MISRA Guideline Compliance Summary

Project: **libcardano-c**
Commit: **6fd2cd9cbc1a1096ae974afec5941f95db91ea04**
Tag: **v0.0.1**
Date: **2024-03-28**
Guidelines: **MISRA C 2012**
Checking Tool: **CppCheck**
Result: **Compliant**

Summary:
There were 0 violations of mandatory guidelines, 0 violations of required guidelines, and 0 violations of advisory guidelines. There are 2 deviations from advisory guidelines, 1 deviation from style, and 1 deviation from required guidelines.

Guideline	Category	Recategorization	Compliance
Directive 1.1	Required		COMPLIANT
Directive 1.2	Advisory		COMPLIANT
Directive 1.3	Required		COMPLIANT
Directive 2.1	Required		COMPLIANT
Directive 2.2	Required		COMPLIANT
Directive 2.3	Advisory		COMPLIANT
Directive 2.4	Advisory		COMPLIANT

Directive 2.5	Advisory		COMPLIANT
Directive 2.6	Advisory		COMPLIANT
Directive 2.7	Advisory		COMPLIANT
Directive 3.1	Required		COMPLIANT
Directive 3.2	Required		COMPLIANT
Directive 4.1	Required		COMPLIANT
Directive 4.2	Advisory		COMPLIANT
Directive 5.1	Required		COMPLIANT
Directive 5.2	Required		COMPLIANT
Directive 5.3	Required		COMPLIANT
Directive 5.4	Required		COMPLIANT
Directive 5.5	Required		COMPLIANT
Directive 5.6	Required		COMPLIANT
Directive 5.7	Required		COMPLIANT
Directive 5.8	Required		COMPLIANT
Directive 5.9	Advisory		COMPLIANT
Directive 6.1	Required		COMPLIANT
Directive 6.2	Required		COMPLIANT
Directive 7.1	Required		COMPLIANT
Directive 7.2	Required		COMPLIANT
Directive 7.3	Required		COMPLIANT
Directive 7.4	Required		COMPLIANT
Directive 8.1	Required		COMPLIANT
Directive 8.2	Required		COMPLIANT
Directive 8.3	Required		COMPLIANT
Directive 8.4	Required		COMPLIANT

Directive 8.5	Required		COMPLIANT
Directive 8.6	Required		COMPLIANT
Directive 8.7	Advisory		COMPLIANT
Directive 8.8	Required		COMPLIANT
Directive 8.9	Advisory		COMPLIANT
Directive 8.10	Required		COMPLIANT
Directive 8.11	Advisory		COMPLIANT
Directive 8.12	Required		COMPLIANT
Directive 8.13	Advisory		COMPLIANT
Directive 8.14	Required		COMPLIANT
Directive 9.1	Mandatory		COMPLIANT
Directive 9.2	Required		COMPLIANT
Directive 9.3	Required		COMPLIANT
Directive 9.4	Required		COMPLIANT
Directive 9.5	Required		COMPLIANT
Directive 10.1	Required		COMPLIANT
Directive 10.2	Required		COMPLIANT
Directive 10.3	Required		COMPLIANT
Directive 10.4	Required		COMPLIANT
Directive 10.5	Advisory		COMPLIANT
Directive 10.6	Required		COMPLIANT
Directive 10.7	Required		COMPLIANT
Directive 10.8	Required		COMPLIANT
Directive 11.1	Required		COMPLIANT
Directive 11.2	Required		COMPLIANT
Directive 11.3	Required		COMPLIANT

Directive 11.4	Advisory		COMPLIANT
Directive 11.5	Advisory		DEVIATION
Directive 11.6	Required		COMPLIANT
Directive 11.7	Required		COMPLIANT
Directive 11.8	Required		COMPLIANT
Directive 11.9	Required		COMPLIANT
Directive 12.1	Advisory		COMPLIANT
Directive 12.2	Required		COMPLIANT
Directive 12.3	Advisory		COMPLIANT
Directive 12.4	Advisory		COMPLIANT
Directive 12.5	Mandatory		COMPLIANT
Directive 13.1	Required		COMPLIANT
Directive 13.2	Required		COMPLIANT
Directive 13.3	Advisory		COMPLIANT
Directive 13.4	Advisory		COMPLIANT
Directive 13.5	Required		COMPLIANT
Directive 13.6	Mandatory		COMPLIANT
Directive 14.1	Required		COMPLIANT
Directive 14.2	Required		COMPLIANT
Directive 14.3	Required		COMPLIANT
Directive 14.4	Required		COMPLIANT
Directive 15.1	Advisory		COMPLIANT
Directive 15.2	Required		COMPLIANT
Directive 15.3	Required		COMPLIANT
Directive 15.4	Advisory		COMPLIANT
Directive 15.5	Advisory		DEVIATION

Directive 15.6	Required		COMPLIANT
Directive 15.7	Required		COMPLIANT
Directive 16.1	Required		COMPLIANT
Directive 16.2	Required		COMPLIANT
Directive 16.3	Required		COMPLIANT
Directive 16.4	Required		COMPLIANT
Directive 16.5	Required		COMPLIANT
Directive 16.6	Required		COMPLIANT
Directive 16.7	Required		COMPLIANT
Directive 17.1	Required		COMPLIANT
Directive 17.2	Required		COMPLIANT
Directive 17.3	Mandatory		COMPLIANT
Directive 17.4	Mandatory		COMPLIANT
Directive 17.5	Advisory		COMPLIANT
Directive 17.6	Mandatory		COMPLIANT
Directive 17.7	Required		COMPLIANT
Directive 17.8	Advisory		COMPLIANT
Directive 18.1	Required		COMPLIANT
Directive 18.2	Required		COMPLIANT
Directive 18.3	Required		COMPLIANT
Directive 18.4	Advisory		COMPLIANT
Directive 18.5	Advisory		COMPLIANT
Directive 18.6	Required		COMPLIANT
Directive 18.7	Required		COMPLIANT
Directive 18.8	Required		COMPLIANT
Directive 19.1	Mandatory		COMPLIANT

Directive 19.2	Advisory		COMPLIANT
Directive 20.1	Advisory		COMPLIANT
Directive 20.2	Required		COMPLIANT
Directive 20.3	Required		COMPLIANT
Directive 20.4	Required		COMPLIANT
Directive 20.5	Advisory		COMPLIANT
Directive 20.6	Required		COMPLIANT
Directive 20.7	Required		COMPLIANT
Directive 20.8	Required		COMPLIANT
Directive 20.9	Required		COMPLIANT
Directive 20.10	Advisory		COMPLIANT
Directive 20.11	Required		COMPLIANT
Directive 20.12	Required		COMPLIANT
Directive 20.13	Required		COMPLIANT
Directive 20.14	Required		COMPLIANT
Directive 21.1	Required		COMPLIANT
Directive 21.2	Required		COMPLIANT
Directive 21.3	Required		DEVIATION
Directive 21.4	Required		COMPLIANT
Directive 21.5	Required		COMPLIANT
Directive 21.6	Required		DEVIATION
Directive 21.7	Required		COMPLIANT
Directive 21.8	Required		COMPLIANT
Directive 21.9	Required		COMPLIANT
Directive 21.10	Required		COMPLIANT
Directive 21.11	Required		COMPLIANT

Directive 21.12	Advisory		COMPLIANT
Directive 21.13	Mandatory		COMPLIANT
Directive 21.14	Required		COMPLIANT
Directive 21.15	Required		COMPLIANT
Directive 21.16	Required		COMPLIANT
Directive 21.17	Mandatory		COMPLIANT
Directive 21.18	Mandatory		COMPLIANT
Directive 21.19	Mandatory		COMPLIANT
Directive 21.20	Mandatory		COMPLIANT
Directive 22.1	Required		COMPLIANT
Directive 22.2	Mandatory		COMPLIANT
Directive 22.3	Required		COMPLIANT
Directive 22.4	Mandatory		COMPLIANT
Directive 22.5	Mandatory		COMPLIANT
Directive 22.6	Mandatory		COMPLIANT
Directive 22.7	Required		COMPLIANT
Directive 22.8	Required		COMPLIANT
Directive 22.9	Required		COMPLIANT
Directive 22.10	Required		COMPLIANT

Deviations

MISRA allows deviations from guidelines in situations where those guidelines might be impractical or unreasonable to follow. All such deviations must be documented and authorized. The documentation should include the guideline, situation, rationale for deviation, and risk analysis.

Rule	Category	Rationale for Skipping
Directive 11.5: A Conversion Should Not Be Performed from Pointer to void into Pointer to Object	Advisory	In our project, conversions from void* to specific object pointers are utilized in the context of generic data handling functions and callback mechanisms. This approach is central to implementing polymorphism in C, allowing us to write modular, reusable code that operates on various data types. Each conversion is carefully controlled and validated to ensure type correctness and safety. The use of void* pointers is confined to specific, well-documented interfaces where the actual data type is known and checked before dereferencing. This strategy allows for the flexibility required by our design patterns while mitigating the risks typically associated with such conversions. Type safety is ensured through rigorous testing and code reviews focused on these critical sections of the codebase.
Directive 15.5: A function should have a single point of exit at the end	Advisory	Early returns can reduce the need for nested conditional statements, making the code more straightforward to read. The intent behind using an early return is to handle edge cases or preconditions at the beginning of the function, allowing the main function logic to remain unindented and clear.

Directive 21.3: The memory allocation and deallocation functions of <stdlib.h> shall not be used	Required	The nature of our software library requires managing a dynamic and potentially large number of objects. Users have the flexibility to create objects at runtime, and the exact number cannot be determined beforehand. Static allocation or using fixed-sized memory pools would restrict the functionality and limit the library's utility. Clear documentation instructs users on proper object lifecycle management, emphasizing the importance of deallocating objects when they are no longer needed.
Directive 21.6: The Standard Library input/output functions shall not be used	Style	The use of standard library input/output functions, specifically snprintf, is deemed necessary for dynamic error message formatting within the library. This functionality is critical for providing meaningful runtime diagnostics and cannot be efficiently replicated with static error messages or significantly simplified error reporting mechanisms. The implementation confines the use of snprintf to controlled environments where buffer sizes are strictly managed, and format string contents are known and verified.

Files Analyzed

lib/include/cardano:

allocators.h
buffer.h
cardano.h
error.h
export.h
object.h
typedefs.h

lib/include/cardano/cbor:

cbor_major_type.h
cbor_reader.h
cbor_reader_state.h
cbor_simple_value.h
cbor_tag.h
cbor_writer.h

lib/include/cardano/crypto:

bip32_private_key.h
blake2b_hash.h
ed25519_private_key.h
ed25519_signature.h
bip32_public_key.h
blake2b_hash_size.h
ed25519_public_key.h
pbkdf2.h

lib/src:

allocators.c
cardano.c
config.h
config.h.in
endian.c
endian.h
error.c
object.c
buffer.c

lib/src/cbor:

cbor_additional_info.h
cbor_initial_byte.c
cbor_initial_byte.h
cbor_reader
cbor_writer.c

lib/src/cbor/cbor_reader:

cbor_reader.c
cbor_reader_core.c
cbor_reader_numeric.h
cbor_reader_tags.c
cbor_reader_collections.c
cbor_reader_core.h
cbor_reader_simple_values.c
cbor_reader_tags.h
cbor_reader_collections.h
cbor_reader_numeric.c
cbor_reader_simple_values.h

lib/src/collections:

array.c
array.h
set.c
set.h

lib/src/crypto:

arithmetic.c
bip32_key_derivation.c
bip32_private_key.c
blake2b_hash.c
ed25519_public_key.c
pbkdf2.c
arithmetic.h
bip32_key_derivation.h
bip32_public_key.c
ed25519_private_key.c
ed25519_signature.c