Interaction betwen infrastructure development and new applications

Khaouja Ahmed,

WWW.LTE.MA

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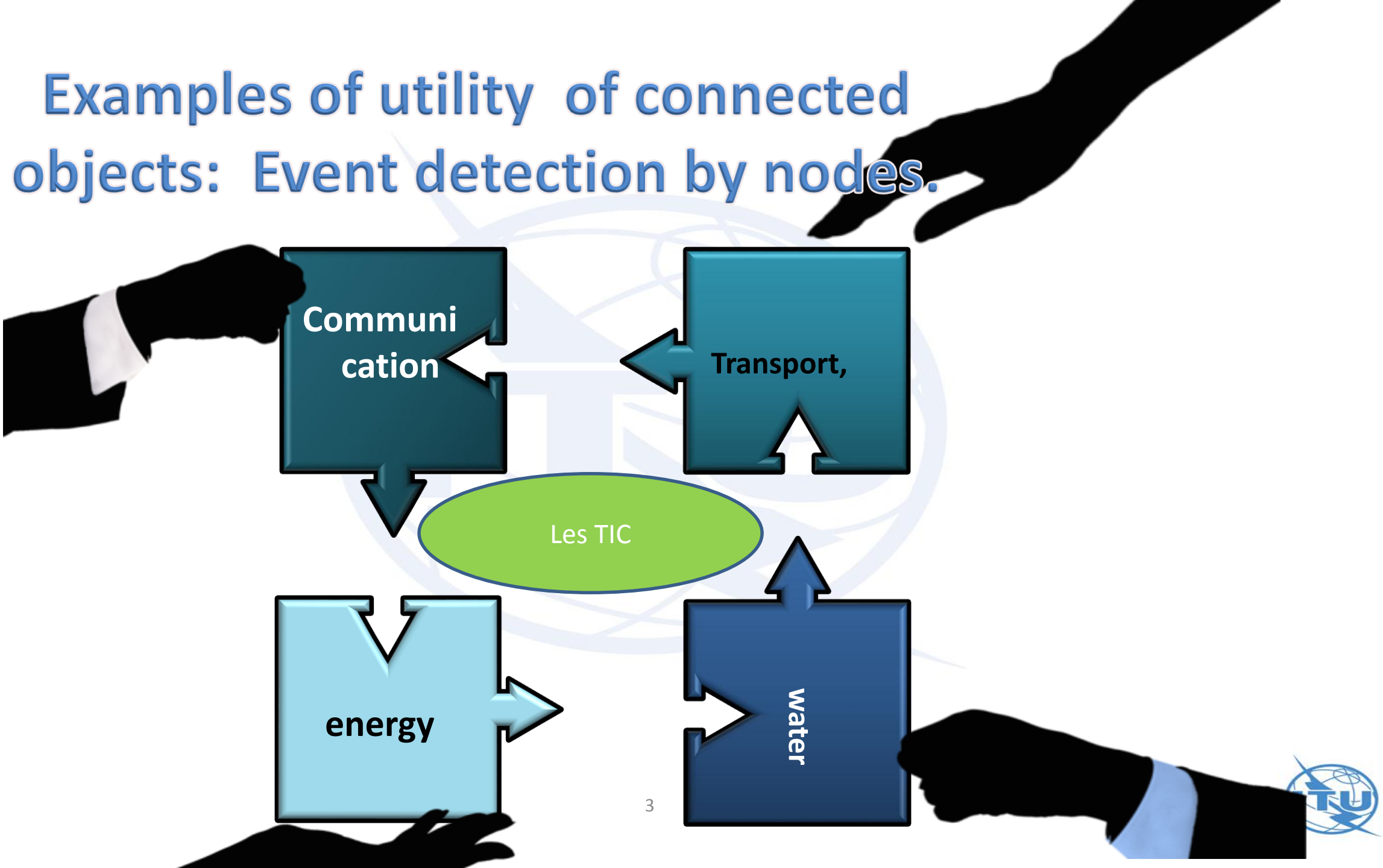
Plan

- Introduction
- Connected Objects
- The Cloud
- The SDN, internal cloud
- The IMS
- The Big Data
- Conclusion

Examples of utility of connected objects: Event detection by nodes.



Example of usefulness of connected objects: The different sensors in a smart city

Example of utility of connected objects : cars

Internet of objects: Examples of difficulties:

- Standardization,
- interoperability ..
- Accessibility and permanent connexion
- Energy autonomy
- Security and data Protection
- Frequency availability

Which operators for the IoT.

- For Sigfox, one of the international leaders of IOT currently: We need other types of networks for IOT

because conventional networks have been designed for humans and not for objects.

- Sigfox is present in 11 countries including the USA.

The Sollicon Valley network was largely carried out by Sigfox

- For the conventional operators and the 3GPP , IOTs does not need other operators types for the IOT: this is continuity.

Does the publication of the document that governs the Narrow Band IoT standard(LTE M1 and M2) by 3GPP is a declaration of war to Sigfox and LoRa ?

- The advantage of this standard is that it is based on established networks, such as those of 4G whith using low bandwidth.
- Some manufacturers of smartphones and equipment manufacturers have brought their support to develop A compatible equipment with Narrow Band IoT.
- The use of LTE-M by industry and operators directly competes with companies such as Sigfox and LoRa.

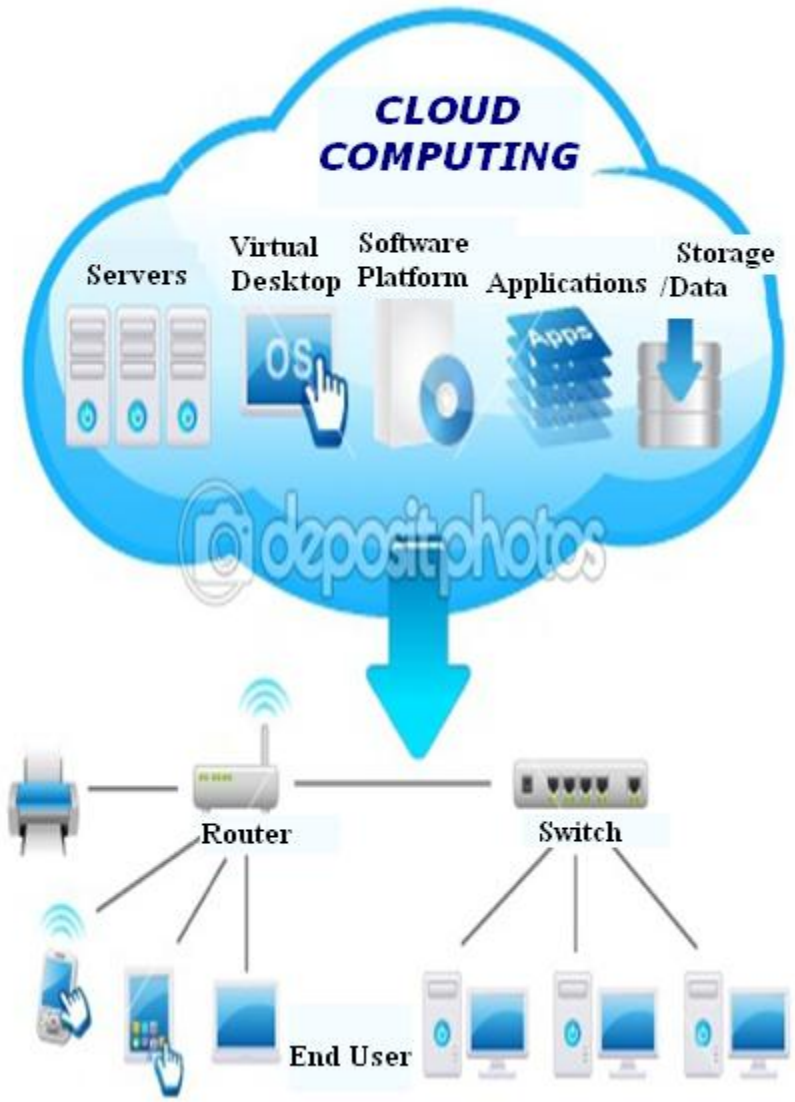
Source: Le Mag, Rennes France

	SIGFOX	LoRa	Clean Slate	NB LTE-M Rel.13	LTE-M Rel.12/13	EC-GSM Rel.13	5G (targets)
	SIGFOX	Lora	CloT	LTE	LTE	GSM	5G
Range (outdoor) MCL	<13km 160 d8	<11km 157 dB	<15km 164 dB	<15km 164 dB	<11km 156 dB	<15km 164 dB	<15km 164 dB
Spectrum Bandwidth	Unlicensed 900MHz 100Hz	Unlicensed 900MHz <500kHz	Licensed 7-900MHz 200kHz or dedicated	Licensed 7-900MHz 200kHz or shared	Licensed 7-900MHz 1.4 MHz or shared	Licensed 8-900MHz 2.4 MHz or shared	Licensed 7-900MHz shared
Data rate	<100bps	<10 kbps	<50kbps	<150kbps	<1 Mbps	10kbps	<1 Mbps
Battery life	>10 years	>10 years	>10 years	>10 years	>10 years	>10 years	>10 years
Availability	2014	2014	2016	2016	2016	2016	Beyond 2020

Definition of Cloud

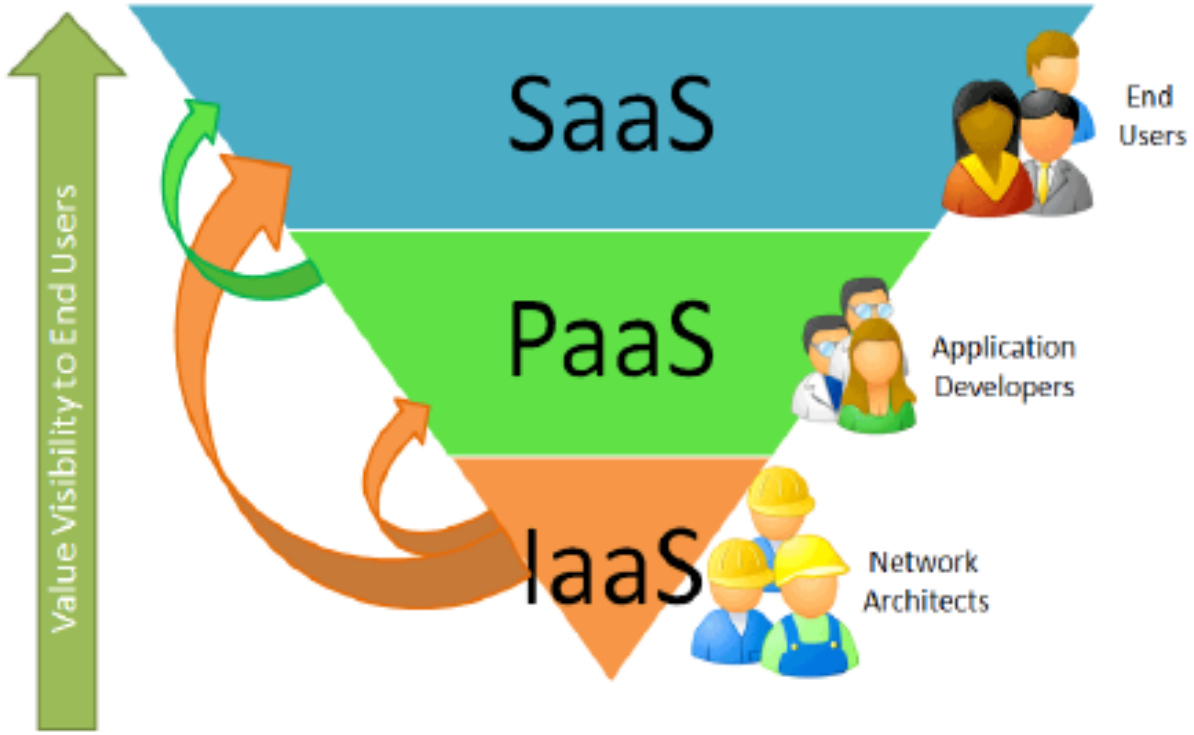
Definition of cloud

- Cloud Computing relies on a virtual space, "the cloud", which gathers standardized computing resources
- The cloud is a computer offering that allows a company or a remote individual: (1) hosting, (2) running applications or services, and (3) to store data.
- These resources are delivered on demand, via the Internet and the user pays only what he uses.



Cloud Types

- The Cloud essentially offers 3 layers:



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The global cloud services market grew by 16.5 percent in 2016, by Gartner. The 2017 turnover expected it to be $ 204 billion in 2017.

Standardization of the cloud

Since its advent in 1999, the cloud has developed almost without standards. But recently ITU and ISO have adopted standardization in this area. Consisting of 3 standards:

-ISO:17788, -
-ISO:17789,ISO:27018 and ISO:19086.

These standards set the security rules to be applied to public cloud providers to ensure the protection of personal data, to ensure transparency and to comply with their regulatory obligations.

Positioning of telecom operators in the cloud market

- Telecom operators can still position themselves to offer cloud services to individuals and businesses.

- Telecom operators can use the cloud internally to better optimize their investments within the framework of the Software Defined Network (SDN) architecture.

SDN architecture (Software Defined Network)

- The SDN was developed by the Open Networking Foundation (ONF). it become operational since 2011.
- It aims to decouple the data plane part of the control plane part in the telecoms networks .
- The SDN leaves only the routing of the packets to the routers. Intelligent control functions such as priority assignment or routing decisions will be decided in a controller common to several devices.

SDN

- Several experts indicate that the majority of mobile telecommunications operators are thinking of introducing connectivity solutions based on the SDN over the next three years.

- The global market for the League of Nations, which amounted to 816 million euros in 2014, is estimated at 7 billion euros in 2019.

SDN (Software Defined Network)

- In an SDN-free network, for example, more bandwidth may be offered during the day (or overnight) to a company as needed. Thus the SDN allows the automation of these configurations in a centralized controller without intervention on each router.

What is Big Data?

Literally, designate Voluminous datasets, it is challenging to process them with conventional management data base tools.

After their storage and processing, by powerful mathematical algorithms, the products resulting from the analyzes of these data can detect very deeply hidden behaviors

The theme of World Telecommunication and Information Society Day in 2017 is "Mega-data for a mega-impact".

Big Data Market

- The analyst firm "Open Source Wikibon", estimates that the Big Data market would amount to $ 53.4 billion in 2017.

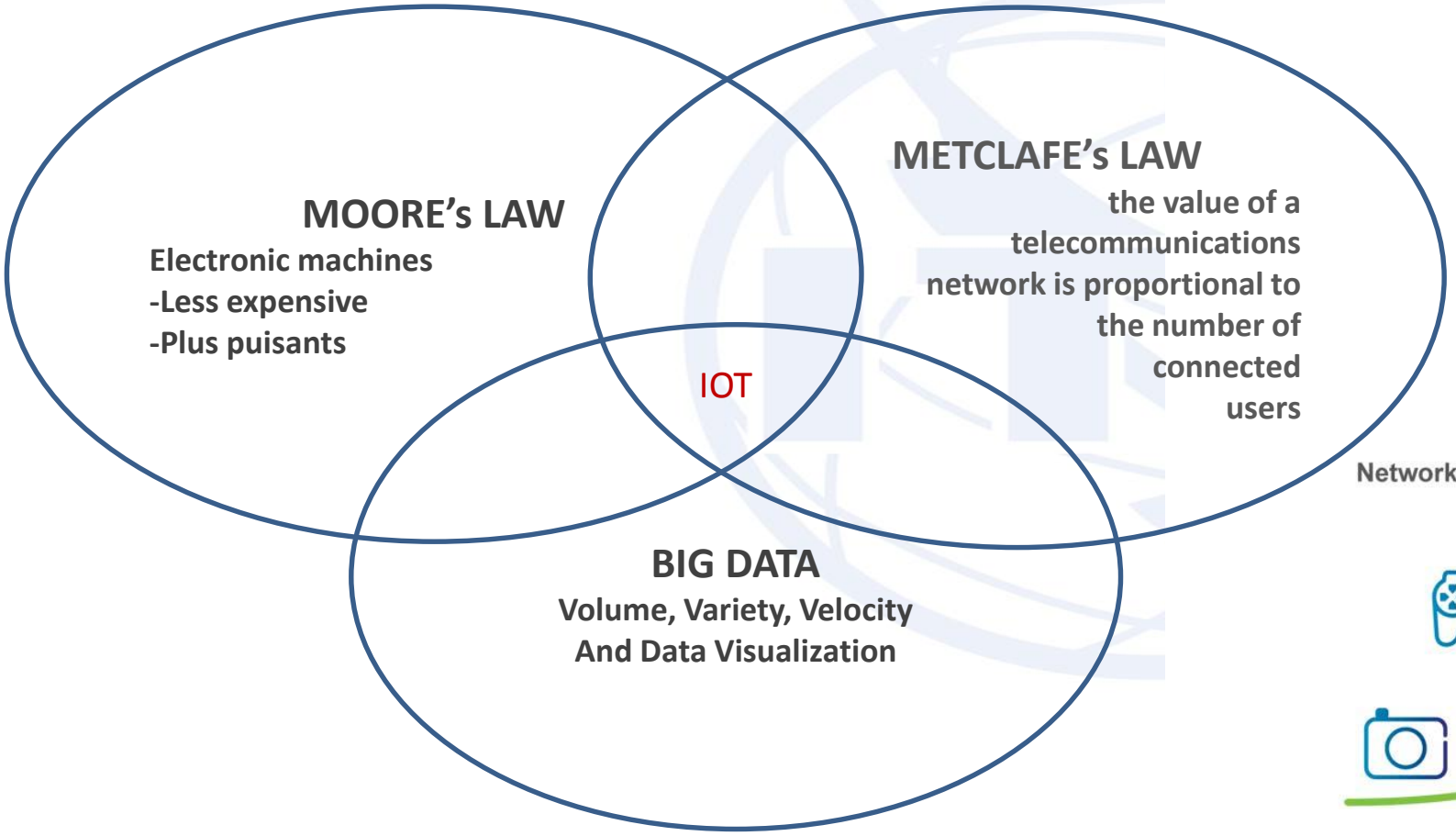
- In Europe, Big Data should also account for 8% of European GDP in 2020, according to the French Association of Software Publishers and Internet Solutions (AFDEL).

- In Europe, the European Commission and European private companies, specialized in the field of data, have pledged to invest 2.5 billion euros in a public-private partnership (PPP) Europe leading the world race in Big Data by 2020

Positioning telecom operators on Big Data

Through the integration of Big Data applications with the SDN, telecom operators will have the possibility to offer premium customers services automatically according to their profitability, given by the Big Data algorithms.

Interaction between Big data and Internet of objects



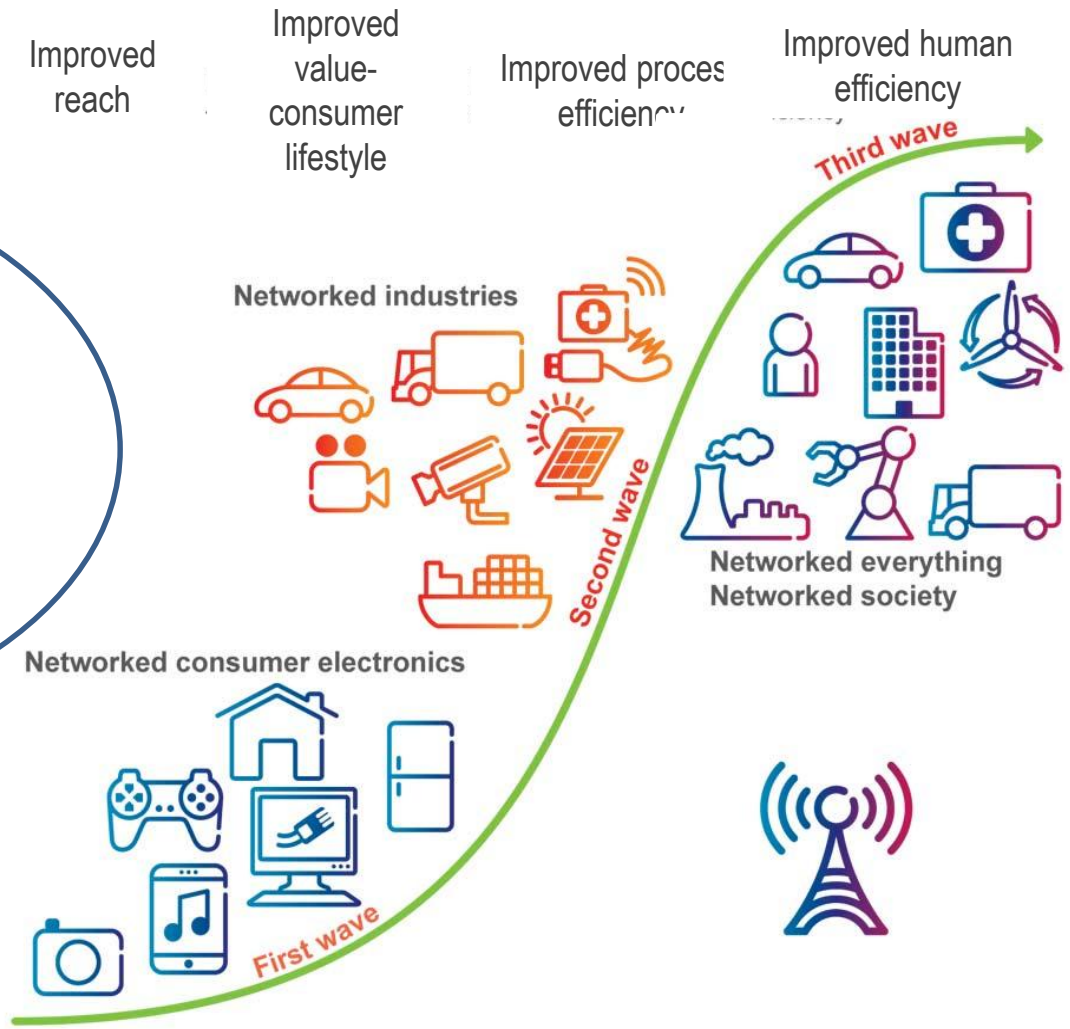
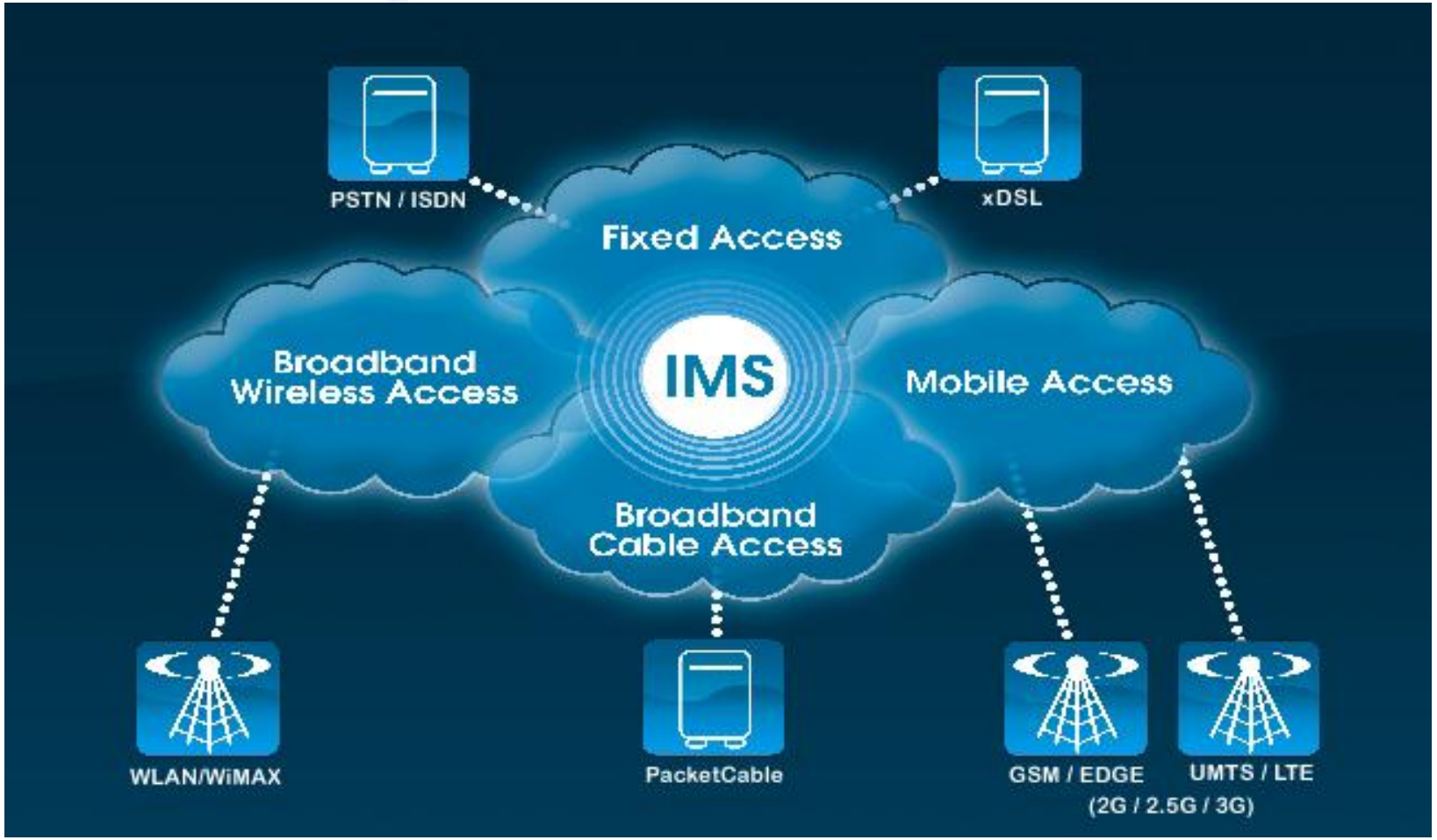


Figure:. The three waves of connected device devlopment

IMS Architecture



IMS (IP Multimedia Subsystem)

The IMS architecture, which has succeeded to NGN since 2007, adapts to the new needs of users by offering them multimedia services and the management of presence and convergence.
The IMS architecture is based on the SIP protocol (Session Initiation Protocol).
According to US firm ABI Research, global operators will invest up to $ 4 billion in 2017 to upgrade their 4G LTE networks in accordance with the IMS architecture, in order to introduce voice over LTE (VoLTE).

IMS

- The IMS introduces a new functionality for example : giving the possibility to control the session during its lifetime, and billing of the session. Ip Interconnection.

- IMS IN MOROCCO
  In Morocco the three operators are in the process of implementing IMS. At all levels and especially to install the VOLTE protocol so that the voice is possible in 4G networks

Conclusion: the Internet faces new challenges

- Explosion of bandwidth requirements faster than investments made!

- The rise of connected objects poses another risk to the networks that of piracy!

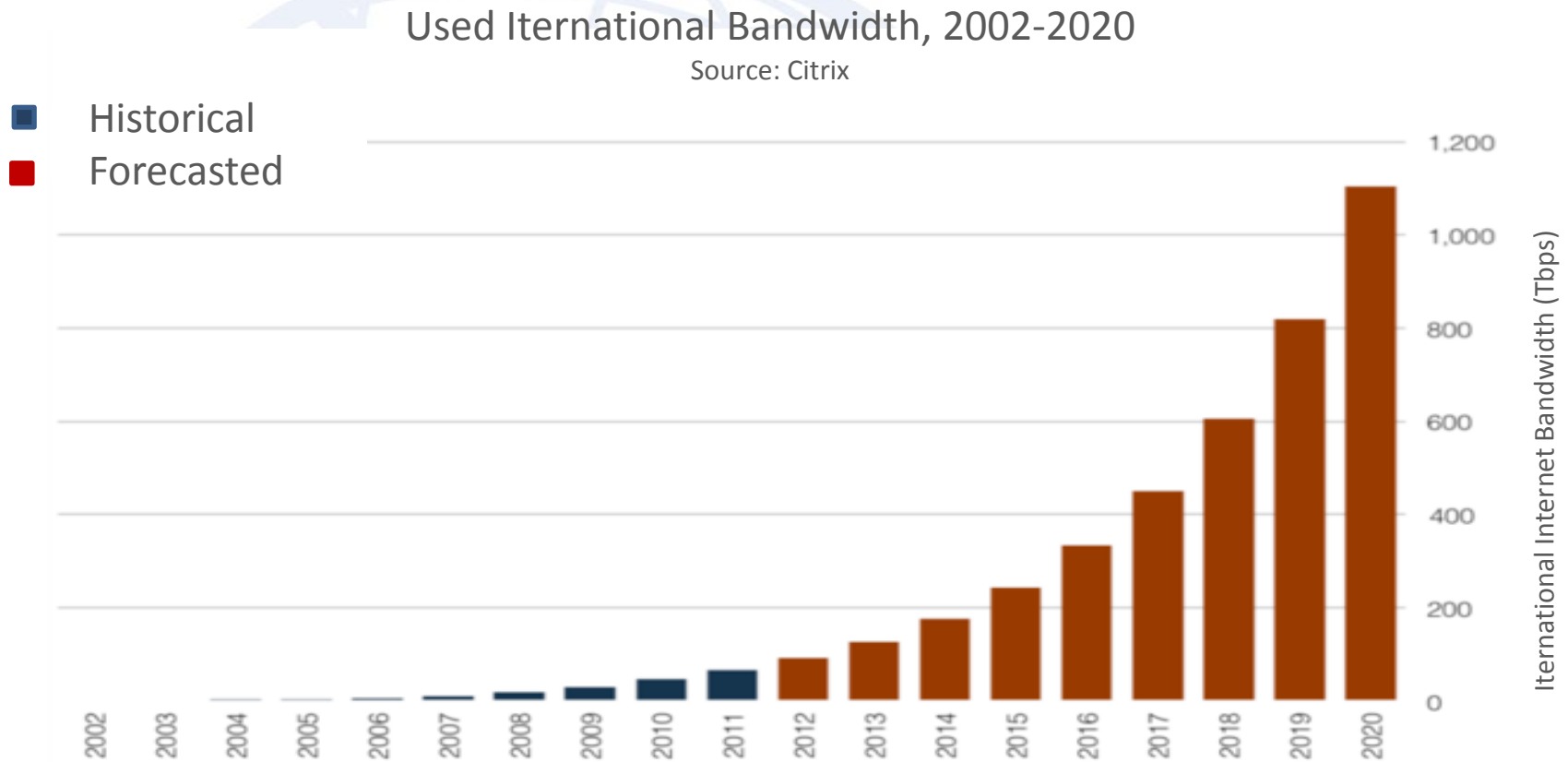
Réseaux capables de résorber le trafic en augmentation

Ex : les câbles sous marins en fibre optique

Bande par abonné: 56 Kb/s en 2000, 100Mb/s en 2010, 250 Mb/s en 2015 et 1Gb/s en 2017 et 10 Gb/s en 2020

Each stream represents only a few bytes in 2000.

By 2020 the world should have more than 40 billion connected objects!



The rise of connected objects poses another risk to the networks that of piracy!

- Risks: taking control of a connected car, using cameras
- to spy on people without their knowledge ...
- Security experts and hardware manufacturers
- must work hard to better protect the various
- connected object

THANK YOU FOR YOUR ATTENTION

Khaouja Ahmed
Directeur de LTE MAGAZINE (www.lte.ma)
Director of PTT SARL MAROC
Mail: khaouja@lte.ma