200GE&400GE application considerations in metro transport aggregation layer network

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Outline

Metro transport network status in China

Metro aggregation layer application discussion

Summary

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Metro transport network status in China

Typically ,metro transport network is divided into three sublayers in China operators, i.e., core layer, aggregation layer and access layer ,and the last two layers are mainly used to provide transport function with different technology (IP RAN and PTN) for mobile back-haul and IP Router/switch for fixed Broadband ,etc..

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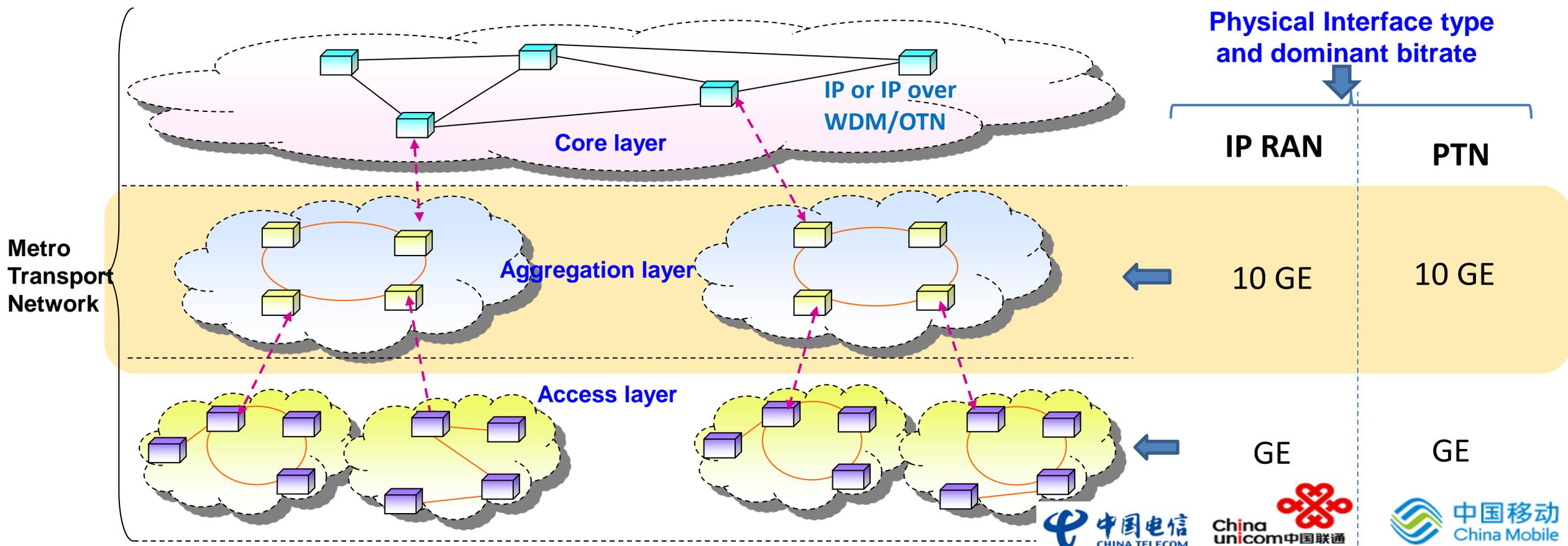
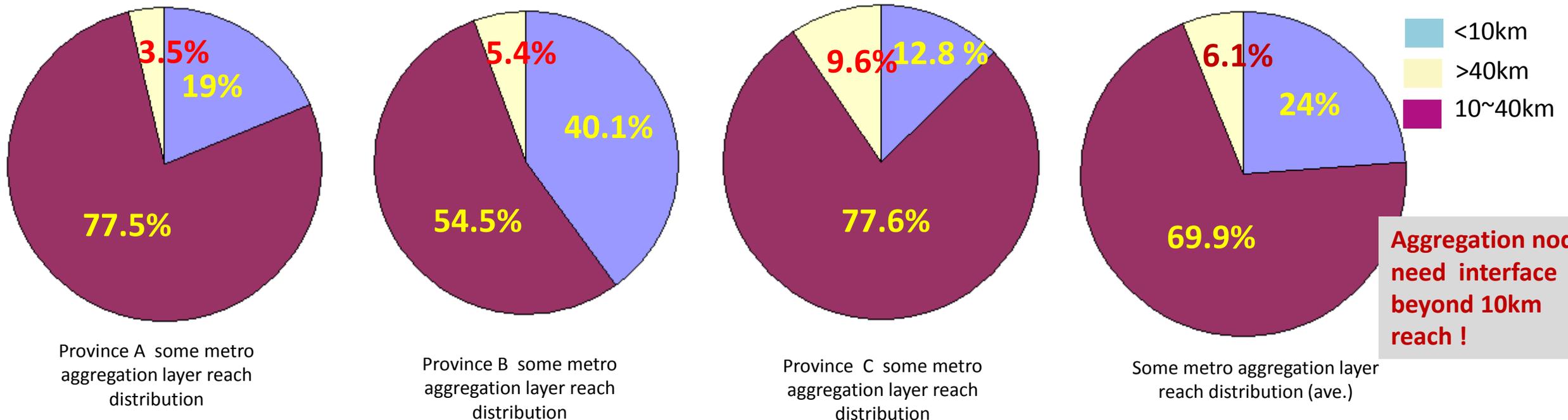# Traffic demand drive network to provide higher bitrate

According to China IMT-2020 (5G) Promotion Group report, the user experienced data rate and peak data rate of 5G would be up to several tenfold than that of 4G , then metro transport network should have the related ability to carry these bandwidth demand, thus metro core and aggregation may provide the application scenarios for 200GE and 400GE,etc..
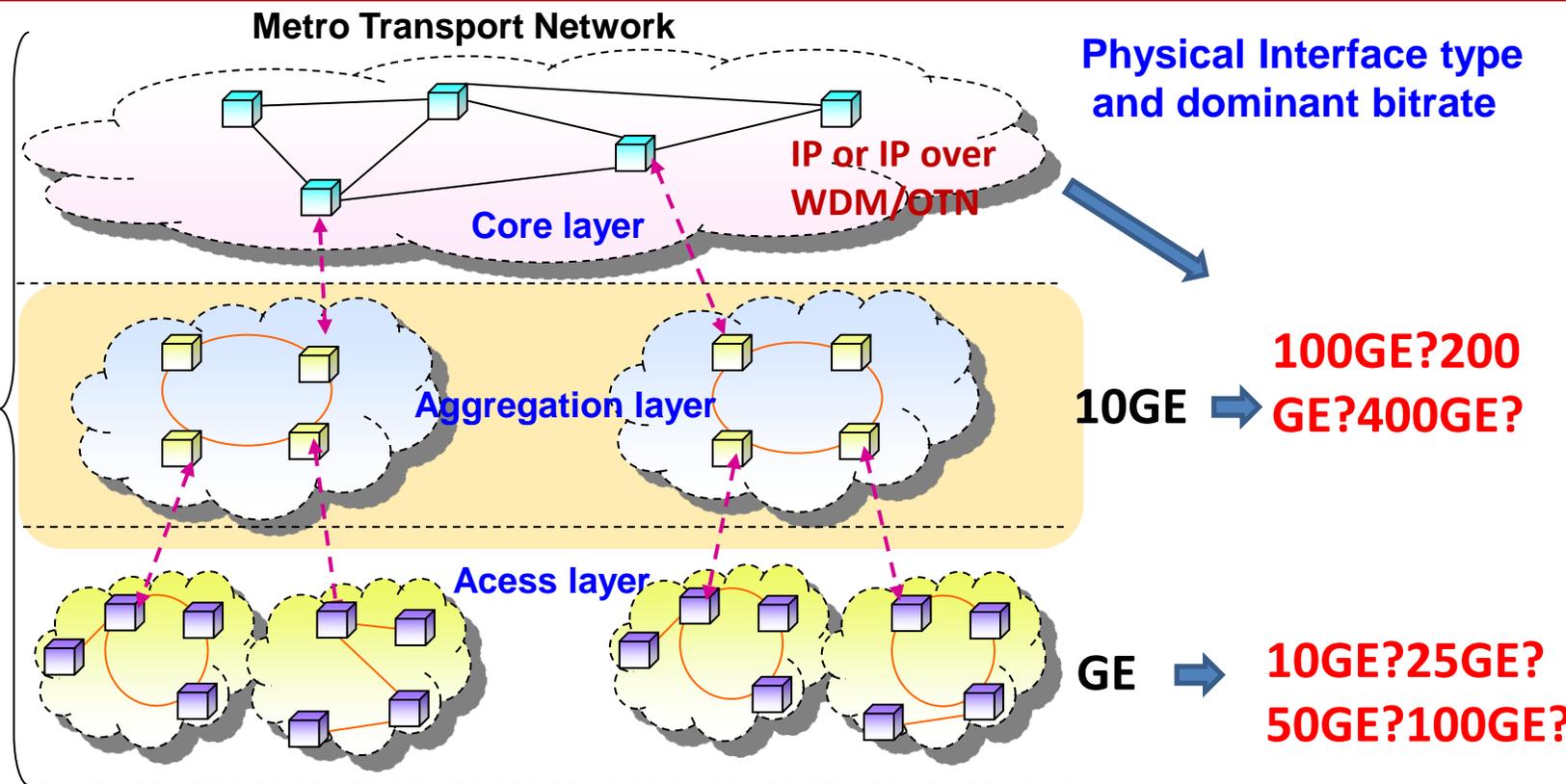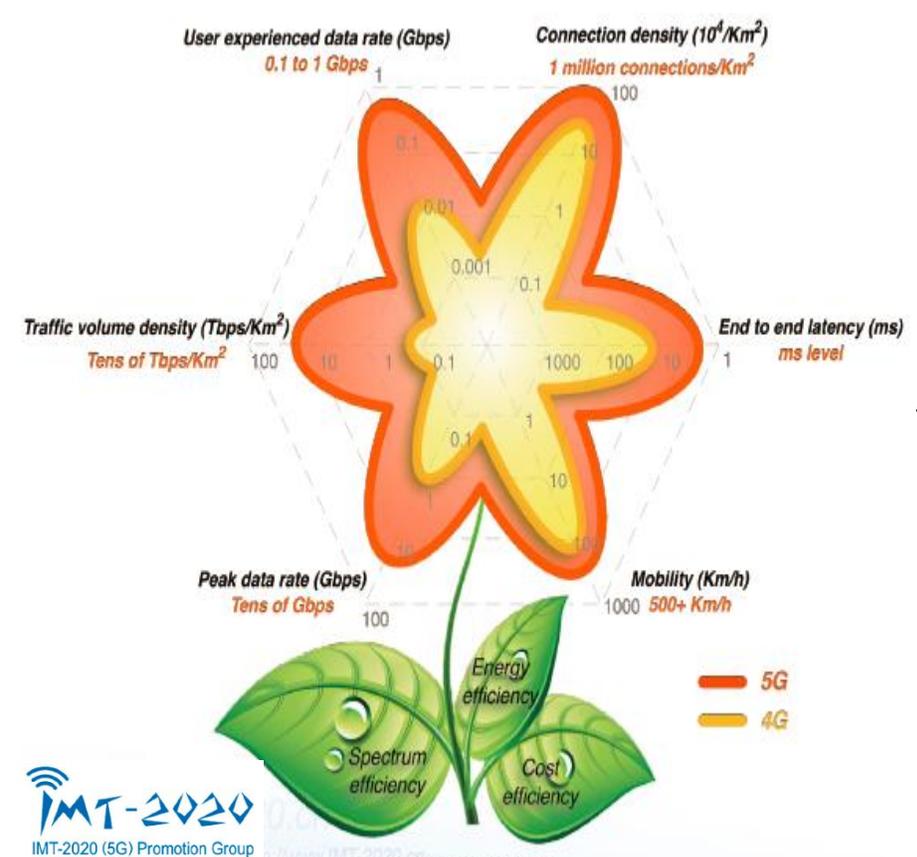
Aggregation node distance from actual networks

As metro core usually use WDM/OTN to extend reach distance of Ethernet interface, therefore current aggregation layer transmission distance is crucial to the future higher bitrate interface, such as 200GE and 400GE,etc.

Furthermore, each metro network may has its own distribution characteristic of reach distance, and some metro aggregation layer node distance from actual networks in China are investigated, and these nodes would has the requirement to deploy link capability more than 10GE.

3.5% **19%** **77.5%**

Province A some metro aggregation layer reach distribution

5.4% **40.1%** **54.5%**

Province B some metro aggregation layer reach distribution

9.6% **12.8 %** **77.6%**

Province C some metro aggregation layer reach distribution

6.1% **24%** **69.9%**

Some metro aggregation layer reach distribution (ave.)

Legend:
- <10km
- >40km
- 10~40km

Aggregation node need interface beyond 10km reach !

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200GE/400GE maximum target reach is 10km!

Aggregation node need interface beyond 10km reach distance , and 10GE/40GE/100GE interface all satisfy this kind of requirement!

Bit-rate	Application Code	Target Distance	NOTE
10GE	10GBASE-SW/ 10GBASE-SR	10km	SMF,1310nm
	10GBASE-EW/ 10GBASE-ER	30km/40km	SMF,1550nm
	10GBASE-LX4	10km	SMF,1310nm,WDM
40GE	40GBASE–LR4	10km	SMF,1310nm,CWDM
	40GBASE–ER4	30km/40km	SMF,1310nm,CWDM
	40GBASE-FR	2km	SMF,1550nm
100GE	100GBASE–LR4	10km	SMF,1310nm,WDM
	100GBASE–ER4	30km/40km	SMF,1310nm,WDM

IEEE 802.3bs objectives of 200GE and 400GE target reach

Provide physical layer specifications which support 200 Gb/s operation over:
- At least 500 m of 4-lane parallel SMF
- At least 2 km of SMF
- At least 10 km of SMF

Provide physical layer specifications which support 400 Gb/s operation over:
- At least 100 m of MMF
- At least 500 m of SMF
- At least 2 km of SMF
- At least 10 km of SMF

200GE/400GE maximum target reach is 10km, and it is suggested be extended to 40km if considering metro aggregation application !

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Summary

1. Metro transport network status in China operators is introduced.

2. Future traffic demand drive transport network to provide higher bandwidth, 200GE and 400GE bitrate would be potential candidates in the metro aggregation layer.

3. Some aggregation node distance from actual networks is investigated, and about up to 70% links of among these nodes will be between 10km and 40km, aggregation node need interface beyond 10km reach.

4. 200GE/400GE maximum target reach is 10km, and it is suggested to be extended to 40km if considering metro aggregation application scenarios .

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THANK YOU
FOR YOUR ATTENTION!

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