

# RAF Aligned Input

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## Motivation

The ideal timing for continuous input events is that they are processed right before the rAF signal is delivered to the rest of the document lifecycle. This allows the input to be processed as part of the document lifecycle such that if it changes layout it will have the best opportunity to generate a frame for the next vsync.

## Concerns

Touch is generally sampled at 120hz. On Android the OS will do vsync alignment delivering touch events at 60hz. However mouse movement is at a much higher frequency than 60 Hz.

## Design

The rAF signal comes into the RenderWidget on the [BeginMainFrame](#) call.

With the addition of the [MainThreadEventQueue](#), events can remain in the queue until the appropriate signal is generated.

When an event is enqueued into the MainThreadEventQueue it will be determined whether it is a continuous event or not.

Pseudo code is as follows:

```
::QueueEvent
  AddEventToQueue Coalescing If Necessary
  If new item added
    Is Event Continuous
      Has a MainFrame been requested?
        If not; Request Main Frame
    Else
      If tail of Events before this event are continuous
        Request Main Thread Task for each with delay 0.
      Request Main Thread Task with delay 0.
```

```

::OnMainFrame
    Reset signal of main thread requested
    While the head of the queue is a continuous event deque and
process.

::OnMainThreadTask
    Dequeue and process a single event

```

## Experimentation

The feature will be shipped behind a content feature: `RafAlignedTouchInput`, `RafAlignedMouseInput`

## Experimentation Results for Touch Input

UMA Metric tracked: `Event.Latency.TouchToFirstScrollUpdateSwapBegin` (mean mircoseconds)

### Android

The experimentation was performed on Dev and Canary releases and showed an improvement in the mean latency of the touch events.

Group	25th percentile	50th percentile	75th percentile
Control	16354.0	22202.9	34854.3
Enabled	15907.4 $\Delta$ : -2.7% p: 0.00 effect size: small	20899.2 $\Delta$ : -5.9% p: 0.00 effect size: medium	33840.0 $\Delta$ : -2.9% p: 0.00 effect size: medium

Windows

Group	25th percentile	50th percentile	75th percentile
Control	8474.5	18944.9	44075.4
Enabled	7001.7 Δ: -17.4%	16768.8 Δ: -11.5%	42392.8 Δ: -3.8%