



ITU Seminar

Bangkok, Thailand , 11-15 November 2002

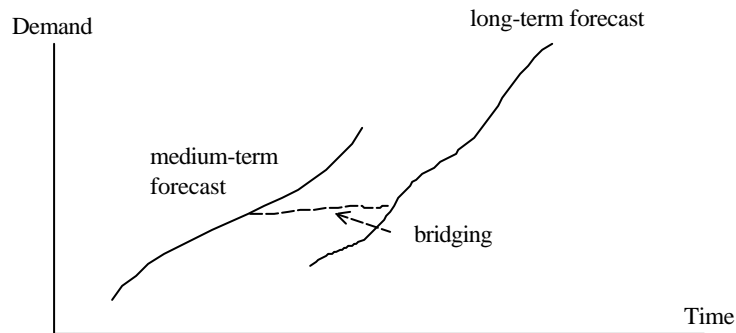
Session 2.3

Network planning at different time scales, long, medium and short term

Network planning at different time scales:

- **Long term network planning (Target network)**
Target network planning as bases for preparing of comprehensive master plans - master plans are usually based on long term assessments.
- **Medium term network planning**
To identify intermediate steps from present to target network.
- **Short term network planning**
Short-term plans can be made up on regional or local bases.

Demand forecasting as bases for network planning



Network planning at different time scales as seen in the evolution steps to NGN

- In respect to strategies for introduction of the new equipment
- In respect to strategies for coexisting of the present and future technology

Strategies for introduction of the new equipment

❖ Consolidation:

Optimize the installed PSTN to reduce capital (CAPEX) and operational expenses (OPEX). Consolidation can be combined with a selection of future-safe products to prepare migration to NGN

❖ Expansion:

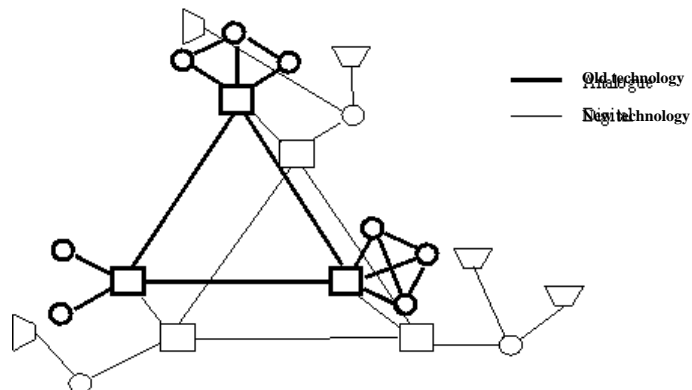
Keep the existing PSTN infrastructure and services, but introduce an overlay NGN (based on broadband access) for addressing new customers and introducing new services (e.g., multimedia).

❖ Replacement:

Replace PSTN components (at their end-of-life) with equivalent NGN components.

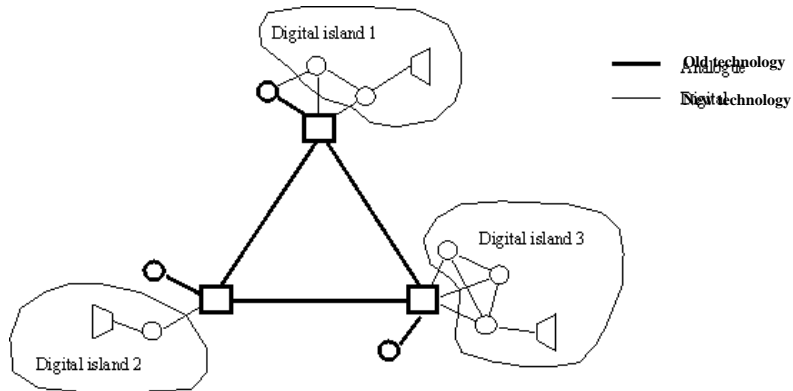
Strategies for coexisting of the present and future technology

Overlay strategy



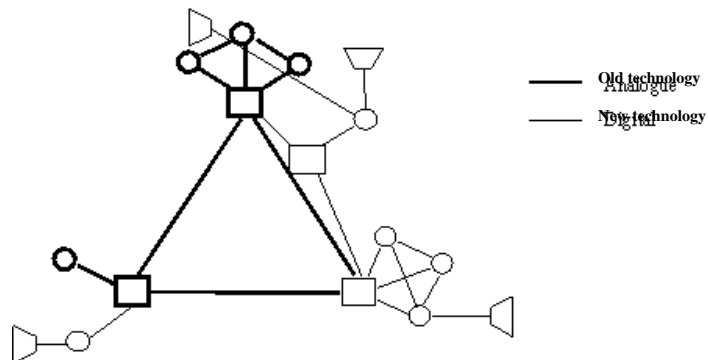
Strategies for coexisting of the present and future technology

Island strategy



Strategies for coexisting of the present and future technology

Pragmatic strategy, where we have layers and islands



Subscribers potential

Based on statistics for population, average household size, average teledensity, residential teledensity and teledensity per house-hold.

Reference to Cellular mobile teledensity and impact on fixed network.

Ratio residential to business subscribers.

Teledensity statistics for highly developed countries

Country	Population (in thousands)	Teledensity [%]	Residential Teledensity [%]	Average household size	Teledensity per house-hold [%]	Cellular mobile Teledensity [%]
Australia	19,157	52.46	73.0	2.64	101.2	44.69
Canada	30,750	67.65	63.4	2.65	98.2	28.46
France	58,892	57.93	74.0	2.46	94.0	49.33
Germany	82,260	61.05	77.0	2.16	95.5	58.60
Italy	57,298	47.39	67.1	2.71	96.9	73.73
Japan	126,919	58.58	73.9	2.70	116.8	52.62
New Zealand	3,831	49.99	70.8	2.91	103.0	56.33
Republic of Korea	47,300	46.37	74.6	3.04	105.5	26.82
Spain	40,600	42.12	74.5	3.25	100.8	60.93
Sweden	8,881	68.20	65.3	2.22	98.7	71.72
Switzerland	7,204	72.67	68.0	2.02	99.6	64.39
United Kingdom	59,766	58.86	70.1	2.38	93.0	72.70
United States of America	275,130	69.97	65.8	2.58	94.1	39.79

Teledensity statistics for highly developed countries

Average household size in the highly developed countries – from 2,0 to 3,4

Ratio residential to business subscribers - about 3 to 1

Teledensity per house-hold in the highly developed countries around 100|%

Impact of Cellular mobile on residential teledensity:

Case of Italy:

Year 1997: average teledensity **44,68 %** , residential teledensity **76,5 %**

Year 2000: average teledensity **47,39 %** , residential teledensity **67,1 %**

Teledensity statistics for different countries in the world

Country	Population (in thousands)	Teledensity {%}	Average household-size	Teledensity per household {%}	Cellular mobile Teledensity {%}
Argentina	37,032	21,32	3,71	68,7	16,34
Brazil	170,115	18,18	3,78	41,6	13,63
Bulgaria	8,225	35,04	2,83	84,6	8,97
China	1,295,336	11,18	3,72	33,9	6,58
India	1,012,396	3,20	5,44	-	0,35
Indonesia	212,029	3,14	4,34	11,3	1,73
Iran	63,661	14,96	4,39	56,1	1,51
Kenya	30,669	1,05	3,22	1,4	0,42
Mexico	98,881	12,47	4,60	42,0	14,24
Morocco	28,351	5,03	5,43	21,0	8,26
Pakistan	141,256	2,16	6,02	9,8	0,25
Peru	25,662	6,69	4,63	25,0	4,96
Philippines	76,499	4,00	5,01	14,0	8,44
Russia	146,934	21,83	2,83	48,7	2,22
South Africa	43,686	11,36	4,39	27,9	19,02
Sudan	31,095	1,24	6,07	5,7	0,07
Thailand	60,607	9,23	3,87	24,2	5,04
Turkey	65,766	28,6	4,56	97,0	24,56
Uganda	22,210	0,28	4,85	0,5	0,85

Teledensity statistics for different countries in the world

Average household size for the selected countries –
from 3,1 to 6,4

Example of calculated subscriber potential for some countries, based on the above estimation :

- Brazil: 54,8 Million (34 %) potential teledensity
- China: 447 Million (35 %) potential teledensity
- Russia: 64 Million (43 %) potential teledensity
- South Africa : 12,4 Million (29 %) potential teledensity

Teledensity statistics for some LDCs

Country	Number of subscribers	Teledensity [%]	Average household size	Teledensity per household [%]
Angola	96,350	0,78	5,1	-
Eritrea	27,375 *	0,68	5,0	1,8
Ethiopia	194,494	0,30	4,2	0,7
Guinea	44,046	0,55	4,2	0,6
Lesotho	23,144 *	1,00	5,2	2,0
Malawi	41,362 *	0,37	7,9	1,2
Myanmar	229,320	0,48	5,0	-
Tanzania	150,141	0,45	5,5	1,0
Solomon Islands	7,860	1,95	7,1	2,0
* only fixed subscribers				

Teledensity statistics for Largest cities

	Population as % of total	Large city teledensity [%]	Rest of country teledensity [%]	Overall teledensity [%]
Low Income	6,0	9,26	2,15	2,54
Lower Middle Income	5,8	24,84	7,30	8,77
Upper Middle Income	16,1	30,77	21,10	22,94
High Income	10,8	57,49	54,83	55,21
Africa	12	6,42	1,39	1,99
Americas	13,6	34,8	21,72	11,39
Asia	4,8	25,97	6,94	7,84
Europe	10,9	48,24	30,19	31,98
Oceania	17,8	45,97	36,77	38,38
WORLD	7,7	17,4	25,25	9,20

Density statistics for Information technology

	Internet hosts per 10000 inhabitants	Internet users per 10000 inhabitants	PCs per 100 inhabitants
Low Income	0,98	62,21	0,59
Lower Middle Income	4,32	264,94	2,45
Upper Middle Income	78,69	992,66	8,24
High Income	1.484,20	3.992,87	37,31
Africa	3,38	84,89	1,06
Americas	1.332,97	2.164,28	26,57
Asia	28,73	433,97	2,18
Europe	191,47	1.804,54	17,94
Oceania	885,26	2.771,59	39,91
WORLD	232,66	820,81	7,74

Statistics for Network growth

(compound annual growth rate in %)

	New telephone lines added 2000-2001	New mobile subscribers added 2000-2001
Low Income	8,3	72,4
Lower Middle Income	17,2	70,5
Upper Middle Income	7,4	27,8
High Income	0,3	14,8
Africa	7,6	51,0
Americas	2,1	21,2
Asia	12,4	38,4
Europe	2,4	20,0
Oceania	0,2	26,7
WORLD	6,0	26,7

CONCLUSION

There is still considerable potential of telecom subscribers in the world, concentrated primarily in the developing countries and after all in the LDCs

Planning in the developing countries for a long period will primarily have to solve problems of huge network expansion, so long-term (target) network planning will be essential task