Composition Profiler

You can now view detailed performance information with the Composition Profiler in After Effects Beta. The Composition Profiler is visible through a new footer on the timeline window that shows you how long your current frame took to render, and a new timeline column, Render Time, that allows you to see the breakdown of each layer, all masks, layer styles, and even individual effects.

Using Composition Profiler

The Frame Render Time display in the timeline footer simply displays the total time (in either milliseconds or seconds) your current frame took to render. This display is always on and color-coded so you can easily keep an eye on it.

In the new Render Time column, you’ll get a color-coded display of how much time each layer that rendered took to render and a bar graph of how that compares to other layers on the same frame.

In addition to seeing how long each layer takes to render, you can also twirl down layers to get a breakdown of how much masks, layer styles and even individual effects contribute to the total render time.

Color Coding

Render times that are either real-time or half-real-time (based on composition frame rate) are displayed as shades of green, with higher values from 100ms to 5 seconds displayed as increasing intensity from yellow to red.

If the frame rate of your composition results in real-time or half-time render times that are longer than one of the fixed stops, the fixed stops are skipped up to the point where the fixed stops are greater than half-time.
Composition Profiler is simply a visualization of data produced by After Effects while it renders the frame. Because the rendering process is both complex and highly optimized, here are some descriptions of how the rendering pipeline handles particular situations to help understand the information you’re seeing.

### Precomps

Layers that are nested compositions ("precomps") will accurately display their render times. However, to fully understand everything that contributes to that render time, you may need to navigate into the precomp, as only the Masks, Layers Styles and Effects on the precomp layer will be broken out.

When the same precomp is used multiple times within a composition, you may find that the precomps higher in the layer stack (i.e. lower numbered layers) may utilize the cache from the instances lower in the layer stack (i.e. higher-numbered layers) and display a much faster render speed.

### Caching

Layers, effects, masks, and styles which have already been rendered to memory in whole or part (i.e. "cached") will display their render time value with an asterisk.

In this situation, the render time is a reflection of how long it took to render anything that was not already cached, as well as the time taken to fetch items from cache. Any items without an asterisk are rendered without using anything from the cache.

Since After Effects frequently and intelligently caches, to fully profile a frame you may find that you need to select Edit > Purge > All Memory and Disk Cache to force that frame to be re-calculated from scratch.

### Composition View Settings

Composition Profiler uses the current composition viewer settings. For example, if you have your composition viewer Resolution/Down Sample Factor Popup set to Half, your profile times will be faster than if you have your resolution set to Full.

When using Composition Profiler, we recommend turning off Adaptive Resolution so the times displayed are accurate for the preview resolution.

### Layers Referenced By Effects

If a layer has it’s Video Switch off but is referenced by another layer’s effect (such as Set Matte, Compound Blur, or CC Glass), then that effect’s Render Time will include the time it took to render referenced layers and the referenced layer’s render time will be empty. This is due to After Effects only rendering the referenced layer as part of the effect’s render process.

In the below example, both Set Matte Source Layer and Compound Blur Source Layer report no Render Time, however the Render Time for Set Matte and Compound Blur effects on the Footage with Effects layer does include the time taken to render Set Matte Source Layer and Compound Blur Source Layer.

### Expressions

Expression calculation time is available in the Render Time column for the property that has the expression. Most expressions run quite fast so you should expect to see 0ms for most of them.
Reducing Render Times

**Composition Profiler** will let you easily track down the elements of your composition that are increasing your render times, and can help you make intelligent decisions on how to speed up your workflow. Turning off layers, effects, masks and layer styles will help previews render faster, and **Composition Profiler** can help you choose which elements to adjust.

**Proxies**

If removing effects or layers is not an option, you may choose to render **Proxies** (available by right clicking an element in the **Project Panel** and choosing File > Create Proxy > Movie or File > Create Proxy > Still). Project elements that have proxies are given a special icon next to them in the **Project Panel**.

**Prerendering**

Similarly, if you have layers or compositions that you do not anticipate changing, you can choose to pre-render those elements via the **Render Queue** and changing the **Post-Render Action** in the **Output Module Settings** to Import & Replace Usage.

**Alternate Effects**

Some effects simply take a long time to render, in this case it may be worth investigating alternate effects that have similar looks with faster rendering times (for example you may want to test **Fast Box Blur** vs. **Gaussian Blur**, **Glow** vs. **VR Glow** or **Colorama** vs. **Tint** vs. **Tritone**).

**Known Issues**

- Using **Adaptive Resolution** may lead to changing **Render Time** values as **After Effects** renders at the adaptive resolution and then again at the composition viewer resolution.
- Enabling **Draft 3D** disables the **Composition Profiler**.
- If the composition window is hidden or closed the **Composition Profiler** will go dormant.