

# readme.md for @push.rocks/smartnpm

Smart npm interface for Node.js 📦

npm TypeScript License: MIT

“ A powerful TypeScript library to programmatically interact with npm registries, retrieve package information, search packages, and handle package downloads with full caching support.

## 📦 Features

- 📦 **Package Information Retrieval** - Get comprehensive metadata about any npm package
- 📦 **Advanced Package Search** - Search npm registry with multiple filter options
- 📦 **Package Downloads** - Download and extract packages to disk programmatically
- 📦 **File Extraction** - Extract specific files or directories from packages without full download
- 📦 **Version & Tag Management** - Work with specific versions, dist-tags, and version ranges
- ⚡ **Smart Caching** - Built-in caching system for improved performance
- 📦 **Custom Registry Support** - Use with npm, Verdaccio, or any npm-compatible registry
- 📦 **Virtual Directory Creation** - Load packages as virtual file systems in memory

## 📦 Installation

```
npm install @push.rocks/smartnpm --save
```

Or using pnpm (recommended):

```
pnpm add @push.rocks/smartnpm
```

## ☐ Quick Start

```
import { NpmRegistry } from '@push.rocks/smartnpm';

// Initialize with default npm registry
const npmRegistry = new NpmRegistry();

// Or use a custom registry
const customRegistry = new NpmRegistry({
  npmRegistryUrl: 'https://your-registry.example.com'
});
```

## ☐ Usage Examples

### Package Information Retrieval

Get detailed information about any npm package:

```
import { NpmRegistry } from '@push.rocks/smartnpm';

const npmRegistry = new NpmRegistry();

async function getPackageDetails() {
  const packageInfo = await npmRegistry.getPackageInfo('@angular/core');

  console.log(`Package: ${packageInfo.name}`);
  console.log(`Latest Version: ${packageInfo.version}`);
  console.log(`Description: ${packageInfo.description}`);
  console.log(`License: ${packageInfo.license}`);

  // Access all versions
  packageInfo.allVersions.forEach(version => {
    console.log(`- ${version.version}: ${version.date}`);
  });
}
```

```
});

// Access dist tags
packageInfo.allDistTags.forEach(tag => {
  console.log(`Tag ${tag.name}: ${tag.targetVersion}`);
});
}
```

## 🔍 Advanced Package Search

Search the npm registry with powerful filters:

```
async function searchPackages() {
  // Search with multiple criteria
  const searchResults = await npmRegistry.searchOnNpm({
    name: 'webpack-plugin',
    keywords: ['webpack', 'plugin', 'build'],
    author: 'webpack-contrib',
    maintainer: 'sokra',
    scope: '@webpack',
    deprecated: false,
    unstable: false,
    insecure: false,
    boostExact: true,
    scoreEffect: 15.3,
    qualityWeight: 1.95,
    popularityWeight: 3.3,
    maintenanceWeight: 2.05
  });

  console.log(`Found ${searchResults.length} packages`);

  searchResults.forEach(pkg => {
    console.log(`📦 ${pkg.name}@${pkg.version}`);
    console.log(`   Score: ${pkg.searchScore}`);
    console.log(`   Quality: ${pkg.score.detail.quality}`);
    console.log(`   Popularity: ${pkg.score.detail.popularity}`);
    console.log(`   Maintenance: ${pkg.score.detail.maintenance}`);
  });
}
```

```
}
```

## Download Packages

Download and extract npm packages to your filesystem:

```
async function downloadPackage() {
  // Download latest version
  await npmRegistry.savePackageToDisk('express', './downloads/express');

  // Download specific version
  const packageInfo = await npmRegistry.getPackageInfo('express');
  const specificVersion = packageInfo.allVersions.find(v => v.version === '4.18.0');
  if (specificVersion) {
    await specificVersion.saveToDisk('./downloads/express-4.18.0');
  }
}
```

## Extract Specific Files

Extract individual files or directories from packages without downloading the entire package:

```
async function extractSpecificFiles() {
  // Get a single file
  const readmeFile = await npmRegistry.getFileFromPackage(
    'typescript',
    'README.md'
  );

  if (readmeFile) {
    console.log('README Contents:', readmeFile.contentBuffer.toString());
  }

  // Get a file from specific version
  const packageJson = await npmRegistry.getFileFromPackage(
    'react',
    'package.json',
    { version: '18.0.0' }
  );
}
```

```

);

// Get all files from a directory
const sourceFiles = await npmRegistry.getFilesFromPackage(
  '@angular/core',
  'src/',
  { distTag: 'latest' }
);

sourceFiles.forEach(file => {
  console.log(`\${file.path} (\${file.contentBuffer.length} bytes)`);
});
}

```

## ☐☐ Version Management

Work with specific versions and dist tags:

```

async function versionManagement() {
  const pkg = await npmRegistry.getPackageInfo('vue');

  // Get best matching version for a range
  const bestVersion = pkg.getBestMatchingVersion('^3.0.0');
  console.log(`Best matching version: \${bestVersion}`);

  // Work with dist tags
  const latestTag = pkg.allDistTags.find(t => t.name === 'latest');
  const nextTag = pkg.allDistTags.find(t => t.name === 'next');

  console.log(`Latest: \${latestTag?.targetVersion}`);
  console.log(`Next: \${nextTag?.targetVersion}`);

  // Get files from specific dist tag
  const files = await npmRegistry.getFilesFromPackage(
    'vue',
    'dist/',
    { distTag: 'next' }
  );
}

```

# ☐ Virtual Directory

Load packages as virtual file systems in memory:

```
async function virtualDirectory() {
  // Create virtual directory from package
  const virtualDir = await npmRegistry.getPackageAsSmartfileVirtualDir('@angular/cli');

  // Work with files in memory
  const allFiles = virtualDir.getFileArray();

  allFiles.forEach(file => {
    console.log(`Virtual file: ${file.path}`);
  });

  // Export virtual directory to disk if needed
  await virtualDir.saveToDisk('./output/angular-cli');
}
```

# ⚡ Caching

The library includes built-in intelligent caching:

```
// Files are automatically cached
const file1 = await npmRegistry.getFileFromPackage('lodash', 'package.json');
// This will be served from cache
const file2 = await npmRegistry.getFileFromPackage('lodash', 'package.json');

// Cache is registry-specific and version-aware
const specificVersion = await npmRegistry.getFileFromPackage(
  'lodash',
  'README.md',
  { version: '4.17.21' }
);
```

# ☐ API Reference

# NpmRegistry Class

## Constructor

```
new NpmRegistry(options?: INpmRegistryConstructorOptions)
```

Options:

- `npmRegistryUrl`: Custom registry URL (default: `https://registry.npmjs.org`)

## Methods

```
getPackageInfo(packageName: string): Promise<NpmPackage>
```

Retrieves comprehensive information about a package.

```
searchOnNpm(searchObject: ISearchObject): Promise<NpmPackage[]>
```

Searches the npm registry with advanced filters.

```
savePackageToDisk(packageName: string, targetDir: string):
```

```
Promise<void>
```

Downloads and extracts a package to the filesystem.

```
getFileFromPackage(packageName: string, filePath: string, options?):
```

```
Promise<SmartFile>
```

Extracts a single file from a package.

```
getFilesFromPackage(packageName: string, filePath: string, options?):
```

```
Promise<SmartFile[]>
```

Extracts multiple files from a package directory.

```
getPackageAsSmartfileVirtualDir(packageName: string):
```

```
Promise<VirtualDirectory>
```

Creates an in-memory virtual directory from a package.

# NpmPackage Class

## Properties

- `name`: Package name
- `version`: Current version
- `description`: Package description
- `license`: License type
- `allVersions`: Array of all available versions
- `allDistTags`: Array of all dist tags
- `dependencies`: Package dependencies
- `keywords`: Package keywords
- `maintainers`: Package maintainers
- `dist`: Distribution information

## Methods

```
getBestMatchingVersion(versionRange: string): string
```

Finds the best matching version for a semver range.

```
saveToDisk(targetDir: string): Promise<void>
```

Saves the package to disk.

```
getFileFromPackage(filePath: string, options?): Promise<SmartFile>
```

Gets a file from the package.

```
getFilesFromPackage(filePath: string, options?): Promise<SmartFile[]>
```

Gets multiple files from the package.

# 📦 Advanced Configuration

## Custom Registry with Authentication

```
const privateRegistry = new NpmRegistry({
  npmRegistryUrl: 'https://private-registry.company.com'
});

// Note: Authentication should be configured via .npmrc or npm config
```

## Error Handling

```
try {
  const pkg = await npmRegistry.getPackageInfo('non-existent-package');
} catch (error) {
  console.error('Package not found:', error.message);
}

// Safe file extraction
const file = await npmRegistry.getFileFromPackage('express', 'README.md');
if (file) {
  // File exists
  console.log('File size:', file.contentBuffer.length);
} else {
  // File doesn't exist
  console.log('File not found');
}
```

## ☐ Common Use Cases

- **CI/CD Pipelines:** Automatically download and verify package contents
- **Security Scanning:** Extract and analyze package files without installation
- **Documentation Generation:** Pull README files and docs from packages
- **Dependency Analysis:** Analyze package structures and dependencies
- **Registry Mirroring:** Sync packages between registries
- **Package Validation:** Verify package contents before deployment
- **Automated Updates:** Check for new versions and update notifications

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# Company Information

Task Venture Capital GmbH

Registered at District court Bremen HRB 35230 HB, Germany

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