Package: MarineChain (via r-universe)

October 14, 2026

Type Package

Title Blockchain-Enabled Maritime Transportation System Simulator

Version 0.1.1

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Description Simulates BMTS cryptographic and consensus layer operations.

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Encoding UTF-8

LazyData true

Imports shiny, shinydashboard, digest, leaflet, plotly

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

VignetteBuilder knitr

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.3

Config/testthat/edition 3

URL https://github.com/ikemillar/MarineChain

BugReports https://github.com/ikemillar/MarineChain/issues

Config/pak/sysreqs libabsl-dev cmake libgdal-dev gdal-bin libgeos-dev make libicu-dev libpng-dev libuv1-dev libssl-dev libproj-dev libsqlite3-dev libudunits2-dev zlib1g-dev

Repository https://ikemillar.r-universe.dev

Date/Publication 2026-06-23 02:34:45 UTC

RemoteUrl https://github.com/ikemillar/marinechain

RemoteRef HEAD

RemoteSha 81ffa22c1646100e8c0c98e9dcc76de8a99b4432

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`app_server` *The Application Server Logic*

Description

The Application Server Logic

Usage

```
app_server(input, output, session)
```

Arguments

`input`	The Shiny input binding element list array mapping object.
`output`	The Shiny output rendering layout UI element structure list.
`session`	The active user environment session context container runtime.

`app_ui` *The Application User Interface*

Description

The Application User Interface

Usage

```
app_ui(request)
```

Arguments

`request`	The Shiny request object parameter environmental state.

calc_distance *Calculate Geodetic Distance (Haversine Formula)*

Description

Calculate Geodetic Distance (Haversine Formula)

Usage

```
calc_distance(lat1, lng1, lat2, lng2)
```

Arguments

lat1, lng1	Latitude and Longitude of Node 1
lat2, lng2	Latitude and Longitude of Node 2

Value

Distance in kilometers

inject_attack *Inject Malicious Attacks into Maritime Telemetry Streams*

Description

Inject Malicious Attacks into Maritime Telemetry Streams

Usage

```
inject_attack(clean_packet, attack_type)
```

Arguments

clean_packet	A list containing data, signature, and metadata from a vessel
attack_type	Character. One of "None", "Replay", "Modification", "Impersonation"

Value

A modified packet structure representing an intercepted/compromised transmission

run_app *Run the BMTS Shiny Simulator Application*

Description

Run the BMTS Shiny Simulator Application

Usage

```
run_app()
```

simulate_crypto_ops *Simulate Cryptographic Processing Overhead*

Description

Simulate Cryptographic Processing Overhead

Usage

```
simulate_crypto_ops(data_size_kb, operation)
```

Arguments

data_size_kb	Numeric. Size of the sensor telemetry data in Kilobytes.
operation	Character. The step to simulate ("encrypt", "sign", "verify", "decrypt").

Value

A list containing processing time (ms) and output data size (kb).

simulate_network_routing *Simulate Multi-Hop Maritime Network Routing*

Description

Simulate Multi-Hop Maritime Network Routing

Usage

```
simulate_network_routing(vessel_coord, cs_coord, haps_coord, payload_size_kb)
```

Arguments

vessel_coord	Vector of c(lat, lng) for the vessel
cs_coord	Vector of c(lat, lng) for the Control Station
haps_coord	Vector of c(lat, lng) for the nearest HAPS platform
payload_size_kb	Numeric size of the telemetry packet

Value

A list detailing routing path, hop count, and transmission latency

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simulate_poah_block *Simulate PoAH Blockchain Block Generation*

Description

Simulate PoAH Blockchain Block Generation

Usage

```
simulate_poah_block(dynamic_ledger, incoming_txs)
```

Arguments

dynamic_ledger	A list representing the current blockchain ledger
incoming_txs	A list of verified vessel data payloads to combine into a block

Value

An updated ledger list containing the new block

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