Lua CJSON 2.1.0 Manual

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1. Overview

The Lua CJSON module provides JSON support for Lua.

Features

> Fast, standards compliant encoding/parsing routines

> Full support for JSON with UTF-8, including decoding surrogate pairs

> Optional run-time support for common exceptions to the JSON specification (infinity, NaN,..)

> No dependencies on other libraries

Caveats

> UTF-16 and UTF-32 are not supported

Lua CJSON is covered by the MIT license. Review the file LICENSE for details.

The latest version of this software is available from the [Lua CJSON website](#).

Feel free to email me if you have any patches, suggestions, or comments.

2. API (Functions)

2.1. Synopsis

```lua
-- Translate Lua value to/from JSON
text = cjson.encode(value)
value = cjson.decode(text)

-- Get and/or set Lua CJSON configuration
setting = cjson.decode_invalid_numbers([setting])
setting = cjson.encode_invalid_numbers([setting])
keep = cjson.encode_keep_buffer([keep])
depth = cjson.encode_max_depth([depth])
depth = cjson.decode_max_depth([depth])
convert, ratio, safe = cjson.encode_sparse_array([convert[, ratio[, safe]]])
```

The `cjson` module will throw an error during JSON conversion if any invalid data is encountered. Refer to `cjson.encode` and `cjson.decode` for details.

The `cjson.safe` module behaves identically to the `cjson` module, except when errors are encountered during JSON conversion. On error, the `cjson_safe.encode` and `cjson_safe.decode` functions will return `nil` followed by the error message.

2.2. decode

```lua
value = cjson.decode(json_text)
```

`cjson.decode` will deserialise any UTF-8 JSON string into a Lua value or table.

UTF-16 and UTF-32 JSON strings are not supported.

`cjson.decode` requires that any NULL (ASCII 0) and double quote (ASCII 34) characters are escaped within strings. All escape codes will be decoded and other bytes will be passed transparently. UTF-8 characters are not validated during decoding and should be checked elsewhere if required.

JSON `null` will be converted to a NULL `lightuserdata` value. This can be compared with `cjson.null` for convenience.

By default, numbers incompatible with the JSON specification (infinity, NaN, hexadecimal) can be decoded. This default can be changed with `cjson.decode_invalid_numbers`.

Example: Decoding
```lua
json_text = '[ true, { "foo": "bar" } ]'
value = cjson.decode(json_text)
-- Returns: { true, { foo = "bar" } }
```

Caution | Care must be taken after decoding JSON objects with numeric keys. Each numeric key will be stored as a Lua `string`. Any subsequent code assuming type `number` may break.

2.3. decode_invalid_numbers

```
setting = cjson.decode_invalid_numbers([setting])
-- "setting" must be a boolean. Default: true.
```

Lua CJSON may generate an error when trying to decode numbers not supported by the JSON specification. *Invalid numbers* are defined as:

> infinity

> not-a-number (NaN)

> hexadecimal

Available settings:

`true`

> Accept and decode *invalid numbers*. This is the default setting.

`false`

> Throw an error when *invalid numbers* are encountered.

The current setting is always returned, and is only updated when an argument is provided.

2.4. decode_max_depth

```
depth = cjson.decode_max_depth([depth])
-- "depth" must be a positive integer. Default: 1000.
```

Lua CJSON will generate an error when parsing deeply nested JSON once the maximum array/object depth has been exceeded. This check prevents unnecessarily complicated JSON from slowing down the application, or crashing the application due to lack of process stack space.

An error may be generated before the depth limit is hit if Lua is unable to allocate more objects on the Lua stack.

By default, Lua CJSON will reject JSON with arrays and/or objects nested more than 1000 levels deep.

The current setting is always returned, and is only updated when an argument is provided.

2.5. encode

```
json_text = cjson.encode(value)
```

`cjson.encode` will serialise a Lua value into a string containing the JSON representation.

`cjson.encode` supports the following types:

> `boolean`

> `lightuserdata` (NULL value only)

> `nil`

> `number`

> `string`

> `table`

The remaining Lua types will generate an error:

> `function`
>
> `lightuserdata` (non-NULL values)
>
> `thread`
>
> `userdata`

By default, numbers are encoded with 14 significant digits. Refer to `cjson.encode_number_precision` for details.

Lua CJSON will escape the following characters within each UTF-8 string:

> Control characters (ASCII 0 - 31)
>
> Double quote (ASCII 34)
>
> Forward slash (ASCII 47)
>
> Blackslash (ASCII 92)
>
> Delete (ASCII 127)

All other bytes are passed transparently.

Caution	Lua CJSON will successfully encode/decode binary strings, but this is technically not supported by JSON and may not be compatible with other JSON libraries. To ensure the output is valid JSON, applications should ensure all Lua strings passed to `cjson.encode` are UTF-8.
	Base64 is commonly used to encode binary data as the most efficient encoding under UTF-8 can only reduce the encoded size by a further ~8%. Lua Base64 routines can be found in the [LuaSocket](#) and [lbase64](#) packages.

Lua CJSON uses a heuristic to determine whether to encode a Lua table as a JSON array or an object. A Lua table with only positive integer keys of type `number` will be encoded as a JSON array. All other tables will be encoded as a JSON object.

Lua CJSON does not use metamethods when serialising tables.

> `rawget` is used to iterate over Lua arrays
>
> `next` is used to iterate over Lua objects

Lua arrays with missing entries (*sparse arrays*) may optionally be encoded in several different ways. Refer to `cjson.encode_sparse_array` for details.

JSON object keys are always strings. Hence `cjson.encode` only supports table keys which are type `number` or `string`. All other types will generate an error.

Note	Standards compliant JSON must be encapsulated in either an object (`{}`) or an array (`[]`). If strictly standards compliant JSON is desired, a table must be passed to `cjson.encode`.

By default, encoding the following Lua values will generate errors:

> Numbers incompatible with the JSON specification (infinity, NaN)

> Tables nested more than 1000 levels deep

> Excessively sparse Lua arrays

These defaults can be changed with:

> `cjson.encode_invalid_numbers`

> `cjson.encode_max_depth`

> `cjson.encode_sparse_array`

Example: Encoding
```
value = { true, { foo = "bar" } }
json_text = cjson.encode(value)
-- Returns: '[true,{"foo":"bar"}]'
```

2.6. encode_invalid_numbers

```
setting = cjson.encode_invalid_numbers([setting])
-- "setting" must a boolean or "null". Default: false.
```

Lua CJSON may generate an error when encoding floating point numbers not supported by the JSON specification (*invalid numbers*):

> infinity

> not-a-number (NaN)

Available settings:

`true`

> Allow *invalid numbers* to be encoded. This will generate non-standard JSON, but this output is supported by some libraries.

`"null"`

> Encode *invalid numbers* as a JSON `null` value. This allows infinity and NaN to be encoded into valid JSON.

`false`

> Throw an error when attempting to encode *invalid numbers*. This is the default setting.

The current setting is always returned, and is only updated when an argument is provided.

2.7. encode_keep_buffer

```
keep = cjson.encode_keep_buffer([keep])
-- "keep" must be a boolean. Default: true.
```

Lua CJSON can reuse the JSON encoding buffer to improve performance.

Available settings:

true

> The buffer will grow to the largest size required and is not freed until the Lua CJSON module is garbage collected. This is the default setting.

false

> Free the encode buffer after each call to `cjson.encode`.

The current setting is always returned, and is only updated when an argument is provided.

2.8. encode_max_depth

```
depth = cjson.encode_max_depth([depth])
-- "depth" must be a positive integer. Default: 1000.
```

Once the maximum table depth has been exceeded Lua CJSON will generate an error. This prevents a deeply nested or recursive data structure from crashing the application.

By default, Lua CJSON will generate an error when trying to encode data structures with more than 1000 nested tables.

The current setting is always returned, and is only updated when an argument is provided.

Example: Recursive Lua table
```
a = {}; a[1] = a
```

2.9. encode_number_precision

```
precision = cjson.encode_number_precision([precision])
-- "precision" must be an integer between 1 and 14. Default: 14.
```

The amount of significant digits returned by Lua CJSON when encoding numbers can be changed to balance accuracy versus performance. For data structures containing many numbers, setting `cjson.encode_number_precision` to a smaller integer, for example `3`, can improve encoding performance by up to 50%.

By default, Lua CJSON will output 14 significant digits when converting a number to text.

The current setting is always returned, and is only updated when an argument is provided.

2.10. encode_sparse_array

```
convert, ratio, safe = cjson.encode_sparse_array([convert[, ratio[, safe]]])
-- "convert" must be a boolean. Default: false.
-- "ratio" must be a positive integer. Default: 2.
-- "safe" must be a positive integer. Default: 10.
```

Lua CJSON classifies a Lua table into one of three kinds when encoding a JSON array. This is determined by the number of values missing from the Lua array as follows:

Normal

All values are available.

Sparse

At least 1 value is missing.

Excessively sparse

The number of values missing exceeds the configured ratio.

Lua CJSON encodes sparse Lua arrays as JSON arrays using JSON `null` for the missing entries.

An array is excessively sparse when all the following conditions are met:

`ratio` > 0

maximum_index > `safe`

maximum_index > *item_count* * `ratio`

Lua CJSON will never consider an array to be *excessively sparse* when `ratio` = `0`. The `safe` limit ensures that small Lua arrays are always encoded as sparse arrays.

By default, attempting to encode an *excessively sparse* array will generate an error. If `convert` is set to `true`, *excessively sparse* arrays will be converted to a JSON object.

The current settings are always returned. A particular setting is only changed when the argument is provided (non-`nil`).

Example: Encoding a sparse array
```
cjson.encode({ [3] = "data" })
-- Returns: '[null,null,"data"]'
```

Example: Enabling conversion to a JSON object
```
cjson.encode_sparse_array(true)
cjson.encode({ [1000] = "excessively sparse" })
-- Returns: '{"1000":"excessively sparse"}'
```

3. API (Variables)

3.1. _NAME

The name of the Lua CJSON module (`"cjson"`).

3.2. _VERSION

The version number of the Lua CJSON module (`"2.1.0"`).

3.3. null

Lua CJSON decodes JSON `null` as a Lua `lightuserdata` NULL pointer. `cjson.null` is provided for comparison.

4. References

RFC 4627

JSON website

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