

# Key Input Metrics

Chromium has a variety of metrics describing input latency, many of which contain substantial overlap. The document provides an overview of our existing metrics, and attempts to show how they relate.

The metrics of the future (currently gathering data, but without much history are:

- Event.Latency.ScrollBegin.Touch.TimeToScrollUpdateSwapBegin4
- Event.Latency.ScrollBegin.Wheel.TimeToScrollUpdateSwapBegin4
- Event.Latency.ScrollUpdate.Touch.TimeToScrollUpdateSwapBegin4
- Event.Latency.ScrollUpdate.Wheel.TimeToScrollUpdateSwapBegin4
- RendererScheduler.ExpectedTaskQueueingDuration

The metrics the input team currently focuses on are:

- Event.Latency.TouchToScrollUpdateSwapBegin (50'th percentile)
- Event.Latency.TouchToFirstScrollUpdateSwapBegin (99'th percentile).

A few other input metrics worth looking at:

- PageLoad.InputTiming.NavigationToFirstNonScroll.AfterPaint
- PageLoad.InputTiming.NavigationToFirstScroll.AfterPaint
- RendererScheduler.ExpectedTaskQueueingDuration

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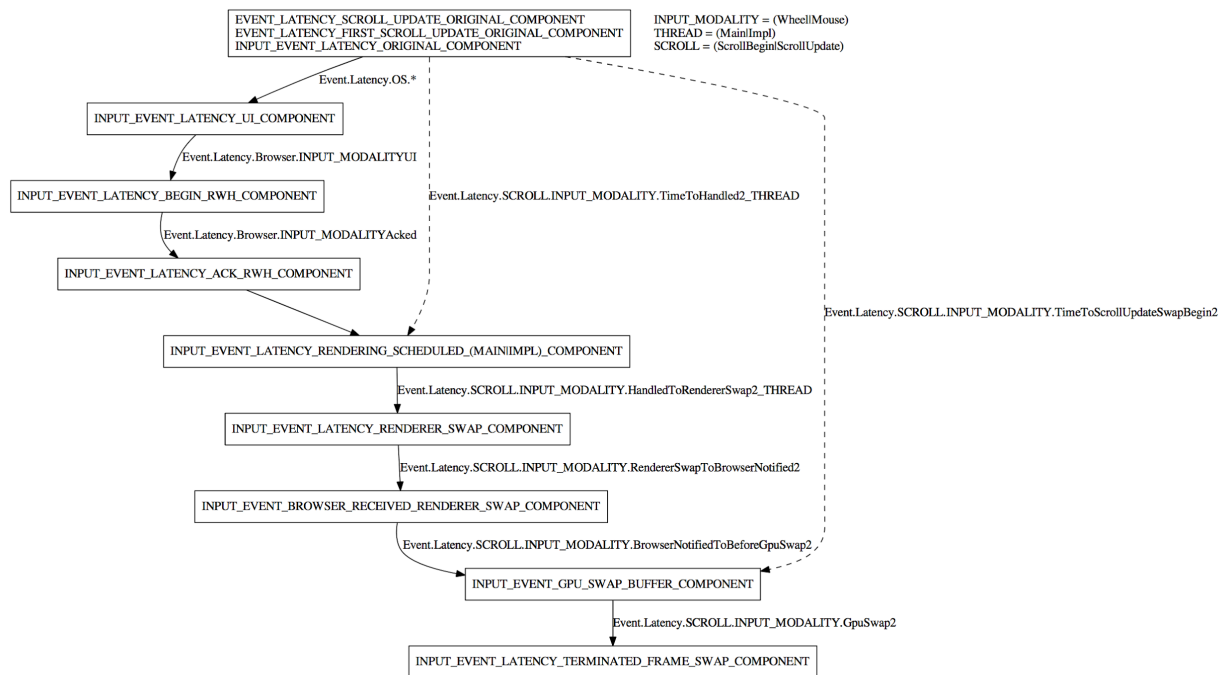
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# Diagram of LatencyInfo entries

Each node in the following [diagram](#) is an entry in the LatencyInfo object. Edge labels name metrics which record the time between two entries in the LatencyInfo.



## Scrolling

### Overall

#### First Scroll

Event.Latency.TouchToFirstScrollUpdateSwapBegin

OS input touch event timestamp until resulting frame swap.

Start: [INPUT\\_EVENT\\_LATENCY\\_FIRST\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_GPU\\_SWAP\\_BUFFER\\_COMPONENT](#)

#### Later Scrolls

Event.Latency.TouchToScrollUpdateSwapBegin

OS touch event input timestamp until resulting frame swap.

Start: [INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_GPU\\_SWAP\\_BUFFER\\_COMPONENT](#)

## Main Thread

Event.Latency.Browser.TouchAcked

Event dispatch to renderer until renderer ack.

Start: [INPUT\\_EVENT\\_LATENCY\\_BEGIN\\_RWH\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_ACK\\_RWH\\_COMPONENT](#)

Event.Latency.Browser.WheelAcked

Event dispatch to renderer until renderer ack.

Start: [INPUT\\_EVENT\\_LATENCY\\_BEGIN\\_RWH\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_ACK\\_RWH\\_COMPONENT](#)

Event.Latency.Browser.TouchUI

Internal event constructed until dispatch to renderer.

Start: [INPUT\\_EVENT\\_LATENCY\\_UI\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_BEGIN\\_RWH\\_COMPONENT](#)

Event.Latency.Browser.WheelUI

Internal event constructed until dispatch to renderer.

Start: [INPUT\\_EVENT\\_LATENCY\\_UI\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_BEGIN\\_RWH\\_COMPONENT](#)

Event.Latency.RendererImpl.GestureScroll2

OS touch event timestamp until impl thread receives event.

Start: Touch event kernel timestamp. (Equivalent to  
[INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#))

End: Received by InputHandlerProxy

Event.Latency.Renderer2.GestureScrollUpdate

OS touch event timestamp until renderer receives event.

Start: Touch event kernel timestamp. (Equivalent to  
[INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#))

End: Received by RenderWidget

Event.Latency.ScrollUpdate.TouchToHandled\_Main

OS touch event timestamp until main thread schedules rendering.

Start: [INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_MAIN\\_COMPONENT](#)

Event.Latency.ScrollUpdate.TouchToHandled\_Impl

OS touch event timestamp until impl thread schedules rendering.

Start: [INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_IMPL\\_COMPONENT](#)

Event.Latency.ScrollUpdate.HandledToRendererSwap\_Main

When main thread rendering is scheduled until renderer requests to swap.

Start: [INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_MAIN\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_RENDERER\\_SWAP\\_COMPONENT](#)

Event.Latency.ScrollUpdate.HandledToRendererSwap\_Impl

When impl thread rendering is scheduled until renderer requests to swap.

Start: [INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_IMPL\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_RENDERER\\_SWAP\\_COMPONENT](#)

## Browser

Event.Latency.Browser.ET\_TOUCH\_MOVED

OS input timestamp until browser constructs internal event.

Start: Event timestamp

End: Internal event constructed (Equivalent to [INPUT\\_EVENT\\_LATENCY\\_UI\\_COMPONENT](#))

## GPU

Event.Latency.ScrollUpdate.RendererSwapToBrowserNotified

Time renderer requests to swap until browser receives that request.

Start: [INPUT\\_EVENT\\_LATENCY\\_RENDERER\\_SWAP\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_BROWSER\\_RECEIVED\\_RENDERER\\_SWAP\\_COMPONENT](#)

Event.Latency.ScrollUpdate.BrowserNotifiedToBeforeGpuSwap

When browser requests a swap until we ask the GPU to swap.

Start: [INPUT\\_EVENT\\_BROWSER\\_RECEIVED\\_RENDERER\\_SWAP\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_GPU\\_SWAP\\_BUFFER\\_COMPONENT](#)

Event.Latency.ScrollUpdate.GPUSwap

Request to swap buffers until buffers have been swapped.

Start: [INPUT\\_EVENT\\_GPU\\_SWAP\\_BUFFER\\_COMPONENT](#)

End: [INPUT\\_EVENT\\_LATENCY\\_TERMINATED\\_FRAME\\_SWAP\\_COMPONENT](#)

## Non-Scrolling

For ideas on additional non-scrolling related metrics, see the [Exposing Input Latency to Web Developers](#) doc.

Event.Latency.HitTest

Duration of a non-recursive hit test.

Event.Latency.HitTestRecursive

Duration of a recursive hit test.

Event.Latency.RendererImpl.\*

OS touch event timestamp until impl thread receives event.

Start: Event kernel timestamp.

End: Received by InputHandlerProxy

Event.Latency.Renderer2.\*

OS touch event timestamp until renderer receives event.

Start: Event kernel timestamp.

End: Received by RenderWidget

## Related UMA metrics

- Blink.Paint.UpdateTime
- Blink.PaintInvalidation.UpdateTime
- Blink.StyleAndLayout.UpdateTime

## Telemetry

[Compute latency](#)

[Component names](#)

[Separate latency info by type](#)

## LatencyInfo components

### Raw Input

Kernel Timestamp

[INPUT\\_EVENT\\_LATENCY\\_ORIGINAL\\_COMPONENT](#)

### Gestures

Kernel Timestamp for touchmove of scroll update gesture.

[INPUT\\_EVENT\\_LATENCY\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

Kernel Timestamp for first touchmove of scroll update gesture.

[INPUT\\_EVENT\\_LATENCY\\_FIRST\\_SCROLL\\_UPDATE\\_ORIGINAL\\_COMPONENT](#)

Time the browser constructs its internal event type.

[INPUT\\_EVENT\\_LATENCY\\_UI\\_COMPONENT](#)

## Renderer

Time the event is sent to the renderer.

[INPUT\\_EVENT\\_LATENCY\\_BEGIN\\_RWH\\_COMPONENT](#)

Time the renderer acks the event.

[INPUT\\_EVENT\\_LATENCY\\_ACK\\_RWH\\_COMPONENT](#)

Time the renderer swapped.

[INPUT\\_EVENT\\_LATENCY\\_RENDERER\\_SWAP\\_COMPONENT](#)

Time the browser received the renderer's request to swap.

[INPUT\\_EVENT\\_BROWSER\\_RECEIVED\\_RENDERER\\_SWAP\\_COMPONENT](#)

Time that main thread rendering work was scheduled for this event.

[INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_MAIN\\_COMPONENT](#)

Time that impl thread rendering work was scheduled for this event.

[INPUT\\_EVENT\\_LATENCY\\_RENDERING\\_SCHEDULED\\_IMPL\\_COMPONENT](#)

## GPU

Time the GPU requested a frame swap.

[INPUT\\_EVENT\\_GPU\\_SWAP\\_BUFFER\\_COMPONENT](#)

Time the GPU finished a frame swap.

[INPUT\\_EVENT\\_LATENCY\\_TERMINATED\\_FRAME\\_SWAP\\_COMPONENT](#)