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# State of Next-Gen Image Formats 2026: A Matched-Quality Benchmark of JPEG, WebP, AVIF, and JPEG XL with Browser-Support Analysis

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ABSTRACT

For the web in 2026, use AVIF. We benchmarked JPEG, WebP, AVIF and JPEG XL at matched visual quality and checked how many browsers can actually display each one. AVIF makes the smallest files, about 37 percent smaller than an already-optimized JPEG at the same quality, and it works in roughly 93 percent of browsers. JPEG XL is the most impressive format on paper, but it displays in only about 14 percent of browsers, so despite years of hype it is still not a format you can ship to the public. The winner of the next-gen format race is not the best codec. It is the one that is both good and supported.

#### 0.1 Download the full study as a PDF

Prefer a formatted, citable paper? This study is also available as a journal-style PDF, *"State of Next-Gen Image Formats 2026,"* with the full benchmark table, browser-support data, and the raw dataset as CSV. → **Download the PDF (journal format)**

**Keywords:** best image format for web, avif vs webp, jpeg xl, webp vs jpeg, avif vs jpeg xl, next gen image formats

KEY FINDINGS

- At the same visual quality (SSIM 0.95), relative to an optimized JPEG, WebP is about 22 percent smaller, JPEG XL about 18 percent smaller, and AVIF about 37 percent smaller. AVIF wins on compression.
- JPEG XL does not beat AVIF on these web-sized images, and roughly ties WebP. Its advantage shows only at very high fidelity, where it pulls slightly ahead of WebP.
- Browser support decides everything: WebP reaches about 96 percent of users, AVIF about 93 percent, but JPEG XL only about 14 percent (Safari only). Chrome removed JPEG XL in 2023 and, as of 2026, has it back only behind a flag.
- JPEG XL's one genuine superpower is lossless recompression of existing JPEGs: it shrinks a JPEG by about 8 percent with no quality loss and can restore the exact original. No other format does this.
- Practical 2026 stack: serve AVIF, fall back to WebP, fall back to JPEG. Revisit JPEG XL only if Chrome turns it on by default.

## 1. The short answer: use AVIF

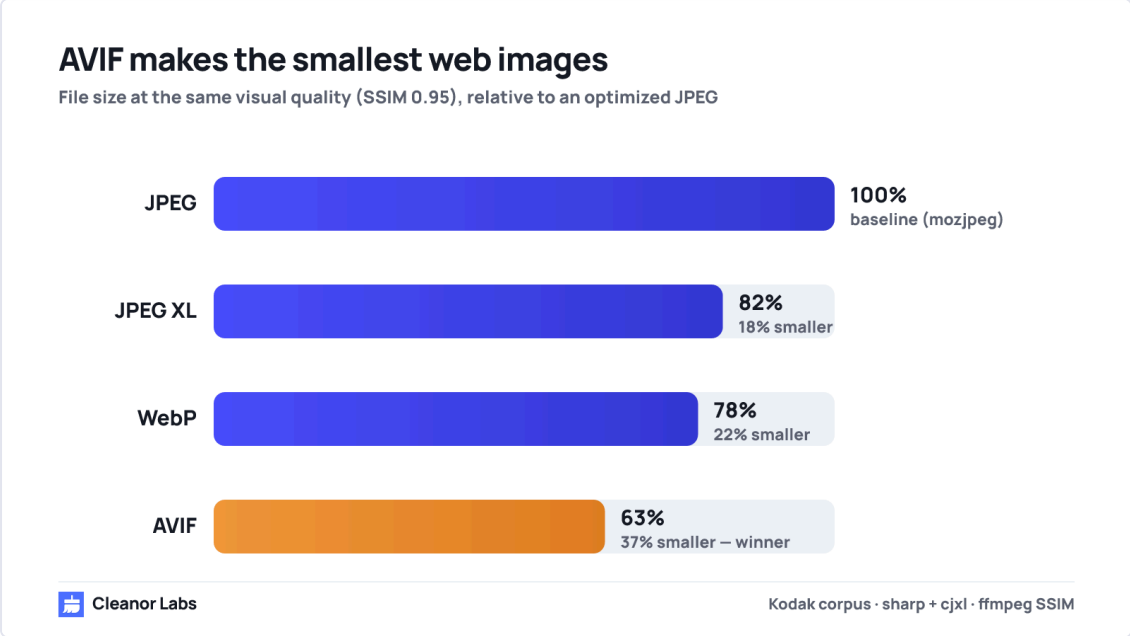


**Figure 1.** At the same visual quality (SSIM 0.95) relative to an optimized JPEG, JPEG XL is 18% smaller, WebP 22% smaller, and AVIF 37% smaller. AVIF produces the smallest web images.

There are three "next-gen" web image formats competing to replace JPEG: WebP (Google, 2010), AVIF (Alliance for Open Media, 2019, built on the AV1 video codec), and JPEG XL (the JPEG committee, 2021). All three beat JPEG. The question is which one to actually use, and the answer in 2026 is AVIF, because it is the only format that is both the strongest compressor at web quality and supported almost everywhere.

## 2. How the formats compare at the same quality

To compare fairly you have to hold quality constant, otherwise a smaller file just means a worse-looking image. We encoded the 24-image Kodak lossless test set to all four formats across seven quality levels, measured the perceptual quality of each output against the lossless original with SSIM (via ffmpeg), and then interpolated the file size each format needs to hit the same SSIM. We did this at SSIM 0.95 (good web quality) and SSIM 0.98 (high quality). The JPEG baseline is a mozjpeg-optimized JPEG, a deliberately tough baseline, so these savings are conservative; against a naive JPEG the gaps are larger, as in our earlier JPEG vs WebP vs AVIF benchmark.

| Format | Size at SSIM 0.95 (good) | Size at SSIM 0.98 (high) |
|---|---|---|
| JPEG (mozjpeg) | baseline | baseline |
| WebP | 22% smaller | 6% smaller |
| JPEG XL | 18% smaller | 7% smaller |
| AVIF | 37% smaller | 18% smaller |

AVIF is the clear winner at both quality levels. The surprise is JPEG XL: on these web-sized images at matched SSIM it does not beat AVIF, and it roughly ties WebP, edging ahead only at the highest quality. JPEG XL's real strengths, near-lossless and lossless coding, progressive decoding, very large images and wide-gamut HDR, sit outside the low-to-mid quality range that most web images live in. For a typical article hero or product photo, AVIF simply produces the smallest file.

## 3. The JPEG XL paradox: great tech, no reach

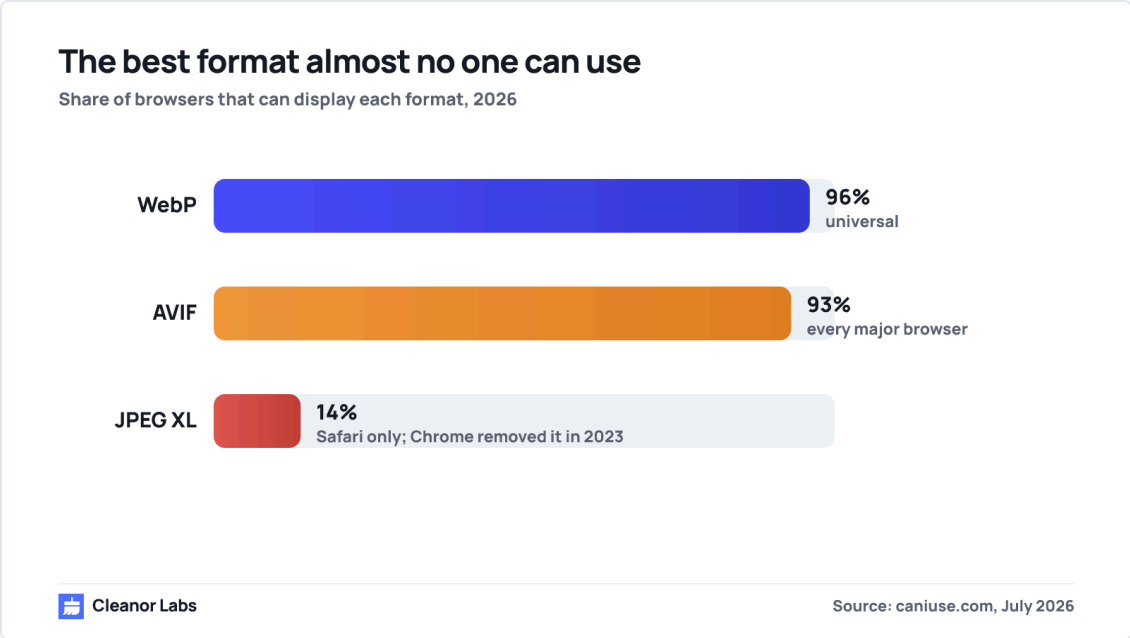


**Figure 2.** Browser support in 2026: WebP 96%, AVIF 93%, but JPEG XL only 14% (Safari-only, after Chrome removed it in 2023). JPEG XL is technically strong but not usable as a primary web format.

Compression is only half the decision. A format is useless on the web if the browser cannot display it. Here JPEG XL falls off a cliff. WebP is effectively universal (about 96 percent of users) and has been cross-browser since Safari added it in 2020. AVIF reaches about 93 percent, supported by every current major browser: Chrome since 2020, Firefox since 2021, Safari since 2023, Edge since 2024. JPEG XL sits at about 14 percent, essentially Safari-only.

The reason is a single decision. Chrome added JPEG XL behind a flag in 2021, then removed it entirely in Chrome 110 in February 2023, citing insufficient ecosystem interest, a move that effectively ended JPEG XL's shot at the web. Apple went the other way, shipping native JPEG XL in Safari 17 and iOS 17 later in 2023. In 2026 the format is staging a quiet comeback: a memory-safe Rust decoder was merged back into Chromium and is available behind a flag again, and Firefox has it behind a flag too. But behind a flag is not shipped. As of 2026, no Chromium browser and no Firefox release enables JPEG XL by default, so you still cannot rely on it for public web content.

### 4. JPEG XL's one real superpower

There is one thing JPEG XL does that nothing else can: losslessly recompress an existing JPEG. Feeding our test JPEGs through JPEG XL's lossless transcode shrank them by about 8 percent with zero quality change, and the process is reversible, you can reconstruct the exact original JPEG byte-for-byte. For an archive of millions of legacy JPEGs, an 8 percent reduction with no quality loss and no risk is genuinely valuable. It is a storage and archival feature, though, not a reason to choose JPEG XL for web delivery.

### 5. What to actually ship in 2026

The pragmatic stack has not really changed, it has just settled:

1. Serve AVIF as the primary format. It is the smallest at web quality and covers about 93 percent of users.
2. Fall back to WebP for the last few percent (old iOS builds, locked-down browsers). It is universally supported and still well ahead of JPEG.
3. Fall back to JPEG or PNG for the long legacy tail.

In HTML this is a single `<picture>` element with AVIF and WebP sources and a JPEG in the `<img>`. The browser picks the best format it understands. You get AVIF's savings for almost everyone and never show a broken image.

Cleanor's free browser-based image converter tools convert to WebP and AVIF locally, so the images never leave your device. Convert to AVIF for the smallest files, keep a WebP or JPEG fallback, and skip JPEG XL for anything public until Chrome turns it on.

### 6. Method and reproducibility

Corpus: the 24-image Kodak lossless suite (768 x 512 PNG masters). Encoders: sharp/libvips for JPEG (mozjpeg), WebP and AVIF (effort 4); cjxl (libjxl 0.11) at effort 7 for JPEG XL. Quality metric: SSIM (All) against the lossless master via ffmpeg, decoded with sharp and djxl. For each format we swept seven quality levels and interpolated the file size at a fixed target SSIM, so every comparison is at matched perceptual quality. SSIM slightly favours codecs tuned to it and does not fully capture JPEG XL's perceptual tuning, so treat the JPEG XL numbers as a floor. Browser-support figures are from caniuse.com as of July 2026. The raw per-image results are published as CSV alongside this report. Scripts: `nextgen-formats-benchmark.mjs`.

## 7. Frequently asked questions

**Is AVIF or JPEG XL better?** For the web in 2026, AVIF. At matched quality AVIF produced smaller files than JPEG XL on web-sized images, and AVIF is supported by about 93 percent of browsers versus about 14 percent for JPEG XL. JPEG XL is excellent technology, especially for high-fidelity and lossless use, but its lack of browser support makes it impractical for public web pages.

**Is JPEG XL better than WebP?** Only slightly, and only at high quality. In our benchmark JPEG XL and WebP were close at good web quality (about 18 versus 22 percent smaller than JPEG), with JPEG XL edging ahead only near visual losslessness. Since WebP is supported almost everywhere and JPEG XL is not, WebP remains the more practical of the two for the web.

**Why did Chrome remove JPEG XL?** Google removed JPEG XL from Chrome in version 110 (February 2023), citing insufficient interest from the ecosystem and the maintenance cost, at a time when AVIF already covered the same use cases with broad support. A memory-safe Rust decoder brought JPEG XL back into Chromium behind a flag in 2026, but it is still not enabled by default.

**What image format should I use for a website?** AVIF, with a WebP and JPEG fallback via a `<picture>` element. AVIF gives the smallest files at web quality and covers about 93 percent of users; the fallbacks cover the rest. Avoid relying on JPEG XL for public content until Chrome enables it by default.

**Does JPEG XL reduce file size without losing quality?** Yes, uniquely. JPEG XL can losslessly recompress an existing JPEG by roughly 8 percent with no quality change, and the original JPEG can be restored exactly. This makes it useful for archiving large JPEG libraries, even though it is not the right choice for web delivery.

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