

@push.rocks/smartjimp

A TypeScript library for image processing combining both sharp and jimp libraries.

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Lightning-fast image processing for TypeScript, powered by Sharp and Jimp

[npm version](#) [TypeScript](#) License: [MIT](#)

Why SmartJimp? ☐☐

SmartJimp bridges the gap between two powerful image processing libraries:

- **Sharp** ☐ - Blazing fast, native C++ bindings, perfect for production
- **Jimp** ☐ - Pure JavaScript, runs anywhere Node.js does

Choose your engine based on your needs - same API, different performance characteristics. Plus, you get automatic caching out of the box!

Installation ☐☐

```
# Using npm
npm install @push.rocks/smartjimp --save

# Using pnpm (recommended)
pnpm add @push.rocks/smartjimp

# Using yarn
yarn add @push.rocks/smartjimp
```

Quick Start ☐☐♂

```
import { SmartJimp } from '@push.rocks/smartjimp';

// Choose your engine
const imageProcessor = new SmartJimp({ mode: 'sharp' }); // or 'jimp'

// That's it! You're ready to process images ☐☐
```

Features ☐

☐☐ Resize Images

Resize images while maintaining aspect ratio or set exact dimensions:

```
import { SmartJimp } from '@push.rocks/smartjimp';
import { SmartFile } from '@push.rocks/smartfile';

const processor = new SmartJimp({ mode: 'sharp' });

// Load an image
const imageFile = await SmartFile.fromUrl('https://example.com/image.jpg');

// Resize to 500px width (height auto-calculated to maintain aspect ratio)
const resized = await processor.getFromSmartfile(imageFile, {
  width: 500
});

// Or resize to exact dimensions
const exactSize = await processor.getFromSmartfile(imageFile, {
  width: 800,
  height: 600
});

// Save the result
await SmartFile.fromBuffer('./resized.jpg', resized).write();
```

☐☐ Format Conversion

Convert between PNG, JPEG, WebP, and AVIF formats with ease:

```
// Convert any image to PNG
const pngBuffer = await processor.getFromSmartfile(imageFile, {
  format: 'png'
});

// Convert to standard JPEG
const jpegBuffer = await processor.getFromSmartfile(imageFile, {
  format: 'jpeg'
});

// Convert to WebP for smaller file sizes
const webpBuffer = await processor.getFromSmartfile(imageFile, {
  format: 'webp',
  width: 1200 // Resize while converting!
});

// Convert to AVIF for next-gen compression (Sharp only)
const avifBuffer = await processor.getFromSmartfile(imageFile, {
  format: 'avif'
});
```

☐☐ Quality Control

Fine-tune image compression quality for the perfect balance between file size and visual fidelity:

```
// High quality JPEG (larger file size)
const highQualityJpeg = await processor.getFromSmartfile(imageFile, {
  format: 'jpeg',
  quality: 90 // 1-100, higher = better quality
});

// Optimized for web (smaller file size)
const webOptimized = await processor.getFromSmartfile(imageFile, {
  format: 'jpeg',
  quality: 75, // Good balance for web
  progressive: true
});
```

```
// Ultra-compressed WebP
const tinyWebP = await processor.getFromSmartfile(imageFile, {
  format: 'webp',
  quality: 60 // WebP handles lower quality better than JPEG
});

// Quality works with all lossy formats
const qualityAvif = await processor.getFromSmartfile(imageFile, {
  format: 'avif',
  quality: 80 // AVIF provides excellent quality even at lower values
});
```

“ **Pro tip:** Different formats handle quality settings differently. AVIF and WebP generally look better than JPEG at the same quality level.

Progressive JPEG Support

Create progressive JPEGs that load in multiple passes for better perceived performance:

```
// Create a progressive JPEG (Sharp mode only)
const progressiveJpeg = await processor.getFromSmartfile(imageFile, {
  format: 'jpeg',
  progressive: true,
  width: 800
});

// Convert PNG to progressive JPEG
const pngFile = await SmartFile.fromUrl('https://example.com/image.png');
const progressiveFromPng = await processor.getFromSmartfile(pngFile, {
  format: 'jpeg',
  progressive: true
});

// Standard JPEG (non-progressive)
const standardJpeg = await processor.getFromSmartfile(imageFile, {
  format: 'jpeg',
  progressive: false // default
```

```
});
```

“ **Note:** Progressive JPEG encoding is only supported in Sharp mode. Jimp will create standard JPEGs regardless of the progressive setting.

Image Effects

Apply visual effects to your images:

```
// Invert colors (currently jimp-only)
const inverted = await processor.getFromSmartfile(imageFile, {
  invert: true
});
```

Direct Buffer Processing

Work directly with buffers for maximum flexibility:

```
// Process raw image buffers
const processedBuffer = await processor.computeAssetVariation(imageBuffer, {
  width: 300,
  format: 'webp',
  quality: 85,
  invert: true
});

// Create progressive JPEG from buffer
const progressiveBuffer = await processor.computeAssetVariation(imageBuffer, {
  format: 'jpeg',
  progressive: true,
  quality: 88
});

// Special AVIF creation method (sharp mode only)
const avifBuffer = await processor.createAvifImageFromBuffer(imageBuffer);
```

☐☐ Built-in Caching

SmartJimp automatically caches processed images for lightning-fast repeated operations:

```
// First call: processes the image
const result1 = await processor.getFromSmartfile(imageFile, { width: 500 });

// Second call: returns from cache instantly! ✂
const result2 = await processor.getFromSmartfile(imageFile, { width: 500 });
```

Cache features:

- Automatic cache key generation based on source and parameters
- 10-minute default TTL
- Memory + disk hybrid caching with LevelCache

Sharp vs Jimp: Choose Your Fighter



Use Sharp when:

- ☐☐♂ **Performance is critical** - Up to 10x faster than Jimp
- ☐☐ **You need AVIF support** - Sharp exclusive feature
- ☐☐ **You need progressive JPEGs** - Sharp exclusive feature
- ☐☐ **Running on servers** - Where native dependencies are OK
- ☐☐ **Processing many images** - Batch operations benefit from speed

Use Jimp when:

- ☐☐ **Cross-platform compatibility is key** - Pure JavaScript, no build steps
- ⚡ **Deploying to serverless** - Some platforms don't support native modules
- ☐☐ **You need pixel-level manipulation** - Jimp has more pixel manipulation features
- ☐☐ **Simpler deployment** - No need to worry about sharp's native dependencies

Advanced Examples ☐☐

Batch Processing with Async Operations

```
import { SmartJimp } from '@push.rocks/smartjimp';
import { SmartFile } from '@push.rocks/smartfile';

const processor = new SmartJimp({ mode: 'sharp' });

// Process multiple images concurrently
const imageUrls = [
  'https://example.com/photo1.jpg',
  'https://example.com/photo2.jpg',
  'https://example.com/photo3.jpg'
];

const processedImages = await Promise.all(
  imageUrls.map(async (url) => {
    const file = await SmartFile.fromUrl(url);
    return processor.getFromSmartfile(file, {
      width: 800,
      format: 'jpeg',
      progressive: true // Web-optimized progressive JPEGs
    });
  })
);

// Save all processed images
await Promise.all(
  processedImages.map((buffer, index) =>
    SmartFile.fromBuffer(`./output/image-${index}.jpg`, buffer).write()
  )
);
```

Creating Responsive Image Sets

```
// Generate multiple sizes for responsive images
const sizes = [320, 640, 1024, 1920];
const formats = ['webp', 'jpeg'] as const;
```

```

for (const size of sizes) {
  for (const format of formats) {
    const processed = await processor.getFromSmartfile(originalImage, {
      width: size,
      format,
      // Use progressive for JPEGs
      progressive: format === 'jpeg'
    });

    await SmartFile.fromBuffer(
      `./responsive/image-${size}.${format}`,
      processed
    ).write();
  }
}

```

Web-Optimized Image Pipeline

```

// Create a complete image optimization pipeline
async function optimizeForWeb(sourceImage: SmartFile) {
  const processor = new SmartJimp({ mode: 'sharp' });

  // Create multiple formats for browser compatibility
  const formats = {
    // Modern browsers: AVIF
    avif: await processor.getFromSmartfile(sourceImage, {
      format: 'avif',
      width: 1200,
      quality: 85 // AVIF excels at lower quality settings
    }),

    // Good browser support: WebP
    webp: await processor.getFromSmartfile(sourceImage, {
      format: 'webp',
      width: 1200,
      quality: 82 // WebP sweet spot for quality/size
    }),
  },

```

```
// Universal fallback: Progressive JPEG
jpeg: await processor.getFromSmartfile(sourceImage, {
  format: 'jpeg',
  progressive: true,
  width: 1200,
  quality: 80 // Standard web quality
})
};

return formats;
}
```

API Reference

Constructor Options

```
interface ISmartJimpOptions {
  mode: 'sharp' | 'jimp'; // Choose your processing engine
}
```

Processing Options

```
interface IAssetVariation {
  format?: 'avif' | 'webp' | 'png' | 'jpeg'; // Output format
  width?: number; // Target width (maintains aspect ratio if
height not set)
  height?: number; // Target height (maintains aspect ratio if
width not set)
  invert?: boolean; // Invert colors (jimp only currently)
  progressive?: boolean; // Create progressive JPEG (sharp only, jpeg
format only)
  quality?: number; // Compression quality 1-100 (lossy formats
only)
}
```

Main Methods

```
getFromSmartfile(smartfile, options?)
```

Process a SmartFile instance with caching enabled.

```
computeAssetVariation(buffer, options)
```

Process a raw buffer without caching.

```
createAvifImageFromBuffer(buffer)
```

Create an AVIF image from buffer (sharp mode only).

Performance Tips

1. **Use Sharp mode in production** - It's significantly faster
2. **Leverage the built-in cache** - Process identical images only once
3. **Batch operations** - Use `Promise.all()` for concurrent processing
4. **Choose appropriate formats:**
 - AVIF: Best compression, limited support
 - WebP: Good compression, good support
 - Progressive JPEG: Universal support, good perceived performance
 - PNG: Lossless, larger files

Troubleshooting

Sharp installation issues

If you encounter issues with Sharp:

```
# Rebuild sharp from source
npm rebuild sharp

# Or install with specific platform
npm install sharp --platform=linux --arch=x64
```

Memory usage

For processing many large images:

```
// Process in batches to control memory usage
const batchSize = 10;
for (let i = 0; i < images.length; i += batchSize) {
  const batch = images.slice(i, i + batchSize);
  await processBatch(batch);
}
```

Progressive JPEG verification

To verify if a JPEG is progressive:

```
# Using ImageMagick
identify -verbose image.jpg | grep "Interlace"
# Output: "Interlace: JPEG" means progressive

# Using exiftool
exiftool -EncodingProcess image.jpg
```

Contributing

We welcome contributions! Please feel free to submit a Pull Request.

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changelog.md for @push.rocks/smartjimp

[1.2.0] - 2025-01-02

Added

- Quality parameter support for image compression
- New `quality` option (1-100) in `IAssetVariation` interface for controlling compression quality
- Quality control implementation for both Sharp and Jimp modes
- Support for quality settings on all lossy formats (JPEG, WebP, AVIF)
- Enhanced documentation with quality control examples

Changed

- Jimp mode now uses fall-through pattern in format switch for cleaner code
- Console logging when Jimp falls back to JPEG for unsupported formats (WebP, AVIF)
- Updated examples in documentation to showcase quality parameter usage

[1.1.0] - 2025-01-02

Added

- Progressive JPEG support for Sharp mode
- New `jpeg` format option in `IAssetVariation` interface
- New `progressive` boolean option for creating progressive JPEGs
- Tests for progressive JPEG functionality

Fixed

- Fixed Sharp switch statement missing break statements causing all formats to output as PNG
- Updated Jimp resize to properly maintain aspect ratio

Changed

- Updated dependencies:
 - jimp: ^0.22.10 → ^1.6.0
 - sharp: ^0.33.2 → ^0.34.3
 - @push.rocks/smartpath: ^5.0.5 → ^6.0.0
 - @push.rocks/smartrequest: ^2.0.15 → ^4.2.1
 - @git.zone/tstest: ^1.0.86 → ^2.3.2
- Both Sharp and Jimp modes now default to JPEG when no format is specified
- Updated documentation to include progressive JPEG examples

Notes

- Progressive JPEG encoding is only supported in Sharp mode
- Jimp mode will create standard JPEGs regardless of the progressive setting