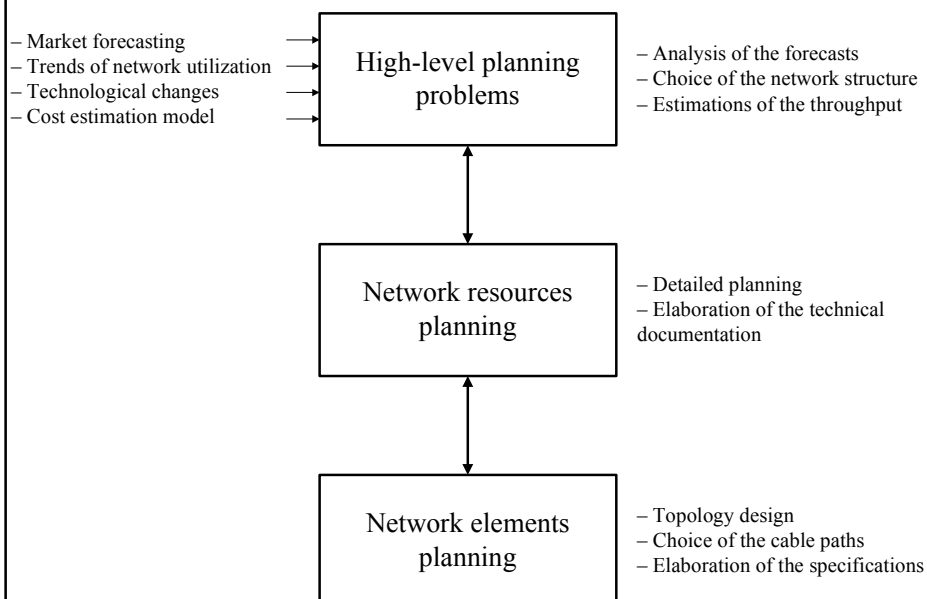


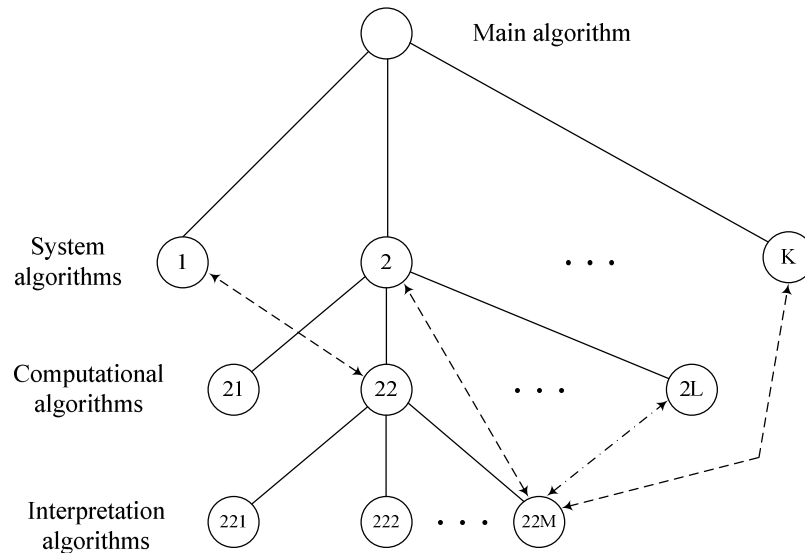
NGN Planning and QoS Aspects

*ITU-D Regional Development Forum for the EUR and CIS Region
NGN and Broadband, Opportunities and Challenges
Chisinau, Moldova, 24 – 26 August 2009*

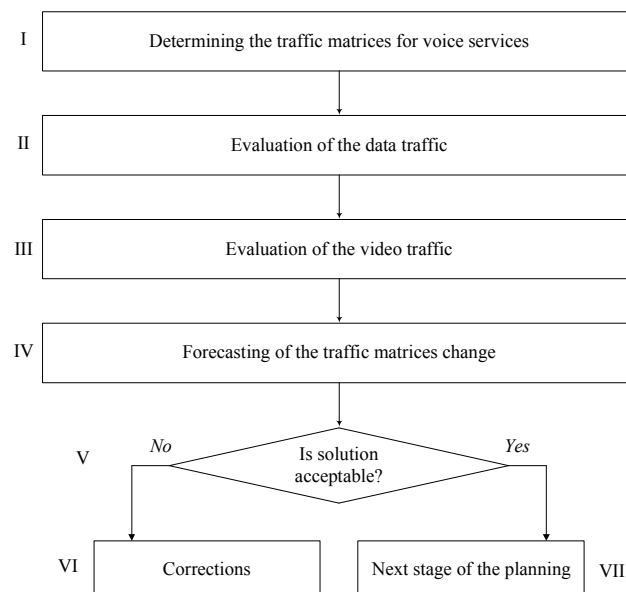
Types of the network planning problems



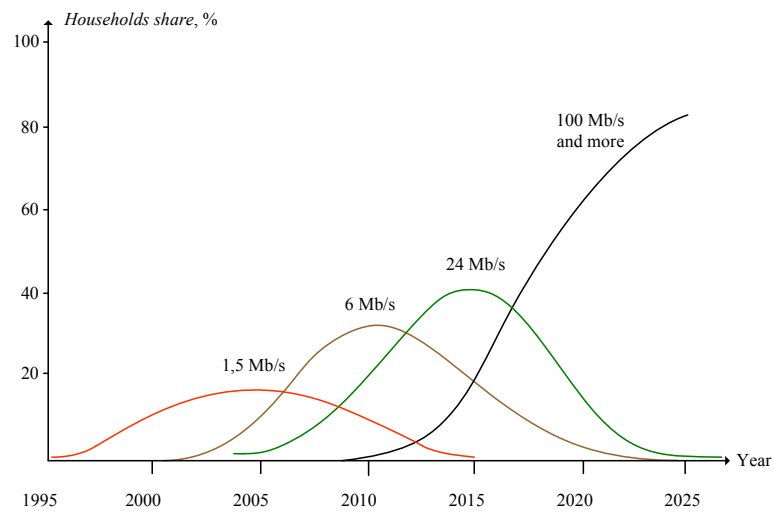
Three types of the planning algorithms



Traffic estimation algorithm for the NGN

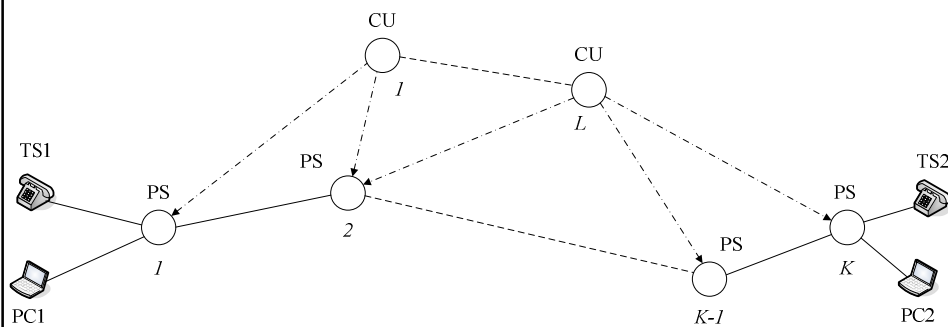


Access bandwidth forecasting



Two level NGN model

I. Control layer

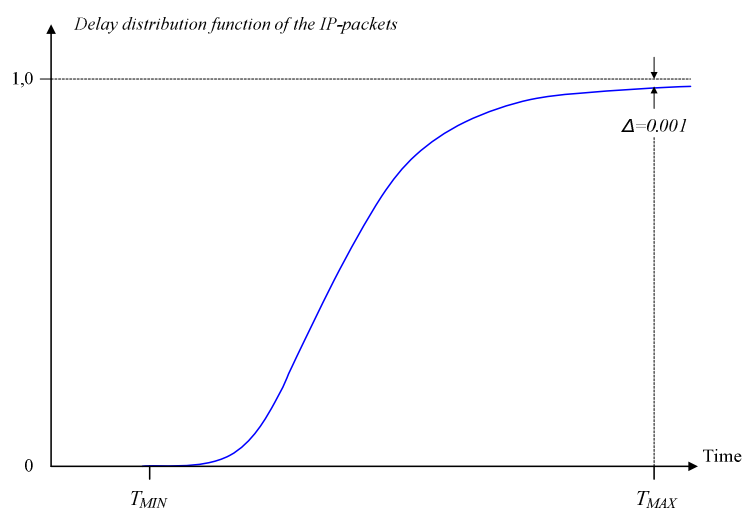


II. IP packets transmission layer

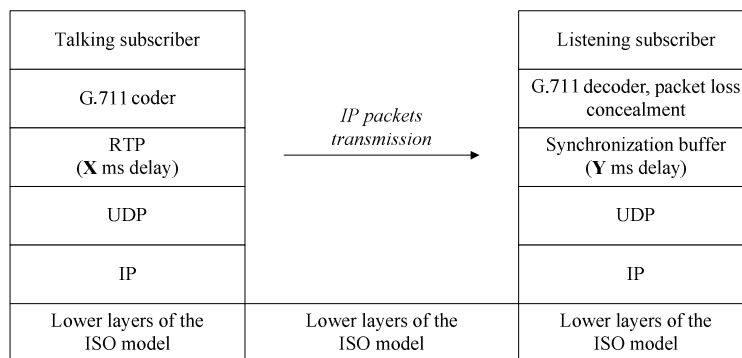
Quality of service indices (Y.1541)

QoS class	IPTD	IPDV	IPLR	IPER
0	100 ms	50 ms	10^{-3}	10^{-4}
1	400 ms	50 ms	10^{-3}	
2	100 ms	U	10^{-3}	
3	400 ms	U	10^{-3}	
4	1 s	U	10^{-3}	
5	U	U	U	U

About IPDV definition



Speech path model in the NGN



QoS aspect: time irreversibility

Speech quality impairment compensation in CS networks:

- **Elaboration of the speech signal processing algorithms;**
- **Signal amplification (when necessary).**

Speech quality impairment compensation in IP networks under condition of the excessive packet exchange delay:

- **Impossible in principle!!!**

QoS indices decomposition (1)

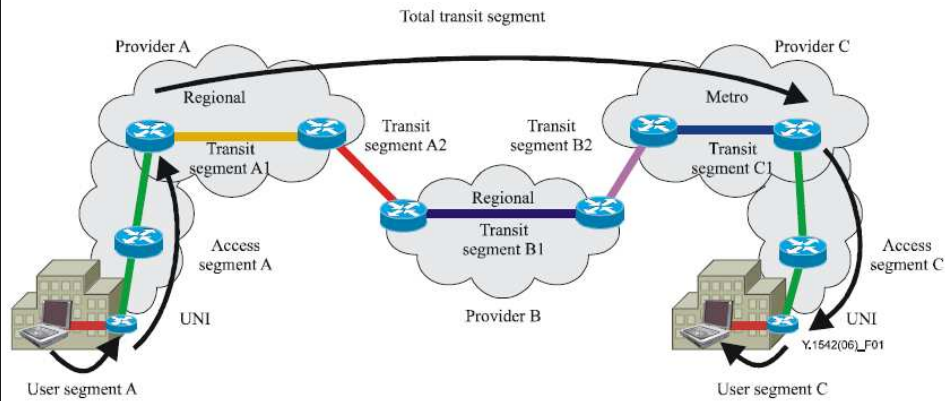


Figure 1/Y.1542 – Example topology for impairment allocation

QoS indices decomposition (2)

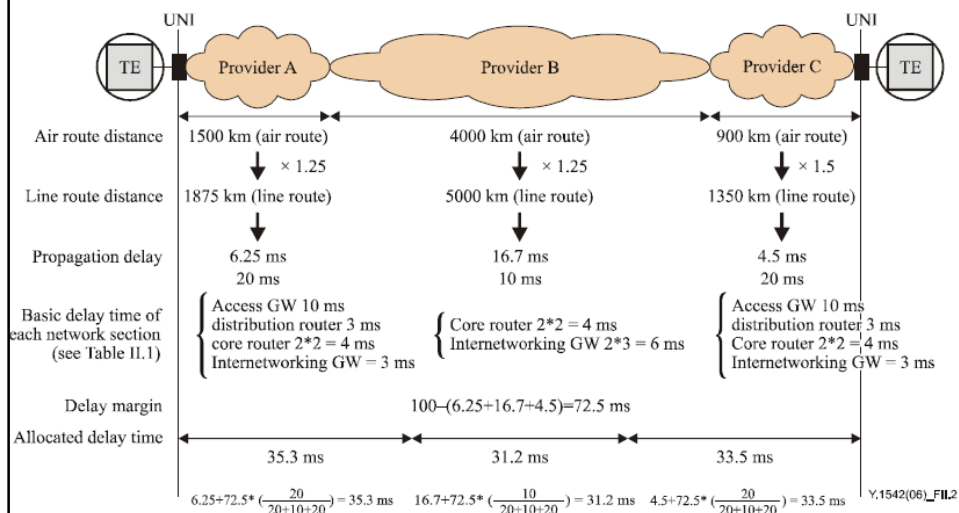
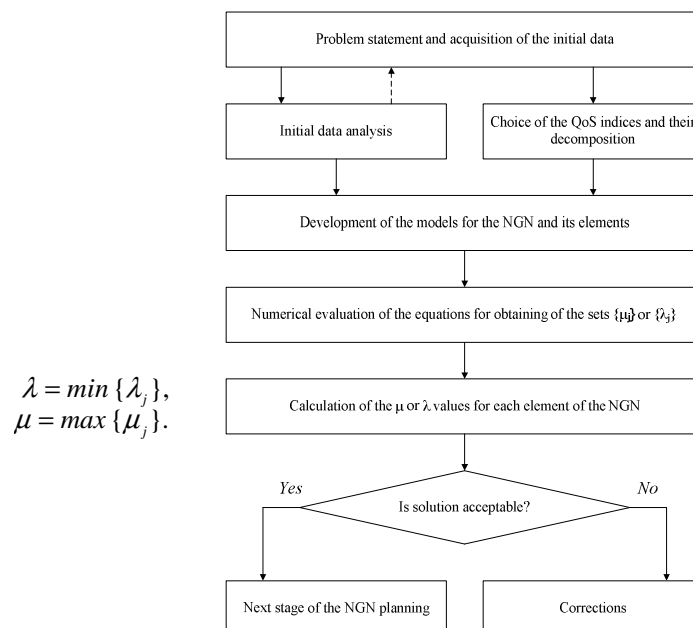


Figure II.2/Y.1542 – Static reference allocation example

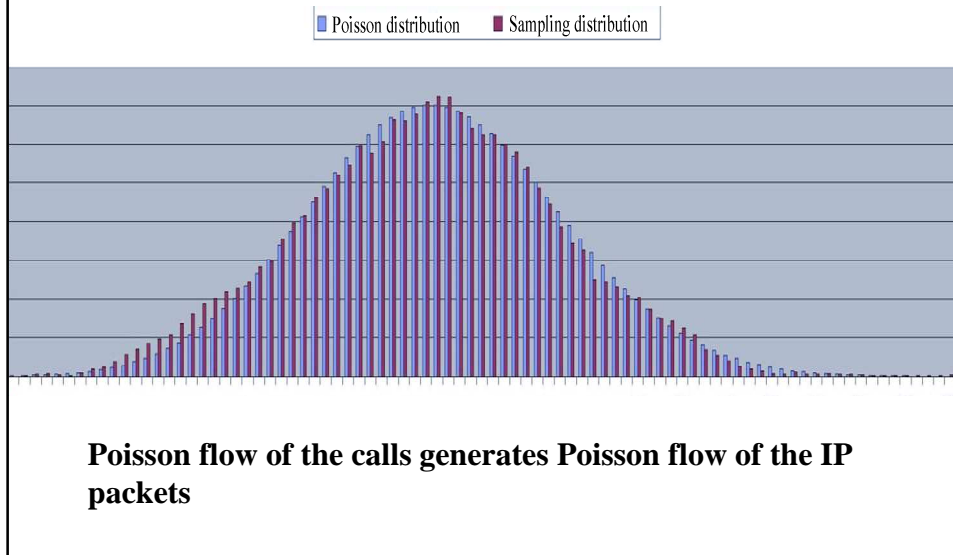
Error in quantile estimation for the exponential distribution

	$p = 0.95$	$p = 0.99$	$p = 0.999$
Exact value	12.59	16.81	22.45
Value by Y.1541	25.80	34.12	43.55
Absolute error	13.21	17.31	21.10
Relative error	1.05	1.03	0.94

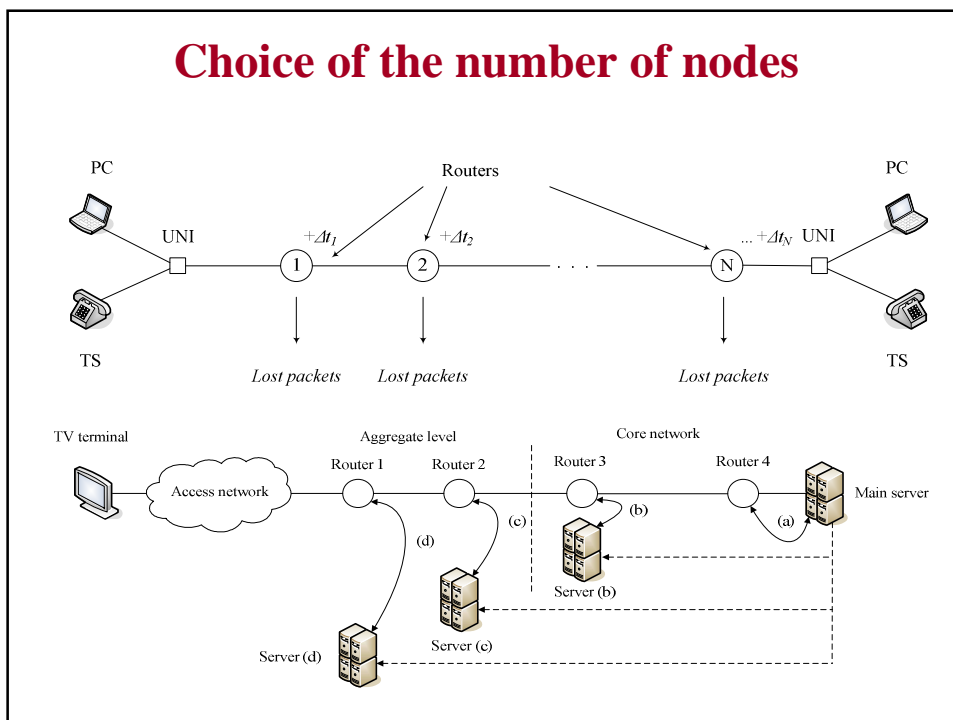
Queueing systems analysis



Behaviour of the incoming flow



Choice of the number of nodes



Conclusions

- 1. NGN planning is a complicated task since multiservice traffic peculiarities have to be taken into consideration.**
- 2. QoS indices related to triple-play services are important for the NGN planning.**
- 3. For the NGN planning, it is necessary to elaborate new methods of the teletraffic system analysis. These methods should consider packet technology specifics.**

NGN Planning and QoS Aspects

Thank you!

Nikolay Sokolov

e-mail: sokolov@niits.ru

Andrey Sokolov

e-mail: asokolov@seventest.ru

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