

# Networks: Overview

Manuel de Oliveira Duarte

# Networks are (almost) everywhere (1)

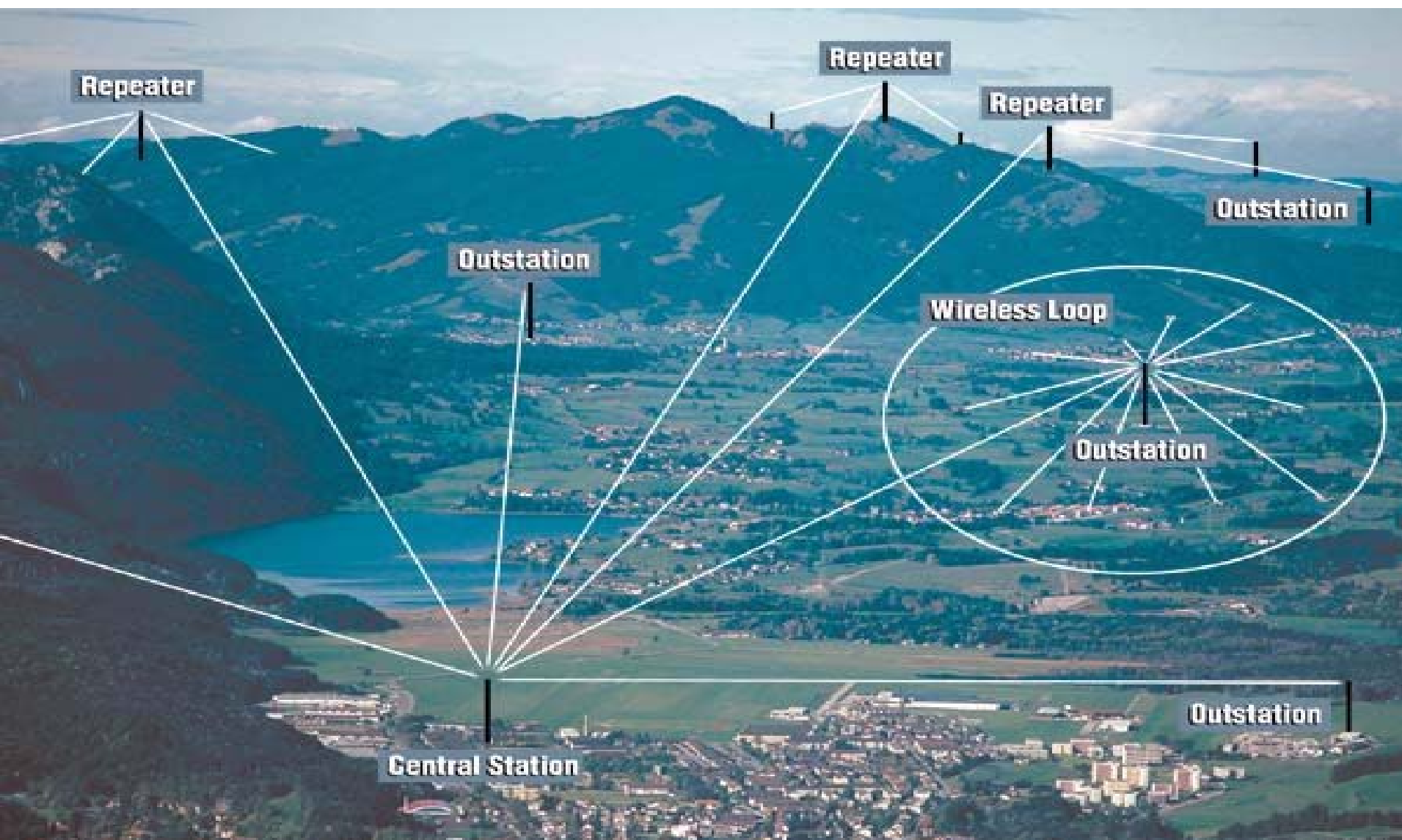


*E t h e r n e t , S D H - S O N E T , x W D M , e t c*

**ADSL, GPON, Wi-Fi, Wi-MAX, 3-4-5G, etc.**

Source: Google Earth + Publicly available images

# Networks are (almost) everywhere



Fonte: [www.motorola.com/gsm\\_outreach](http://www.motorola.com/gsm_outreach)



# Networks are (almost) everywhere



Source: author's photos (Seoul, 2008)



# Networks are (almost) everywhere



Source: author's photos (Asturias, 2002)



# Networks are (almost) everywhere...



...and make themselves visible in many different manners:



Source: author's photos (Viseu, 2002, Aveiro 2005, Ovar, 2013)



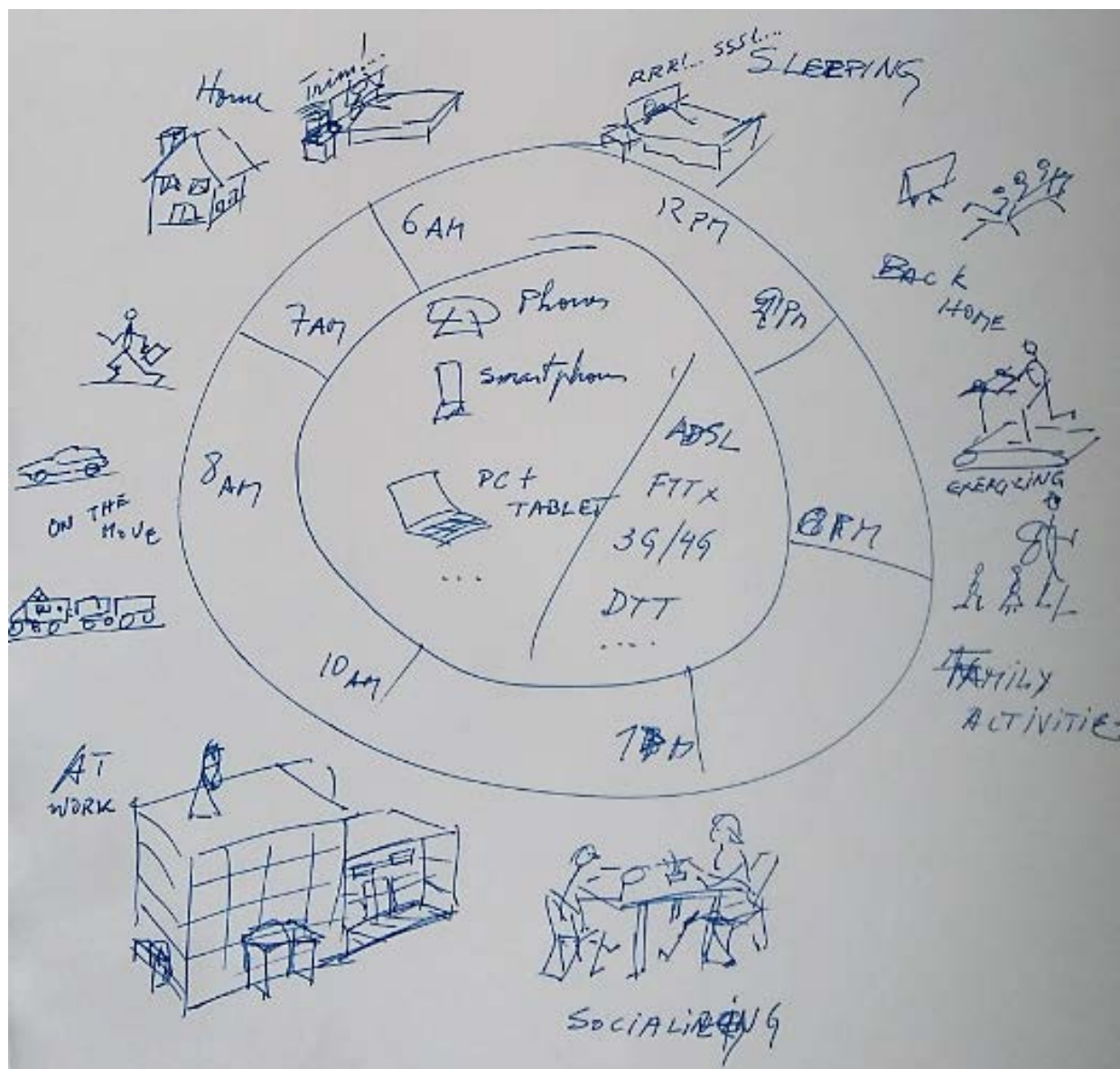
# Networks are (almost) everywhere...

Source: author's photos (Seoul, 2008)

- ...and make themselves visible in many different manners:



# Networks deliver services in many different life contexts:



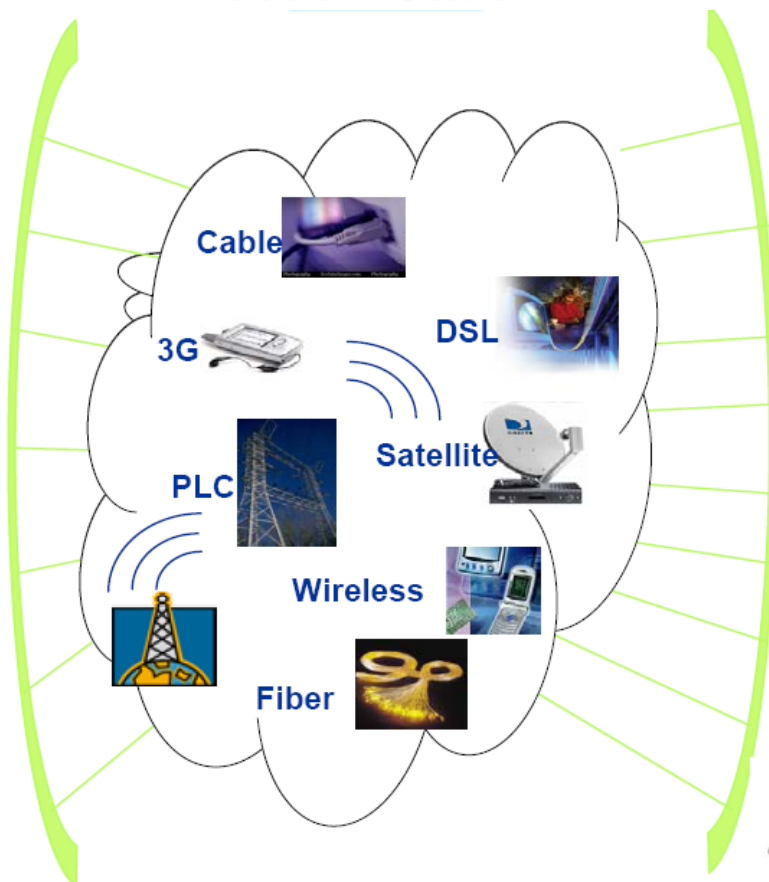


# Networks connect people through a large variety of devices:

## Access Terminal



## Access Network

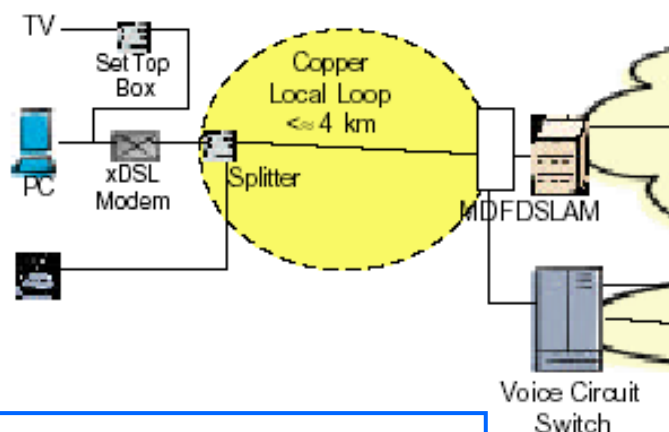


## Services and Applications

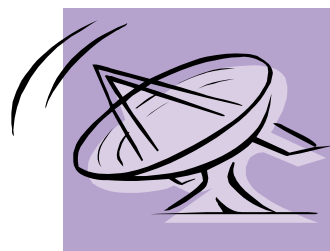


Fonte: <http://www.itu.int/osg/spu/presentations/2006/ponder-ngn-access-10-april-2006.ppt>

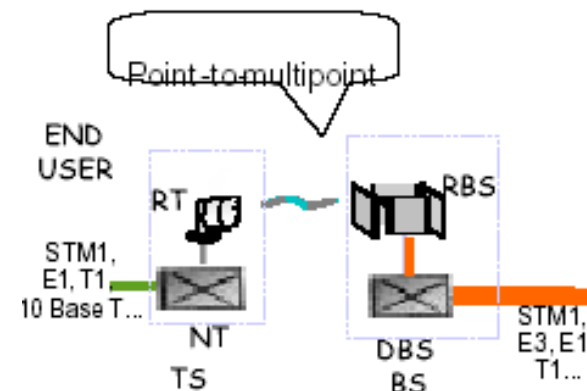
# Networks rely on various physical access technologies:



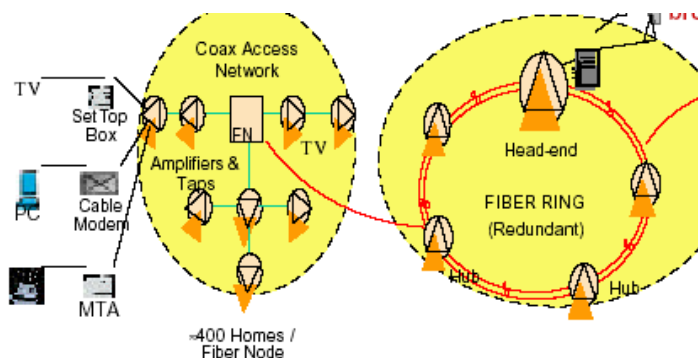
**xDSL (Copper)**



**Satellite (Space)**



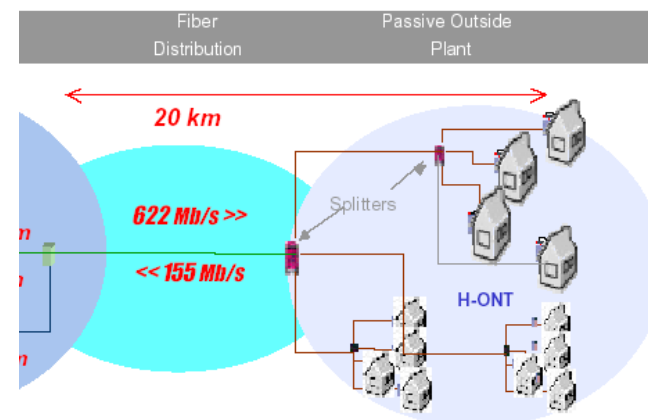
**Wireless (Space)**



**HFC – Hybrid Fibre Coax (Copper + fibre)**



**Power line (Copper)**



**FTTx (Optical Fibre)**

Fonte: ITU-D Forum, Chisinau, Moldova, 24 – 26 August 2009, Session 5\_IS - 10



# Networks influence, virtually, all types of human activity:

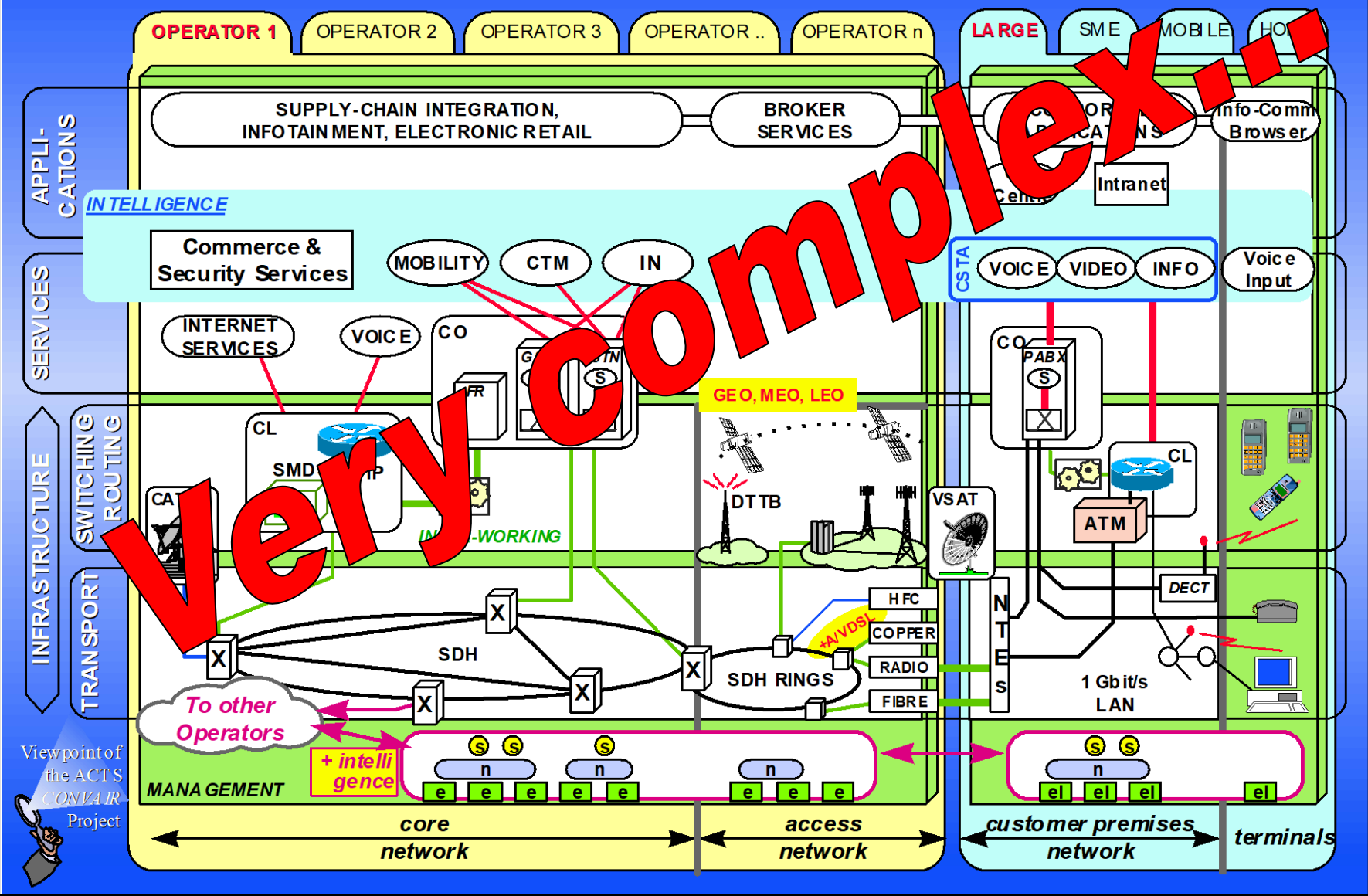
## ...such as:

- Banking
  - Administration and government
  - Commerce
  - Manufacturing
  - Health
  - Education
  - Transportation
  - Tourism
  - Culture and Entertainment
  - etc ...
- **Communication Networks and Services** are, currently, an essential part of social morphology.
  - Being **networked** has a strong influence in a large variety of situations and forms of life.





Networks are complex structures:



**Networks are so important that they even deserve celebrations in some countries:**



Source:

[https://commons.wikimedia.org/wiki/Category:Republic\\_Day\\_parade\\_2004\\_\(India\)#/media/File:The\\_tableau\\_from\\_Department\\_of\\_Telecommunications\\_titled\\_%22Telecom-life\\_Line\\_of\\_India%22\\_projecting\\_mobile\\_revolution\\_presently\\_encompassing\\_India,\\_passing\\_through\\_Rajpath\\_on\\_the\\_occasion\\_of\\_55th\\_Republic\\_Day\\_Parade-2004.jpg](https://commons.wikimedia.org/wiki/Category:Republic_Day_parade_2004_(India)#/media/File:The_tableau_from_Department_of_Telecommunications_titled_%22Telecom-life_Line_of_India%22_projecting_mobile_revolution_presently_encompassing_India,_passing_through_Rajpath_on_the_occasion_of_55th_Republic_Day_Parade-2004.jpg)



# End ...

**duarte@ua.pt**