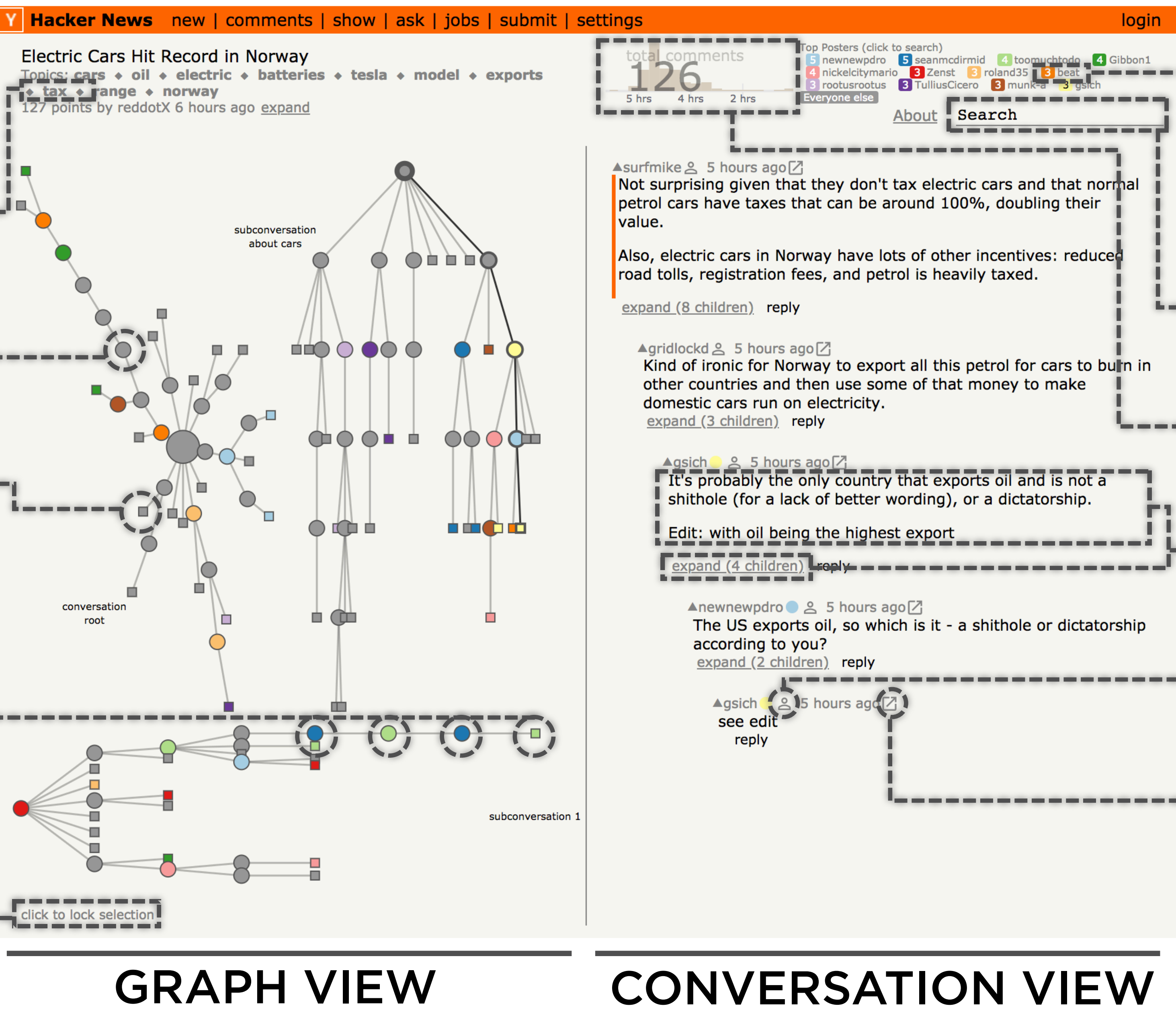
Clicking one of these topic model tags searches for comments containing that term.

Hovering near a node (via Voronoi) selects that comment, all of its ancestors, and all of its immediate children.

Leaves are shown as squares, while internal nodes are circles.

Nodes authored by the most frequent commenters are highlighted with color. This allows for easy identification of back and forth discussion.

Clicking anywhere in the graph view locks or unlocks the current selection (i.e. it disables hover interactions in the graph view)



METADATA SUMMARY & SEARCH CONTROLS

Clicking on this legend of the most frequent commenters searches for comments by that user within this thread.

Here the user can enter text to search for users or text within comments. Mousing over this scented-wiget histogram filters comments to a particular time window.

Clicking expand or on a comment adds that comment's children to the current selection.

This icon searches for comments from users in the current thread.

Clicking this icon zooms into that comments associated subtree.