

# @push.rocks/smartc ls

Provides a wrapper for native AsyncLocalStorage to manage continuation-local storage.

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continuation-local-storage using native AsyncLocalStorage

## Install

To install `@push.rocks/smartcls`, use the following command with npm:

```
npm install @push.rocks/smartcls
```

or if you prefer using Yarn:

```
yarn add @push.rocks/smartcls
```

## Usage

`@push.rocks/smartcls` simplifies the usage of native AsyncLocalStorage in Node.js, allowing for a more convenient approach to work with continuation-local storage. This can be especially handy in scenarios where context passing through asynchronous calls is essential, such as in web servers or complex application flows that involve async operations.

## Basic Setup and Running Context

To start using `@push.rocks/smartcls`, you first need to import it and create an instance of `SmartCls`.

```
import { SmartCls } from '@push.rocks/smartcls';  
  
const mySmartCls = new SmartCls();
```

Once you have an instance, you can utilize the `run` method to establish a new context. Within this context, you can set and get values that are scoped to the lifetime of the context.

```
mySmartCls.run(() => {
  mySmartCls.set('key', 'value');

  // later in the async flow
  console.log(mySmartCls.get('key')); // Outputs: 'value'
});
```

## Asynchronous Example

The power of `SmartCls` becomes evident when working with asynchronous operations. Values set in a specific context are accessible throughout the async flow initiated within that context.

```
import { SmartCls } from '@push.rocks/smartcls';

const mySmartCls = new SmartCls();

mySmartCls.run(async () => {
  mySmartCls.set('asyncKey', 'asyncValue');

  await someAsyncFunction();
  console.log(mySmartCls.get('asyncKey')); // Outputs: 'asyncValue', even after async
operations
});
```

Ensure all asynchronous operations initiated in the context are awaited or properly handled to maintain the context's integrity.

## Nested Contexts

`@push.rocks/smartcls` supports nested contexts, allowing you to create sub-contexts within a main context. This can be useful for overriding values or isolating sections of your async flow.

```
import { SmartCls } from '@push.rocks/smartcls';

const mySmartCls = new SmartCls();

mySmartCls.run(() => {
  mySmartCls.set('level', 'top');
```

```
mySmartCls.run(() => {
  mySmartCls.set('level', 'nested');
  console.log(mySmartCls.get('level')); // Outputs: 'nested'
});

console.log(mySmartCls.get('level')); // Outputs: 'top', reverting back to the parent
context
});
```

## Working with Express or Similar Frameworks

In a web server scenario using Express or a similar framework, you can integrate `SmartCls` to track request-specific data across asynchronous operations without explicitly passing the request object.

```
import express from 'express';
import { SmartCls } from '@push.rocks/smartcls';

const app = express();
const mySmartCls = new SmartCls();

app.use((req, res, next) => {
  mySmartCls.run(() => {
    mySmartCls.set('requestId', req.header('X-Request-Id') || Math.random().toString());
    next();
  });
});

app.get('/', async (req, res) => {
  // Simulate an async operation
  await new Promise(resolve => setTimeout(resolve, 100));

  // Access the requestId set at the beginning of the request
  res.send(`Request ID: ${mySmartCls.get('requestId')}`);
});

app.listen(3000, () => {
  console.log('Server running on port 3000');
```

```
});
```

This example demonstrates how to maintain a unique `requestId` for logging or tracking purposes across asynchronous operations within a single request-response cycle.

## Important Considerations

- Ensure that all async operations in a context are awaited to prevent context leakage.
- Be mindful of memory usage when storing large objects in the context, as each context retains its values until completion.
- `SmartCls` leverages Node.js's native `AsyncLocalStorage`, so it's dependent on the Node.js version supporting this feature.

## Conclusion

`@push.rocks/smartcls` offers a straightforward and efficient approach to managing continuation-local storage in Node.js applications, simplifying context management across asynchronous operations.

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