Mobile Networks Evolution: Economic Aspects of Evolution towards IMT2000

ITU-BDT Regional Seminar on Fixed Mobile Convergence and new network architecture for Arab Region

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Summary

1. Service and network evolution
2. Issues for migrating to IMT2000
3. Evolution scenarii

Introduction

Main trends in the telecom scene (1)

Convergence

- *Wireline data*: wireless data with WiFi,
- *Wireline voice*: data with VoIP,
- *Wireless voice*: data with VoIP over wireless,
- *Broadcast services*: TV/ADSL, TV on mobile,
- *Core network*: one unique packet core network,

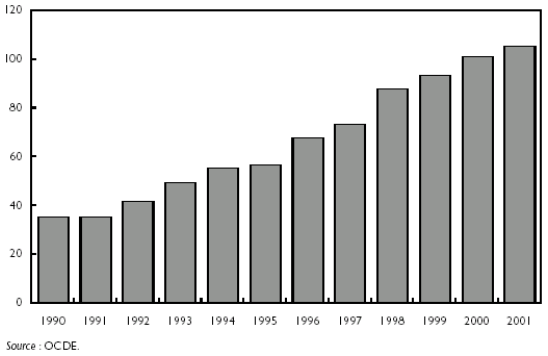
⇒ New hybrid services through multiple networks.

⇒ NGN and IMS.

Main trends in the telecom scene (2)

New entrants

- Operators evolution in OECD area



Source : OCDE.

- Alternative operators, MVNO, new licences, …
- Entrants from the Internet world.

Main trends in the telecom scene (3)

New technologies and alternative solutions

- *WiFi, Bluetooth*, …: indoor coverage,
- *WiMAX, Flash-OFDM*: outdoor and 3G challengers,
- …

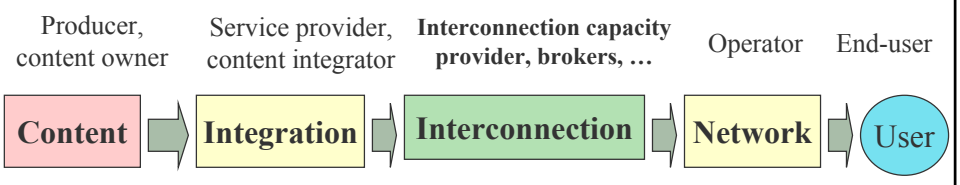
⇒ Multiple access technologies to services (data and voice) ≠ 2G networks.

Main trends in the telecom scene (4)

Value chain extension

Migration of service intelligence from the core to the user terminals: value is pushed to the edges of the networks.

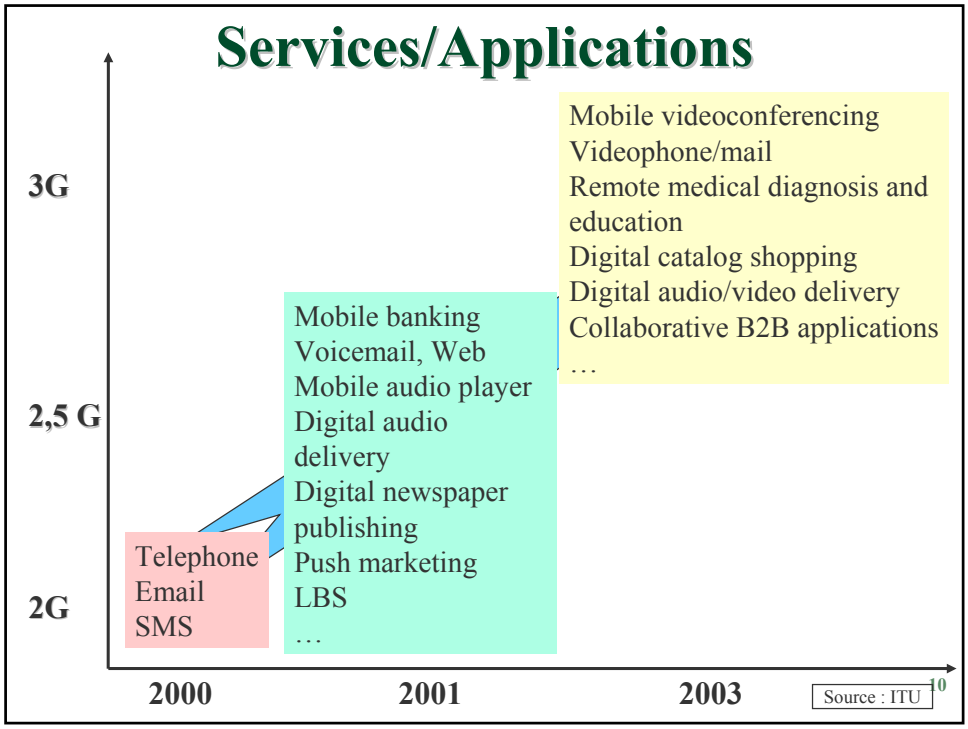
⇒ With IP, the value chain got extended and the operators share in the service reduces.



Main trends in the telecom scene (5)

- Mobility + wireless access,
- Wideband (fixed and mobile),
- Customization,
- …

I. Service and networks evolution

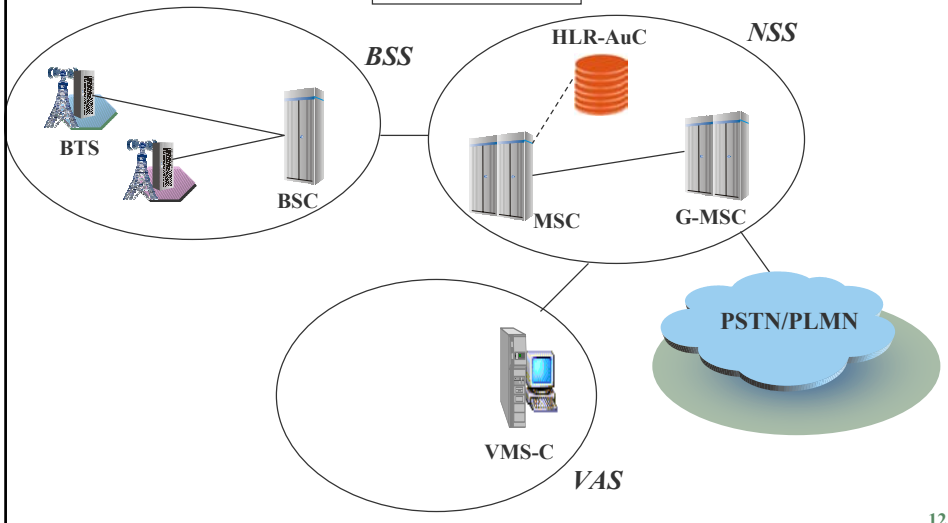


UMTS services classes

Service class	*Conversa-tional*	*Streaming*	*Interactive*	*Background*
Main characteris-tics	- Minimum jitter, - Low delay.	- Minimum jitter	- Query/ answer mode, - Minimise errors.	- No delay constraints, - Minimise errors.
Example	Voice	Video	Web browsing	Email

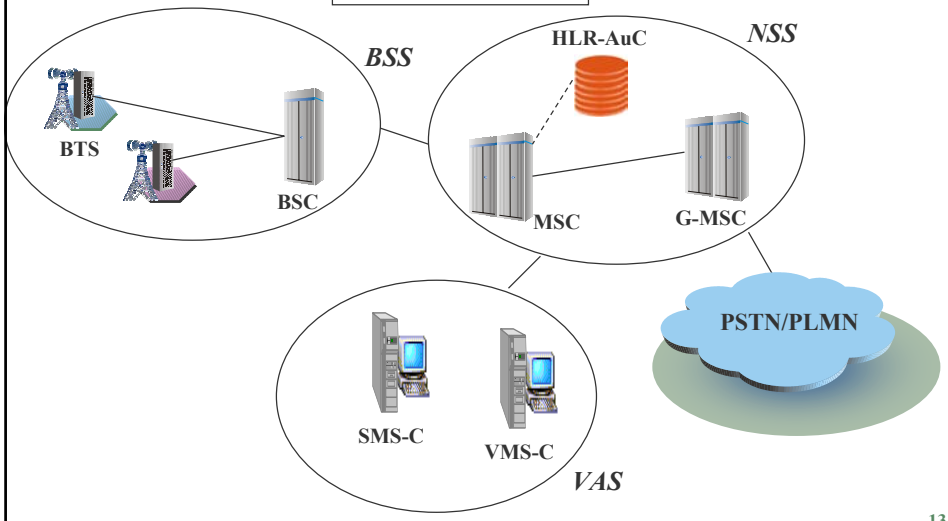
Network infrastructure evolution (1)

Early 2G



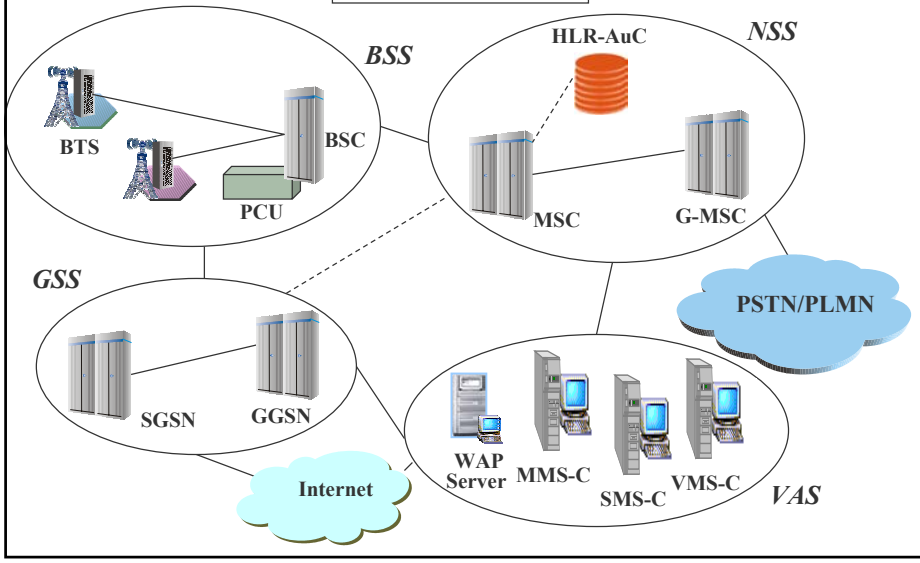
Network infrastructure evolution (2)

2G in 2000

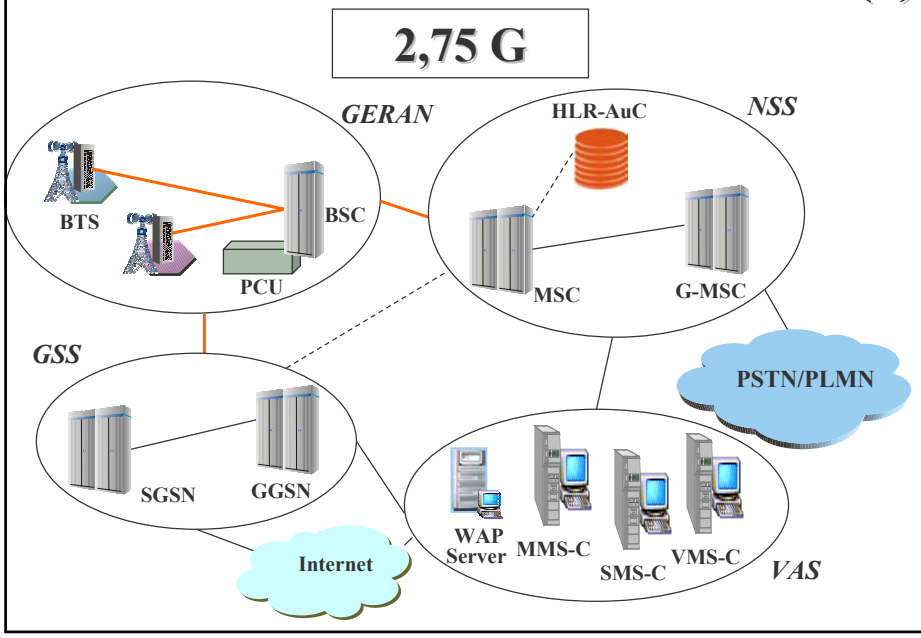


Network infrastructure evolution (3)

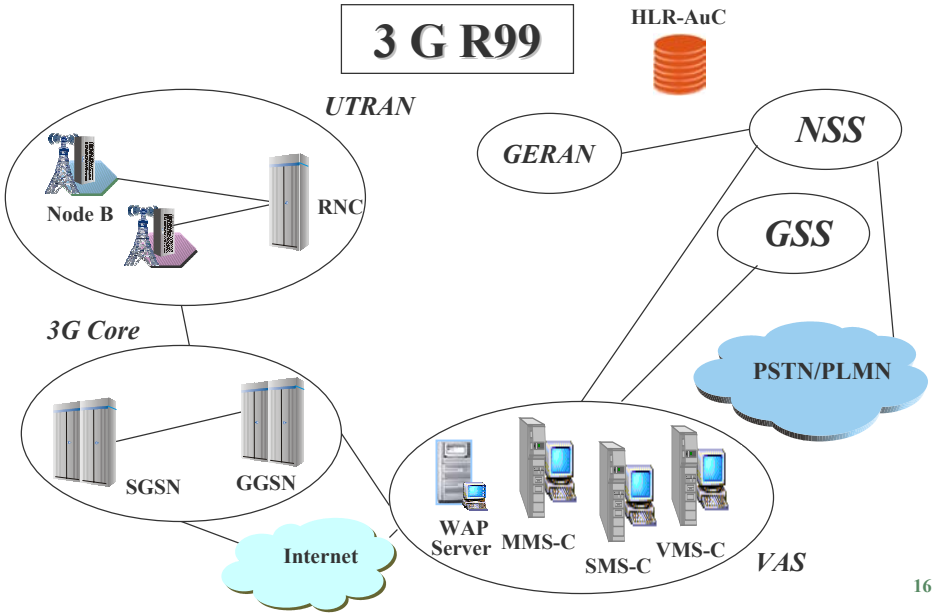
2,5 G



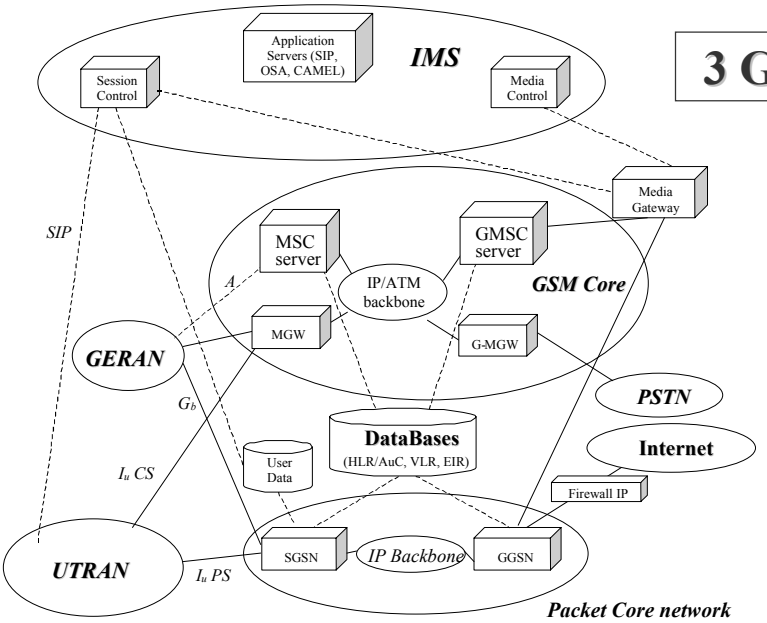
Network infrastructure evolution (4)



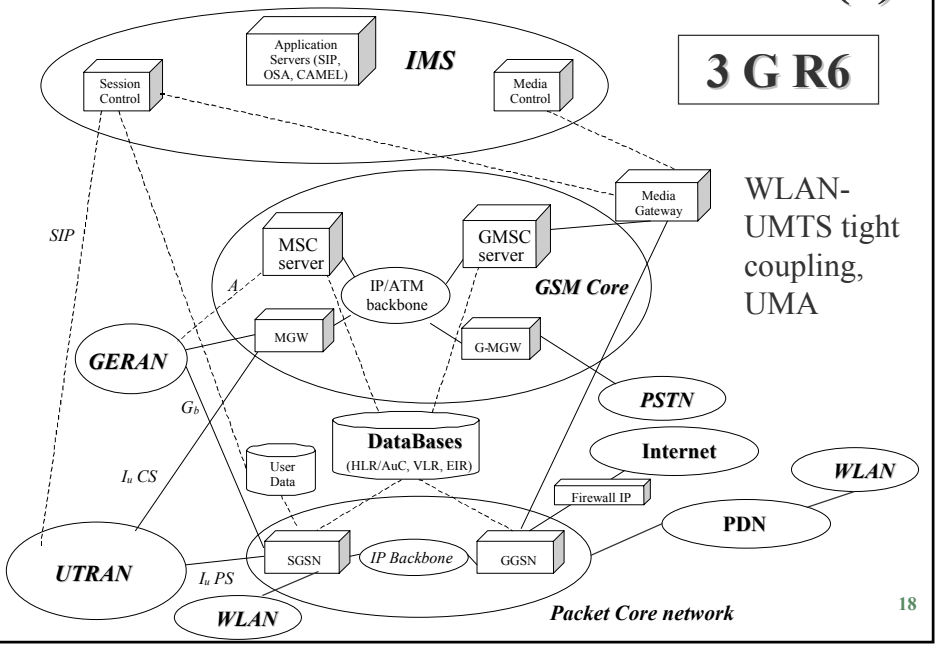
Network infrastructure evolution (5)



Network infrastructure evolution (6)



Network infrastructure evolution (7)



WLAN-UMTS tight coupling, UMA

Evolutions constraints

	HW	*SW*	*Skills*	*Updating costs*
2G to **2,5 G**	GSS	BSS	PS and IP	Medium
2,5 G to **2,75 G**	Minor	BSS	No	Low
2,75 G to **3G R99**	New	New	New	High
3G R99 to **3G R5**	IMS	IMS	IMS – NGN – SIP	Medium
3G R5 to **3G R6**	/	WLAN coupling	/	Low

2. Issues for migrating to IMT 2000

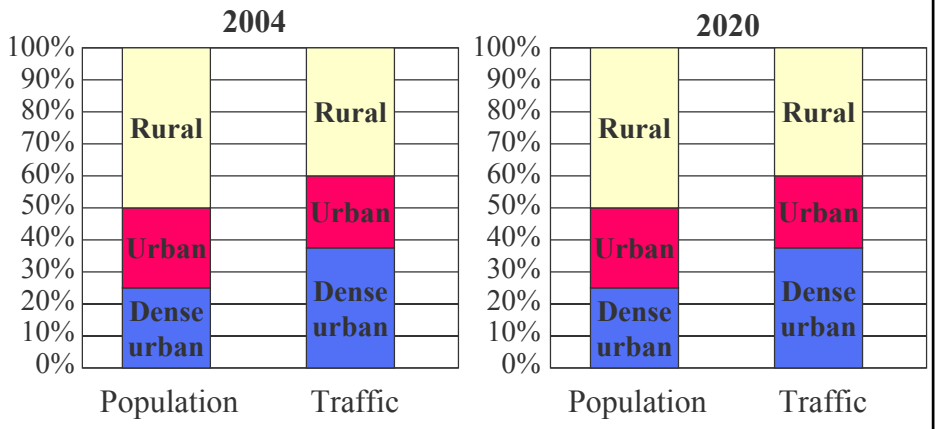
Why evolve to 3G ?

- New revenues (open the network to the Internet world, new services,
- Competition,
- Users demand,
- Ready for the future,
- Regulatory issues (cf. EC).

Users needs

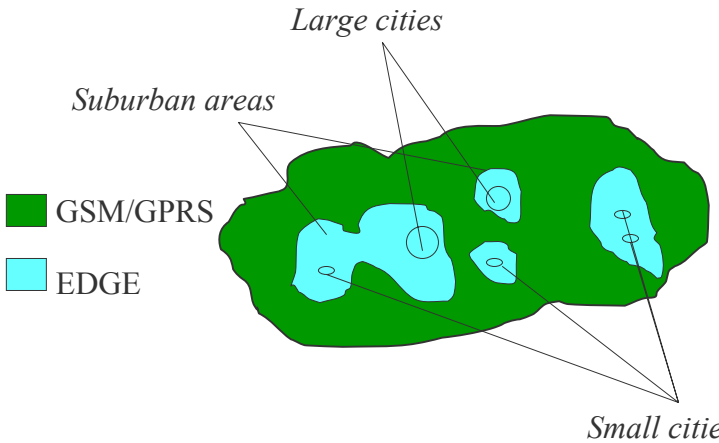
- Forecast demand / Observed demand,
- ***Voice*** = everyone, i.e. mass market (cf. GSM evolution),
- ***Data*** = mainly young people (cf. UMTS evolution).

Where to deploy 3G?



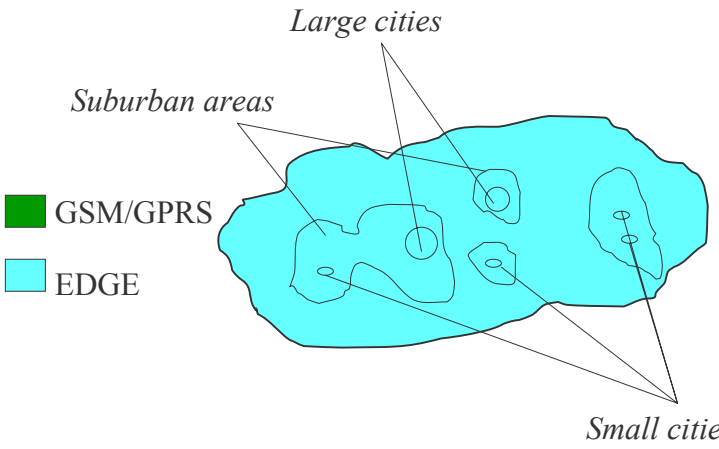
Example: migration from 2G to 3G (1)

Phase 1 = Dense trafic areas



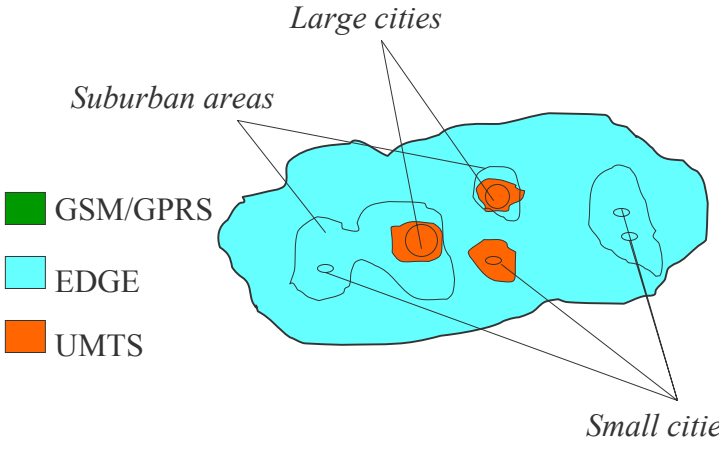
Example: migration from 2G to 3G (2)

Phase 2 = Complete coverage



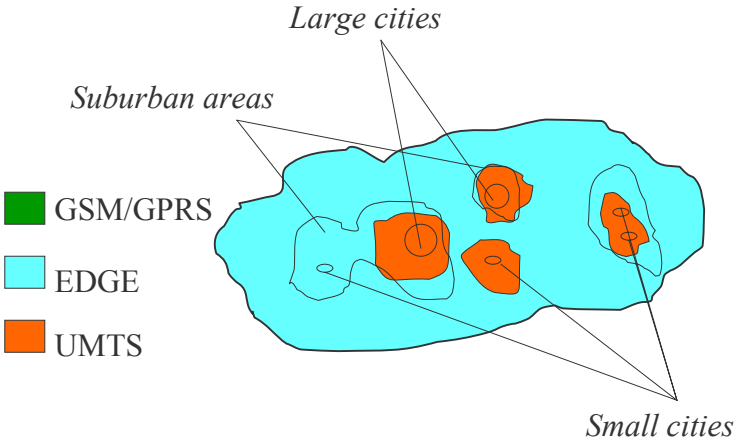
Example: migration from 2G to 3G (3)

Phase 3 = UMTS in very high traffic areas



Example: migration from 2G to 3G (4)

Phase 4 = Expand UMTS in high traffic areas



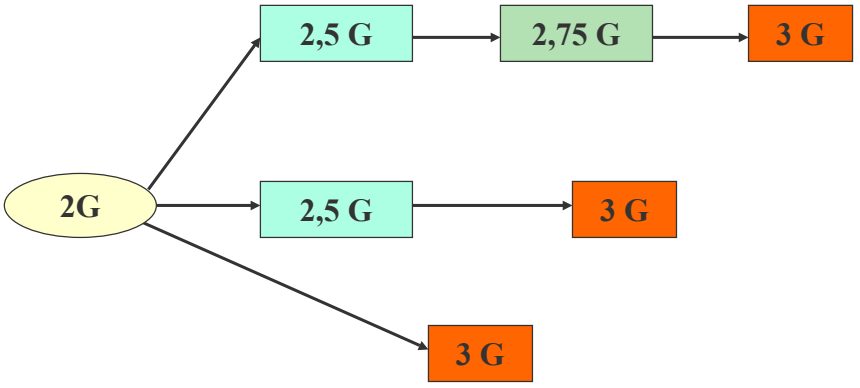
Combined coverage: WiFi indoor (cf. UMA and UMTS R6), EDGE and/or WiMAX in rural areas.

Terminal equipment base

- **Major barriers (/2G):**
- Cost,
- Availability,
- Performance,
- Renewing cycle,
- …

3. Evolution scenarii

Likely paths towards 3G



Which path for which operator?

- New entrant operator,
- Historical operator (fixe + mobile),
- New operator (fixe only).

$\Rightarrow$ Different costs of deploying a new network, different regulatory constraints, different subscriber base, …

Costs of GSM and UMTS

Estimated cost (in USD) of GSM and UMTS networks

(source: Gartner Dataquest)

	Cost per subscriber		*Percent change*	*GSM (%)*	*UMTS (%)*
	GSM	*UMTS*			
Core network	20,00	24,50	22,5%	10	7
Radio network	70,00	101,50	45,0%	35	29
Transmission links	40,00	80,50	101,3%	20	23
Maintenance	22,00	38,50	75,0%	11	11
Sales & marketing	16,00	35,00	118,8%	8	10
Customer care & billing	20,00	42,00	110,0%	10	12
IT management	12,00	28,00	133,3%	6	8
Total	200,00	350,00	75,0%	100	100

Capital and operating costs per subscriber (without terminals)

	GSM	GPRS	WCDMA
Capital costs			
Network only (radio + core + BCS)	$150	$170	$248,5
Average annual operating costs			
For a large, mature operator	$350	$364	$379
For a new entrant or poorly-run operator	$600	$624	$649
Total (first year)			
For a large, mature operator	$500	$534	$627,5
For a new entrant or poorly-run operator	$750	$794	$897,5

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Capital and operating costs per subscriber (with terminals)

	GSM	GPRS	WCDMA
Capital costs			
Network only (radio + core + BCS)	$150	$170	$248,5
Terminal	$50	$55	$300
Total	$200	$225	$548,5
Average annual operating costs			
For a large, mature operator	$350	$364	$379
For a new entrant or poorly-run operator	$600	$624	$649
Total (first year)			
For a large, mature operator	$550	$589	$817,5
For a new entrant or poorly-run operator	$800	$849	$1 187,5

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Comparison

- Without terminals provision, cost of introducing 3G: 20 to 25 %
- Subsidising the terminals: 48%
- With licence: ?

$\Rightarrow$ Mobile market maturity and competition are the key points for deciding about the strategy to be adopted.

Concluding remarks

- Choice of moving to 3G is complex.
- Today: many technologies and threats from new entrants.
- Different issue for a GSM/GPRS/EDGE operator and an IS-95 operator.
- Terminal base (massive 2,5G) is the first major constraint.
- Subscribers demand (basically SMS based services) is the other issue.