Client View Engine

1.0.0

Generated by Doxygen 1.15.0

Chapter 1

Directory Hierarchy

1.1 Directories

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Chapter 3

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 5

File Index

5.1 File List

Here is a list of all files with brief descriptions:

Chapter 6

Directory Documentation

6.1 api Directory Reference

Files

- file __init__.py
- file stateapi.py

6.2 command Directory Reference

Files

- file basics.py
- file bss_tm_cmd.py
- file link_measurement_cmd.py
- file neighbor_cmd.py
- file request_beacon_cmd.py

6.3 control Directory Reference

Files

- file __init__.py
- file controller.py
- file hostapd.py

6.4 dashboard Directory Reference

Files

- file __init__.py
- file bmrep_dashboard.py
- file bsstm_dashboard.py
- file lmrep_dashboard.py
- file nbrank_dashboard.py
- file neighbor_dashboard.py
- file pipe_pool.py
- file qoe_dashboard.py
- file socket_pool.py
- file station_dashboard.py

6.5 db Directory Reference

Files

- file __init__.py
- file bmrep_db.py
- file bsstm_db.py
- file lmrep_db.py
- file nbrank_db.py
- file neighbor_db.py
- file qoe_db.py
- file station_db.py

6.6 defaults Directory Reference

Files

- file __init__.py
- file enums.py
- file info.py

6.7 metrics Directory Reference

Files

- file __init__.py
- file nbranking.py
- file qoe.py
- file tm_engine.py

6.8 model Directory Reference

Files

- file __init__.py
- file ap.py
- file mac_address.py
- file measurement.py
- file neighbor.py
- file station.py

6.9 parser Directory Reference

Files

- file ap_parser.py
- file measurement_parser.py
- file neighbor_parser.py
- file station_parser.py

6.10 protocol Directory Reference

Files

- file rxmux.py

6.11 store Directory Reference

Files

- file __init__.py
- file acceptance.py
- file routine.py

6.12 tests Directory Reference

Files

- file __init__.py
- file test_add_neib.py
- file test_bm.py
- file test_bss_tm.py
- file test_lm.py

Chapter 7

Namespace Documentation

7.1 ap_parser Namespace Reference

Classes

- class APParser

7.2 api Namespace Reference

Namespaces

- namespace stateapi

7.3 api.stateapi Namespace Reference

Classes

- class StateAPI

7.4 basics Namespace Reference

Classes

- class BasicCommand

7.5 bss_tm_cmd Namespace Reference

Classes

- class ReqMode
- class BssTmRequestBuilder

7.6 control Namespace Reference

Namespaces

- namespace controller
- namespace hostapd

7.7 control.controller Namespace Reference

Classes

- class Controller

Variables

- float CONTROLLER_WAIT_LOOP_SEC = 0.5

7.7.1 Variable Documentation

7.7.1.1 CONTROLLER_WAIT_LOOP_SEC

```
float control.controller.CONTROLLER_WAIT_LOOP_SEC = 0.5
```

7.8 control.hostapd Namespace Reference

Classes

- class LastCommandStatus
- class HostapdController

Variables

- controller = HostapdController()

7.8.1 Variable Documentation

7.8.1.1 controller

```
control.hostapd.controller = HostapdController()
```

7.9 dashboard Namespace Reference

Namespaces

- namespace bmrep_dashboard
- namespace bsstm_dashboard
- namespace lmrep_dashboard
- namespace nbrank_dashboard
- namespace neighbor_dashboard
- namespace pipe_pool
- namespace qoe_dashboard
- namespace socket_pool
- namespace station_dashboard

7.10 dashboard.bmrep_dashboard Namespace Reference

Classes

- class BeaconMeasurementDashboard

Functions

- write_stream (pipe_or_sock, str text)

7.10.1 Function Documentation

7.10.1.1 write_stream()

```
dashboard.bmrep_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.11 dashboard.bsstm_dashboard Namespace Reference

Classes

- class BSSTransitionResponseDashboard

Functions

- write_stream (pipe_or_sock, str text)

7.11.1 Function Documentation

7.11.1.1 write_stream()

```
dashboard.bsstm_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.12 dashboard.lmrep_dashboard Namespace Reference

Classes

- class LinkMeasurementDashboard

Functions

- write_stream (pipe_or_sock, str text)

7.12.1 Function Documentation

7.12.1.1 write_stream()

```
dashboard.lmrep_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.13 dashboard.nbrank_dashboard Namespace Reference

Classes

- class NeighborRankingDashboard

Functions

- write_stream (pipe_or_sock, str text)
- rcpi_to_db (rcpi_val)
- rsni_to_db (rsni_val)

7.13.1 Function Documentation

7.13.1.1 rcpi_to_db()

```
dashboard.nbrank_dashboard.rcpi_to_db (
              rcpi_val)
```

Convert RCPI (0..220) to dBm. RCPI to RSSI dBm: dBm = RCPI/2 - 110. Show N/A if invalid.

7.13.1.2 rsni_to_db()

```
dashboard.nbrank_dashboard.rsni_to_db (
              rsni_val)
```

Convert RSNI (0..255) to dB. RSNI to dB: value = RSNI/2 dB. Show N/A if invalid.

7.13.1.3 write_stream()

```
dashboard.nbrank_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.14 dashboard.neighbor_dashboard Namespace Reference

Classes

- class NeighborDashboard

Functions

- write_stream (pipe_or_sock, str text)

7.14.1 Function Documentation

7.14.1.1 write_stream()

```
dashboard.neighbor_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.15 dashboard.pipe_pool Namespace Reference

Classes

- class PipePool

7.16 dashboard.qoe_dashboard Namespace Reference

Classes

- class QoEDashboard

Functions

- write_stream (pipe_or_sock, str text)

7.16.1 Function Documentation

7.16.1.1 write_stream()

```
dashboard.qoe_dashboard.write_stream (
              pipe_or_sock,
             str text)
```

Write text to either a pipe (file) or a socket transparently.

7.17 dashboard.socket_pool Namespace Reference

Classes

- class ClientConnection
- class SocketPool

7.18 dashboard.station_dashboard Namespace Reference

Classes

- class StationDashboard

Functions

- write_stream (out, str text)
- str read_stream (inp)

7.18.1 Function Documentation

7.18.1.1 read_stream()

```
str dashboard.station_dashboard.read_stream (
              inp)
```

7.18.1.2 write_stream()

```
dashboard.station_dashboard.write_stream (
              out,
             str text)
```

7.19 db Namespace Reference

Namespaces

- namespace bmrep_db
- namespace bsstm_db
- namespace lmrep_db
- namespace nbrank_db
- namespace neighbor_db
- namespace qoe_db
- namespace station_db

7.20 db.bmrep_db Namespace Reference

Classes

- class BeaconMeasurementDB

Variables

- str DEFAULT_STA_MAC = "00:00:00:00:00:00"
- int EXPIRE_SEC = 300

7.20.1 Variable Documentation

7.20.1.1 DEFAULT_STA_MAC

```
str db.bmrep_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
```

7.20.1.2 EXPIRE_SEC

```
int db.bmrep_db.EXPIRE_SEC = 300
```

7.21 db.bsstm_db Namespace Reference

Classes

- class BSSTransitionResponseDB

Variables

- str DEFAULT_STA_MAC = "00:00:00:00:00:00"

7.21.1 Variable Documentation

7.21.1.1 DEFAULT_STA_MAC

```
str db.bsstm_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
```

7.22 db.lmrep_db Namespace Reference

Classes

- class LinkMeasurementDB

Variables

- str DEFAULT_STA_MAC = "00:00:00:00:00:00"

7.22.1 Variable Documentation

7.22.1.1 DEFAULT_STA_MAC

```
str db.lmrep_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
```

7.23 db.nbrank_db Namespace Reference

Classes

- class NeighborRankingDB

Variables

- str DEFAULT_STA_MAC = "00:00:00:00:00:00"

7.23.1 Variable Documentation

7.23.1.1 DEFAULT_STA_MAC

```
str db.nbrank_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
```

7.24 db.neighbor_db Namespace Reference

Classes

- class NeighborDB

Variables

- str DEFAULT_STA_MAC = "00:00:00:00:00:00"

7.24.1 Variable Documentation

7.24.1.1 DEFAULT_STA_MAC

```
str db.neighbor_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
```

7.25 db.qoe_db Namespace Reference

Classes

- class QoEDB

7.26 db.station_db Namespace Reference

Classes

- class StationDB

7.27 defaults Namespace Reference

Namespaces

- namespace enums
- namespace info

7.28 defaults.enums Namespace Reference

Classes

- class WiFi24GHZChannels
- class WiFi24GHZChannelsNo
- class WiFiOperatingClass

7.29 defaults.info Namespace Reference

Variables

- dict CAPABILITY_FLAGS
- dict EXT_CAPABILITY_FLAGS
- dict OPERATING_CLASS_TABLE
- dict PHY_TYPE_TABLE

7.29.1 Variable Documentation

7.29.1.1 CAPABILITY_FLAGS

```
dict defaults.info.CAPABILITY_FLAGS
```

Initial value:

```
00001 =  {
00002     0x0001: "ESS",
00003     0x0002: "IBSS",
00004     0x0004: "CF_POLLABLE",
00005     0x0008: "CF_POLL_REQUEST",
00006     0x0010: "PRIVACY",
00007     0x0020: "SHORT_PREAMBLE",
00008     0x0040: "PBCC",
00009     0x0080: "CHANNEL_AGILITY",
00010     0x0100: "SPECTRUM_MGMT",
00011     0x0200: "QOS",
00012     0x0400: "SHORT_SLOT_TIME",
00013     0x0800: "APSD",
00014     0x1000: "RADIO_MEASUREMENT",
00015     0x2000: "DSSS_OFDM",
00016     0x4000: "DELAYED_BA",
00017     0x8000: "IMMEDIATE_BA",
00018 }
```

7.29.1.2 EXT_CAPABILITY_FLAGS

```
dict defaults.info.EXT_CAPABILITY_FLAGS
```

Initial value:

```
00001 =  {
00002     0: "20_40_BSS_COEXISTENCE",
00003     1: "EXT_CHANNEL_SWITCHING",
00004     2: "PSMP_CAP",
00005     3: "SPSMP_CAP",
00006     8: "FMS",
00007     9: "PROXY_ARP",
00008     10: "COLLOCATED_INTERFERENCE",
00009     11: "CIVIC_LOCATION",
00010     12: "GEOSPACIAL_LOCATION",
00011     16: "TFS",
00012     17: "WNM_SLEEP_MODE",
00013     18: "TIM_BROADCAST",
00014     19: "BSS_TRANSITION",
00015     24: "TIMING_MEASUREMENT",
00016     25: "CHANNEL_USAGE",
00017     26: "SSID_LIST",
00018     40: "FILS_CAP",
00019     41: "TWT_REQUESTER",
00020     42: "TWT_RESPONDER",
00021 }
```

7.29.1.3 OPERATING_CLASS_TABLE

```
dict defaults.info.OPERATING_CLASS_TABLE
```

Initial value:

```
00001 =  {
00002     81: "2.4GHz 20MHz (channels 1...13)",
00003     82: "2.4GHz 40MHz (channels 3...11)",
00004     83: "2.4GHz 20MHz (channel 14)",
00005     115: "5GHz 20MHz (36...48)",
00006     116: "5GHz 40MHz (38...46)",
00007     117: "5GHz 80MHz (42)",
00008     118: "5GHz 160MHz (50)",
00009     119: "5GHz 20MHz (52...64)",
00010     120: "5GHz 40MHz (54...62)",
00011     121: "5GHz 80MHz (58)",
00012     122: "5GHz 160MHz (50)",
00013     125: "6GHz 20MHz (1...233)",
00014     126: "6GHz 40MHz (3...231)",
00015     127: "6GHz 80MHz (7...227)",
00016     128: "6GHz 160MHz (15...219)",
00017     # 6 GHz extensions (IEEE 802.11ax/ay)
00018     129: "6GHz 20MHz (low band)",
00019     130: "6GHz 40MHz (low band)",
00020     131: "6GHz 80MHz (low band)",
00021     132: "6GHz 160MHz (low band)",
00022     # 60 GHz (802.11ad/ay)
00023     180: "60GHz (Channel 1)",
00024     181: "60GHz (Channel 2)",
00025     182: "60GHz (Channel 3)",
00026     183: "60GHz (Channel 4)",
00027 }
```

7.29.1.4 PHY_TYPE_TABLE

```
dict defaults.info.PHY_TYPE_TABLE
```

Initial value:

```
00001 =  {
00002     0: "Unknown",
00003     1: "FHSS",
00004     2: "DSSS",
00005     3: "IR Baseband",
00006     4: "OFDM (802.11a/g)",
00007     5: "HR/DSSS (802.11b)",
00008     6: "ERP (802.11g)",
00009     7: "HT (802.11n)",
00010     8: "VHT (802.11ac)",
00011     9: "HE (802.11ax)",
00012     10: "EHT (802.11be)",
00013 }
```

7.30 link_measurement_cmd Namespace Reference

Classes

- class LinkMeasurementCommandBuilder

7.31 logger Namespace Reference

Classes

- class LogLevel
- class Logger

7.32 measurement_parser Namespace Reference

Functions

- Optional[BeaconMeasurement] parse_beacon_measurement (dot11)
- Optional[LinkMeasurement] parse_link_measurement (dot11)
- Optional[BSSTransitionResponse] parse_bss_tm_response (dot11)

7.32.1 Function Documentation

7.32.1.1 parse_beacon_measurement()

```
Optional[BeaconMeasurement] measurement_parser.parse_beacon_measurement (
              dot11)
```

```
Convert a Scapy 802.11k Beacon Report frame into a BeaconMeasurement object.
Returns None if the frame is not a Beacon Measurement Report.
Logs each step for debugging.
```

7.32.1.2 parse_bss_tm_response()

```
Optional[BSSTransitionResponse] measurement_parser.parse_bss_tm_response (
              dot11)
```

```
Parse an 802.11v BSS Transition Management Response.
Keeps Logger.log_info() calls for full traceability.
```

7.32.1.3 parse_link_measurement()

```
Optional[LinkMeasurement] measurement_parser.parse_link_measurement (
              dot11)
```

```
Convert a Scapy 802.11k Link Measurement Report frame into a LinkMeasurement object.
Returns None if the frame is not a Link Measurement Report.
Logs each step for debugging.
```

7.33 metrics Namespace Reference

Namespaces

- namespace nbranking
- namespace qoe
- namespace tm_engine

7.34 metrics.nbranking Namespace Reference

Classes

- class NeighborRanking

7.35 metrics.qoe Namespace Reference

Classes

- class QoEComponents
- class QoEHistory
- class QoE

7.36 metrics.tm_engine Namespace Reference

Classes

- class TransitionManagementEngine

Variables

- float QOE_TRANSITION_THRESHOLD = 0.55

7.36.1 Variable Documentation

7.36.1.1 QOE_TRANSITION_THRESHOLD

```
float metrics.tm_engine.QOE_TRANSITION_THRESHOLD = 0.55
```

7.37 model Namespace Reference

Namespaces

- namespace ap
- namespace mac_address
- namespace measurement
- namespace neighbor
- namespace station

7.38 model.ap Namespace Reference

Classes

- class APStatus
- class AP

7.39 model.mac_address Namespace Reference

Classes

- class MacAddress

7.40 model.measurement Namespace Reference

Classes

- class BeaconReport
- class BeaconMeasurement
- class LinkMeasurement
- class BSSTransitionResponse

7.41 model.neighbor Namespace Reference

Classes

- class Neighbor

7.42 model.station Namespace Reference

Classes

- class Station

7.43 neighbor_cmd Namespace Reference

Classes

- class NeighborCommandBuilder

7.44 neighbor_parser Namespace Reference

Classes

- class NeighborParser

Functions

- Neighbor neighbor_from_beacon_report (BeaconReport br)

7.44.1 Function Documentation

7.44.1.1 neighbor_from_beacon_report()

```
Neighbor neighbor_parser.neighbor_from_beacon_report (
            BeaconReport br)
```

```
Convert a BeaconReport into a Neighbor object.
Only fields available from BeaconReport are filled.
```

7.45 request_beacon_cmd Namespace Reference

Classes

- class OperatingClass
- class MeasurementMode
- class ReqMode
- class RequestBeaconCommandBuilder

7.46 run_tests Namespace Reference

Functions

- main ()

7.46.1 Function Documentation

7.46.1.1 main()

```
run_tests.main ()
```

7.47 runner Namespace Reference

Functions

- link_measurement_scheduler (ctrl, StationDB stationDB, LinkMeasurementDB lmrepDB, interval_sec)
- beacon_measurement_scheduler (ctrl, StationDB stationDB, neighborDB, BeaconMeasurementDB bmrep↩ DB, interval_sec)
- qoe_scheduler (QoE qoe_calc, float interval_sec=5.0)
- nbranking_scheduler (StationDB stdb, NeighborRankingDB nrdb, BeaconMeasurementDB bmr, NeighborDB ndb, float interval_sec=5.0)
- bss_tm_scheduler (Controller controller, float interval_sec=5.0)
- accept_thread (SocketPool pool, str name)
- server_thread ()
- main ()

7.47.1 Function Documentation

7.47.1.1 accept_thread()

```
runner.accept_thread (
             SocketPool pool,
             str name)
```

Accept incoming connections and track them.

7.47.1.2 beacon_measurement_scheduler()

```
runner.beacon_measurement_scheduler (
              ctrl,
             StationDB stationDB,
              neighborDB,
             BeaconMeasurementDB bmrepDB,
              interval_sec)
```

7.47.1.3 bss_tm_scheduler()

```
runner.bss_tm_scheduler (
             Controller controller,
             float  interval_sec = 5.0)
```

7.47.1.4 link_measurement_scheduler()

```
runner.link_measurement_scheduler (
              ctrl,
             StationDB stationDB,
             LinkMeasurementDB lmrepDB,
              interval_sec)
```

7.47.1.5 main()

```
runner.main ()
```

7.47.1.6 nbranking_scheduler()

```
runner.nbranking_scheduler (
            StationDB stdb,
            NeighborRankingDB nrdb,
            BeaconMeasurementDB bmr,
            NeighborDB ndb,
            float  interval_sec = 5.0)
```

7.47.1.7 qoe_scheduler()

```
runner.qoe_scheduler (
            QoE qoe_calc,
            float  interval_sec = 5.0)
```

7.47.1.8 server_thread()

```
runner.server_thread ()
```

7.48 rxmux Namespace Reference

Classes

- class MgmtType
- class RxMux

7.49 station_parser Namespace Reference

Classes

- class StationParser

7.50 store Namespace Reference

Namespaces

- namespace acceptance
- namespace routine

7.51 store.acceptance Namespace Reference

Classes

- class BSSTransitionResponseStatus
- class BSSTransitionAcceptance

7.52 store.routine Namespace Reference

Classes

- class Routine

7.53 tests Namespace Reference

Namespaces

- namespace test_add_neib
- namespace test_bm
- namespace test_bss_tm
- namespace test_lm

7.54 tests.test_add_neib Namespace Reference

Functions

- test_add_neib ()

7.54.1 Function Documentation

7.54.1.1 test_add_neib()

```
tests.test_add_neib.test_add_neib ()
```

7.55 tests.test_bm Namespace Reference

Functions

- test_rbm ()

7.55.1 Function Documentation

7.55.1.1 test_rbm()

```
tests.test_bm.test_rbm ()
```

7.56 tests.test_bss_tm Namespace Reference

Functions

- test_bss_tm ()

7.56.1 Function Documentation

7.56.1.1 test_bss_tm()

```
tests.test_bss_tm.test_bss_tm ()
```

7.57 tests.test_lm Namespace Reference

Functions

- test_lm ()

7.57.1 Function Documentation

7.57.1.1 test_lm()

```
tests.test_lm.test_lm ()
```

Chapter 8

Class Documentation

8.1 model.ap.AP Class Reference

Public Member Functions

- __init__ (ap)
- to_dict (self)
- __str__ (self)

8.1.1 Constructor & Destructor Documentation

8.1.1.1 __init__()

```
model.ap.AP.__init__ (
              ap)
```

8.1.2 Member Function Documentation

8.1.2.1 __str__()

```
model.ap.AP.__str__ (
              self)
```

8.1.2.2 to_dict()

```
model.ap.AP.to_dict (
              self)
```

```
Dump the complete state of the AP.
Returns a dictionary of all AP attributes.
```

The documentation for this class was generated from the following file:

- model/ap.py

8.2 ap_parser.APParser Class Reference

Public Member Functions

- parse_status (AP ap, str content)

Static Public Member Functions

- from_content (str content)
- list decode_supported_rates (rate_hex_str)

Static Protected Member Functions

- _convert_value (ap, str value)

8.2.1 Member Function Documentation

8.2.1.1 _convert_value()

```
ap_parser.APParser._convert_value (
              ap,
             str value)  [static], [protected]
```

Convert string value to appropriate type (int, hex, None, or string).

8.2.1.2 decode_supported_rates()

```
list ap_parser.APParser.decode_supported_rates (
              rate_hex_str)  [static]
```

Convert the supported rate hex string into Mbps list

8.2.1.3 from_content()

```
ap_parser.APParser.from_content (
             str content)  [static]
```

8.2.1.4 parse_status()

```
ap_parser.APParser.parse_status (
             AP ap,
             str content)
```

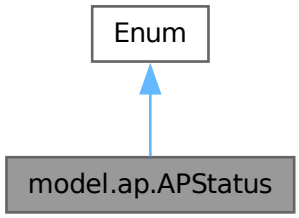
Parse status content from hostapd in key=value format.

The documentation for this class was generated from the following file:

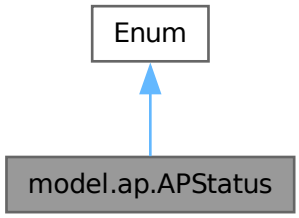
- parser/ap_parser.py

8.3 model.ap.APStatus Class Reference

Inheritance diagram for model.ap.APStatus:



Collaboration diagram for model.ap.APStatus:



Static Public Attributes

- int AP_ENABLED = 1
- int AP_DISABLED = 0

8.3.1 Member Data Documentation

8.3.1.1 AP_DISABLED

```
int model.ap.APStatus.AP_DISABLED = 0  [static]
```

8.3.1.2 AP_ENABLED

```
int model.ap.APStatus.AP_ENABLED = 1  [static]
```

The documentation for this class was generated from the following file:

- model/ap.py

8.4 basics.BasicCommand Class Reference

Public Member Functions

- str status ()

Static Public Member Functions

- str enable ()
- str disable ()
- str station_info (str mac)
- str first_station ()
- str next_station (str mac)
- str chan_switch (int beacon_interv, WiFi24GHZChannels freq)
- str show_neighbor ()
- str remove_neighbor (str bssid)
- str reload_config ()
- str reload ()

8.4.1 Member Function Documentation

8.4.1.1 chan_switch()

```
str basics.BasicCommand.chan_switch (
            int beacon_interv,
            WiFi24GHZChannels freq)  [static]
```

8.4.1.2 disable()

```
str basics.BasicCommand.disable ()  [static]
```

8.4.1.3 enable()

```
str basics.BasicCommand.enable ()  [static]
```

8.4.1.4 first_station()

```
str basics.BasicCommand.first_station ()  [static]
```

8.4.1.5 next_station()

```
str basics.BasicCommand.next_station (
            str mac)  [static]
```

8.4.1.6 reload()

```
str basics.BasicCommand.reload ()  [static]
```

8.4.1.7 reload_config()

```
str basics.BasicCommand.reload_config ()  [static]
```

8.4.1.8 remove_neighbor()

```
str basics.BasicCommand.remove_neighbor (
            str bssid)  [static]
```

8.4.1.9 show_neighbor()

```
str basics.BasicCommand.show_neighbor ()  [static]
```

8.4.1.10 station_info()

```
str basics.BasicCommand.station_info (
            str mac)  [static]
```

8.4.1.11 status()

```
str basics.BasicCommand.status ()
```

The documentation for this class was generated from the following file:

- command/basics.py

8.5 model.measurement.BeaconMeasurement Class Reference

Public Member Functions

- __post_init__ (self)
- dict to_dict (self)

Static Public Member Functions

- "BeaconMeasurement" from_bytes (bytes bts, str sta_mac=None)

Static Public Attributes

- Optional sta_mac = None
- int measurement_token = None
- int dialog_token = None
- List beacon_reports = None

8.5.1 Member Function Documentation

8.5.1.1 __post_init__()

```
model.measurement.BeaconMeasurement.__post_init__ (
              self)
```

8.5.1.2 from_bytes()

```
"BeaconMeasurement" model.measurement.BeaconMeasurement.from_bytes (
             bytes bts,
             str  sta_mac = None)  [static]
```

8.5.1.3 to_dict()

```
dict model.measurement.BeaconMeasurement.to_dict (
              self)
```

Dump the complete state of the BeaconMeasurement.

8.5.2 Member Data Documentation

8.5.2.1 beacon_reports

```
List model.measurement.BeaconMeasurement.beacon_reports = None  [static]
```

8.5.2.2 dialog_token

```
model.measurement.BeaconMeasurement.dialog_token = None  [static]
```

8.5.2.3 measurement_token

```
model.measurement.BeaconMeasurement.measurement_token = None  [static]
```

8.5.2.4 sta_mac

```
model.measurement.BeaconMeasurement.sta_mac = None  [static]
```

The documentation for this class was generated from the following file:

- model/measurement.py

8.6 dashboard.bmrep_dashboard.BeaconMeasurementDashboard Class Reference

Public Member Functions

- __init__ (self, BeaconMeasurementDB bm_db)
- str as_table (self, Optional[str] sort_by="rcpi", Optional[int] limit=None)
- show (self, Optional[str] sort_by="rcpi", Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False)

Public Attributes

- db = bm_db

8.6.1 Detailed Description

```
Prettier, tabulated display of current BeaconMeasurementDB contents.
```

8.6.2 Constructor & Destructor Documentation

8.6.2.1 __init__()

```
dashboard.bmrep_dashboard.BeaconMeasurementDashboard.__init__ (
              self,
             BeaconMeasurementDB bm_db)
```

8.6.3 Member Function Documentation

8.6.3.1 as_table()

```
str dashboard.bmrep_dashboard.BeaconMeasurementDashboard.as_table (
              self,
             Optional[str]  sort_by = "rcpi",
             Optional[int]  limit = None)
```

8.6.3.2 show()

```
dashboard.bmrep_dashboard.BeaconMeasurementDashboard.show (
              self,
             Optional[str]  sort_by = "rcpi",
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False)
```

8.6.4 Member Data Documentation

8.6.4.1 db

```
dashboard.bmrep_dashboard.BeaconMeasurementDashboard.db = bm_db
```

The documentation for this class was generated from the following file:

- dashboard/bmrep_dashboard.py

8.7 db.bmrep_db.BeaconMeasurementDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- add (self, BeaconMeasurement bm, Optional[str] sta_mac=None)
- list[BeaconMeasurement] get (self, Optional[str] sta_mac=None)
- Dict[str, list[BeaconMeasurement]] all (self)
- Dict[str, list[BeaconMeasurement]] raw (self)
- Dict[str, list[dict]] to_dict (self)
- remove (self, Optional[str] sta_mac=None)
- clear (self, Optional[str] sta_mac=None)
- bool is_expired (self, float ts)
- int count (self, Optional[str] sta_mac=None)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __repr__ (self)

Protected Attributes

- dict _store = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.7.1 Detailed Description

```
BeaconMeasurement DB with soft expiration.
Internally stores timestamps, but all public access returns the old format.
```

8.7.2 Constructor & Destructor Documentation

8.7.2.1 __init__()

```
db.bmrep_db.BeaconMeasurementDB.__init__ (
              self)
```

8.7.3 Member Function Documentation

8.7.3.1 __contains__()

```
bool db.bmrep_db.BeaconMeasurementDB.__contains__ (
              self,
             str sta_mac)
```

8.7.3.2 __len__()

```
db.bmrep_db.BeaconMeasurementDB.__len__ (
              self)
```

8.7.3.3 __new__()

```
db.bmrep_db.BeaconMeasurementDB.__new__ (
              cls)
```

8.7.3.4 __repr__()

```
db.bmrep_db.BeaconMeasurementDB.__repr__ (
              self)
```

8.7.3.5 add()

```
db.bmrep_db.BeaconMeasurementDB.add (
              self,
             BeaconMeasurement bm,
             Optional[str]  sta_mac = None)
```

8.7.3.6 all()

```
Dict[str, list[BeaconMeasurement]] db.bmrep_db.BeaconMeasurementDB.all (
              self)
```

8.7.3.7 clear()

```
db.bmrep_db.BeaconMeasurementDB.clear (
              self,
             Optional[str]  sta_mac = None)
```

8.7.3.8 count()

```
int db.bmrep_db.BeaconMeasurementDB.count (
              self,
             Optional[str]  sta_mac = None)
```

8.7.3.9 get()

```
list[BeaconMeasurement] db.bmrep_db.BeaconMeasurementDB.get (
              self,
             Optional[str]  sta_mac = None)
```

8.7.3.10 is_expired()

```
bool db.bmrep_db.BeaconMeasurementDB.is_expired (
              self,
             float ts)
```

Check if the provided timestamp is expired based on EXPIRE_SEC.

Args:
    ts (float): Timestamp to check.

Returns:
    bool: True if the timestamp is expired, False otherwise.

8.7.3.11 raw()

```
Dict[str, list[BeaconMeasurement]] db.bmrep_db.BeaconMeasurementDB.raw (
              self)
```

8.7.3.12 remove()

```
db.bmrep_db.BeaconMeasurementDB.remove (
              self,
             Optional[str]  sta_mac = None)
```

8.7.3.13 to_dict()

```
Dict[str, list[dict]] db.bmrep_db.BeaconMeasurementDB.to_dict (
              self)
```

Return the complete state of the database, omitting timestamps.
Keys are station MAC addresses; values are lists of measurements (as dicts if possible, else repr()).

8.7.4 Member Data Documentation

8.7.4.1 _initialized

```
bool db.bmrep_db.BeaconMeasurementDB._initialized = True  [protected]
```

8.7.4.2 _instance

```
db.bmrep_db.BeaconMeasurementDB._instance = None  [static], [protected]
```

8.7.4.3 _lock

```
db.bmrep_db.BeaconMeasurementDB._lock = RLock()  [static], [protected]
```

8.7.4.4 _store

```
dict db.bmrep_db.BeaconMeasurementDB._store = {}  [protected]
```

The documentation for this class was generated from the following file:

- db/bmrep_db.py

8.8 model.measurement.BeaconReport Class Reference

Public Member Functions

- float rssi_dbm (self)
- float snr_db (self)
- Optional[str] parse_ssid (self)
- dict to_dict (self)

Public Attributes

- operating_class
- channel_number
- measurement_start_time
- measurement_duration
- reported_frame_info
- rcpi
- rsni
- bssid
- antenna_id
- parent_tsf
- rssi_dbm
- snr_db

Static Public Attributes

- Optional reported_frame_body = None
- Optional ssid = None

8.8.1 Member Function Documentation

8.8.1.1 parse_ssid()

```
Optional[str] model.measurement.BeaconReport.parse_ssid (
              self)
```

8.8.1.2 rssi_dbm()

```
float model.measurement.BeaconReport.rssi_dbm (
              self)
```

8.8.1.3 snr_db()

```
float model.measurement.BeaconReport.snr_db (
              self)
```

8.8.1.4 to_dict()

```
dict model.measurement.BeaconReport.to_dict (
              self)
```

Dump the complete state of the BeaconReport.

8.8.2 Member Data Documentation

8.8.2.1 antenna_id

model.measurement.BeaconReport.antenna_id

8.8.2.2 bssid

model.measurement.BeaconReport.bssid

8.8.2.3 channel_number

model.measurement.BeaconReport.channel_number

8.8.2.4 measurement_duration

model.measurement.BeaconReport.measurement_duration

8.8.2.5 measurement_start_time

model.measurement.BeaconReport.measurement_start_time

8.8.2.6 operating_class

model.measurement.BeaconReport.operating_class

8.8.2.7 parent_tsf

model.measurement.BeaconReport.parent_tsf

8.8.2.8 rcpi

model.measurement.BeaconReport.rcpi

8.8.2.9 reported_frame_body

model.measurement.BeaconReport.reported_frame_body = None [static]

8.8.2.10 reported_frame_info

model.measurement.BeaconReport.reported_frame_info

8.8.2.11 rsni

`model.measurement.BeaconReport.rsni`

8.8.2.12 rssi_dbm

`model.measurement.BeaconReport.rssi_dbm`

8.8.2.13 snr_db

`model.measurement.BeaconReport.snr_db`

8.8.2.14 ssid

`model.measurement.BeaconReport.ssid = None [static]`

The documentation for this class was generated from the following file:

- model/measurement.py

8.9 bss_tm_cmd.BssTmRequestBuilder Class Reference

Public Member Functions

- __init__ (self, str sta_addr, ReqMode req_mode, Optional[int] disassoc_timer=None, Optional[int] validity_interval=None, Optional[List["Neighbor"]] neighbors=None, Optional[int] dialog_token=None)
- str build (self)
- __str__ (self)

Public Attributes

- sta_addr = sta_addr
- req_mode = req_mode
- disassoc_timer = disassoc_timer
- validity_interval = validity_interval
- neighbors = neighbors or [ ]
- dialog_token = dialog_token

Static Protected Member Functions

- str _encode_neighbor ("Neighbor" n)

8.9.1 Detailed Description

```
Builds a BSS Transition Management Request (BSS_TM_REQ) command for hostapd_cli.
Supports multiple neighbors.
```

8.9.2 Constructor & Destructor Documentation

8.9.2.1 __init__()

```
bss_tm_cmd.BssTmRequestBuilder.__init__ (
              self,
             str sta_addr,
             ReqMode req_mode,
             Optional[int]  disassoc_timer = None,
             Optional[int]  validity_interval = None,
             Optional[List["Neighbor"]]  neighbors = None,
             Optional[int]  dialog_token = None)
```

8.9.3 Member Function Documentation

8.9.3.1 __str__()

```
bss_tm_cmd.BssTmRequestBuilder.__str__ (
              self)
```

8.9.3.2 _encode_neighbor()

```
str bss_tm_cmd.BssTmRequestBuilder._encode_neighbor (
             "Neighbor" n)  [static], [protected]

Encode Neighbor instance into Neighbor Report hex.
```

8.9.3.3 build()

```
str bss_tm_cmd.BssTmRequestBuilder.build (
              self)

Build full hostapd_cli BSS_TM_REQ command string.
```

8.9.4 Member Data Documentation

8.9.4.1 dialog_token

```
bss_tm_cmd.BssTmRequestBuilder.dialog_token = dialog_token
```

8.9.4.2 disassoc_timer

```
bss_tm_cmd.BssTmRequestBuilder.disassoc_timer = disassoc_timer
```

8.9.4.3 neighbors

```
bss_tm_cmd.BssTmRequestBuilder.neighbors = neighbors or []
```

8.9.4.4 req_mode

```
bss_tm_cmd.BssTmRequestBuilder.req_mode = req_mode
```

8.9.4.5 sta_addr

```
bss_tm_cmd.BssTmRequestBuilder.sta_addr = sta_addr
```

8.9.4.6 validity_interval

```
bss_tm_cmd.BssTmRequestBuilder.validity_interval = validity_interval
```

The documentation for this class was generated from the following file:

- command/bss_tm_cmd.py

8.10 store.acceptance.BSSTransitionAcceptance Class Reference

Public Member Functions

- __new__ (cls, Optional[str] persist_path=None)
- None __init__ (self, Optional[str] persist_path=None)
- None add (self, MacAddress mac, int status)
- List[int] get (self, MacAddress mac)
- Dict[str, List[int]] to_dict (self)
- None save (self, Optional[str] path=None)
- None load (self, Optional[str] path=None)
- __len__ (self)
- bool __contains__ (self, MacAddress mac)
- List[int] __getitem__ (self, MacAddress mac)
- __repr__ (self)

Public Attributes

- Dict[str, List[int]] info = dict()
- str persist_path = persist_path or "bss_transition_acceptance.json"

Protected Member Functions

- None _save (self, Optional[str] path=None)
- None _load (self, Optional[str] path=None)

Protected Attributes

- _lock = threading.Lock()
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _instance_lock = threading.Lock()

8.10.1 Detailed Description

```
Singleton class that accepts and persists BSS Transition response statuses for each station.
```

8.10.2 Constructor & Destructor Documentation

8.10.2.1 __init__()

```
None store.acceptance.BSSTransitionAcceptance.__init__ (
              self,
             Optional[str]  persist_path = None)
```

8.10.3 Member Function Documentation

8.10.3.1 __contains__()

```
bool store.acceptance.BSSTransitionAcceptance.__contains__ (
              self,
             MacAddress mac)
```

8.10.3.2 __getitem__()

```
List[int] store.acceptance.BSSTransitionAcceptance.__getitem__ (
              self,
             MacAddress mac)
```

8.10.3.3 __len__()

```
store.acceptance.BSSTransitionAcceptance.__len__ (
              self)
```

8.10.3.4 __new__()

```
store.acceptance.BSSTransitionAcceptance.__new__ (
              cls,
             Optional[str]  persist_path = None)
```

8.10.3.5 __repr__()

```
store.acceptance.BSSTransitionAcceptance.__repr__ (
              self)
```

8.10.3.6 _load()

```
None store.acceptance.BSSTransitionAcceptance._load (
              self,
             Optional[str]  path = None)  [protected]
```

Internal, thread-safe load-from-path.

8.10.3.7 _save()

```
None store.acceptance.BSSTransitionAcceptance._save (
              self,
             Optional[str]  path = None)  [protected]
```

Internal, thread-safe save-to-path.

8.10.3.8 add()

```
None store.acceptance.BSSTransitionAcceptance.add (
              self,
             MacAddress mac,
             int status)
```

Add a response status for a MAC. Will also persist immediately (incremental persistence).
Args:
    mac: MacAddress (object or string)
    status: BSSTransitionResponseStatus

8.10.3.9 get()

```
List[int] store.acceptance.BSSTransitionAcceptance.get (
              self,
             MacAddress mac)
```

Get the list of response statuses for a MAC address.
Returns: List of BSSTransitionResponseStatus

8.10.3.10 load()

```
None store.acceptance.BSSTransitionAcceptance.load (
              self,
             Optional[str]  path = None)
```

Manually reload from file.

8.10.3.11 save()

```
None store.acceptance.BSSTransitionAcceptance.save (
              self,
             Optional[str]  path = None)
```

Save the current info dict to file, overwriting it.

8.10.3.12 to_dict()

```
Dict[str, List[int]] store.acceptance.BSSTransitionAcceptance.to_dict (
              self)
```

Return the full mapping mac->list-of-status as JSON-serializable dict.

8.10.4 Member Data Documentation

8.10.4.1 _initialized

```
bool store.acceptance.BSSTransitionAcceptance._initialized = True  [protected]
```

8.10.4.2 _instance

```
store.acceptance.BSSTransitionAcceptance._instance = None  [static], [protected]
```

8.10.4.3 _instance_lock

```
store.acceptance.BSSTransitionAcceptance._instance_lock = threading.Lock()  [static], [protected]
```

8.10.4.4 _lock

```
store.acceptance.BSSTransitionAcceptance._lock = threading.Lock()  [protected]
```

8.10.4.5 info

```
store.acceptance.BSSTransitionAcceptance.info = dict()
```

8.10.4.6 persist_path

```
str store.acceptance.BSSTransitionAcceptance.persist_path = persist_path or "bss_transition_↩
acceptance.json"
```

The documentation for this class was generated from the following file:

- store/acceptance.py

8.11 model.measurement.BSSTransitionResponse Class Reference

Public Member Functions

- bool accepted (self)
- bool rejected (self)
- bool has_candidates (self)
- bool has_vendor_extensions (self)
- bool termination_imminent (self)
- dict to_dict (self)
- __repr__ (self)

Public Attributes

- int status_code = 0
- dialog_token
- accepted
- rejected
- has_candidates
- has_vendor_extensions
- termination_imminent

Static Public Attributes

- int bss_termination_delay = 0
- Optional target_bssid = None
- List candidate_list = field(default_factory=list)
- List neighbor_reports = field(default_factory=list)
- List vendor_ies = field(default_factory=list)
- List extra_ies = field(default_factory=list)

8.11.1 Detailed Description

```
Parsed representation of an 802.11v BSS Transition Management Response
(Action Code = 8 under WNM category 10).
```

8.11.2 Member Function Documentation

8.11.2.1 __repr__()

```
model.measurement.BSSTransitionResponse.__repr__ (
              self)
```

8.11.2.2 accepted()

```
bool model.measurement.BSSTransitionResponse.accepted (
              self)
```

True if the STA accepted the BSS transition suggestion.

8.11.2.3 has_candidates()

```
bool model.measurement.BSSTransitionResponse.has_candidates (
              self)
```

Whether the response contains any candidate BSS entries.

8.11.2.4 has_vendor_extensions()

```
bool model.measurement.BSSTransitionResponse.has_vendor_extensions (
              self)
```

8.11.2.5 rejected()

```
bool model.measurement.BSSTransitionResponse.rejected (
              self)
```

8.11.2.6 termination_imminent()

```
bool model.measurement.BSSTransitionResponse.termination_imminent (
              self)
```

Non-zero termination delay means AP plans to disassociate soon.

8.11.2.7 to_dict()

```
dict model.measurement.BSSTransitionResponse.to_dict (
              self)
```

Dump the complete state of the BSSTransitionResponse.

8.11.3 Member Data Documentation

8.11.3.1 accepted

model.measurement.BSSTransitionResponse.accepted

8.11.3.2 bss_termination_delay

model.measurement.BSSTransitionResponse.bss_termination_delay = 0 [static]

8.11.3.3 candidate_list

model.measurement.BSSTransitionResponse.candidate_list = field(default_factory=list) [static]

8.11.3.4 dialog_token

model.measurement.BSSTransitionResponse.dialog_token

8.11.3.5 extra_ies

model.measurement.BSSTransitionResponse.extra_ies = field(default_factory=list) [static]

8.11.3.6 has_candidates

model.measurement.BSSTransitionResponse.has_candidates

8.11.3.7 has_vendor_extensions

model.measurement.BSSTransitionResponse.has_vendor_extensions

8.11.3.8 neighbor_reports

model.measurement.BSSTransitionResponse.neighbor_reports = field(default_factory=list) [static]

8.11.3.9 rejected

model.measurement.BSSTransitionResponse.rejected

8.11.3.10 status_code

model.measurement.BSSTransitionResponse.status_code = 0

8.11.3.11 target_bssid

```
model.measurement.BSSTransitionResponse.target_bssid = None  [static]
```

8.11.3.12 termination_imminent

```
model.measurement.BSSTransitionResponse.termination_imminent
```

8.11.3.13 vendor_ies

```
model.measurement.BSSTransitionResponse.vendor_ies = field(default_factory=list)  [static]
```

The documentation for this class was generated from the following file:

- model/measurement.py

8.12 dashboard.bsstm_dashboard.BSSTransitionResponseDashboard Class Reference

Public Member Functions

- __init__ (self, BSSTransitionResponseDB db)
- str as_table (self, Optional[str] sort_by="dialog_token", Optional[int] limit=None)
- show (self, Optional[str] sort_by="dialog_token", Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False)

Public Attributes

- db = db

8.12.1 Detailed Description

```
Prettier, boxed/tabulated display of current BSSTransitionResponseDB contents.
```

8.12.2 Constructor & Destructor Documentation

8.12.2.1 __init__()

```
dashboard.bsstm_dashboard.BSSTransitionResponseDashboard.__init__ (
              self,
             BSSTransitionResponseDB db)
```

8.12.3 Member Function Documentation

8.12.3.1 as_table()

```
str dashboard.bsstm_dashboard.BSSTransitionResponseDashboard.as_table (
              self,
             Optional[str]  sort_by = "dialog_token",
             Optional[int]  limit = None)
```

8.12.3.2 show()

```
dashboard.bsstm_dashboard.BSSTransitionResponseDashboard.show (
              self,
             Optional[str]  sort_by = "dialog_token",
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False)
```

8.12.4 Member Data Documentation

8.12.4.1 db

```
dashboard.bsstm_dashboard.BSSTransitionResponseDashboard.db = db
```

The documentation for this class was generated from the following file:

- dashboard/bsstm_dashboard.py

8.13 db.bsstm_db.BSSTransitionResponseDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self, Optional[str] filename=None)
- add (self, "BSSTransitionResponse" resp, Optional[str] sta_mac=None)
- remove (self, int dialog_token, Optional[str] sta_mac=None)
- Optional["BSSTransitionResponse"] get (self, int dialog_token, Optional[str] sta_mac=None)
- List["BSSTransitionResponse"] all_for_sta (self, Optional[str] sta_mac=None)
- Dict[str, List["BSSTransitionResponse"]] all (self)
- int count (self, Optional[str] sta_mac=None)
- clear (self, Optional[str] sta_mac=None)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __iter__ (self)
- to_dict (self)
- __repr__ (self)

Public Attributes

- filename = filename
- acceptance = BSSTransitionAcceptance(self.filename)

Protected Attributes

- dict _db = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.13.1 Detailed Description

```
Database for storing BSSTransitionResponse reports per station.
```

8.13.2 Constructor & Destructor Documentation

8.13.2.1 __init__()

```
db.bsstm_db.BSSTransitionResponseDB.__init__ (
              self,
             Optional[str]  filename = None)
```

8.13.3 Member Function Documentation

8.13.3.1 __contains__()

```
bool db.bsstm_db.BSSTransitionResponseDB.__contains__ (
              self,
             str sta_mac)
```

8.13.3.2 __iter__()

```
db.bsstm_db.BSSTransitionResponseDB.__iter__ (
              self)
```

```
Iterate over all BSS Transition responses (flattened).
```

8.13.3.3 __len__()

```
db.bsstm_db.BSSTransitionResponseDB.__len__ (
              self)
```

8.13.3.4 __new__()

```
db.bsstm_db.BSSTransitionResponseDB.__new__ (
              cls)
```

8.13.3.5 __repr__()

```
db.bsstm_db.BSSTransitionResponseDB.__repr__ (
              self)
```

8.13.3.6 add()

```
db.bsstm_db.BSSTransitionResponseDB.add (
              self,
             "BSSTransitionResponse" resp,
             Optional[str]  sta_mac = None)
```

8.13.3.7 all()

```
Dict[str, List["BSSTransitionResponse"]] db.bsstm_db.BSSTransitionResponseDB.all (
              self)
```

8.13.3.8 all_for_sta()

```
List["BSSTransitionResponse"] db.bsstm_db.BSSTransitionResponseDB.all_for_sta (
              self,
             Optional[str]  sta_mac = None)
```

8.13.3.9 clear()

```
db.bsstm_db.BSSTransitionResponseDB.clear (
              self,
             Optional[str]  sta_mac = None)
```

8.13.3.10 count()

```
int db.bsstm_db.BSSTransitionResponseDB.count (
              self,
             Optional[str]  sta_mac = None)
```

8.13.3.11 get()

```
Optional["BSSTransitionResponse"] db.bsstm_db.BSSTransitionResponseDB.get (
              self,
             int dialog_token,
             Optional[str]  sta_mac = None)
```

8.13.3.12 remove()

```
db.bsstm_db.BSSTransitionResponseDB.remove (
              self,
             int dialog_token,
             Optional[str]  sta_mac = None)
```

8.13.3.13 to_dict()

```
db.bsstm_db.BSSTransitionResponseDB.to_dict (
              self)
```

Export as nested dict: sta_mac -> dialog_token -> dict.

8.13.4 Member Data Documentation

8.13.4.1 _db

```
dict db.bsstm_db.BSSTransitionResponseDB._db = {}  [protected]
```

8.13.4.2 _initialized

```
bool db.bsstm_db.BSSTransitionResponseDB._initialized = True  [protected]
```

8.13.4.3 _instance

```
db.bsstm_db.BSSTransitionResponseDB._instance = None  [static], [protected]
```

8.13.4.4 _lock

```
db.bsstm_db.BSSTransitionResponseDB._lock = RLock()  [static], [protected]
```

8.13.4.5 acceptance

```
db.bsstm_db.BSSTransitionResponseDB.acceptance = BSSTransitionAcceptance(self.filename)
```

8.13.4.6 filename

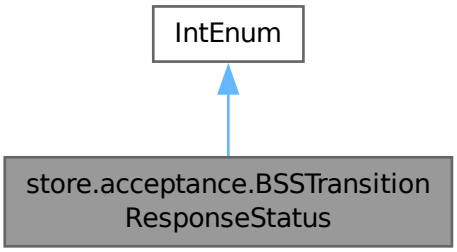
```
db.bsstm_db.BSSTransitionResponseDB.filename = filename
```

The documentation for this class was generated from the following file:

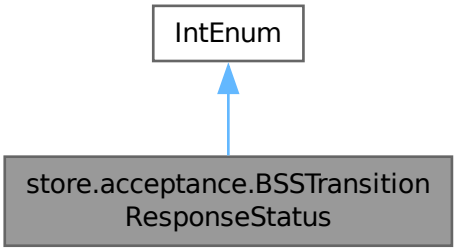
- db/bsstm_db.py

8.14 store.acceptance.BSSTransitionResponseStatus Class Reference

Inheritance diagram for store.acceptance.BSSTransitionResponseStatus:



Collaboration diagram for store.acceptance.BSSTransitionResponseStatus:



Public Member Functions

- str description (self)

Static Public Attributes

- int ACCEPTED = 0
- int REJECT_UNSPECIFIED = 1
- int REJECT_TS_DELAY_TOO_SHORT = 2
- int REJECT_STA_POLICY = 3
- int REJECT_AP_POLICY = 4
- int REJECT_STA_BUSY = 5
- int REJECT_INSUFFICIENT_RESOURCES = 6
- int REJECT_OTHER = 7

8.14.1 Member Function Documentation

8.14.1.1 description()

```
str store.acceptance.BSSTransitionResponseStatus.description (
            self)
```

Return a human-readable description of the status.

8.14.2 Member Data Documentation

8.14.2.1 ACCEPTED

```
int store.acceptance.BSSTransitionResponseStatus.ACCEPTED = 0  [static]
```

8.14.2.2 REJECT_AP_POLICY

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_AP_POLICY = 4  [static]
```

8.14.2.3 REJECT_INSUFFICIENT_RESOURCES

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_INSUFFICIENT_RESOURCES = 6  [static]
```

8.14.2.4 REJECT_OTHER

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_OTHER = 7  [static]
```

8.14.2.5 REJECT_STA_BUSY

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_STA_BUSY = 5  [static]
```

8.14.2.6 REJECT_STA_POLICY

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_STA_POLICY = 3  [static]
```

8.14.2.7 REJECT_TS_DELAY_TOO_SHORT

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_TS_DELAY_TOO_SHORT = 2  [static]
```

8.14.2.8 REJECT_UNSPECIFIED

```
int store.acceptance.BSSTransitionResponseStatus.REJECT_UNSPECIFIED = 1  [static]
```

The documentation for this class was generated from the following file:

- store/acceptance.py

8.15 dashboard.socket_pool.ClientConnection Class Reference

Public Member Functions

- close (self)

Static Public Attributes

- socket conn .socket

8.15.1 Detailed Description

```
Represents a connected client.
```

8.15.2 Member Function Documentation

8.15.2.1 close()

```
dashboard.socket_pool.ClientConnection.close (
             self)
```

8.15.3 Member Data Documentation

8.15.3.1 conn

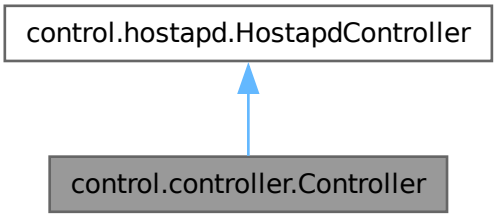
```
socket dashboard.socket_pool.ClientConnection.conn .socket  [static]
```

The documentation for this class was generated from the following file:

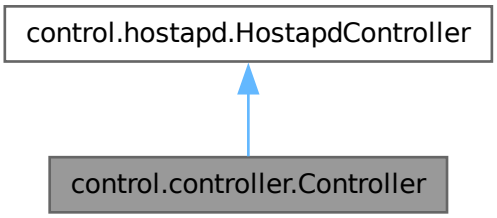
- dashboard/socket_pool.py

8.16 control.controller.Controller Class Reference

Inheritance diagram for control.controller.Controller:



Collaboration diagram for control.controller.Controller:



Public Member Functions

- __init__ (self, ctrl_path="/var/run/hostapd/wlan0", iface="wlan0", RxMux rxmux=None)
- enable (self)
- disable (self)
- restart (self)
- int get_stations (self, StationDB stdb)
- int get_neighbors (self, NeighborDB ndb)
- add_neighbor (self, NeighborCommandBuilder neib)
- bool remove_neighbor (self, str bssid)
- req_link_measurement (self, LinkMeasurementCommandBuilder lm)
- req_beacon_measurement (self, RequestBeaconCommandBuilder rbm)
- bool req_bss_tm (self, BssTmRequestBuilder rbtm)

Public Member Functions inherited from control.hostapd.HostapdController

- __init__ (self, ctrl_path="/var/run/hostapd/wlan0", iface="wlan0", RxMux rxmux=None)
- connect (self)
- start_read (self)
- stop_read (self)
- disconnect (self)
- bool send_command (self, cmd, timeout=3.0)
- str|None receive (self, timeout=3.0)
- str|None receive_event (self, timeout=3.0)
- bool handle_rx_msg (self, str msg)
- clear_reply (self)
- clear_events (self)
- repl (self)

Static Protected Member Functions

- bool _event_enabled (str e)
- bool _event_disabled (str e)
- bool _check_beacon_req_ack (msg)

Additional Inherited Members

Public Attributes inherited from control.hostapd.HostapdController

- ctrl_path = ctrl_path
- iface = iface
- sock = None
- str local_path = f"/tmp/hostapd_ctrl_{os.getpid()}"
- Optional[RxMux] rxmux = rxmux
- last_cmd_status = LastCommandStatus.NOINIT

Protected Member Functions inherited from control.hostapd.HostapdController

- _reader_loop (self)

Protected Attributes inherited from control.hostapd.HostapdController

- _event_queue = queue.Queue()
- _reply_queue = queue.Queue()
- _reader_thread = None
- bool _running = False

8.16.1 Constructor & Destructor Documentation

8.16.1.1 __init__()

```
control.controller.Controller.__init__ (
              self,
              ctrl_path = "/var/run/hostapd/wlan0",
              iface = "wlan0",
             RxMux  rxmux = None)
```

8.16.2 Member Function Documentation

8.16.2.1 _check_beacon_req_ack()

```
bool control.controller.Controller._check_beacon_req_ack (
              msg)  [static], [protected]
```

8.16.2.2 _event_disabled()

```
bool control.controller.Controller._event_disabled (
             str e)  [static], [protected]
```

8.16.2.3 _event_enabled()

```
bool control.controller.Controller._event_enabled (
             str e)  [static], [protected]
```

8.16.2.4 add_neighbor()

```
control.controller.Controller.add_neighbor (
              self,
             NeighborCommandBuilder neib)
```

8.16.2.5 disable()

```
control.controller.Controller.disable (
              self)
```

8.16.2.6 enable()

```
control.controller.Controller.enable (
              self)
```

8.16.2.7 get_neighbors()

```
int control.controller.Controller.get_neighbors (
              self,
             NeighborDB ndb)
```

8.16.2.8 get_stations()

```
int control.controller.Controller.get_stations (
              self,
             StationDB stdb)
```

8.16.2.9 remove_neighbor()

```
bool control.controller.Controller.remove_neighbor (
             self,
            str bssid)
```

8.16.2.10 req_beacon_measurement()

```
control.controller.Controller.req_beacon_measurement (
             self,
            RequestBeaconCommandBuilder rbm)
```

8.16.2.11 req_bss_tm()

```
bool control.controller.Controller.req_bss_tm (
             self,
            BssTmRequestBuilder rbtm)
```

8.16.2.12 req_link_measurement()

```
control.controller.Controller.req_link_measurement (
             self,
            LinkMeasurementCommandBuilder lm)
```

8.16.2.13 restart()

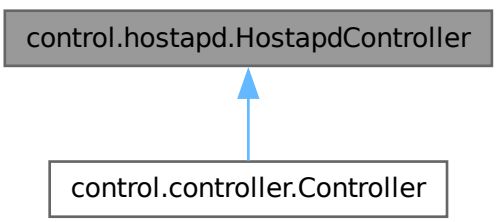
```
control.controller.Controller.restart (
             self)
```

The documentation for this class was generated from the following file:

- control/controller.py

8.17 control.hostapd.HostapdController Class Reference

Inheritance diagram for control.hostapd.HostapdController:



Public Member Functions

- __init__ (self, ctrl_path="/var/run/hostapd/wlan0", iface="wlan0", RxMux rxmux=None)
- connect (self)
- start_read (self)
- stop_read (self)
- disconnect (self)
- bool send_command (self, cmd, timeout=3.0)
- str|None receive (self, timeout=3.0)
- str|None receive_event (self, timeout=3.0)
- bool handle_rx_msg (self, str msg)
- clear_reply (self)
- clear_events (self)
- repl (self)

Public Attributes

- ctrl_path = ctrl_path
- iface = iface
- sock = None
- str local_path = f"/tmp/hostapd_ctrl_{os.getpid()}"
- Optional[RxMux] rxmux = rxmux
- last_cmd_status = LastCommandStatus.NOINIT

Protected Member Functions

- _reader_loop (self)

Protected Attributes

- _event_queue = queue.Queue()
- _reply_queue = queue.Queue()
- _reader_thread = None
- bool _running = False

8.17.1 Constructor & Destructor Documentation

8.17.1.1 __init__()

```
control.hostapd.HostapdController.__init__ (
              self,
              ctrl_path = "/var/run/hostapd/wlan0",
              iface = "wlan0",
             RxMux  rxmux = None)
```

8.17.2 Member Function Documentation

8.17.2.1 _reader_loop()

```
control.hostapd.HostapdController._reader_loop (
              self)  [protected]
```

Background thread to read from the socket and separate replies and events.

8.17.2.2 clear_events()

```
control.hostapd.HostapdController.clear_events (
              self)
```

8.17.2.3 clear_reply()

```
control.hostapd.HostapdController.clear_reply (
              self)
```

8.17.2.4 connect()

```
control.hostapd.HostapdController.connect (
              self)
```

Connect to the controller.

8.17.2.5 disconnect()

```
control.hostapd.HostapdController.disconnect (
              self)
```

Disconnect from the controller.

8.17.2.6 handle_rx_msg()

```
bool control.hostapd.HostapdController.handle_rx_msg (
              self,
             str msg)
```

8.17.2.7 receive()

```
str | None control.hostapd.HostapdController.receive (
              self,
              timeout = 3.0)
```

Retrieve a reply from _reply_queue, waiting up to timeout seconds.

8.17.2.8 receive_event()

```
str | None control.hostapd.HostapdController.receive_event (
              self,
              timeout = 3.0)
```

Retrieve an event from _event_queue, waiting up to timeout seconds.

8.17.2.9 repl()

```
control.hostapd.HostapdController.repl (
              self)
```

Simple REPL shell for interacting with the controller.
Type 'exit' or 'quit' to exit.

8.17.2.10 send_command()

```
bool control.hostapd.HostapdController.send_command (
              self,
              cmd,
              timeout = 3.0)
```

8.17.2.11 start_read()

```
control.hostapd.HostapdController.start_read (
              self)
```

8.17.2.12 stop_read()

```
control.hostapd.HostapdController.stop_read (
              self)
```

8.17.3 Member Data Documentation

8.17.3.1 _event_queue

```
control.hostapd.HostapdController._event_queue = queue.Queue()  [protected]
```

8.17.3.2 _reader_thread

```
control.hostapd.HostapdController._reader_thread = None  [protected]
```

8.17.3.3 _reply_queue

```
control.hostapd.HostapdController._reply_queue = queue.Queue()  [protected]
```

8.17.3.4 _running

```
bool control.hostapd.HostapdController._running = False  [protected]
```

8.17.3.5 ctrl_path

```
control.hostapd.HostapdController.ctrl_path = ctrl_path
```

8.17.3.6 iface

```
control.hostapd.HostapdController.iface = iface
```

8.17.3.7 last_cmd_status

```
control.hostapd.HostapdController.last_cmd_status = LastCommandStatus.NOINIT
```

8.17.3.8 local_path

```
control.hostapd.HostapdController.local_path = f"/tmp/hostapd_ctrl_{os.getpid()}"
```

8.17.3.9 rxmux

```
Optional[RxMux] control.hostapd.HostapdController.rxmux = rxmux
```

8.17.3.10 sock

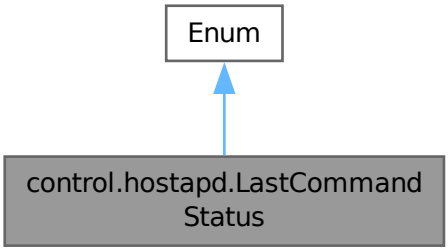
```
control.hostapd.HostapdController.sock = None
```

The documentation for this class was generated from the following file:

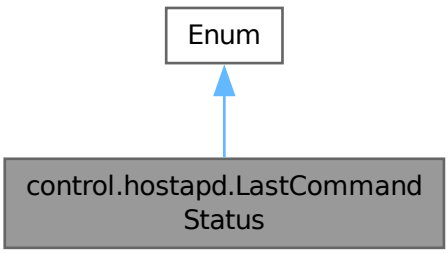
- control/hostapd.py

8.18 control.hostapd.LastCommandStatus Class Reference

Inheritance diagram for control.hostapd.LastCommandStatus:



Collaboration diagram for control.hostapd.LastCommandStatus:



Static Public Attributes

- int OK = 0
- int FAIL = 1
- int NOINIT = 2

8.18.1 Member Data Documentation

8.18.1.1 FAIL

```
int control.hostapd.LastCommandStatus.FAIL = 1  [static]
```

8.18.1.2 NOINIT

```
int control.hostapd.LastCommandStatus.NOINIT = 2  [static]
```

8.18.1.3 OK

```
int control.hostapd.LastCommandStatus.OK = 0  [static]
```

The documentation for this class was generated from the following file:

- control/hostapd.py

8.19 model.measurement.LinkMeasurement Class Reference

Public Member Functions

- Optional[float] rssi_dbm (self)
- dict to_dict (self)

Static Public Member Functions

- "LinkMeasurement" from_bytes (bytes bts)

Public Attributes

- rssi_dbm

Static Public Attributes

- Optional sta_mac = None
- int measurement_token = None
- Optional tx_power = None
- Optional link_margin = None
- Optional rx_antenna_id = None
- Optional tx_antenna_id = None
- Optional rcpi = None
- Optional rsni = None
- Optional bssid = None
- Optional operating_class = None
- Optional channel_number = None
- Optional parent_tsf = None

8.19.1 Detailed Description

802.11k Link Measurement Report

8.19.2 Member Function Documentation

8.19.2.1 from_bytes()

"LinkMeasurement" model.measurement.LinkMeasurement.from_bytes (
bytes *bts*) [static]

8.19.2.2 rssi_dbm()

Optional[float] model.measurement.LinkMeasurement.rssi_dbm (
self)

8.19.2.3 to_dict()

dict model.measurement.LinkMeasurement.to_dict (
self)

Dump the complete state of the LinkMeasurement.

8.19.3 Member Data Documentation

8.19.3.1 bssid

model.measurement.LinkMeasurement.bssid = None [static]

8.19.3.2 channel_number

model.measurement.LinkMeasurement.channel_number = None [static]

8.19.3.3 link_margin

model.measurement.LinkMeasurement.link_margin = None [static]

8.19.3.4 measurement_token

model.measurement.LinkMeasurement.measurement_token = None [static]

8.19.3.5 operating_class

```
model.measurement.LinkMeasurement.operating_class = None  [static]
```

8.19.3.6 parent_tsf

```
model.measurement.LinkMeasurement.parent_tsf = None  [static]
```

8.19.3.7 rcpi

```
model.measurement.LinkMeasurement.rcpi = None  [static]
```

8.19.3.8 rsni

```
model.measurement.LinkMeasurement.rsni = None  [static]
```

8.19.3.9 rssi_dbm

```
model.measurement.LinkMeasurement.rssi_dbm
```

8.19.3.10 rx_antenna_id

```
model.measurement.LinkMeasurement.rx_antenna_id = None  [static]
```

8.19.3.11 sta_mac

```
model.measurement.LinkMeasurement.sta_mac = None  [static]
```

8.19.3.12 tx_antenna_id

```
model.measurement.LinkMeasurement.tx_antenna_id = None  [static]
```

8.19.3.13 tx_power

```
model.measurement.LinkMeasurement.tx_power = None  [static]
```

The documentation for this class was generated from the following file:

- model/measurement.py

8.20 link_measurement_cmd.LinkMeasurementCommandBuilder Class Reference

Public Member Functions

- __init__ (self, str mac)
- str build (self)
- str __str__ (self)

Public Attributes

- mac = mac

8.20.1 Constructor & Destructor Documentation

8.20.1.1 __init__()

```
link_measurement_cmd.LinkMeasurementCommandBuilder.__init__ (
              self,
             str mac)
```

8.20.2 Member Function Documentation

8.20.2.1 __str__()

```
str link_measurement_cmd.LinkMeasurementCommandBuilder.__str__ (
              self)
```

8.20.2.2 build()

```
str link_measurement_cmd.LinkMeasurementCommandBuilder.build (
              self)
```

8.20.3 Member Data Documentation

8.20.3.1 mac

```
link_measurement_cmd.LinkMeasurementCommandBuilder.mac = mac
```

The documentation for this class was generated from the following file:

- command/link_measurement_cmd.py

8.21 dashboard.lmrep_dashboard.LinkMeasurementDashboard Class Reference

Public Member Functions

- __init__ (self, LinkMeasurementDB db)
- str as_table (self, Optional[str] sort_by="measurement_token", Optional[int] limit=None)
- show (self, Optional[str] sort_by="measurement_token", Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False)

Public Attributes

- db = db

8.21.1 Detailed Description

```
Pretty, boxed/tabulated display of current LinkMeasurementDB contents.
```

8.21.2 Constructor & Destructor Documentation

8.21.2.1 __init__()

```
dashboard.lmrep_dashboard.LinkMeasurementDashboard.__init__ (
              self,
             LinkMeasurementDB db)
```

8.21.3 Member Function Documentation

8.21.3.1 as_table()

```
str dashboard.lmrep_dashboard.LinkMeasurementDashboard.as_table (
              self,
             Optional[str]  sort_by = "measurement_token",
             Optional[int]  limit = None)
```

8.21.3.2 show()

```
dashboard.lmrep_dashboard.LinkMeasurementDashboard.show (
              self,
             Optional[str]  sort_by = "measurement_token",
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False)
```

8.21.4 Member Data Documentation

8.21.4.1 db

```
dashboard.lmrep_dashboard.LinkMeasurementDashboard.db = db
```

The documentation for this class was generated from the following file:

- dashboard/lmrep_dashboard.py

8.22 db.lmrep_db.LinkMeasurementDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- add (self, LinkMeasurement lm, Optional[str] sta_mac=None)
- Optional[LinkMeasurement] get (self, Optional[str] sta_mac=None)
- Dict[str, LinkMeasurement] all (self)
- Dict[str, LinkMeasurement] raw (self)
- Dict[str, dict] to_dict (self)
- int count (self)
- clear (self, Optional[str] sta_mac=None)
- remove (self, Optional[str] sta_mac=None)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __iter__ (self)
- __repr__ (self)

Static Public Attributes

- int expiration_sec = 300

Protected Member Functions

- bool _is_expired (self, float ts)

Protected Attributes

- dict _store = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.22.1 Detailed Description

```
Thread-safe DB storing exactly one LinkMeasurement per station,
with soft TTL expiration that applies ONLY on reads.
Internally stores timestamps but NEVER exposes them.
```

8.22.2 Constructor & Destructor Documentation

8.22.2.1 __init__()

```
db.lmrep_db.LinkMeasurementDB.__init__ (
              self)
```

8.22.3 Member Function Documentation

8.22.3.1 __contains__()

```
bool db.lmrep_db.LinkMeasurementDB.__contains__ (
              self,
             str sta_mac)
```

8.22.3.2 __iter__()

```
db.lmrep_db.LinkMeasurementDB.__iter__ (
              self)
```

8.22.3.3 __len__()

```
db.lmrep_db.LinkMeasurementDB.__len__ (
              self)
```

8.22.3.4 __new__()

```
db.lmrep_db.LinkMeasurementDB.__new__ (
              cls)
```

8.22.3.5 __repr__()

```
db.lmrep_db.LinkMeasurementDB.__repr__ (
              self)
```

8.22.3.6 _is_expired()

```
bool db.lmrep_db.LinkMeasurementDB._is_expired (
             self,
            float ts)  [protected]
```

8.22.3.7 add()

```
db.lmrep_db.LinkMeasurementDB.add (
             self,
            LinkMeasurement lm,
            Optional[str]  sta_mac = None)
```

8.22.3.8 all()

```
Dict[str, LinkMeasurement] db.lmrep_db.LinkMeasurementDB.all (
             self)
```

8.22.3.9 clear()

```
db.lmrep_db.LinkMeasurementDB.clear (
             self,
            Optional[str]  sta_mac = None)
```

8.22.3.10 count()

```
int db.lmrep_db.LinkMeasurementDB.count (
             self)
```

8.22.3.11 get()

```
Optional[LinkMeasurement] db.lmrep_db.LinkMeasurementDB.get (
             self,
            Optional[str]  sta_mac = None)
```

8.22.3.12 raw()

```
Dict[str, LinkMeasurement] db.lmrep_db.LinkMeasurementDB.raw (
             self)
```

8.22.3.13 remove()

```
db.lmrep_db.LinkMeasurementDB.remove (
             self,
            Optional[str]  sta_mac = None)
```

8.22.3.14 to_dict()

```
Dict[str, dict] db.lmrep_db.LinkMeasurementDB.to_dict (
               self)
```

Return the complete state of the database, omitting timestamps.
Only unexpired entries are included.
The value is a dictionary as returned by measurement's to_dict(), or a repr if not available.

8.22.4 Member Data Documentation

8.22.4.1 _initialized

```
bool db.lmrep_db.LinkMeasurementDB._initialized = True  [protected]
```

8.22.4.2 _instance

```
db.lmrep_db.LinkMeasurementDB._instance = None  [static], [protected]
```

8.22.4.3 _lock

```
db.lmrep_db.LinkMeasurementDB._lock = RLock()  [static], [protected]
```

8.22.4.4 _store

```
dict db.lmrep_db.LinkMeasurementDB._store = {}  [protected]
```

8.22.4.5 expiration_sec

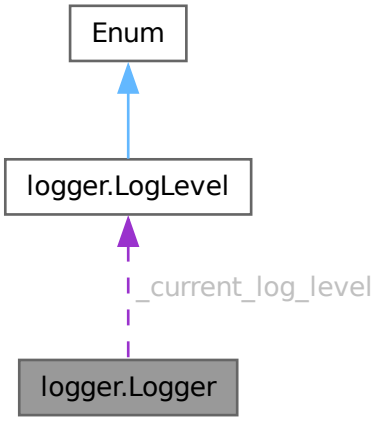
```
int db.lmrep_db.LinkMeasurementDB.expiration_sec = 300  [static]
```

The documentation for this class was generated from the following file:

- db/lmrep_db.py

8.23 logger.Logger Class Reference

Collaboration diagram for logger.Logger:



Public Member Functions

- set_current_log_level (cls, LogLevel level)
- LogLevel get_current_log_level (cls)

Static Public Member Functions

- None log (LogLevel level, str msg)
- None log_err (str msg)
- None log_debug (str msg)
- None log_info (str msg)

Static Protected Attributes

- LogLevel _current_log_level = LogLevel.INFO

8.23.1 Member Function Documentation

8.23.1.1 get_current_log_level()

```
LogLevel logger.Logger.get_current_log_level (
            cls)
```

8.23.1.2 log()

```
None logger.Logger.log (
             LogLevel level,
             str msg)  [static]
```

8.23.1.3 log_debug()

```
None logger.Logger.log_debug (
             str msg)  [static]
```

8.23.1.4 log_err()

```
None logger.Logger.log_err (
             str msg)  [static]
```

8.23.1.5 log_info()

```
None logger.Logger.log_info (
             str msg)  [static]
```

8.23.1.6 set_current_log_level()

```
logger.Logger.set_current_log_level (
              cls,
             LogLevel level)
```

8.23.2 Member Data Documentation

8.23.2.1 _current_log_level

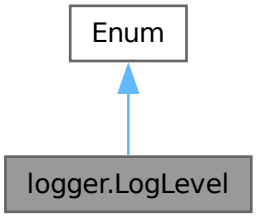
```
LogLevel logger.Logger._current_log_level = LogLevel.INFO  [static], [protected]
```

The documentation for this class was generated from the following file:

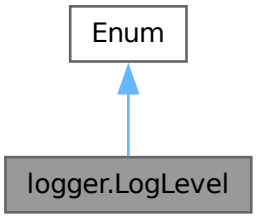
- logger.py

8.24 logger.LogLevel Class Reference

Inheritance diagram for logger.LogLevel:



Collaboration diagram for logger.LogLevel:



Static Public Member Functions

- "LogLevel" int_to_level (int level)

Static Public Attributes

- int EXCESSIVE = 0
- int MSGDUMP = 1
- int DEBUG = 2
- int INFO = 3
- int WARNING = 4
- int ERROR = 5

8.24.1 Member Function Documentation

8.24.1.1 int_to_level()

```
"LogLevel" logger.LogLevel.int_to_level (
            int level)  [static]
```

8.24.2 Member Data Documentation

8.24.2.1 DEBUG

```
int logger.LogLevel.DEBUG = 2  [static]
```

8.24.2.2 ERROR

```
int logger.LogLevel.ERROR = 5  [static]
```

8.24.2.3 EXCESSIVE

```
int logger.LogLevel.EXCESSIVE = 0  [static]
```

8.24.2.4 INFO

```
int logger.LogLevel.INFO = 3  [static]
```

8.24.2.5 MSGDUMP

```
int logger.LogLevel.MSGDUMP = 1  [static]
```

8.24.2.6 WARNING

```
int logger.LogLevel.WARNING = 4  [static]
```

The documentation for this class was generated from the following file:

- logger.py

8.25 model.mac_address.MacAddress Class Reference

Public Member Functions

- __init__ (self, str mac)
- __str__ (self)
- __repr__ (self)
- bool is_multicast (self)
- bool is_unicast (self)
- bool is_broadcast (self)
- bool is_local_administered (self)
- str oui (self)
- str client_part (self)
- str anonymized (self, str hash_algorithm="sha256", int length=12)

Static Public Member Functions

- bool is_valid (str mac)

Public Attributes

- str raw = self._normalize(mac)
- str octets = self.raw.split(":")

Static Protected Member Functions

- str _normalize (str mac)

8.25.1 Detailed Description

```
Object for MAC address handling, parsing, and representation.
```

8.25.2 Constructor & Destructor Documentation

8.25.2.1 __init__()

```
model.mac_address.MacAddress.__init__ (
              self,
             str mac)
```

8.25.3 Member Function Documentation

8.25.3.1 __repr__()

```
model.mac_address.MacAddress.__repr__ (
              self)
```

8.25.3.2 __str__()

```
model.mac_address.MacAddress.__str__ (
              self)
```

8.25.3.3 _normalize()

```
str model.mac_address.MacAddress._normalize (
             str mac)  [static], [protected]
```

8.25.3.4 anonymized()

```
str model.mac_address.MacAddress.anonymized (
              self,
             str  hash_algorithm = "sha256",
             int  length = 12)
```

```
Return the MAC address as OUI:HASHED_CLIENT_PART.
hash_algorithm: Hash function to use (e.g. 'sha256', 'md5').
length: Number of hex characters from digest to use.
```

8.25.3.5 client_part()

```
str model.mac_address.MacAddress.client_part (
              self)
```

```
Return the client-specific part (last three octets) as a string.
```

8.25.3.6 is_broadcast()

```
bool model.mac_address.MacAddress.is_broadcast (
              self)
```

8.25.3.7 is_local_administered()

```
bool model.mac_address.MacAddress.is_local_administered (
              self)
```

8.25.3.8 is_multicast()

```
bool model.mac_address.MacAddress.is_multicast (
              self)
```

8.25.3.9 is_unicast()

```
bool model.mac_address.MacAddress.is_unicast (
              self)
```

8.25.3.10 is_valid()

```
bool model.mac_address.MacAddress.is_valid (
             str mac)  [static]
```

```
Check if the given string is a valid MAC address format.
Acceptable formats:
  - XX:XX:XX:XX:XX:XX
  - XX-XX-XX-XX-XX-XX
  - XXXXXXXXXXXX
Returns True if valid, False otherwise.
```

8.25.3.11 oui()

```
str model.mac_address.MacAddress.oui (
              self)
```

```
Return the OUI (Organizationally Unique Identifier) as a string.
```

8.25.4 Member Data Documentation

8.25.4.1 octets

```
str model.mac_address.MacAddress.octets = self.raw.split(":")
```

8.25.4.2 raw

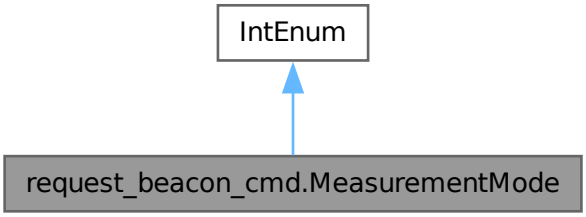
```
str model.mac_address.MacAddress.raw = self._normalize(mac)
```

The documentation for this class was generated from the following file:

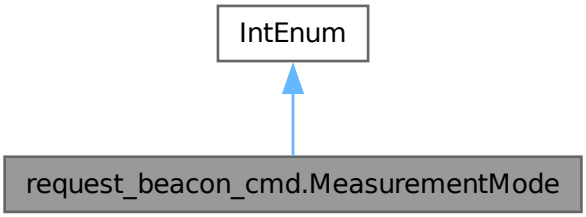
- model/mac_address.py

8.26 request_beacon_cmd.MeasurementMode Class Reference

Inheritance diagram for request_beacon_cmd.MeasurementMode:



Collaboration diagram for request_beacon_cmd.MeasurementMode:



Static Public Attributes

- int PASSIVE = 0
- int ACTIVE = 1
- int TABLE = 2

8.26.1 Detailed Description

```
Beacon measurement modes per IEEE 802.11k.
```

8.26.2 Member Data Documentation

8.26.2.1 ACTIVE

```
int request_beacon_cmd.MeasurementMode.ACTIVE = 1  [static]
```

8.26.2.2 PASSIVE

```
int request_beacon_cmd.MeasurementMode.PASSIVE = 0  [static]
```

8.26.2.3 TABLE

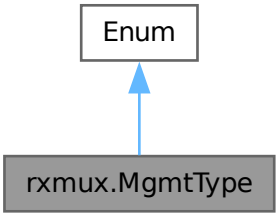
```
int request_beacon_cmd.MeasurementMode.TABLE = 2  [static]
```

The documentation for this class was generated from the following file:

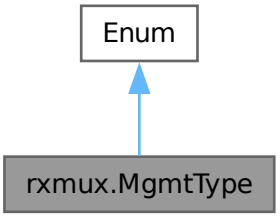
- command/request_beacon_cmd.py

8.27 rxmux.MgmtType Class Reference

Inheritance diagram for rxmux.MgmtType:



Collaboration diagram for rxmux.MgmtType:



Static Public Attributes

- int LM_RESPONSE = 3
- int BM_RESPONSE = 1
- int BSS_TM_RESPONSE = 8
- int UNKNOWN = -1

8.27.1 Member Data Documentation

8.27.1.1 BM_RESPONSE

```
int rxmux.MgmtType.BM_RESPONSE = 1  [static]
```

8.27.1.2 BSS_TM_RESPONSE

```
int rxmux.MgmtType.BSS_TM_RESPONSE = 8  [static]
```

8.27.1.3 LM_RESPONSE

```
int rxmux.MgmtType.LM_RESPONSE = 3  [static]
```

8.27.1.4 UNKNOWN

```
int rxmux.MgmtType.UNKNOWN = -1  [static]
```

The documentation for this class was generated from the following file:

- protocol/rxmux.py

8.28 model.neighbor.Neighbor Class Reference

Public Member Functions

- __init__ (self)
- dict to_dict (self)
- __dict__ (self)
- __str__ (self)

Public Attributes

- str|None bssid = None
- str|None ssid = None
- str|None nr_raw = None
- int|None bssid_info = None
- int|None oper_class = None
- int|None channel = None
- int|None phy_type = None
- str|None oper_class_desc = None
- str|None phy_type_desc = None
- str|None subelements = None
- int|None rcpi = None
- int|None rsni = None

8.28.1 Detailed Description

```
Represents one neighbor entry from hostapd's SHOW_NEIGHBOR output.
```

8.28.2 Constructor & Destructor Documentation

8.28.2.1 __init__()

```
model.neighbor.Neighbor.__init__ (
              self)
```

8.28.3 Member Function Documentation

8.28.3.1 __dict__()

```
model.neighbor.Neighbor.__dict__ (
              self)
```

8.28.3.2 __str__()

```
model.neighbor.Neighbor.__str__ (
              self)
```

8.28.3.3 to_dict()

```
dict model.neighbor.Neighbor.to_dict (
              self)
```

```
Dump the complete state of the Neighbor object.
Returns a dictionary of all attributes.
```

8.28.4 Member Data Documentation

8.28.4.1 bssid

```
model.neighbor.Neighbor.bssid = None
```

8.28.4.2 bssid_info

```
model.neighbor.Neighbor.bssid_info = None
```

8.28.4.3 channel

```
model.neighbor.Neighbor.channel = None
```

8.28.4.4 nr_raw

```
model.neighbor.Neighbor.nr_raw = None
```

8.28.4.5 oper_class

```
model.neighbor.Neighbor.oper_class = None
```

8.28.4.6 oper_class_desc

```
model.neighbor.Neighbor.oper_class_desc = None
```

8.28.4.7 phy_type

```
model.neighbor.Neighbor.phy_type = None
```

8.28.4.8 phy_type_desc

```
model.neighbor.Neighbor.phy_type_desc = None
```

8.28.4.9 rcpi

```
model.neighbor.Neighbor.rcpi = None
```

8.28.4.10 rsni

```
model.neighbor.Neighbor.rsni = None
```

8.28.4.11 ssid

```
model.neighbor.Neighbor.ssid = None
```

8.28.4.12 subelements

```
model.neighbor.Neighbor.subelements = None
```

The documentation for this class was generated from the following file:

- model/neighbor.py

8.29 neighbor_cmd.NeighborCommandBuilder Class Reference

Public Member Functions

- __init__ (self, Optional[Neighbor] neighbor=None, Optional[str] bssid=None, Optional[str] ssid=None, Optional[Dict[str, Any]] nr=None, Optional[Dict[str, Any]] lci=None, Optional[Dict[str, Any]] civic=None, bool stationary=False, Optional[int] bss_parameter=None)
- str build (self)
- str __str__ (self)

Public Attributes

- neighbor = neighbor
- bssid = neighbor.bssid
- ssid = neighbor.ssid
- nr = None
- lci = lci
- civic = civic
- stationary = stationary
- bss_parameter = bss_parameter

Static Protected Member Functions

- str _encode_neighbor_report (Dict[str, Any] cfg)
- str _encode_lci (Dict[str, Any] lci)
- str _encode_civic (Dict[str, Any] civic)
- str _encode_ssid_hex (str ssid)

8.29.1 Detailed Description

```
Build and parse hostapd 'SET_NEIGHBOR' commands.

Example with NeighborInfo:
    neighbor = NeighborInfo.from_line("00:11:22:33:44:55 ssid=MyNet nr=...")
    req = NeighborCommandBuilder(
        neighbor=neighbor,
        lci={"latitude": 37.4219, "longitude": -122.0840, "altitude": 10.0},
        civic={"country": "US", "city": "MountainView"},
        stationary=True,
        bss_parameter=5
    )
    print(req.build())

Example with dict (backward compatible):
    req = NeighborCommandBuilder(
        bssid="00:11:22:33:44:55",
        ssid="MyNet",
        nr={"bssid_info": 0x1234, "reg_class": 81, "channel": 6, "phy_type": 7},
        lci={"latitude": 37.4219, "longitude": -122.0840, "altitude": 10.0},
        civic={"country": "US", "city": "MountainView"},
        stationary=True,
        bss_parameter=5
    )
    print(req.build())
```

8.29.2 Constructor & Destructor Documentation

8.29.2.1 __init__()

```
neighbor_cmd.NeighborCommandBuilder.__init__ (
              self,
             Optional[Neighbor]  neighbor = None,
             Optional[str]  bssid = None,
             Optional[str]  ssid = None,
             Optional[Dict[str, Any]]  nr = None,
             Optional[Dict[str, Any]]  lci = None,
             Optional[Dict[str, Any]]  civic = None,
             bool  stationary = False,
             Optional[int]  bss_parameter = None)
```

8.29.3 Member Function Documentation

8.29.3.1 __str__()

```
str neighbor_cmd.NeighborCommandBuilder.__str__ (
              self)
```

8.29.3.2 _encode_civic()

```
str neighbor_cmd.NeighborCommandBuilder._encode_civic (
             Dict[str, Any] civic)  [static], [protected]

Simplified civic info encoding:
country + city as ASCII, prefixed with lengths.
Example: [len_country][country_bytes][len_city][city_bytes]
```

8.29.3.3 _encode_lci()

```
str neighbor_cmd.NeighborCommandBuilder._encode_lci (
            Dict[str, Any] lci)  [static], [protected]
```

Very simplified LCI encoding:
[latitude(8 bytes double)][longitude(8 bytes double)][altitude(4 bytes float)]

8.29.3.4 _encode_neighbor_report()

```
str neighbor_cmd.NeighborCommandBuilder._encode_neighbor_report (
            Dict[str, Any] cfg)  [static], [protected]
```

Encode Neighbor Report fields into a minimal valid binary hex representation.
IEEE 802.11k format: [BSSID(6)][BSSID Info(4)][Reg Class(1)][Channel(1)][PHY Type(1)]

8.29.3.5 _encode_ssid_hex()

```
str neighbor_cmd.NeighborCommandBuilder._encode_ssid_hex (
            str ssid)  [static], [protected]
```

Encode SSID as a hex string.

8.29.3.6 build()

```
str neighbor_cmd.NeighborCommandBuilder.build (
             self)
```

Builds the full 'SET_NEIGHBOR' command string with proper encoding.

8.29.4 Member Data Documentation

8.29.4.1 bss_parameter

```
neighbor_cmd.NeighborCommandBuilder.bss_parameter = bss_parameter
```

8.29.4.2 bssid

```
neighbor_cmd.NeighborCommandBuilder.bssid = neighbor.bssid
```

8.29.4.3 civic

```
neighbor_cmd.NeighborCommandBuilder.civic = civic
```

8.29.4.4 lci

```
neighbor_cmd.NeighborCommandBuilder.lci = lci
```

8.29.4.5 neighbor

```
neighbor_cmd.NeighborCommandBuilder.neighbor = neighbor
```

8.29.4.6 nr

```
neighbor_cmd.NeighborCommandBuilder.nr = None
```

8.29.4.7 ssid

```
neighbor_cmd.NeighborCommandBuilder.ssid = neighbor.ssid
```

8.29.4.8 stationary

```
neighbor_cmd.NeighborCommandBuilder.stationary = stationary
```

The documentation for this class was generated from the following file:

- command/neighbor_cmd.py

8.30 dashboard.neighbor_dashboard.NeighborDashboard Class Reference

Public Member Functions

- __init__ (self, NeighborDB neighbordb)
- str as_table (self, Optional[str] sort_by="channel", Optional[int] limit=None)
- show (self, Optional[str] sort_by="channel", Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False)

Public Attributes

- db = neighbordb

8.30.1 Detailed Description

```
Tabulated display of current NeighborDB contents, grouped by station MAC.
```

8.30.2 Constructor & Destructor Documentation

8.30.2.1 __init__()

```
dashboard.neighbor_dashboard.NeighborDashboard.__init__ (
              self,
             NeighborDB neighbordb)
```

8.30.3 Member Function Documentation

8.30.3.1 as_table()

```
str dashboard.neighbor_dashboard.NeighborDashboard.as_table (
              self,
             Optional[str]  sort_by = "channel",
             Optional[int]  limit = None)
```

8.30.3.2 show()

```
dashboard.neighbor_dashboard.NeighborDashboard.show (
              self,
             Optional[str]  sort_by = "channel",
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False)
```

```
Display dashboard to pipe OR socket OR stdout.
```

8.30.4 Member Data Documentation

8.30.4.1 db

```
dashboard.neighbor_dashboard.NeighborDashboard.db = neighbordb
```

The documentation for this class was generated from the following file:

- dashboard/neighbor_dashboard.py

8.31 db.neighbor_db.NeighborDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- add (self, Neighbor neighbor, Optional[str] sta_mac=None)
- remove (self, str bssid, Optional[str] sta_mac=None)
- Optional[Neighbor] get (self, str bssid, Optional[str] sta_mac=None)
- list[Neighbor] all_for_sta (self, Optional[str] sta_mac=None)
- Dict[str, list[Neighbor]] all (self)
- int count (self, Optional[str] sta_mac=None)
- clear (self, Optional[str] sta_mac=None)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __iter__ (self)
- Dict[str, Dict[str, dict]] to_dict (self)
- __repr__ (self)

Protected Attributes

- dict _db = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.31.1 Detailed Description

```
Database of neighbors associated with stations (STA MACs).
```

8.31.2 Constructor & Destructor Documentation

8.31.2.1 __init__()

```
db.neighbor_db.NeighborDB.__init__ (
              self)
```

8.31.3 Member Function Documentation

8.31.3.1 __contains__()

```
bool db.neighbor_db.NeighborDB.__contains__ (
              self,
             str sta_mac)
```

8.31.3.2 __iter__()

```
db.neighbor_db.NeighborDB.__iter__ (
              self)
```

Iterate over all neighbors (flattened).

8.31.3.3 __len__()

```
db.neighbor_db.NeighborDB.__len__ (
              self)
```

8.31.3.4 __new__()

```
db.neighbor_db.NeighborDB.__new__ (
              cls)
```

Singleton instantiation.

8.31.3.5 __repr__()

```
db.neighbor_db.NeighborDB.__repr__ (
              self)
```

8.31.3.6 add()

```
db.neighbor_db.NeighborDB.add (
              self,
             Neighbor neighbor,
             Optional[str]  sta_mac = None)
```

Add or update a neighbor for a given station MAC.

If sta_mac is None, defaults to AP MAC (00:00:00:00:00:00)

8.31.3.7 all()

```
Dict[str, list[Neighbor]] db.neighbor_db.NeighborDB.all (
              self)
```

Return all neighbors grouped by station MAC.

8.31.3.8 all_for_sta()

```
list[Neighbor] db.neighbor_db.NeighborDB.all_for_sta (
              self,
             Optional[str]  sta_mac = None)
```

Return all neighbors for a specific station.

8.31.3.9 clear()

```
db.neighbor_db.NeighborDB.clear (
              self,
             Optional[str]  sta_mac = None)
```

Clear neighbors for a station or all if sta_mac is None.

8.31.3.10 count()

```
int db.neighbor_db.NeighborDB.count (
              self,
             Optional[str]  sta_mac = None)
```

Count neighbors for a station or all neighbors if sta_mac is None.

8.31.3.11 get()

```
Optional[Neighbor] db.neighbor_db.NeighborDB.get (
              self,
             str bssid,
             Optional[str]  sta_mac = None)
```

Retrieve a neighbor by station MAC and BSSID.

8.31.3.12 remove()

```
db.neighbor_db.NeighborDB.remove (
              self,
             str bssid,
             Optional[str]  sta_mac = None)
```

Remove a neighbor for a given station MAC.

8.31.3.13 to_dict()

```
Dict[str, Dict[str, dict]] db.neighbor_db.NeighborDB.to_dict (
              self)
```

Dump the complete state of the database.
Returns a nested dictionary: sta_mac -> bssid -> dict (neighbor representation).

8.31.4 Member Data Documentation

8.31.4.1 _db

```
dict db.neighbor_db.NeighborDB._db = {}  [protected]
```

8.31.4.2 _initialized

```
bool db.neighbor_db.NeighborDB._initialized = True  [protected]
```

8.31.4.3 _instance

```
db.neighbor_db.NeighborDB._instance = None  [static], [protected]
```

8.31.4.4 _lock

```
db.neighbor_db.NeighborDB._lock = RLock()  [static], [protected]
```

The documentation for this class was generated from the following file:

- db/neighbor_db.py

8.32 neighbor_parser.NeighborParser Class Reference

Static Public Member Functions

- bytes make_nr (str bssid, int bssid_info, int oper_class, int channel, int phy_type, bytes subelements=b"")
- "Neighbor" from_line (str line)
- dict[str, Any] as_dict (Neighbor neib)
- str to_nr_hex (Neighbor neib)

Static Protected Member Functions

- _parse_nr (Neighbor neib)
- str _decode_hex_ssid (str hex_str)

8.32.1 Member Function Documentation

8.32.1.1 _decode_hex_ssid()

```
str neighbor_parser.NeighborParser._decode_hex_ssid (
            str hex_str)  [static], [protected]
```

8.32.1.2 _parse_nr()

```
neighbor_parser.NeighborParser._parse_nr (
            Neighbor neib)  [static], [protected]
```

8.32.1.3 as_dict()

```
dict[str, Any] neighbor_parser.NeighborParser.as_dict (
            Neighbor neib)  [static]
```

8.32.1.4 from_line()

```
"Neighbor" neighbor_parser.NeighborParser.from_line (
            str line)  [static]
```

8.32.1.5 make_nr()

```
bytes neighbor_parser.NeighborParser.make_nr (
            str bssid,
            int bssid_info,
            int oper_class,
            int channel,
            int phy_type,
            bytes  subelements = b"")  [static]
```

```
Construct the NR (Neighbor Report) binary field (IEEE 802.11 7.3.2.90.10).
Args:
    bssid: str - MAC address in string format (e.g., "aa:bb:cc:dd:ee:ff")
    bssid_info: int - BSSID Information (4 bytes, little-endian)
    oper_class: int - Operating class (1 byte)
    channel: int - Channel number (1 byte)
    phy_type: int - PHY type (1 byte)
    subelements: bytes - Optional trailing subelements (variable length)
Returns:
    bytes - NR field binary encoding
```

8.32.1.6 to_nr_hex()

```
str neighbor_parser.NeighborParser.to_nr_hex (
            Neighbor neib)  [static]
```

```
Convert this NeighborInfo to a hex string suitable for SET_NEIGHBOR command.
Returns the hex-encoded NR (Neighbor Report) field.
```

The documentation for this class was generated from the following file:

- parser/neighbor_parser.py

8.33 metrics.nbranking.NeighborRanking Class Reference

Public Member Functions

- __init__ (self, StationDB stdb, NeighborRankingDB nrdb, BeaconMeasurementDB bmr, NeighborDB ndb)
- update (self)

Public Attributes

- nrdb = nrdb
- bmr = bmr
- ndb = ndb
- stdb = stdb

Static Protected Member Functions

- List[Neighbor] _rank_beacon (Station station, List[BeaconMeasurement] lbmr, NeighborDB nb)
- List[Neighbor] _rank_nobeacon (Station station, NeighborDB nb)

8.33.1 Constructor & Destructor Documentation

8.33.1.1 __init__()

```
metrics.nbranking.NeighborRanking.__init__ (
              self,
             StationDB stdb,
             NeighborRankingDB nrdb,
             BeaconMeasurementDB bmr,
             NeighborDB ndb)
```

8.33.2 Member Function Documentation

8.33.2.1 _rank_beacon()

```
List[Neighbor] metrics.nbranking.NeighborRanking._rank_beacon (
             Station station,
             List[BeaconMeasurement] lbmr,
             NeighborDB nb)  [static], [protected]
```

```
Create Neighbor objects from BeaconReport entries and rank them.
Scoring:
  score = rssi_dbm + 0.5 * snr_db + (known_neighbor ? bonus : 0)
Higher score == better neighbor.
```

8.33.2.2 _rank_nobeacon()

```
List[Neighbor] metrics.nbranking.NeighborRanking._rank_nobeacon (
            Station station,
            NeighborDB nb)  [static], [protected]
```

Fallback ranking when no beacon measurements are available.
Simply returns the NeighborDB entries for that station ordered:
  1) neighbors with an SSID first (likely real APs)
  2) then by BSSID lexicographically

8.33.2.3 update()

```
metrics.nbranking.NeighborRanking.update (
             self)
```

8.33.3 Member Data Documentation

8.33.3.1 bmr

```
metrics.nbranking.NeighborRanking.bmr = bmr
```

8.33.3.2 ndb

```
metrics.nbranking.NeighborRanking.ndb = ndb
```

8.33.3.3 nrdb

```
metrics.nbranking.NeighborRanking.nrdb = nrdb
```

8.33.3.4 stdb

```
metrics.nbranking.NeighborRanking.stdb = stdb
```

The documentation for this class was generated from the following file:

- metrics/nbranking.py

8.34 dashboard.nbrank_dashboard.NeighborRankingDashboard Class Reference

Public Member Functions

- __init__ (self, NeighborRankingDB nr_db)
- str as_table (self, Optional[int] limit=None)
- show (self, Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False)

Public Attributes

- db = nr_db

8.34.1 Detailed Description

```
Prettier, tabulated display of current NeighborRankingDB contents.
```

8.34.2 Constructor & Destructor Documentation

8.34.2.1 __init__()

```
dashboard.nbrank_dashboard.NeighborRankingDashboard.__init__ (
              self,
             NeighborRankingDB nr_db)
```

8.34.3 Member Function Documentation

8.34.3.1 as_table()

```
str dashboard.nbrank_dashboard.NeighborRankingDashboard.as_table (
              self,
             Optional[int]  limit = None)
```

8.34.3.2 show()

```
dashboard.nbrank_dashboard.NeighborRankingDashboard.show (
              self,
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False)
```

```
Display the dashboard ... print or send to FIFO or socket.
```

8.34.4 Member Data Documentation

8.34.4.1 db

```
dashboard.nbrank_dashboard.NeighborRankingDashboard.db = nr_db
```

The documentation for this class was generated from the following file:

- dashboard/nbrank_dashboard.py

8.35 db.nbrank_db.NeighborRankingDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- set_ranking (self, str sta_mac, List[Neighbor] neighbors)
- add_neighbor (self, str sta_mac, Neighbor neighbor)
- List[Neighbor] get_ranking (self, Optional[str] sta_mac=None)
- remove (self, Optional[str] sta_mac=None)
- Dict[str, List[Neighbor]] all (self)
- int count (self, Optional[str] sta_mac=None)
- clear (self, Optional[str] sta_mac=None)
- Dict[str, list] to_dict (self)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __iter__ (self)
- __repr__ (self)

Protected Attributes

- dict _db = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.35.1 Detailed Description

```
Thread-safe singleton database for neighbor rankings per station MAC.
```

8.35.2 Constructor & Destructor Documentation

8.35.2.1 __init__()

```
db.nbrank_db.NeighborRankingDB.__init__ (
              self)
```

8.35.3 Member Function Documentation

8.35.3.1 __contains__()

```
bool db.nbrank_db.NeighborRankingDB.__contains__ (
              self,
             str sta_mac)
```

8.35.3.2 __iter__()

```
db.nbrank_db.NeighborRankingDB.__iter__ (
              self)
```

Iterate over all neighbors (flattened).

8.35.3.3 __len__()

```
db.nbrank_db.NeighborRankingDB.__len__ (
              self)
```

8.35.3.4 __new__()

```
db.nbrank_db.NeighborRankingDB.__new__ (
              cls)
```

8.35.3.5 __repr__()

```
db.nbrank_db.NeighborRankingDB.__repr__ (
              self)
```

8.35.3.6 add_neighbor()

```
db.nbrank_db.NeighborRankingDB.add_neighbor (
              self,
             str sta_mac,
             Neighbor neighbor)
```

Add or update a neighbor in the ranking for a station (appends to the end).

8.35.3.7 all()

```
Dict[str, List[Neighbor]] db.nbrank_db.NeighborRankingDB.all (
              self)
```

Return the entire database.

8.35.3.8 clear()

```
db.nbrank_db.NeighborRankingDB.clear (
              self,
             Optional[str]  sta_mac = None)
```

Clear neighbor rankings for a station or all stations.

8.35.3.9 count()

```
int db.nbrank_db.NeighborRankingDB.count (
              self,
             Optional[str]  sta_mac = None)
```

Count neighbors for a station or total if None.

8.35.3.10 get_ranking()

```
List[Neighbor] db.nbrank_db.NeighborRankingDB.get_ranking (
              self,
             Optional[str]  sta_mac = None)
```

Get the ordered neighbor ranking for a station.

8.35.3.11 remove()

```
db.nbrank_db.NeighborRankingDB.remove (
              self,
             Optional[str]  sta_mac = None)
```

Remove the ranking for a station.

8.35.3.12 set_ranking()

```
db.nbrank_db.NeighborRankingDB.set_ranking (
              self,
             str sta_mac,
             List[Neighbor] neighbors)
```

Set the ordered neighbor ranking for a station.

8.35.3.13 to_dict()

```
Dict[str, list] db.nbrank_db.NeighborRankingDB.to_dict (
              self)
```

Dump the entire state of the database.
For each station MAC, returns a list of dicts (one per Neighbor, using Neighbor.to_dict() if available).

8.35.4 Member Data Documentation

8.35.4.1 _db

```
dict db.nbrank_db.NeighborRankingDB._db = {}  [protected]
```

8.35.4.2 _initialized

```
bool db.nbrank_db.NeighborRankingDB._initialized = True  [protected]
```

8.35.4.3 _instance

```
db.nbrank_db.NeighborRankingDB._instance = None  [static], [protected]
```

8.35.4.4 _lock

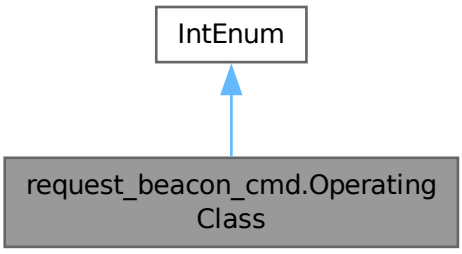
```
db.nbrank_db.NeighborRankingDB._lock = RLock()  [static], [protected]
```

The documentation for this class was generated from the following file:

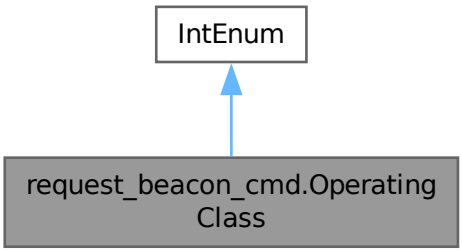
- db/nbrank_db.py

8.36 request_beacon_cmd.OperatingClass Class Reference

Inheritance diagram for request_beacon_cmd.OperatingClass:



Collaboration diagram for request_beacon_cmd.OperatingClass:



Static Public Attributes

- int CLASS_2_4GHZ_20MHZ = 81
- int CLASS_2_4GHZ_40MHZ = 82
- int CLASS_5GHZ_20MHZ = 115
- int CLASS_5GHZ_40MHZ = 116
- int CLASS_5GHZ_80MHZ = 117

8.36.1 Detailed Description

```
Common 802.11 operating classes for 2.4GHz and 5GHz.
```

8.36.2 Member Data Documentation

8.36.2.1 CLASS_2_4GHZ_20MHZ

```
int request_beacon_cmd.OperatingClass.CLASS_2_4GHZ_20MHZ = 81  [static]
```

8.36.2.2 CLASS_2_4GHZ_40MHZ

```
int request_beacon_cmd.OperatingClass.CLASS_2_4GHZ_40MHZ = 82  [static]
```

8.36.2.3 CLASS_5GHZ_20MHZ

```
int request_beacon_cmd.OperatingClass.CLASS_5GHZ_20MHZ = 115  [static]
```

8.36.2.4 CLASS_5GHZ_40MHZ

```
int request_beacon_cmd.OperatingClass.CLASS_5GHZ_40MHZ = 116  [static]
```

8.36.2.5 CLASS_5GHZ_80MHZ

```
int request_beacon_cmd.OperatingClass.CLASS_5GHZ_80MHZ = 117  [static]
```

The documentation for this class was generated from the following file:

- command/request_beacon_cmd.py

8.37 dashboard.pipe_pool.PipePool Class Reference

Public Member Functions

- __init__ (self)
- IO create (self, str name, str path, str mode="w")
- Optional[IO] get (self, str name)
- close (self, str name)
- destroy (self)
- list[str] list (self)
- __len__ (self)
- __repr__ (self)

Protected Attributes

- dict _pipes = {}
- dict _paths = {}
- _lock = threading.RLock()

8.37.1 Detailed Description

```
Manages multiple named pipes (FIFOs) for simple IPC streaming.
```

8.37.2 Constructor & Destructor Documentation

8.37.2.1 __init__()

```
dashboard.pipe_pool.PipePool.__init__ (
            self)
```

8.37.3 Member Function Documentation

8.37.3.1 __len__()

```
dashboard.pipe_pool.PipePool.__len__ (
            self)
```

8.37.3.2 __repr__()

```
dashboard.pipe_pool.PipePool.__repr__ (
              self)
```

8.37.3.3 close()

```
dashboard.pipe_pool.PipePool.close (
              self,
             str name)
```

Close a pipe and optionally remove its file.

8.37.3.4 create()

```
IO dashboard.pipe_pool.PipePool.create (
              self,
             str name,
             str path,
             str  mode = "w")
```

Create or open a named pipe (FIFO).

Args:
    name: logical name for the pipe
    path: filesystem path to the FIFO
    mode: 'w' for writer, 'r' for reader

8.37.3.5 destroy()

```
dashboard.pipe_pool.PipePool.destroy (
              self)
```

Close and clean up all pipes.

8.37.3.6 get()

```
Optional[IO] dashboard.pipe_pool.PipePool.get (
              self,
             str name)
```

Retrieve a pipe by name.

8.37.3.7 list()

```
list[str] dashboard.pipe_pool.PipePool.list (
              self)
```

List all active pipe names.

8.37.4 Member Data Documentation

8.37.4.1 _lock

```
dashboard.pipe_pool.PipePool._lock = threading.RLock()  [protected]
```

8.37.4.2 _paths

```
dict dashboard.pipe_pool.PipePool._paths = {}  [protected]
```

8.37.4.3 _pipes

```
dashboard.pipe_pool.PipePool._pipes = {}  [protected]
```

The documentation for this class was generated from the following file:

- dashboard/pipe_pool.py

8.38 metrics.qoe.QoE Class Reference

Public Member Functions

- __init__ (self)
- QoEComponents compute_qoe (self, Station station, Optional[LinkMeasurement] lm=None)
- update (self)
- Optional[QoEComponents] get_components (self, str mac)
- Optional[QoEHistory] get_history (self, str mac)
- List[tuple[str, float]] get_worst_stations (self, int n=5)
- List[tuple[str, float]] get_best_stations (self, int n=5)
- Dict get_statistics (self)

Public Attributes

- stdb = StationDB()
- qoedb = QoEDB()
- lmdb = LinkMeasurementDB()
- dict history = {}
- dict component_cache = {}

Static Public Attributes

- int RSSI_EXCELLENT = -50
- int RSSI_GOOD = -65
- int RSSI_POOR = -80
- int SNR_EXCELLENT = 35
- int SNR_GOOD = 25
- int SNR_POOR = 10
- int BITRATE_EXCELLENT = 400
- int BITRATE_GOOD = 150
- int BITRATE_POOR = 20
- int INACTIVE_THRESHOLD_MS = 5000
- int INACTIVE_CRITICAL_MS = 20000
- float RETRY_RATE_ACCEPTABLE = 0.05
- float RETRY_RATE_POOR = 0.20
- float FCS_RATE_ACCEPTABLE = 0.01
- float FCS_RATE_POOR = 0.05
- int BACKLOG_ACCEPTABLE = 10
- int BACKLOG_CRITICAL = 100
- float MAX_RELIABILITY_PENALTY = 0.85
- float MAX_LATENCY_PENALTY = 0.70
- float MAX_ACTIVITY_PENALTY = 0.80
- float SCORE_FLOOR = 0.05

Protected Member Functions

- float _compute_connectivity (self, Station station)
- float _compute_signal_quality (self, Station station, Optional[LinkMeasurement] lm)
- float _compute_throughput (self, Station station)
- float _compute_reliability (self, Station station)
- float _compute_latency (self, Station station)
- float _compute_activity (self, Station station)

Static Protected Member Functions

- float _clamp (float value, float min_val=0.0, float max_val=1.0)
- float _normalize_linear (Optional[float] value, float poor, float good, float excellent, float floor=0.1)

8.38.1 Detailed Description

```
Compute and maintain QoE (Quality of Experience) scores for WiFi stations.

QoE is a multi-dimensional metric (0.0 to 1.0) that combines:
- Signal Quality: RSSI, SNR, link margin (30%)
- Reliability: Packet errors, retries, FCS errors (25%)
- Throughput: Bitrates, efficiency (20%)
- Latency: Queue backlog, inactive time (15%)
- Activity: Recent traffic, engagement (10%)

Higher scores indicate better user experience.
```

8.38.2 Constructor & Destructor Documentation

8.38.2.1 __init__()

```
metrics.qoe.QoE.__init__ (
              self)
```

8.38.3 Member Function Documentation

8.38.3.1 _clamp()

```
float metrics.qoe.QoE._clamp (
             float value,
             float  min_val = 0.0,
             float  max_val = 1.0)  [static], [protected]
```

Ensure value is within valid range.

8.38.3.2 _compute_activity()

```
float metrics.qoe.QoE._compute_activity (
              self,
             Station station)  [protected]
```

Activity level based on recent traffic and engagement.
Inactive stations should have lower QoE as they're not actively used.

8.38.3.3 _compute_connectivity()

```
float metrics.qoe.QoE._compute_connectivity (
              self,
             Station station)  [protected]
```

Basic connectivity indicator for API compatibility.
Returns 1.0 for authorized/associated stations, 0.0 otherwise.
Not used in overall QoE score calculation.

8.38.3.4 _compute_latency()

```
float metrics.qoe.QoE._compute_latency (
              self,
             Station station)  [protected]
```

Latency indicator based on backlog packets and inactive time.
Lower is better for responsiveness.

8.38.3.5 _compute_reliability()

```
float metrics.qoe.QoE._compute_reliability (
             self,
            Station station)  [protected]
```

Reliability based on retry rates, FCS errors, and packet failures.
Uses multiplicative penalties capped at maximum.

8.38.3.6 _compute_signal_quality()

```
float metrics.qoe.QoE._compute_signal_quality (
             self,
            Station station,
            Optional[LinkMeasurement] lm)  [protected]
```

Signal quality based on RSSI, SNR, and link margin.
Average of available metrics, weighted equally.

8.38.3.7 _compute_throughput()

```
float metrics.qoe.QoE._compute_throughput (
             self,
            Station station)  [protected]
```

Throughput score based on actual bitrates and efficiency.
Uses the best available rate indicator.

8.38.3.8 _normalize_linear()

```
float metrics.qoe.QoE._normalize_linear (
            Optional[float] value,
            float poor,
            float good,
            float excellent,
            float  floor = 0.1)  [static], [protected]
```

Normalize a value using piecewise linear interpolation.

Returns floor if value <= poor, 1.0 if value >= excellent,
and interpolates linearly between poor-good and good-excellent.

8.38.3.9 compute_qoe()

```
QoEComponents metrics.qoe.QoE.compute_qoe (
             self,
            Station station,
            Optional[LinkMeasurement]  lm = None)
```

Compute comprehensive QoE for a station.
Returns QoEComponents with all metrics and overall score.

8.38.3.10 get_best_stations()

```
List[tuple[str, float]] metrics.qoe.QoE.get_best_stations (
              self,
             int  n = 5)
```

Get the N stations with highest QoE.

8.38.3.11 get_components()

```
Optional[QoEComponents] metrics.qoe.QoE.get_components (
              self,
             str mac)
```

Get detailed QoE breakdown for a station.

8.38.3.12 get_history()

```
Optional[QoEHistory] metrics.qoe.QoE.get_history (
              self,
             str mac)
```

Get QoE history for trend analysis.

8.38.3.13 get_statistics()

```
Dict metrics.qoe.QoE.get_statistics (
              self)
```

Get overall QoE statistics across all stations.

8.38.3.14 get_worst_stations()

```
List[tuple[str, float]] metrics.qoe.QoE.get_worst_stations (
              self,
             int  n = 5)
```

Get the N stations with lowest QoE.

8.38.3.15 update()

```
metrics.qoe.QoE.update (
              self)
```

Iterate through all stations and update QoE database.
Only logs outliers to reduce noise.

8.38.4 Member Data Documentation

8.38.4.1 BACKLOG_ACCEPTABLE

```
int metrics.qoe.QoE.BACKLOG_ACCEPTABLE = 10  [static]
```

8.38.4.2 BACKLOG_CRITICAL

```
int metrics.qoe.QoE.BACKLOG_CRITICAL = 100  [static]
```

8.38.4.3 BITRATE_EXCELLENT

```
metrics.qoe.QoE.BITRATE_EXCELLENT = 400  [static]
```

8.38.4.4 BITRATE_GOOD

```
metrics.qoe.QoE.BITRATE_GOOD = 150  [static]
```

8.38.4.5 BITRATE_POOR

```
metrics.qoe.QoE.BITRATE_POOR = 20  [static]
```

8.38.4.6 component_cache

```
dict metrics.qoe.QoE.component_cache = {}
```

8.38.4.7 FCS_RATE_ACCEPTABLE

```
float metrics.qoe.QoE.FCS_RATE_ACCEPTABLE = 0.01  [static]
```

8.38.4.8 FCS_RATE_POOR

```
float metrics.qoe.QoE.FCS_RATE_POOR = 0.05  [static]
```

8.38.4.9 history

```
dict metrics.qoe.QoE.history = {}
```

8.38.4.10 INACTIVE_CRITICAL_MS

```
int metrics.qoe.QoE.INACTIVE_CRITICAL_MS = 20000  [static]
```

8.38.4.11 INACTIVE_THRESHOLD_MS

```
int metrics.qoe.QoE.INACTIVE_THRESHOLD_MS = 5000  [static]
```

8.38.4.12 lmdb

```
metrics.qoe.QoE.lmdb = LinkMeasurementDB()
```

8.38.4.13 MAX_ACTIVITY_PENALTY

```
float metrics.qoe.QoE.MAX_ACTIVITY_PENALTY = 0.80  [static]
```

8.38.4.14 MAX_LATENCY_PENALTY

```
float metrics.qoe.QoE.MAX_LATENCY_PENALTY = 0.70  [static]
```

8.38.4.15 MAX_RELIABILITY_PENALTY

```
float metrics.qoe.QoE.MAX_RELIABILITY_PENALTY = 0.85  [static]
```

8.38.4.16 qoedb

```
metrics.qoe.QoE.qoedb = QoEDB()
```

8.38.4.17 RETRY_RATE_ACCEPTABLE

```
float metrics.qoe.QoE.RETRY_RATE_ACCEPTABLE = 0.05  [static]
```

8.38.4.18 RETRY_RATE_POOR

```
float metrics.qoe.QoE.RETRY_RATE_POOR = 0.20  [static]
```

8.38.4.19 RSSI_EXCELLENT

```
int metrics.qoe.QoE.RSSI_EXCELLENT = -50  [static]
```

8.38.4.20 RSSI_GOOD

```
int metrics.qoe.QoE.RSSI_GOOD = -65  [static]
```

8.38.4.21 RSSI_POOR

```
int metrics.qoe.QoE.RSSI_POOR = -80  [static]
```

8.38.4.22 SCORE_FLOOR

```
metrics.qoe.QoE.SCORE_FLOOR = 0.05  [static]
```

8.38.4.23 SNR_EXCELLENT

```
int metrics.qoe.QoE.SNR_EXCELLENT = 35  [static]
```

8.38.4.24 SNR_GOOD

```
int metrics.qoe.QoE.SNR_GOOD = 25  [static]
```

8.38.4.25 SNR_POOR

```
int metrics.qoe.QoE.SNR_POOR = 10  [static]
```

8.38.4.26 stdb

```
metrics.qoe.QoE.stdb = StationDB()
```

The documentation for this class was generated from the following file:

- metrics/qoe.py

8.39 metrics.qoe.QoEComponents Class Reference

Public Member Functions

- float overall (self)
- Dict to_dict (self)

Public Attributes

- overall

Static Public Attributes

- float connectivity = 0.0
- float signal_quality = 0.0
- float reliability = 0.0
- float throughput = 0.0
- float latency = 0.0
- float activity = 0.0
- datetime timestamp = field(default_factory=datetime.now)

8.39.1 Detailed Description

```
Breakdown of QoE score components for transparency.
```

8.39.2 Member Function Documentation

8.39.2.1 overall()

```
float metrics.qoe.QoEComponents.overall (
              self)
```

```
Weighted average of all components based on user impact.
```

8.39.2.2 to_dict()

```
Dict metrics.qoe.QoEComponents.to_dict (
              self)
```

8.39.3 Member Data Documentation

8.39.3.1 activity

```
metrics.qoe.QoEComponents.activity = 0.0  [static]
```

8.39.3.2 connectivity

```
metrics.qoe.QoEComponents.connectivity = 0.0  [static]
```

8.39.3.3 latency

```
metrics.qoe.QoEComponents.latency = 0.0  [static]
```

8.39.3.4 overall

```
metrics.qoe.QoEComponents.overall
```

8.39.3.5 reliability

```
metrics.qoe.QoEComponents.reliability = 0.0  [static]
```

8.39.3.6 signal_quality

```
metrics.qoe.QoEComponents.signal_quality = 0.0  [static]
```

8.39.3.7 throughput

```
metrics.qoe.QoEComponents.throughput = 0.0  [static]
```

8.39.3.8 timestamp

```
datetime metrics.qoe.QoEComponents.timestamp = field(default_factory=datetime.now)  [static]
```

The documentation for this class was generated from the following file:

- metrics/qoe.py

8.40 dashboard.qoe_dashboard.QoEDashboard Class Reference

Public Member Functions

- __init__ (self, QoEDB qoedb, Optional[QoE] qoe_engine=None)
- str as_overview_table (self, bool sort_by_qoe=True, Optional[int] limit=None)
- str as_detailed_table (self, bool sort_by_qoe=True, Optional[int] limit=10)
- str as_visual_breakdown (self, str mac)
- str as_statistics_summary (self)
- str as_alerts (self, float threshold=0.4, int limit=5)
- str as_compact_dashboard (self, int limit=10)
- str as_full_dashboard (self, int limit=20)
- show (self, str mode="compact", bool sort_by_qoe=True, Optional[int] limit=None, Optional[IO] pipe=None, bool replace=False, bool disable_color=False)

Public Attributes

- db = qoedb
- engine = qoe_engine
- bool use_color = True

Static Public Attributes

- dict COLORS
- dict BOX

Protected Member Functions

- str _colorize (self, str text, str color)
- str _qoe_color (self, float qoe)
- str _qoe_status (self, float qoe)
- str _trend_symbol (self, str trend)
- str _bar_chart (self, float value, int width=20, str filled_char="...", str empty_char="...")
- str _render_header (self, str title, int width)
- str _render_table_row (self, List[str] columns, List[int] widths, str separator="...")

8.40.1 Detailed Description

```
Comprehensive QoE dashboard with component breakdown, trends, and alerts.

Features:
- Overall QoE scores with color-coded status
- Component breakdown (connectivity, signal, throughput, reliability, latency, activity)
- Historical trends (improving/declining/stable)
- Volatility indicators
- Statistics summary
- Problem station alerts
```

8.40.2 Constructor & Destructor Documentation

8.40.2.1 __init__()

```
dashboard.qoe_dashboard.QoEDashboard.__init__ (
              self,
             QoEDB qoedb,
             Optional[QoE]  qoe_engine = None)
```

```
Args:
    qoe_db: QoE database for scores
    qoe_engine: Optional QoE engine for component details and history
```

8.40.3 Member Function Documentation

8.40.3.1 _bar_chart()

```
str dashboard.qoe_dashboard.QoEDashboard._bar_chart (
              self,
             float value,
             int  width = 20,
             str  filled_char = "...",
             str  empty_char = "...")  [protected]
```

Create a simple bar chart for a 0-1 value.

8.40.3.2 _colorize()

```
str dashboard.qoe_dashboard.QoEDashboard._colorize (
              self,
             str text,
             str color)  [protected]
```

Apply color to text if colors are enabled.

8.40.3.3 _qoe_color()

```
str dashboard.qoe_dashboard.QoEDashboard._qoe_color (
              self,
             float qoe)  [protected]
```

Get color based on QoE score.

8.40.3.4 _qoe_status()

```
str dashboard.qoe_dashboard.QoEDashboard._qoe_status (
              self,
             float qoe)  [protected]
```

Get status emoji/symbol based on QoE score.

8.40.3.5 _render_header()

```
str dashboard.qoe_dashboard.QoEDashboard._render_header (
              self,
             str title,
             int width)  [protected]
```

Render a box header.

8.40.3.6 _render_table_row()

```
str dashboard.qoe_dashboard.QoEDashboard._render_table_row (
              self,
             List[str] columns,
             List[int] widths,
             str  separator = "...")  [protected]
```

Render a single table row.

8.40.3.7 _trend_symbol()

```
str dashboard.qoe_dashboard.QoEDashboard._trend_symbol (
              self,
             str trend)  [protected]
```

Get symbol for trend direction.

8.40.3.8 as_alerts()

```
str dashboard.qoe_dashboard.QoEDashboard.as_alerts (
              self,
             float  threshold = 0.4,
             int  limit = 5)
```

Show stations with QoE below threshold (problem stations).

8.40.3.9 as_compact_dashboard()

```
str dashboard.qoe_dashboard.QoEDashboard.as_compact_dashboard (
              self,
             int  limit = 10)
```

Single-screen compact dashboard with key info.

8.40.3.10 as_detailed_table()

```
str dashboard.qoe_dashboard.QoEDashboard.as_detailed_table (
              self,
             bool  sort_by_qoe = True,
             Optional[int]  limit = 10)
```

Detailed table with component breakdown for each station.

8.40.3.11 as_full_dashboard()

```
str dashboard.qoe_dashboard.QoEDashboard.as_full_dashboard (
              self,
             int  limit = 20)
```

Full detailed dashboard.

8.40.3.12 as_overview_table()

```
str dashboard.qoe_dashboard.QoEDashboard.as_overview_table (
              self,
             bool  sort_by_qoe = True,
             Optional[int]  limit = None)
```

Compact overview table with current QoE scores only.
History, trends, and volatility are removed.

8.40.3.13 as_statistics_summary()

```
str dashboard.qoe_dashboard.QoEDashboard.as_statistics_summary (
              self)
```

Verbose statistics summary based only on current QoE values.
No history or trend info.

8.40.3.14 as_visual_breakdown()

```
str dashboard.qoe_dashboard.QoEDashboard.as_visual_breakdown (
              self,
             str mac)
```

Visual bar chart breakdown for a single station.

8.40.3.15 show()

```
dashboard.qoe_dashboard.QoEDashboard.show (
              self,
             str  mode = "compact",
             bool  sort_by_qoe = True,
             Optional[int]  limit = None,
             Optional[IO]  pipe = None,
             bool  replace = False,
             bool  disable_color = False)
```

Display dashboard to pipe OR socket OR stdout.

```
Args:
    mode: "compact", "full", "overview", "detailed", "stats", or "alerts"
    sort_by_qoe: Sort stations by QoE score
    limit: Max number of stations to show
    pipe: Output destination (socket, file, or None for stdout)
    replace: Clear screen before output (ANSI escape codes)
    disable_color: Disable color output
```

8.40.4 Member Data Documentation

8.40.4.1 BOX

```
dict dashboard.qoe_dashboard.QoEDashboard.BOX  [static]
```

Initial value:

```
=  {
        "tl": "...", "tr": "...", "bl": "...", "br": "...",
        "h": "...", "v": "...",
        "t": "...", "b": "...", "l": "...", "r": "...",
        "cross": "...",
        "vl": "...", "vr": "...", "ht": "...", "hb": "...",
    }
```

8.40.4.2 COLORS

```
dict dashboard.qoe_dashboard.QoEDashboard.COLORS  [static]
```

Initial value:

```
=  {
        "red": "\033[91m",
        "yellow": "\033[93m",
        "green": "\033[92m",
        "blue": "\033[94m",
        "cyan": "\033[96m",
        "magenta": "\033[95m",
        "white": "\033[97m",
        "gray": "\033[90m",
        "bold": "\033[1m",
        "reset": "\033[0m",
    }
```

8.40.4.3 db

```
dashboard.qoe_dashboard.QoEDashboard.db = qoedb
```

8.40.4.4 engine

```
dashboard.qoe_dashboard.QoEDashboard.engine = qoe_engine
```

8.40.4.5 use_color

```
bool dashboard.qoe_dashboard.QoEDashboard.use_color = True
```

The documentation for this class was generated from the following file:

- dashboard/qoe_dashboard.py

8.41 db.qoe_db.QoEDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- set (self, str sta_mac, float qoe_value)
- Optional[float] get (self, str sta_mac)
- remove (self, str sta_mac)
- Dict[str, float] all (self)
- int count (self)
- clear (self)
- Dict[str, float] to_dict (self)
- bool __contains__ (self, str sta_mac)
- __len__ (self)
- __iter__ (self)
- __repr__ (self)

Protected Attributes

- dict _db = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.41.1 Detailed Description

```
Database for storing QoE (Quality of Experience) for each station.
```

8.41.2 Constructor & Destructor Documentation

8.41.2.1 __init__()

```
db.qoe_db.QoEDB.__init__ (
              self)
```

8.41.3 Member Function Documentation

8.41.3.1 __contains__()

```
bool db.qoe_db.QoEDB.__contains__ (
              self,
             str sta_mac)
```

8.41.3.2 __iter__()

```
db.qoe_db.QoEDB.__iter__ (
              self)
```

Iterate over all (sta_mac, qoe) pairs.

8.41.3.3 __len__()

```
db.qoe_db.QoEDB.__len__ (
              self)
```

8.41.3.4 __new__()

```
db.qoe_db.QoEDB.__new__ (
              cls)
```

8.41.3.5 __repr__()

```
db.qoe_db.QoEDB.__repr__ (
              self)
```

8.41.3.6 all()

```
Dict[str, float] db.qoe_db.QoEDB.all (
              self)
```

Return all QoE entries.

8.41.3.7 clear()

```
db.qoe_db.QoEDB.clear (
              self)
```

Clear all QoE entries.

8.41.3.8 count()

```
int db.qoe_db.QoEDB.count (
              self)
```

Number of stations with QoE recorded.

8.41.3.9 get()

```
Optional[float] db.qoe_db.QoEDB.get (
              self,
             str sta_mac)
```

Get QoE for a station. Returns None if not set.

8.41.3.10 remove()

```
db.qoe_db.QoEDB.remove (
              self,
             str sta_mac)
```

Remove QoE entry for a station.

8.41.3.11 set()

```
db.qoe_db.QoEDB.set (
              self,
             str sta_mac,
             float qoe_value)
```

Set or update QoE for a station.

8.41.3.12 to_dict()

```
Dict[str, float] db.qoe_db.QoEDB.to_dict (
              self)
```

Dump the complete state of the database.
Returns a dictionary mapping station MAC addresses to their QoE value.

8.41.4 Member Data Documentation

8.41.4.1 _db

```
db.qoe_db.QoEDB._db = {}  [protected]
```

8.41.4.2 _initialized

```
bool db.qoe_db.QoEDB._initialized = True  [protected]
```

8.41.4.3 _instance

```
db.qoe_db.QoEDB._instance = None  [static], [protected]
```

8.41.4.4 _lock

```
db.qoe_db.QoEDB._lock = RLock()  [static], [protected]
```

The documentation for this class was generated from the following file:

- db/qoe_db.py

8.42 metrics.qoe.QoEHistory Class Reference

Public Member Functions

- add (self, float score)
- float average (self)
- float smoothed (self)
- str trend (self)
- float volatility (self)

Static Public Attributes

- deque history = field(default_factory=lambda: deque(maxlen=60))
- float alpha = 0.3

Protected Member Functions

- float _smoothed_for_list (self, list data)

8.42.1 Detailed Description

```
Track QoE over time for trend analysis.
```

8.42.2 Member Function Documentation

8.42.2.1 _smoothed_for_list()

```
float metrics.qoe.QoEHistory._smoothed_for_list (
             self,
            list data)  [protected]
```

```
Compute exponential smoothing for a given slice of history.
```

8.42.2.2 add()

```
metrics.qoe.QoEHistory.add (
              self,
             float score)
```

8.42.2.3 average()

```
float metrics.qoe.QoEHistory.average (
              self)
```

8.42.2.4 smoothed()

```
float metrics.qoe.QoEHistory.smoothed (
              self)
```

Exponential smoothing of the QoE scores.

8.42.2.5 trend()

```
str metrics.qoe.QoEHistory.trend (
              self)
```

Detect if QoE is improving, declining, or stable using smoothed scores.

8.42.2.6 volatility()

```
float metrics.qoe.QoEHistory.volatility (
              self)
```

Measure how much QoE fluctuates (standard deviation).

8.42.3 Member Data Documentation

8.42.3.1 alpha

```
float metrics.qoe.QoEHistory.alpha = 0.3  [static]
```

8.42.3.2 history

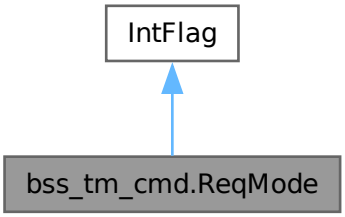
```
metrics.qoe.QoEHistory.history = field(default_factory=lambda:  deque(maxlen=60))  [static]
```

The documentation for this class was generated from the following file:

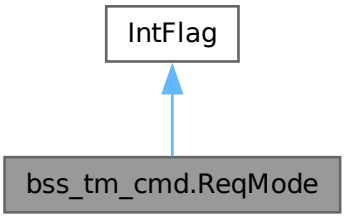
- metrics/qoe.py

8.43 bss_tm_cmd.ReqMode Class Reference

Inheritance diagram for bss_tm_cmd.ReqMode:



Collaboration diagram for bss_tm_cmd.ReqMode:



Static Public Attributes

- int PREFERRED_CAND_LIST_INCLUDED = 0x01
- int ABRUPT_TRANSITION = 0x02
- int DISASSOC_IMMINENT = 0x04
- int BSS_TERMINATION_INCLUDED = 0x08
- int ESS_DISASSOC_IMMINENT = 0x10
- int CANDIDATE_LIST_PROVIDED_BY_STA = 0x20

8.43.1 Detailed Description

```
IEEE 802.11v BSS Transition Management Request Mode bits.
```

8.43.2 Member Data Documentation

8.43.2.1 ABRUPT_TRANSITION

```
int bss_tm_cmd.ReqMode.ABRUPT_TRANSITION = 0x02  [static]
```

8.43.2.2 BSS_TERMINATION_INCLUDED

```
int bss_tm_cmd.ReqMode.BSS_TERMINATION_INCLUDED = 0x08  [static]
```

8.43.2.3 CANDIDATE_LIST_PROVIDED_BY_STA

```
int bss_tm_cmd.ReqMode.CANDIDATE_LIST_PROVIDED_BY_STA = 0x20  [static]
```

8.43.2.4 DISASSOC_IMMINENT

```
int bss_tm_cmd.ReqMode.DISASSOC_IMMINENT = 0x04  [static]
```

8.43.2.5 ESS_DISASSOC_IMMINENT

```
int bss_tm_cmd.ReqMode.ESS_DISASSOC_IMMINENT = 0x10  [static]
```

8.43.2.6 PREFERRED_CAND_LIST_INCLUDED

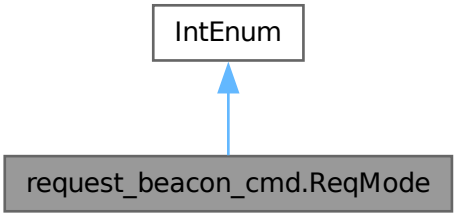
```
int bss_tm_cmd.ReqMode.PREFERRED_CAND_LIST_INCLUDED = 0x01  [static]
```

The documentation for this class was generated from the following file:

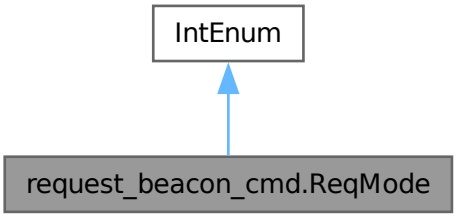
- command/bss_tm_cmd.py

8.44 request_beacon_cmd.ReqMode Class Reference

Inheritance diagram for request_beacon_cmd.ReqMode:



Collaboration diagram for request_beacon_cmd.ReqMode:



Static Public Attributes

- int NORMAL = 0
- int LCI = 1 << 0
- int CIVIC = 1 << 1

8.44.1 Detailed Description

```
Request modes for REQ_BEACON command.
```

8.44.2 Member Data Documentation

8.44.2.1 CIVIC

```
int request_beacon_cmd.ReqMode.CIVIC = 1 << 1  [static]
```

8.44.2.2 LCI

```
int request_beacon_cmd.ReqMode.LCI = 1 << 0  [static]
```

8.44.2.3 NORMAL

```
int request_beacon_cmd.ReqMode.NORMAL = 0  [static]
```

The documentation for this class was generated from the following file:

- command/request_beacon_cmd.py

8.45 request_beacon_cmd.RequestBeaconCommandBuilder Class Reference

Public Member Functions

- __init__ (self, str dest_mac="")
- set_req_mode (self, int mode)
- set_measurement_params (self, int operating_class, int channel_number, int randomization_interval, int measurement_duration, int measurement_mode, str bssid)
- add_subelements (self, bytes data)
- str build (self)
- str __str__ (self)

Public Attributes

- dest_mac = dest_mac
- int req_mode = 0
- int operating_class = 0
- int channel_number = 0
- int randomization_interval = 0
- int measurement_duration = 0
- int measurement_mode = 0
- str bssid = b'\xff\xff\xff\xff\xff\xff'
- str subelements = b''

Protected Member Functions

- bytes _build_payload (self)

8.45.1 Detailed Description

```
Build a REQ_BEACON command for hostapd from human-readable parameters.
```

8.45.2 Constructor & Destructor Documentation

8.45.2.1 __init__()

```
request_beacon_cmd.RequestBeaconCommandBuilder.__init__ (
              self,
             str  dest_mac = "")
```

8.45.3 Member Function Documentation

8.45.3.1 __str__()

```
str request_beacon_cmd.RequestBeaconCommandBuilder.__str__ (
              self)
```

8.45.3.2 _build_payload()

```
bytes request_beacon_cmd.RequestBeaconCommandBuilder._build_payload (
              self)  [protected]
```

Assemble payload binary per IEEE 802.11k spec.

8.45.3.3 add_subelements()

```
request_beacon_cmd.RequestBeaconCommandBuilder.add_subelements (
              self,
             bytes data)
```

Optional variable-length subelements (raw bytes).

8.45.3.4 build()

```
str request_beacon_cmd.RequestBeaconCommandBuilder.build (
              self)
```

Return the final REQ_BEACON command string for hostapd.

8.45.3.5 set_measurement_params()

```
request_beacon_cmd.RequestBeaconCommandBuilder.set_measurement_params (
              self,
             int operating_class,
             int channel_number,
             int randomization_interval,
             int measurement_duration,
             int measurement_mode,
             str bssid)
```

All standard fields from IEEE 802.11k Beacon Request body.

8.45.3.6 set_req_mode()

```
request_beacon_cmd.RequestBeaconCommandBuilder.set_req_mode (
             self,
            int mode)
```

8.45.4 Member Data Documentation

8.45.4.1 bssid

```
request_beacon_cmd.RequestBeaconCommandBuilder.bssid = b'\xff\xff\xff\xff\xff\xff'
```

8.45.4.2 channel_number

```
int request_beacon_cmd.RequestBeaconCommandBuilder.channel_number = 0
```

8.45.4.3 dest_mac

```
request_beacon_cmd.RequestBeaconCommandBuilder.dest_mac = dest_mac
```

8.45.4.4 measurement_duration

```
int request_beacon_cmd.RequestBeaconCommandBuilder.measurement_duration = 0
```

8.45.4.5 measurement_mode

```
int request_beacon_cmd.RequestBeaconCommandBuilder.measurement_mode = 0
```

8.45.4.6 operating_class

```
int request_beacon_cmd.RequestBeaconCommandBuilder.operating_class = 0
```

8.45.4.7 randomization_interval

```
int request_beacon_cmd.RequestBeaconCommandBuilder.randomization_interval = 0
```

8.45.4.8 req_mode

```
int request_beacon_cmd.RequestBeaconCommandBuilder.req_mode = 0
```

8.45.4.9 subelements

```
request_beacon_cmd.RequestBeaconCommandBuilder.subelements = b''
```

The documentation for this class was generated from the following file:

- command/request_beacon_cmd.py

8.46 store.routine.Routine Class Reference

Public Member Functions

- __init__ (self, str output_dir, Optional[Dict[str, str]] db_initials=None, float batch_interval=30.0, Optional[int] retention_days=None, str organize_by="date" # "date", hour, or, flat)
- stop (self, bool save_final=True)
- Dict[str, Any] get_statistics (self)
- Dict[str, Any] force_save (self)
- Dict[str, Any] get_latest_snapshot (self)
- list list_saved_batches (self, int limit=10)

Public Attributes

- output_dir = Path(output_dir)
- str metadata_dir = self.output_dir / "_metadata"
- db_initials
- dict databases
- batch_interval = batch_interval
- retention_days = retention_days
- str organize_by = organize_by

Protected Member Functions

- Path _get_organized_path (self, datetime timestamp)
- str _generate_filename (self, str db_name, datetime timestamp)
- Optional[Dict[str, Any]] _get_db_snapshot (self, str db_name, Any db_obj, datetime timestamp)
- Dict[str, Any] _save_batch (self)
- _save_batch_metadata (self, Dict[str, Any] metadata, Path batch_dir)
- _save_session_metadata (self)
- _cleanup_old_batches (self)
- _run (self)

Protected Attributes

- _stop_event = threading.Event()
- _lock = threading.Lock()
- int _batch_counter = 0
- _session_id = datetime.now().strftime("%Y%m%d_%H%M%S")
- int _save_errors = 0
- int _total_saves = 0
- dict _session_metadata
- _thread = threading.Thread(target=self._run, daemon=True, name="RoutineThread")

8.46.1 Constructor & Destructor Documentation

8.46.1.1 __init__()

```
store.routine.Routine.__init__ (
              self,
             str output_dir,
             Optional[Dict[str, str]]  db_initials = None,
             float  batch_interval = 30.0,
             Optional[int]  retention_days = None,
             str  organize_by = "date"  # "date",
              hour,
              or,
              flat)
```

Enhanced database persistence routine with organized timestamped storage.

```
Args:
    output_dir: Root directory for database storage
    db_initials: Dictionary mapping db names to filename initials
    batch_interval: How often (seconds) to persist a batch
    retention_days: Auto-delete batches older than this (None = keep all)
    organize_by: How to organize files - "date" (YYYY/MM/DD/), "hour" (YYYY/MM/DD/HH/), or "flat"
```

8.46.2 Member Function Documentation

8.46.2.1 _cleanup_old_batches()

```
store.routine.Routine._cleanup_old_batches (
              self)  [protected]
```

Remove batches older than retention_days.

8.46.2.2 _generate_filename()

```
str store.routine.Routine._generate_filename (
              self,
             str db_name,
             datetime timestamp)  [protected]
```

```
Generate organized filename with timestamp.
Format: {initial}_{YYYYMMDD_HHMMSS}_{batch}.json
Example: BM_20251115_143022_0042.json
```

8.46.2.3 _get_db_snapshot()

```
Optional[Dict[str, Any]] store.routine.Routine._get_db_snapshot (
              self,
             str db_name,
             Any db_obj,
             datetime timestamp)  [protected]
```

Get a snapshot of a database with full metadata.

8.46.2.4 _get_organized_path()

```
Path store.routine.Routine._get_organized_path (
              self,
             datetime timestamp)  [protected]
```

Get organized directory path based on timestamp.

Returns path like:
- date: output_dir/2025/11/15/
- hour: output_dir/2025/11/15/14/
- flat: output_dir/

8.46.2.5 _run()

```
store.routine.Routine._run (
              self)  [protected]
```

Main routine loop.

8.46.2.6 _save_batch()

```
Dict[str, Any] store.routine.Routine._save_batch (
              self)  [protected]
```

Save all database snapshots with metadata tracking.

8.46.2.7 _save_batch_metadata()

```
store.routine.Routine._save_batch_metadata (
              self,
             Dict[str, Any] metadata,
             Path batch_dir)  [protected]
```

Save metadata for a specific batch.

8.46.2.8 _save_session_metadata()

```
store.routine.Routine._save_session_metadata (
              self)  [protected]
```

Save overall session metadata.

8.46.2.9 force_save()

```
Dict[str, Any] store.routine.Routine.force_save (
              self)
```

Manually trigger an immediate save.

8.46.2.10 get_latest_snapshot()

```
Dict[str, Any] store.routine.Routine.get_latest_snapshot (
              self)
```

Get current in-memory snapshots without saving.

8.46.2.11 get_statistics()

```
Dict[str, Any] store.routine.Routine.get_statistics (
              self)
```

Get runtime statistics.

8.46.2.12 list_saved_batches()

```
list store.routine.Routine.list_saved_batches (
              self,
             int  limit = 10)
```

List recent saved batches with metadata.

8.46.2.13 stop()

```
store.routine.Routine.stop (
              self,
            bool  save_final = True)
```

Stop the routine and save final metadata.

8.46.3 Member Data Documentation

8.46.3.1 _batch_counter

```
store.routine.Routine._batch_counter = 0  [protected]
```

8.46.3.2 _lock

store.routine.Routine._lock = threading.Lock() [protected]

8.46.3.3 _save_errors

store.routine.Routine._save_errors = 0 [protected]

8.46.3.4 _session_id

store.routine.Routine._session_id = datetime.now().strftime("%Y%m%d_%H%M%S") [protected]

8.46.3.5 _session_metadata

store.routine.Routine._session_metadata [protected]

Initial value:

```
=  {
            "session_id": self._session_id,
            "start_time": datetime.now().isoformat(),
            "databases": list(self.databases.keys()),
            "config": {
                "batch_interval": batch_interval,
                "organize_by": organize_by,
                "retention_days": retention_days
            },
            "saves": []
        }
```

8.46.3.6 _stop_event

store.routine.Routine._stop_event = threading.Event() [protected]

8.46.3.7 _thread

store.routine.Routine._thread = threading.Thread(target=self._run, daemon=True, name="Routine↩
Thread") [protected]

8.46.3.8 _total_saves

store.routine.Routine._total_saves = 0 [protected]

8.46.3.9 batch_interval

store.routine.Routine.batch_interval = batch_interval

8.46.3.10 databases

```
dict store.routine.Routine.databases
```

Initial value:

```
=  {
            "bmdb": BeaconMeasurementDB(),
            "lmdb": LinkMeasurementDB(),
            "qoedb": QoEDB(),
            "stdb": StationDB(),
            "neighbordb": NeighborDB(),
            "bsstmdb": BSSTransitionResponseDB(),
        }
```

8.46.3.11 db_initials

```
store.routine.Routine.db_initials
```

Initial value:

```
=  db_initials or {
            "bmdb": "BM",
            "lmdb": "LM",
            "qoedb": "QOE",
            "stdb": "ST",
            "neighbordb": "NB",
            "bsstmdb": "BSSTM",
        }
```

8.46.3.12 metadata_dir

```
str store.routine.Routine.metadata_dir = self.output_dir / "_metadata"
```

8.46.3.13 organize_by

```
str store.routine.Routine.organize_by = organize_by
```

8.46.3.14 output_dir

```
store.routine.Routine.output_dir = Path(output_dir)
```

8.46.3.15 retention_days

```
store.routine.Routine.retention_days = retention_days
```

The documentation for this class was generated from the following file:

- store/routine.py

8.47 rxmux.RxMux Class Reference

Public Member Functions

- None __init__ (self)
- cleardb (self, str mac)
- Optional[Tuple[MgmtType, RadioTap]] mux (self, bytes frame_bytes)

Static Public Member Functions

- bytes parse_buf_string (str s)

Public Attributes

- lm_db = LinkMeasurementDB()
- bm_db = BeaconMeasurementDB()
- bss_tm_db = BSSTransitionResponseDB()
- st_db = StationDB()
- qe_db = QoEDB()
- nr_db = NeighborRankingDB()

8.47.1 Detailed Description

```
Multiplex incoming 802.11 frames into specific storages based on Action frame category.
```

8.47.2 Constructor & Destructor Documentation

8.47.2.1 __init__()

```
None rxmux.RxMux.__init__ (
              self)
```

8.47.3 Member Function Documentation

8.47.3.1 cleardb()

```
rxmux.RxMux.cleardb (
              self,
             str mac)
```

8.47.3.2 mux()

```
Optional[Tuple[MgmtType, RadioTap]] rxmux.RxMux.mux (
              self,
             bytes frame_bytes)
```

```
Parse a raw 802.11 frame and store in the appropriate DB.
```

8.47.3.3 parse_buf_string()

```
bytes rxmux.RxMux.parse_buf_string (
            str s)  [static]
```

Extract buf= hex string and return bytes.

8.47.4 Member Data Documentation

8.47.4.1 bm_db

```
rxmux.RxMux.bm_db = BeaconMeasurementDB()
```

8.47.4.2 bss_tm_db

```
rxmux.RxMux.bss_tm_db = BSSTransitionResponseDB()
```

8.47.4.3 lm_db

```
rxmux.RxMux.lm_db = LinkMeasurementDB()
```

8.47.4.4 nr_db

```
rxmux.RxMux.nr_db = NeighborRankingDB()
```

8.47.4.5 qe_db

```
rxmux.RxMux.qe_db = QoEDB()
```

8.47.4.6 st_db

```
rxmux.RxMux.st_db = StationDB()
```

The documentation for this class was generated from the following file:

- protocol/rxmux.py

8.48 dashboard.socket_pool.SocketPool Class Reference

Public Member Functions

- __init__ (self)
- socket.socket create (self, str name, str path, str mode="server")
- Optional[ClientConnection] accept (self, str name, Optional[str] client_name=None)
- Optional[ClientConnection] get_client (self, str client_name)
- List[ClientConnection] get_clients (self, str server_name)
- close_client (self, str client_name)
- broadcast (self, str server_name, bytes data)
- Optional[socket.socket] get (self, str name)
- close (self, str name)
- destroy (self)
- List[str] list (self)
- List[str] list_clients (self, Optional[str] server_name=None)
- Dict stats (self)
- __len__ (self)
- __repr__ (self)

Protected Attributes

- dict _sockets = {}
- dict _clients = {}
- dict _client_lookup = {}
- _lock = threading.RLock()
- int _client_counter = 0

8.48.1 Detailed Description

```
Manages multiple UNIX domain sockets for IPC (server + client) with client tracking.
```

8.48.2 Constructor & Destructor Documentation

8.48.2.1 __init__()

```
dashboard.socket_pool.SocketPool.__init__ (
            self)
```

8.48.3 Member Function Documentation

8.48.3.1 __len__()

```
dashboard.socket_pool.SocketPool.__len__ (
            self)
```

8.48.3.2 __repr__()

```
dashboard.socket_pool.SocketPool.__repr__ (
              self)
```

8.48.3.3 accept()

```
Optional[ClientConnection] dashboard.socket_pool.SocketPool.accept (
              self,
             str name,
             Optional[str]  client_name = None)
```

```
Block until a client connects to a server socket.
Returns a ClientConnection object that can be used to communicate with the client.

Args:
    name: server socket name
    client_name: optional name for the client connection (auto-generated if None)
```

8.48.3.4 broadcast()

```
dashboard.socket_pool.SocketPool.broadcast (
              self,
             str server_name,
             bytes data)
```

```
Send data to all clients connected to a server.
```

8.48.3.5 close()

```
dashboard.socket_pool.SocketPool.close (
              self,
             str name)
```

8.48.3.6 close_client()

```
dashboard.socket_pool.SocketPool.close_client (
              self,
             str client_name)
```

```
Close and remove a specific client connection.
```

8.48.3.7 create()

```
socket.socket dashboard.socket_pool.SocketPool.create (
              self,
             str name,
             str path,
             str  mode = "server")
```

Create a UNIX domain socket.

```
Args:
    name: logical handle
    path: path on filesystem
    mode: "server" or "client"
```

8.48.3.8 destroy()

```
dashboard.socket_pool.SocketPool.destroy (
              self)
```

8.48.3.9 get()

```
Optional[socket.socket] dashboard.socket_pool.SocketPool.get (
              self,
             str name)
```

8.48.3.10 get_client()

```
Optional[ClientConnection] dashboard.socket_pool.SocketPool.get_client (
              self,
             str client_name)
```

Get a client connection by name.

8.48.3.11 get_clients()

```
List[ClientConnection] dashboard.socket_pool.SocketPool.get_clients (
              self,
             str server_name)
```

Get all clients connected to a server.

8.48.3.12 list()

```
List[str] dashboard.socket_pool.SocketPool.list (
              self)
```

8.48.3.13 list_clients()

```
List[str] dashboard.socket_pool.SocketPool.list_clients (
              self,
             Optional[str]  server_name = None)
```

List all client connection names, optionally filtered by server.

8.48.3.14 stats()

```
Dict dashboard.socket_pool.SocketPool.stats (
              self)
```

Get statistics about the socket pool.

8.48.4 Member Data Documentation

8.48.4.1 _client_counter

```
int dashboard.socket_pool.SocketPool._client_counter = 0  [protected]
```

8.48.4.2 _client_lookup

```
dashboard.socket_pool.SocketPool._client_lookup = {}  [protected]
```

8.48.4.3 _clients

```
dict dashboard.socket_pool.SocketPool._clients = {}  [protected]
```

8.48.4.4 _lock

```
dashboard.socket_pool.SocketPool._lock = threading.RLock()  [protected]
```

8.48.4.5 _sockets

```
dashboard.socket_pool.SocketPool._sockets = {}  [protected]
```

The documentation for this class was generated from the following file:

- dashboard/socket_pool.py

8.49 api.stateapi.StateAPI Class Reference

Public Member Functions

- __init__ (self)
- Dict build_station_api_dict (self, Station station, Optional[LinkMeasurement] lm=None)
- Dict[str, Any] req (self)
- str json (self)
- serve (self, str host="0.0.0.0", int port=8080)

Public Attributes

- stdb = StationDB()
- lmdb = LinkMeasurementDB()
- qoe = QoE()
- str path = "/" or self.path.startswith("/api"):

8.49.1 Constructor & Destructor Documentation

8.49.1.1 __init__()

```
api.stateapi.StateAPI.__init__ (
              self)
```

8.49.2 Member Function Documentation

8.49.2.1 build_station_api_dict()

```
Dict api.stateapi.StateAPI.build_station_api_dict (
              self,
             Station station,
             Optional[LinkMeasurement]  lm = None)
```

Generate API-friendly dict with key station metrics and QoE.

8.49.2.2 json()

```
str api.stateapi.StateAPI.json (
              self)
```

8.49.2.3 req()

```
Dict[str, Any] api.stateapi.StateAPI.req (
              self)
```

8.49.2.4 serve()

```
api.stateapi.StateAPI.serve (
               self,
              str  host = "0.0.0.0",
              int  port = 8080)
```

Serve the StateAPI on a simple HTTP server, responding with the JSON API data.

8.49.3 Member Data Documentation

8.49.3.1 lmdb

```
api.stateapi.StateAPI.lmdb = LinkMeasurementDB()
```

8.49.3.2 path

```
str api.stateapi.StateAPI.path = "/" or self.path.startswith("/api"):
```

8.49.3.3 qoe

```
api.stateapi.StateAPI.qoe = QoE()
```

8.49.3.4 stdb

```
api.stateapi.StateAPI.stdb = StationDB()
```

The documentation for this class was generated from the following file:

- api/stateapi.py

8.50 model.station.Station Class Reference

Public Member Functions

- __init__ (self)
- dict[str, Any] to_dict (self)
- str __str__ (self)

Public Attributes

- dict info_dict = {}
- str|None raw = None
- str|None mac = None
- list flags = [ ]
- int|None aid = None
- list[str]|None capability = None
- int|None listen_interval = None
- list[float]|None supported_rates = None
- str|None timeout_next = None
- int|None rx_packets = None
- int|None tx_packets = None
- int|None rx_bytes = None
- int|None tx_bytes = None
- int|None rx_airtime = None
- int|None tx_airtime = None
- int|None beacons_count = None
- int|None rx_drop_misc = None
- int|None backlog_packets = None
- int|None backlog_bytes = None
- int|None fcs_error_count = None
- int|None beacon_loss_count = None
- int|None expected_throughput = None
- int|None tx_retry_count = None
- int|None tx_retry_failed = None
- int|None tx_bitrate = None
- int|None rx_bitrate = None
- int|None tx_duration = None
- int|None rx_duration = None
- int|None rx_mcs = None
- int|None tx_mcs = None
- int|None rx_vhtmcs = None
- int|None tx_vhtmcs = None
- int|None rx_he_nss = None
- int|None tx_he_nss = None
- int|None rx_vht_nss = None
- int|None tx_vht_nss = None
- int|None rx_dcm = None
- int|None tx_dcm = None
- int|None rx_guard_interval = None
- int|None tx_guard_interval = None
- int|None signal = None
- int|None avg_signal = None
- int|None avg_beacon_signal = None
- int|None avg_ack_signal = None
- int|None inactive_msec = None
- int|None connected_sec = None
- int|None rx_rate_info = None
- int|None tx_rate_info = None
- int|None connected_time = None
- int|None mbo_cell_capa = None
- str|None supp_op_classes = None
- int|None min_txpower = None
- int|None max_txpower = None
- list[str]|None ext_capab = None

8.50.1 Detailed Description

Represents the status information of an associated station.

8.50.2 Constructor & Destructor Documentation

8.50.2.1 __init__()

```
model.station.Station.__init__ (
              self)
```

8.50.3 Member Function Documentation

8.50.3.1 __str__()

```
str model.station.Station.__str__ (
              self)
```

Prettier and multi-column tabular string representation of StationBasicInfo.

8.50.3.2 to_dict()

```
dict[str, Any] model.station.Station.to_dict (
              self)
```

Dump the complete state of the Station object.
Returns a dictionary of all attributes.

8.50.4 Member Data Documentation

8.50.4.1 aid

```
int | None model.station.Station.aid = None
```

8.50.4.2 avg_ack_signal

```
int | None model.station.Station.avg_ack_signal = None
```

8.50.4.3 avg_beacon_signal

```
int | None model.station.Station.avg_beacon_signal = None
```

8.50.4.4 avg_signal

```
int | None model.station.Station.avg_signal = None
```

8.50.4.5 backlog_bytes

```
int | None model.station.Station.backlog_bytes = None
```

8.50.4.6 backlog_packets

```
int | None model.station.Station.backlog_packets = None
```

8.50.4.7 beacon_loss_count

```
int | None model.station.Station.beacon_loss_count = None
```

8.50.4.8 beacons_count

```
int | None model.station.Station.beacons_count = None
```

8.50.4.9 capability

```
list[str] | None model.station.Station.capability = None
```

8.50.4.10 connected_sec

```
int | None model.station.Station.connected_sec = None
```

8.50.4.11 connected_time

```
int | None model.station.Station.connected_time = None
```

8.50.4.12 expected_throughput

```
int | None model.station.Station.expected_throughput = None
```

8.50.4.13 ext_capab

```
list[str] | None model.station.Station.ext_capab = None
```

8.50.4.14 fcs_error_count

```
int | None model.station.Station.fcs_error_count = None
```

8.50.4.15 flags

```
list model.station.Station.flags = []
```

8.50.4.16 inactive_msec

```
int | None model.station.Station.inactive_msec = None
```

8.50.4.17 info_dict

```
dict model.station.Station.info_dict = {}
```

8.50.4.18 listen_interval

```
int | None model.station.Station.listen_interval = None
```

8.50.4.19 mac

```
str | None model.station.Station.mac = None
```

8.50.4.20 max_txpower

```
int | None model.station.Station.max_txpower = None
```

8.50.4.21 mbo_cell_capa

```
int | None model.station.Station.mbo_cell_capa = None
```

8.50.4.22 min_txpower

```
int | None model.station.Station.min_txpower = None
```

8.50.4.23 raw

```
str | None model.station.Station.raw = None
```

8.50.4.24 rx_airtime

```
int | None model.station.Station.rx_airtime = None
```

8.50.4.25 rx_bitrate

```
int | None model.station.Station.rx_bitrate = None
```

8.50.4.26 rx_bytes

```
int | None model.station.Station.rx_bytes = None
```

8.50.4.27 rx_dcm

```
int | None model.station.Station.rx_dcm = None
```

8.50.4.28 rx_drop_misc

```
int | None model.station.Station.rx_drop_misc = None
```

8.50.4.29 rx_duration

```
int | None model.station.Station.rx_duration = None
```

8.50.4.30 rx_guard_interval

```
int | None model.station.Station.rx_guard_interval = None
```

8.50.4.31 rx_he_nss

```
int | None model.station.Station.rx_he_nss = None
```

8.50.4.32 rx_mcs

```
int | None model.station.Station.rx_mcs = None
```

8.50.4.33 rx_packets

```
int | None model.station.Station.rx_packets = None
```

8.50.4.34 rx_rate_info

```
int | None model.station.Station.rx_rate_info = None
```

8.50.4.35 rx_vht_nss

```
int | None model.station.Station.rx_vht_nss = None
```

8.50.4.36 rx_vhtmcs

```
int | None model.station.Station.rx_vhtmcs = None
```

8.50.4.37 signal

```
int | None model.station.Station.signal = None
```

8.50.4.38 supp_op_classes

```
str | None model.station.Station.supp_op_classes = None
```

8.50.4.39 supported_rates

```
list[float] | None model.station.Station.supported_rates = None
```

8.50.4.40 timeout_next

```
str | None model.station.Station.timeout_next = None
```

8.50.4.41 tx_airtime

```
int | None model.station.Station.tx_airtime = None
```

8.50.4.42 tx_bitrate

```
int | None model.station.Station.tx_bitrate = None
```

8.50.4.43 tx_bytes

```
int | None model.station.Station.tx_bytes = None
```

8.50.4.44 tx_dcm

```
int | None model.station.Station.tx_dcm = None
```

8.50.4.45 tx_duration

```
int | None model.station.Station.tx_duration = None
```

8.50.4.46 tx_guard_interval

```
int | None model.station.Station.tx_guard_interval = None
```

8.50.4.47 tx_he_nss

```
int | None model.station.Station.tx_he_nss = None
```

8.50.4.48 tx_mcs

```
int | None model.station.Station.tx_mcs = None
```

8.50.4.49 tx_packets

```
int | None model.station.Station.tx_packets = None
```

8.50.4.50 tx_rate_info

```
int | None model.station.Station.tx_rate_info = None
```

8.50.4.51 tx_retry_count

```
int | None model.station.Station.tx_retry_count = None
```

8.50.4.52 tx_retry_failed

```
int | None model.station.Station.tx_retry_failed = None
```

8.50.4.53 tx_vht_nss

```
int | None model.station.Station.tx_vht_nss = None
```

8.50.4.54 tx_vhtmcs

```
int | None model.station.Station.tx_vhtmcs = None
```

The documentation for this class was generated from the following file:

- model/station.py

8.51 dashboard.station_dashboard.StationDashboard Class Reference

Public Member Functions

- __init__ (self, StationDB stationdb)
- show (self, Optional[IO] pipe_out=None, Optional[IO] pipe_in=None, bool replace=False, **kwargs)

Public Attributes

- db = stationdb
- int index = 0

Protected Member Functions

- str _render_station (self, Station station, int idx, int total)
- _handle_command (self, str cmd, list[Station] stations)
- _write (self, Optional[IO] out, str text, bool replace)

8.51.1 Detailed Description

```
Display 1 station at a time.
Supports interactive navigation through pipe/socket input.
```

8.51.2 Constructor & Destructor Documentation

8.51.2.1 __init__()

```
dashboard.station_dashboard.StationDashboard.__init__ (
              self,
             StationDB stationdb)
```

8.51.3 Member Function Documentation

8.51.3.1 _handle_command()

```
dashboard.station_dashboard.StationDashboard._handle_command (
              self,
             str cmd,
             list[Station] stations)  [protected]
```

8.51.3.2 _render_station()

```
str dashboard.station_dashboard.StationDashboard._render_station (
              self,
             Station station,
             int idx,
             int total)  [protected]
```

8.51.3.3 _write()

```
dashboard.station_dashboard.StationDashboard._write (
              self,
             Optional[IO] out,
             str text,
             bool replace)  [protected]
```

8.51.3.4 show()

```
dashboard.station_dashboard.StationDashboard.show (
              self,
             Optional[IO]  pipe_out = None,
             Optional[IO]  pipe_in = None,
             bool  replace = False,
             ** kwargs)
```

8.51.4 Member Data Documentation

8.51.4.1 db

```
dashboard.station_dashboard.StationDashboard.db = stationdb
```

8.51.4.2 index

```
int dashboard.station_dashboard.StationDashboard.index = 0
```

The documentation for this class was generated from the following file:

- dashboard/station_dashboard.py

8.52 db.station_db.StationDB Class Reference

Public Member Functions

- __new__ (cls)
- __init__ (self)
- add (self, Station station)
- Optional[Station] get (self, str mac)
- remove (self, str mac)
- list[Station] all (self)
- list[str] list (self)
- int count (self)
- clear (self)
- update (self, str mac, dict info)
- Dict[str, dict] to_dict (self)
- bool __contains__ (self, str mac)
- __len__ (self)
- __iter__ (self)
- __repr__ (self)

Protected Attributes

- dict _stations = {}
- bool _initialized = True

Static Protected Attributes

- _instance = None
- _lock = RLock()

8.52.1 Detailed Description

```
Singleton database for managing Station objects.
```

8.52.2 Constructor & Destructor Documentation

8.52.2.1 __init__()

```
db.station_db.StationDB.__init__ (
              self)
```

8.52.3 Member Function Documentation

8.52.3.1 __contains__()

```
bool db.station_db.StationDB.__contains__ (
              self,
             str mac)
```

8.52.3.2 __iter__()

```
db.station_db.StationDB.__iter__ (
              self)
```

8.52.3.3 __len__()

```
db.station_db.StationDB.__len__ (
              self)
```

8.52.3.4 __new__()

```
db.station_db.StationDB.__new__ (
              cls)
```

8.52.3.5 __repr__()

```
db.station_db.StationDB.__repr__ (
              self)
```

8.52.3.6 add()

```
db.station_db.StationDB.add (
              self,
             Station station)
```

Add or update a Station entry by MAC address.

8.52.3.7 all()

```
list[Station] db.station_db.StationDB.all (
              self)
```

Return all Station entries.

8.52.3.8 clear()

```
db.station_db.StationDB.clear (
              self)
```

Remove all Station entries.

8.52.3.9 count()

```
int db.station_db.StationDB.count (
              self)
```

Return total number of stations.

8.52.3.10 get()

```
Optional[Station] db.station_db.StationDB.get (
              self,
             str mac)
```

Retrieve a station by MAC address.

8.52.3.11 list()

```
list[str] db.station_db.StationDB.list (
              self)
```

Return list of MAC addresses for all stations.

8.52.3.12 remove()

```
db.station_db.StationDB.remove (
              self,
             str mac)
```

Remove a Station entry.

8.52.3.13 to_dict()

```
Dict[str, dict] db.station_db.StationDB.to_dict (
              self)
```

Dump the complete state of the database.
Returns a dictionary mapping lowercased station MAC addresses to
their dictionary representations (calls Station.to_dict() if available, else vars()).

8.52.3.14 update()

```
db.station_db.StationDB.update (
              self,
             str mac,
             dict info)
```

Update an existing station's info_dict or attributes.

8.52.4 Member Data Documentation

8.52.4.1 _initialized

```
bool db.station_db.StationDB._initialized = True  [protected]
```

8.52.4.2 _instance

```
db.station_db.StationDB._instance = None  [static], [protected]
```

8.52.4.3 _lock

```
db.station_db.StationDB._lock = RLock()  [static], [protected]
```

8.52.4.4 _stations

```
db.station_db.StationDB._stations = {}  [protected]
```

The documentation for this class was generated from the following file:

- db/station_db.py

8.53 station_parser.StationParser Class Reference

Static Public Member Functions

- "Station" from_content (str content)

Protected Member Functions

- None _parse_content (Station station, str content)
- int|None _get_int (station, str key)
- str|None _get_str (station, str key)
- None _populate_attributes (Station station)

Static Protected Member Functions

- list[float] _decode_supported_rates (str rate_hex_str)
- list[str] _decode_capability (str|None capability)
- list[str] _decode_ext_capab (str|None ext_capab)
- list[dict[str, str]] _decode_supported_op_classes (str|None supp_op_classes)
- Any _convert_value (str value)
- bool _is_mac_address (str value)

8.53.1 Member Function Documentation

8.53.1.1 _convert_value()

```
Any station_parser.StationParser._convert_value (
            str value)  [static], [protected]
```

Convert textual values to Python types.

8.53.1.2 _decode_capability()

```
list[str] station_parser.StationParser._decode_capability (
            str | None capability)  [static], [protected]
```

Return list of supported capability flags.

8.53.1.3 _decode_ext_capab()

```
list[str] station_parser.StationParser._decode_ext_capab (
            str | None ext_capab)  [static], [protected]
```

Decode the variable-length ext_capab hex string into feature names.

8.53.1.4 _decode_supported_op_classes()

```
list[dict[str, str]] station_parser.StationParser._decode_supported_op_classes (
            str | None supp_op_classes)  [static], [protected]
```

Decode the 'supp_op_classes' hex string into a list of supported operating classes.
Example input: '515153547373475767778797a7b7c7d7e7f808182'

8.53.1.5 _decode_supported_rates()

```
list[float] station_parser.StationParser._decode_supported_rates (
            str rate_hex_str)  [static], [protected]
```

Convert supported rate codes into Mbps values.

8.53.1.6 _get_int()

```
int | None station_parser.StationParser._get_int (
             station,
            str key)  [protected]
```

8.53.1.7 _get_str()

```
str | None station_parser.StationParser._get_str (
             station,
            str key)  [protected]
```

8.53.1.8 _is_mac_address()

```
bool station_parser.StationParser._is_mac_address (
            str value)  [static], [protected]
```

8.53.1.9 _parse_content()

```
None station_parser.StationParser._parse_content (
            Station station,
            str content)  [protected]
```

Parse hostapd STA info content into attributes.

8.53.1.10 _populate_attributes()

```
None station_parser.StationParser._populate_attributes (
            Station station)  [protected]
```

Fill instance vars from parsed dictionary automatically.

8.53.1.11 from_content()

```
"Station" station_parser.StationParser.from_content (
            str content)  [static]
```

The documentation for this class was generated from the following file:

- parser/station_parser.py

8.54 metrics.tm_engine.TransitionManagementEngine Class Reference

Public Member Functions

- __init__ (self, Controller ctrl)
- run (self)

Static Public Member Functions

- bool qoe_quality_test (float qoe)

Public Attributes

- stdb = StationDB()
- nbdb = NeighborDB()
- btdb = BSSTransitionResponseDB()
- qoedb = QoEDB()
- rndb = NeighborRankingDB()
- ctrl = ctrl

Protected Member Functions

- _run_sta (self, Station station)

8.54.1 Constructor & Destructor Documentation

8.54.1.1 __init__()

```
metrics.tm_engine.TransitionManagementEngine.__init__ (
             self,
            Controller ctrl)
```

8.54.2 Member Function Documentation

8.54.2.1 _run_sta()

```
metrics.tm_engine.TransitionManagementEngine._run_sta (
             self,
            Station station)  [protected]
```

8.54.2.2 qoe_quality_test()

```
bool metrics.tm_engine.TransitionManagementEngine.qoe_quality_test (
            float qoe)  [static]
```

8.54.2.3 run()

```
metrics.tm_engine.TransitionManagementEngine.run (
             self)
```

8.54.3 Member Data Documentation

8.54.3.1 btdb

```
metrics.tm_engine.TransitionManagementEngine.btdb = BSSTransitionResponseDB()
```

8.54.3.2 ctrl

```
metrics.tm_engine.TransitionManagementEngine.ctrl = ctrl
```

8.54.3.3 nbdb

```
metrics.tm_engine.TransitionManagementEngine.nbdb = NeighborDB()
```

8.54.3.4 qoedb

```
metrics.tm_engine.TransitionManagementEngine.qoedb = QoEDB()
```

8.54.3.5 rndb

```
metrics.tm_engine.TransitionManagementEngine.rndb = NeighborRankingDB()
```

8.54.3.6 stdb

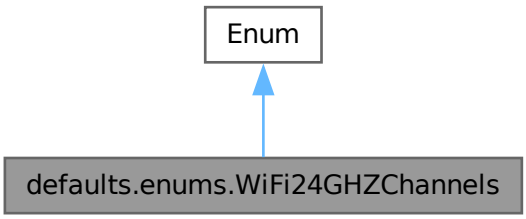
```
metrics.tm_engine.TransitionManagementEngine.stdb = StationDB()
```

The documentation for this class was generated from the following file:

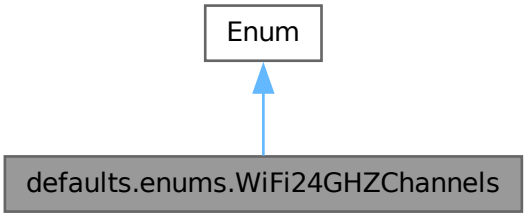
- metrics/tm_engine.py

8.55 defaults.enums.WiFi24GHZChannels Class Reference

Inheritance diagram for defaults.enums.WiFi24GHZChannels:



Collaboration diagram for defaults.enums.WiFi24GHZChannels:



Static Public Attributes

- int CHANNEL_1 = 2412
- int CHANNEL_6 = 2437
- int CHANNEL_11 = 2462

8.55.1 Member Data Documentation

8.55.1.1 CHANNEL_1

```
int defaults.enums.WiFi24GHZChannels.CHANNEL_1 = 2412  [static]
```

8.55.1.2 CHANNEL_11

```
int defaults.enums.WiFi24GHZChannels.CHANNEL_11 = 2462  [static]
```

8.55.1.3 CHANNEL_6

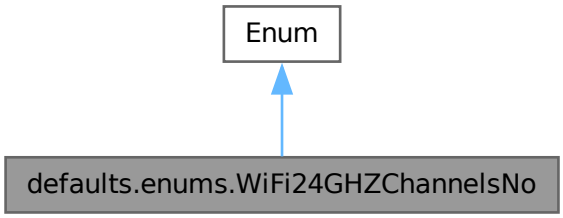
```
int defaults.enums.WiFi24GHZChannels.CHANNEL_6 = 2437  [static]
```

The documentation for this class was generated from the following file:

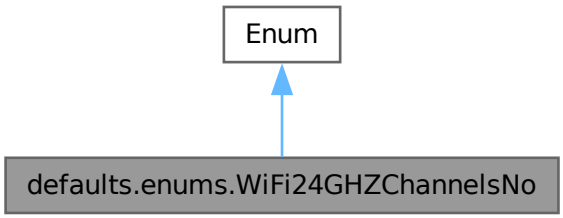
- defaults/enums.py

8.56 defaults.enums.WiFi24GHZChannelsNo Class Reference

Inheritance diagram for defaults.enums.WiFi24GHZChannelsNo:



Collaboration diagram for defaults.enums.WiFi24GHZChannelsNo:



Static Public Attributes

- int CHANNEL_1 = 1
- int CHANNEL_6 = 6
- int CHANNEL_11 = 11

8.56.1 Member Data Documentation

8.56.1.1 CHANNEL_1

```
int defaults.enums.WiFi24GHZChannelsNo.CHANNEL_1 = 1  [static]
```

8.56.1.2 CHANNEL_11

```
int defaults.enums.WiFi24GHZChannelsNo.CHANNEL_11 = 11  [static]
```

8.56.1.3 CHANNEL_6

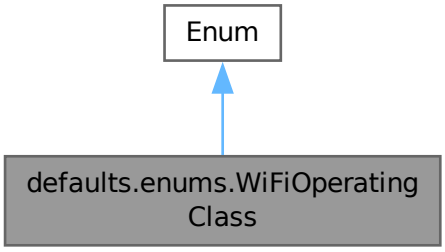
```
int defaults.enums.WiFi24GHZChannelsNo.CHANNEL_6 = 6  [static]
```

The documentation for this class was generated from the following file:

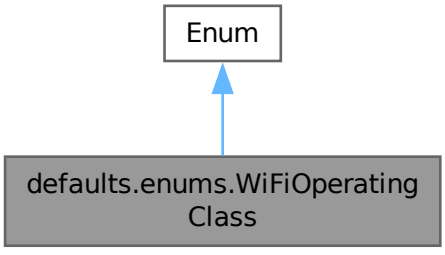
- defaults/enums.py

8.57 defaults.enums.WiFiOperatingClass Class Reference

Inheritance diagram for defaults.enums.WiFiOperatingClass:



Collaboration diagram for defaults.enums.WiFiOperatingClass:



Static Public Attributes

- int BAND_2_4GHz_20MHz = 81
- int BAND_2_4GHz_40MHz = 82
- int BAND_2_4GHz_20MHz_CH14 = 83
- int BAND_5GHz_20MHz_LOW = 115
- int BAND_5GHz_40MHz_LOW = 116
- int BAND_5GHz_80MHz_LOW = 117
- int BAND_5GHz_160MHz_LOW = 118
- int BAND_5GHz_20MHz_HIGH = 119
- int BAND_5GHz_40MHz_HIGH = 120
- int BAND_5GHz_80MHz_HIGH = 121
- int BAND_5GHz_160MHz_HIGH = 122
- int BAND_6GHz_20MHz = 125
- int BAND_6GHz_40MHz = 126
- int BAND_6GHz_80MHz = 127
- int BAND_6GHz_160MHz = 128
- int BAND_6GHz_20MHz_LOW_BAND = 129
- int BAND_6GHz_40MHz_LOW_BAND = 130
- int BAND_6GHz_80MHz_LOW_BAND = 131
- int BAND_6GHz_160MHz_LOW_BAND = 132
- int BAND_60GHz_CHANNEL_1 = 180
- int BAND_60GHz_CHANNEL_2 = 181
- int BAND_60GHz_CHANNEL_3 = 182
- int BAND_60GHz_CHANNEL_4 = 183

8.57.1 Member Data Documentation

8.57.1.1 BAND_2_4GHz_20MHz

```
int defaults.enums.WiFiOperatingClass.BAND_2_4GHz_20MHz = 81  [static]
```

8.57.1.2 BAND_2_4GHz_20MHz_CH14

```
int defaults.enums.WiFiOperatingClass.BAND_2_4GHz_20MHz_CH14 = 83  [static]
```

8.57.1.3 BAND_2_4GHz_40MHz

```
int defaults.enums.WiFiOperatingClass.BAND_2_4GHz_40MHz = 82  [static]
```

8.57.1.4 BAND_5GHz_160MHz_HIGH

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_160MHz_HIGH = 122  [static]
```

8.57.1.5 BAND_5GHz_160MHz_LOW

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_160MHz_LOW = 118  [static]
```

8.57.1.6 BAND_5GHz_20MHz_HIGH

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_20MHz_HIGH = 119  [static]
```

8.57.1.7 BAND_5GHz_20MHz_LOW

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_20MHz_LOW = 115  [static]
```

8.57.1.8 BAND_5GHz_40MHz_HIGH

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_40MHz_HIGH = 120  [static]
```

8.57.1.9 BAND_5GHz_40MHz_LOW

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_40MHz_LOW = 116  [static]
```

8.57.1.10 BAND_5GHz_80MHz_HIGH

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_80MHz_HIGH = 121  [static]
```

8.57.1.11 BAND_5GHz_80MHz_LOW

```
int defaults.enums.WiFiOperatingClass.BAND_5GHz_80MHz_LOW = 117  [static]
```

8.57.1.12 BAND_60GHz_CHANNEL_1

```
int defaults.enums.WiFiOperatingClass.BAND_60GHz_CHANNEL_1 = 180  [static]
```

8.57.1.13 BAND_60GHz_CHANNEL_2

```
int defaults.enums.WiFiOperatingClass.BAND_60GHz_CHANNEL_2 = 181  [static]
```

8.57.1.14 BAND_60GHz_CHANNEL_3

```
int defaults.enums.WiFiOperatingClass.BAND_60GHz_CHANNEL_3 = 182  [static]
```

8.57.1.15 BAND_60GHz_CHANNEL_4

```
int defaults.enums.WiFiOperatingClass.BAND_60GHz_CHANNEL_4 = 183  [static]
```

8.57.1.16 BAND_6GHz_160MHz

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_160MHz = 128  [static]
```

8.57.1.17 BAND_6GHz_160MHz_LOW_BAND

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_160MHz_LOW_BAND = 132  [static]
```

8.57.1.18 BAND_6GHz_20MHz

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_20MHz = 125  [static]
```

8.57.1.19 BAND_6GHz_20MHz_LOW_BAND

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_20MHz_LOW_BAND = 129  [static]
```

8.57.1.20 BAND_6GHz_40MHz

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_40MHz = 126  [static]
```

8.57.1.21 BAND_6GHz_40MHz_LOW_BAND

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_40MHz_LOW_BAND = 130  [static]
```

8.57.1.22 BAND_6GHz_80MHz

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_80MHz = 127  [static]
```

8.57.1.23 BAND_6GHz_80MHz_LOW_BAND

```
int defaults.enums.WiFiOperatingClass.BAND_6GHz_80MHz_LOW_BAND = 131  [static]
```

The documentation for this class was generated from the following file:

- defaults/enums.py

Chapter 9

File Documentation

9.1 api/stateapi.py File Reference

Classes

- class api.stateapi.StateAPI

Namespaces

- namespace api
- namespace api.stateapi

9.2 command/basics.py File Reference

Classes

- class basics.BasicCommand

Namespaces

- namespace basics

9.3 command/bss_tm_cmd.py File Reference

Classes

- class bss_tm_cmd.ReqMode
- class bss_tm_cmd.BssTmRequestBuilder

Namespaces

- namespace bss_tm_cmd

9.4 command/link_measurement_cmd.py File Reference

Classes

- class link_measurement_cmd.LinkMeasurementCommandBuilder

Namespaces

- namespace link_measurement_cmd

9.5 command/neighbor_cmd.py File Reference

Classes

- class neighbor_cmd.NeighborCommandBuilder

Namespaces

- namespace neighbor_cmd

9.6 command/request_beacon_cmd.py File Reference

Classes

- class request_beacon_cmd.OperatingClass
- class request_beacon_cmd.MeasurementMode
- class request_beacon_cmd.ReqMode
- class request_beacon_cmd.RequestBeaconCommandBuilder

Namespaces

- namespace request_beacon_cmd

9.7 control/controller.py File Reference

Classes

- class control.controller.Controller

Namespaces

- namespace control
- namespace control.controller

Variables

- float control.controller.CONTROLLER_WAIT_LOOP_SEC = 0.5

9.8 control/hostapd.py File Reference

Classes

- class control.hostapd.LastCommandStatus
- class control.hostapd.HostapdController

Namespaces

- namespace control
- namespace control.hostapd

Variables

- control.hostapd.controller = HostapdController()

9.9 dashboard/bmrep_dashboard.py File Reference

Classes

- class dashboard.bmrep_dashboard.BeaconMeasurementDashboard

Namespaces

- namespace dashboard
- namespace dashboard.bmrep_dashboard

Functions

- dashboard.bmrep_dashboard.write_stream (pipe_or_sock, str text)

9.10 dashboard/bsstm_dashboard.py File Reference

Classes

- class dashboard.bsstm_dashboard.BSSTransitionResponseDashboard

Namespaces

- namespace dashboard
- namespace dashboard.bsstm_dashboard

Functions

- dashboard.bsstm_dashboard.write_stream (pipe_or_sock, str text)

9.11 dashboard/lmrep_dashboard.py File Reference

Classes

- class dashboard.lmrep_dashboard.LinkMeasurementDashboard

Namespaces

- namespace dashboard
- namespace dashboard.lmrep_dashboard

Functions

- dashboard.lmrep_dashboard.write_stream (pipe_or_sock, str text)

9.12 dashboard/nbrank_dashboard.py File Reference

Classes

- class dashboard.nbrank_dashboard.NeighborRankingDashboard

Namespaces

- namespace dashboard
- namespace dashboard.nbrank_dashboard

Functions

- dashboard.nbrank_dashboard.write_stream (pipe_or_sock, str text)
- dashboard.nbrank_dashboard.rcpi_to_db (rcpi_val)
- dashboard.nbrank_dashboard.rsni_to_db (rsni_val)

9.13 dashboard/neighbor_dashboard.py File Reference

Classes

- class dashboard.neighbor_dashboard.NeighborDashboard

Namespaces

- namespace dashboard
- namespace dashboard.neighbor_dashboard

Functions

- dashboard.neighbor_dashboard.write_stream (pipe_or_sock, str text)

9.14 dashboard/pipe_pool.py File Reference

Classes

- class dashboard.pipe_pool.PipePool

Namespaces

- namespace dashboard
- namespace dashboard.pipe_pool

9.15 dashboard/qoe_dashboard.py File Reference

Classes

- class dashboard.qoe_dashboard.QoEDashboard

Namespaces

- namespace dashboard
- namespace dashboard.qoe_dashboard

Functions

- dashboard.qoe_dashboard.write_stream (pipe_or_sock, str text)

9.16 dashboard/socket_pool.py File Reference

Classes

- class dashboard.socket_pool.ClientConnection
- class dashboard.socket_pool.SocketPool

Namespaces

- namespace dashboard
- namespace dashboard.socket_pool

9.17 dashboard/station_dashboard.py File Reference

Classes

- class dashboard.station_dashboard.StationDashboard

Namespaces

- namespace dashboard
- namespace dashboard.station_dashboard

Functions

- dashboard.station_dashboard.write_stream (out, str text)
- str dashboard.station_dashboard.read_stream (inp)

9.18 db/bmrep_db.py File Reference

Classes

- class db.bmrep_db.BeaconMeasurementDB

Namespaces

- namespace db
- namespace db.bmrep_db

Variables

- str db.bmrep_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"
- int db.bmrep_db.EXPIRE_SEC = 300

9.19 db/bsstm_db.py File Reference

Classes

- class db.bsstm_db.BSSTransitionResponseDB

Namespaces

- namespace db
- namespace db.bsstm_db

Variables

- str db.bsstm_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"

9.20 db/lmrep_db.py File Reference

Classes

- class db.lmrep_db.LinkMeasurementDB

Namespaces

- namespace db
- namespace db.lmrep_db

Variables

- str db.lmrep_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"

9.21 db/nbrank_db.py File Reference

Classes

- class db.nbrank_db.NeighborRankingDB

Namespaces

- namespace db
- namespace db.nbrank_db

Variables

- str db.nbrank_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"

9.22 db/neighbor_db.py File Reference

Classes

- class db.neighbor_db.NeighborDB

Namespaces

- namespace db
- namespace db.neighbor_db

Variables

- str db.neighbor_db.DEFAULT_STA_MAC = "00:00:00:00:00:00"

9.23 db/qoe_db.py File Reference

Classes

- class db.qoe_db.QoEDB

Namespaces

- namespace db
- namespace db.qoe_db

9.24 db/station_db.py File Reference

Classes

- class db.station_db.StationDB

Namespaces

- namespace db
- namespace db.station_db

9.25 defaults/enums.py File Reference

Classes

- class defaults.enums.WiFi24GHZChannels
- class defaults.enums.WiFi24GHZChannelsNo
- class defaults.enums.WiFiOperatingClass

Namespaces

- namespace defaults
- namespace defaults.enums

9.26 defaults/info.py File Reference

Namespaces

- namespace defaults
- namespace defaults.info

Variables

- dict defaults.info.CAPABILITY_FLAGS
- dict defaults.info.EXT_CAPABILITY_FLAGS
- dict defaults.info.OPERATING_CLASS_TABLE
- dict defaults.info.PHY_TYPE_TABLE

9.27 logger.py File Reference

Classes

- class logger.LogLevel
- class logger.Logger

Namespaces

- namespace logger

9.28 metrics/nbranking.py File Reference

Classes

- class metrics.nbranking.NeighborRanking

Namespaces

- namespace metrics
- namespace metrics.nbranking

9.29 metrics/qoe.py File Reference

Classes

- class metrics.qoe.QoEComponents
- class metrics.qoe.QoEHistory
- class metrics.qoe.QoE

Namespaces

- namespace metrics
- namespace metrics.qoe

9.30 metrics/tm_engine.py File Reference

Classes

- class metrics.tm_engine.TransitionManagementEngine

Namespaces

- namespace metrics
- namespace metrics.tm_engine

Variables

- float metrics.tm_engine.QOE_TRANSITION_THRESHOLD = 0.55

9.31 model/ap.py File Reference

Classes

- class model.ap.APStatus
- class model.ap.AP

Namespaces

- namespace model
- namespace model.ap

9.32 model/mac_address.py File Reference

Classes

- class model.mac_address.MacAddress

Namespaces

- namespace model
- namespace model.mac_address

9.33 model/measurement.py File Reference

Classes

- class model.measurement.BeaconReport
- class model.measurement.BeaconMeasurement
- class model.measurement.LinkMeasurement
- class model.measurement.BSSTransitionResponse

Namespaces

- namespace model
- namespace model.measurement

9.34 model/neighbor.py File Reference

Classes

- class model.neighbor.Neighbor

Namespaces

- namespace model
- namespace model.neighbor

9.35 model/station.py File Reference

Classes

- class model.station.Station

Namespaces

- namespace model
- namespace model.station

9.36 parser/ap_parser.py File Reference

Classes

- class ap_parser.APParser

Namespaces

- namespace ap_parser

9.37 parser/measurement_parser.py File Reference

Namespaces

- namespace measurement_parser

Functions

- Optional[BeaconMeasurement] measurement_parser.parse_beacon_measurement (dot11)
- Optional[LinkMeasurement] measurement_parser.parse_link_measurement (dot11)
- Optional[BSSTransitionResponse] measurement_parser.parse_bss_tm_response (dot11)

9.38 parser/neighbor_parser.py File Reference

Classes

- class neighbor_parser.NeighborParser

Namespaces

- namespace neighbor_parser

Functions

- Neighbor neighbor_parser.neighbor_from_beacon_report (BeaconReport br)

9.39 parser/station_parser.py File Reference

Classes

- class station_parser.StationParser

Namespaces

- namespace station_parser

9.40 protocol/rxmux.py File Reference

Classes

- class rxmux.MgmtType
- class rxmux.RxMux

Namespaces

- namespace rxmux

9.41 run_tests.py File Reference

Namespaces

- namespace run_tests

Functions

- run_tests.main ()

9.42 runner.py File Reference

Namespaces

- namespace runner

Functions

- runner.link_measurement_scheduler (ctrl, StationDB stationDB, LinkMeasurementDB lmrepDB, interval_sec)
- runner.beacon_measurement_scheduler (ctrl, StationDB stationDB, neighborDB, BeaconMeasurementDB bmrepDB, interval_sec)
- runner.qoe_scheduler (QoE qoe_calc, float interval_sec=5.0)
- runner.nbranking_scheduler (StationDB stdb, NeighborRankingDB nrdb, BeaconMeasurementDB bmr, NeighborDB ndb, float interval_sec=5.0)
- runner.bss_tm_scheduler (Controller controller, float interval_sec=5.0)
- runner.accept_thread (SocketPool pool, str name)
- runner.server_thread ()
- runner.main ()

9.43 api/__init__.py File Reference

Namespaces

- namespace api

9.44 control/__init__.py File Reference

Namespaces

- namespace control

9.45 dashboard/__init__.py File Reference

Namespaces

- namespace dashboard

9.46 db/__init__.py File Reference

Namespaces

- namespace db

9.47 defaults/__init__.py File Reference

Namespaces

- namespace defaults

9.48 metrics/__init__.py File Reference

Namespaces

- namespace metrics

9.49 model/__init__.py File Reference

Namespaces

- namespace model

9.50 store/__init__.py File Reference

Namespaces

- namespace store

9.51 tests/__init__.py File Reference

Namespaces

- namespace tests

9.52 store/acceptance.py File Reference

Classes

- class store.acceptance.BSSTransitionResponseStatus
- class store.acceptance.BSSTransitionAcceptance

Namespaces

- namespace store
- namespace store.acceptance

9.53 store/routine.py File Reference

Classes

- class store.routine.Routine

Namespaces

- namespace store
- namespace store.routine

9.54 tests/test_add_neib.py File Reference

Namespaces

- namespace tests
- namespace tests.test_add_neib

Functions

- tests.test_add_neib.test_add_neib ()

9.55 tests/test_bm.py File Reference

Namespaces

- namespace tests
- namespace tests.test_bm

Functions

- tests.test_bm.test_rbm ()

9.56 tests/test_bss_tm.py File Reference

Namespaces

- namespace tests
- namespace tests.test_bss_tm

Functions

- tests.test_bss_tm.test_bss_tm ()

9.57 tests/test_lm.py File Reference

Namespaces

- namespace tests
- namespace tests.test_lm

Functions

- tests.test_lm.test_lm ()

Index