

# Transformation of the digital environment

## A vision from an Engineering perspective

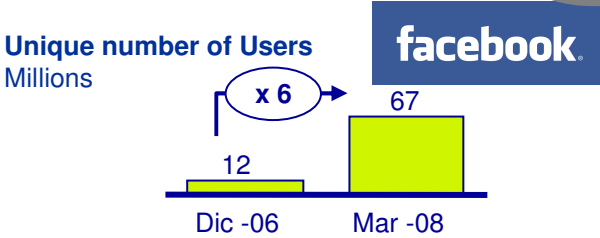
Vicente San Miguel- CTO  
TELEFÓNICA S.A.  
Madrid, 9th May 2008



# Customer's response to new services is very fast...

**Social networks:  
Applications' year**

**Facebook:  
more than 19.000 applications  
( 140 applications/day)**



**Content generation:  
Microblogging impulse**

**Twitter, JaiKu, Pownce,...  
I share with my contacts all my activities, instantly  
“phenomenon *What are you doing now?*”.**



**More than 1.000.000 users in 3 months**

**New experiences of desintermediation:  
Launched of music through the Network**



**RadioHead launched *In Rainbows*  
With more than 1,5 million Downloads in three months**

**Earnings: 4,8 M pounds**

**New consumer habits:  
Watch TV programs through PC**

**iBBC Player launched in Christmas got 1 million “TV viewers” in 20 days**



**More than 250.000 programs watched or downloaded per**

... and they get delighted with new devices...

Today, more and more sophisticated services and devices:



## ... producing an explosion of Information...

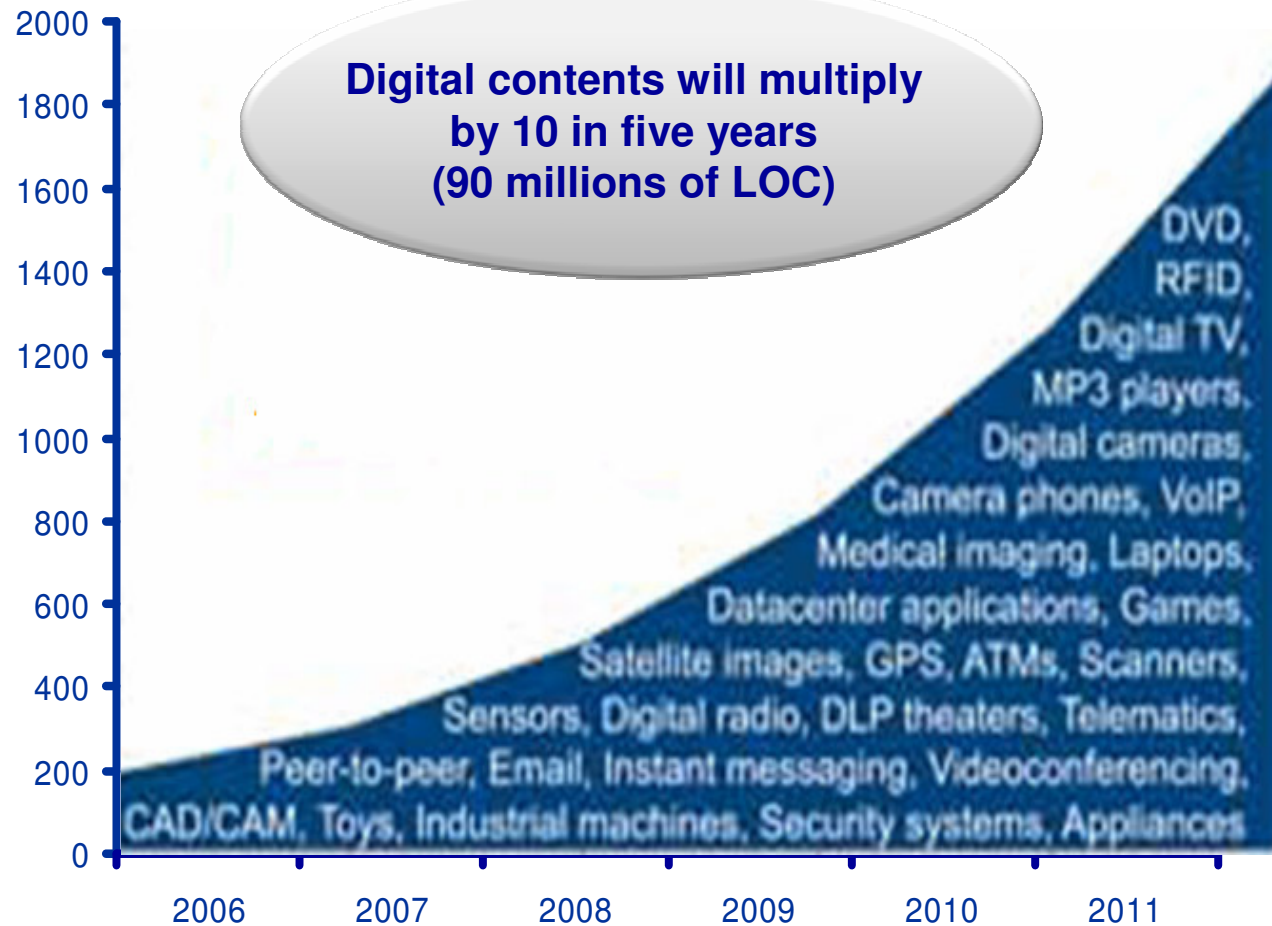
- In 2006 created, captured and copied information was of **161 exabytes** ( $1,288 \times 10^{18}$  bits)
- It will be of **988 exabytes** ( $\times 6$ ) in 2010
- The sources are very different but come from more than **1000 billion devices in the world:** cameras, medicine scanners, telephones, videos, high definition TV, security cameras,...
- In **2010**, **70%** of contents will be user generated

Factor	in full	in words	SI prefix	SI symbol
1.0E+24	large 1 000 000 000 000 000 000 000 000 000	septillion	yotta	Y
1.0E+21	1 000 000 000 000 000 000 000 000	sextillion	zetta	Z
1.0E+18	1 000 000 000 000 000 000 000	quintillion	exa	E
1.0E+15	1 000 000 000 000 000	quadrillion	peta	P
1.0E+12	1 000 000 000 000	trillion	tera	T
1.0E+9	1 000 000 000	billion	giga	G
1.0E+6	1 000 000	million	mega	M
1.0E+3	1 000	thousand	kilo	k
1.0E+2	100	hundred	hecto	h
1.0E+1	10	ten	deka	da
1.0E 0	ref. 1	initial value	one	-
1.0E-1	0.1	tenth	deci	d
1.0E-2	0.01	hundredth	centi	c
1.0E-3	0.001	thousandth	milli	m
1.0E-6	0.000 001	millionth	micro	$\mu$
1.0E-9	0.000 000 001	billionth	nano	n
1.0E-12	0.000 000 000 001	trillionth	pico	p
1.0E-15	0.000 000 000 000 001	quadrillionth	femto	f
1.0E-18	0.000 000 000 000 000 001	quintillionth	atto	a
1.0E-21	0.000 000 000 000 000 000 001	sextillionth	zepto	z
1.0E-24	small 0.000 000 000 000 000 000 000 001	septillionth	yocto	y

Source: IDC: The Expanding Digital Universe 2007

... which keeps on surprising us

## Exabytes



New measurement units

Kilo =  $10^3$

Mega =  $10^6$  = 1 book

Giga =  $10^9$

Tera =  $10^{12}$  = 0,5 LOC\*

Peta =  $10^{15}$

Exa =  $10^{18}$  = 50.000 LOC

Zetta =  $10^{21}$

\* LOC = Library Of Congress = 20 Terabytes

Sources: Discovery Institute 2008; IDC/EMC2 2008

And where communications are being a key element...

Worldwide, in 2007, IP traffic was around 100 Exabytes, with a foreseen of x5-x6 (more than 500 Exabytes) for 2010

Source: IDC, Ovum, Pyramid, Cisco IBSG 2007

Worldwide, in 2015, IP traffic will be 1 Zettabyte approximately, that is, 50 times 2006 IP traffic or equivalent to 50.000 LOC\*

\*LOC = Library Of Congress= 20 Terabytes

Source: Discovery Institute 2008

All 1997 Spain IP traffic is the same magnitude as generated by 10 Imagenio homes today

... after the great effort made by Operators and Industry, facing scalability and quality challenges

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**From talking about Megas...**

1.0E-1	0.1	tenth	deci	d
1.0E-2	0.01	hundredth	centi	c
1.0E-3	0.001	thousandth	milli	m
1.0E-6	0.000 001	millionth	micro	μ
1.0E-9	0.000 000 001	billionth	nano	n
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1.0E-18	0.000 000 000 000 000 001	quintillionth	atto	a
1.0E-21	0.000 000 000 000 000 000 001	sextillionth	zepto	z
1.0E-24	small 0.000 000 000 000 000 000 000 001	septillionth	yocto	y

Year 1997

Factor	in full	in words	SI prefix	SI symbol
1.0E+24	large 1 000 000 000 000 000 000 000 000	septillion	yotta	Y
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1.0E+18	1 000 000 000 000 000 000	quintillion	exa	E
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1.0E+9	1 000 000 000	billion	giga	G
1.0E+6	1 000 000	million	mega	M

**...to talking about Teras and Femtos...**

1.0E-18	0.000 000 000 000 000 001	quintillionth	atto	a
1.0E-21	0.000 000 000 000 000 000 001	sextillionth	zepto	z
1.0E-24	small 0.000 000 000 000 000 000 000 001	septillionth	yocto	y

Year 2007

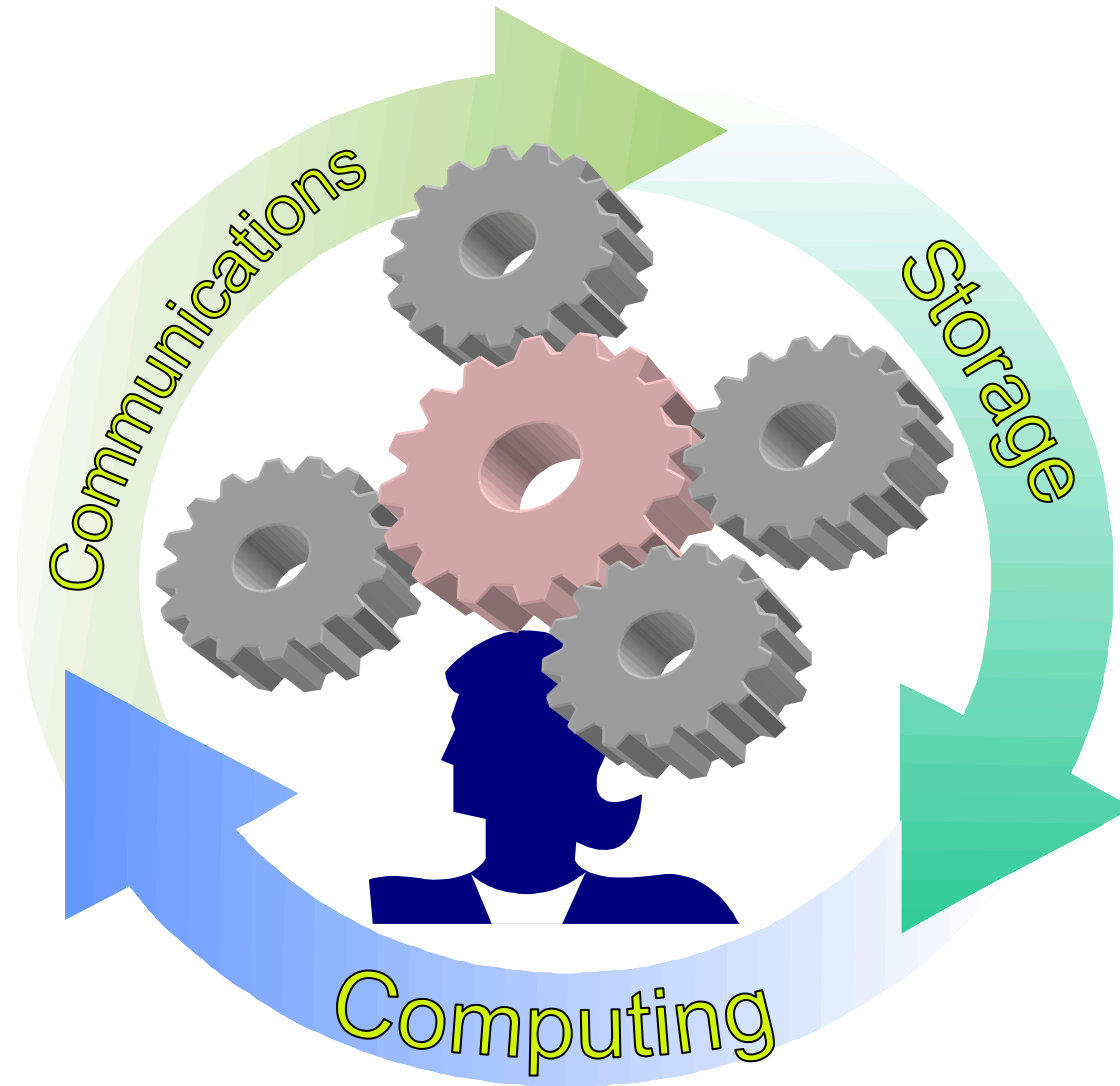
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**...to talking about Zettas and Attos?**

1.0E-21	0.000 000 000 000 000 000 001	sextillionth	zepto	z
1.0E-24	small 0.000 000 000 000 000 000 000 001	septillionth	yocto	y

Year 2015

This explosion represents an opportunity for several industries to cooperate in this new era



All this lets us make the most of ourselves as engineers

- With a continuous updating of our knowledge
- Applying technology possibilities to solve our customers' present (pull) and future (push) needs
- Always innovating to solve different situations in an efficient way

*Telefonica*

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