

Way forward on LTE UDC

MediaTek et al.

Background and Status [1/3]

- RAN#76
 - *The TR was approved but the SI is extended until September. RAN agreed that additional information on the APDC solution is to be provided to RAN2 by 2017-06-26. At the next RAN2 meeting, we will analyse this additional information and update the TR via CRs. RAN#77 will make a decision between DEFLATE based solution and APDC solution (unless RAN2 is able to make a quick and easy decision). 1 TU is allocated for this activity in RAN2#99. (See SR in [RP-171464](#))*

Background and Status [2/3]

- RAN2#99
 - [RAN2 ✉ 99#14: \[R2-1709921\]](#) CR36.754 simulation results of APDC
 - No objection received by the deadline
 - Results from (R2-1708296, R2-1708383, R2-1708572, R2-1709041, R2-1708360) for 8KB and 16KB buffer sizes
 - Indicates APDC compression efficiency being function of compression buffer size
 - Clarify the buffer size issue of APDC (32KB buffer *not* supported)
 - Update conclusion section based on the results.
 - [R2-1708357](#) Clean-up of the TR 36.754 (agreed)
 - [R2-1709742](#) Update of Description and Evaluation Results for DEFLATE (agreed)
- *“Both solutions based on DEFLATE and APDC are candidates for a UL data compression solution. However **RAN2 recommends only one solution to be selected** for specification in a potential Work Item (WI).”*
- RAN#77 decision on a single algorithm ✓

Background and Status [3/3]

Input	DEFLATE		APDC 26Jun		RoHC Available
	8KB	32KB	8KB	16KB	
#1 FTP- Client (CMCC)	49.96%	49.96%	54.34%	54.34%	73.3%
#2 FTP- Server (CMCC)	44.61%	44.61%	50.34%	50.34%	59.7%
#3 Online video (CMCC)	62.98%	62.99%	61.00%	61.04%	5.4%
#4 Long period video (CMCC)	71.26%	73.75%	76.67%	78.13%	5.1%
#5 SIP UE1(CMCC)	86.50%	87.95%	83.91%	85.18%	4.4%
#6 SIP UE2 (CMCC)	83.79%	84.87%	80.62%	81.78%	21.7%
#7 SIP UE3 (CMCC)	86.85%	88.25%	84.20%	85.67%	23.1%
#8 Web surfing (CMCC)	65.20%	70.03%	64.24%	66.87%	45.1%
#9 Video data (MediaTek)	59.08%	57.92%	73.47%	73.9%	80.7%
#10 Long duration FTP (MediaTek)	62.01%	58.56%	75.34%	75.30%	83.4%
#11 Multiple IP flows (Qualcomm)	71.63%	73.79%	73.35%	74.68%	N/A

NOTE: 32KB not supported

Source: TR36.754, R2-1709921

Summary

Performance ⁽¹⁾	Complexity	Readiness	IODT	3GPP compliance
DEFLATE = APDC	DEFLATE = APDC	DEFLATE > APDC	DEFLATE > APDC	DEFLATE = APDC

- TR36.754: Solution based on DEFLATE and solution based on APDC have shown significant and similar compression efficiency.

- DEFLATE efficiency better with SIP than APDC – VoLTE capacity gains expected

- DEFLATE and RoHC outperform APDC

NOTE 1: compression efficiency

- DEFLATE can be used in low-end platforms
- No advantage with APDC

- DEFLATE ready: RFC1951⁽²⁾ in public domain
- DEFLATE is widely used in the two most popular mobile platforms today
- APDC is not specified

NOTE 2: published in May 1996

- DEFLATE known (RFC1951) and widely used today
- DEFLATE IODT will be expedited

- Network upgrade required (RRC, PDCP) regardless whether DEFLATE or APDC is used

Way forward on LTE UDC

- RAN#77 to adopt the DEFLATE-based solution as the only new compression algorithm for LTE UDC
- Corresponding WI in RP-171851

Appendix – TR36.754 results

Input		DEFLATE		DEFLATE		DEFLATE		APDC 26Jun		RoHC
		Static Huffman 1byte UDC hdr.		Adap. Huffman no 1byte UDC hdr		Adap. Huffman 1byte UDC hdr		8KB	16KB	
		8KB	32KB	8KB	32KB	8KB	32KB	8KB	16KB	
#1	FTP- Client (CMCC)	49.96%	49.96%	51.69%	51.69%	49.96%	49.96%	54.34%	54.34%	73.3%
#2	FTP- Server (CMCC)	44.61%	44.61%	46.02%	46.02%	44.61%	44.61%	50.34%	50.34%	59.7%
#3	Online video (CMCC)	62.98%	62.99%	65.56%	65.55%	64.93%	64.92%	61.00%	61.04%	5.4%
#4	Long period video (CMCC)	71.26%	73.75%	73.37%	75.47%	71.93%	73.97%	76.67%	78.13%	5.1%
#5	SIP UE1(CMCC)	86.50%	87.95%	86.99%	88.25%	86.87%	88.13%	83.91%	85.18%	4.4%
#6	SIP UE2 (CMCC)	83.79%	84.87%	84.94%	85.34%	84.83%	85.23%	80.62%	81.78%	21.7%
#7	SIP UE3 (CMCC)	86.85%	88.25%	87.31%	88.62%	87.20%	88.52%	84.20%	85.67%	23.1%
#8	Web surfing (CMCC)	65.20%	70.03%	66.99%	71.04%	66.22%	70.28%	64.24%	66.87%	45.1%
#9	Video data (MediaTek)	59.08%	57.92%	61.26%	59.92%	59.41%	58.07%	73.47%	73.9%	80.7%
#10	Long duration FTP (MediaTek)	62.01%	58.56%	63.91%	60.46%	62.01%	58.56%	75.34%	75.30%	83.4%
#11	Multiple IP flows (Qualcomm)	71.63%	73.79%	73.03%	74.87%	72.08%	73.92%	73.35%	74.68%	N/A

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