IEEE Addressing World Challenges

Growing Urbanization SMART CITIES

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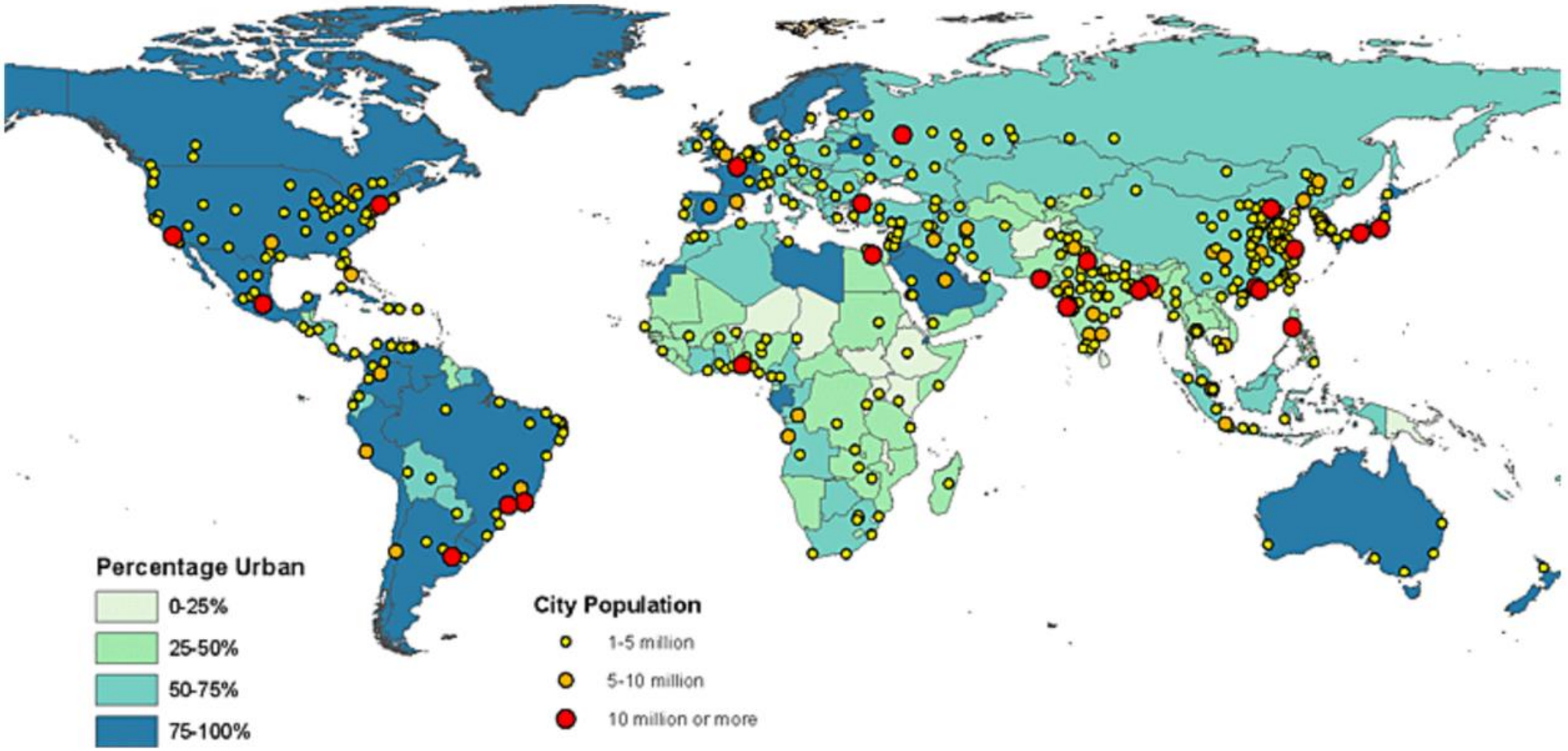
Growing Urbanization

World Urbanization Prospects, the 2011 Revision

Map 3: Percentage of urban population and agglomerations by size class, 2011

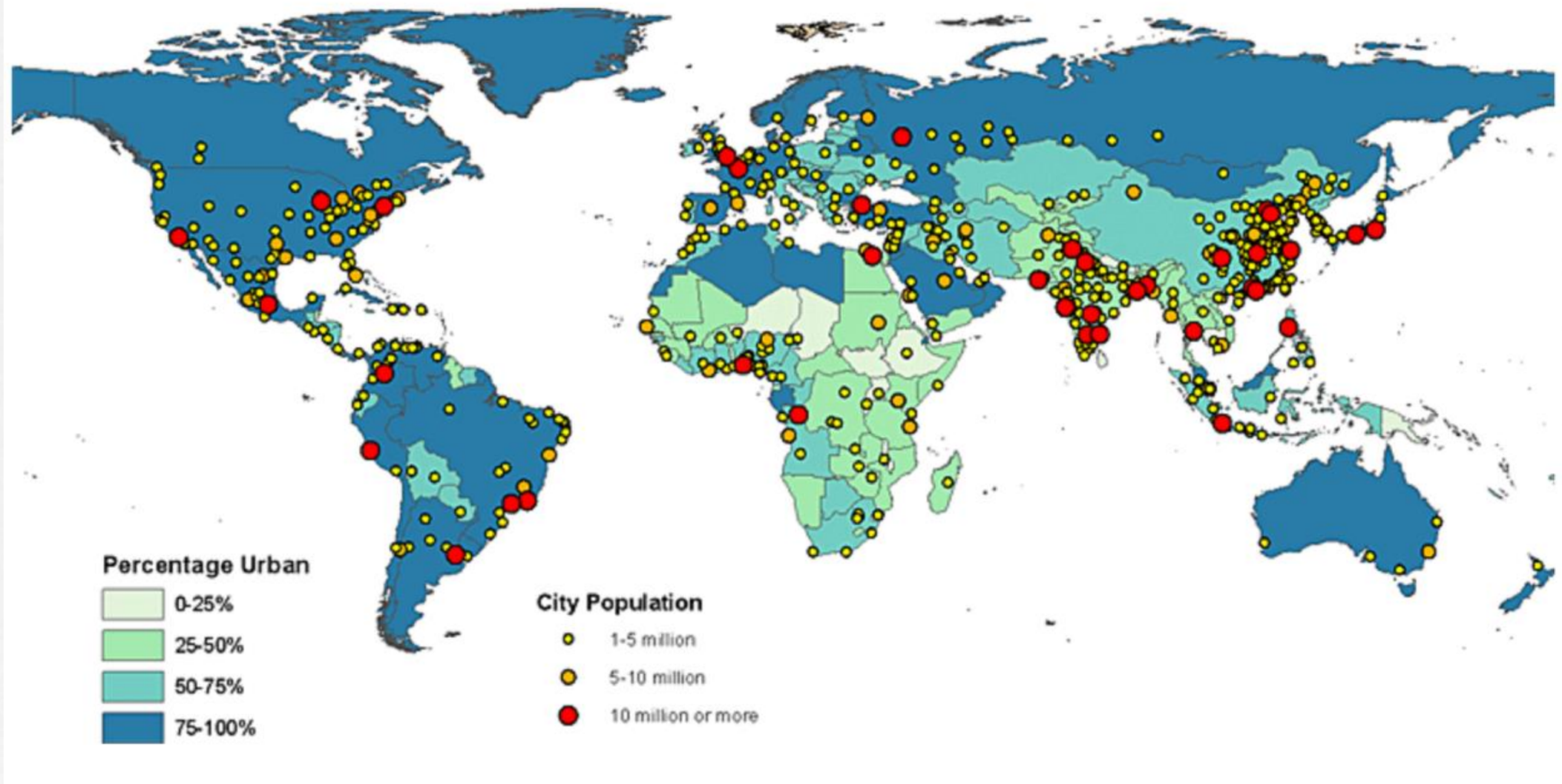


http://esa.un.org/unup/Maps/maps_urban_2025.htm

Growing Urbanization

World Urbanization Prospects, the 2011 Revision

Map 4: Percentage of urban population and agglomerations by size class, 2025



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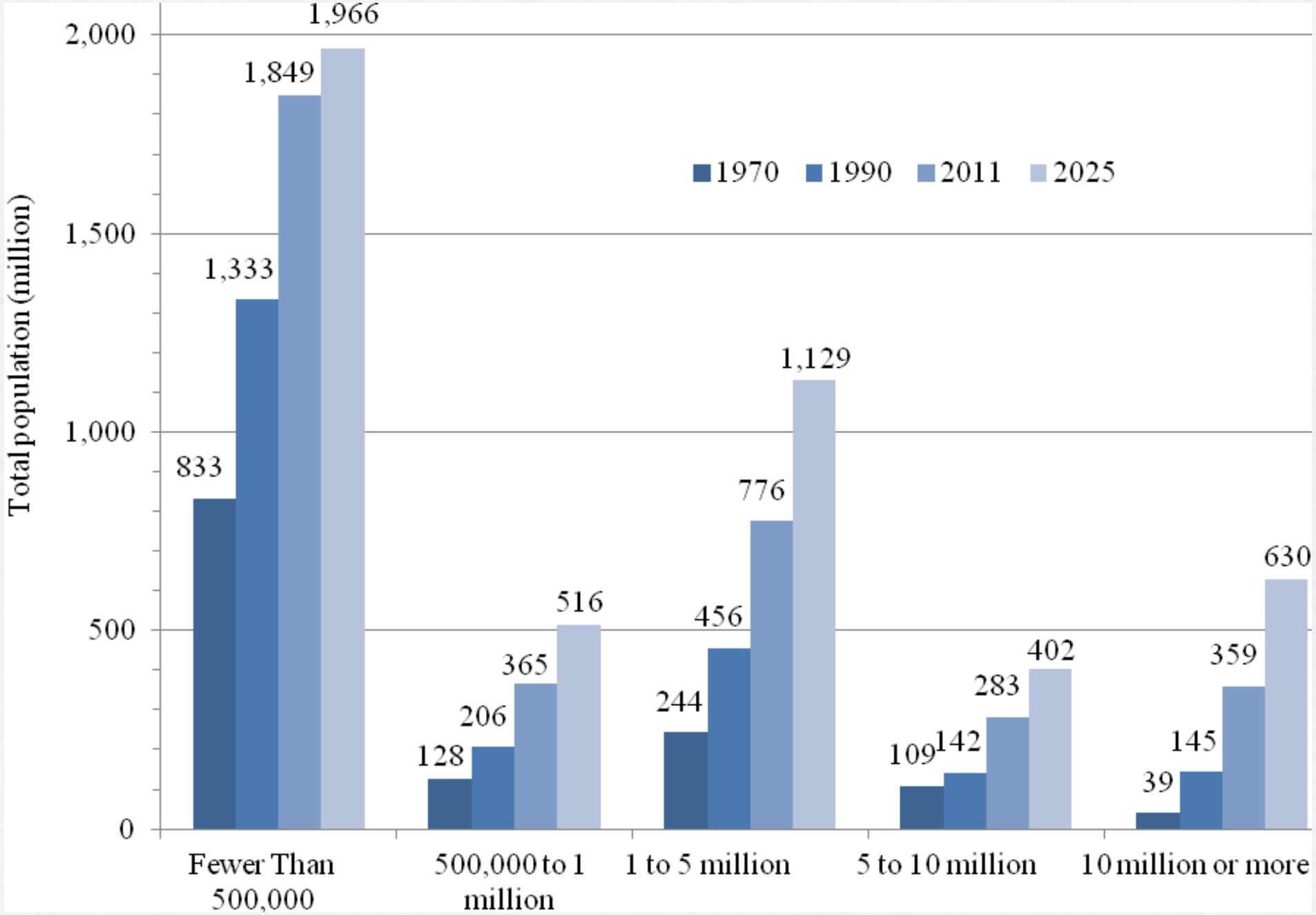
Growing Urbanization



http://esa.un.org/unup/Maps/maps_urban_2025.htm

GROWING URBANIZATION

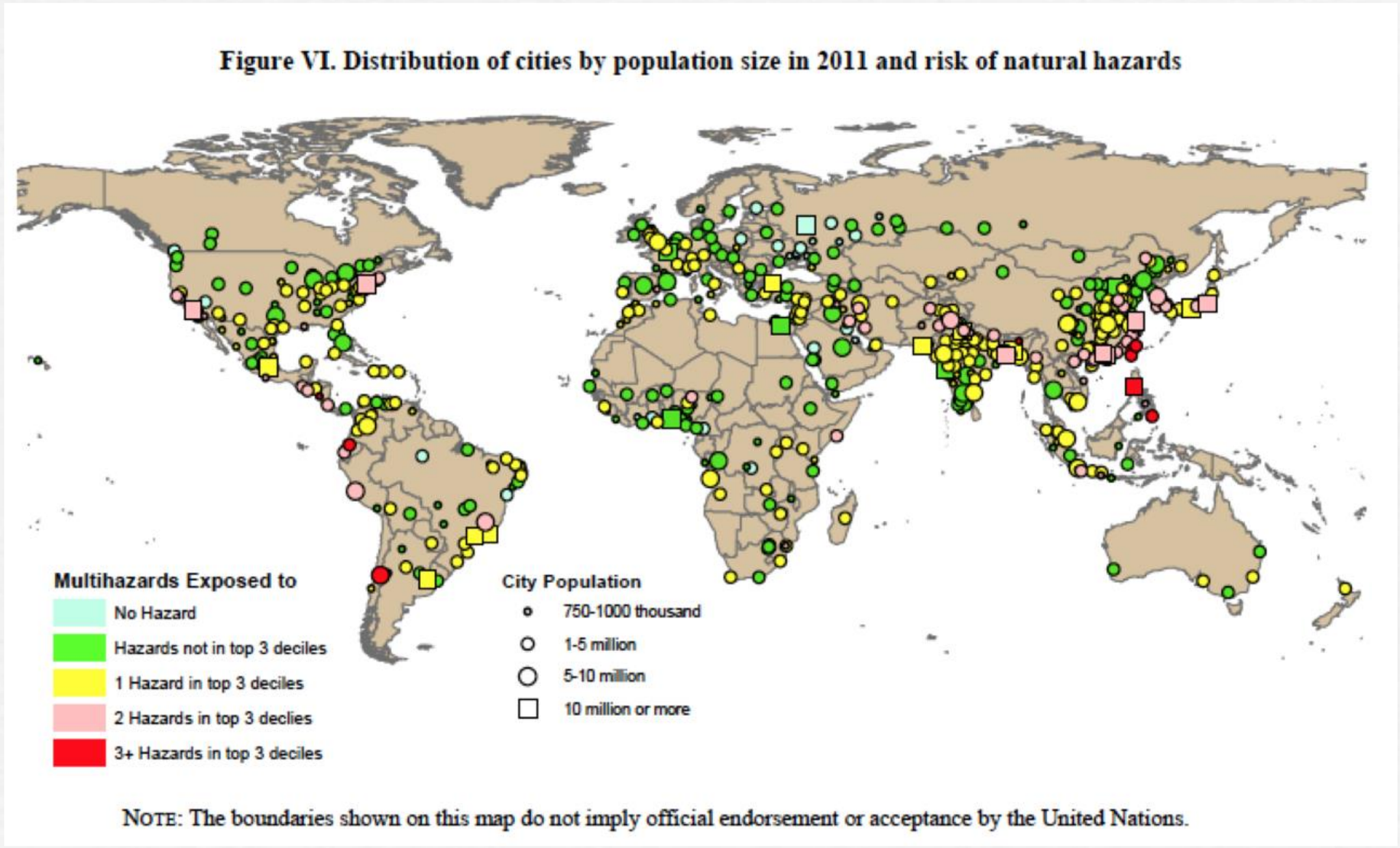
- **SOME FACTS:**
  - **HALF OF WORLD POPULATION LIVES IN CITIES IN 2013**
  - **HALF OF ASIA POPULATION TO LIVE IN CITIES BY 2020**
  - **HALF OF AFRICA POPULATION TO LIVE IN CITIES BY 2035**
  - **POPULATION GROWTH FROM 7B to 9.3B BY 2050**
    EXPECTED GROWTH IN CITIES FROM 3.6B to 6.3B BY 2050
    RURAL POPULATION EXPECTED TO DECREASE BY 2020
  - **MEGACITIES (>10M) ARE IMPRESSIVE BUT REPRESENT ONLY 9.9% GROWING TO 13.6% IN 2025**
    OVER 50% OF URBANIZATION INVOLVES CITIES OF 0.5M

Challenges of Urbanization

- **EXPOSURE TO NATURAL CHALLENGES**
- **POPULATION EXPLOSION**
- **HIGH COST OF LIVING**
- **RISING LEVELS OF POLLUTION**
- **INCREASE IN CRIME RATES**
- **INFRASTRUCTURES INVESTMENT - 10T$ per Y by 2025**
- **EXPONENTIAL GROWTH OF DATA**
- **POTENTIAL CULTURAL CLASHES**

Challenges - Natural

- ★ Sensors
- ★ Networks
- ★ Big Data
- ★ Risk Mgt



http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

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Challenges - Population

- **EXPLOSION MEANS**
  - **Traffic Management - Public and Private**
  - **Access to Resources - Logistics, Distribution/Disposal**
  - **Housing**
  - **Epidemics**
  - **Cultural Clashes**

★ Sensors
★ Networks
★ Pharma
★ Production Processes

http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

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Challenges - Living

- **HIGH COST OF LIVING MEANS**
  - **Disparity in access to basic resources**
  - **Ghettos**
  - **Poor vs Rich Neighbors**

★ Production Processes
★ Distribution Processes
★ Access to Services

http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

Challenges - Pollution

- **HIGH LEVELS OF POLLUTION MEANS**
  - **Health Care Issues**
  - **Depletion of the Environment**

★ Sensors
★ Networks
★ Pharma
★ BioTech
★ NanoTech

http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

Challenges - Crime

- **INCREASED CRIME RATES MEANS**
  - **Security**
  - **Culture of Violence**

★ Sensors
★ Networks
★ Identity Mgt
★ Communications

http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

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Challenges - Infrastructures

- **INFRASTRUCTURE INVESTMENTS MEANS**
  - **Sustainability**
  - **Efficiency**
  - **Control - Ownership**
  - **Accessibility**

★ Networks
★ Terminals
★ Wireless
★ Nanotech

http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf

Urbanization Challenge

Smart Cities
“IEEE support”
Flagship Initiative

New Technology FDC Maturity Process

Prospect List

Incubator

In partnership with Local Players

Phase 1:

Coordinate across IEEE OUs

Phase 2: Position as “One Face” to Customers

Phase 3: Position as “Thought Leader”

Ongoing Support or Dissolve

Urbanization “Smart Cities”

Objective

- **Contribute to Manage the Urbanization Challenge– IEEE brand recognition: Societies, Education, Standards**
  all have key roles

- **Help guide in appropriate use of technology**

- **Raise awareness on benefits and downside of technology**

Successful Technology disappears from every day perception
The IEEE logo is a trusted assurance
that the best technology can be exploited

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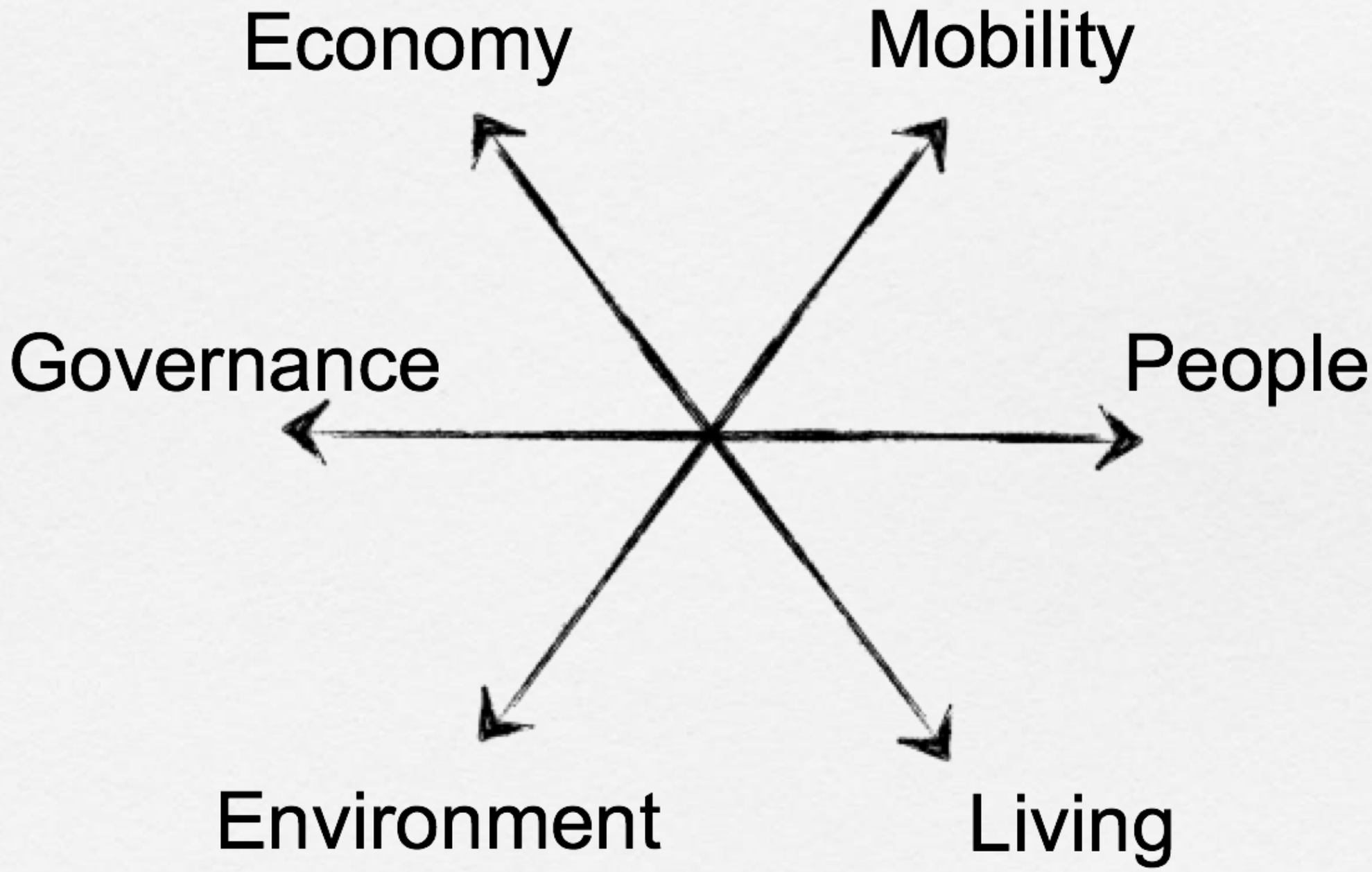
Ups and Downs

A holistic view is needed



Approach

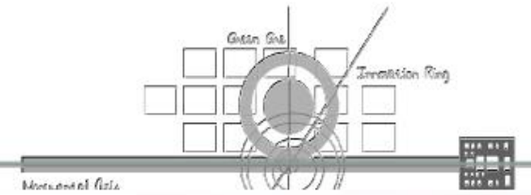
- **To Start: Select one city per year per Continent: Criteria**
  - **Each city has a concrete plan and funds to become a Smart City**
  - **The local constituency welcomes IEEE involvement**
  - **The local authorities have interest in sharing experience at the international level and in becoming a path leader**
  - **There is a local Chapter and Section willing to take "Feet" on the Ground" responsibility and to support**
  - **There is a local University interested to work on Smart Cities and some form of industry commitment**
  - **There are local facilities available to host IEEE initiatives**
- **Intent is to develop a repeatable process and engage additional cities around the world.**

Approach – IEEE offers

- **Organization of a local workshop with international experts in the specific area of focus; a follow up WS in the 2nd year**
- **Connection to other international organizations looking at various aspects of "Smart"**
- **Support to local university by sharing courses, supporting courses creation, promoting PhD student exchange, organizing Summer Schools**
- **Provision of at least two DLT per year and help IEEE local Chapter**
- **Engage with MGA: Provide training to IEEE Members & Public**
  - **Goal: Develop Common Technical Vision**
  - **MOOC Smart Cities 2014**

Steps

- **Use Guadalajara as a proof of concept**
  - **IEEE FDC Staff management**
  - **Identify a Reference Point from each interested Society in becoming part of the initiative**
  - **Identify Patrons**
  - **Establish relations with International Bodies (e.g. ITU, E.C. ICT LABS)**
  - **Begin developing a portfolio: workshop, courses, white papers, MOOC ...**
  - **Establish IEEE corporate marketing world plan**



CCD LOCATION:

- In **Guadalajara's Historic** center
- Around **Parque Morelos**
- It is part of a Comprehensive strategy for the **revival** and **regeneration** of the main city area
- CCD core area is **40 hectares+ Parque Morelos**
- Area of direct beneficial influence is **380 hectares.**
- **DUIS certification** is a prerequisite for the Digital Creative City

Assets

1. Optical Fiber Ring and WiFi Mesh to support the Urban OS and the digital life in CCD.
2. Data center for CCD and the smart city
3. First Intelligent Building (in order to define sensors, mix with the team of architects to optimize systems of the buildings for smarter energy, water, & weather management).
4. Smartphone Apps for smarter mobility and a framework to report events in the smart city.
5. The INFOBOX as the kernel of the Urban OS where all the people can know the status of the smart city and how well is performing their processes.
6. Digital kiosks in order to provide interaction and city services to the people at CCD.
7. HD Cameras for security, as sensors for smart lights, as monitors for traffic and pollution.
8. Operation center for CCD in order to have graphic displays as dashboards for the municipality to take actions to optimize and keep at the optimal all the city proceses and services.
9. CCD Energy smart grid - in order to suport on site created energy (solar from panels)
10. Smart lighting system for the City.

IEEE Involvement

1. organize a kick off workshop bringing in some of its volunteers with specific expertise in the areas required by Guadalajara for its endeavor
2. connect Guadalajara to other international organizations participating to the IEEE Urbanization Challenge (at this time we have agreement with the ITU, ICT LABS and we are negotiating with the Osservatorio Tuttimedia - McLuhan Foundation)
3. provide support to the local University in the organization of a study plan and courses in the Smart City area, with special focus on those aspects that are most relevant to Guadalajara
4. provide continuous local support through the IEEE Section/Chapter
5. organize a follow up workshop on the second year of the initiative and 2 DLT per year
6. Provide access, in synch with ICT LABS, to Master School in Digital Cities
7. support the exchange of a few PhD students with other Universities
8. connect Guadalajara to relevant IEEE events
9. provide exposure to the Guadalajara initiative through appropriate IEEE publications

2013 RoadMap

- End of May - final plan for Guadalajara involvement
  - involvement of other major Players
- June FDC Approval, Report to TAB
- September- Selection of 4 cities for 2014
  - consider 1 in Europe, 1 in Asia, 1 in South America , 1 in Africa
- November - Workshop in Guadalajara
- End of year White Paper

2014 RoadMap

- March/June/September/November workshops in the selected cities
- Follow up in Guadalajara - one event every 4 to 6 months organized by local Chapter and Local University
- Start up of a course on Smart Cities at Guadalajara University
- MOOC
- Partnership with ICT LABS for Smart Cities in Europe

2014 RoadMap ICT LABS Europe

Intelligent Mobility

Privacy Security

Smart Spaces

Digital Cities

Privacy Security

Cloud Computing

Smart Energy

Future Networks

2015 RoadMap

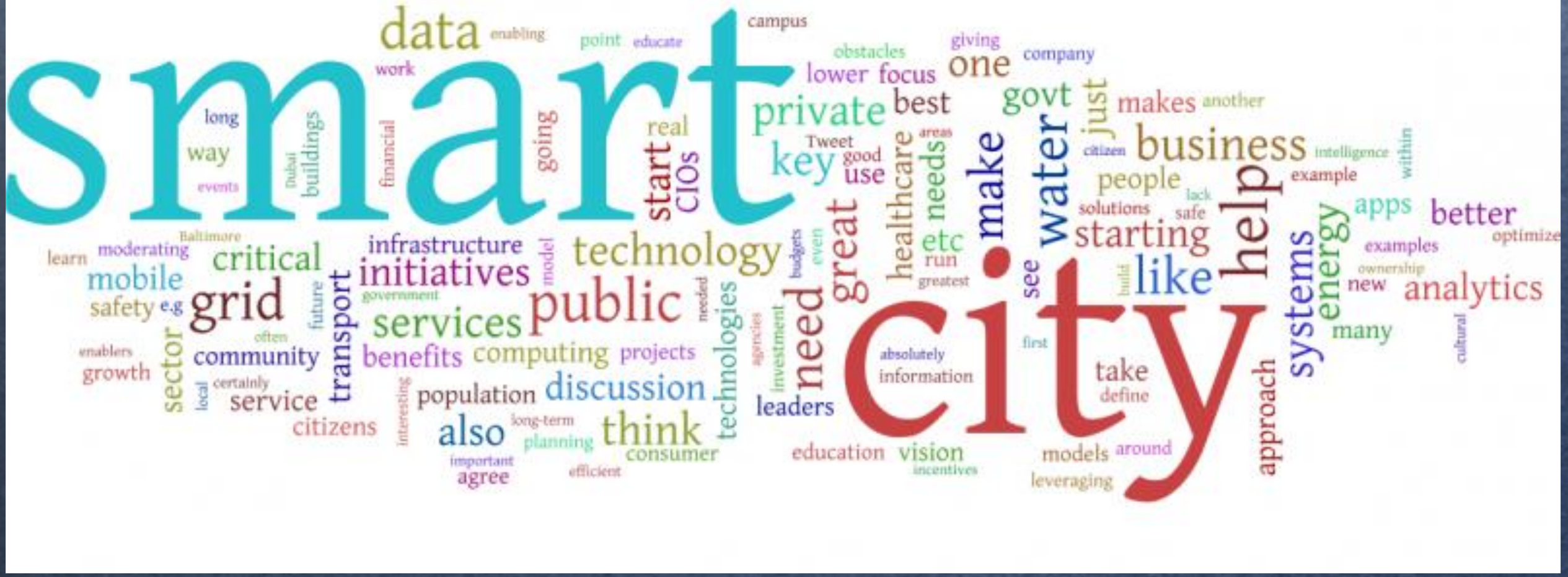
- March/June/September/November workshops in the selected cities
- Follow up in previous cities - one event every 4 to 6 months organized by local Chapter and Local University
- Clustering of University for an International Master on Smart Cities
- Presence at the EXPO 2015 in Milan
- Initiative self sustained, Place in IEEE infrastructure 2017

Business Plan

- Seed Money from FDC completed the initiative in 2013
  - for organization in Guadalajara
    - supporting 6 Theses/ 1PhD
    - setting up a Shared Knowledge Base
    - tele education framework support
    - for Chapter support
    - University support
    - 2 distinguished lecturers
    - travel staff/volunteers

Business Plan

- Seed Money through TMC/FDC to expand in 2014
  - for the 4 cities
  - Plan: Self sustaining initiatives in Guadalajara with 20% margin
- Seed Money from TMC/FDC continues in 2015. Funding requirement TBD
- Plan: Self sustained initiatives in previous 5 cities with 20% margin that cover Chapter and University expenses


smart
city
data
enabling
point
educate
campus
work
obstacles
giving
company
lower
focus
one
private
best
govt
makes
another
long
way
buildings
Dubai
financial
going
real
start
CIOs
Tweet
key
good
use
areas
needs
healthcare
etc
make
water
just
citizen
business
intelligence
within
people
example
lack
solutions
safe
apps
better
optimize
starting
like
help
examples
ownership
new
analytics
systems
energy
many
cultural
Baltimore
learn
moderating
critical
infrastructure
initiatives
technology
mobile
safety
e.g
grid
future
transport
government
model
public
needed
services
technologies
sector
often
enablers
community
benefits
computing
projects
growth
local
certainly
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population
leaders
investment
budgets
even
agencies
need
great
see
first
absolutely
information
take
define
approach
citizens
interesting
also
long-term
planning
think
consumer
important
agree
efficient
education
vision
incentives
models
around
leveraging

When does a City become Smart?

- ★ Once it is a Vision of its Future
- ★ Once it has started a path towards that Vision
- ★ Once it is able to make Innovation tangible and widespread

SMART IS A WAY OF BEING

IT IS NOT A POINT OF ARRIVAL

How Smart is a City?

★ SMART CITY INDEX

need for a Metrics to measure progress and benchmark

★ START BY LOOKING AT THE “AS IS”

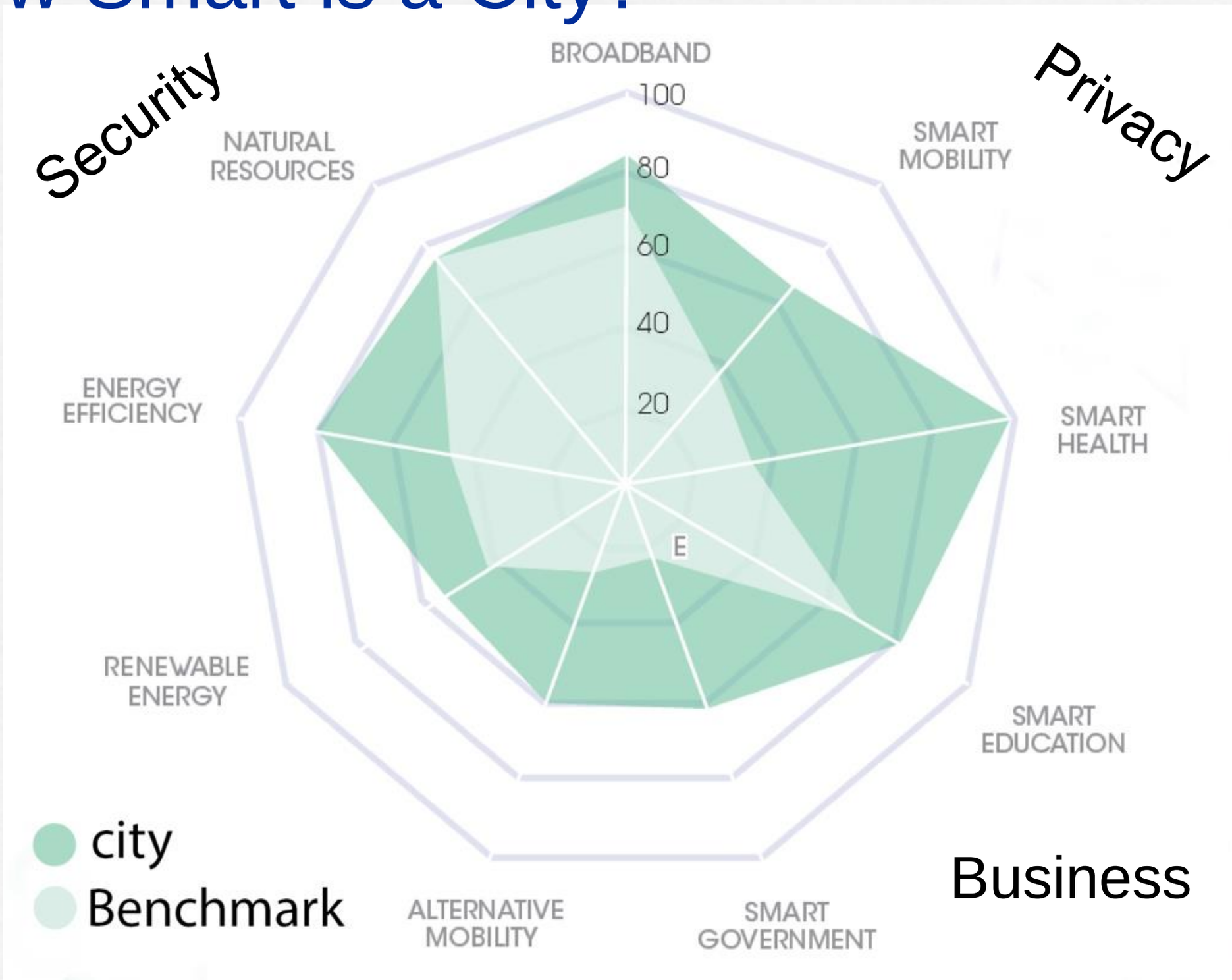
measure what exists, not what is being promised

★ COVERS A BROAD RANGE OF ASPECTS

e.g. Infrastructures, Sustainable Development (alternative mobility, renewable energy, energy efficiency, Natural Resources Mgt -air, water, waste)

INDEPENDENTLY ASSESSED

How Smart is a City?



How Smart is a City?

Broadband

- **Fixed Broadband Penetration**
- **Mobile Broadband Penetration**
- **Ultra Broadband (FTTC, FTTH)**
- **WiFi Coverage**
- **Broadband Buoys**
- **Pervasive Cloud Support**
- **Augmented Reality**
- **....**

How Smart is a City?

Smart Health

- **Reservation, Payment, Results via WEB**
- **Doctor Selection via WEB**
- **Digital Medical Record**
- **Remote Monitoring**
- **Remote Consultancy**
- **Robotic Assistance**
- **Epidemics Detection**
- **....**

How Smart is a City?

Smart Education

- **Penetration of PC at School**
- **Penetration of Multimedia Interactive BlackBoard**
- **Connected Classroom**
- **Digital Book and Courses Adoption**
- **Remote Education**
- **Personalized Education**
- **Self created education material**
- **....**

How Smart is a City?

Smart Mobility

- **Electronic Ticket for public transport**
- **On Line Schedule and lines stops/destination**
- **Mobile Travel Assistant**
- **Multi-Modal Mobility Support**
- **Parking reservation “on the go”**
- **Best route prompt**
- **Proactive Traffic Management**
- **....**

How Smart is a City?

Smart Government

- **On Line Certificate**
- **On Line School (registration-monitoring-...)**
- **On Line Payment for taxes and dues**
- **Open Data Framework**
- **Polling Services - City Government Watch**
- **Crowdsourcing for the City**
- **Electronic Voting**
- **....**

How Smart is a City?

Alternative Mobility

- **Electric Cars penetration and Public Power Supply**
- **City Managed Car Sharing/Pooling and Bike Sharing**
- **Reserved bike path penetration**
- **Shared work sites**
- **Community Car Sharing/Pooling support framework**
- **Measures stimulating alternative mobility**
- **Disabled mobility support**
- **....**

How Smart is a City?

Natural Resources

- **Selective Waste Management**
- **Water treatment, purification, control**
- **Air Pollution Control**
- **Crowdsourcing for NR Mgt**
- **Pervasive Sensors for ambient monitoring**
- **Personal Carbon Tax**
- **Real Time NR display to citizens - Awareness programs**
- **....**

How Smart is a City?

Energy Efficiency

- **Smart Buildings for decreased power consumption**
- **Tele-Heating**
- **Public Lighting Control**
- **City Resources spearheading power reduction**
- **Smart Grids**
- **Tax policy towards energy efficiency**
- **Zero power sensors**
- **....**

How Smart is a City?

Renewable Energy

- **Photovoltaic**
- **Wind power generation**
- **Hydroelectric power generation**
- **City Resources spearheading power reduction**
- **Solar Panels for water heating**
- **Tax policy towards micro energy production**
- **Re-cycling of waste for power production**
- **....**

How Smart is a City?

	RANKING NAZIONALE	PUNTEGGIO INDEX
Bologna	1	100,0
Milano	2	97,4
Roma	3	92,9
Reggio Emilia	4	92,2
Torino	5	91,8
Firenze	6	90,6
Brescia	7	86,3
Piacenza	8	85,8
Parma	9	84,9
Monza	10	81,7
Cremona	11	81,3
Vicenza	12	80,3
Pisa	13	79,4
Forlì	13	79,4
Modena	15	79,3
Genova	16	78,2
Bari	17	78,1
Verona	18	77,6
Bergamo	19	76,5
Padova	20	76,3
Pavia	21	76,2
Trento	21	76,2
Mantova	23	75,1
Sondrio	24	74,9
Varese	25	74,1
Lodi	26	74,0
Como	27	73,1
Ferrara	28	73,0
La Spezia	29	72,8
Salerno	29	72,8
Prato	31	70,6
Rimini	32	70,5
Ravenna	33	70,4
Potenza	34	69,9
Siena	35	68,9
Lecce	36	67,4
Udine	37	67,0
Arezzo	38	66,9
Bolzano	39	66,3

	RANKING NAZIONALE	PUNTEGGIO INDEX
Cagliari	40	66,2
Venezia	41	65,3
Livorno	42	65,2
Benevento	43	64,4
Pistoia	43	64,4
Cuneo	45	64,3
Lecco	46	63,7
Lucca	47	63,5
Grosseto	48	63,4
Foggia	49	62,9
Napoli	50	62,4
Treviso	51	61,6
Matera	51	61,6
Pesaro	53	61,5
Avellino	54	60,7
Brindisi	55	60,5
Cosenza	56	60,3
Chieti	57	59,5
Barletta	58	59,3
Tortoli	59	58,9
Frosinone	60	58,4
Oristano	61	57,8
Biella	62	57,5
Perugia	62	57,5
Palermo	64	57,3
Ancona	65	57,2
Sassari	66	56,8
Macerata	67	56,7
Olbia	67	56,7
Caserta	69	56,6
Massa	70	56,4
Aosta	70	56,4
Catania	72	56,1
Ascoli Piceno	73	55,4
L'Aquila	74	55,2
Andria	75	55,1
Villacidro	75	55,1
Taranto	77	54,9
Lanusei	78	54,7

	RANKING NAZIONALE	PUNTEGGIO INDEX
Isernia	79	54,5
Novara	80	54,3
Carbonia	81	53,9
Asti	81	53,9
Ragusa	83	53,5
Belluno	83	53,5
Reggio Calabria	85	53,4
Pordenone	85	53,4
Siracusa	87	53,2
Rovigo	88	53,1
Savona	89	52,9
Pescara	89	52,9
Teramo	91	52,5
Latina	92	52,2
Sanluri	93	52,0
Trani	94	51,8
Trapani	95	51,7
Verbania	96	51,6
Viterbo	96	51,6
Tempio Pausania	98	51,5
Vercelli	99	51,1
Trieste	100	50,8
Iglesias	101	50,5
Terni	101	50,5
Catanzaro	103	50,4
Gorizia	104	50,3
Alessandria	104	50,3
Campobasso	106	48,9
Nuoro	107	47,5
Imperia	108	47,0
Crotone	109	46,7
Caltanissetta	110	46,3
Agrigento	110	46,3
Rieti	112	46,1
Enna	113	45,8
Messina	114	42,4
Vibo Valentia	114	42,4
Fermo	116	39,0

BROADBAND · SMART MOBILITY · SMART HEALTH · SMART EDUCATION · SMART GOVERNMENT · MOBILITÀ ALTERNATIVA · ENERGIE RINNOVABILI · EFFICIENZA ENERGETICA · RISORSE NATURALI

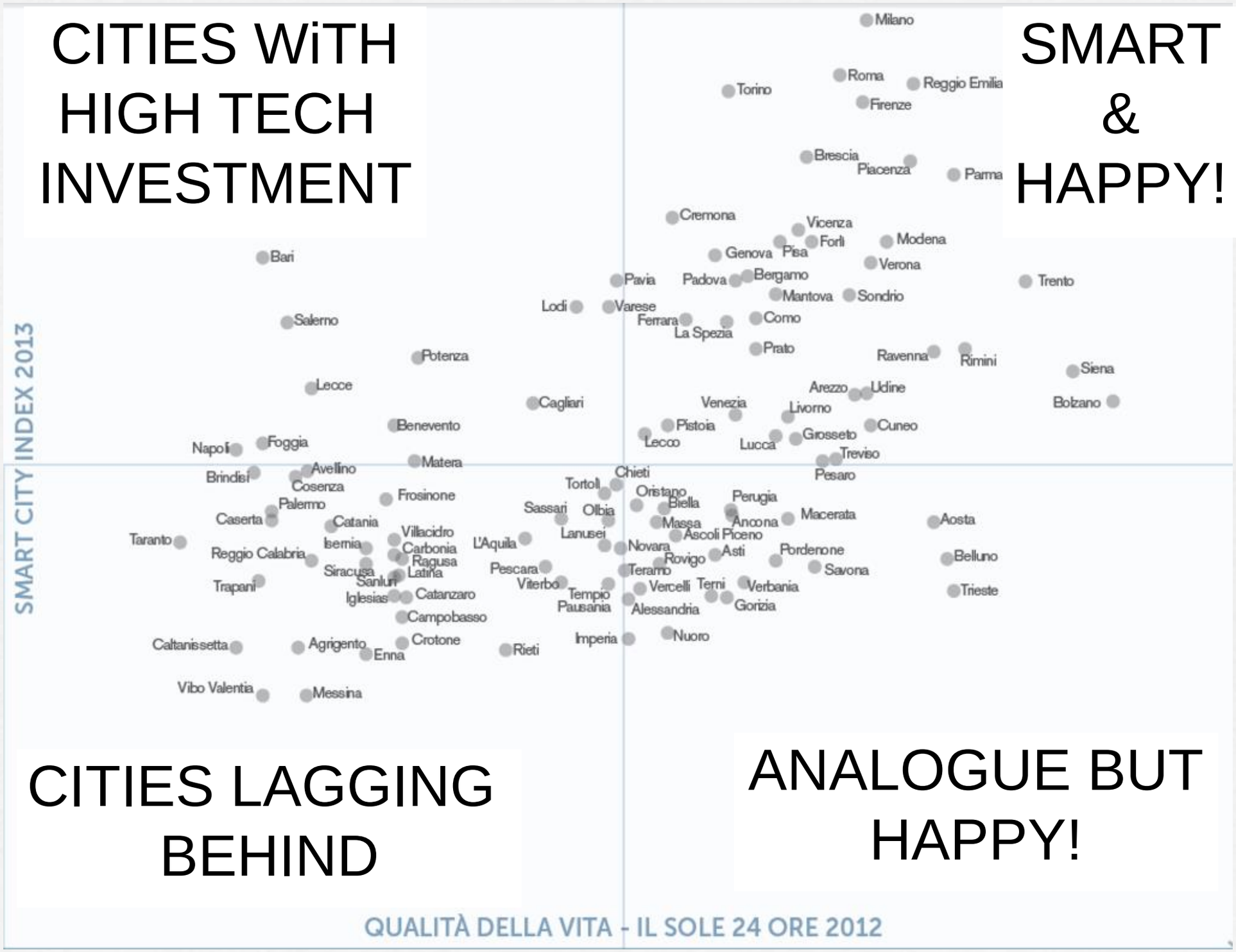
Prima fascia · Seconda fascia · Terza fascia

116 Italian Cities ranking by Between - SMART CITY INDEX Report 2013

Does Smart correlate to Happy?

CITIES WiTH HIGH TECH INVESTMENT

SMART & HAPPY!



CITIES LAGGING BEHIND

ANALOGUE BUT HAPPY!

QUALITÀ DELLA VITA - IL SOLE 24 ORE 2012

There is a Regional dimension to a Smart City...

Renewable Energy

- **Distribution of population ease the burden on the city**
- **Health Care, Education**
- **Mobility, Energy**
- **eServices**
- **Alternative Production Processes (remote working)**
- **Alternative Social Aggregation. Hub and Spokes**
- **....**

Focus on Technology

There’s Plenty
and we have just began

ICT as an enabling technology

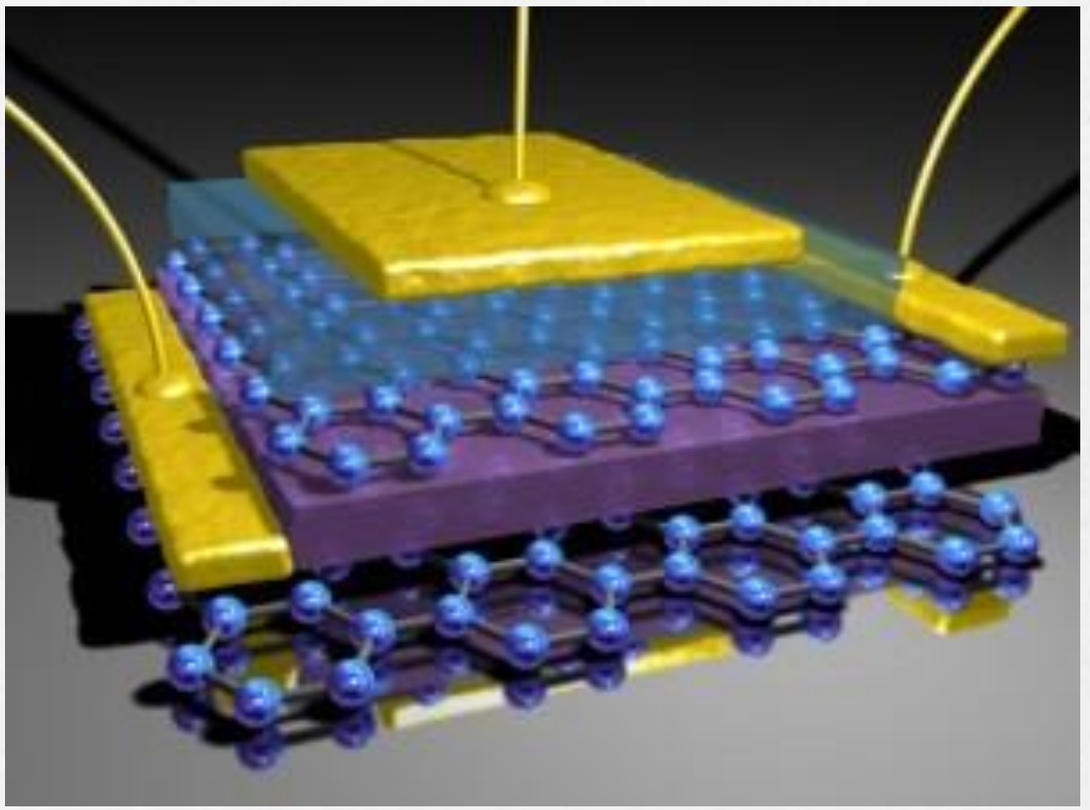
Graphene

EU Flagship Project

From etching to printing

Any surface becomes a screen

Embedded electronics



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ICT as an enabling technology

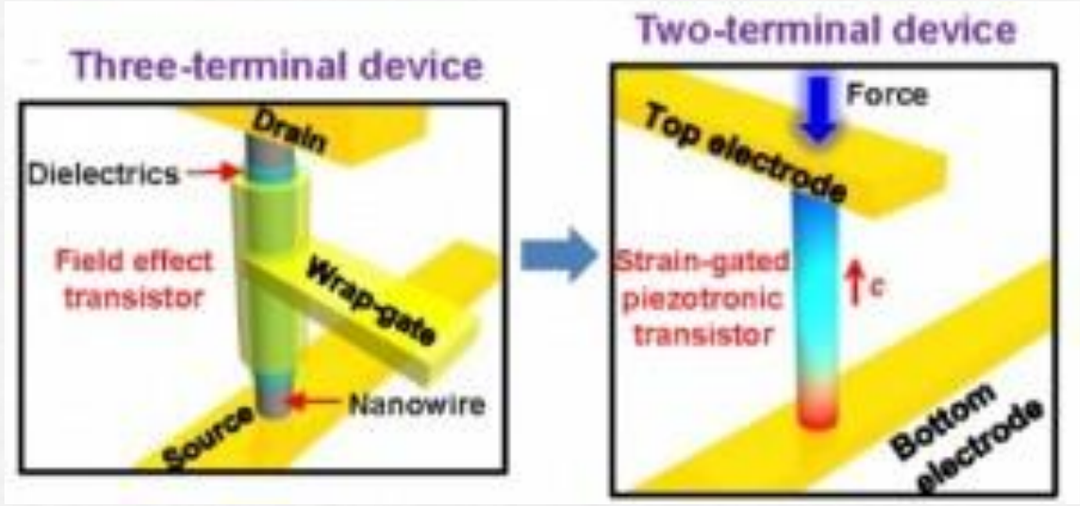
Taxels - Smart Materials

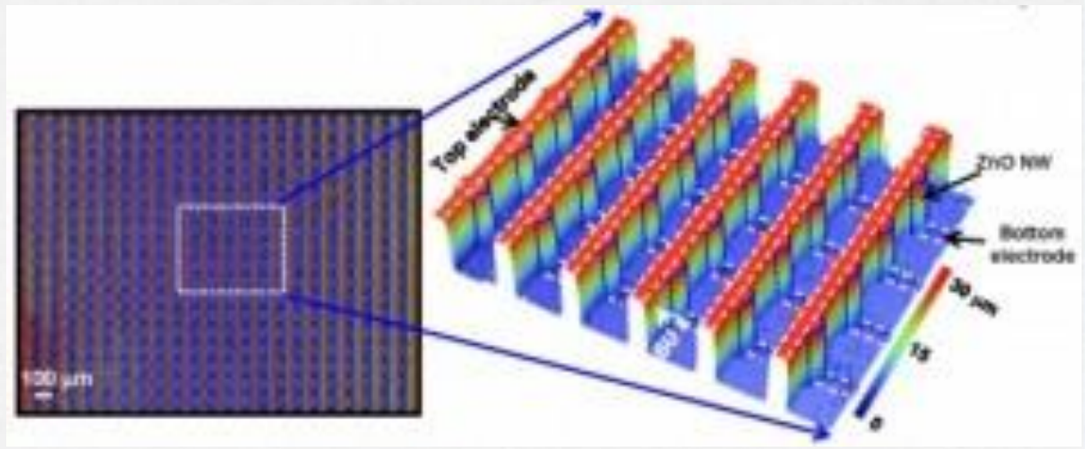
Haptic adds the touch

Robotics

Any surface can “feel”

Ambient awareness





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ICT as an enabling technology

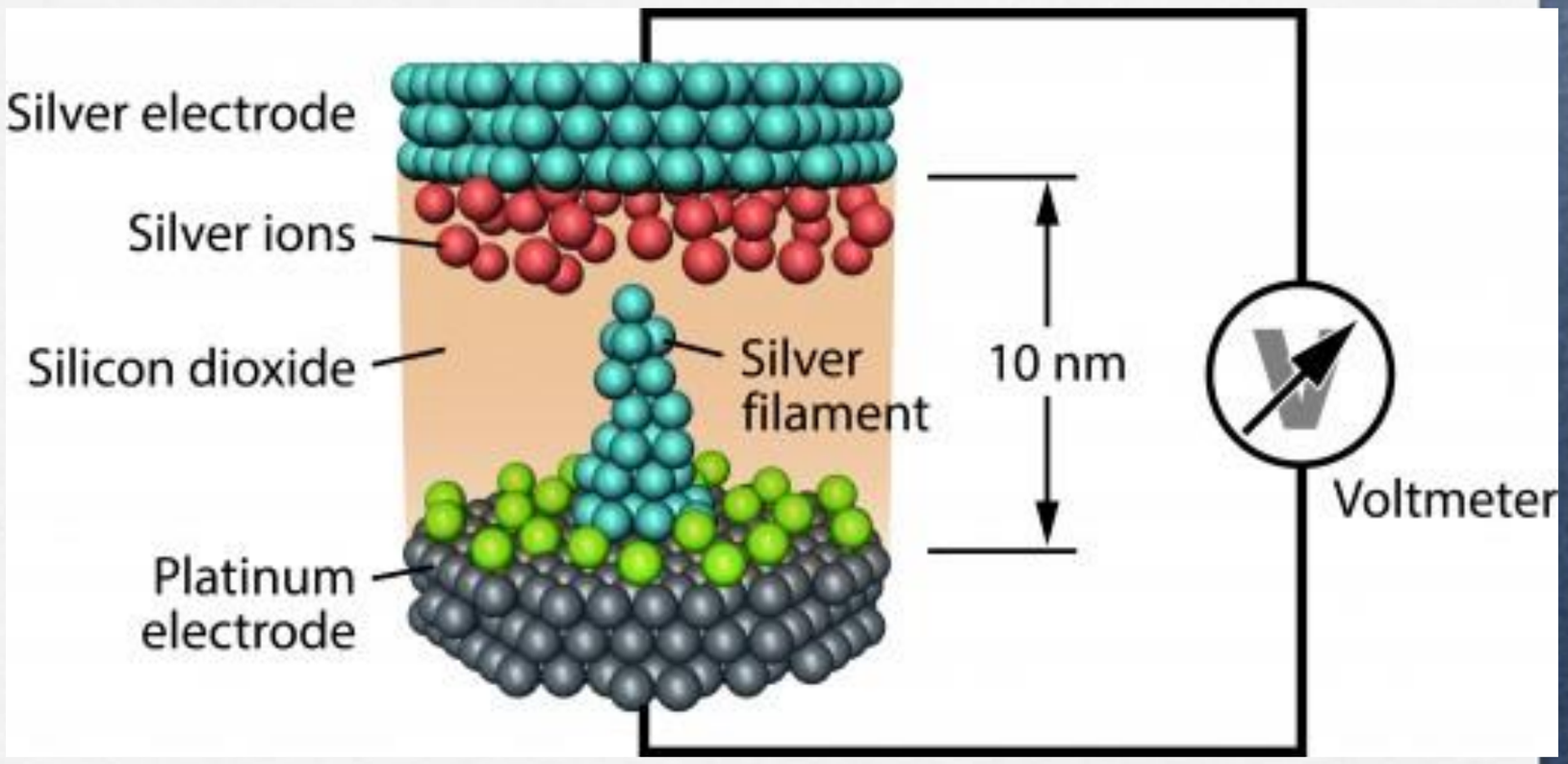
Nano Tech

Building bottom up

Properties by Design

Self assembling

Storage, Photonics, Processing



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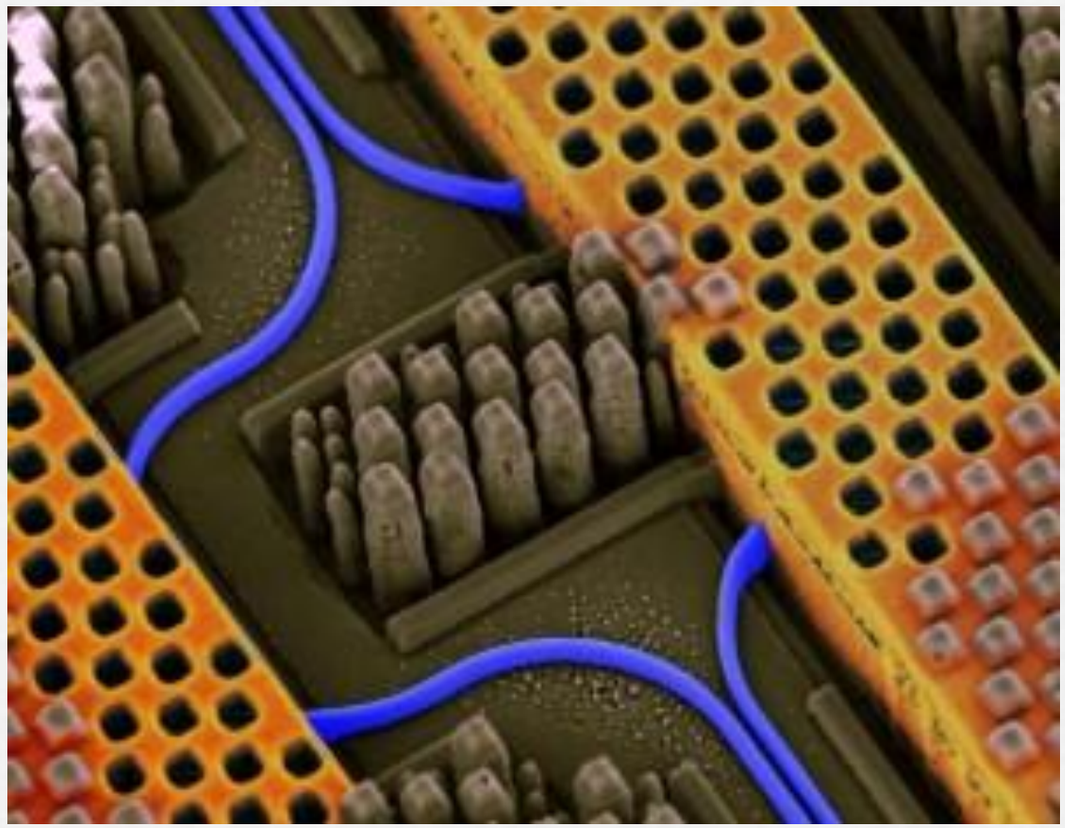
ICT as an enabling technology

Embedded Photonics

Photonics inside the chip



Massive Distributed Processing

Interconnected Data Crunchers

The Network is a Supercomputer

ICT as an enabling technology

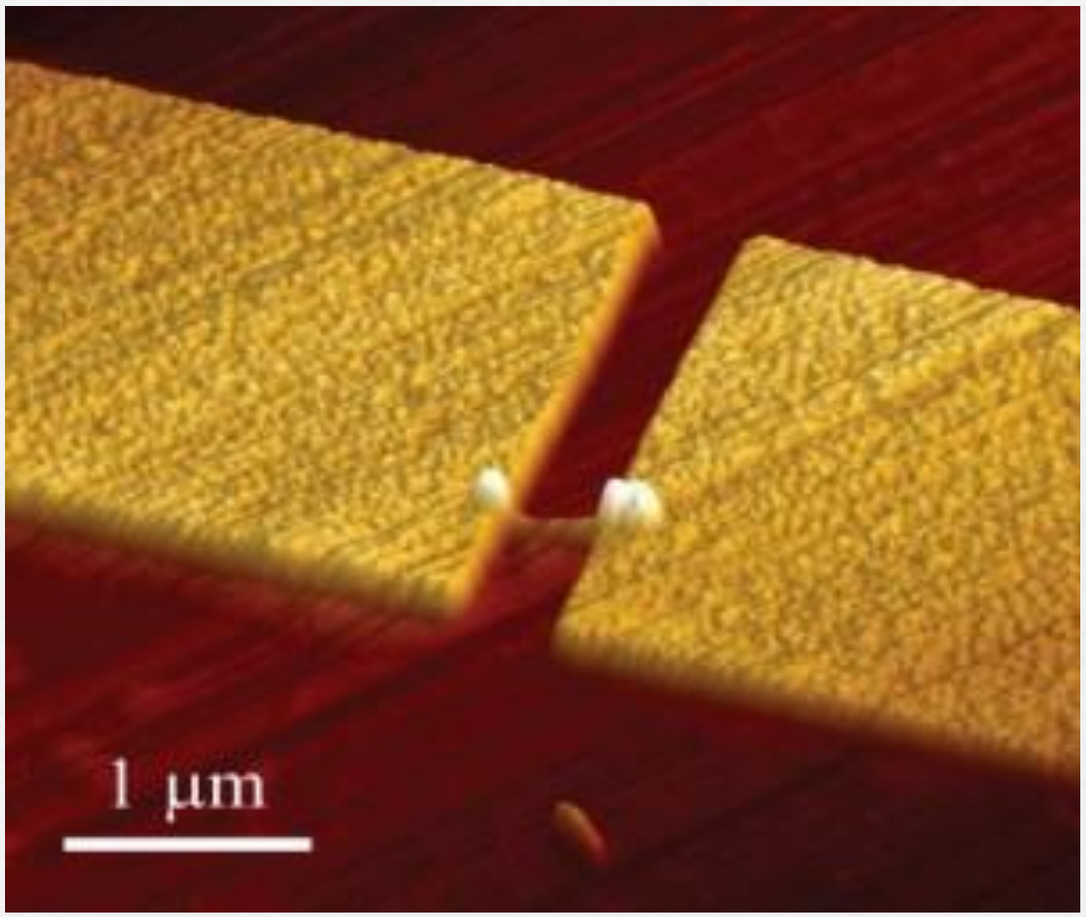
Quantum Cryptography

QC destroys PKC

Quantum Entanglement

Single Photon Emission

Optical Fibre end to end



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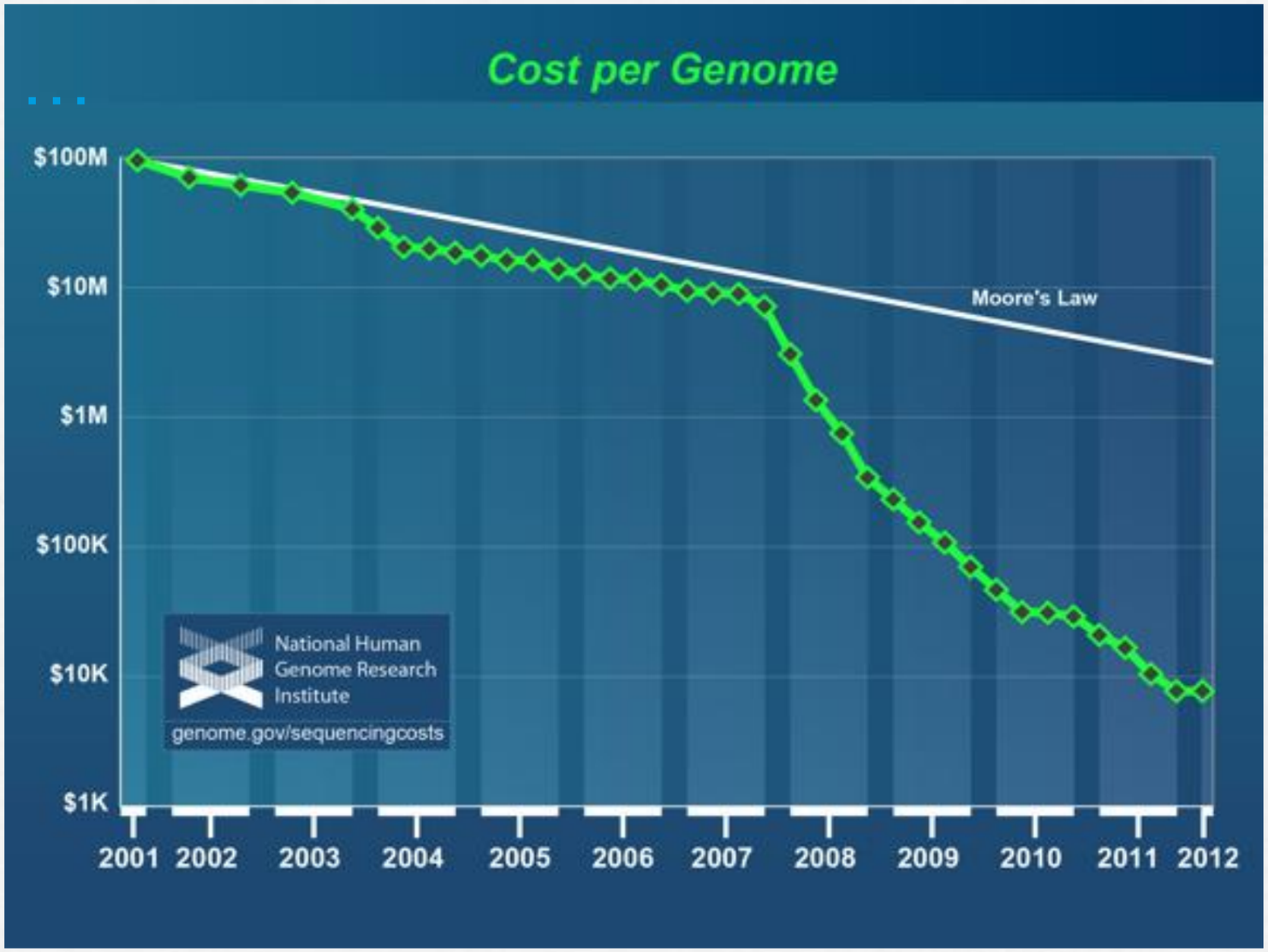
ICT as an enabling technology

ICT biggest disruption …

Not performance increase

but COST decrease

Moving from Value Chains to Ecosystems



IEEE Advancing Technology for Humanity

ICT as an enabling technology

There's plenty now!

We don't have to wait.

Technology Today

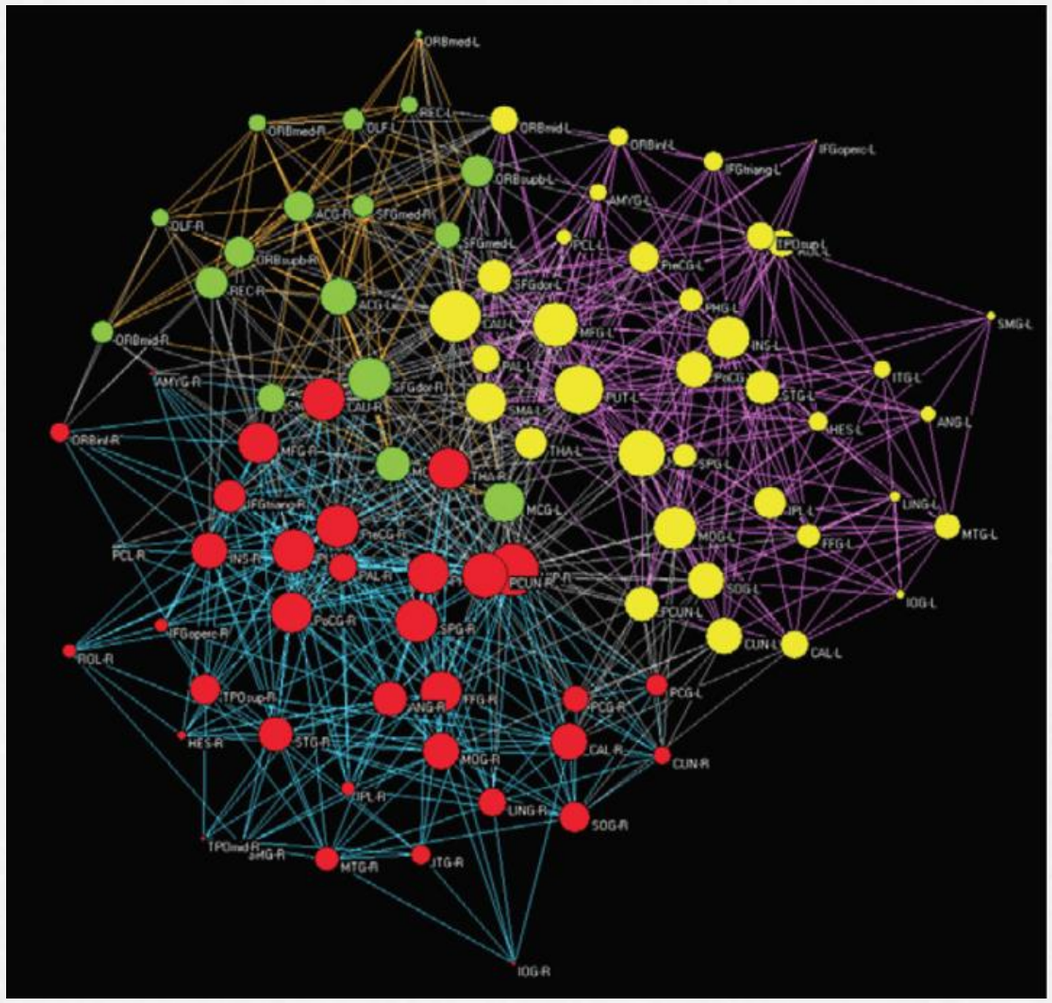
is good enough!

IEEE
Advancing Technology for Humanity

Towards a Semantic Comm. Fabric

There are Networks ... and then there are Networks

- Telecom Fixed Ntw



SW

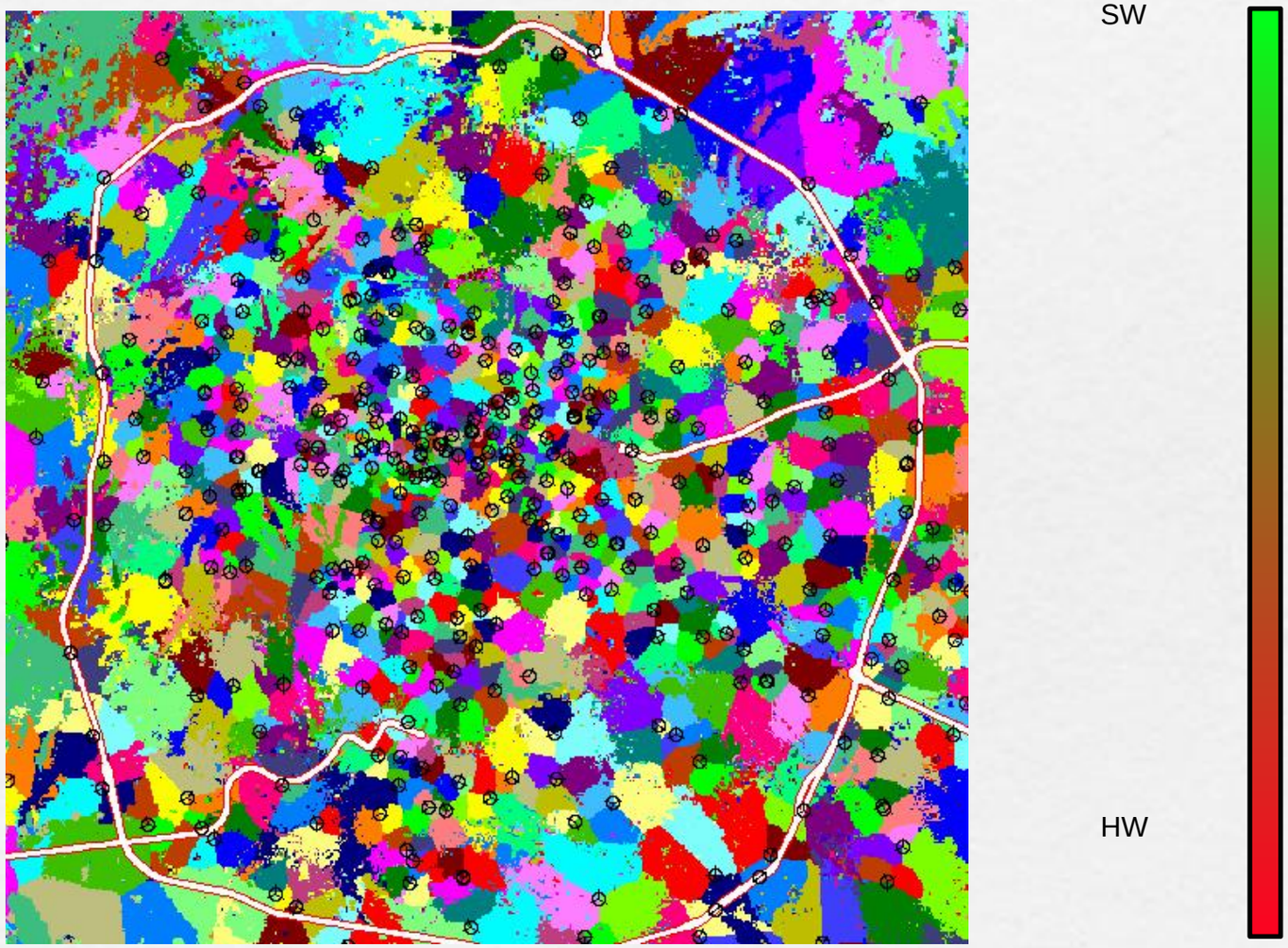
HW

Towards a Semantic Comm. Fabric

There are Networks ... and then there are Networks

- Telecom Fixed Ntw

- Telecom Mobile Ntw



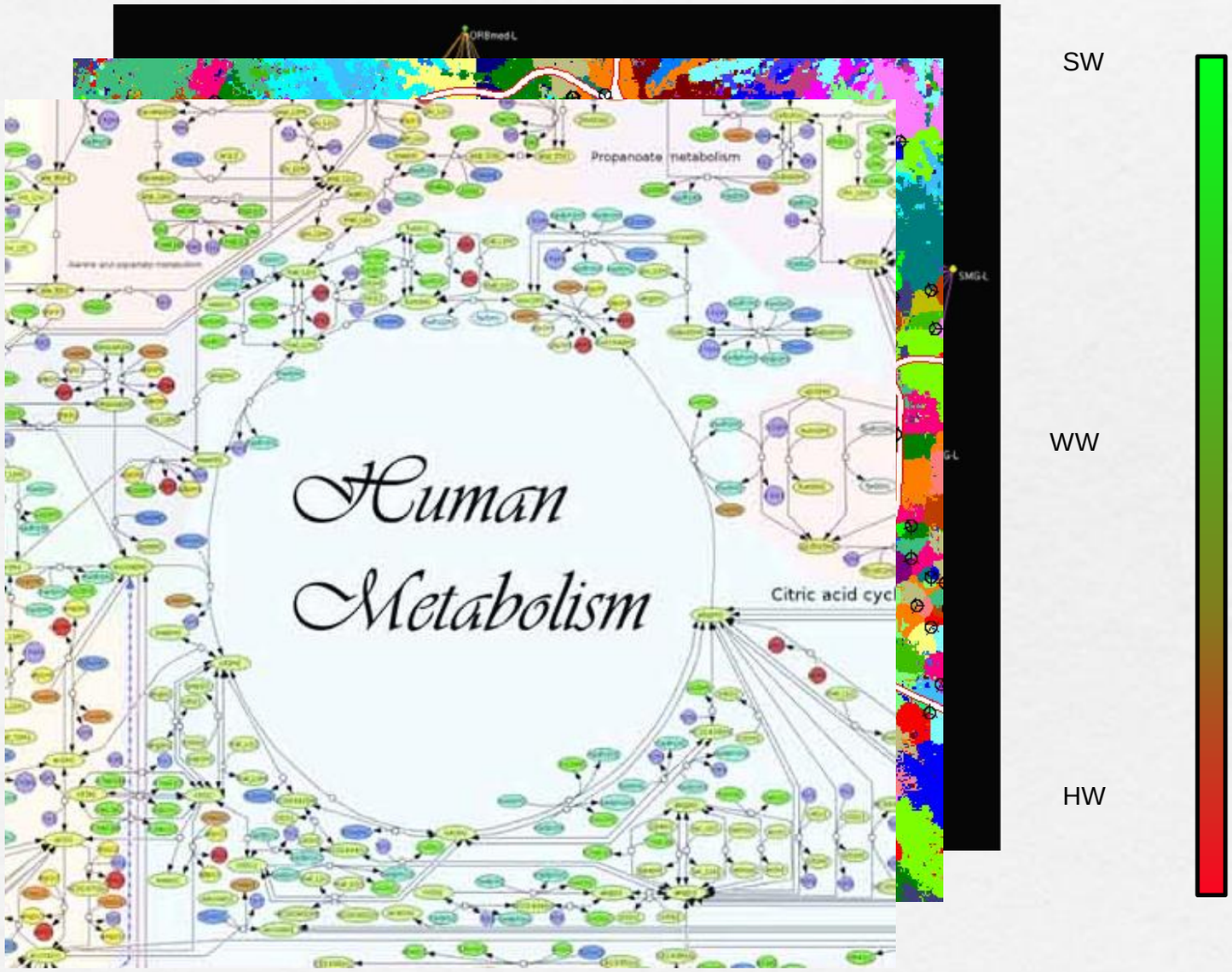
Towards a Semantic Comm. Fabric

There are Networks ... and then there are Networks

- Telecom Fixed Ntw

- Telecom Mobile Ntw

- Metabolic Ntw



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Towards a Semantic Comm. Fabric

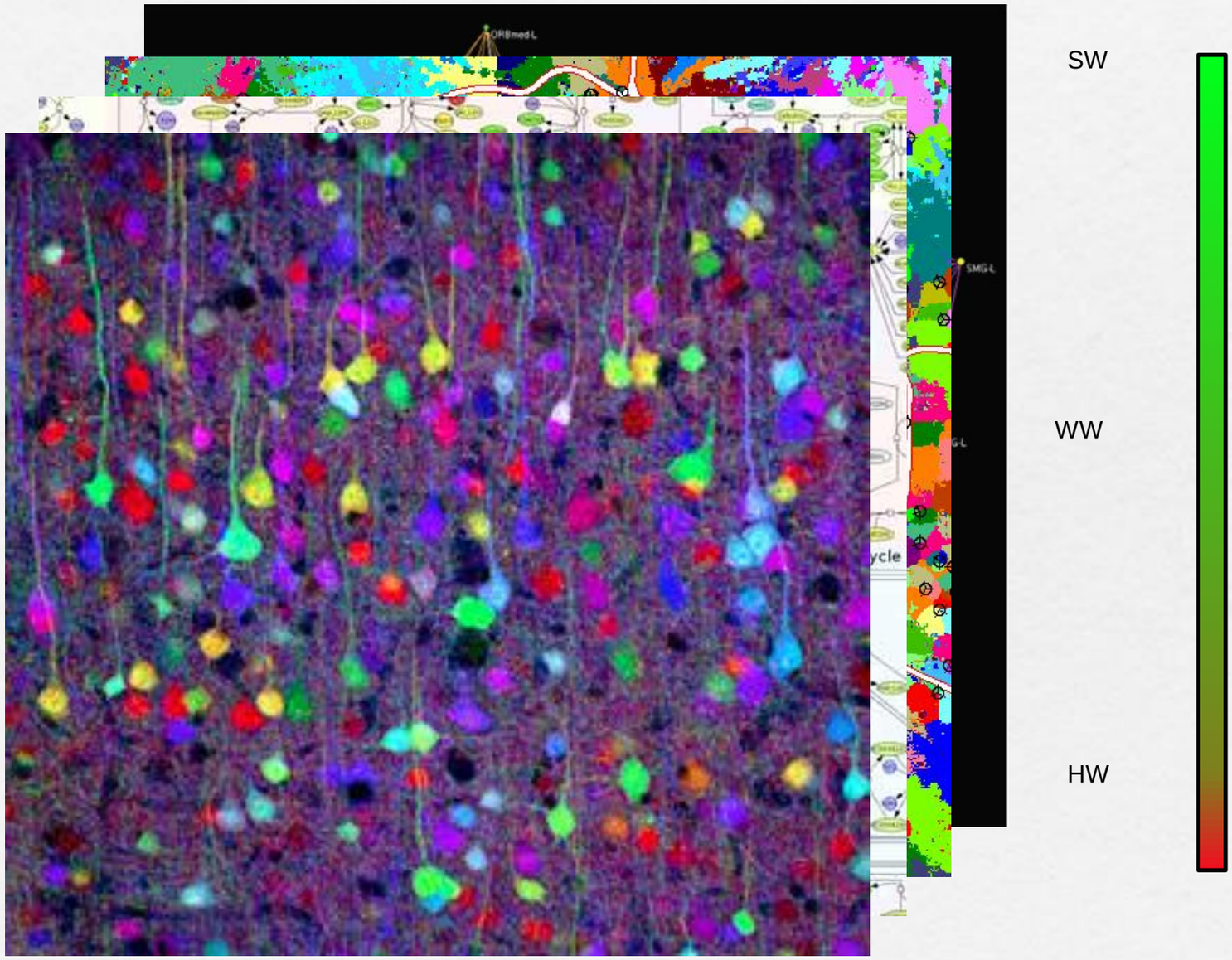
There are Networks ... and then there are Networks

- Telecom Fixed Ntw

- Telecom Mobile Ntw

- Metabolic Ntw

- Brain Ntw



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Towards a Semantic Comm. Fabric

There are Networks ... and then there are Networks

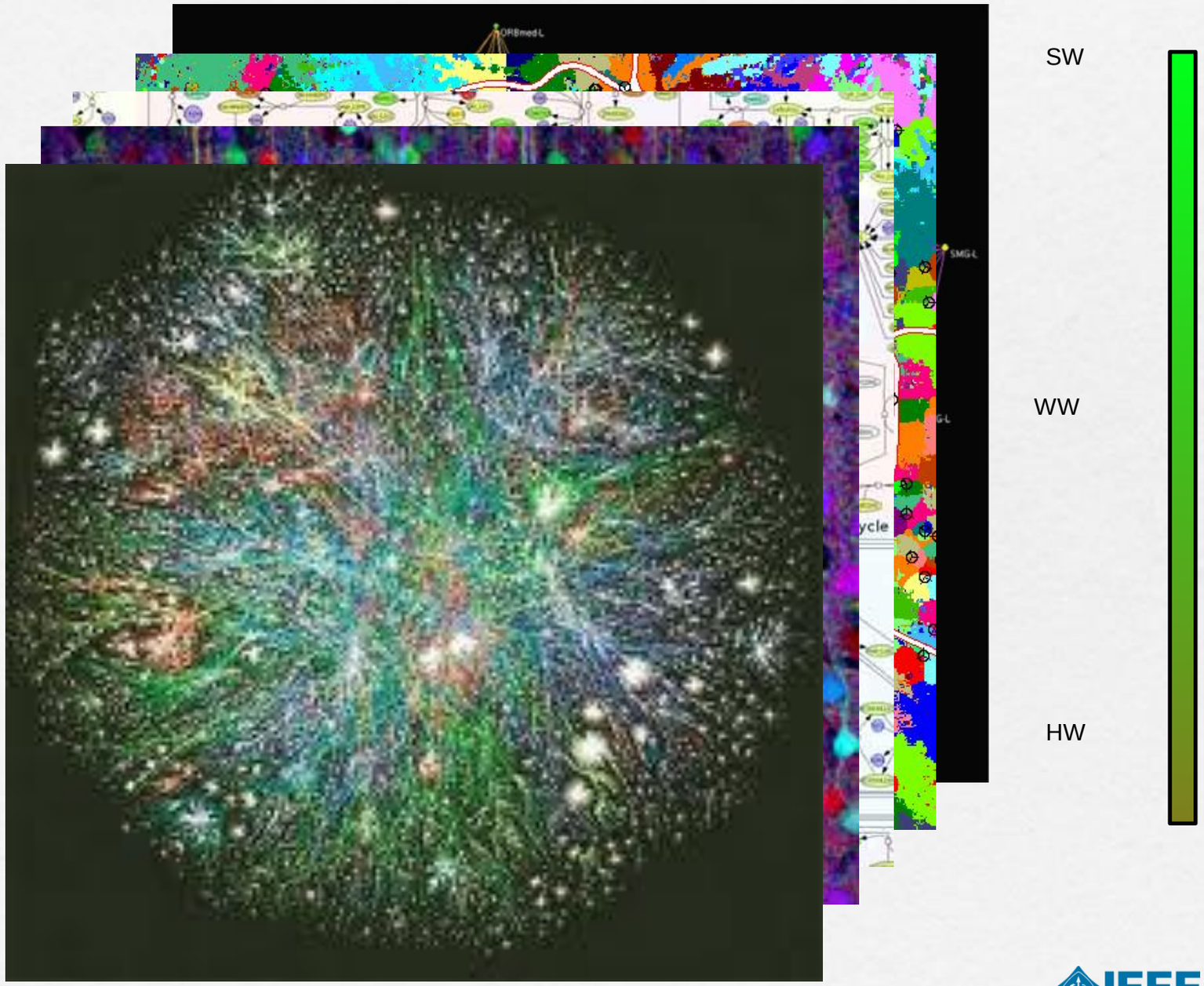
- Telecom Fixed Ntw

- Telecom Mobile Ntw

- Metabolic Ntw

- Brain Ntw

- Thoughts Ntw



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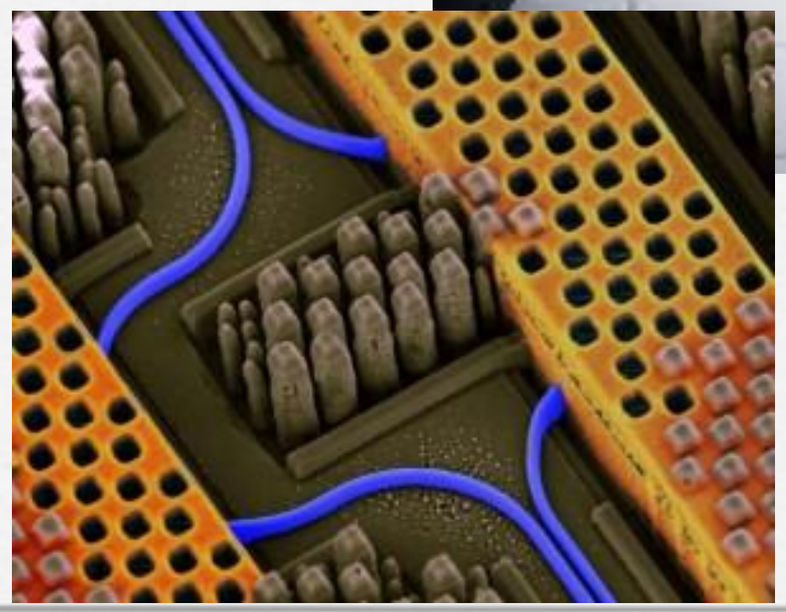
Towards a Semantic Comm. Fabric

Alternative Connection Paradigms

- Flat Networks

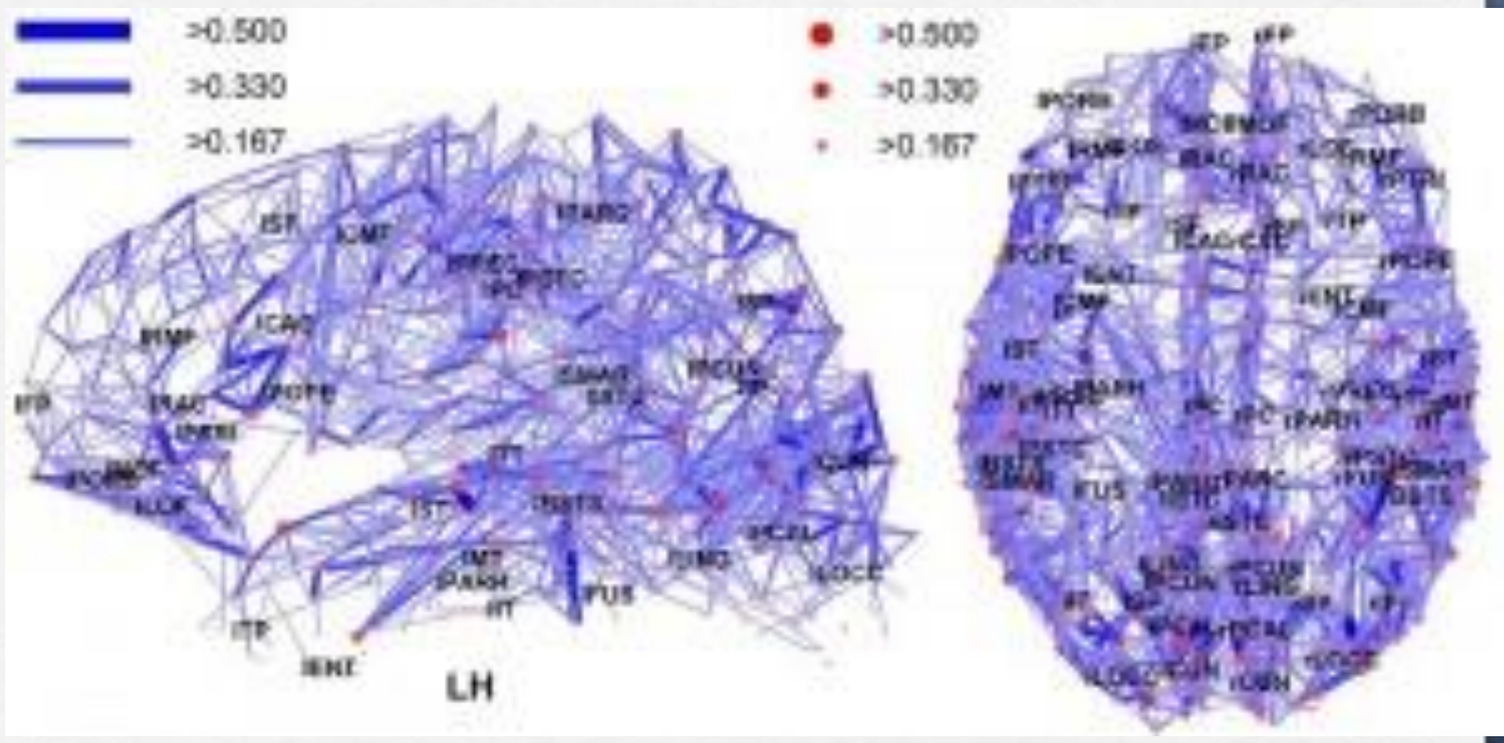


Towards a Semantic Comm. Fabric

Alternative Connection Paradigms

- Flat Networks

- Halo Nets (mesh)



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Towards a Semantic Comm. Fabric

Alternative Connection Paradigms

- Flat Networks

- Halo Nets (mesh)

- Software Defined Networks

Towards a Semantic Comm. Fabric

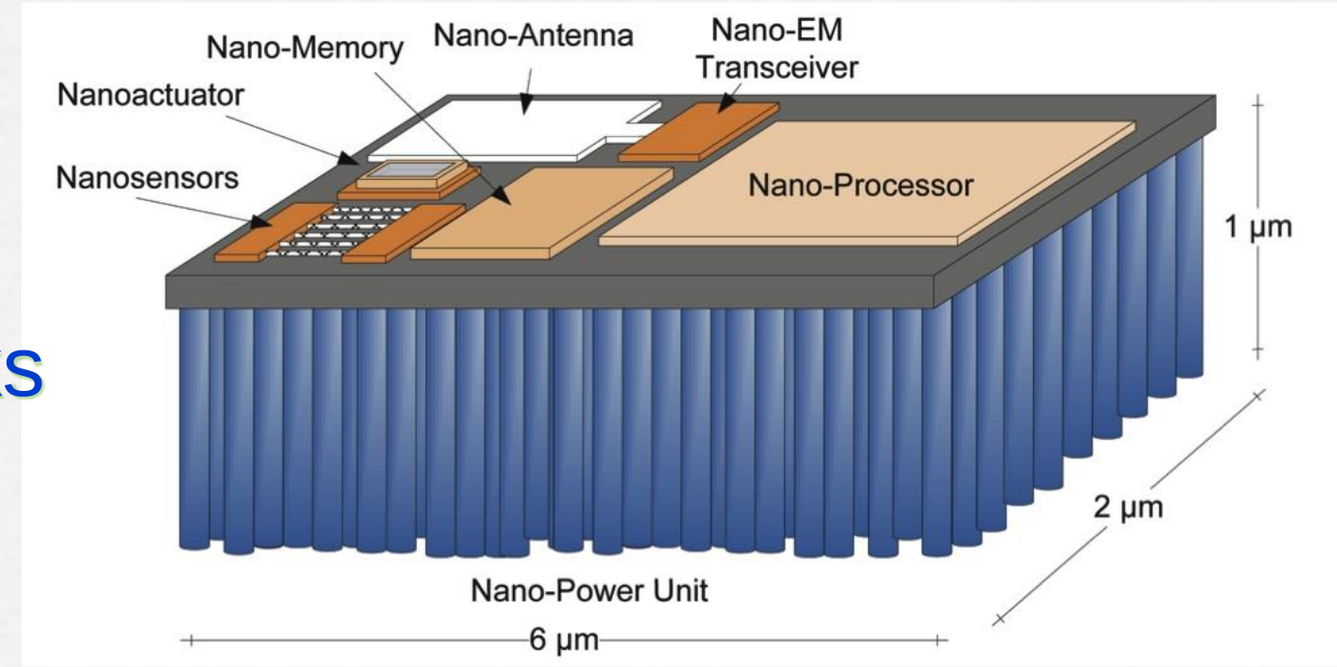
Alternative Connection Paradigms

- Flat Networks

- Halo Nets (mesh)

- Software Defined Networks

- Information at the edges



Towards a Semantic Comm. Fabric

Alternative Connection Paradigms

- Flat Networks

- Halo Nets (mesh)

- Software Defined Networks

- Information at the edges

- Ambient interconnection

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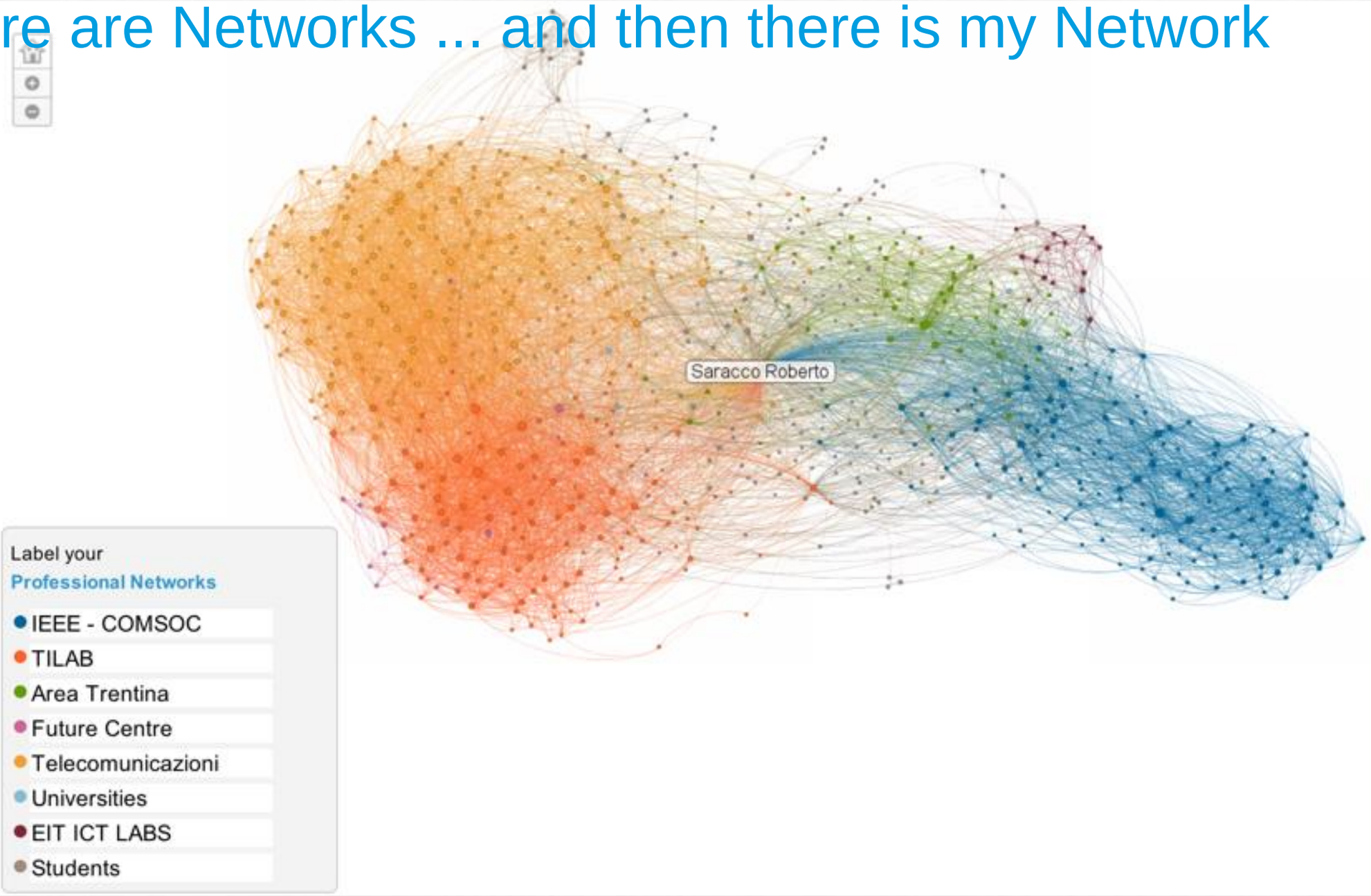
Towards a Semantic Comm. Fabric

There are Networks ... and then there is my Network



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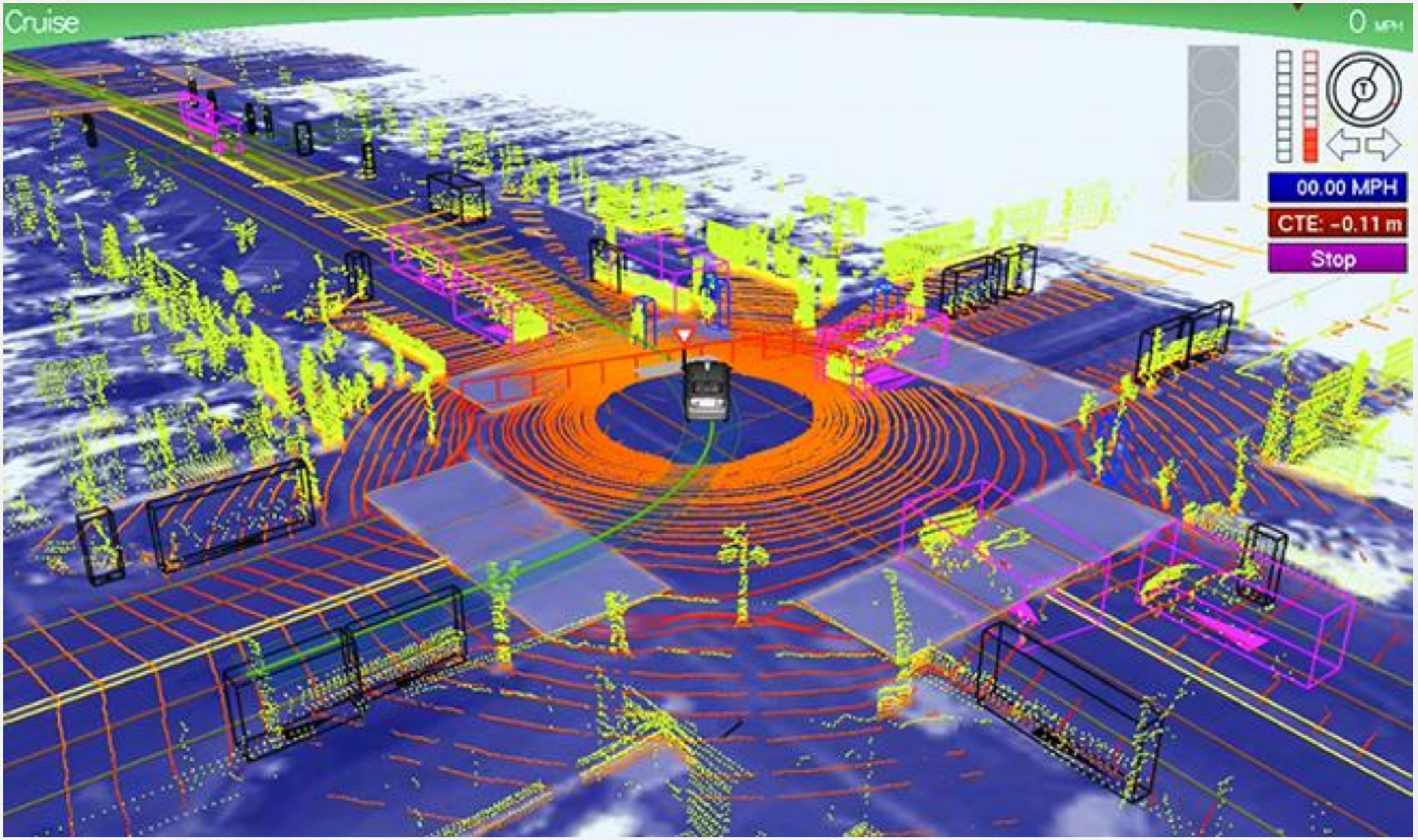
Drowning or Leveraging Data

More data is generated at an amazing pace!

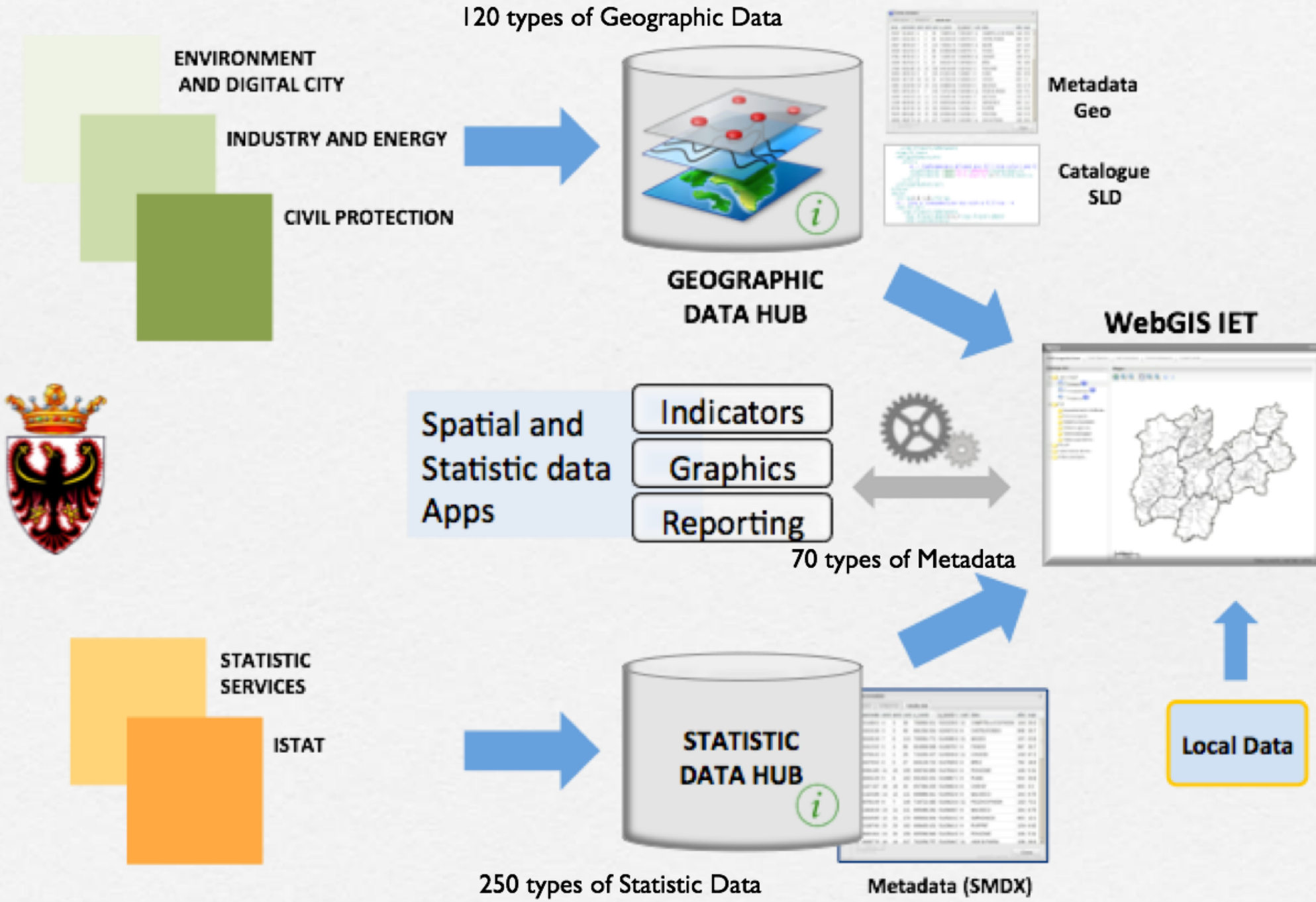


Networks ... and Networks

Radio gets the Upper Hand

Fostering Innovation in ICT

Trentino Open Data and NGN



IEEE Advancing Technology for Humanity

Fostering Innovation in ICT

Trentino Open Data and NGN

IEEE
Advancing Technology for Humanity

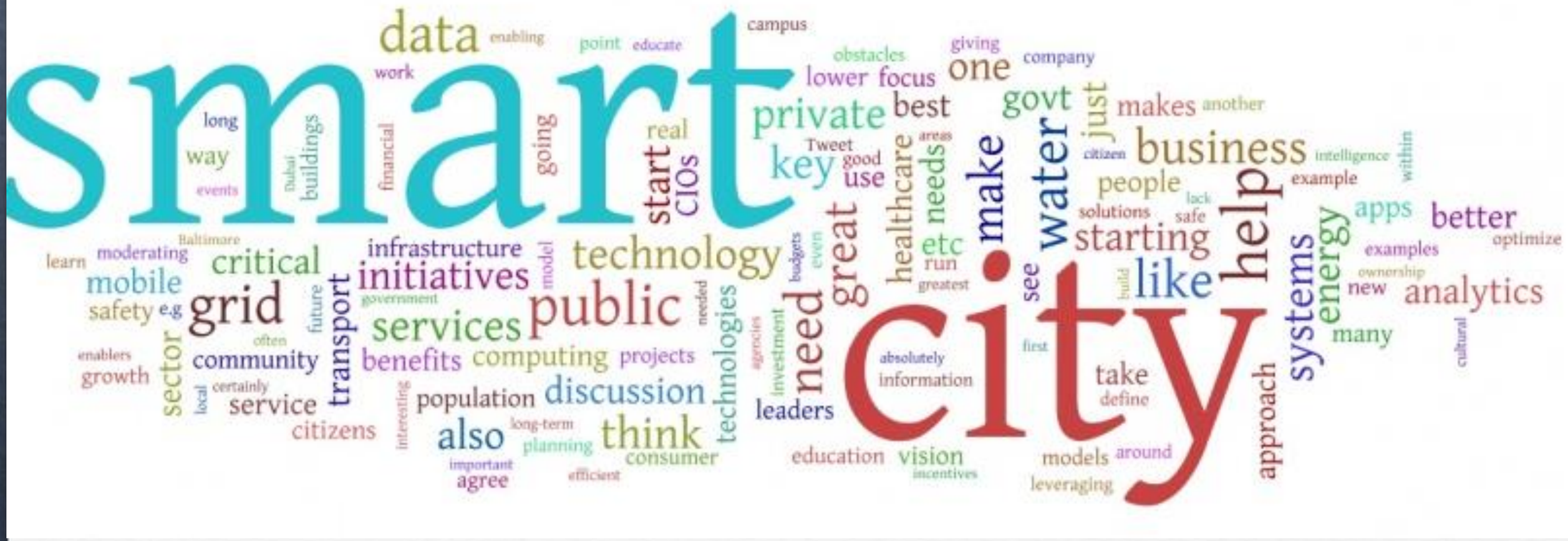
Fostering Innovation in ICT

EIT ICT LABS: Digital Cities, Smart Spaces, ITS

IEEE
Advancing Technology for Humanity

STANDARDS AND SMART CITIES PROJECTS

THE QUEST FOR SMARTER CITIES



REF:

http://www.blog.telecomfuturecentre.it/category/digital-cities/

WHY STANDARDS

M2M

M2H

WHY STANDARDS

Preparing the way for smart cities

How our work will help to accelerate the rollout of smart cities across the United Kingdom

BENEFITS OF STANDARDS

INTEROPERABILITY
COST REDUCTION
SPECIALIZATION
NETWORKING
CYBER SECURITY
CHALLENGES
PROVEN SOLUTIONS
INDEPENDENT ADVICE
REFERENCE MODELS

WHY STANDARDS (ACCORDING PMI)

Standards provide guidelines, rules and characteristics for project, program and portfolio management. Standards are widely accepted and, when consistently applied, they help you, your global peers and your organization achieve professional excellence.

Ref:

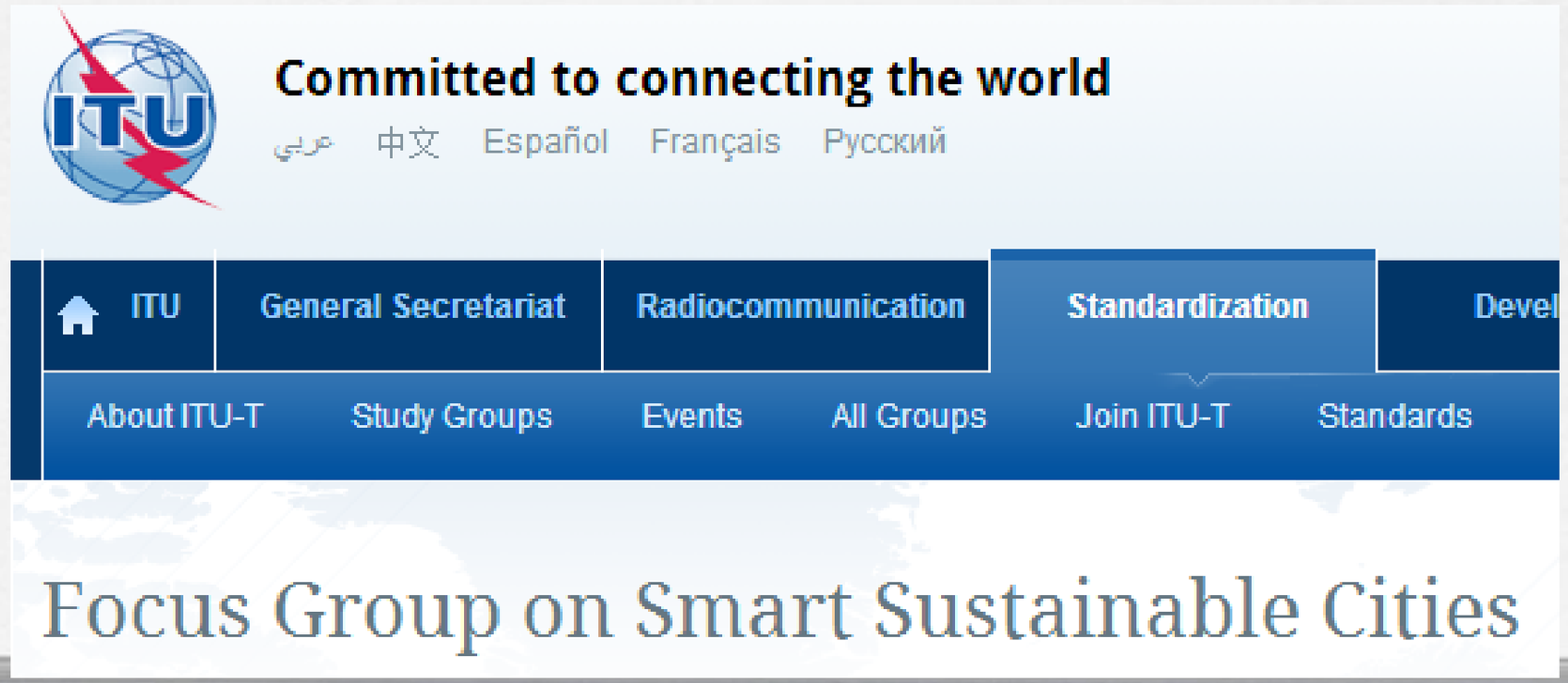
Project Management Institute

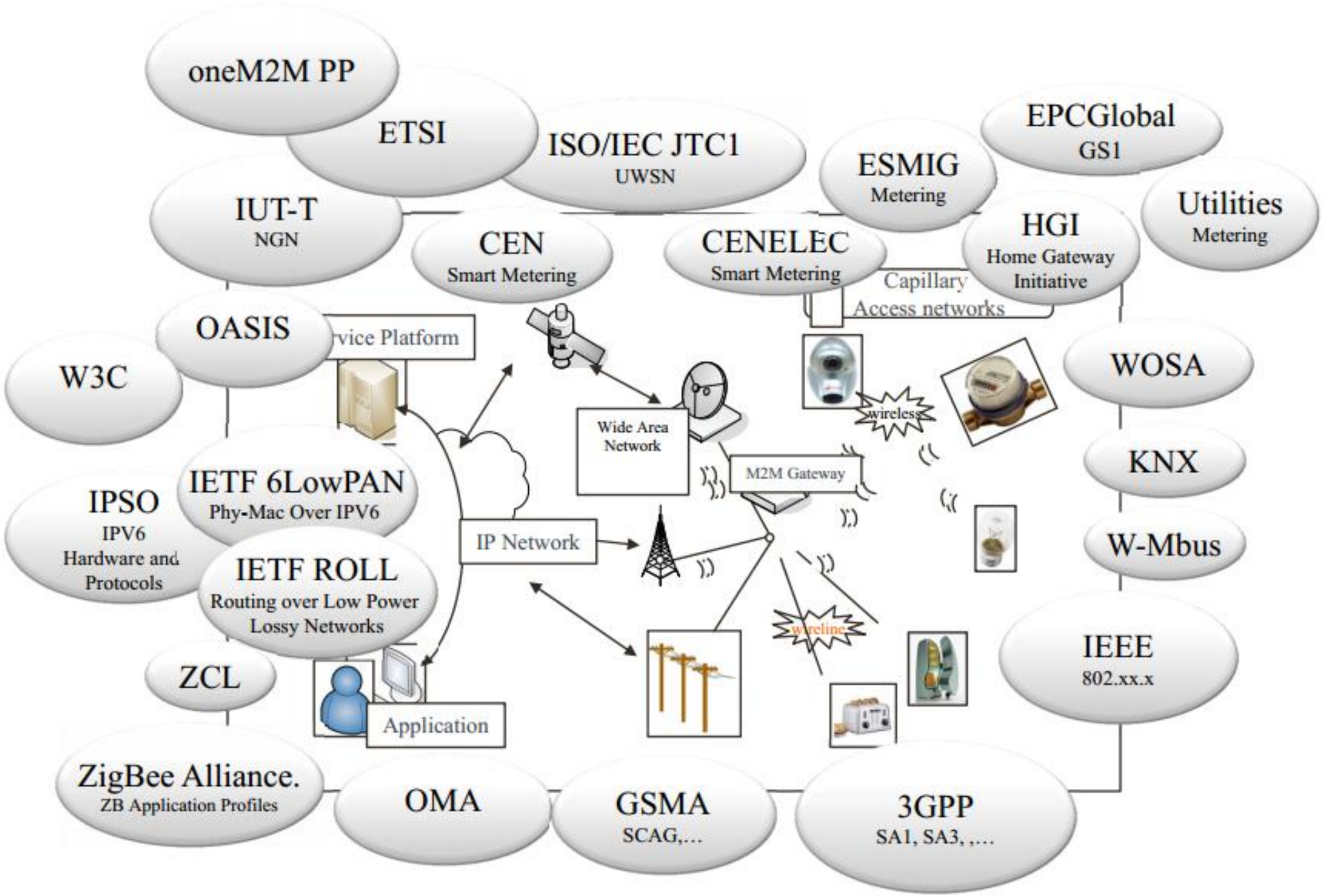
ORGANIZATIONS

IEEE SA Standards Association

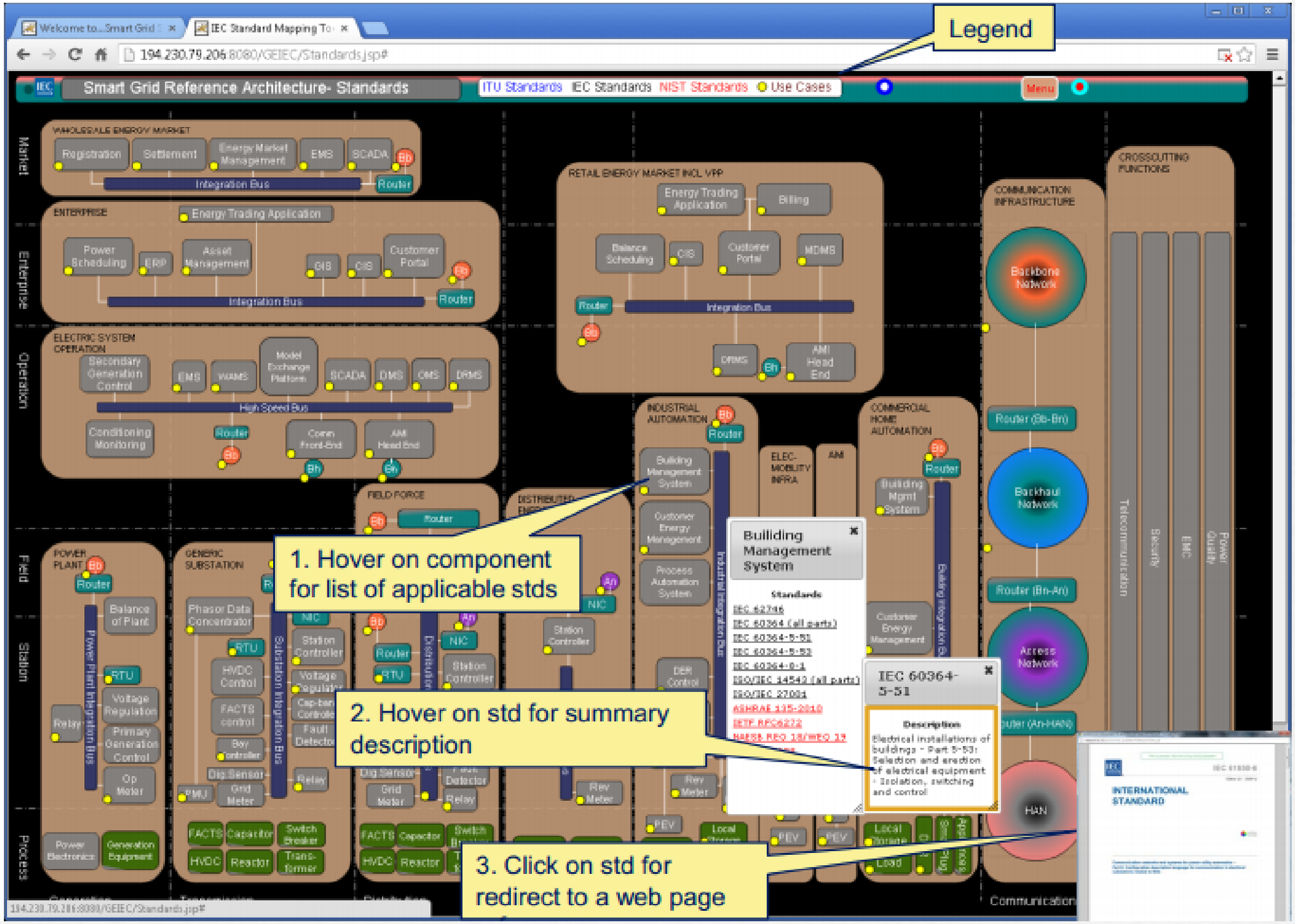
SmartCitiesCouncil

bsi.




oneM2M PP
ETSI
ISO/IEC JTC1
UWSN
EPCGlobal
GS1
ESMIG
Metering
Utilities
Metering
IUT-T
NGN
CEN
Smart Metering
CENELEC
Smart Metering
HGI
Home Gateway
Initiative
Capillary
Access networks
OASIS
W3C
vice Platform
WOSA
KNX
W-Mbus
IEEE
802.xx.x
wireless
wireline
Wide Area
Network
M2M Gateway
IP Network
IPSO
IPV6
Hardware and
Protocols
IETF 6LowPAN
Phy-Mac Over IPV6
IETF ROLL
Routing over Low Power
Lossy Networks
ZCL
Application
ZigBee Alliance.
ZB Application Profiles
OMA
GSMA
SCAG,…
3GPP
SA1, SA3, ,…

IEC SG3 STANDARDS MAPPING TOOL



YOUNG STANDARDS

This PAS was sponsored by the UK Department for Business, Innovation & Skills (BIS).
Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution.
It came into effect on 28 February 2014.

Ref:

YOUNG STANDARDS

SmartCitiesCouncil

Smart City Standard debuts

Posted by Jesse Berst on 02/26/2014

Smart Cities Council Advisor the Open Geospatial Consortium is out with an updated standard of great relevance to all cities. It creates a standard way to describe and geo-locate sensors, actuators and processors.

ENERGY

GRID

CITIZENS

HEALTH

STANDARDS

NET-
WORKING

HOMES

IEEE
CLOUD
COMPUTING

THE INTERNET OF THINGS

TRANSPORT

TRANSPORT

EXAMPLES OF STANDARDS

IEEE Standards Activities for Smart Cities

Overview

In order to meet the increased energy demands of the future, cities throughout the world will need to become smarter. To enable and facilitate this, IEEE has been working for many years on the infrastructure and networking necessary to design, generate, automate, operate, deliver, distribute, support, and connect energy to the cities, homes, and systems that demand it—both now and over the coming years. Major related standards projects are underway in the areas of Smart Grid, Cloud Computing, the Internet of Things (IoT), Intelligent Transportation, and eHealth.

Smart Energy: Connecting to Smart Grids

Approved standards and projects under development

- IEEE 2030 series on the Smart Grid, including electric vehicle infrastructure
- IEEE 1547 series on handling distributed resources in electric power systems
- IEEE 1815 series on electric power systems communications

IEEE Pre-standards activities

- Smart Energy Data Repository
- Systems and Components for Energy Routers

Smart Networking and Connectivity

Approved standards and projects under development

- IEEE 802 series on wired and wireless networking
- IEEE 1775 series on powerline communication equipment
- IEEE 1901 series on broadband over powerline networks
- IEEE 1451 series, addressing sensors
- IEEE 1900 series on dynamic spectrum access
- IEEE 1801 on low-power chip design

Enabling Consumer Connectivity Through Consensus Building

Smart Grid into Home Devices Standards
IEEE 1675 / IEEE 1775
IEEE 2030 / IEEE P2030.1
IEEE 1901 / IEEE P1901.2

Home Networking Standards
IEEE 802
IEEE 1901
IEEE P1901.2
IEEE 1815

Smart Grid into Home Devices Standards
IEEE 1547 Series
(Distributed Energy Interconnection
Solar, Wind, Storage, etc.)
IEEE 2030

Smart Metering Standards
IEEE P1377
IEEE 1701
IEEE 1702
IEEE P1703
IEEE P1704
IEEE P1705

3D Video Standards
IEEE P3333

Mobile Video Standards
IEEE P2200 / IEEE 802.11
(Intelligently Cached
Mobile Content)

Home Networking Standards
IEEE 802 / IEEE 1901
IEEE P1901.2 / IEEE P1905.1
(Communication Inside
the Home)

Electric Vehicle Standards
IEEE 802 Series / IEEE 1901
IEEE P1901.2 / IEEE 1609 Series
(Vehicular Communications)
IEEE 2030 / IEEE P2030.1

IEEE Standards Activities in Cloud Computing

Overview:

Cloud computing offers the promise of ubiquitous, scalable, on-demand computing resources provided as a service for everything from mobile devices to supercomputers. Cloud computing offers end consumers a "pay as you go" model—a powerful shift for computing towards a utility model like the electricity system, the telephone system, or more recently the Internet. IEEE is coordinating the support of cloud computing through its Cloud Computing Initiative, the first broad-based collaborative project for the cloud to be introduced by a global professional association.

- IEEE P1609.0 Draft Guide for Wireless Access in Vehicular Environments (WAVE) - Architecture
- IEEE P2301 Draft Guide for Cloud Portability and Interoperability Profiles (CPIP)
- IEEE P2302 Draft Standard for Intercloud Interoperability and Federation (SIIF)

IEEE Standards Activities in the eHealth Space

Overview:

IEEE has many standards in the eHealth technology area, from body area networks to 3D modeling of medical data and personal health device communications. Another area is the IEEE 11073™ family of standards is a group of standards under Health Informatics/Personal Health Device Communication, for data interoperability and architecture. IEEE 11073 standards are designed to help healthcare product vendors and integrators create devices and systems for disease management, health and fitness and independent living that can help save lives and improve quality of life for people worldwide.

IEEE Standards - Improving Personal Health

Glucose Meter
IEEE 11073-10417™

Insulin Pump
IEEE 11073-10419™

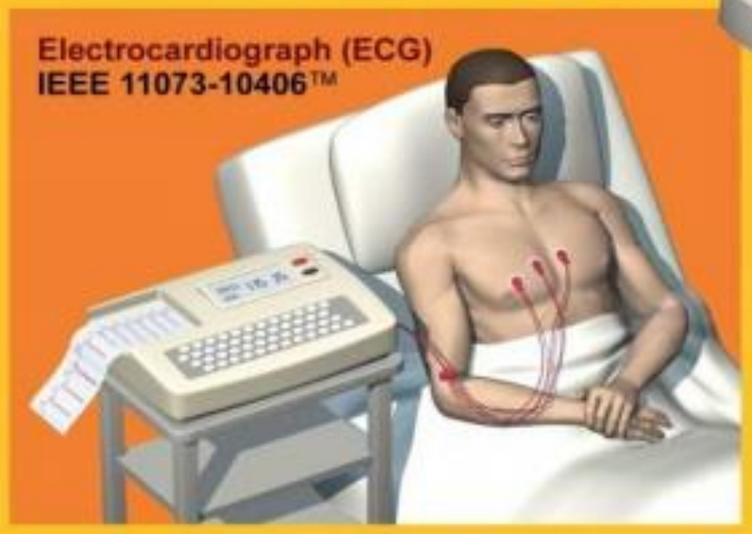
Weigh Scale
IEEE 11073-10415™

Blood Pressure Monitor
IEEE 11073-10407™

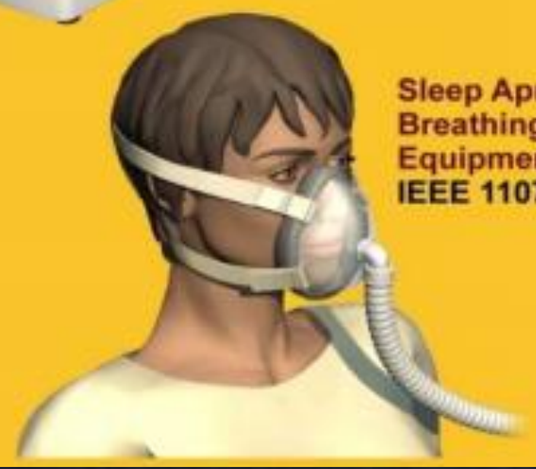
Cardiovascular Fitness & Activity Monitor
IEEE 11073-10441™

Body Composition Analyzer
IEEE 11073-10420™

Sleep Monitor
IEEE 11073-10423™



Electrocardiograph (ECG)
IEEE 11073-10406™



Sleep Apnea Breathing Therapy Equipment
IEEE 11073-10424™

Connectivity Transports

IEEE 802.3™
(Often referred to as Ethernet)

IEEE 802.11™
(Often referred to as WiFi®)

IEEE 802.15.1™
(Often referred to as Bluetooth®)

IEEE 802.15.4™
(Often referred to as Zigbee®)

IEEE 11073-30300™
(Often referred to as Infrared Communications)

IEEE 11073-30400™

Near Field Communications

Cloud
IEEE P2301™
IEEE P2302™

Health Care Manager

Physician

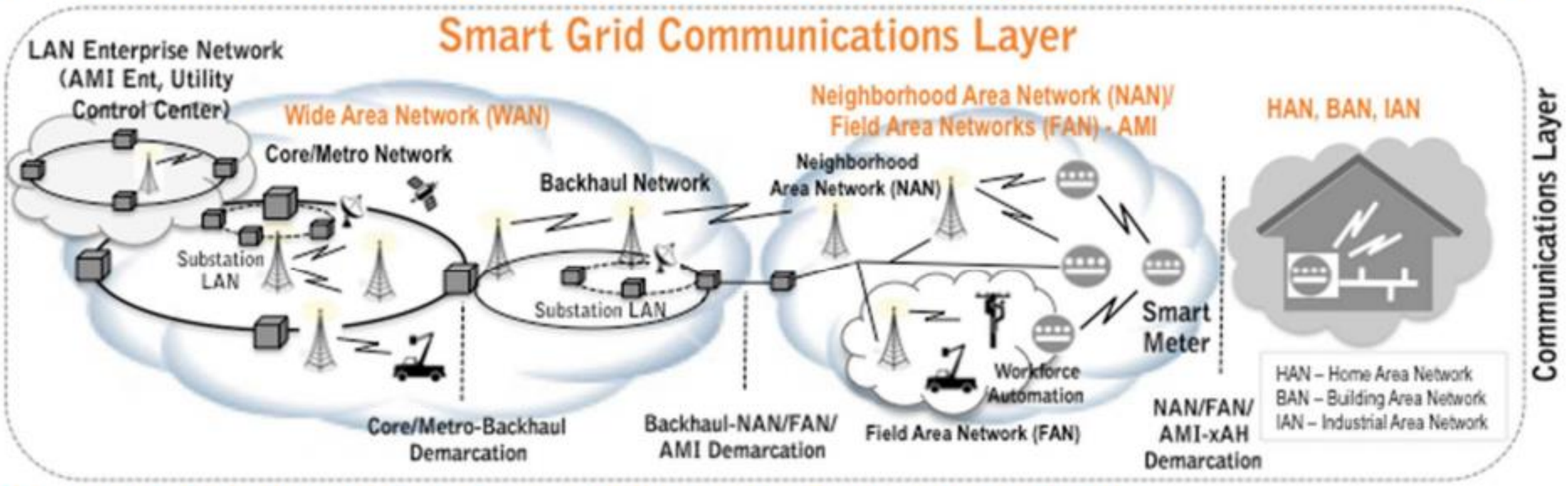
World Wide Web

IEEE Standards Activities in the Internet of Things (IoT)

Overview

The success of the Internet of Things (IoT) depends strongly on standardization, which provides interoperability, compatibility, reliability, and effective operations on a global scale. Recognizing the value of IoT to industry and the benefits this technology innovation brings to the public, the IEEE Standards Association (IEEE-SA) has a number of standards, projects and events that are directly related to creating the environment needed for a vibrant IoT.

IEEE Standards for Smart Networking/Communications



Smart Grid Network Technology & Protocols Standards Mapping

Wide Area Network (WAN)			NAN/FAN			Smart Meters	HAN, BAN, IAN		Technology Standards
Substation	Core/Metro Network/Backhaul Network		Substaion						
	Wireline	Wireless		Wireline	Wireless		Wireline	Wireless	
LAN IEEE 1815/IEC 61850 Several Options	IEEE 802.1 IEEE 802.3	IEEE 802.16d/e IEEE 802.20 IEEE 802.22	LAN IEEE 1815/IEC 61850 Several Options	IEEE 802.1 IEEE 802.3 IEEE 1901	IEEE 802.11 IEEE 802.15.4 IEEE 802.16	IEEE SC31 (1377, 1701, 1703, P1704)	IEEE 802.1 IEEE 802.3 IEEE 1901 IEEE 1901.2 IEEE P1905.1	IEEE 802.11 IEEE 802.15.4	

ISO

Subcommittee	Subcommittee Title
ISO/TC 268/SC 1	Smart community infrastructures

Standards and projects under the direct responsibility of ISO/TC 268 Secretariat

Standard and/or project
ISO/AWI 37101 Sustainable development and resilience of communities -- Management systems -- General principles and requirements
ISO/DIS 37120 Sustainable development and resilience of communities -- Indicators for city services and quality of life
ISO/AWI TR 37121 Inventory and review of existing indicators on sustainable development and resilience in cities

Ref:

Committed to connecting the world

عربي 中文 Español Français Русский

SOME ITU RECOMMENDATIONS

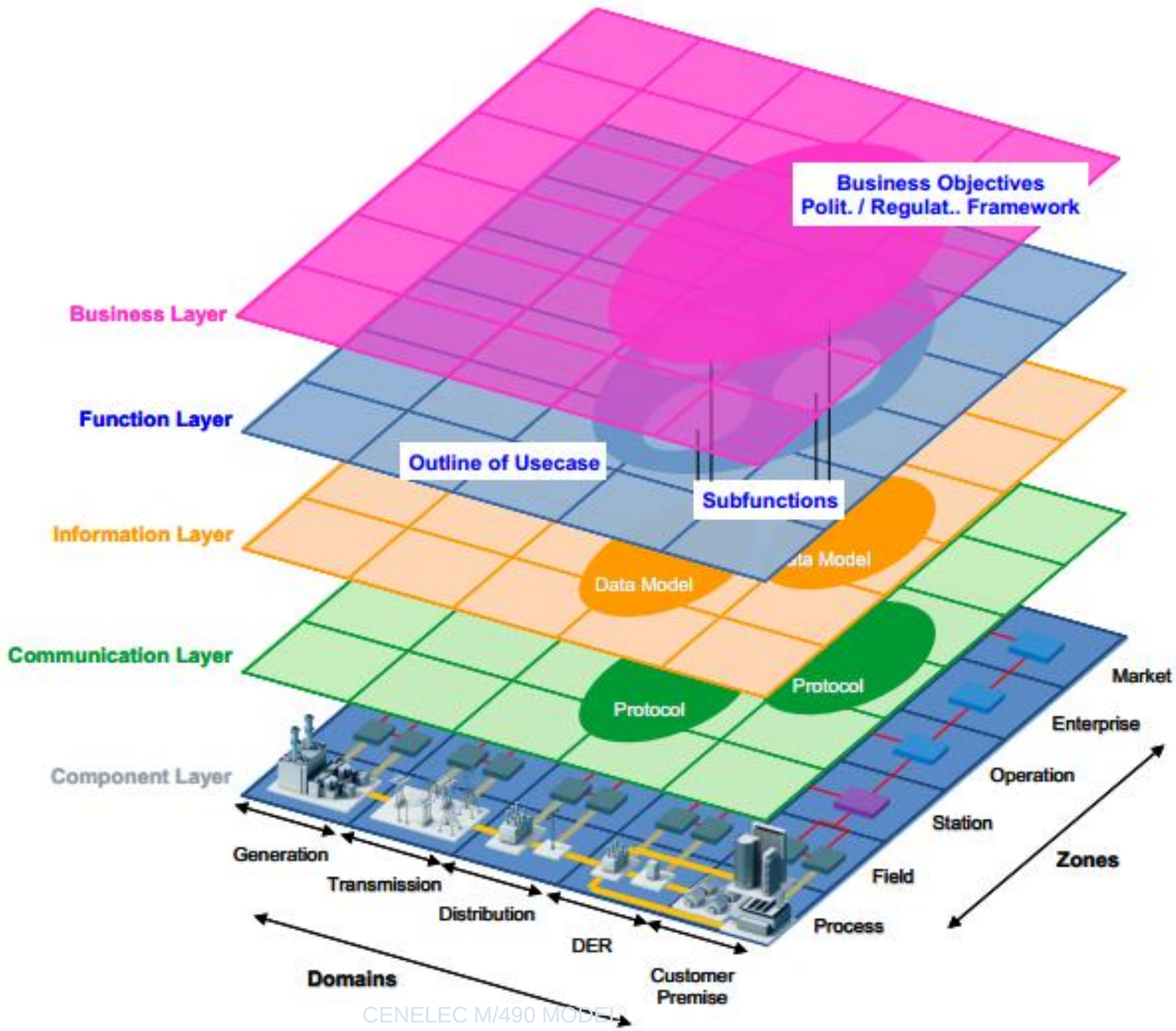
ITU-T L.1300: Best practices for green data centres

ITU-T L.1310: Energy efficiency metrics and measurement methods for telecommunication equipment

ITU-T L.1400: Overview and general principles of methodologies for assessing the environmental impact of information and communication technologies

ITU-T L.1410: Methodology for the assessment of the environmental impact of information and communication technology goods, networks and services

ITU-T L.1420: Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organizations



RESEARCH OPPORTUNITIES

Gracias

Participa en IEEE

Gianna@ieee.org