

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*

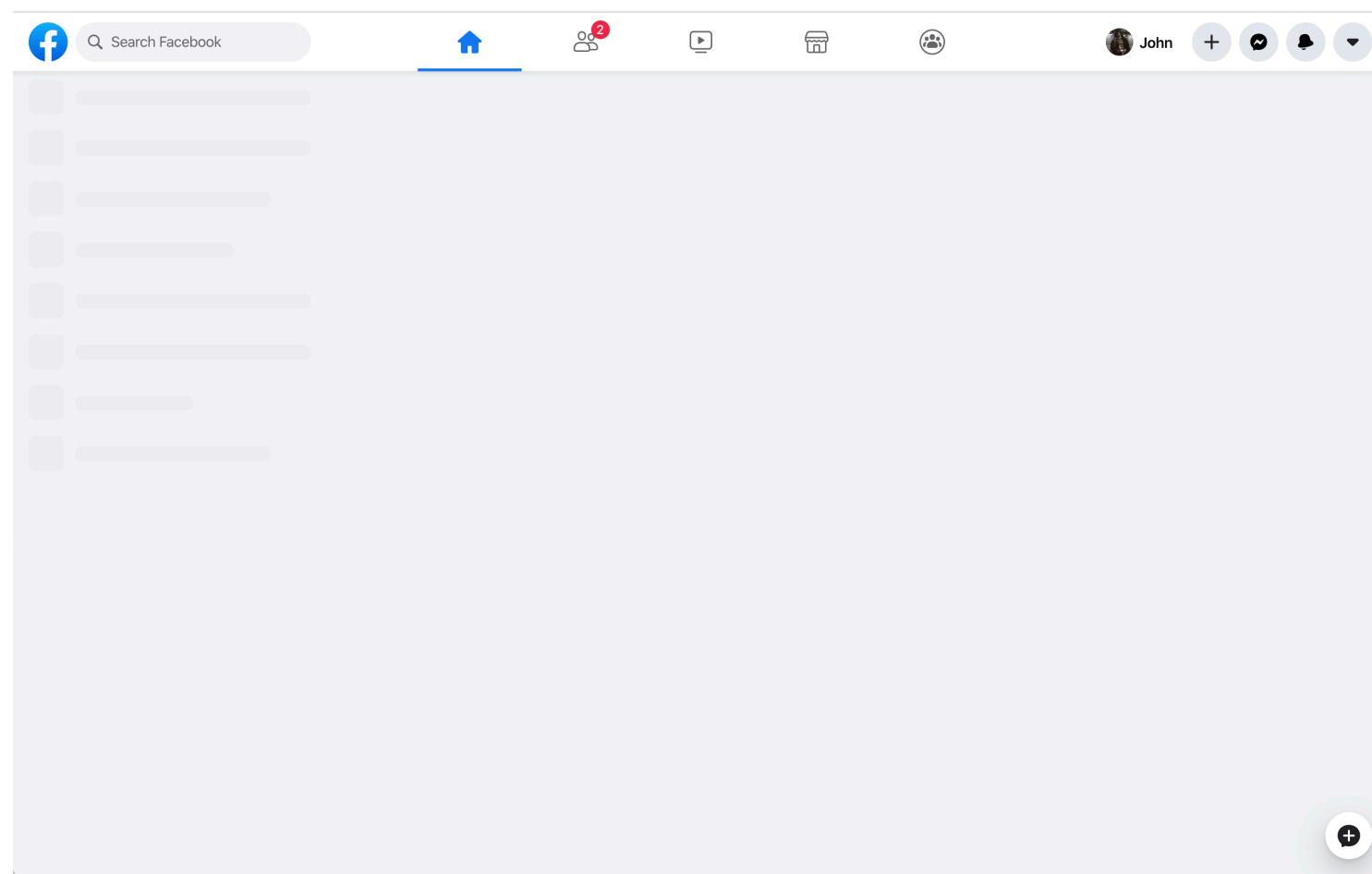
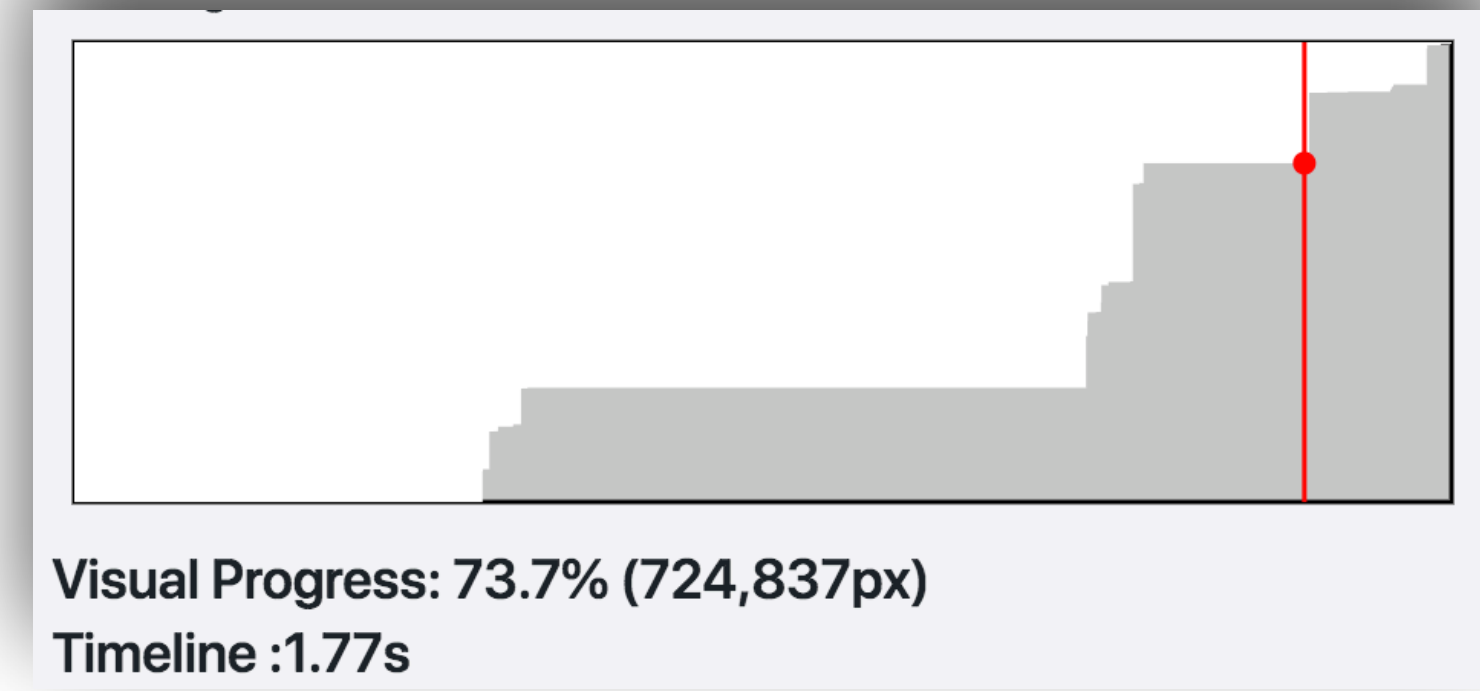
Visual Completion

"User perceived latency of web page loading"

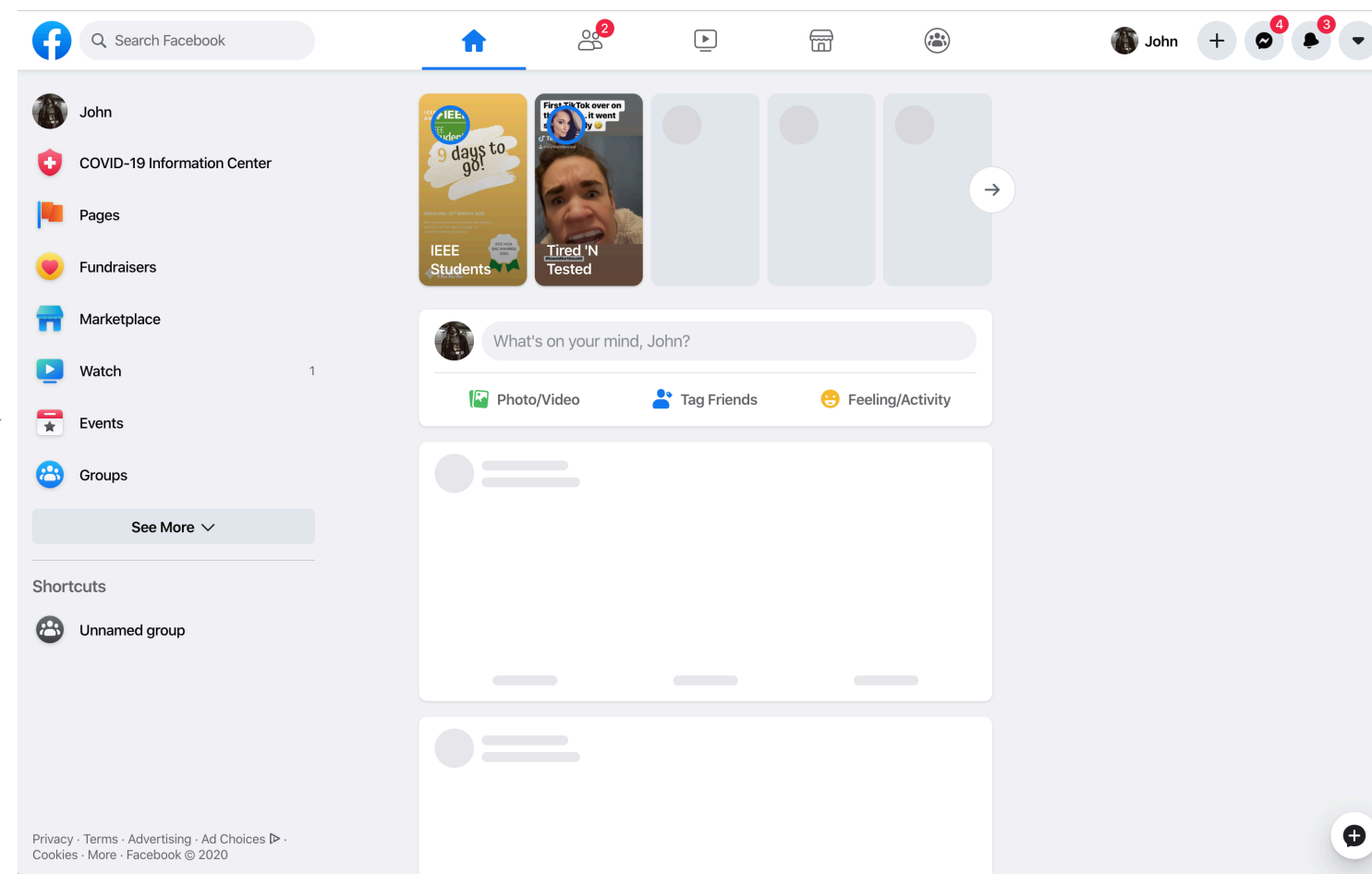
- User-centric metrics
- RUM (Real User Monitoring)
- Navigations and Interactions
- Speed and Responsiveness

Visual Completion

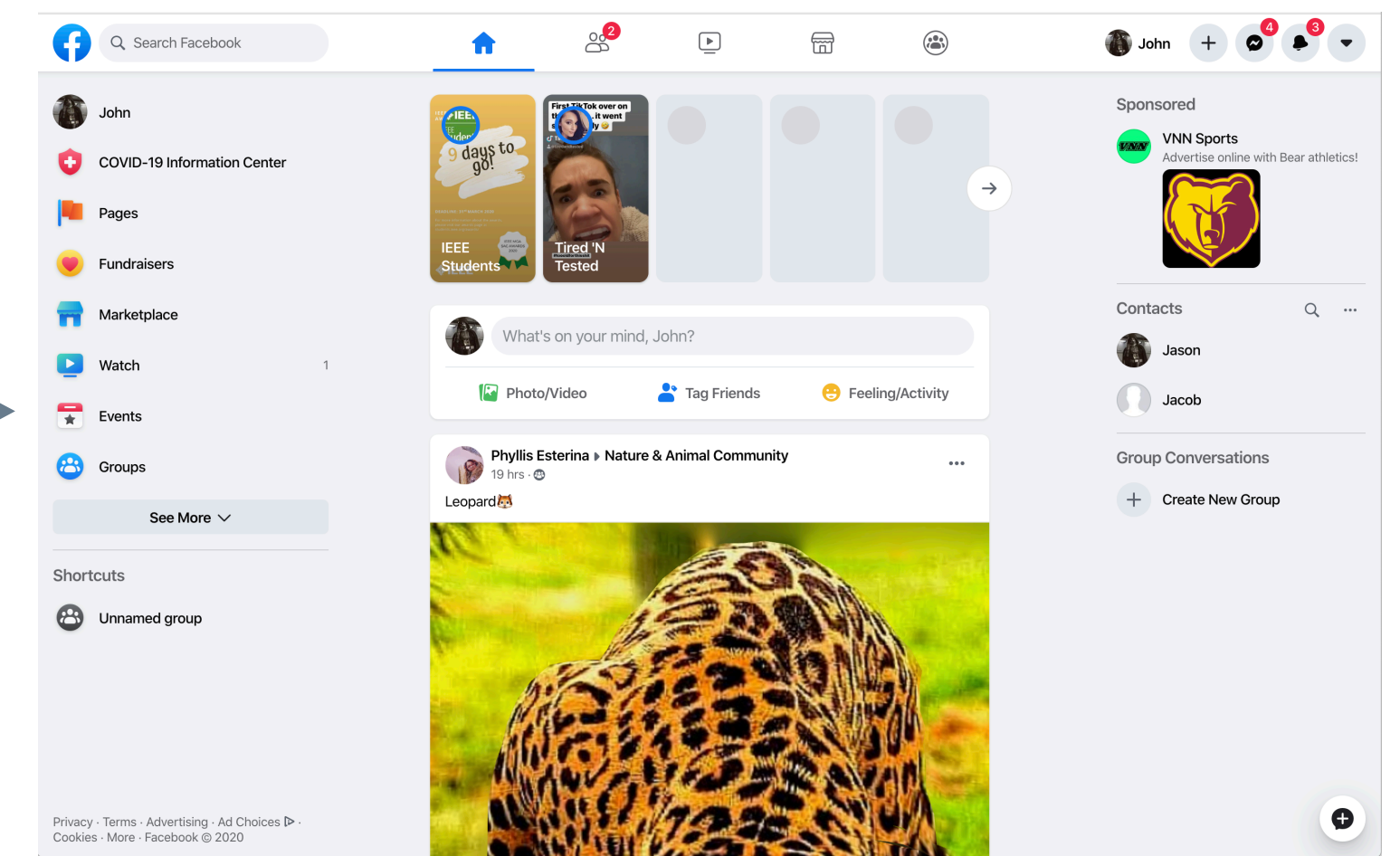
Visual Progress



First Paint

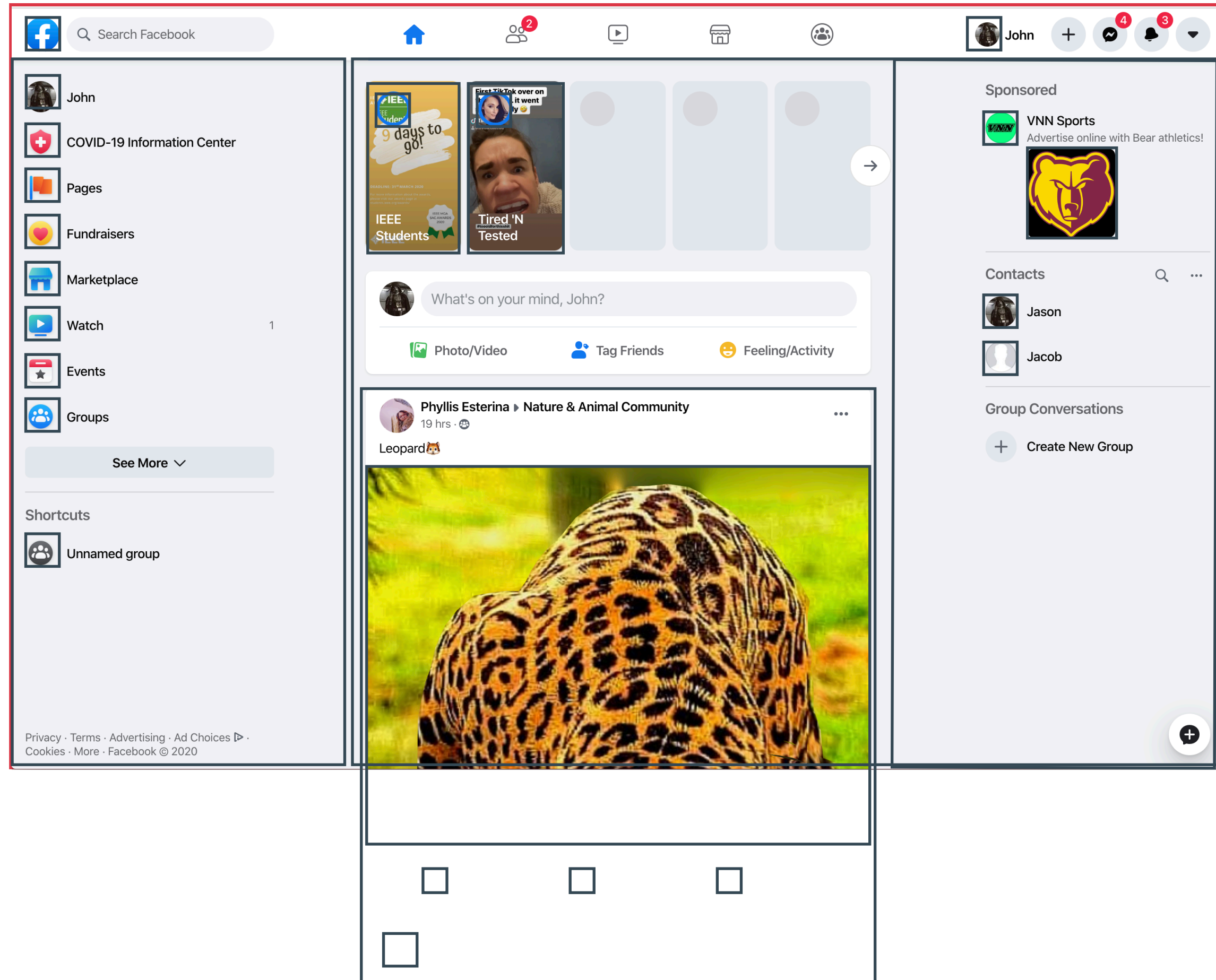


Progressive Paint



Visually Complete

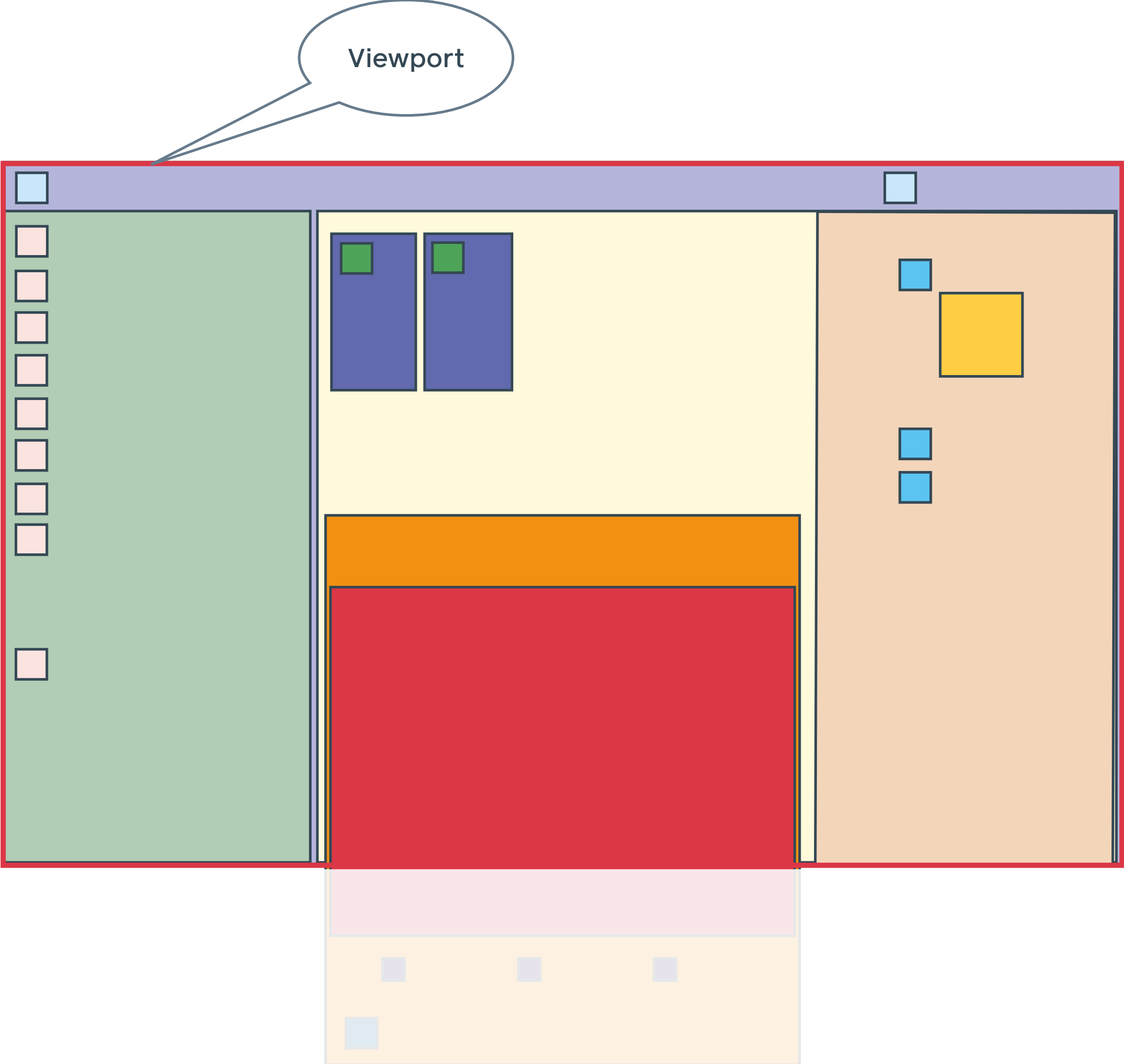
Simplified Visual Element Observation



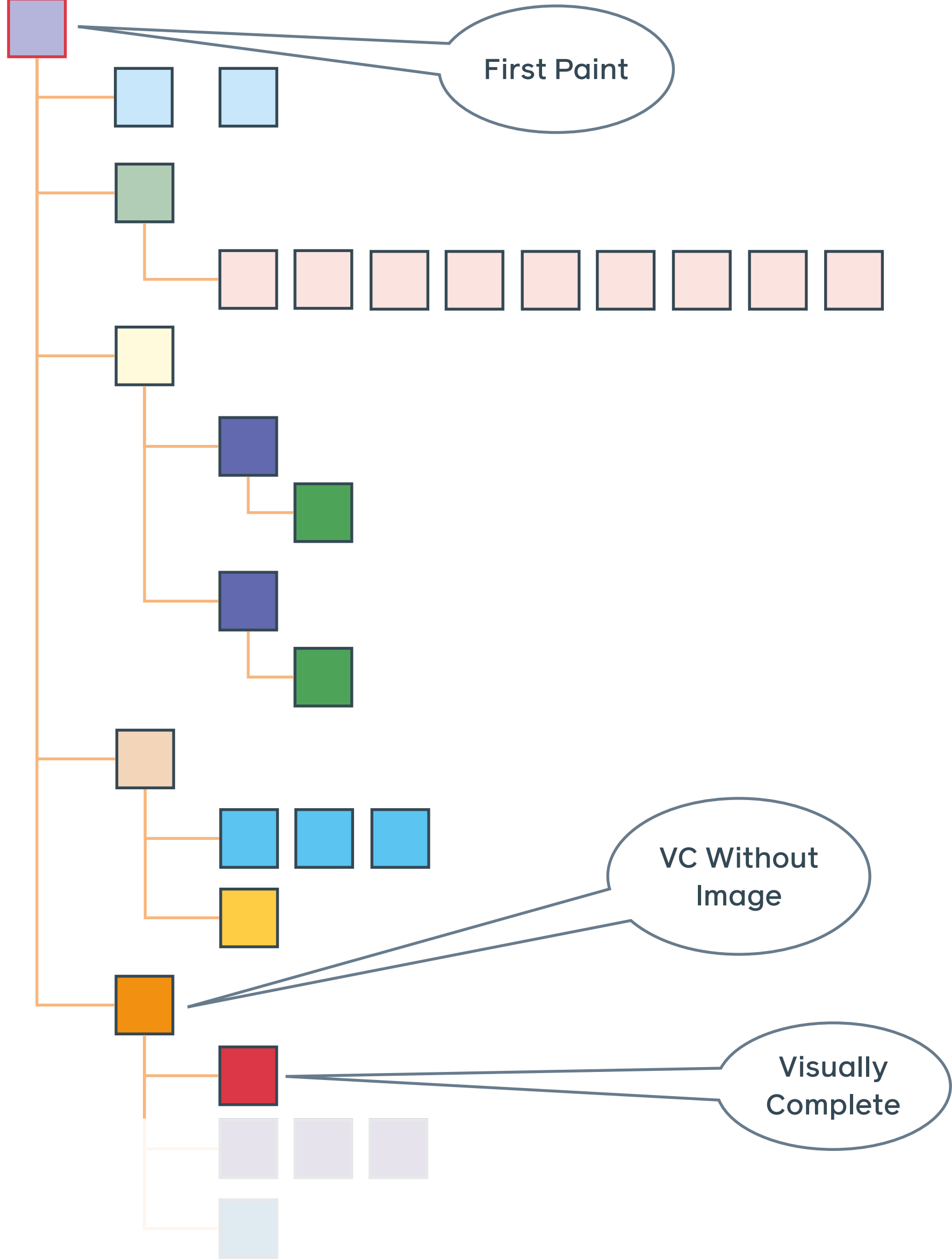
- *Styled Container Element*
- *Text Element*
- *Image Element*
- *CSS Background Image*

- *AddedNode Mutation*
- *Hidden → Visible*
- *Image Src Change*

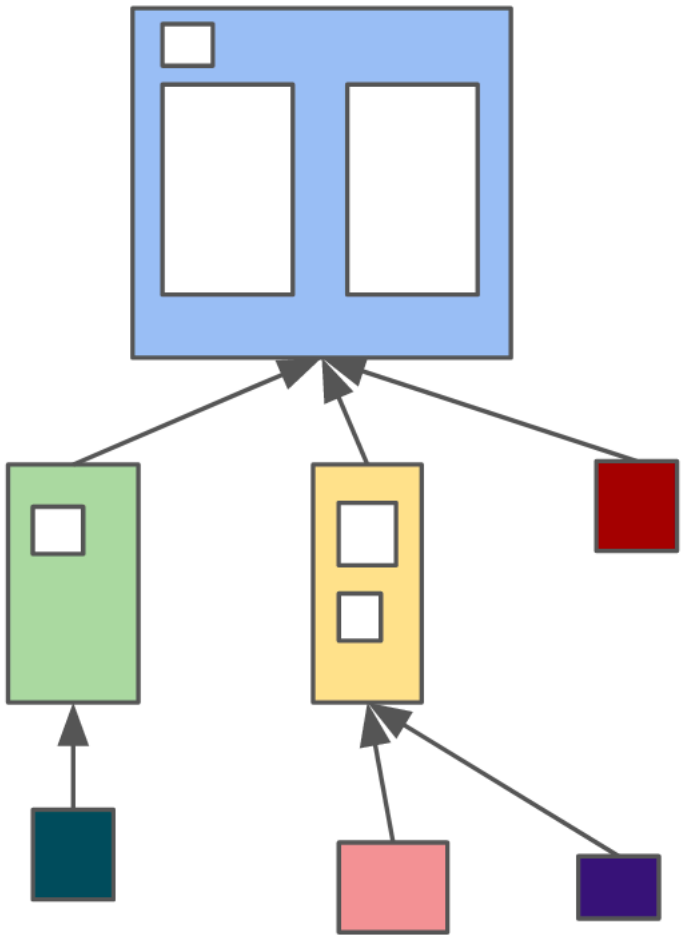
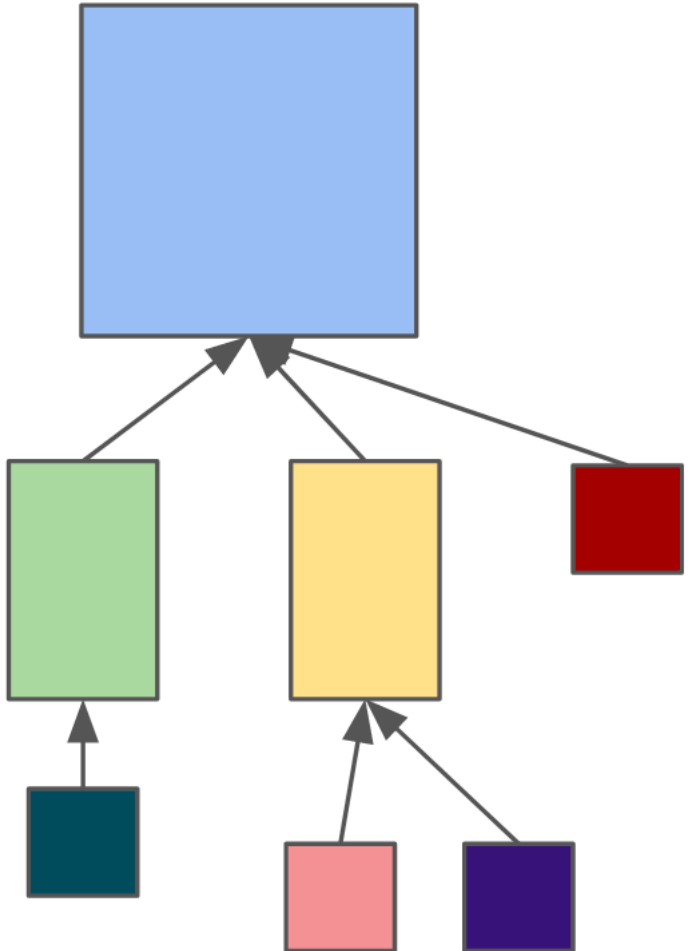
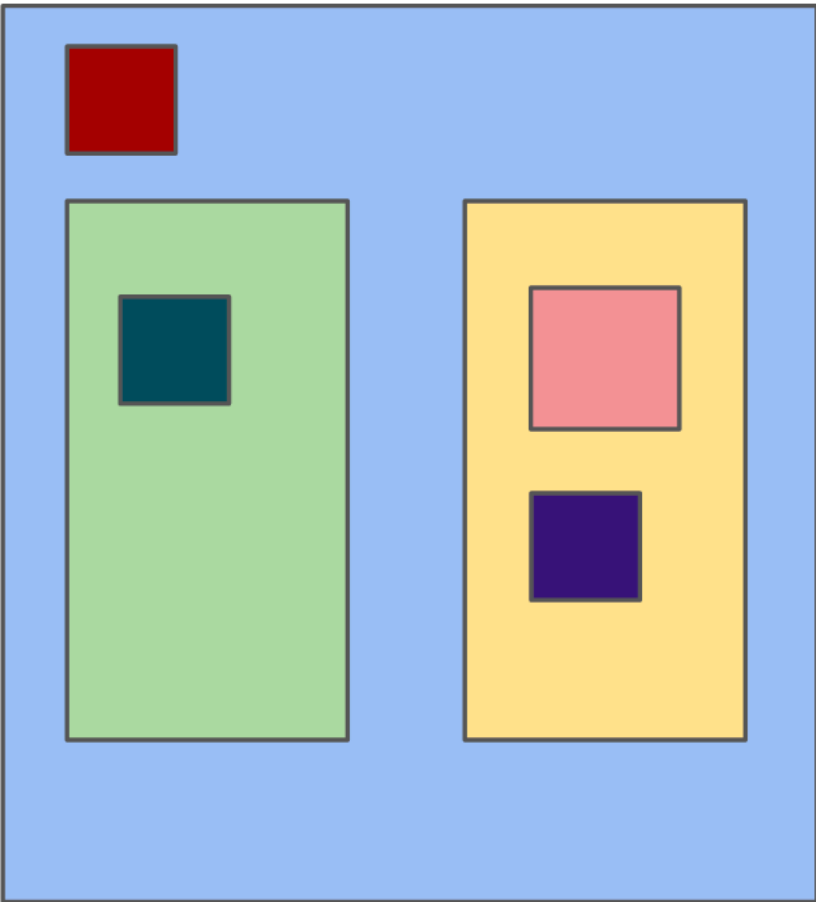
Visual Completion



DOM Mutation Tree



Painted Pixel Calculation



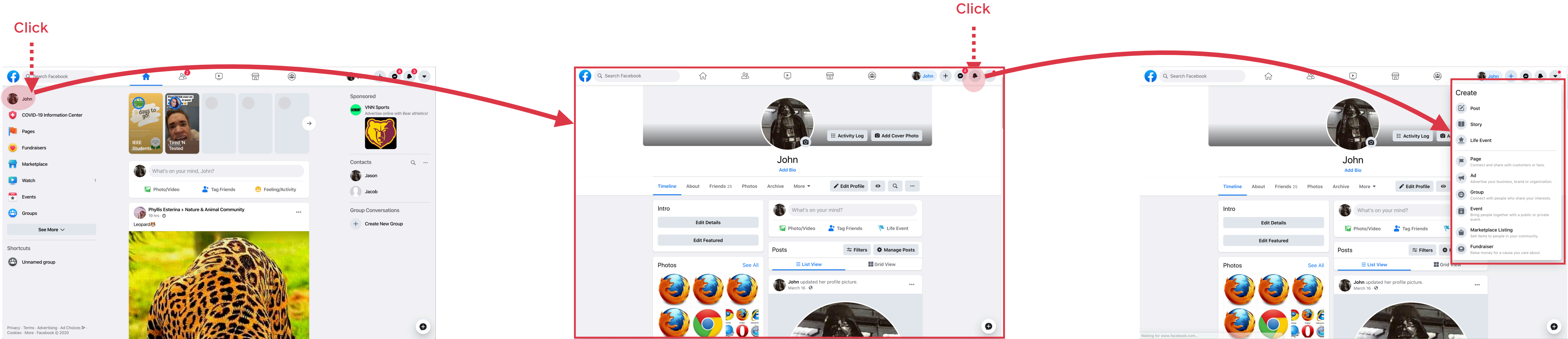
Observe

Build Tree Structure

Calculate Painted Pixels

Visual Completion

Navigation and Interaction



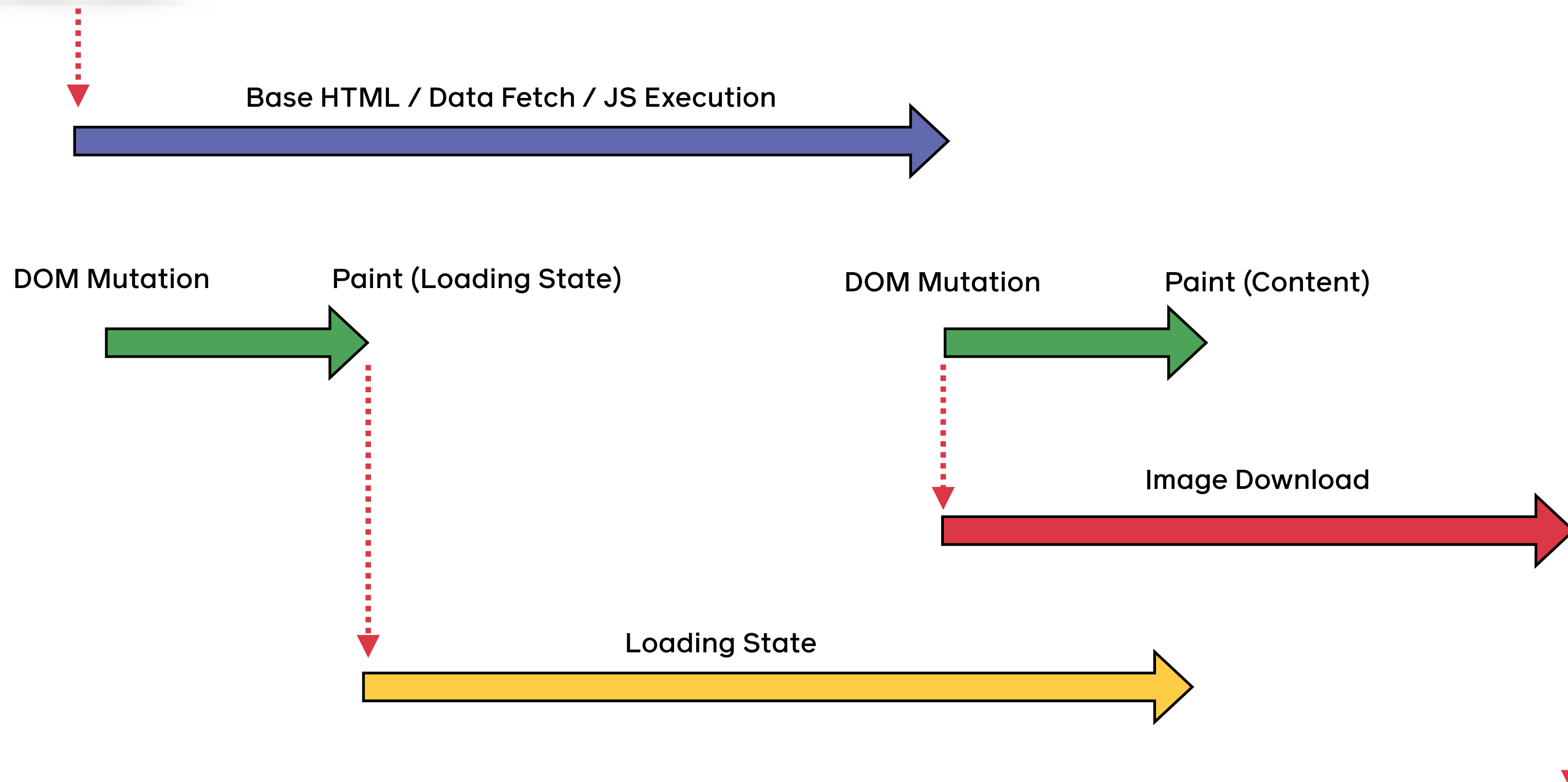
Initial Load

In-App Navigation
(Page Transition)

User Interaction
(Dialog / Dropdown / Popup)

Visual Change Tracing

Trace Start

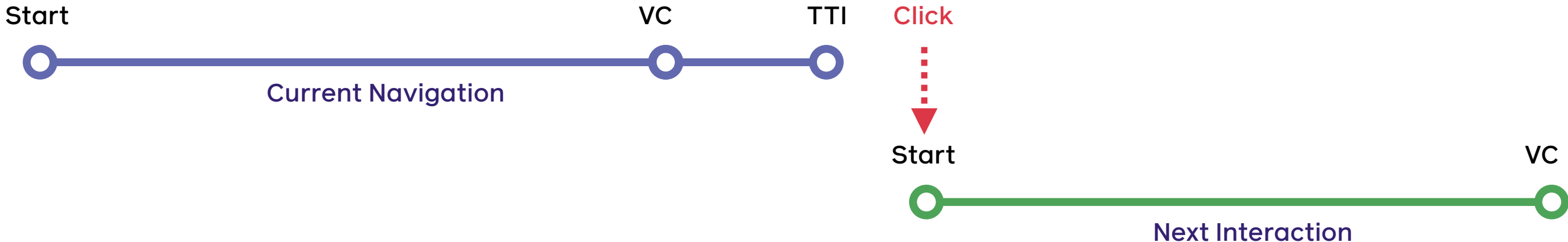


- *Base HTML Response*
- *Data Fetch (Ajax)*
- *Javascript Execution*
- *DOM Mutation Observer*
- *Intersection Observer*
- *Loading State Tracking*
- *Image Download Tracking*

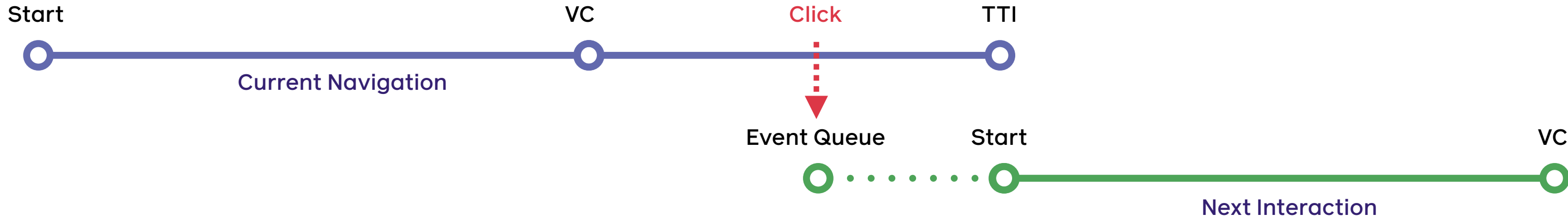
Trace End → Metrics Report

Clean Measure

Successful VC

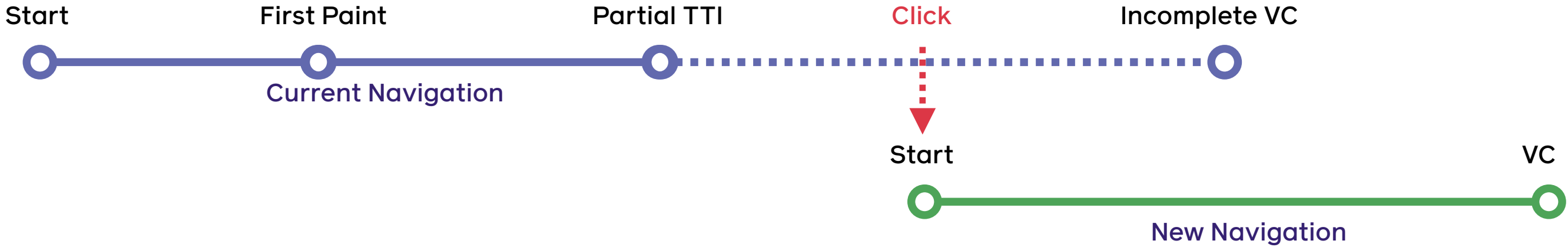


Successful VC / Delayed Interaction



Contaminated Measure

Unsuccessful VC / Navigate Away



Unsuccessful VC / Cancel



Visual Completion

Performance Goals

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

The New Facebook.com



Tooling



Measure

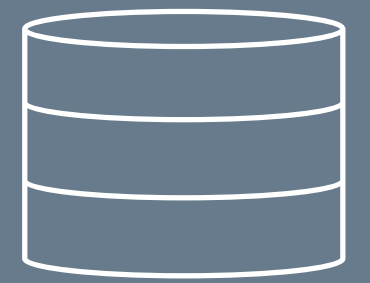


Goal

The screenshot shows the Facebook homepage for a user named Josephine. At the top, there is a search bar and navigation icons for home, video, marketplace, groups, and profile. The main content area includes a 'What's on your mind' section with options for 'Photo/Video', 'Tag Friends', and 'Feeling/Activity'. Below this is a post by Fiona Ozeri about fireworks. To the right, there are sections for 'Sponsored' (Lebo's Pizza), 'Birthdays' (Jessica, Erica and 2 others), and 'Contacts' (Dennis Han, Eric Jones, Cynthia Lopez, Betty Chen, Tina Lim, Molly Carter). The left sidebar contains navigation options like 'Watch', 'Events', 'Friends', and 'Memories', along with a 'Shortcuts' section listing items like 'Save the Pomeroy Theatre' and 'Weekend Trips'.



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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