Throughput requirements – proposal for a way forward

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IEEE 1914
Next Generation Fronthaul Interface
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Background

Class	Sub Class (FFS)	Priority Level (FFS)	Latency upper bound requirement (FFS)	Throughput requirement (FFS)	Reserved	informative
control & management	synchronization	0		Low BW		
	Low latency RAN control-plane	1		Low BW		
data-plane	Subclass1	2		R3_low – R3_high		3GPP model Option 6,7,8
	Subclass_2	3		R4_low – R4_high		3GPP model Option 4,5
	Subclass_3	4		R5_low – R5_high		3GPP model Option 1,2,3
Transport NW control & management		?	?	Low BW		
Reserved						

Way forward after Oct16 f2f [1]:

- Need to fill in the transport class table
- Requirements (following Prof. Choi's contribution, Transport requirements for different splits (ATT))

On the contrary

- Proposal to use latency requirement as primary factor for CoS specification, instead of throughput [2]

[1] 201610 IEEE 1914 f2f meeting summary

[2] tf1_1702_cai_tazi_NGFI_COS_specification_1.pdf

Thoughts on throughput requirements

- Delay requirement can only be met is required throughout can be accommodated
  - Delay is more critical in the context of CoS definition

- Still, there is a value in defining realistic deployment scenarios

- Proposal: Fronthaul dimensioning tool
- To facilitate analysis on deployment scenarios

- Invitation to share views on parameters and their values in foreseen deployment scenarios to be included in the standard
- Conclusion to be drawn at April f2f meeting

Presentation of the tool

Fronthaul dimensioning tool for LTE in DL

Developed by Foxconn and MTI

Edit values of input parameters to see resulting fronthaul throughput.

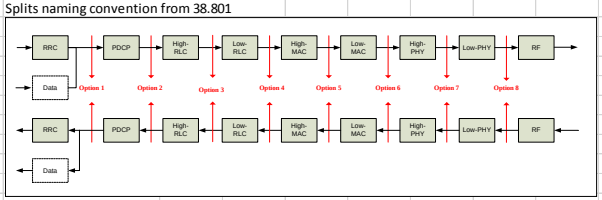
Configuration

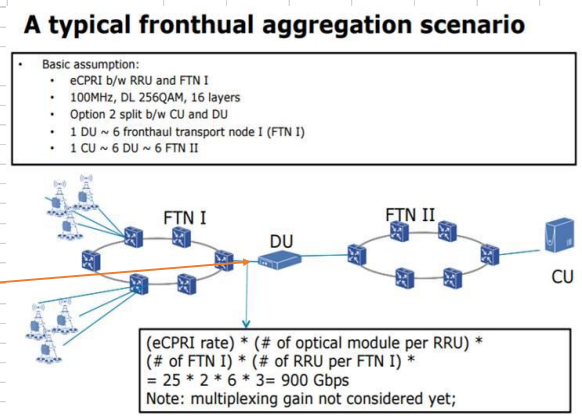
	Input Parameters	Variant 1 Value	Variant 2 Value	Variant 3 Value
Radio	Bandwidth [MHz]	20	100	20
	# of symbols per subframe	14	14	
	# of CFI symbols	1	1	
	# of UEs per TTI	1	1	
	# of RE for reference singal per RB per subframe	6	6	
	# of subcarriers per RB	12	12	
	# of antennas	2	16	
	# MIMO layers	2	16	2
	Bit width (I+Q)	32	32	
	Compression, % of orginal	100%	59%	100%
	Modulation (e.g. 64QAM = 6, 256QAM = 8)	6	8	6
	# Sectors	1	1	1
	Duplex	FDD	FDD	FDD
	% for DL for TDD	50%	50%	50%
	DL load factor	100%	100%	100%
	Split option	3GPP Option 8	3GPP Option 7.1	3GPP Option 2
FH entering DU	Transport overhead, % (e.g. CPRI 25%, RoE <10%)	0.0%	0.0%	0.0%
	MUX gain on link entering DU [sum of throughputs/aggregated throughput]	1	1	1
	# of RRU per FTN I	1	3	1
	# of FTN I per DU	1	6	1
	# of opticals modules per RRU (FFS: clarify purpose)	1	2	1
FFS	number of DU per CU			
	Resiliency			
	Resulting DL throughput, Gbps	**1.96608**	**905.74848**	**0.1875**

Assumptions

	Split 7.3 - only data for PDSCH taken into account, control channels impact is treated as negligible here
187.5	Throughput requirement in Mbps for spilt option 1-6 [NGMN Small Cell Backhaul Requirements] for 20 MHz, 64QAM, 2 MIMO layers
Option 7-3 (Only for DL)	Only the encoder resides in the CU, and the rest of PHY functions reside in the DU.
Option 7-1 (DL)	iFFT and CP addition functions reside in the DU, the rest of PHY functions reside in the CU.

Splits naming convention from 38.801





Source: tf1_1701_huang_two-level-architecture_2.pdf

Summary

- Proposal is to analyze realistic throughput requirements to be included in the standard

Thank you