

Package: MarineChain (via r-universe)

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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>

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

RemoteRef HEAD

RemoteSha 81ffa22c1646100e8c0c98e9dcc76de8a99b4432

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app_server	<i>The Application Server Logic</i>
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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	<i>The Application User Interface</i>
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Description

The Application User Interface

Usage

app_ui(request)

Arguments

- | | |
|---------|---|
| request | The Shiny request object parameter environmental state. |
|---------|---|

calc_distance	<i>Calculate Geodetic Distance (Haversine Formula)</i>
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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	<i>Inject Malicious Attacks into Maritime Telemetry Streams</i>
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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	<i>Run the BMTS Shiny Simulator Application</i>
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Description

Run the BMTS Shiny Simulator Application

Usage

run_app()

simulate_crypto_ops	<i>Simulate Cryptographic Processing Overhead</i>
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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	<i>Simulate Multi-Hop Maritime Network Routing</i>
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Description

Simulate Multi-Hop Maritime Network Routing

Usage

simulate_network_routing(vessel_coord, cs_coord, haps_coord, payload_size_kb)

Arguments

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

Value

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

<code>simulate_poah_block</code>	<i>Simulate PoAH Blockchain Block Generation</i>
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Description

Simulate PoAH Blockchain Block Generation

Usage

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

Arguments

<code>dynamic_ledger</code>	A list representing the current blockchain ledger
<code>incoming_txs</code>	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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