img decoding attribute

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Motivation

Images on the web remain one of the primary causes of jank. The reason for this is that the work required to rasterize images to the screen is typically heavy. The largest component of the work is decoding the image into a bitmap format suitable for rasterization.

When done synchronously, the decoding process can delay presentation of other non-image content. For example, in order to present images and text together, the images need to be decoded, which means text can't be displayed until that work is done. This is currently the default behavior of Chrome and Safari.

The browser can make this work asynchronous. It can rasterize and present content without images while at the same time scheduling an asynchronous decode off the critical path. When the decode finishes, the browser can then update the visual presentation to include images. This comes at a cost of having a heuristic that dictates when it is OK to defer decodes as opposed to when the content has to be presented atomically. Any such heuristic can have flaws that cause images that are important to present synchronously be deferred. As a result, users may experience a image flicker or pop that the developer did not intend. Firefox and Edge currently implement such heuristics. They work reasonably well but can still have unintended visual flashes.

There seems to be a need for a developer tool to specify an image hint to the browser which can assist the browser in deciding whether to defer the decode. This proposal is for such a tool.

Proposal

We propose to add an image attribute called **decoding** which informs the browser of developer intent. This attribute would have three states:

- **async**: The developer prefers performance over atomic presentation of content
- **sync**: The developer prefers atomic presentation of content over performance
- **auto:** The developer does not indicate a preference. This also serves as the default value if the attribute is not specified.

With this attribute, the browser should make an effort to respect the developer's preference. Note that this is intentionally weak language, allowing for the browser not to jank or to apply a

heuristic if deemed important. Finally, the auto value allows for all browsers to continue implementing their default behavior.

Example uses

```
<!-- the decode for this image may be deferred -->
<img decoding=async src="...">

<!-- if possible the decode for this image should not be deferred -->
<img decoding=sync src="...">

<!-- the browser is free to do what it feels is best for the user -->
<img decoding=auto src="...">
<img src="...">
```