



Innovations in Clouds,
Internet and Networks

19th
ICIN
CONFERENCE

PARIS
MARCH 1 - 3, 2016

Future challenges for telecoms research

the end of Internet “as we knew it” ?

ICIN

March 1-3, 2016

Nicolas Demassieux

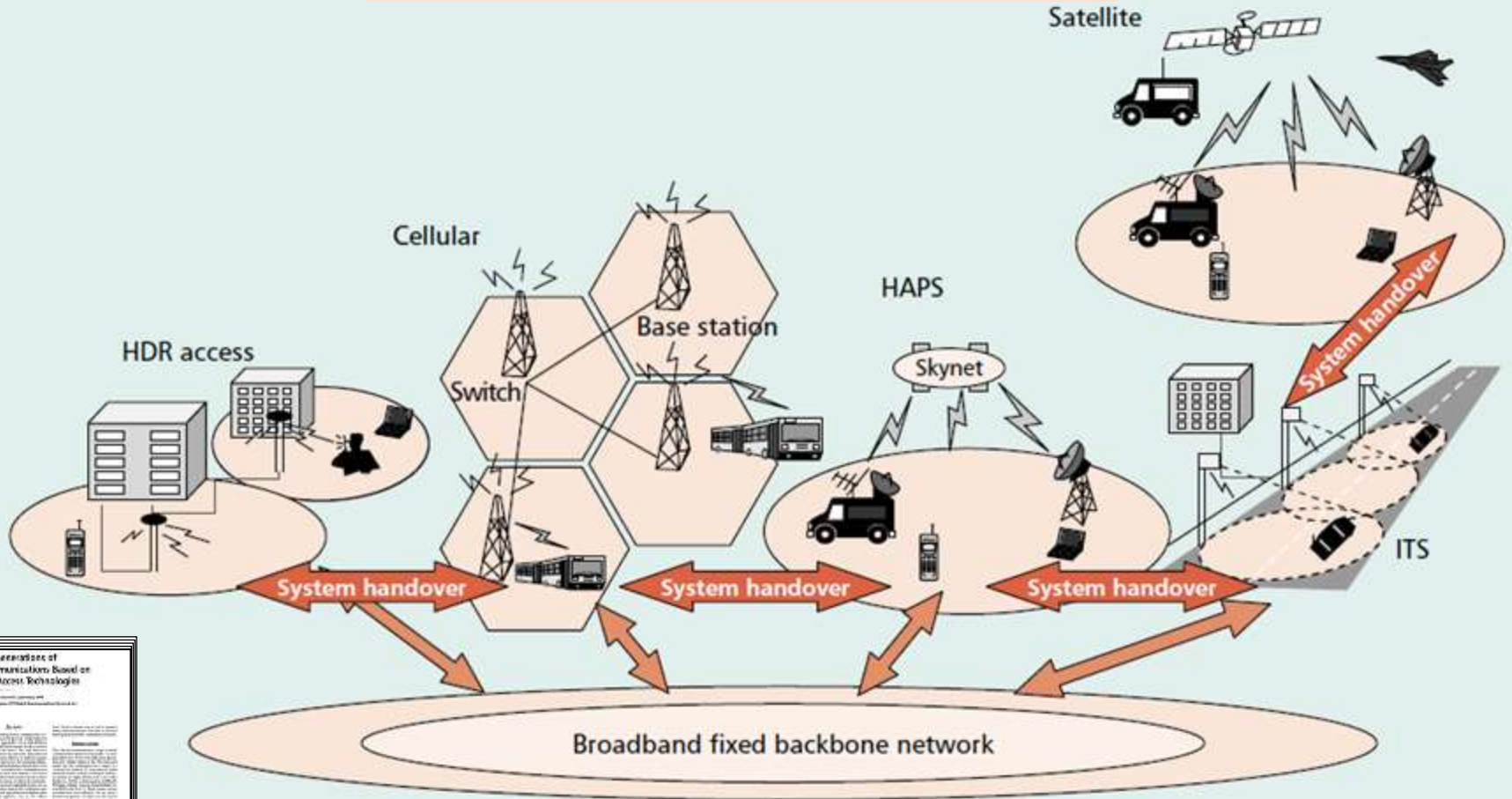
Senior Vice President, Orange Labs Research



@ndemassieux

2000

Radio Access Technology Evolutions
Densification (Cell Shrinking – D2D...)
Flexible resources management
Heterogeneous-Networks
Broadband for smartphones



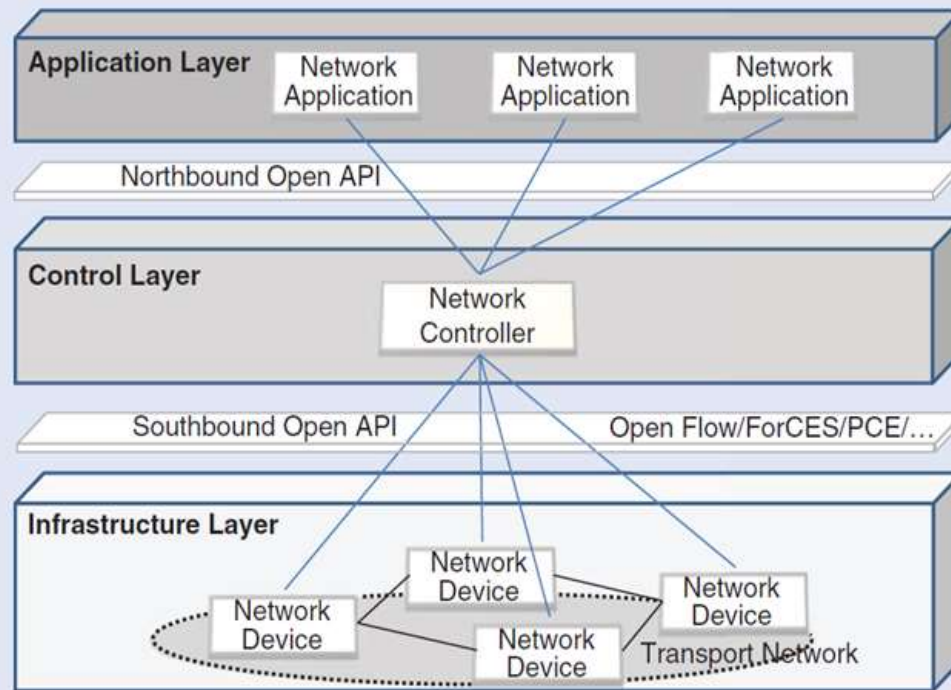
Source : The Future Generations of Mobile Communications Based on Broadband Access Technologies, IEEE Communications magazine December 2000

2015

SDN/NFV

SON, Customer Experience Management

Low Power Wide Area for the Internet of Things

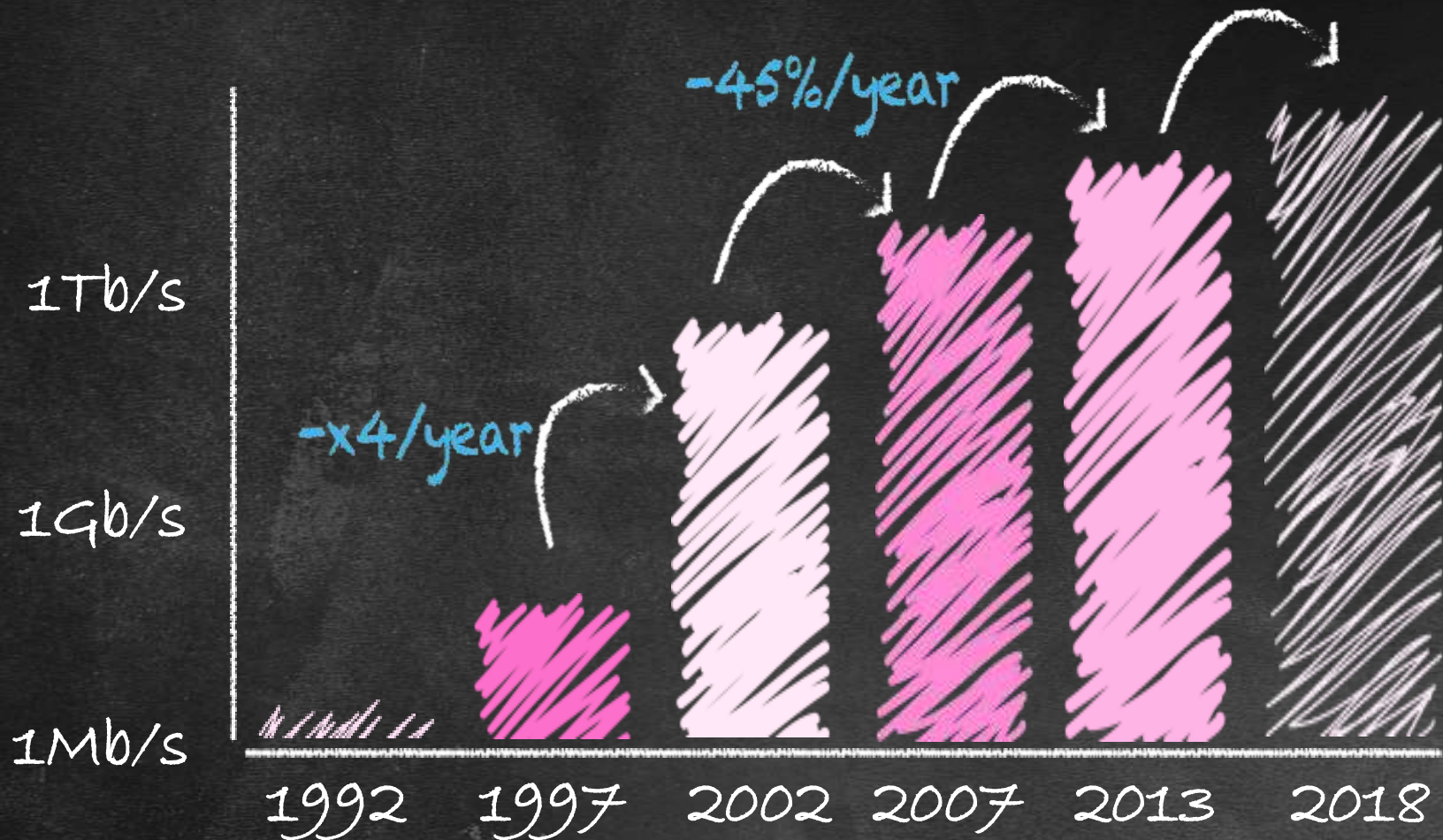


Source : 5G on the Horizon,
IEEE vehicular technology magazine, September 2013

SO WHAT'S NEXT?

Global Connectivity:

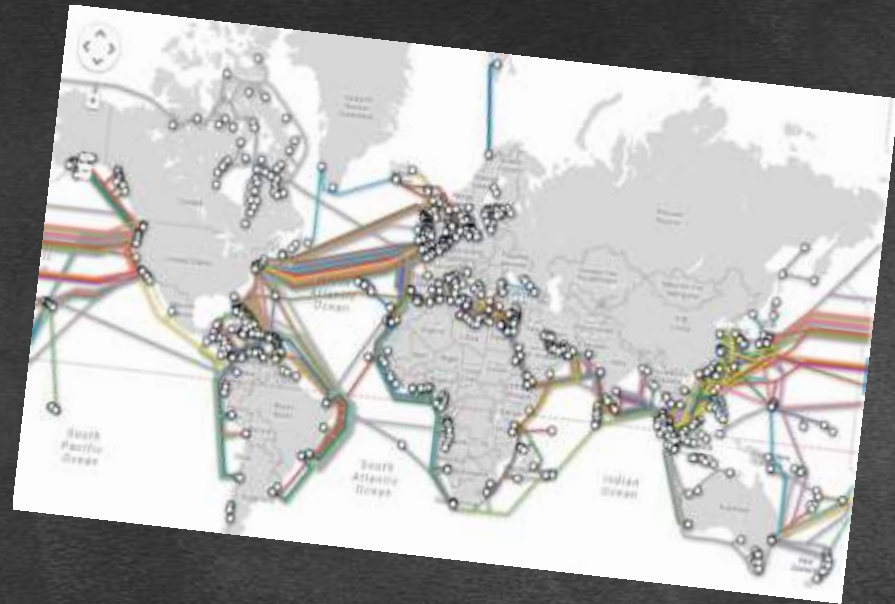
Keep the Internet capacity growing? -20%/year



K+TgV



2023 : end of the Internet
due to a « capacity crunch » ?



K+Tqv



2012
(for the Mayas)

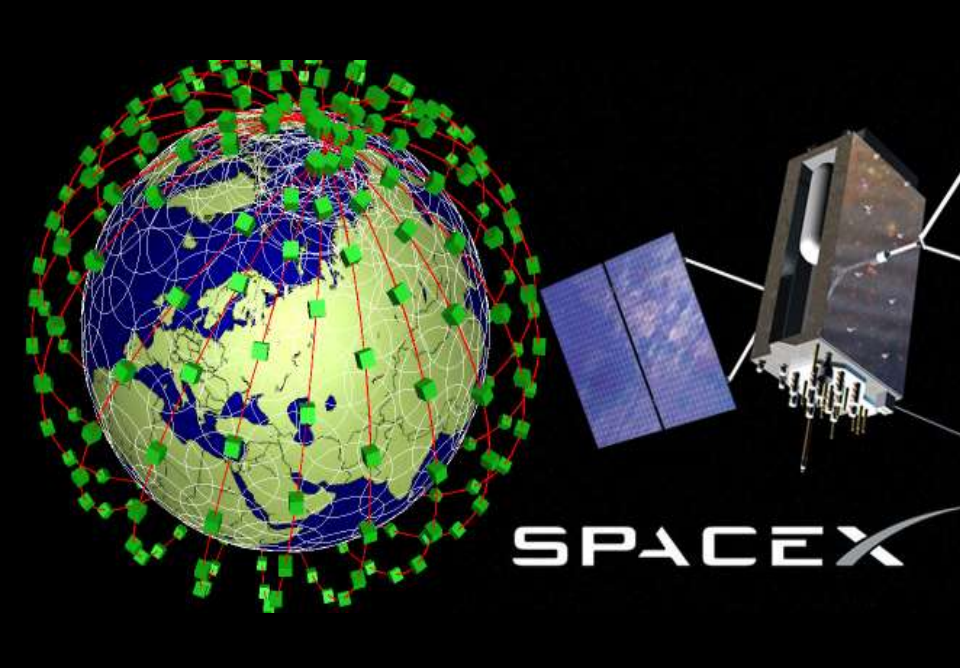


2027
(for the Aztecs)

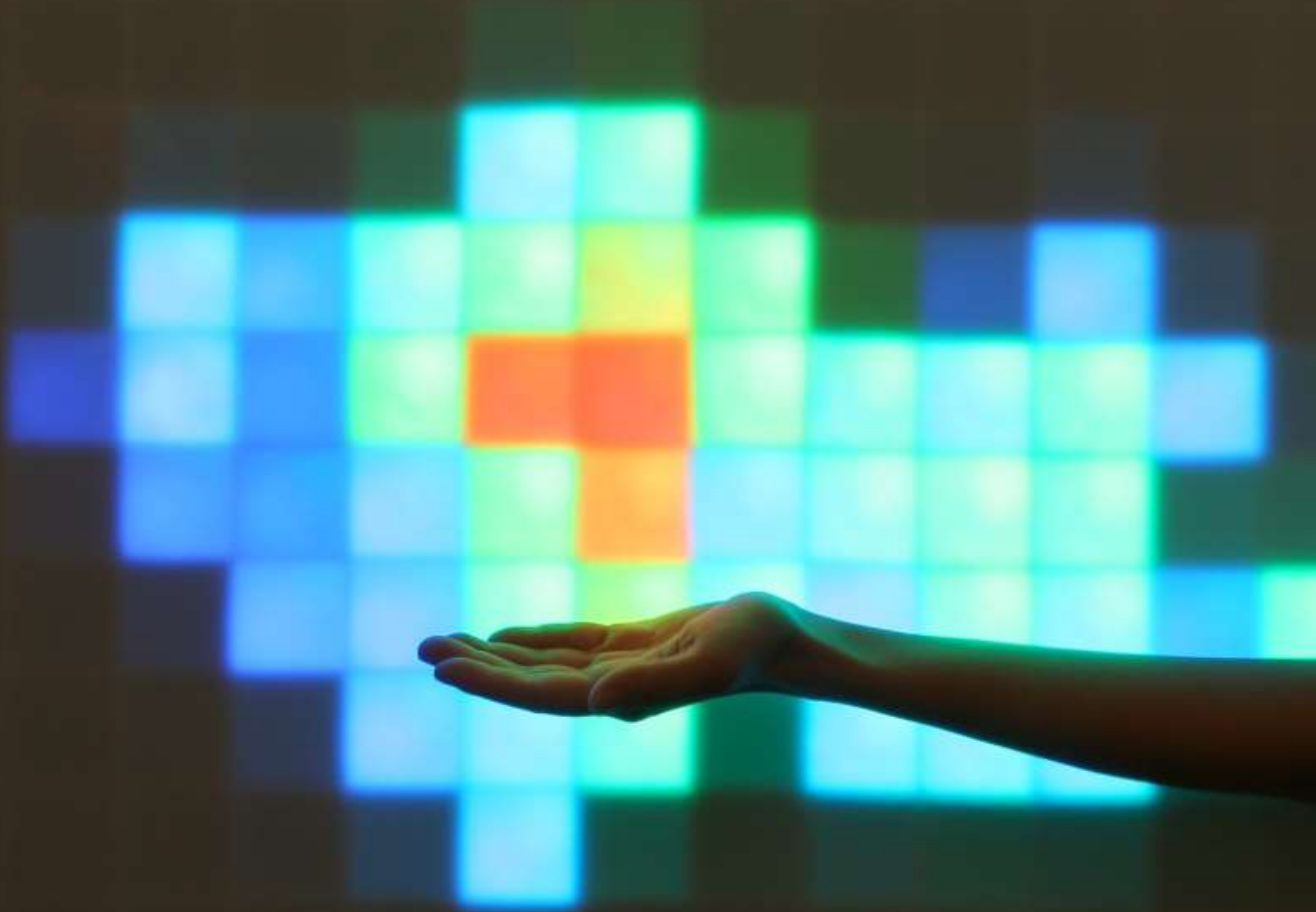
Signs of a connectivity Gold Rush

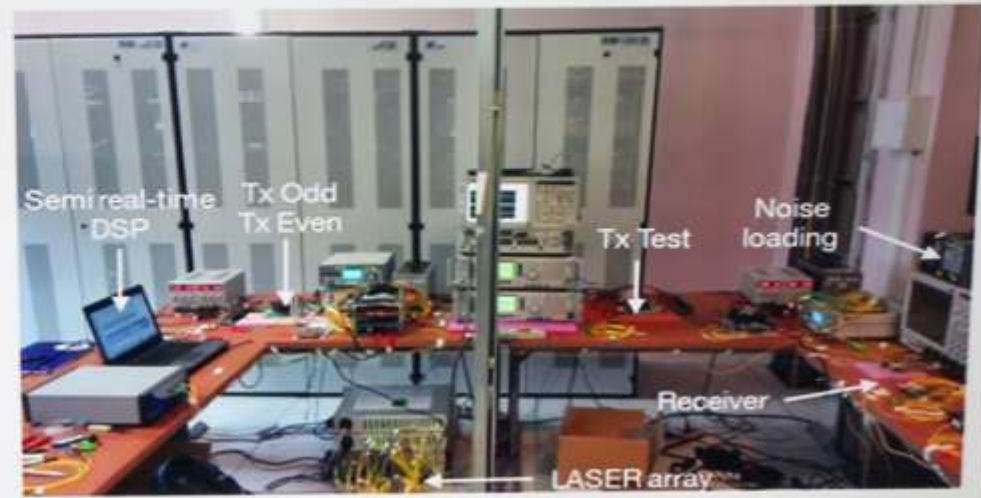
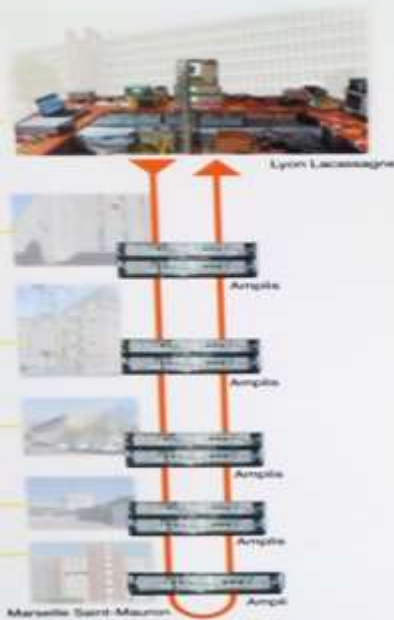
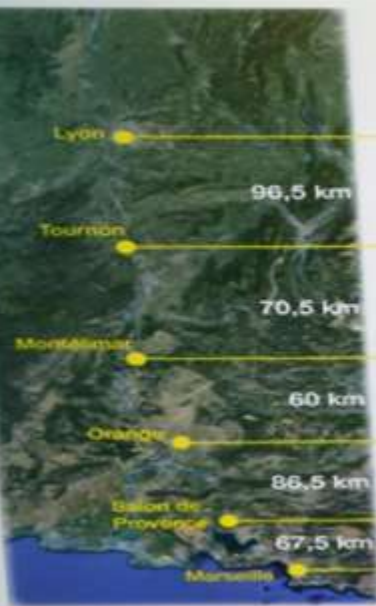


<+tg v



1st demonstration of time-reversal for 5G wireless communication

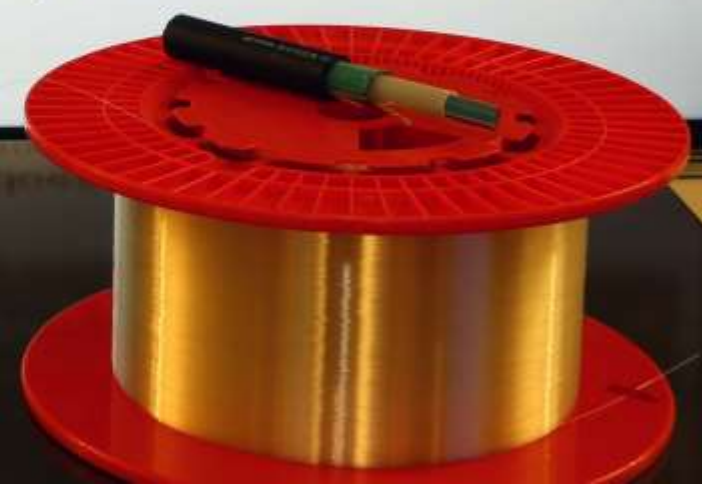




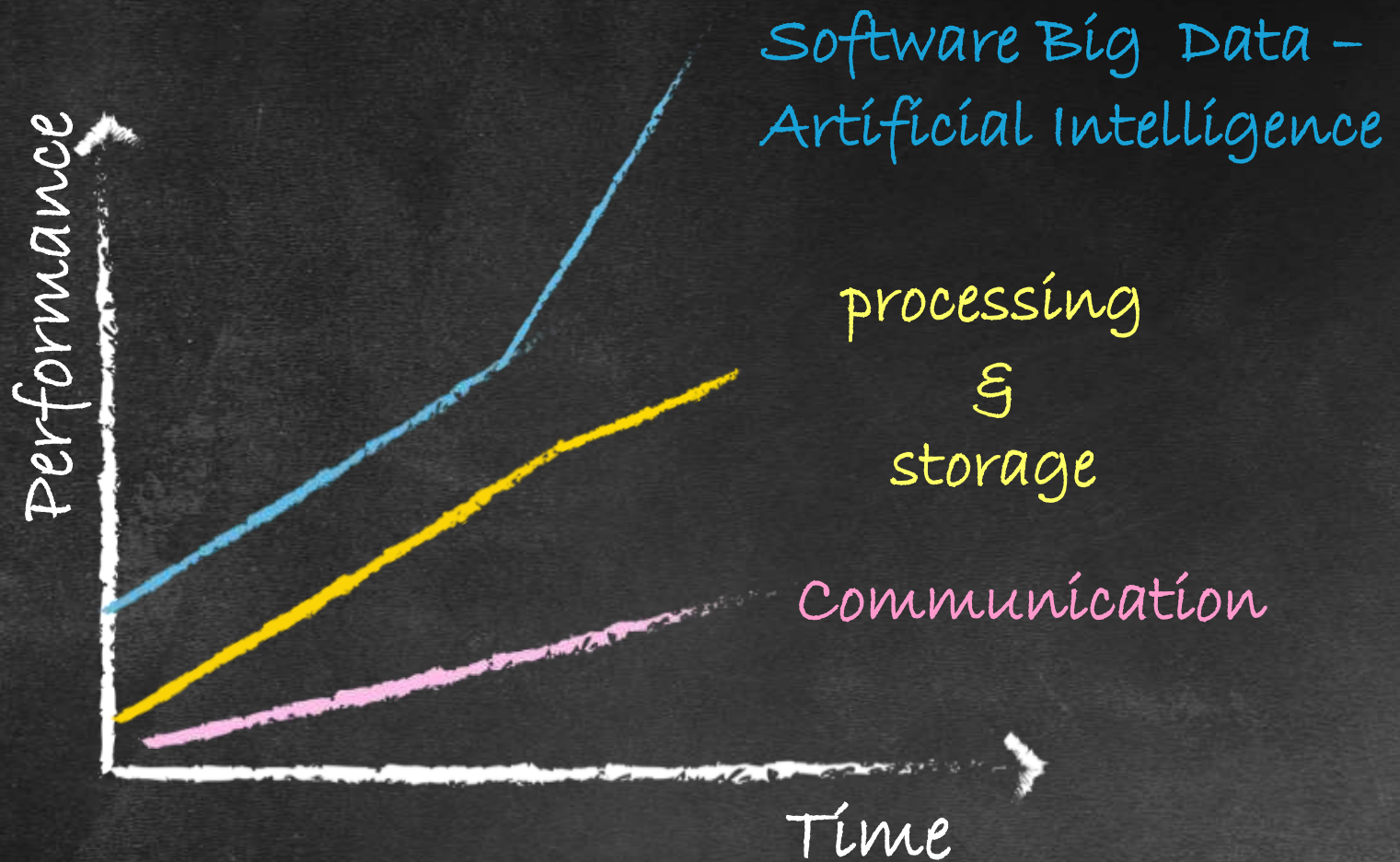
■ 38.4 Tbps: what does it represent ?

- 8 500 000 films broadcasted in parallel (4 Go / 120 mn)
- 15 200 000 TV channels in parallel (2.5 Mbps).
- 600 000 000 phone lines (64 Kbps).
- US Congress library broadcasted in ~4 s (1.5×10^{14} bits).

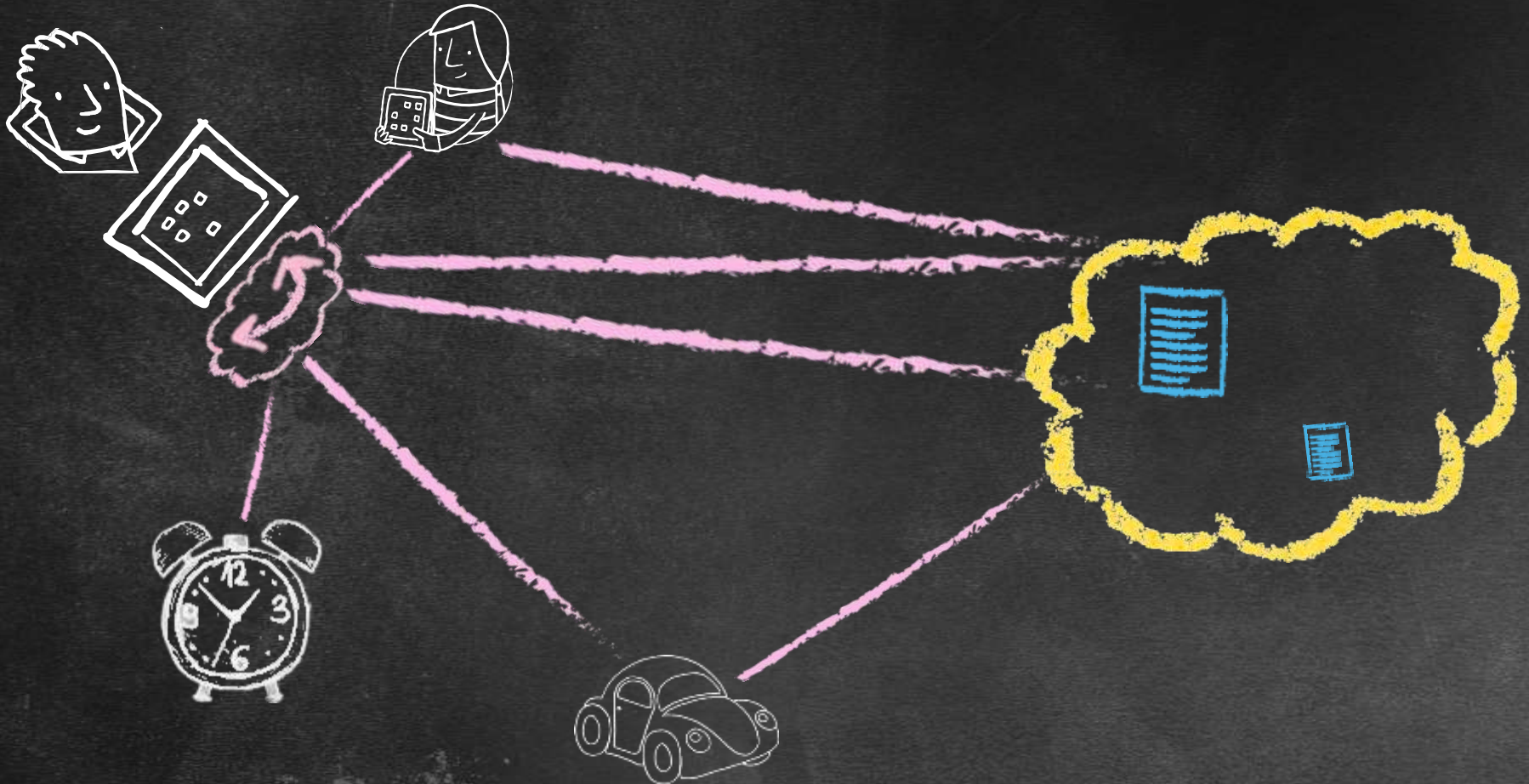
World record :
40 Tb/s on one fiber
along 750km



SO WHAT'S NEXT?

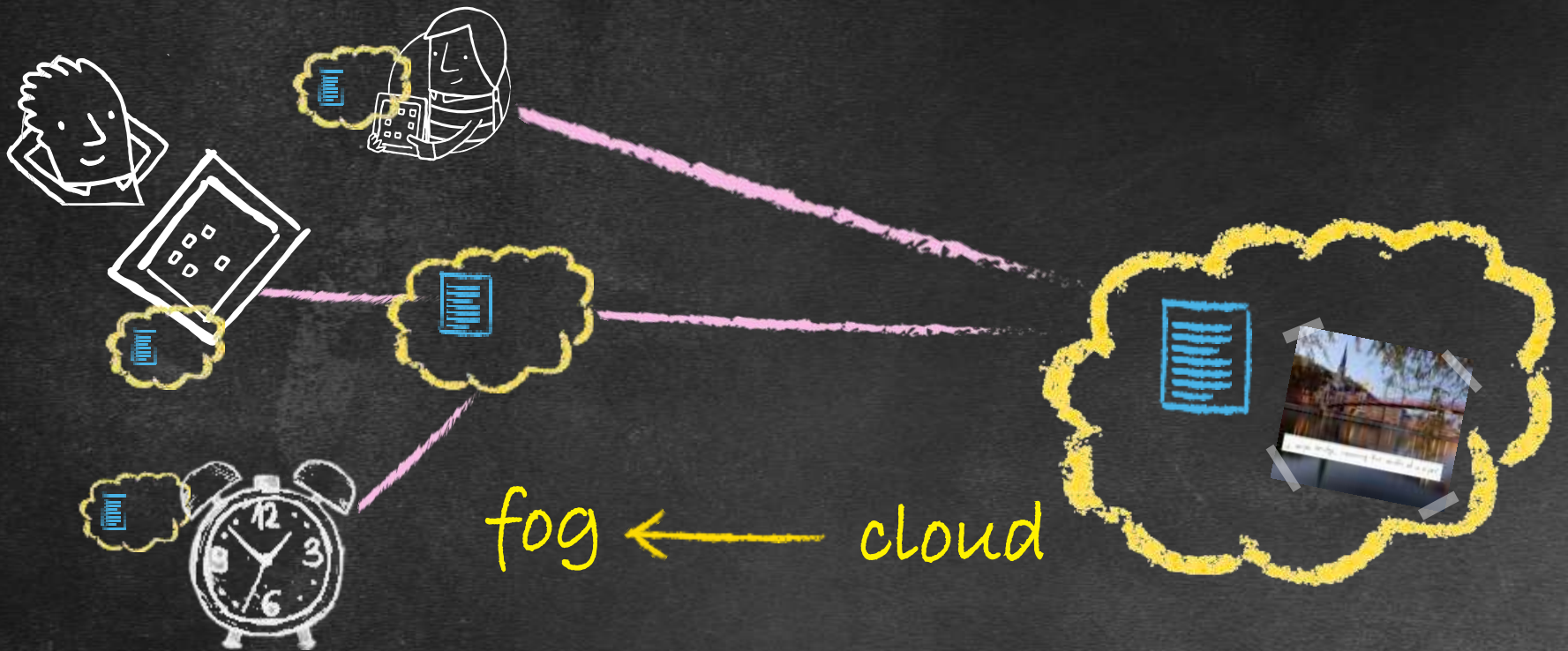


ambient connectivity



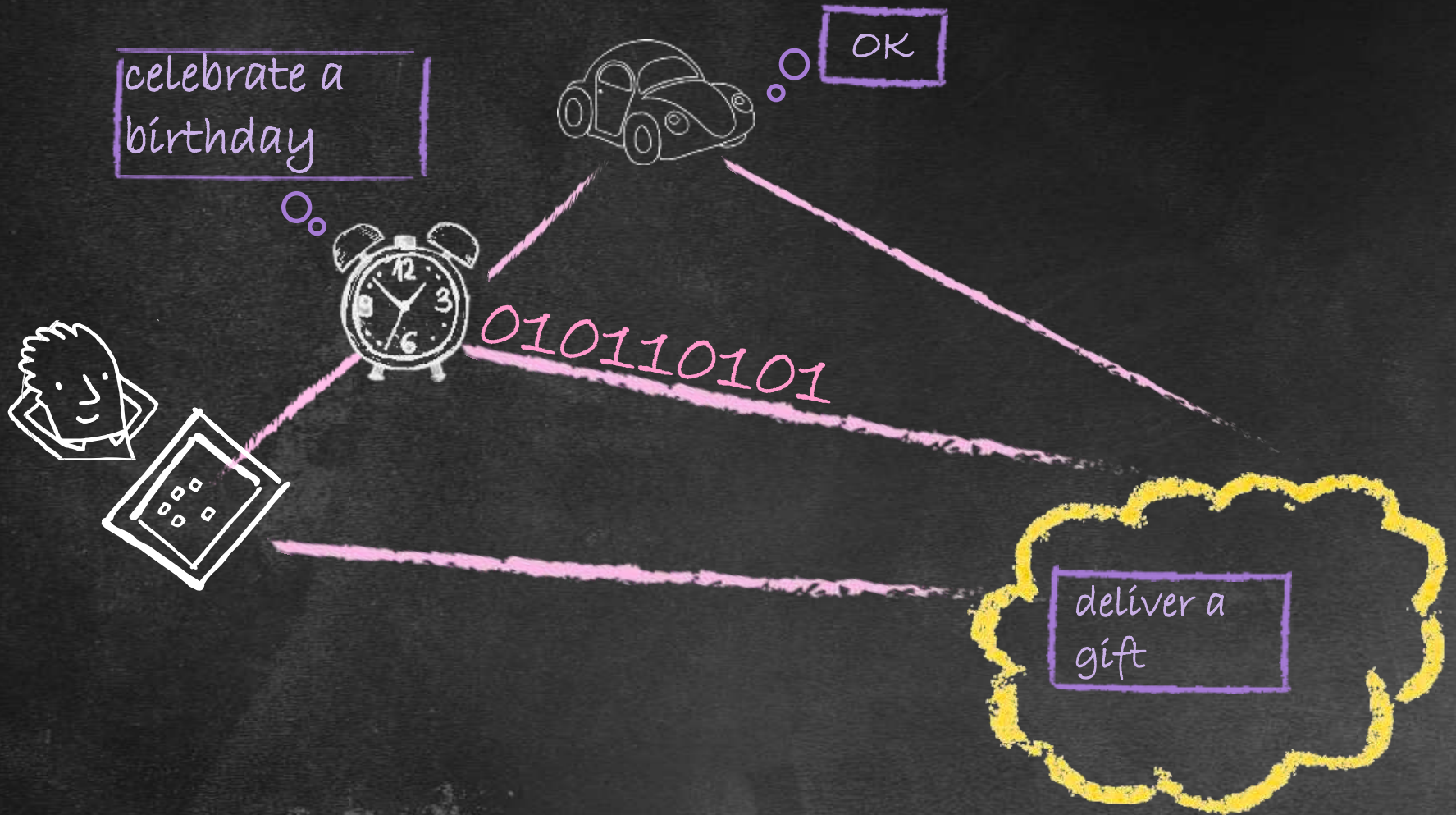
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software infrastructure

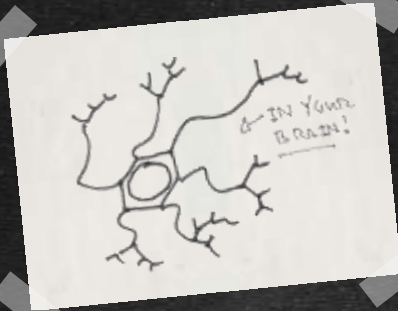


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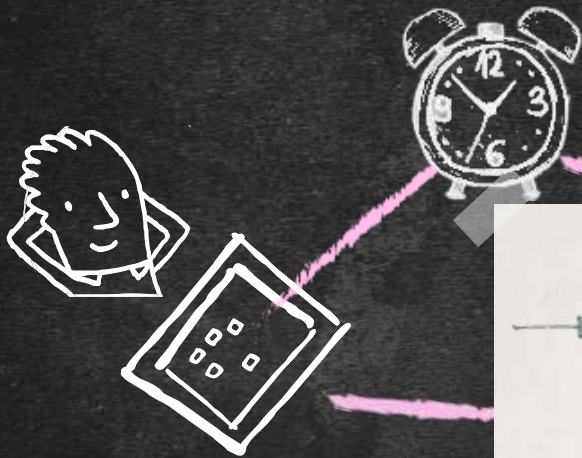
web of things



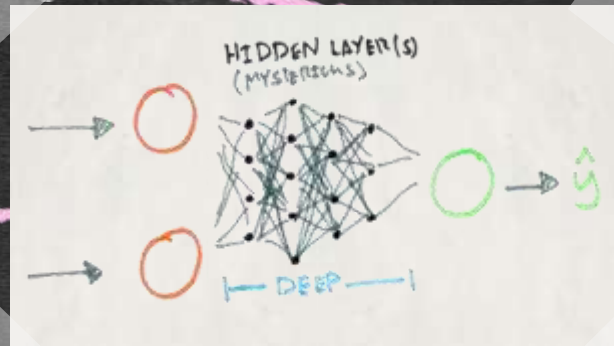
artificial intelligence



managing
complexity
and performance



Smart
services



<+tg v

Big Data → AI powered infra and services

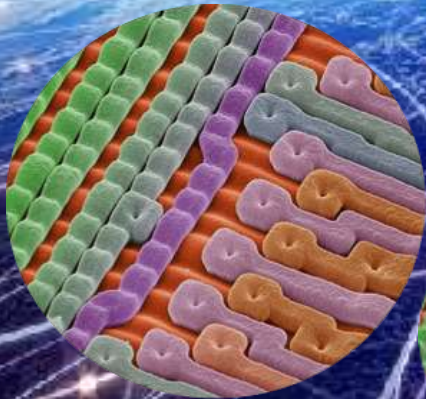
Internet
of
Things → large scale Web of Things

Cloud → distributed software infrastructure

Networks → ambient connectivity

K+Tg v

SO WHAT'S NEXT?





Big Data → AI powered infra and services

Internet
of
Things → large scale Web of Things

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Ambient
Internet

=

Large Scale
Intelligent
Cyber-Physical
System

Future challenges for telecoms research

1. meeting the traffic demand while improving on the energy and resources efficiency
2. connecting the next billions humans + the next trillion devices
3. becoming an intelligent innovation platform
4. staying human-friendly : secure, reliable, broadly and fairly available

interact with us...



 @ndemassieux

blog :
research.orange.com



Backup



towards the ambient internet?

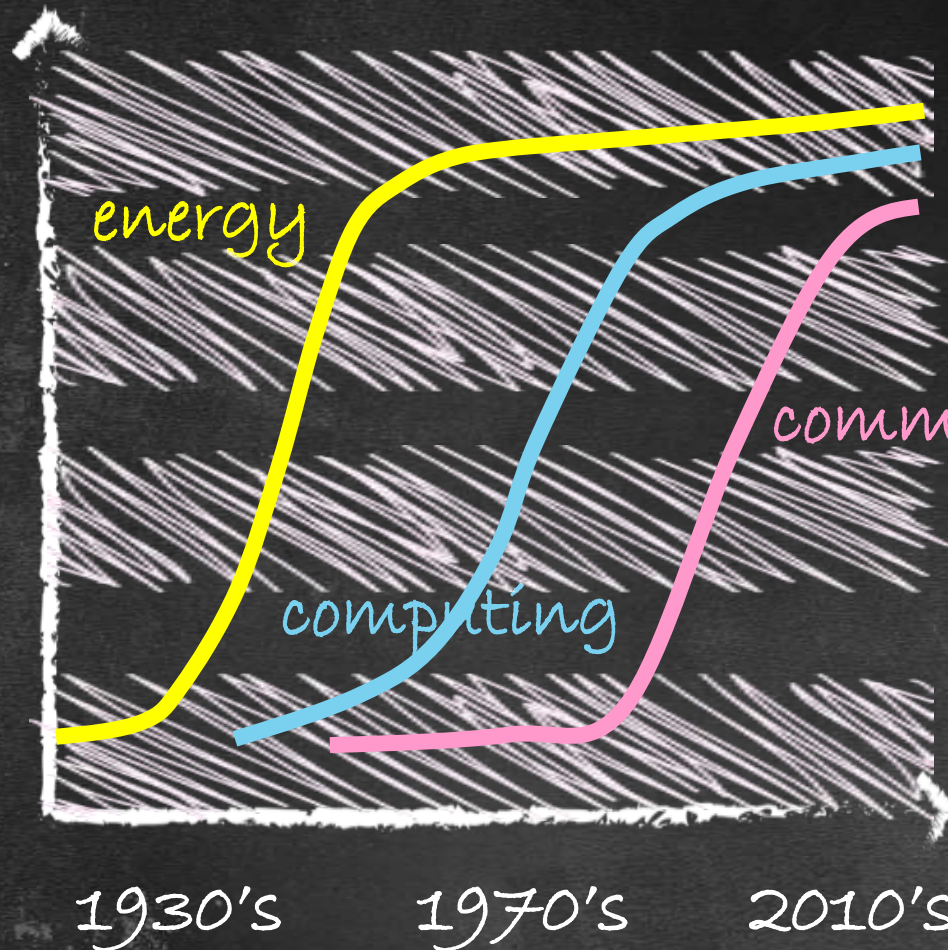
« offered » in public area or services
« embedded » in everyday's objects

Ambient &
smart

Specialization

Dissemination

Introduction



K+Tg v

9 research domains in Orange

