readme.md for @push.rocks/smartnginx

Control Nginx programmatically from Node.js with full TypeScript support □□

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Features

- □□ **Dynamic Configuration** - Generate and manage Nginx configs on the fly
- □□ **SSL/TLS Ready** - Built-in support for SSL certificates with automatic HTTP→HTTPS redirects
- □□ **Hot Reload** - Apply configuration changes without downtime
- □□ **Zero-Config Defaults** - Self-signed certificates auto-generated for immediate testing
- □□ **Reverse Proxy Made Easy** - Set up proxy hosts with a single method call
- □□ **Smart Diffing** - Only reloads Nginx when configurations actually change
- □□ **TypeScript First** - Full type definitions included

Install

```
pnpm add @push.rocks/smartnginx
# or
npm install @push.rocks/smartnginx
```

> **Prerequisites**: Nginx must be installed and available in your system PATH.

Quick Start

```
import { SmartNginx } from '@push.rocks/smartnginx';

// Create a SmartNginx instance with a default fallback URL
const nginx = new SmartNginx({
  defaultProxyUrl: 'https://your-default-site.com'
});

// Add a reverse proxy host
nginx.addHostCandidate({
  hostName: 'api.example.com',
  destination: 'localhost',
  destinationPort: 3000,
  privateKey: '<your-ssl-private-key>',
  publicKey: '<your-ssl-certificate>'
});

// Deploy and start Nginx
await nginx.deploy();
```

That's it! Your reverse proxy is now running □□

Usage

Creating the SmartNginx Instance

The `SmartNginx` class is your main interface for managing Nginx:

```
import { SmartNginx } from '@push.rocks/smartnginx';

const nginx = new SmartNginx({
```

```
  defaultProxyUrl: 'https://fallback.example.com',  // Where unmatched requests go
  logger: myCustomLogger  // Optional: pass a @push.rocks/smartlog instance
});
```

Adding Host Configurations

Each host represents a domain/subdomain with its proxy rules and SSL certificates:

```
// Add a host using addHostCandidate()
const myHost = nginx.addHostCandidate({
  hostName: 'app.example.com',        // Domain name
  destination: '127.0.0.1',           // Backend server address
  destinationPort: 8080,              // Backend port
  privateKey: sslPrivateKeyPem,       // SSL private key (PEM format)
  publicKey: sslCertificatePem        // SSL certificate (PEM format)
});
```

Multi-Host Setup

Run multiple sites through a single Nginx instance:

```
// Production API
nginx.addHostCandidate({
  hostName: 'api.myapp.com',
  destination: 'localhost',
  destinationPort: 3000,
  privateKey: apiPrivateKey,
  publicKey: apiCertificate
});

// Admin panel
nginx.addHostCandidate({
  hostName: 'admin.myapp.com',
  destination: 'localhost',
  destinationPort: 4000,
  privateKey: adminPrivateKey,
  publicKey: adminCertificate
});
```

```
// Staging environment
nginx.addHostCandidate({
  hostName: 'staging.myapp.com',
  destination: '192.168.1.100',
  destinationPort: 8080,
  privateKey: stagingPrivateKey,
  publicKey: stagingCertificate
});

// Deploy all at once
await nginx.deploy();
```

Deploying Configurations

The `deploy()` method is smart about changes:

```
// First deploy - writes configs and starts Nginx
await nginx.deploy();

// Add more hosts dynamically
nginx.addHostCandidate({
  hostName: 'newsite.example.com',
  destination: 'localhost',
  destinationPort: 5000,
  privateKey: newPrivateKey,
  publicKey: newCertificate
});

// Second deploy - detects changes, updates configs, hot-reloads Nginx
await nginx.deploy();

// If you call deploy() with no changes, it skips the reload (efficient!)
await nginx.deploy(); // → "hosts have not diverged, skipping nginx reload"
```

Querying Deployed Hosts

```
// Get all deployed hosts
const hosts = await nginx.listDeployedHosts();
console.log(`Running ${hosts.length} hosts`);

// Find a specific host by domain
const apiHost = nginx.getDeployedNginxHostByHostName('api.example.com');
if (apiHost) {
  console.log(`API proxying to ${apiHost.destination}:${apiHost.destinationPort}`);
}
```

Removing Hosts

```
const hostToRemove = nginx.getDeployedNginxHostByHostName('staging.myapp.com');
if (hostToRemove) {
  await nginx.removeDeployedHost(hostToRemove);
  // Nginx automatically reloaded with updated config
}
```

Stopping Nginx

```
// Gracefully stop the Nginx process
await nginx.stop();
```

Generated Configuration

SmartNginx generates production-ready Nginx configurations:

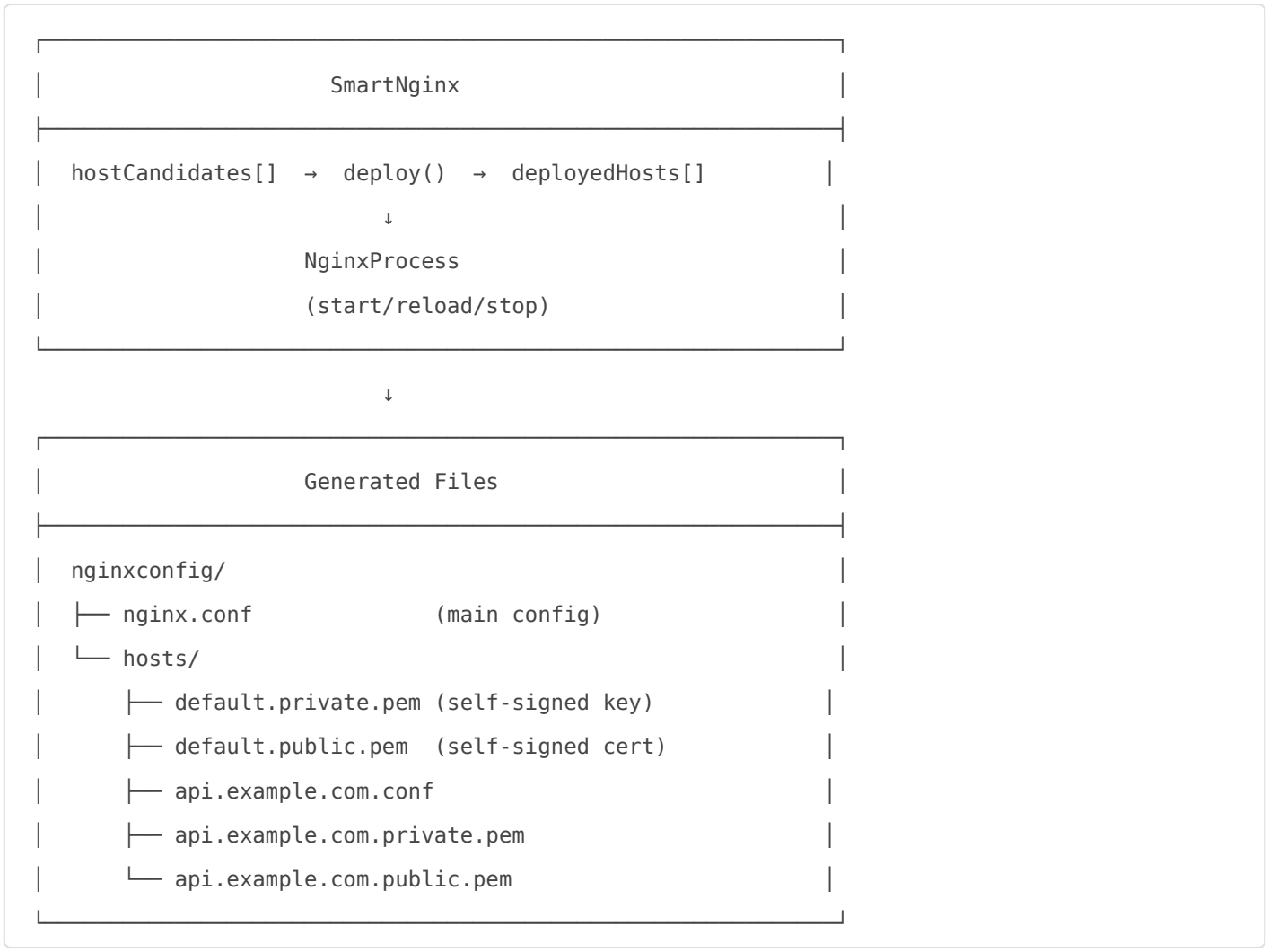
For each host, you get:

- HTTP (port 80) → HTTPS (port 443) automatic redirect
- Upstream with keepalive connections (100 idle connections)
- WebSocket-friendly proxy settings (HTTP/1.1, no buffering)
- Proper proxy headers (`X-Real-IP`, `X-Forwarded-For`, `X-Forwarded-Proto`)
- Smart failover (`proxy_next_upstream` on errors, timeouts, 404/429/500/502)

Default server:

- Self-signed certificate for unmatched domains
- Redirects to your configured `defaultProxyUrl`

Architecture



API Reference

SmartNginx

Method	Description
`addHostCandidate(config)`	Add a new host configuration
`deploy()`	Write configs and start/reload Nginx

Method	Description
`listDeployedHosts()`	Get all currently deployed hosts
`getDeployedNginxHostByHostName(hostname)`	Find a host by domain name
`removeDeployedHost(host)`	Remove a host and reload Nginx
`stop()`	Gracefully stop Nginx

IHostConfig

```
interface IHostConfig {
  hostName: string;        // Domain name (e.g., 'api.example.com')
  destination: string;     // Backend server IP/hostname
  destinationPort: number; // Backend port
  privateKey: string;      // SSL private key (PEM)
  publicKey: string;       // SSL certificate (PEM)
}
```

NginxHost

Each host instance exposes:

- `hostName` - The configured domain
- `destination` - Backend address
- `destinationPort` - Backend port
- `configString` - The generated Nginx config (after deploy)
- `deploy()` - Write this host's config files

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