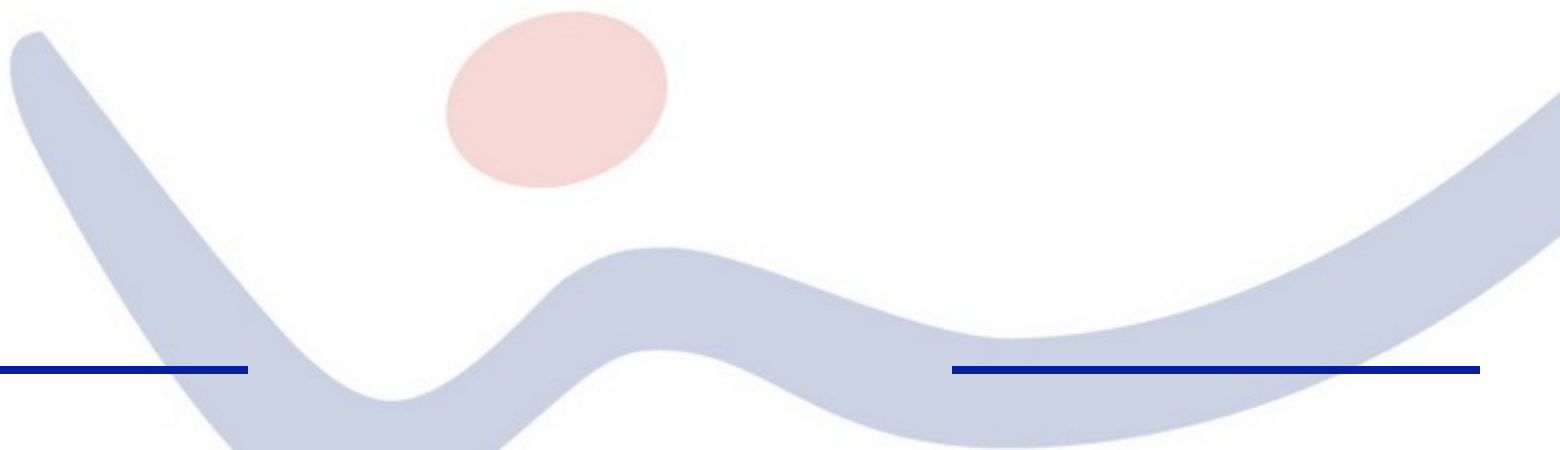


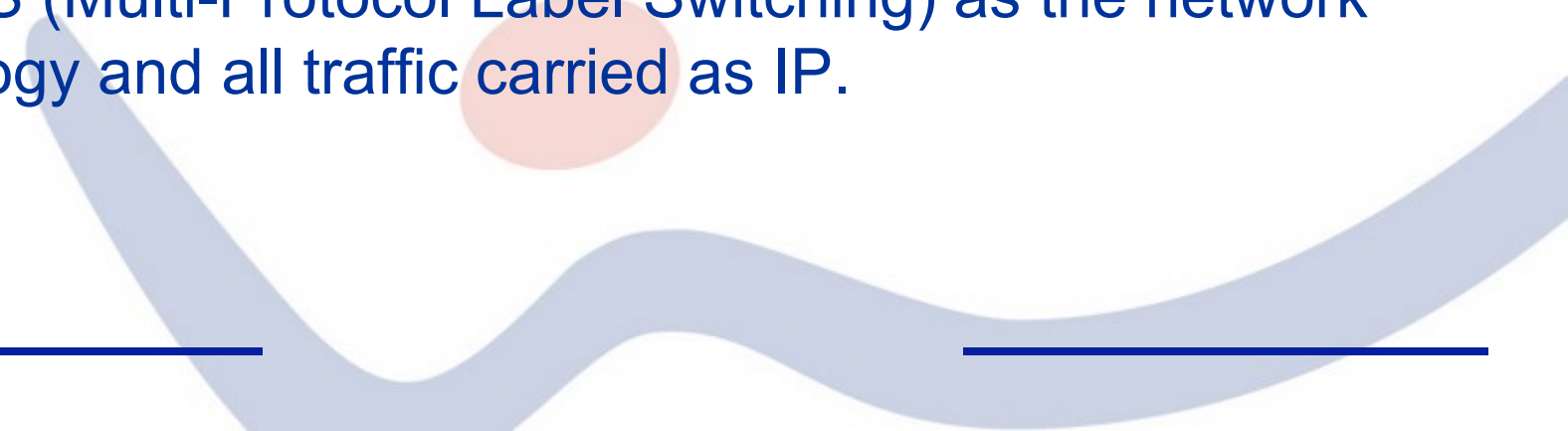
# **Evolution towards the NGN**

**Ermanno Berruto – WIND**

***ANFoV - Osservatorio NGN  
Milano, 13 giugno 2007***




It is generally recognized that, at least in the medium term, the IP network will become the “unified” transport layer for any kind of service or applications. This concept takes several names which change depending on the context (NGN, or Next Generation Network, all-IP network, multiservice backbone, etc.) but has one meaning: a single, converged fixed network capable of carrying voice, data, new services over the same physical network, with IP/MPLS (Multi-Protocol Label Switching) as the network technology and all traffic carried as IP.

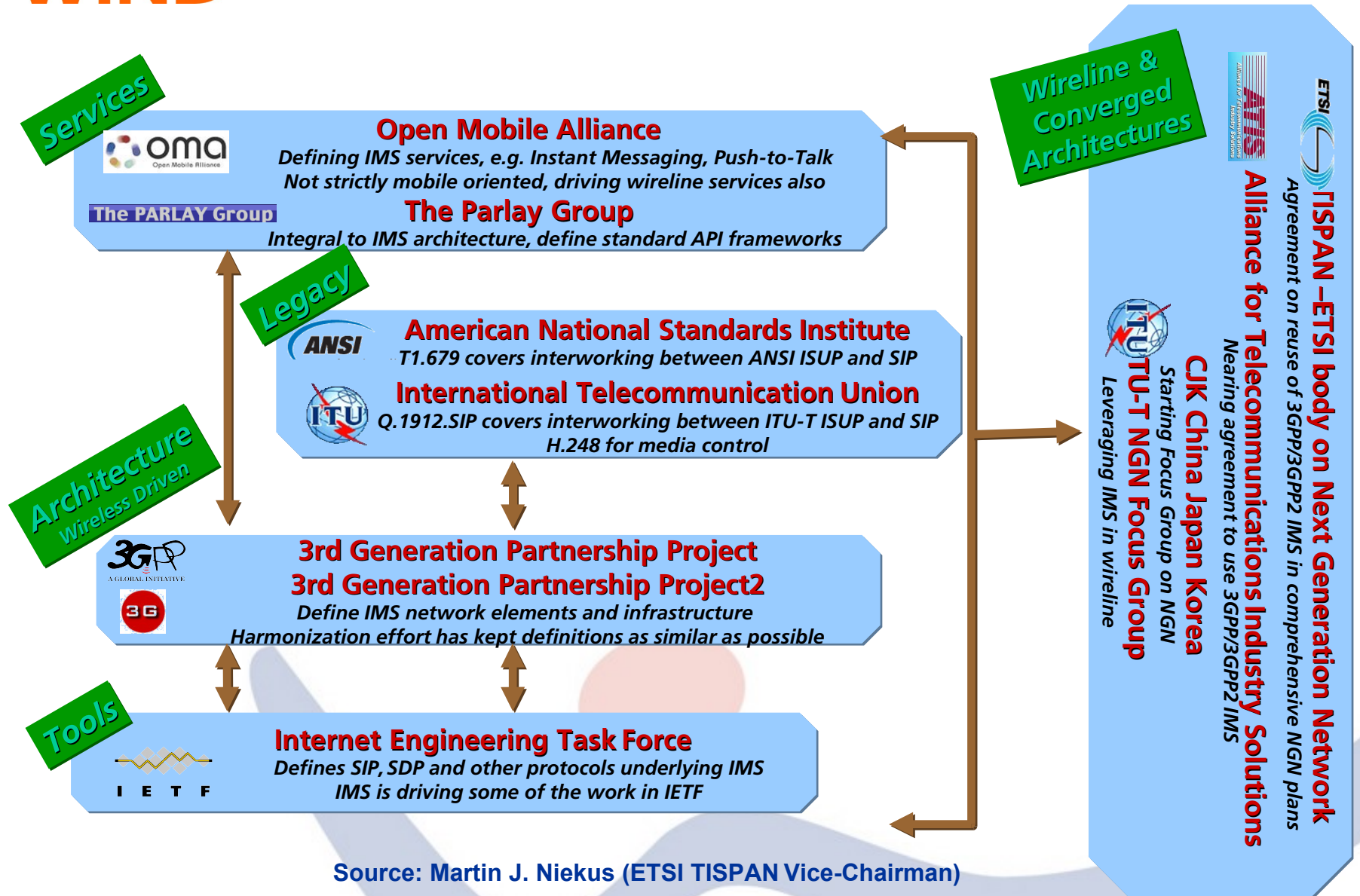
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## ITU-T Definition of a **Next Generation Network** (Y.2001)

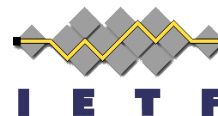
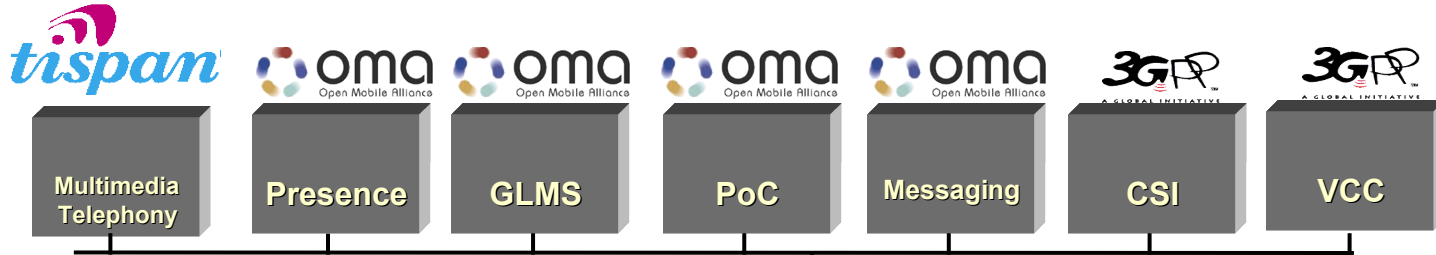
*Next Generation Network (NGN): a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users*

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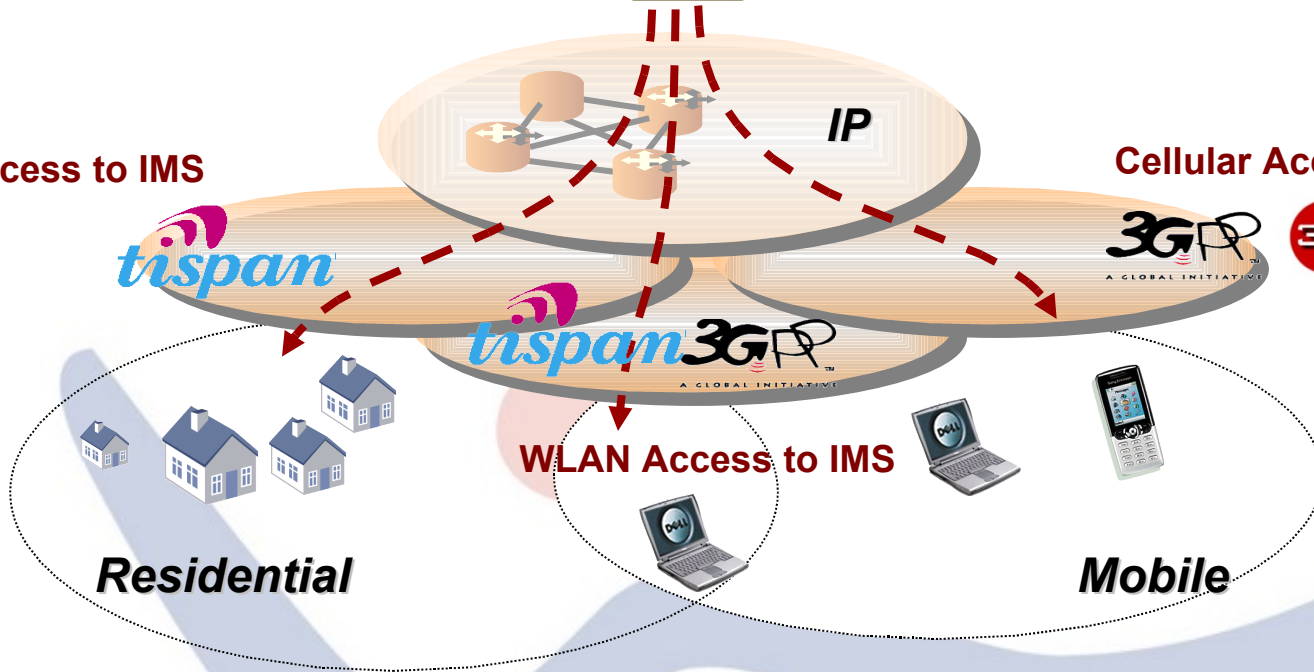


Source: Martin J. Niekus (ETSI TISPAN Vice-Chairman)



Wireline Access to IMS

Cellular Access to IMS



**Residential**

**Mobile**

**3G** 3RD GENERATION PARTNERSHIP PROJECT 2 "3GPP2"

- **Support of IP multimedia sessions with:**
    - unified handling of different media types, including VoIP, thus enabling peer-to-peer real-time services, such as voice and video over the PS domain
    - end to end QoS negotiation
  - **Flexibility in resource utilization**
    - mix of network and terminal based resources
    - scalable common service control – the ability to manage parallel user services
  - **Support of interworking with PSTN, ISDN and Internet**
  - **Support of access independence :**
    - operators should be able to offer services to users regardless of how they obtain an IP connection (e.g. GPRS, UMTS, xDSL, LAN).
  - **Open Interfaces: IP multimedia applications shall, as a principle, not be standardised, allowing operator specific variations**
    - enable rapid service creation and deployment using service capabilities for all user equipment (fixed/mobile) and all application servers
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The NGAN deployment is, from the technical point of view composed of the following options:

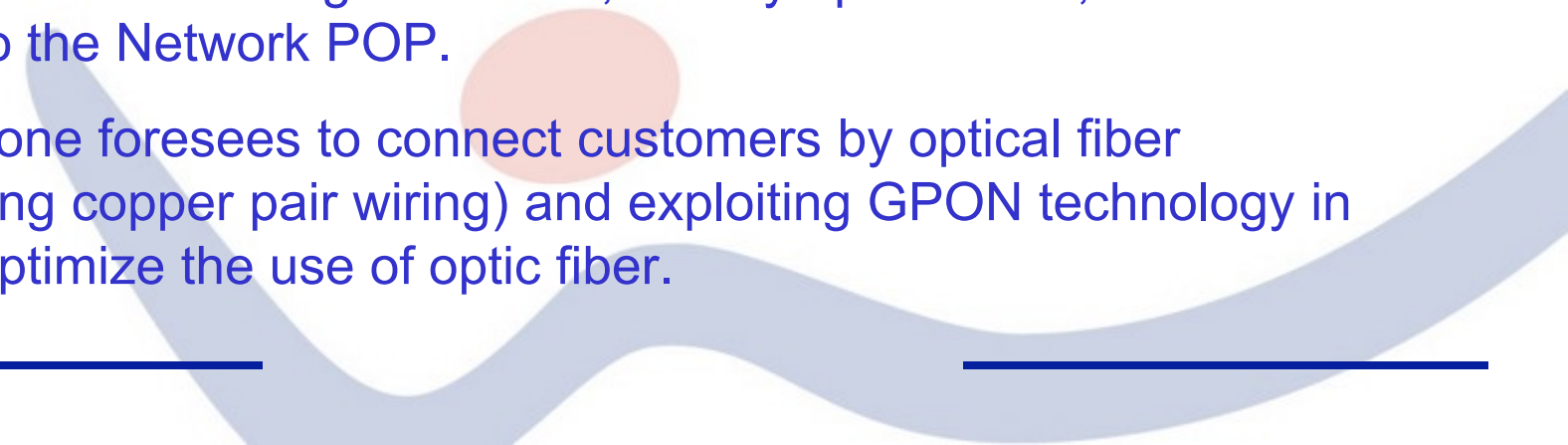
- FTTCab architecture based on VDSL2 technology
- FTTB architecture based on VDSL2 and GPON technologies
- FTTH architecture based on GPON technology

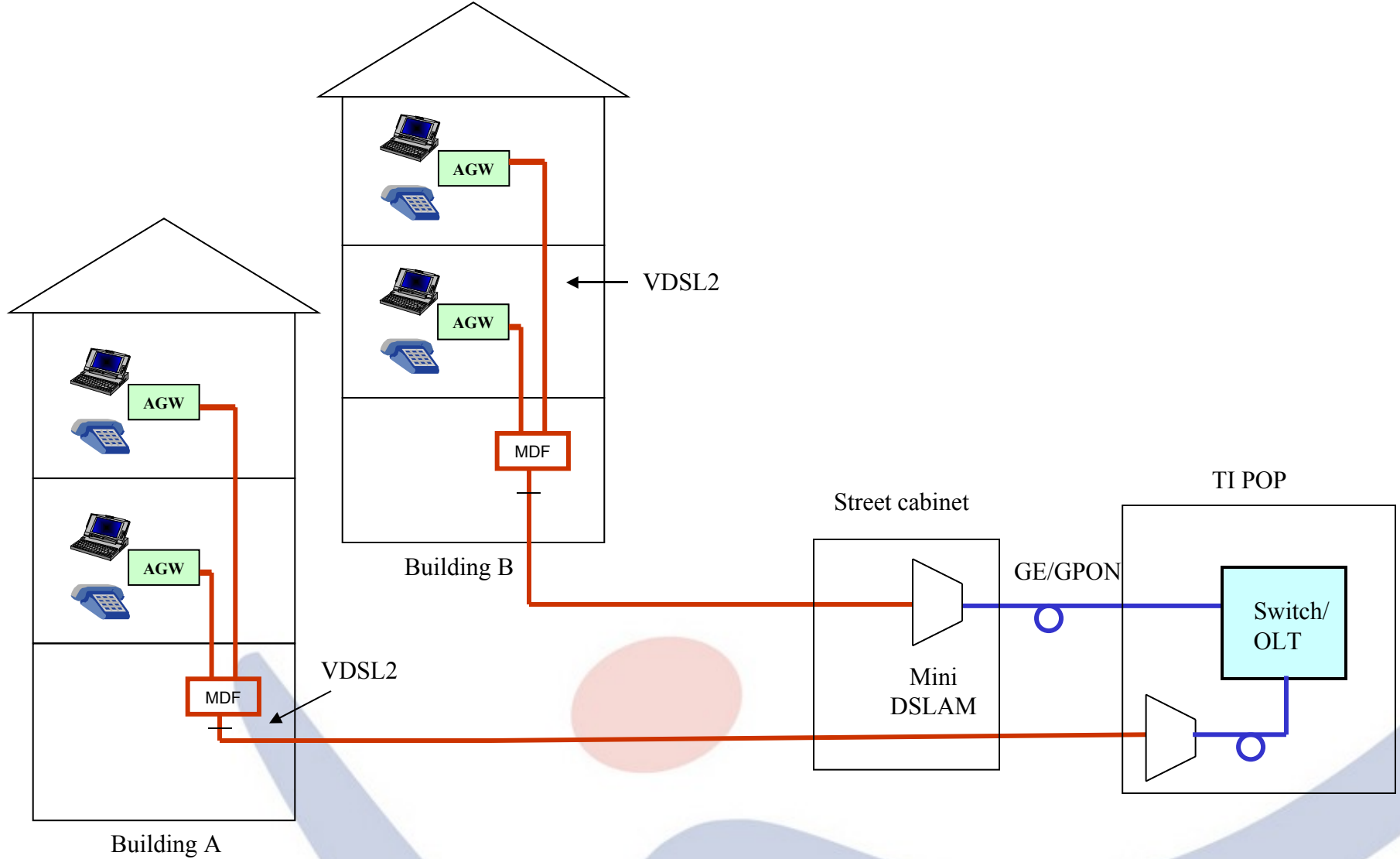
The first option foresees to connect customers by present copper pair, exploiting VDSL2 technology terminated by a DSLAM collocated either in a street cabinet or in Central Office (overlight option).

The second option foresees to connect customers by present copper in-house wiring, exploiting VDSL2 technology terminated by a DSLAM collocated in the building basement, and by optical fiber, from the building to the Network POP.

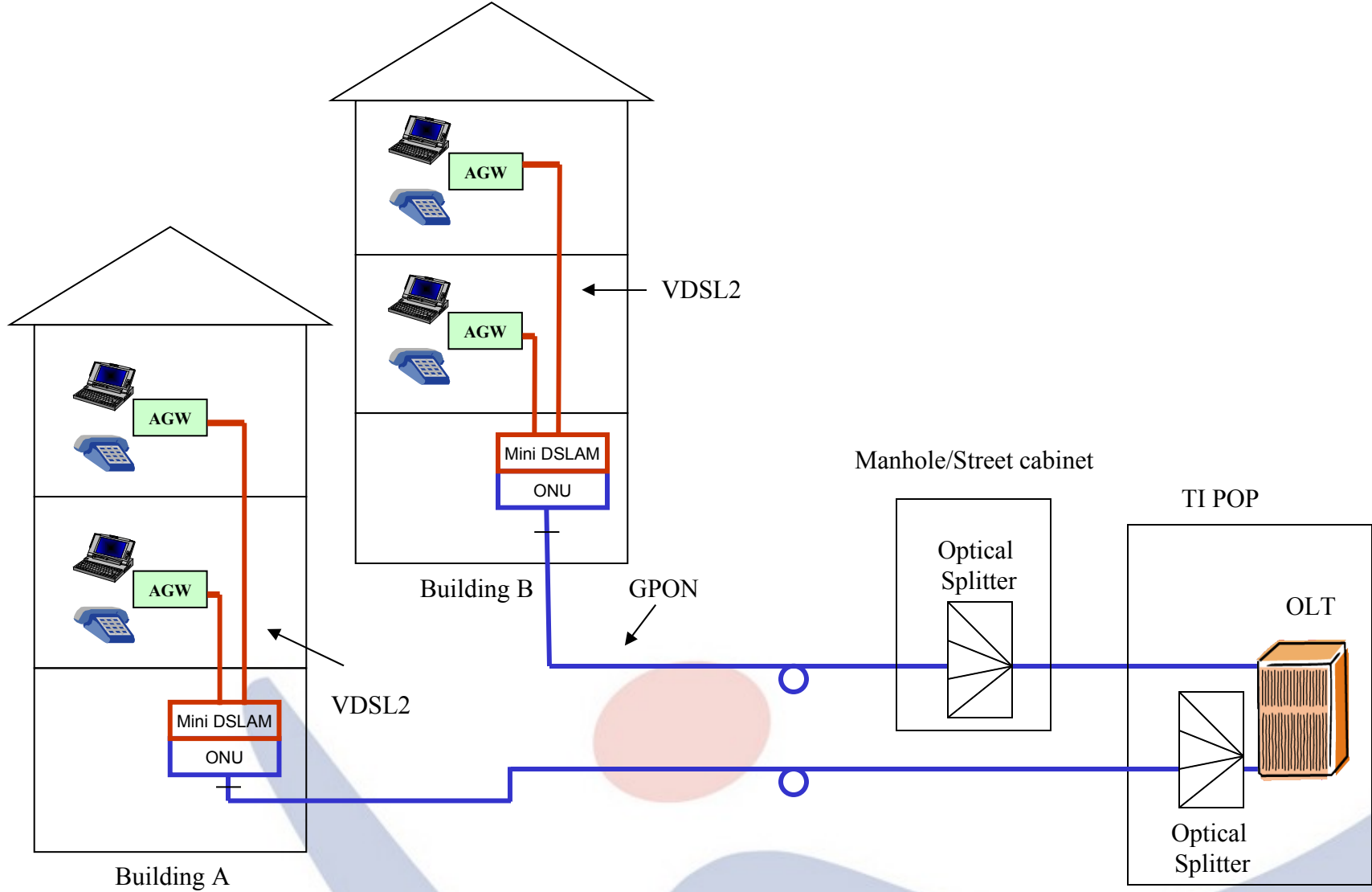
The third one foresees to connect customers by optical fiber (substituting copper pair wiring) and exploiting GPON technology in order to optimize the use of optic fiber.

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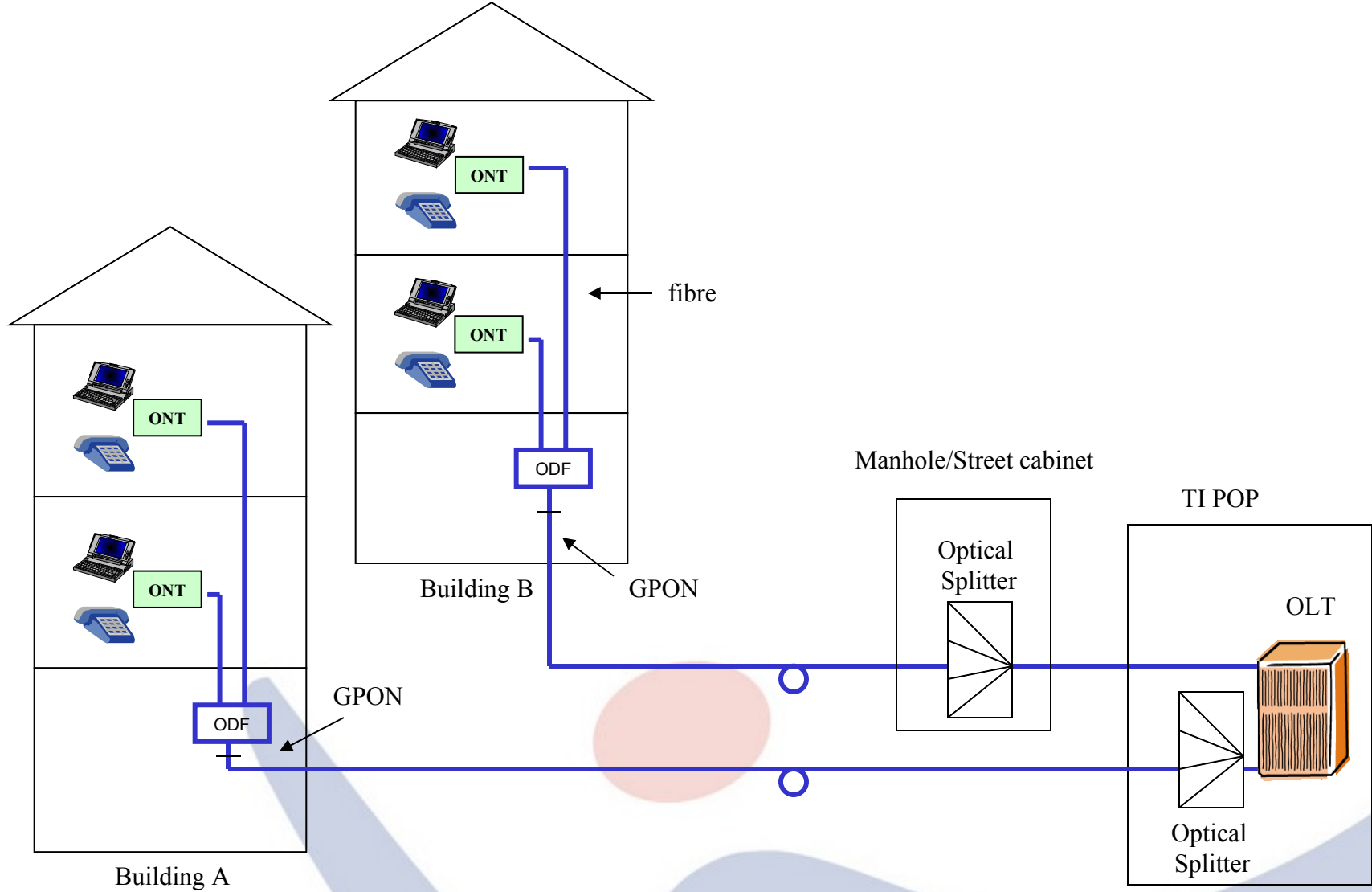
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- Implementing this scenario, the copper pairs between the Central Office and the Street Cabinet are no longer used, apart for tele-powering purposes, but the MDF in the Central Office must be maintained active in order to allow OLO keeping their LLU offers and then protecting their investments
- The current TI offer already includes the sub-loop unbundling, but two barriers can be identified in the development of an FTTCab scenario:
  - colocation at the street cabinet is not yet foreseen (impacting factors: costs, timing, permits, space, power supply, security/privacy)
    - access to TI street cabinet to colocate mini-DSLAM
    - expansion of the TI street cabinet
    - OLO cabinet installed near to TI street cabinet
  - backhauling from the Street Cabinet to the OLO Network (impacting factors: costs, timing, permits)
    - dark fiber offer
    - duct sharing
    - IRU offers for capacity/lambda



- Implementing this scenario, the copper pairs between the Central Office and the Building are no longer used, but the MDF in the Central Office must be maintained active in order to allow OLO keeping their LLU offers and then protecting their investments
- Three barriers can be identified in the development of an FTTB scenario:
  - “vertical” barrier: in-house wiring to be used (impacting factors: costs, timing, permits, space)
    - property rights of the in-house copper wiring
    - specific offers for unbundling
  - colocation at the basement of the building (impacting factors: costs, timing, permits, space)
  - backhauling from the Building to the OLO Network (impacting factors: costs, timing, permits)
    - dark fiber offer
    - duct sharing
    - IRU offers for capacity/lambda



- Implementing this scenario, the entire copper pairs between the Central Office and the Customer are no longer used, but the MDF in the Central Office must be maintained active in order to allow OLO keeping their LLU offers and then protecting their investments
  - Three barriers can be identified in the development of an FTTH scenario:
    - “vertical” barrier: in-house wiring to be deployed (impacting factors: costs, timing, permits, space)
      - rules for the deployment of in-house wiring
      - specific offers
    - unbundling at the last optical splitter, without colocation (impacting factors: costs, timing, permits)
    - backhauling from the Customer/last optical splitter to the OLO Network (impacting factors: costs, timing, permits)
      - dark fiber offer
      - duct sharing
      - IRU offers for capacity/lambda
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- Differences in geographical areas, where evolution could be driven by either market or incentive or policy, will lead to a different penetration of optical fiber and then to a different deployment of the presented solutions: in general FTTCab, FTTB and FTTH can be seen not as alternative but as complementary solutions. Therefore regulations should cater for all solutions in an hybrid scenario.
  - Investments already spent in the current LLU solution must be preserved, even when evolving towards NGAN solutions.
  - Possible bitstream offers, based on the presented scenarios, must be differentiated, taking into account the level of infrastructure of OLOs.
  - Considering the high investments needed and the technical constraints to replicate NGAN solutions, regulations must avoid the establishment of a monopoly in the access network.
  - Considering the timing of the introduction of NGAN solutions, regulations must be established as soon as possible, avoiding any “regulations holidays”.
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