

RMON Design and Manual

Version: 2.01

## Version History

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| --- | --- | --- | --- |
| **Date** | **Version** | **Author** | **Change Comment** |
| 5-08-2020 |  |  | Created design document |
| 11-08-2020 | 1.01 | Prathiba Jeevan | Included Airinterface capacity calculation |
| 23-09-2020 | 1.02 | Prathiba Jeevan | Converted GUI version to CLI version |
| 29-09-2020 | 1.03 | Prathiba Jeevan | Included realtime statistical analysis |
| 22-10-2020 | 1.04 | Prathiba Jeevan  Ishwarya Subashchandran | Included internal database to store the LTP details (and reuse functionality) |
| 04-11-2020 | 1.05 | Prathiba Jeevan | Included delta value for the total-bytes-input and total-bytes-output |
| 23.11.2020 | 1.06 | Prathiba Jeevan | Included extra fields in the output file (both capacity/realtime statistics) to analyse the issues more in detail. |
| 25.11.2020 | 1.07 | Ishwarya Subashchandran | Included consolidate output for the report |
| 01.12.2020 | 1.08 | Prathiba Jeevan | Converted the project into Maven project |
| 08.12.2020 | 1.09 | Prathiba Jeevan | Included Vendor and equipment fields in the report |
| 16.12.2020 | 1.10 | Prathiba Jeevan | Modified logic to get the current transmission mode for air-interface capacity calculation. |
| 20.12.2020 | 1.11 | Prathiba Jeevan | Changed the manual logging mechanism to log4j |
| 04.01.2021 | 2.01 | Prathiba Jeevan | Restructured code to make it more modular (no functionality change) and included logic for utilization |
| 08.01.2021 | 2.02 | Prathiba Jeevan | Included analyser for both the reports (capacity calculation,realtime statistics) |

## Hierarchy

From top ,

**·        Vlan interface**

**·        MAC interface**

**·        Ethernet container | TDM structure kind**

**·        Hybrid MW Structure | Pure Ethernet Structure**

**·        Air Interface | Wire interface**

How this relation will be implemented in Logical-termination-point ?

Inside LTP , we have a leaflist

"client-ltp": [ "<upper-layer-uuid>"]

“server-ltp": [ "<Lower layer>” ]

Possible layering (from bottom upward) :

* WireInterface serves PureEthernetStructure serves EthernetContainer serves MacInterface …
* Hybrid microwave device: AirInterface serves HybridMwStructure serves TdmContainers and one EthernetContainer …
* Pure ethernet microwave device: AirInterface serves PureEthernetStructure serves one EthernetContainer

There is always a 1:1 relationship between Wire-/AirInterface instances and \*Structure instances.

The type of \*Structure has to be chosen according to type of device (hybrid or pure Ethernet).

There is always a 1:1 relationship between \*Structure and EthernetContainer instances.

There might be several TdmContainers clients of a HybridMwStructure.

Empty leaf-lists need not to be represented in NETCONF.

server-ltp leaf-list of lowest Layer (AirInterface and WireInterface) might be missing in the object.

## LTP to connector mapping information

The connector id in logical-termination-point/ltp-augment-1-0:ltp-augment-pac/ltp-augment-capability/connector should be available in the equipment/connector/local-id

## Air Interface Capacity Calculation

The air interface capacity will be calculated by using the following formula,

|  |
| --- |
| Air interface capacity = (Channel Bandwidth of the currently operated transmission Mode)  / (Symbol rate reduction factor of the currently operated transmission Mode)  \* log2(Number of states in the modulation scheme of the currently operated transmission Mode)  \* (Code Rate of the currently operated transmission Mode)  / 1.15 |

**Design and sequence**

Get the air-interface-status/transmission-mode-cur and interface-status

If interface-status is Up

In the air-interface-capability/transmission-mode-list, match the instance for the current transmission mode and get the attributes Channel Bandwidth, Symbol rate reduction factor, modulation scheme, Code Rate

Calculate capacity of the air-interface using the mentioned formula. Output will be in kbits/sec

**Error mapping:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error Message** | **Reason** |
| 1 | Interface status is down | If air-interface-status/interface-status is down, there will be no further proceeding to calculate the capacity |
| 2 | No match identified for the current transmission mode | If there is no match for the air-interface-status/transmission-mode-cur in the air-interface-capability/transmission-mode-list |
| 3 | channel-bandwidth attribute is not available | For the matched transmission-mode in air-interface-capability/transmission-mode-list , if channel-bandwidth is missing |
| 4 | code-rate attribute is not available | For the matched transmission-mode in air-interface-capability/transmission-mode-list , if code-rate is missing |
| 5 | symbol-rate-reduction-factor attribute is not available | For the matched transmission-mode in air-interface-capability/transmission-mode-list , if symbol-rate-reduction-factor is missing |
| 6 | modulation-scheme attribute is not available | For the matched transmission-mode in air-interface-capability/transmission-mode-list , if modulation-scheme is missing |
| 7 | No output received while trying to fetch status/InterfaceStatus | If no output received for the restconf request for the attribute status/interface-status(possible reason timeout) |
| 8 | No output received while trying to fetch status/transmission-mode-cur | If no output received for the restconf request for the attribute status/transmission-mode-cur(possible reason timeout) |
| 9 | No output received while trying to fetch transmission-mode-list | If no output received for the restconf request for the attribute capability/transmission-mode-list(possible reason timeout) |
| 10 | Rest call failure with response code for status/InterfaceStatus attribute | Restconf response code for the attribute retrieval is other than 200 for status/interface-status attribute |
| 11 | Rest call failure with response code for status/transmission-mode-cur attribute | Restconf response code for the attribute retrieval is other than 200 for status/transmission-mode-cur attribute |
| 12 | Rest call failure with response code for capability/transmission-mode-list attribute | Restconf response code for the attribute retrieval is other than 200 for capability/transmission-mode-list attribute |

**Current Issues:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No** | **Vendor** | **Issue#** | **Blocking** | **Reason** |
| 1 | Ericsson | mantis#146 | yes | status Transmission-mode-cur is not available(transmitter-is-on attribute is true ) |
| 2 |  | [mantis#151](https://ericsson.bugtracker.openbackhaul.com/view.php?id=151) | yes | Issue in accessing air-interface-capability/transmission-mode-list class when it has values which are in out of range( Value:\"254\"Radix:10) |
| 3 |  | [mantis#140](https://ericsson.bugtracker.openbackhaul.com/view.php?id=140) | no | current-performance-data-list/time-xstates-list is not having proper implementation to figureout the current tranmission mode. Later we changed the logic and using status/transmission-mode-cur to figureout the same. So we can ignore this issue. |
| 4 | Huawei | [mantis#212](https://huawei.bugtracker.openbackhaul.com/view.php?id=212) | no | current-performance-data-list/time-xstates-list is not having proper implementation to figureout the current tranmission mode. Later we changed the logic and using status/transmission-mode-cur to figureout the same. So we can ignore this issue. |
| 5 |  | [mantis#218](https://huawei.bugtracker.openbackhaul.com/view.php?id=218) | yes | Unable to figureout vendor name and equipment names(ltp-augment class implementation is not available in Logical termination point instances) |

## Real Time Statistics

Measuring the utilization of the LAN and WAN ports based on the bytes-in and bytes-out of the connected Ethernet layer.

**Design and sequence**

Based on the server/client ltp mapping, find the ethernet-container connected to the LAN/WAN ports

If ethernet is available

Get ethernet-container-status/interface-status,total-bytes-input,total-bytes-output

If interface-status is UP

For the first run , capture the total-bytes-input and output. And from the second run , calculate the delta value by subtracting the previous bytes-in/out. And calculate the utilization per minute(divide by 15)

**Error Mapping:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error Message** | **Reason** |
| 1 | no Mapped Ethernet-container | For the air/wire interfacethere is no mapped ethernet layer from their server/client-ltp mapping |
| 2 | Issues while trying to Map Ethernet layer | Issues in the client-server ltp mapping implemented in the model |
| 3 | no response received for Ethernet status class retrieval | If no output received for the restconf request for the ethernet-container/status(possible reason timeout) |
| 4 | response code is for ethernet status class is not 200 | Restconf response code for the retrieval is other than 200 for ethernet-container/status attribute |
| 5 | Interface status is down | If ethernet-container-status/interface-status is down , there will be no further proveeding to calculate the capacity |
| 6 | statistics-is-up attribute is not available | Restconf response code for the attribute retrieval is other than 200 for status/statistics-is-up attribute |
| 7 | interface-status attribute is not available | Restconf response code for the attribute retrieval is other than 200 for status/interface-status attribute |
| 8 | total-bytes-output attribute is not available | Restconf response code for the attribute retrieval is other than 200 for status/total-bytes-output attribute |
| 9 | total-bytes-input attribute is not available | Restconf response code for the attribute retrieval is other than 200 for status/total-bytes-input attribute |

**Issues:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No** | **Vendor** | **Issue#** | **Blocking** | **Reason** |
| 1 | Huawei | [mantis#215](https://huawei.bugtracker.openbackhaul.com/view.php?id=215%20-%20for%20issue%20related%20to%20parallel%20retrieval%20of%20status%20class%20in%20Huawei%20devices(realtime%20statistics)) | yes | unable to retrieve Status class details(in parallel). Inconsistently we are observing this issue. |
| 2 | siae(AGS 20) | TBD | yes | For Ethernet-container , layer protocol is defined as LAYER\_PROTOCOL\_NAME\_TYPE\_ETHERNET instead of LAYER\_PROTOCOL\_NAME\_TYPE\_ETHERNET\_CONTAINER\_LAYER |
| 3 |  | [mantis#170](https://apc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fsiae.bugtracker.openbackhaul.com%2Fview.php%3Fid%3D170&data=04%7C01%7Cprathiba.jeevan%40wipro.com%7C8428b753eb5d4d95eecf08d8c2c18219%7C258ac4e4146a411e9dc879a9e12fd6da%7C1%7C0%7C637473483663344926%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=PYEslxNF%2BuF7439XkAZiIGMy5Lu30f9geCtcrij1e0Q%3D&reserved=0) |  |  |

## User Manual

The application consists of the following components,

|  |  |  |
| --- | --- | --- |
| **Components** | **Purpose** | |
| RMON.sh | Script to start the RMON process | |
| RMONV2-0.1 | executable jar for RMON process | |
| AnalyzerV2-0.1 | executable jar for analysing the issues once the RMON process completes | |
| Config.properties | **property** | **Values and How to?** |
| Controller.username | User1 |
| Controller.password | \*\*\*\*\*\* |
| Controller.ip | ip/NAT of the controller |
| Controller.port | by default 8181(configurable) |
| frequency.sec | Tune this to set the frequency. For example , to set the frequency for 15 mins, modify frequency.min =15 |
| frequency.min |
| frequency.hour |
| Iteration | number of iteration planned |
| Node.all=yes | If want to perform the operation for all , then give Yes or else no |
| Node.Names=513250010 | If want to perform operation for certain nodes, provide Node.all=no and give the node ids(comma separate) |
| execute.capacityCalculation=no | give yes to generate air-interface capacity |
| execute.statisticsCalculation=yes | give yes to generate statistic reports |
| log4j.properties | **Important property** | **Default value** |
| log4j.appender.file.File | ${user.home}/SDN/RMonReports/Logs/Rmon.log |