NexTech 2010
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Tutorial

Surveillance Technologies Beyond State-of-the-Art

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Topics:

* Advanced Surveillance Techniques
* Communication Technologies for Surveillance
* Processing Power driving Surveillance Business
* Multi-Sensor Surveillance Technologies
* Surveillance and Physical / Cyber Security
* Smart Home & Home Security
* Satellite Surveillance

The Big Controversy

Technology
Money
Security
Business World ?
Future ??????

Big natural disasters

Deaths	Date	Disaster	City	Country
230.000	26.12.04	Indian Ocean Tsunami		Indonesia
222.000	12.01.10	Haiti Earthquake	Port-au-Prince	Haiti
79.000	08.10.05	Kashmir earthquake		Pakistan
15.000	June 2010	Russian heat wave		Russia

List of non-natural catastrophies

Deaths	Date	Catastrophy	City	Country
2976	11.09.01	September 11, WTC	New York City	USA
796	14.08.07	Yasidi bombings	Qahtaniya	Iraq
334	01.09.04	Beslan School Hostage	Beslan	Russia
209	11.07.06	Mumbai train bombings	Mumbai	India
191	11.03.04	Madrid Bombings	Madrid	Spain
173	26.11.08	Mumbai attacks	Mumbai	India
110	10.10.08	Orakzai bombing	Orakzai agency	Pakistan
103	16.10.06	Digampathana bombing	Dambulla	Sri Lanka
52	07.07.05	London bombings	London	UK
32	16.04.07	Virginia Tech massacre	Blacksburg	USA
17	26.04.02	Erfurt massacre	Erfurt	Germany
16	11.03.09	Winnenden school shooting	Winnenden	Germany
12	20.04.99	Columbine High School Masacre	Columbine	USA

Bank Robberies

Value	Date	Disaster	City	Country
$65m	06.08.09	Graff Diamonds robbery 2	London	UK
$92.5m	21.02.06	Securitas depot cash robbery	Kent	UK
$41.5m	20.12.04	Northern Bank robbery	Belfast	Northern Ireland
$6.7m	16.03.06	Agricultural Bank of China robbery	Hebei	China
$94.3m	07.08.05	Banco Central burglary	Fortalezo	Brazil
$1.8m	30.12.07	Chelembra bank robbery	Kerala	India

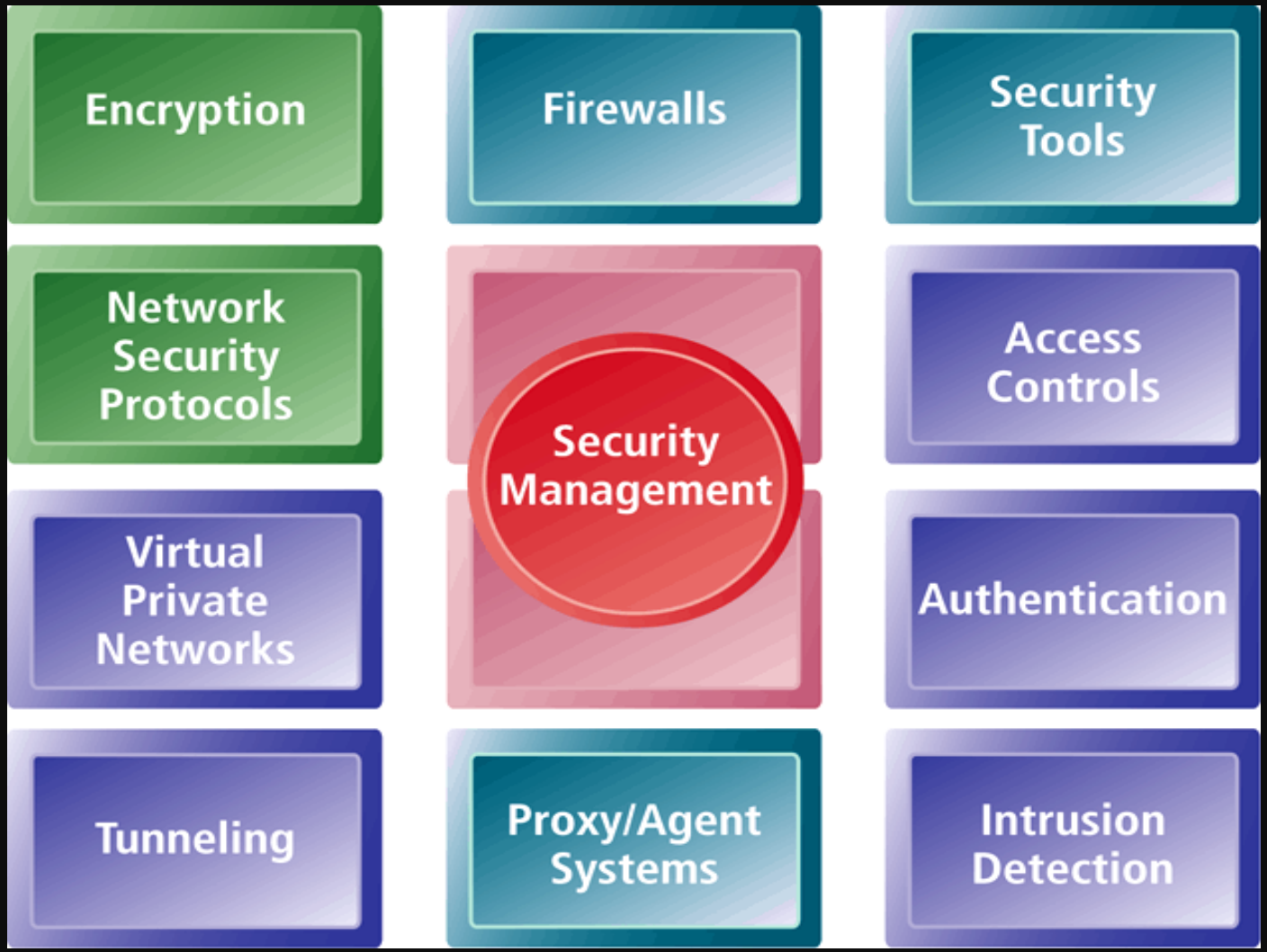
Art Crimes

Value	Date	Disaster	City
$123 m	20.05.10	Pablo Picasso painting stolen	Paris
$163 m	11.02.08	Monet, Degas, Van Gogh, Cezanne stolen	Zurich
$55m	20.12.07	Picasso, Portinari stolen	São Paulo
$47m	21.01.06	Saliera stolen	Vienna
$612	12.06.08	Picasso et al stolen	São Paulo
$133 m	27.08.03	Da Vinci Painting stolen	Drumlanrig Castle

Do we have

SECURITY ?

Tools Available to Achieve Site Security



NASA – www.nasa.gov

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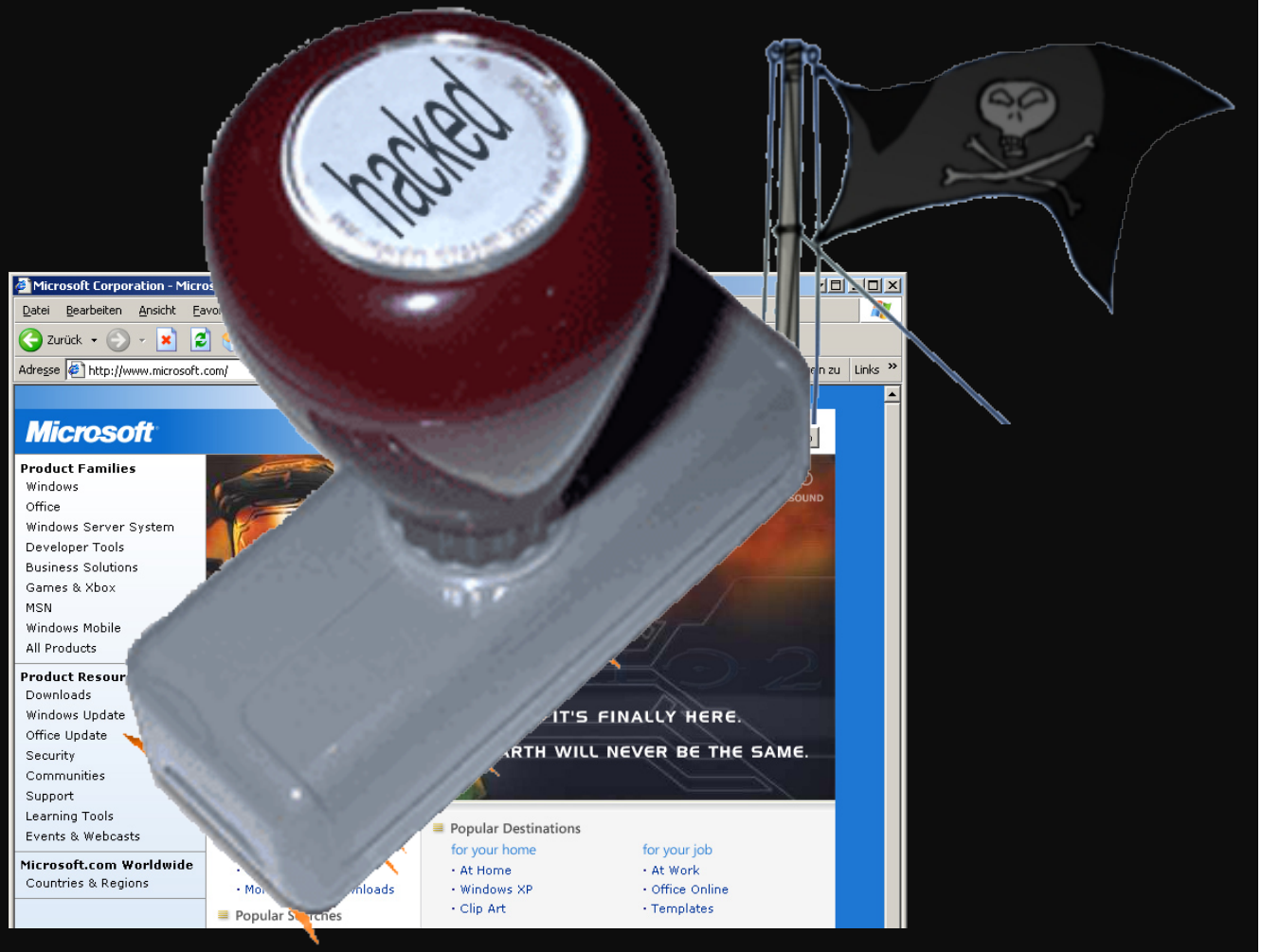
CNN – www.cnn.com

NSA – www.nsa.gov

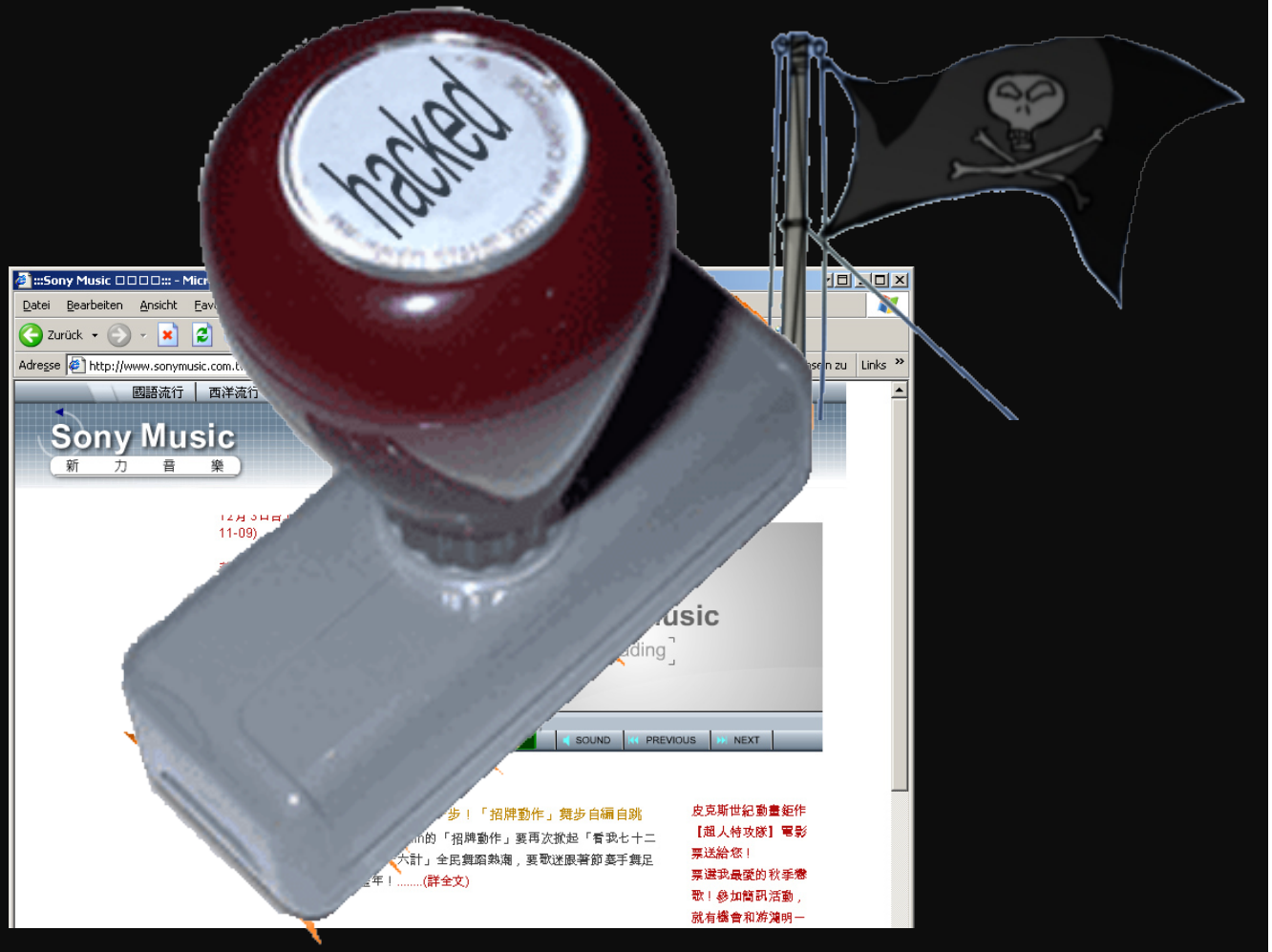
RIAA – www.riaa.com

NAVY – www.navy.mil

Samsung - www.samsung.com

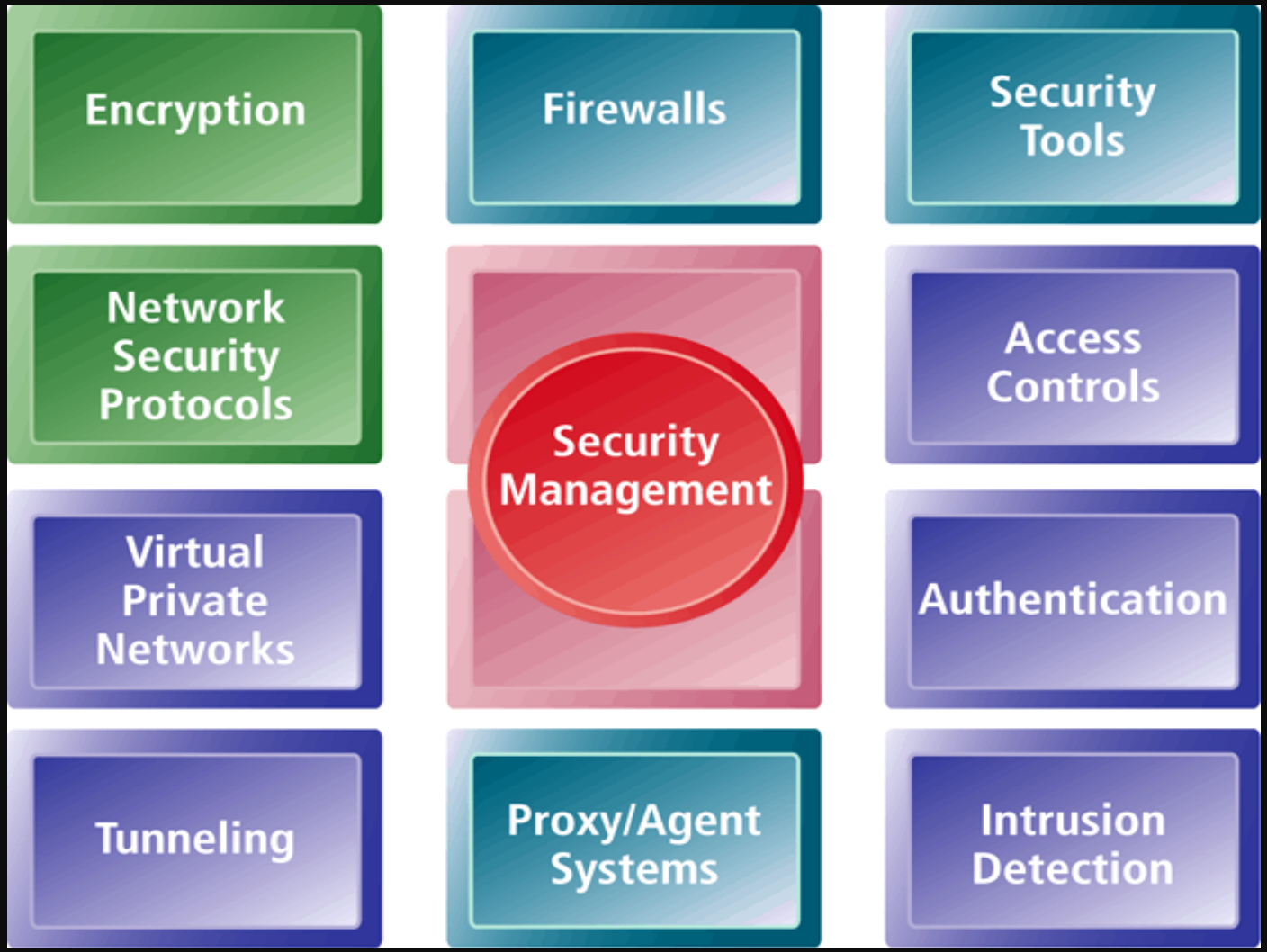


Microsoft - www.microsoft.com



Sony Music www.sonymusic.com

Security Bla Bla ….
Tools Available to Achieve Site Security



Balance: A and C

SECURITY

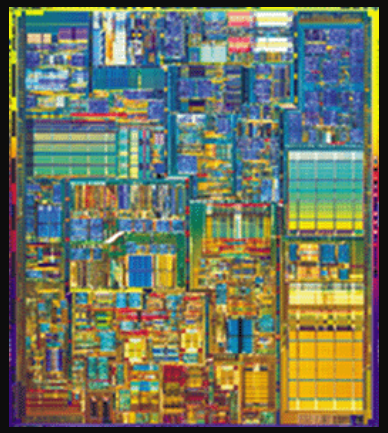
The

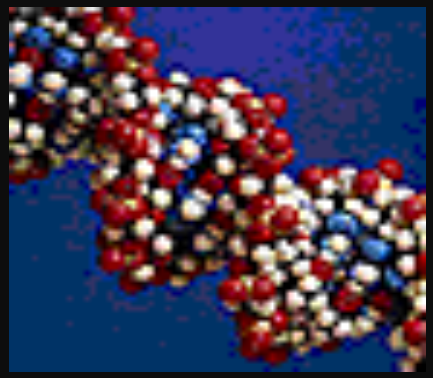
R & D Trends

Information may take different physical forms…

… mechanical,

… or electronic,





… or bio-molecular,

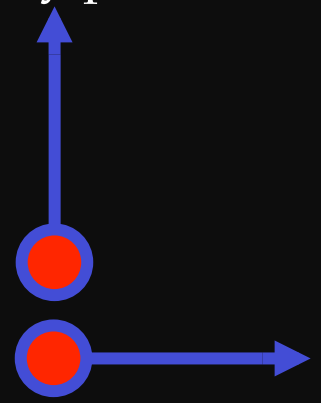
… or quantum, etc.

There is no information without a physical carrier, and no computation without a physical process.

The laws of physics dictate what computations can b

Classical Bit

A classical bit is, at every point in time:



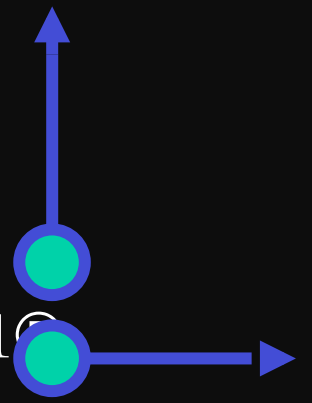
- either in state 1:
- or in state 0:

State of a classical bit: $b \in \{0,1\}$

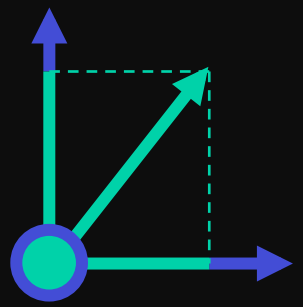
B ist ein element aus dem wertbereich 0 or 1

Quantum Bit

A quantum bit (« qubit ») is, at every point in time:



- either in basis state $|1\rangle$
- or in basis state $|0\rangle$:



- or in a superposition state, i.e. at the same time $|1\rangle$ and $|0\rangle$:

State of a qubit:

$|\psi\rangle \in E$

where E is a 2-dimensional vector space

What Does it Mean- “Security”?

- **Communications security**
- **Network security**
- **Information Security**
- **????**
- **?????**
- **?????**

Society Security

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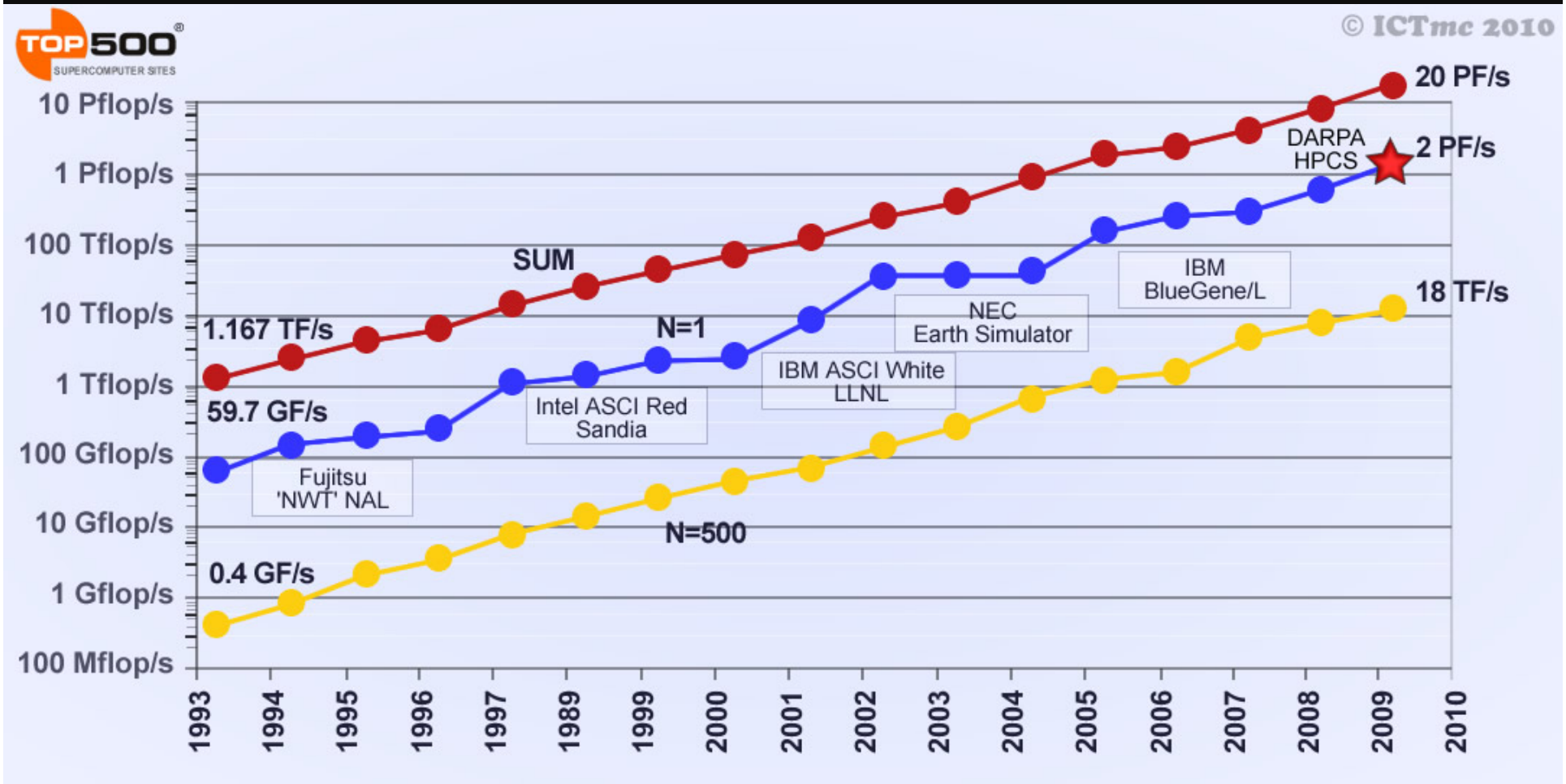
HPC IPC !!!

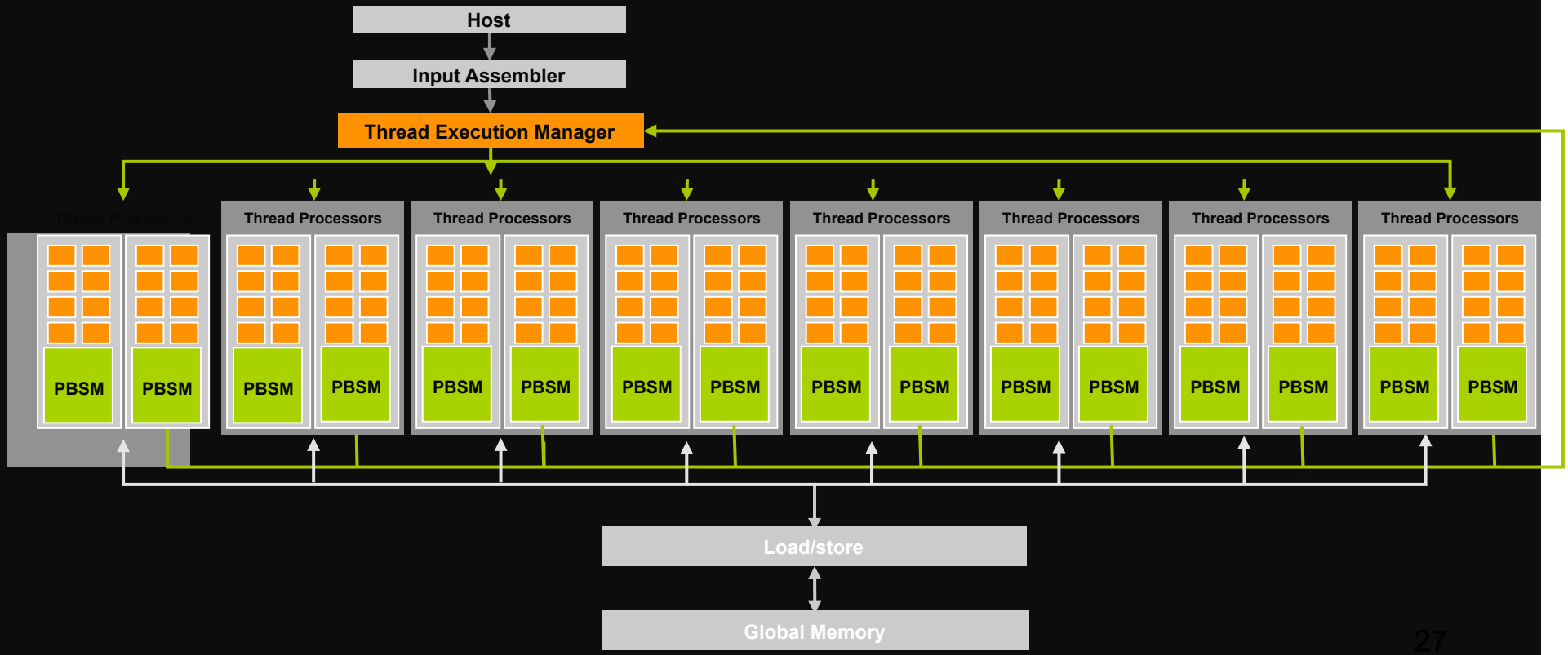

TOP500
SUPERCOMPUTER SITES
© ICTmc 2010
10 Pflop/s
1 Pflop/s
100 Tflop/s
10 Tflop/s
1 Tflop/s
100 Gflop/s
10 Gflop/s
1 Gflop/s
100 Mflop/s
1993
1994
1995
1996
1997
1989
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
SUM
N=1
N=500
20 PF/s
2 PF/s
18 TF/s
1.167 TF/s
59.7 GF/s
0.4 GF/s
DARPA HPCS
IBM BlueGene/L
NEC Earth Simulator
IBM ASCI White LLNL
Intel ASCI Red Sandia
Fujitsu 'NWT' NAL

GPU Block Reduced Inter-Processor Com

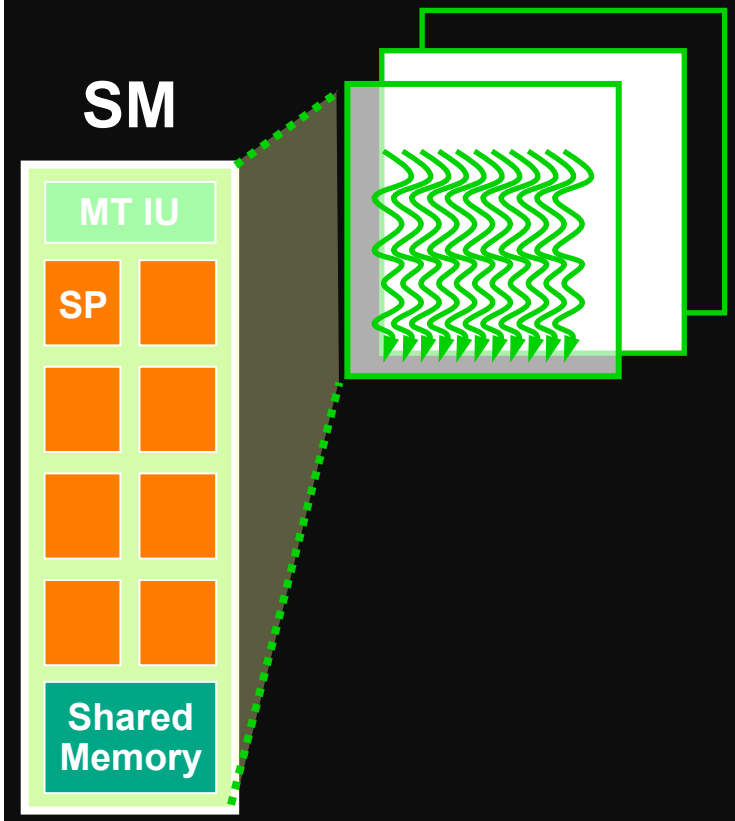
128 Thread Processors execute kernel threads

Up to 12,288 parallel threads active

Per-block shared memory (PBSM) accelerates processing

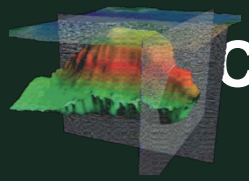


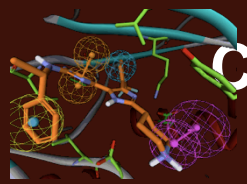
Streaming Multiprocessor (SM)

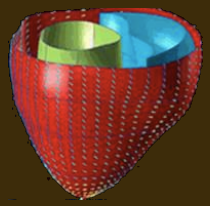


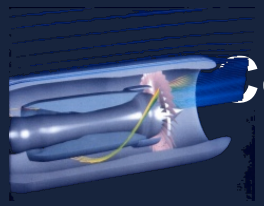
- Processing elements
  - 8 scalar thread processors (SP)
  - 32 GFLOPS peak at 1.35 GHz
  - 8192 32-bit registers (32KB)
    - ½ MB total register file space!
  - usual ops: float, int, branch, …
- Hardware multithreading
  - up to 8 blocks resident at once
  - up to 768 active threads in total
- 16KB on-chip memory
  - low latency storage
  - shared amongst threads of a block
  - supports thread communication

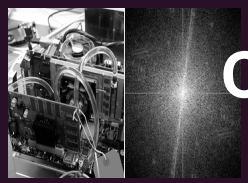
GPU Computing Example Markets

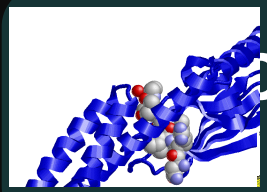

Computational Geoscience

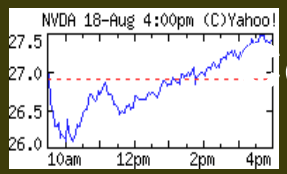

Computational Chemistry


Computational Medicine


Computational Modeling


Computational Science


Computational Biology



Computational Finance

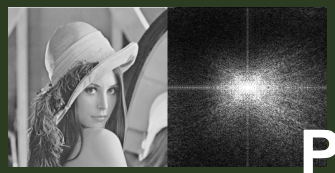
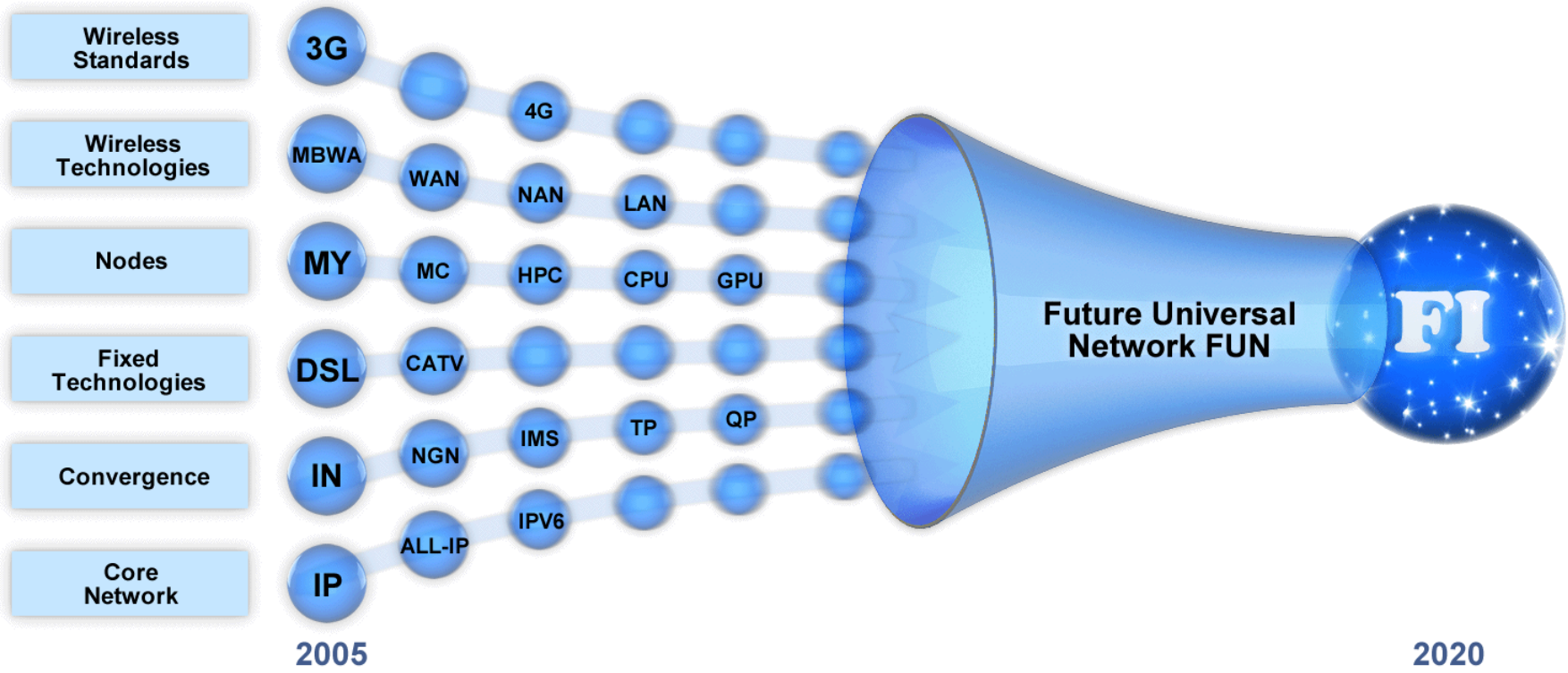


Image Processing

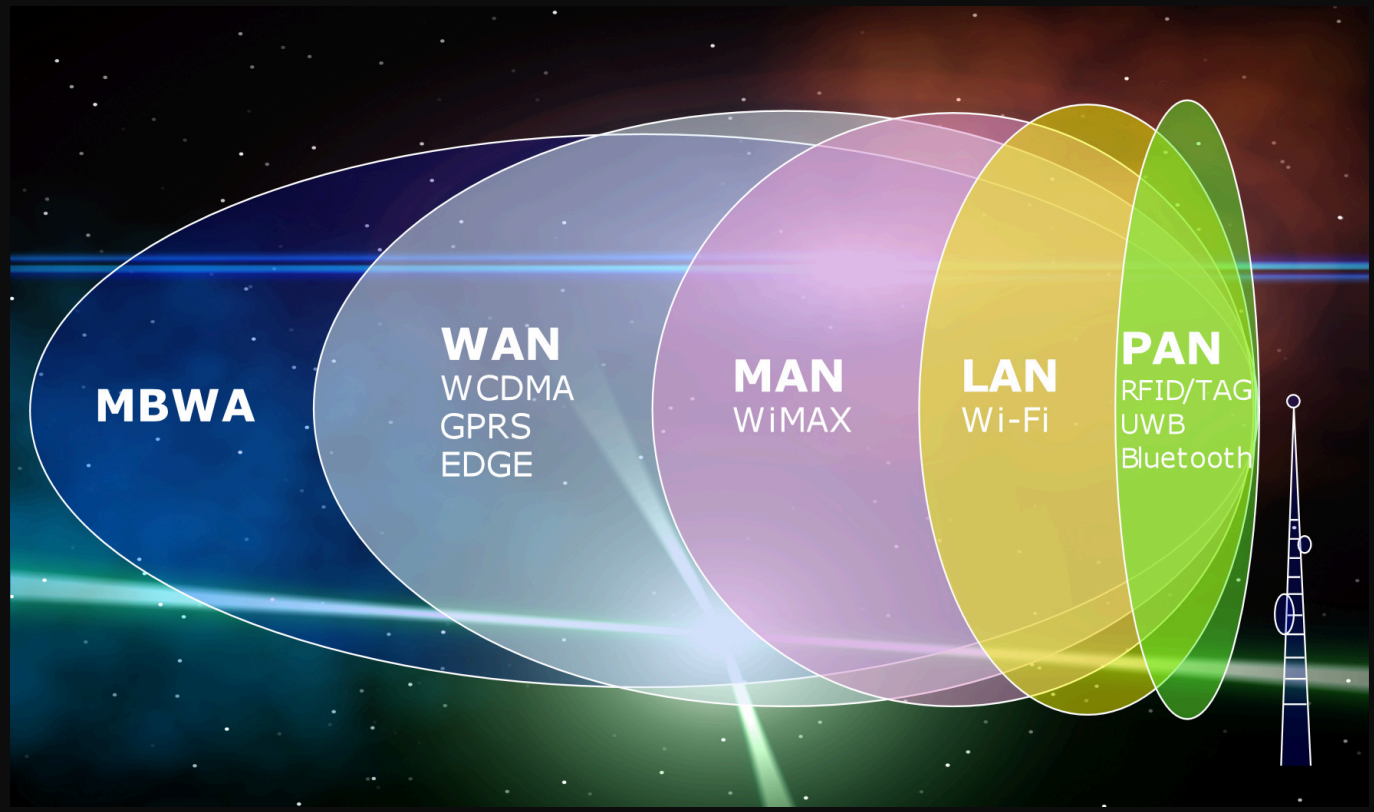
GPU Applications Examples-

- 3D image analysis
- Adaptive radiation therapy
- Acoustics
- Astronomy
- Audio
- Automobile vision
- Bioinfomatics
- Biological simulation
- Broadcast
- Cellular automata
- Computational Fluid Dynamics
- Computer Vision
- Cryptography
- CT reconstruction
- Data Mining
- Digital cinema/projections
- Electromagnetic simulation
- Equity training
- Film
- Financial - lots of areas
- Languages
- GIS
- Holographics cinema
- Imaging (lots)
- Mathematics research
- Military (lots)
- Mine planning
- Molecular dynamics
- MRI reconstruction
- Multispectral imaging
- nbody
- Network processing
- Neural network
- Oceanographic research
- Optical inspection
- Particle physics
- Protein folding
- Quantum chemistry
- Ray tracing
- Radar
- Reservoir simulation
- Robotic vision/AI
- Robotic surgery
- Satellite data analysis
- Seismic imaging
- Surgery simulation
- Surveillance
- Ultrasound
- Video conferencing
- Telescope
- Video
- Visualization
- Wireless
- X-ray

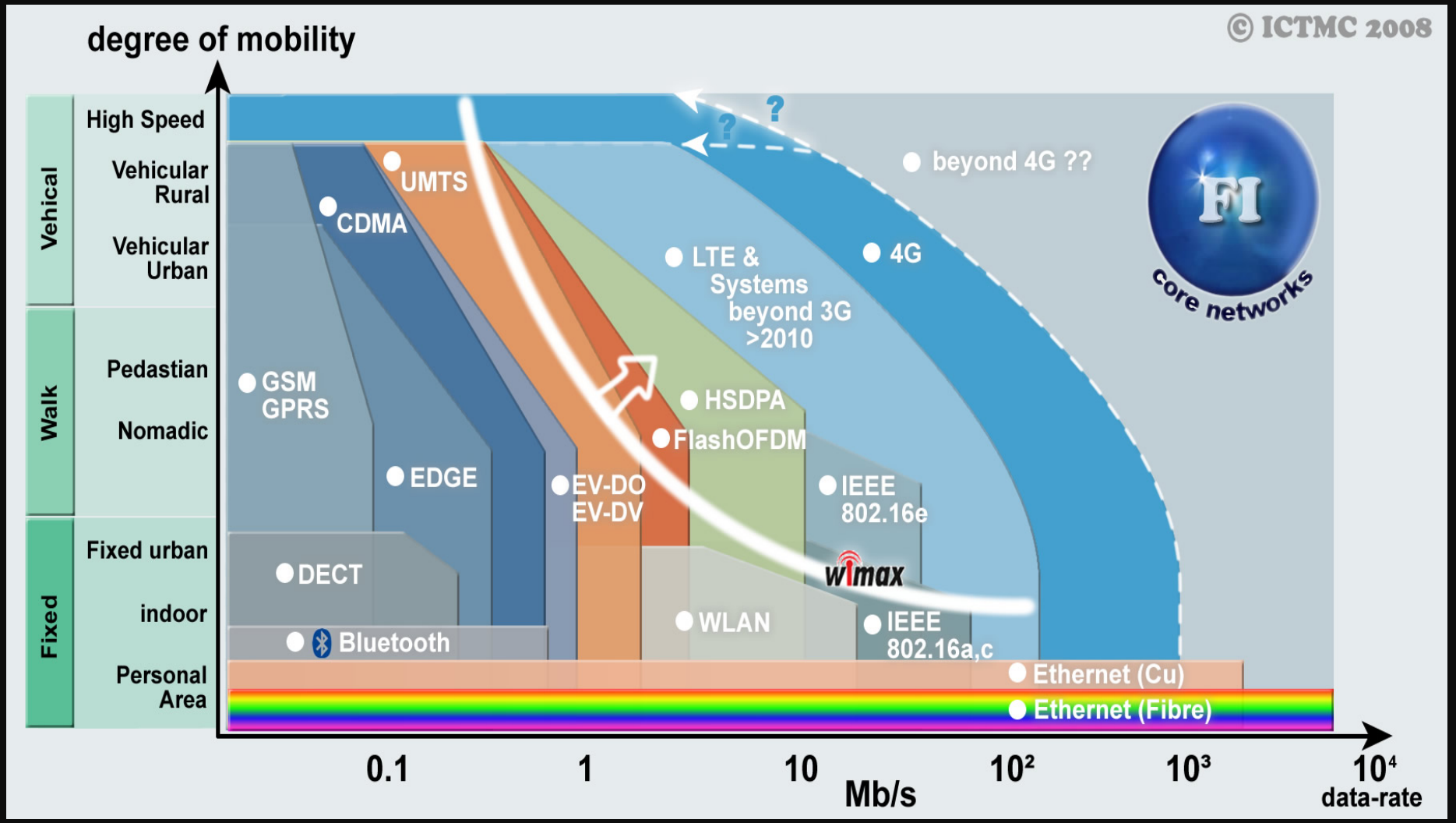
FI The Big Picture



Wireless Standards



ICT - Emerging & Future Technologies



Thank you, Steve Sutor

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