

A syntax for the RADIUS Connect-Info attribute used in Wi-Fi networks

<https://datatracker.ietf.org/doc/draft-grayson-connectinfo/>

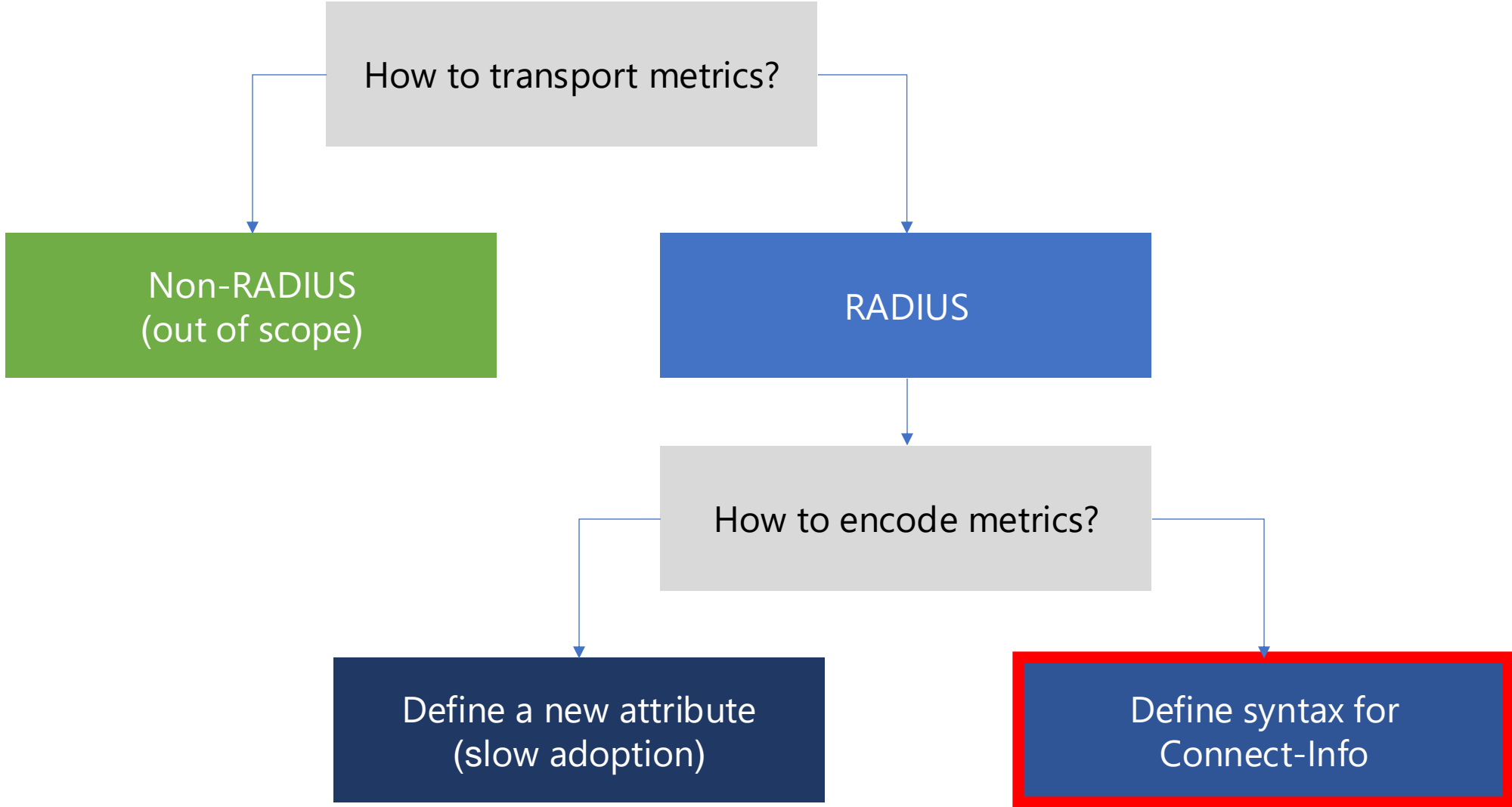
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Motivation

- Increasing adoption of RADIUS between **separate administrative domains**.
- Increasing adoption of RADIUS **without bi-lateral agreement** between NAS and AAA provider.
- Increasingly **complex wireless environment** with multiple overlapping networks.
- Handling **more diversity** in systems, across different Wi-Fi generations and spectrum allocations.
- AAA providers want to ensure their users are getting a **great Wi-Fi experience**.
- Industry benefits from **consistent framework** to provide visibility of Wi-Fi network metrics.
- Reliable insights into likely Wi-Fi experience increases confidence and **drives adoption**.

The above factors led to the WBA establishing its [Access Network Metrics Project](#)

How best to share access network metrics?



Example of existing Wi-Fi Connect-Info implementations

Implementation #1: CONNECT 11.00 Mbps 802.11b

Implementation #2: CONNECT 54.00 Mbps 802.11g

Implementation #3: CONNECT 11.00 Mbps 802.11b

Implementation #4: CONNECT 0Mbps 802.11b

Implementation #5: CONNECT 54.00 Mbps / 802.11ax / RSSI: 41 / Channel : 144

Implementation #6: CONNECT 54.00 Mbps, 802.11ax, RSSI: 36, Channel: 149

Opportunity to define a syntax for Connect-Info string that encompasses current implementations while supporting new optional key value pairs that address new requirements.

Access Network Metrics Key/Value Pairs

Wi-Fi Access Network Information

- Wi-Fi Channel Number/Band
- Noise
- Channel Utilization
- RSSI-minimum

STA-to-AP 802.11 Information

- RSSI
- Transmit bit rate
- Receive bit rate
- Frame loss
- Frame retry

Some key/value pairs applicable to sending Connect-Info in Access-Request and Account-Request, others applicable only to Accounting-Request type Interim and Stop, e.g., frame-loss, and frame-retry.

Sharing metrics where metric calculation can be customized

- Example of metric#1 that does not have a conformance test requirement and instead access network configuration allows to tune the algorithm used to generate metric#1
 - E.g., channel utilization configured using `chan_util_avg_period`
- Do we avoid defining sharing such metrics, or do we enable additional algorithm information to be optionally encoded
 - Facilitates comparison between a system that signals Metric#1(Algorithm-A) and another that signals Metric#1(Algorithm-B)
- Draft-00 permits sharing of algorithm information for a subset of key value pairs

ABNF Syntax and example encodings

```
-----  
; Connect-Info RADIUS Attribute #77 Syntax  
-----  
  
connect-info-77 = "CONNECT" *SP connectAttribute  
                  *( { DELIMITER connectAttribute } )  
  
connectAttribute = (MAXSPEED " Mbps") / PHYRATE  
                  ; indication of maximum  
                  ; achievable data rate  
  
connectAttribute =/ "802.11" WIFIGEN          ; Wi-Fi 802.11 version  
  
-----  
; connectAttributes - NON-DEVICE/CLIENT RELATED.  
;  
; These key-value pairs MAY be included in the Connect-Info attribute  
; when the attribute is included in the Access-Request or  
; Accounting-Request message.  
-----  
  
connectAttribute =/ "Channel:" *SP CHANNUM    ; Wi-Fi channel number  
  
connectAttribute =/ "Band:" *SP ("2.4"/"5"/"6")  
                  ; the Wi-Fi band - used to  
                  ; differentiate between  
                  ; re-use of channel  
                  ; numbers in 6 GHz  
  
connectAttribute =/ "RSSI-min:" *SP SS       ; the absolute value of  
                  ; configured minimum RSSI  
                  ; in dBm on the WLAN  
                  ; Access Point
```

Connect-Info = "CONNECT 54.00 Mbps / 802.11n / Channel: 1 / RSSI: 53"

Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:46 RSSI:50 RSSI-min:80"

Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:46 RSSI:48(AVG-EXP8)
RSSI-min:80 Noise:94"

Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:46 RSSI:48(AVG-EXP8)
RSSI-min:80 Noise:94(MED-LIN80S) ChanUtil:12(AVG-LIN600S)"

Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:46 RSSI:56(AVG-EXP8)
RSSI-min:80 Noise:90(MED-LIN80S) ChanUtil:15(AVG-LIN300S) TxBitRate:150.0
RxBitRate:150.0"

Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:46 Band:5 RSSI:56(AVG-
EXP8) RSSI-min:80 Noise:90(MED-LIN80S) ChanUtil:15(AVG-LIN300S) TxBitRate:150.0
RxBitRate:150.0 FrameLoss:3 FrameRetry:6"

Connect-Info = "CONNECT MaxRate MCS11-2SS / 802.11ax / Channel:37 / Band:6 /
RSSI:43(AVG-EXP8) / Noise:50 / ChanUtil:2(AVG-LIN5S)"

Next Steps

- Welcome comments and feedback on scope.
- Please share other implementations of Connect-Info that should be accommodated in syntax.
- Does radext WG think this is in scope of working group, e.g., helping to address current goal of “Define best practices for RADIUS roaming, and roaming consortia based on experience with RADIUS/TLS.”
- Imagine timeline for progressing draft can accommodate current radext priorities.