

Visual Completion measurement on Web

Performance Summit III

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FACEBOOK

Web Performance

- SPA (Single Page Application)
- Progressive Rendering
- Server-Side Rendering / Client-Side Rendering

- ***Universal Metrics***

- *Simple*
- *High-level Browser APIs*
- *Full page load specific*
- *Less Insightful*

- ***Custom Metrics***

- *Complicated*
- *Low-level Browser APIs*
- *More Accurate*
- *More Insightful*

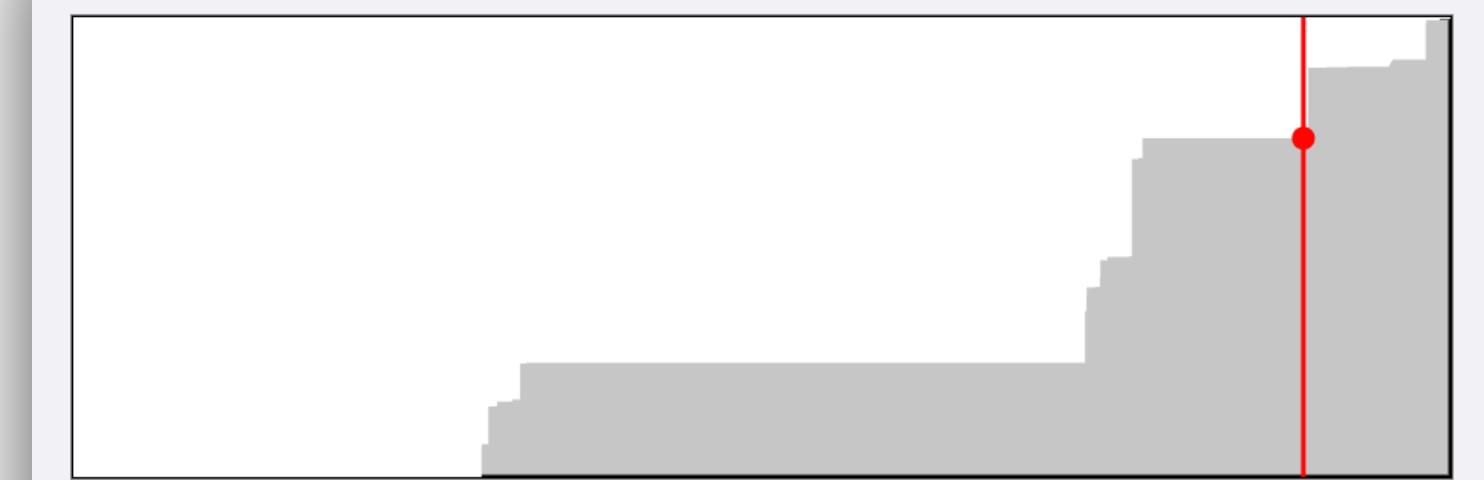
Visual Completion

"User perceived latency of web page loading"

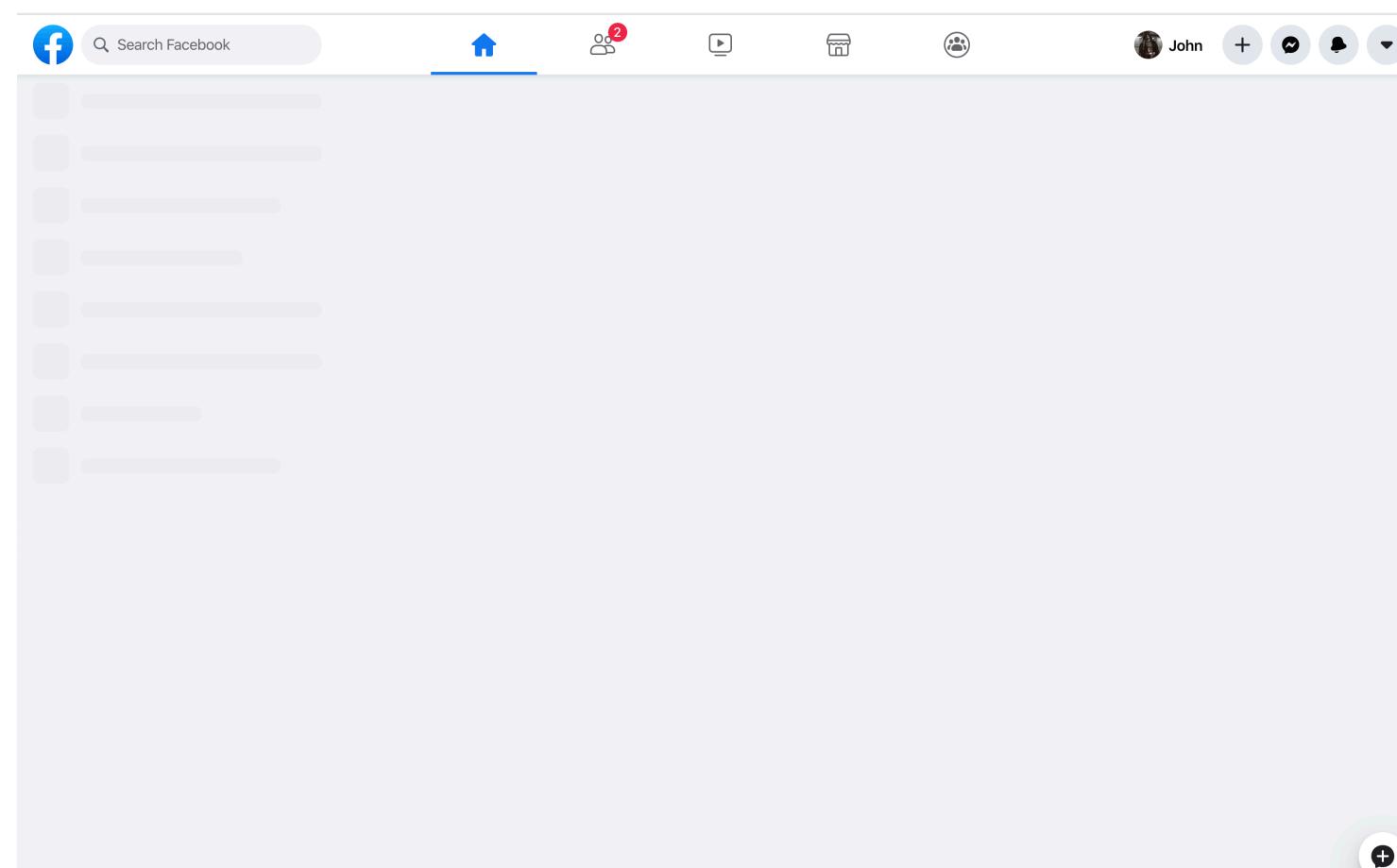
- User-centric metrics
- RUM (Real User Monitoring)
- Navigations and Interactions
- Speed and Responsiveness

Visual Completion

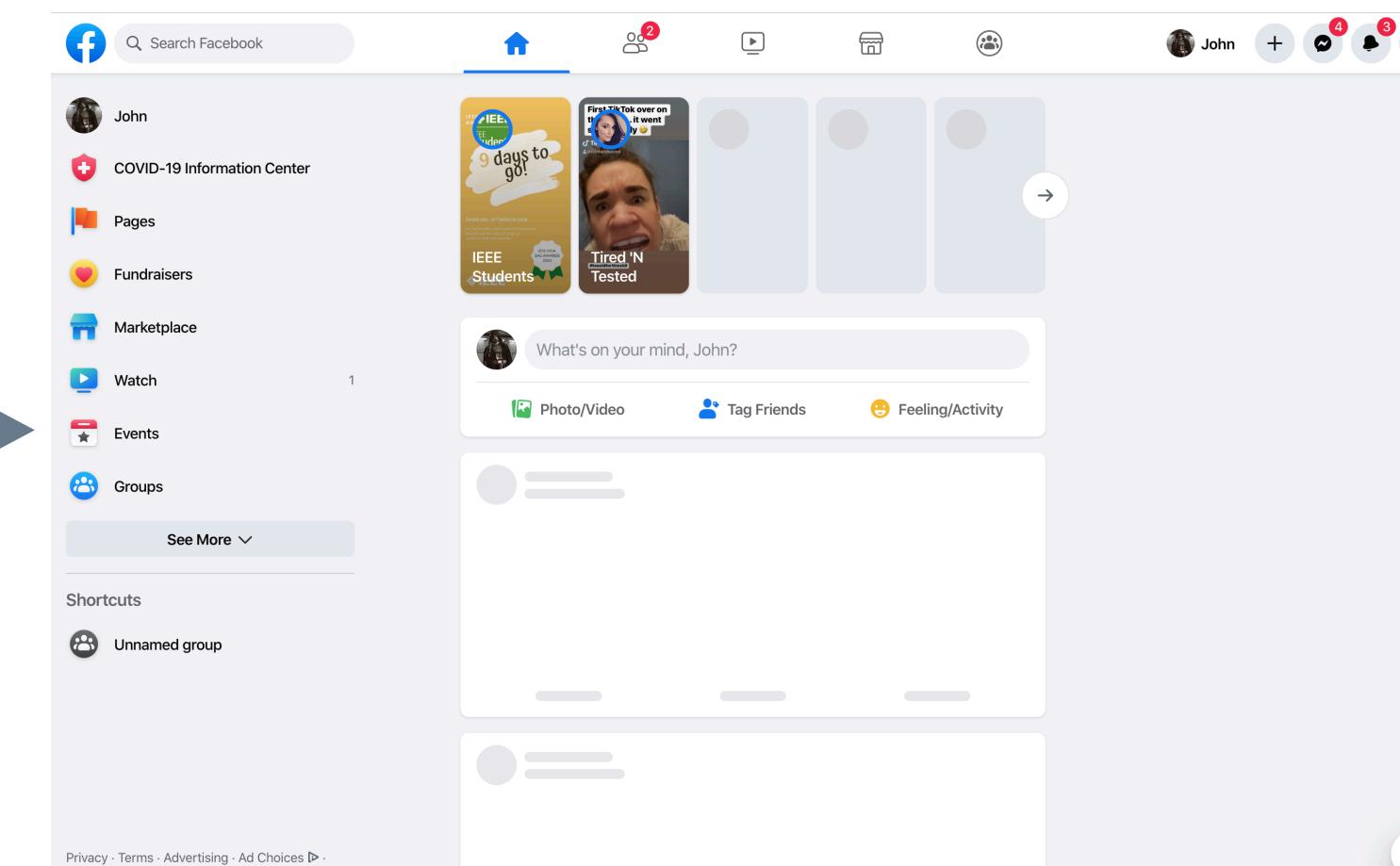
Visual Progress



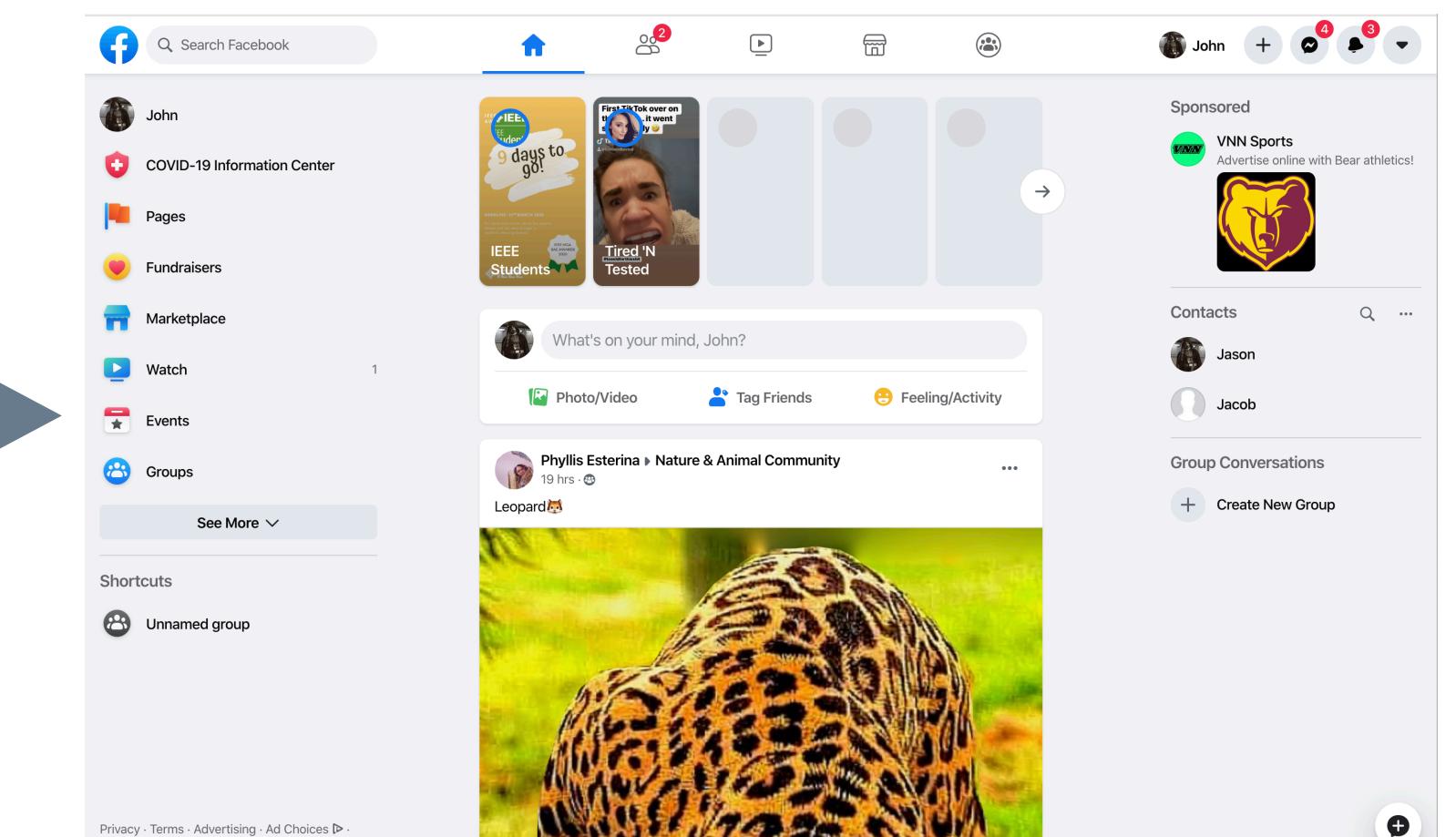
Visual Progress: 73.7% (724,837px)
Timeline :1.77s



First Paint

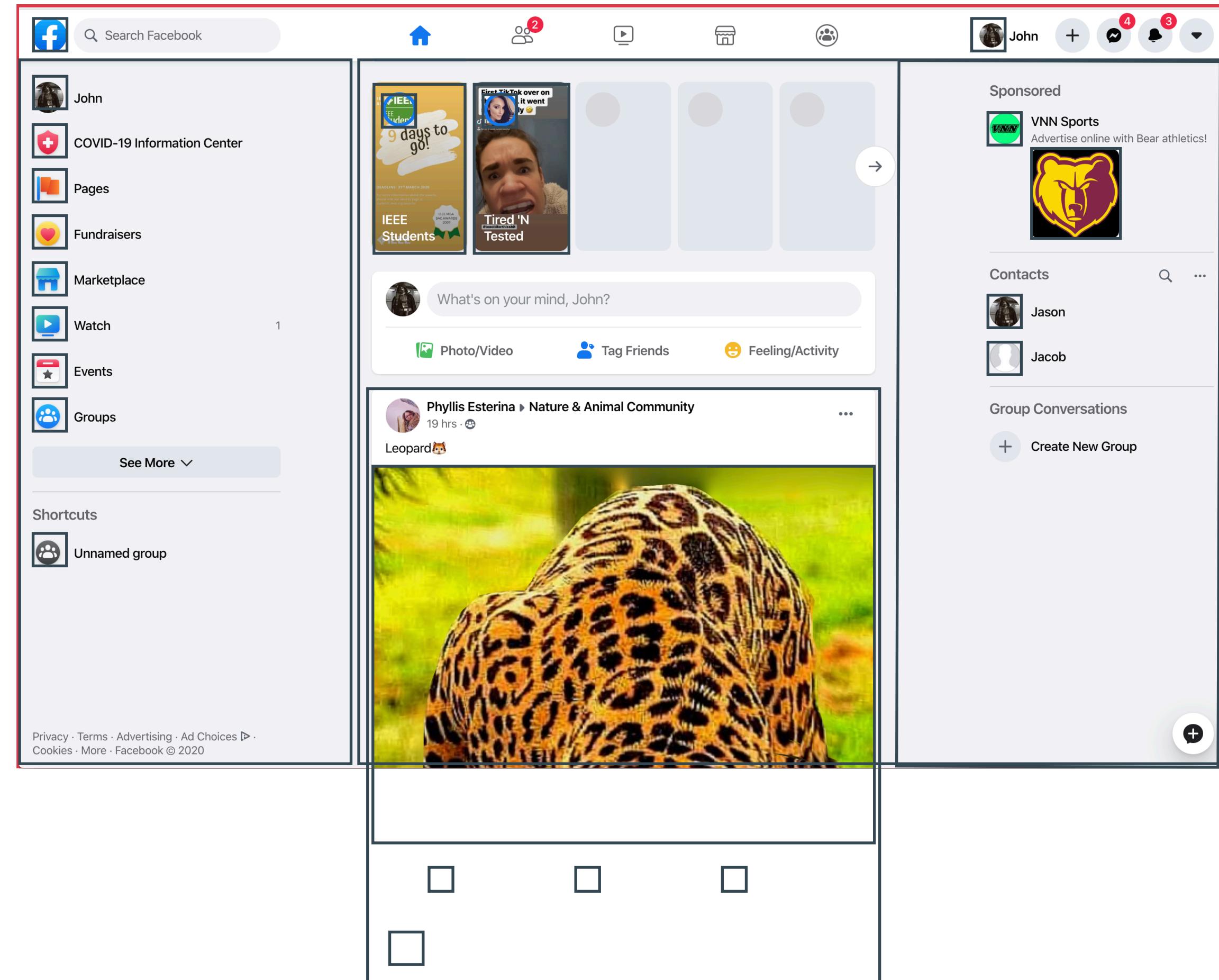


Progressive Paint



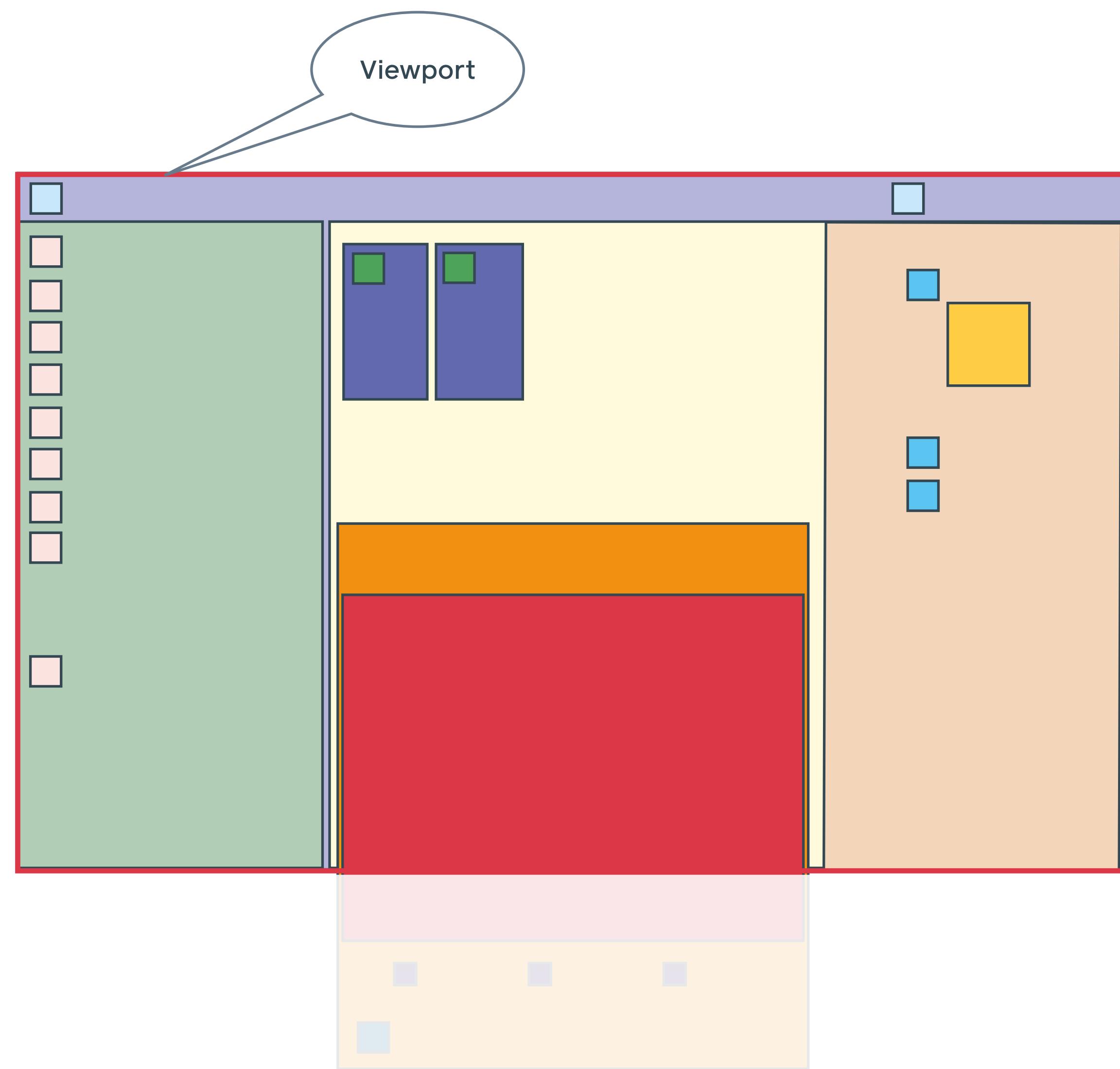
Visually Complete

Simplified Visual Element Observation

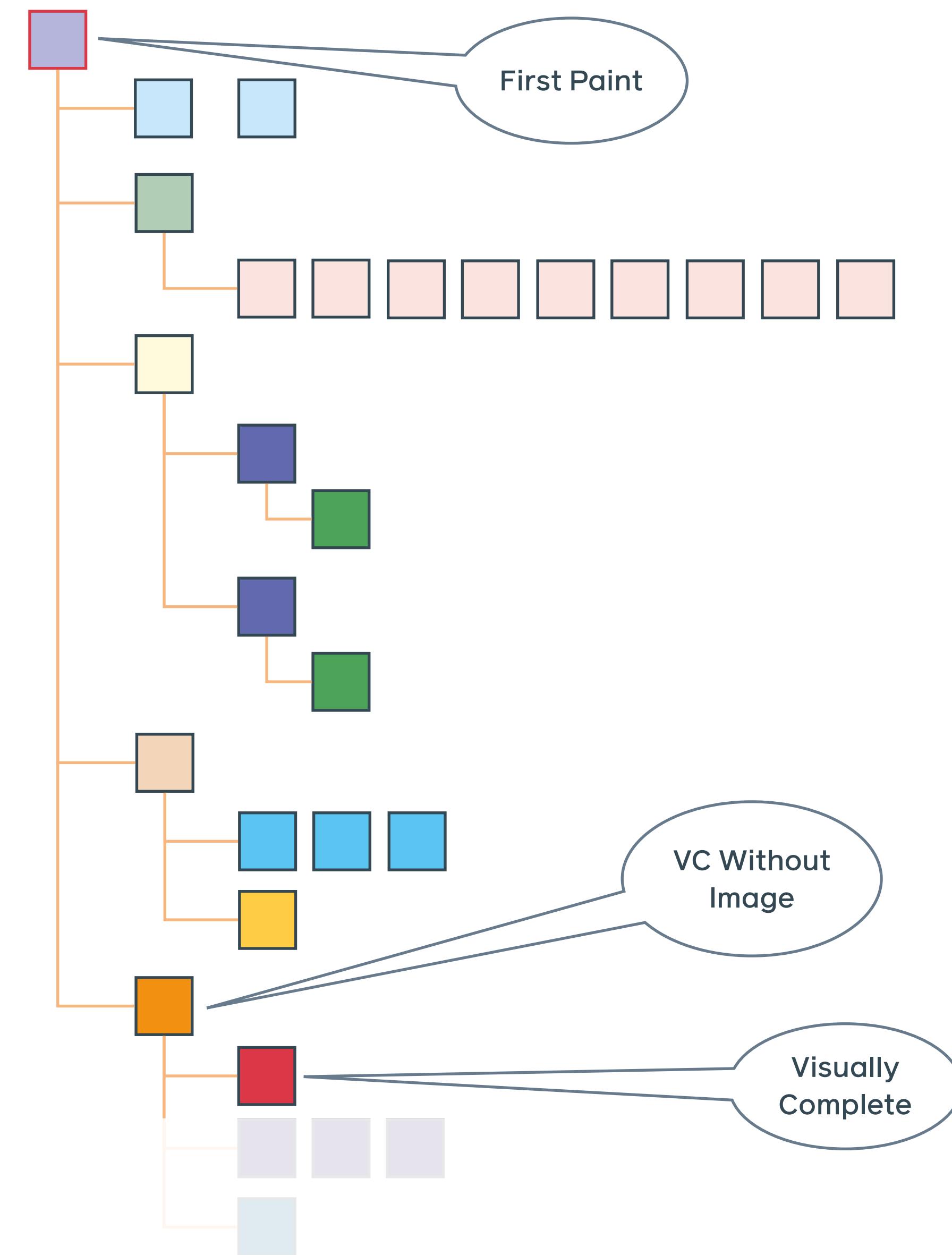


- **Styled Container Element**
- **Text Element**
- **Image Element**
- **CSS Background Image**
- **AddedNode Mutation**
- **Hidden → Visible**
- **Image Src Change**

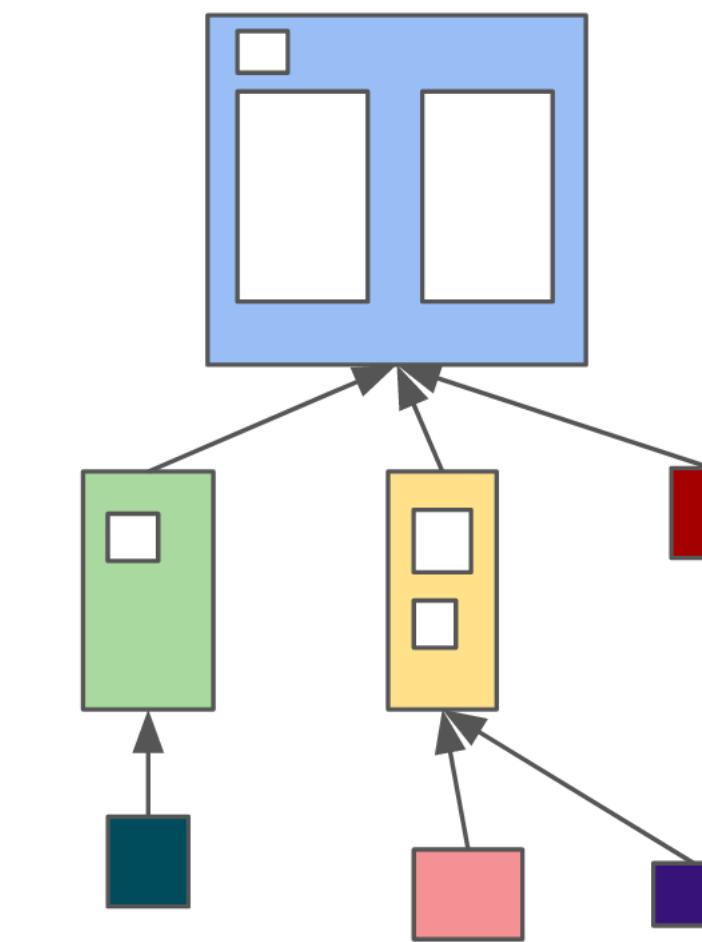
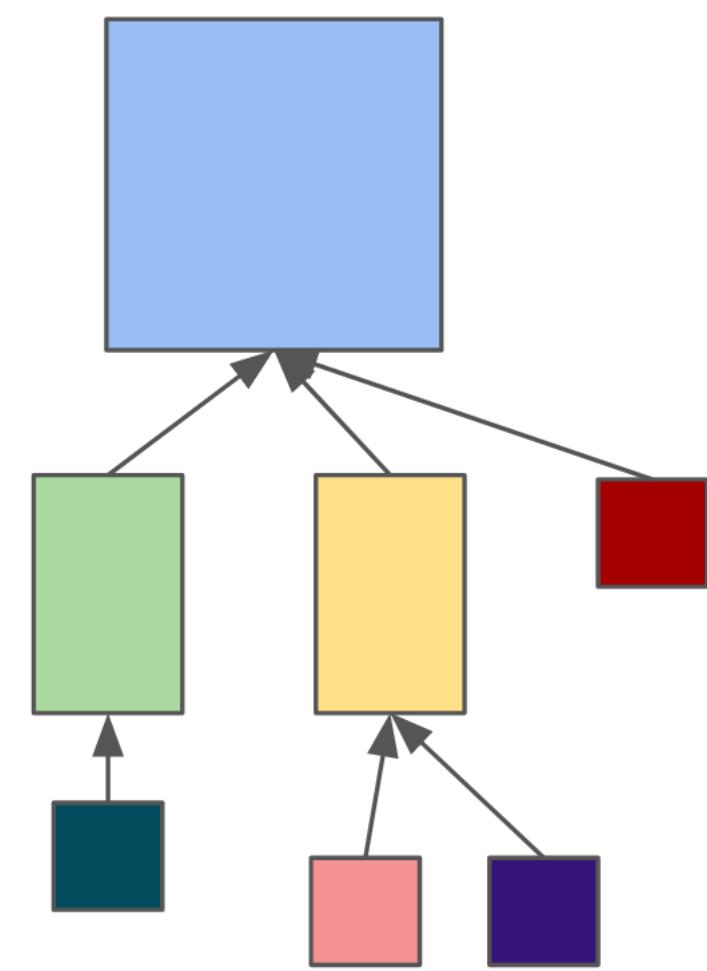
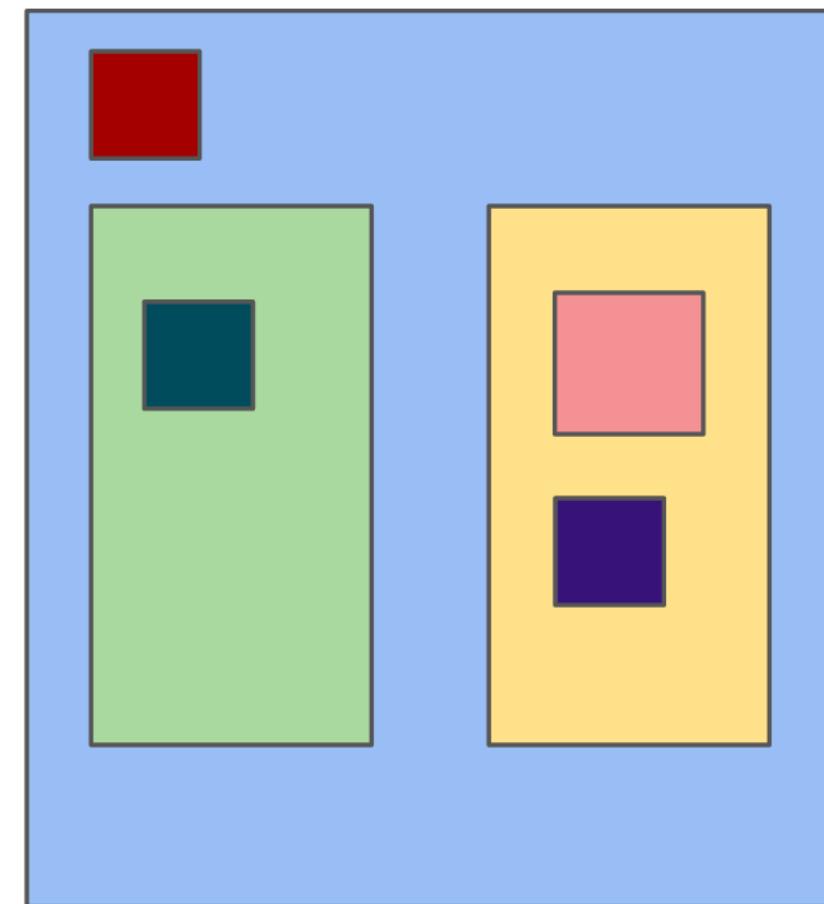
Visual Completion



DOM Mutation Tree



Painted Pixel Calculation



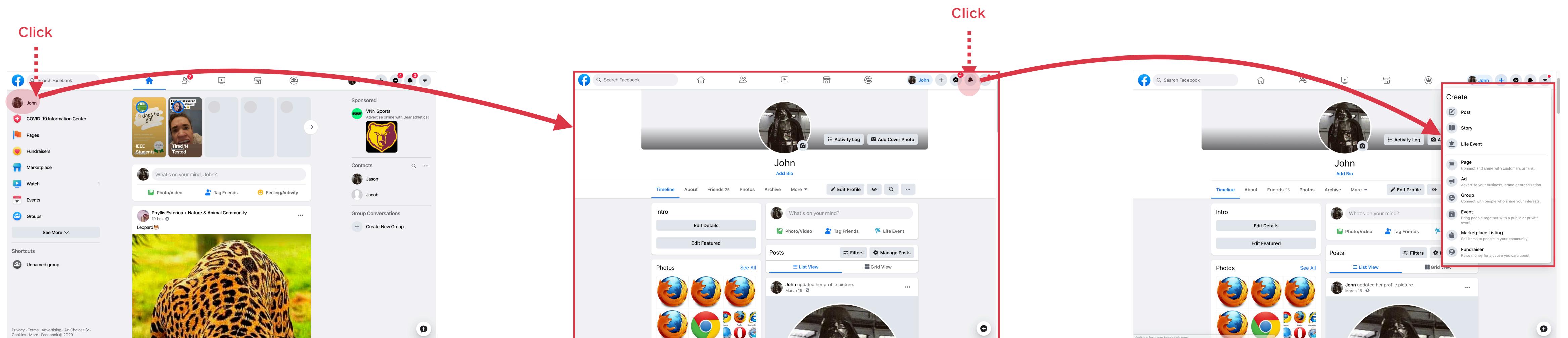
Observe

Build Tree Structure

Calculate Painted Pixels

Visual Completion

Navigation and Interaction



Initial Load

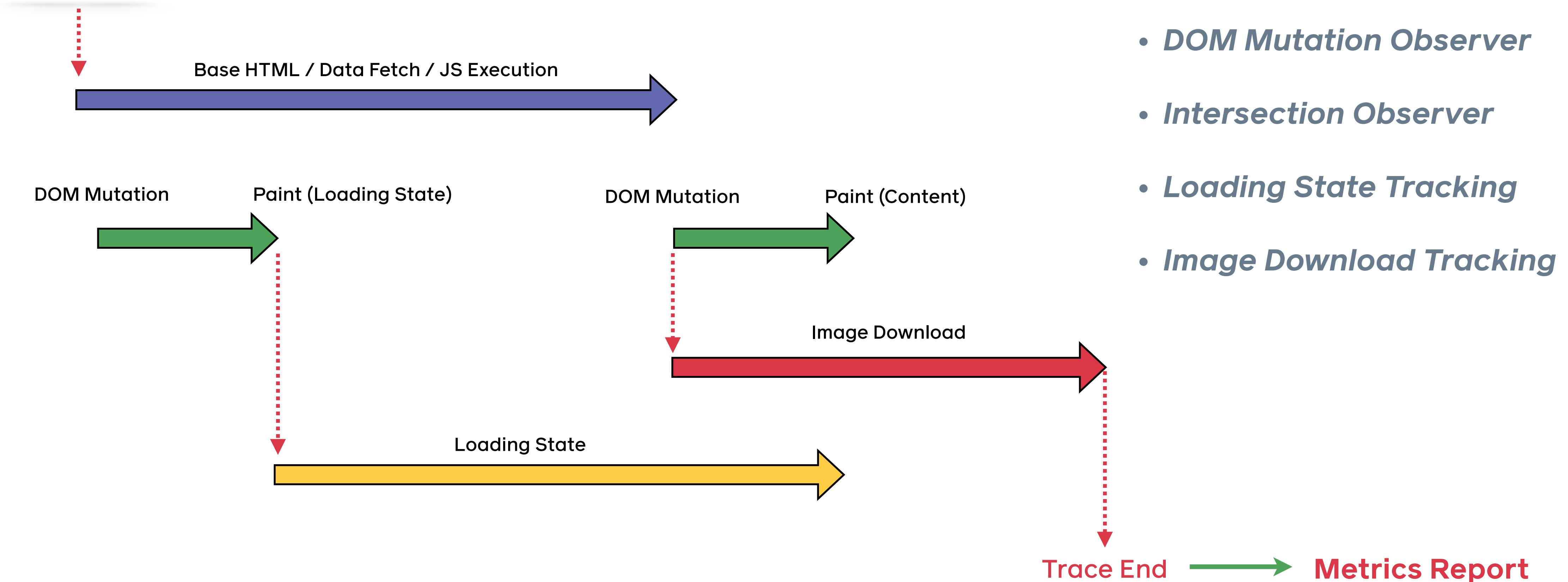
In-App Navigation
(Page Transition)

User Interaction
(Dialog / Dropdown / Popup)

Visual Completion

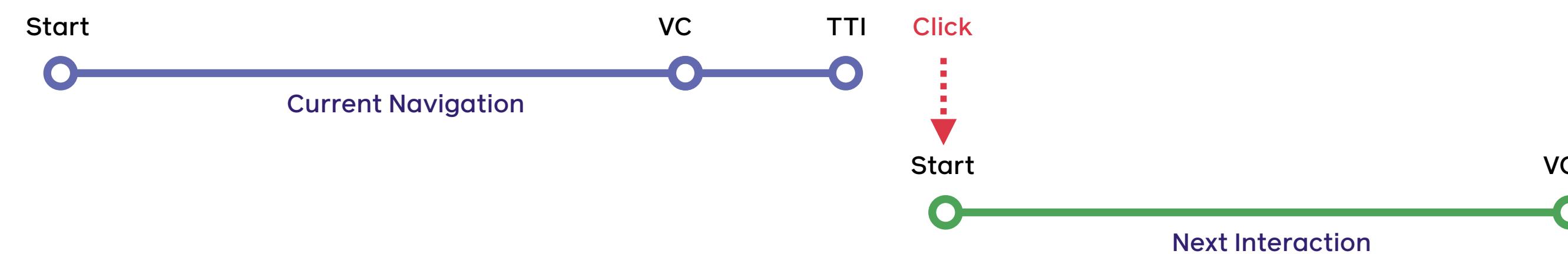
Visual Change Tracing

Trace Start

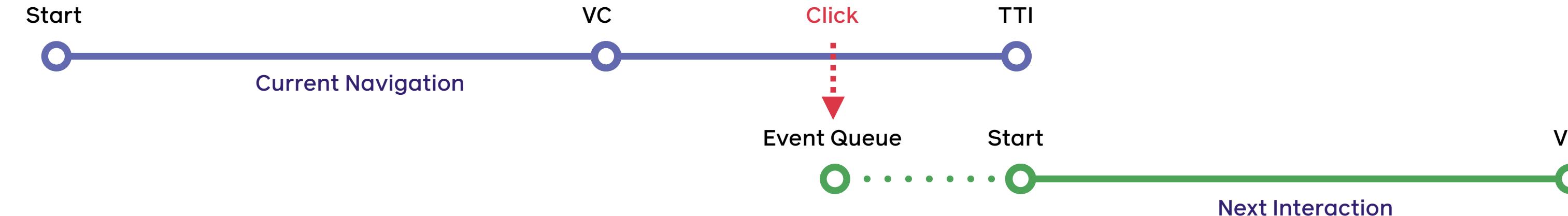


Clean Measure

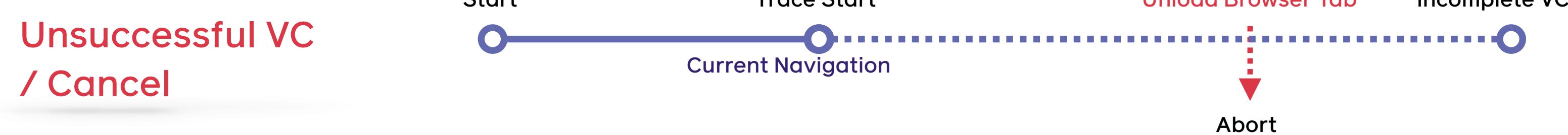
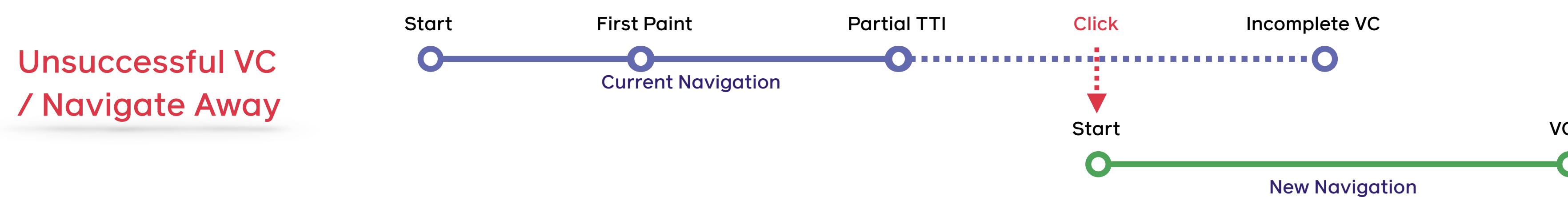
Successful VC



Successful VC
/ Delayed Interaction

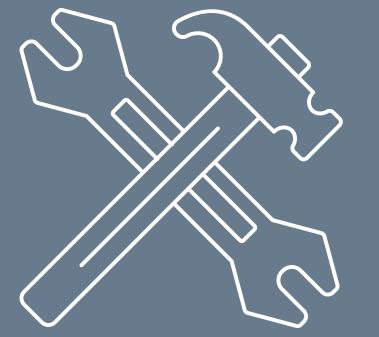


Contaminated Measure



Performance Goals

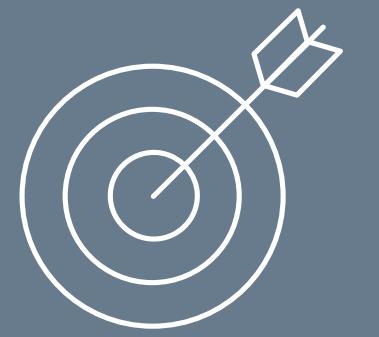
- Faster Visually Complete
- Lower Speed Index
- Higher % of Successful Visual Completion
- Minimize Interaction Delay



Tooling



Measure



Goal

The New Facebook.com

The screenshot shows the new Facebook homepage. At the top, there's a search bar with "Search Facebook" and a magnifying glass icon. Below it is a navigation bar with icons for Home, Watch, Events, Friends, and Memories. On the left, a sidebar shows "Josephine Williams" and links for Watch, Events, Friends, and Memories, along with a "See More" button. The main content area displays a news feed with several posts: "Add to Story" by Josephine Williams, profiles of Tom Russo, Betty Chen, Dennis Han, and Cynthia Lopez, a post from Fiona Ozeri about a fireworks show, and a sponsored post for Lebo's Pizza. To the right, there are sections for "Birthdays" (Jessica, Erica, and 2 others have birthdays today) and "Contacts" (Dennis Han, Eric Jones, Cynthia Lopez, Betty Chen, Tina Lim, Molly Carter). A large image of fireworks serves as a background for the feed.



Investigate



Data Analysis



Alerting

FACEBOOK

Appendix : Sub-Metrics Schema

Latency Metrics	
Visually Complete	Time to last visual change
Visually Complete Without Image	Time to last visual change except image element
Event Queue Time	Pending user event until actual handler started
First Paint	Time to first visual change
Speed Index	Score of average visual progress
Time-to-Interactive	Event handler readiness

Tagging	
Event Type	Initial full page load / In-app navigation / Interaction
Background	Whether browser tab was put to background
Scroll Position	Document scroll position when visually complete is marked
Viewport Size	Width and height of browser viewport
Result Type	Success / Cancel / Error
Contamination	new interaction was started before Visual Completion

Thank You

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