

# How IoT platforms for smart cities DO converge towards an ecosystem of interoperable resources



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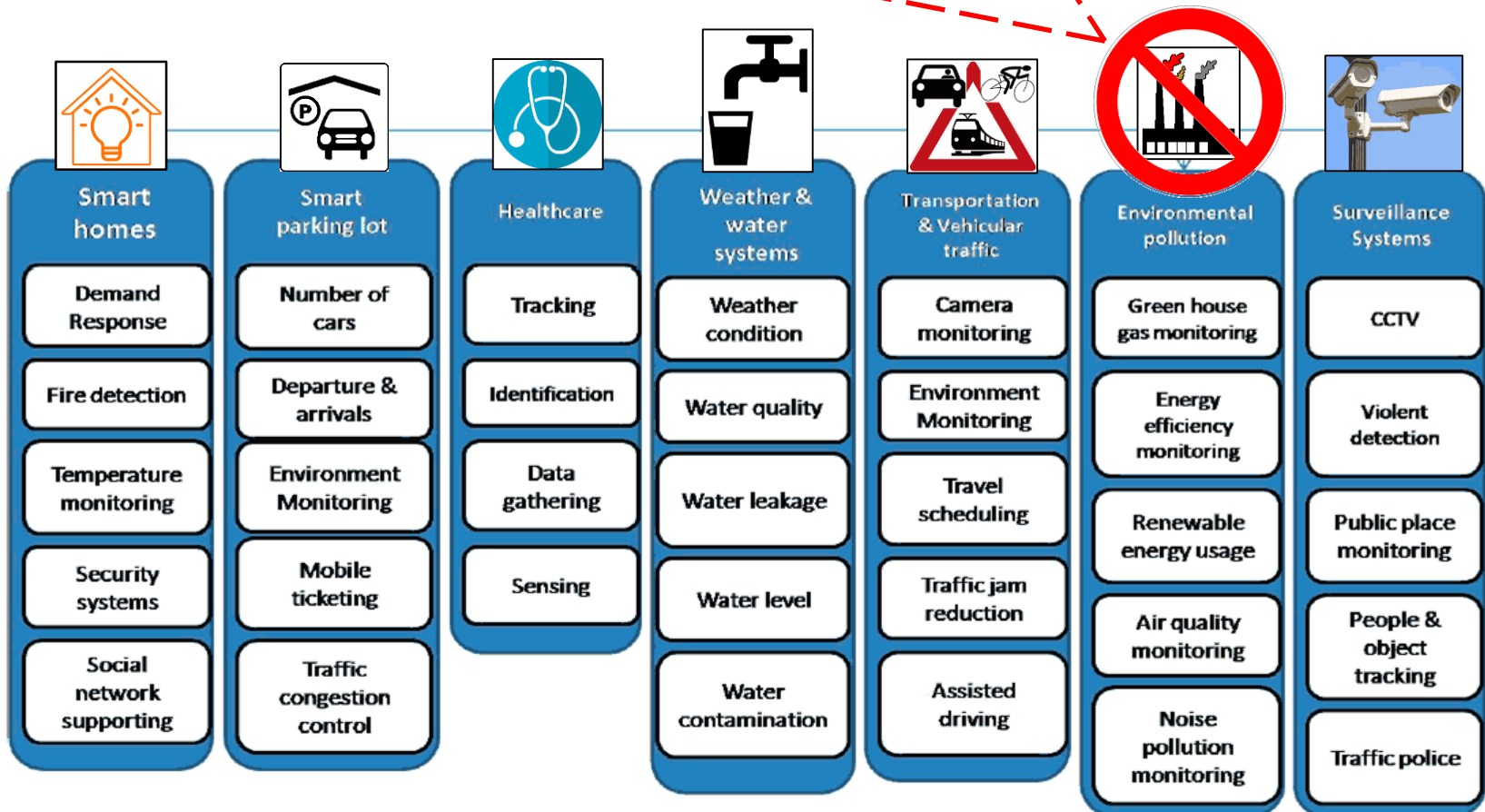


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What's the problem ?

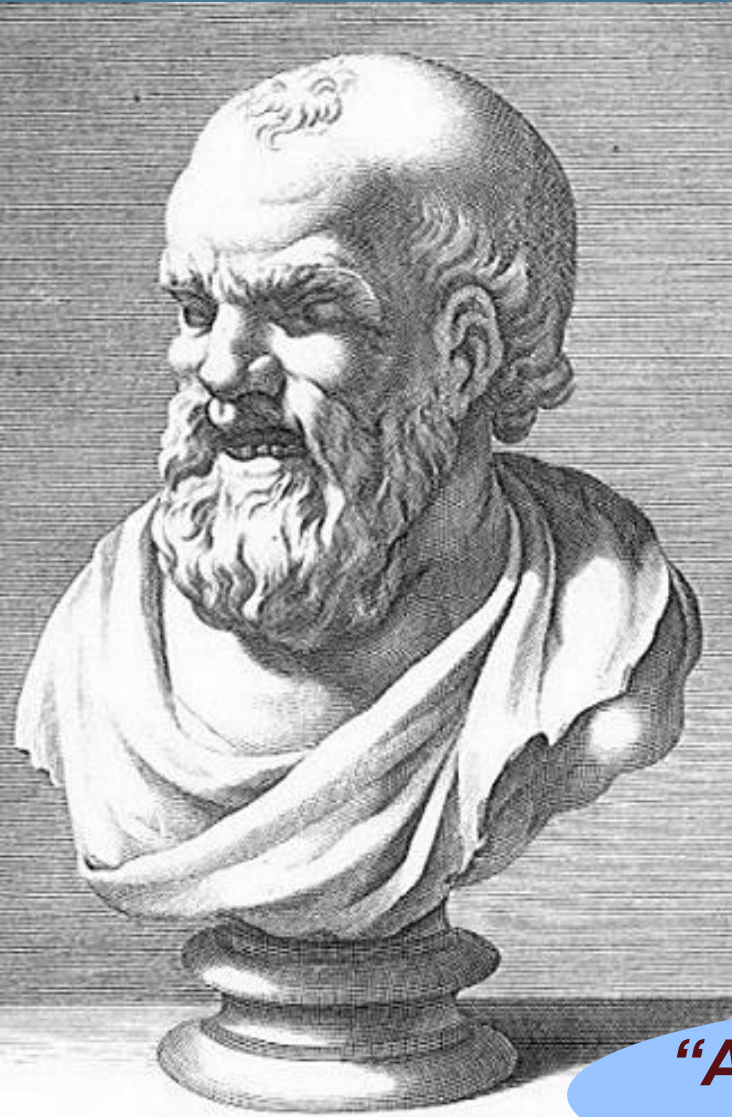
# What's the problem ?

***"Cities need solutions; SDOs offer modules"***



Source: Ref (1) "Review of Smart Cities based on IoT" <https://www.mdpi.com/1996-1073/10/4/421/pdf> .

# I blame ... Δημόκριτος (Dēmókritos, c. 460 – c. 370 BC)



D E M O C R I T U S

Δημόκριτος was a Greek pre-Socratic philosopher noted for his atomic theory of matter

- Everything is composed of “Atomos”, indestructible and always in motion
- Atoms are various geometric shapes/sizes, indivisible
- There are infinite numbers of atoms and of kinds of atoms

***“Atomism” and modular thinking  
are endemic to IoT SDOs !***

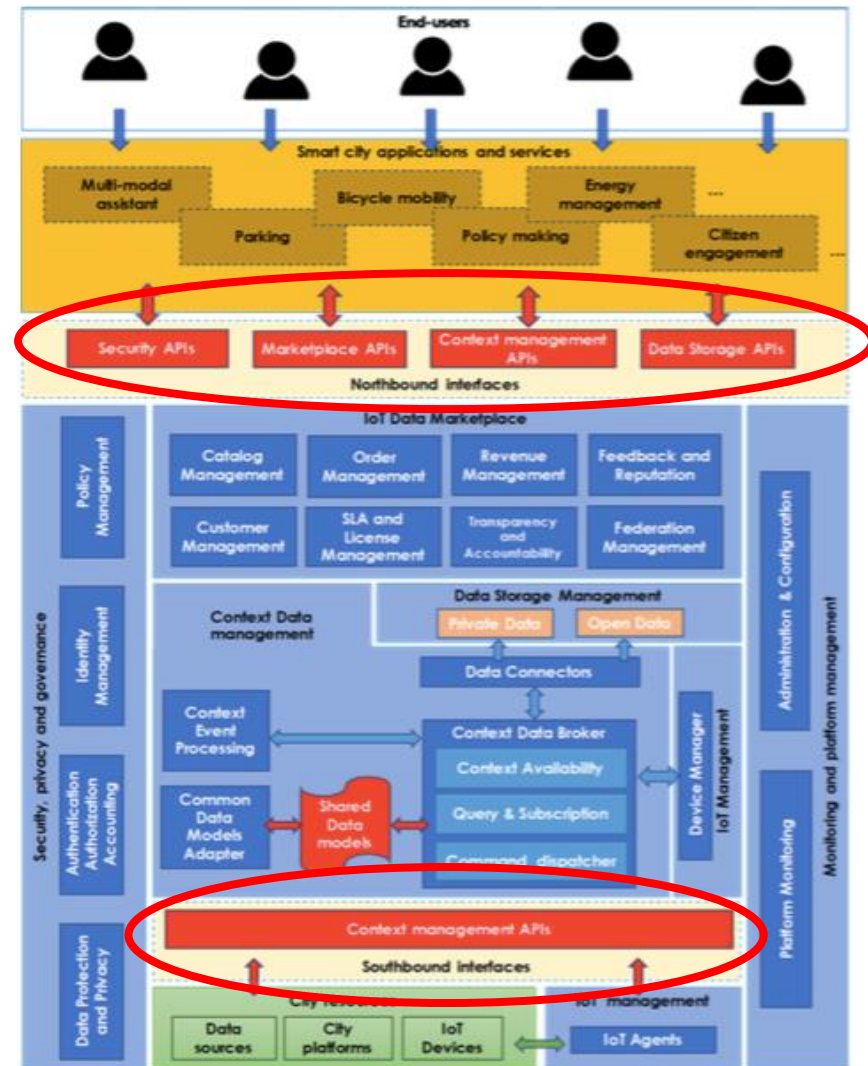


# SynchroniCity Architecture makes modules into solutions

## Set of logical components with “Minimal Interoperability Mechanisms”

This resulted from:

- Architecture guidelines and use case analysis
- Reference zones compliance
- Reuse of existing approaches:
  - the outcome of high-level analysis of the most relevant European initiatives regarding IoT and Smart City platforms showed some commonalities, among the heterogeneous projects, in terms of technologies and functionalities.
- OASC principles
  - One city is not a market.
  - Cities need interoperability and standards to boost competitiveness by avoiding vendor lock-in, comparability to benchmark performance, and easy sharing of best practices.
  - Cities need solutions that can be implemented with respect for local practices and job creation.
  - Adoption of four simple mechanisms: **driven-by-implementation** attitude, **API**, a set of **data models**, and an **open data platform**.



[https://synchronicity-iot.eu/wp-content/uploads/2018/09/SynchroniCity\\_D2.10.pdf](https://synchronicity-iot.eu/wp-content/uploads/2018/09/SynchroniCity_D2.10.pdf)



Who's working on the "modules" ?

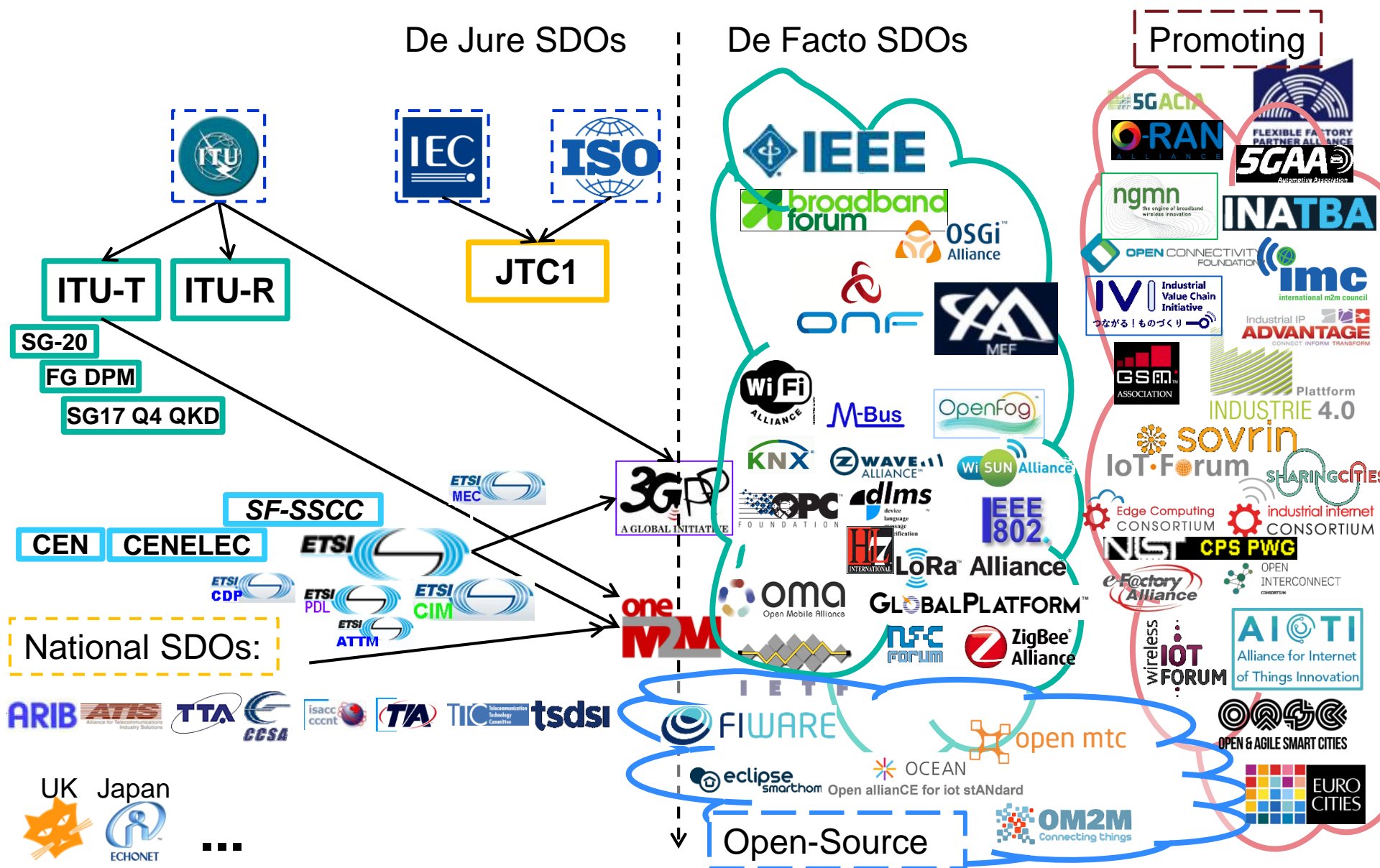
# Who's working on it ? Global Standards bodies



Global Standardisation Collaboration, March 26-27, 2019  
Smart Cities & Communities section co-chaired by Lindsay Frost

All documents at: [www.itu.int/en/ITU-T/gsc/Pages/meetings.aspx](http://www.itu.int/en/ITU-T/gsc/Pages/meetings.aspx)

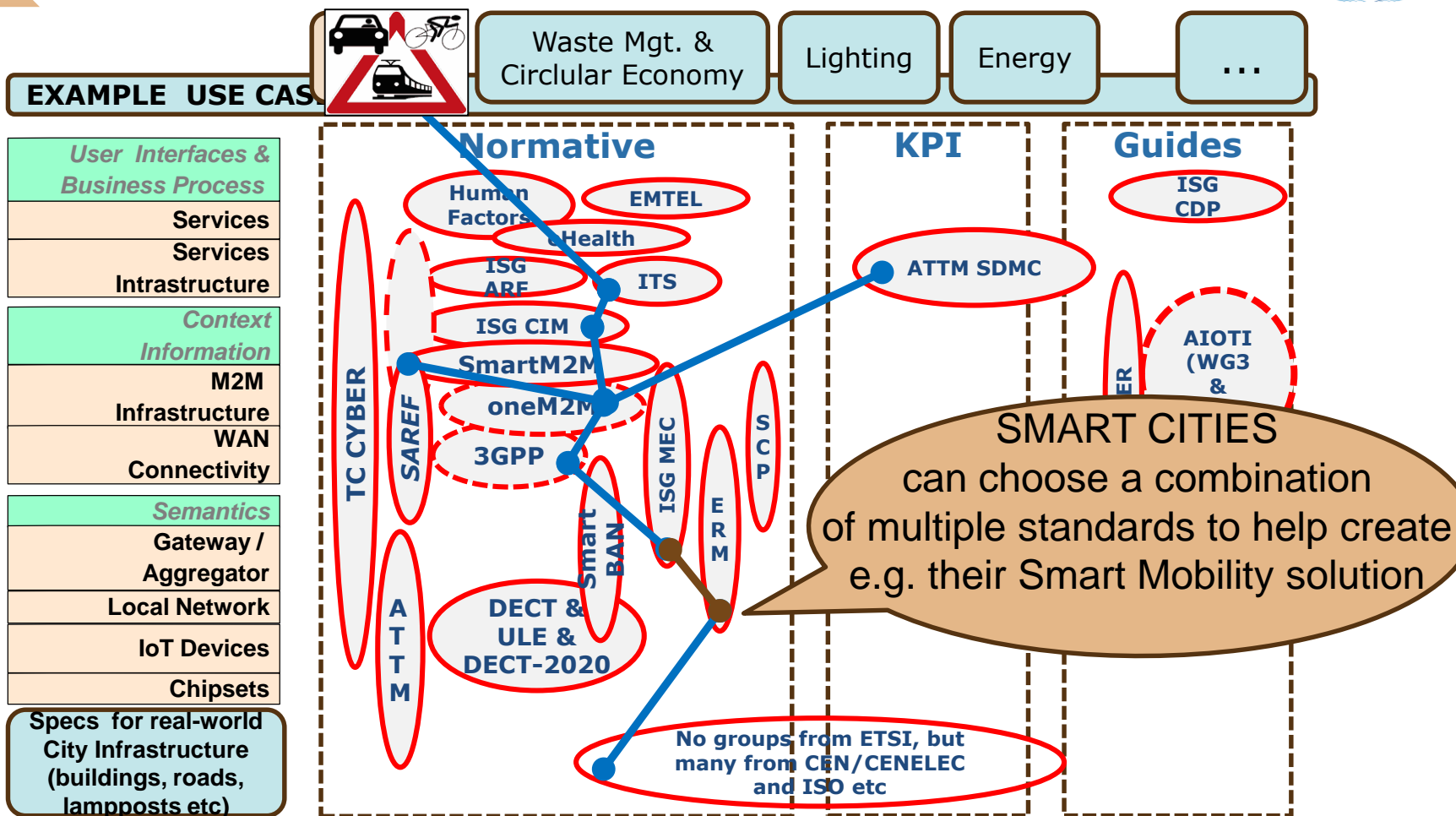
# Who's working on it ? SDO and Fora (selection)





# Who's working on it ? ETSI for example!

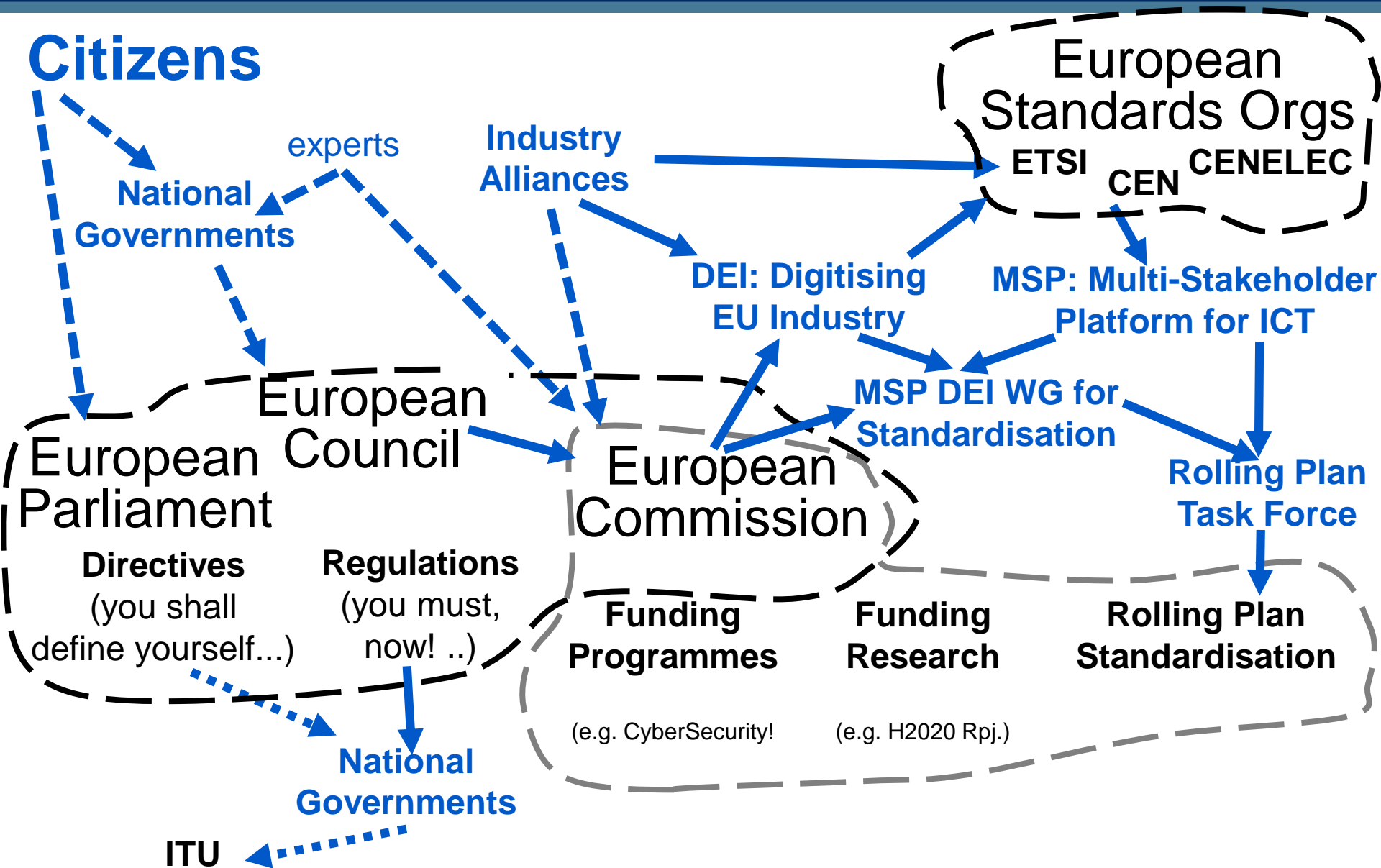
**Bottom-up Stack:**  
Things → Connectivity → Platforms → Services



# Who's working on it ? ETSI groups

- [3GPP](#) (3rd Generation Partnership Project)
- [ATTM](#) (Access, Terminals, Transmission and Multiplexing)
- [ATTM SDMC](#) (Sustainable Digital Multiservice Cities)
- [CYBER](#) (CyberSecurity)
- [DECT & ULE](#) (Digital Enhanced Cordless Telecommunications)
- [EE](#) (Environmental Engineering)
- [eHealth](#)
- [EMTEL](#) (Emergency Communications)
- [ERM](#) (EMC and Radio Spectrum Matters)
- [Human Factors](#)
- [ISG ARF](#) (Augmented Reality Framework)
- [ISG CDP](#) (City Digital Profile)
- [ISG CIM](#) (Context Information Management)
- [ISG MEC](#) (Multi-access Edge Computing)
- [ISG OEU](#) (Operational Energy Efficiency for Users)
- [ITS](#) (Intelligent Transport Systems)
- [oneM2M](#)
- [SmartBAN](#) (Smart Body-Area Networks)
- [SmartM2M](#) & [SAREF](#) (\*) (Smart Appliances REference Ontology)
- [USER](#)

# Who's working on it ? Policy makers, politicians, experts



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That's not chaos.

That's an ecosystem.

Grow with it.



How the <beeeep> are we expected  
to pick the right Standards?

# Collaborate! Create “open list of specs” ... where to start?

## Databases exist (but not easily sorted/filtered)

- ETSI <https://www.etsi.org/standards-search>
- ITU <https://www.itu.int/net4/ITU-T/landscape> (various SDOs)
- IEC <https://webstore.iec.ch/advsearchform>
- CENELEC <https://www.cenelec.eu/dyn/www/f?p=104:103>
- CEN <https://standards.cen.eu/dyn/www/f?p=CENWEB:105>
- IEEE <https://standards.ieee.org/search-results.html?q=smart+city>
- .... and others

## Summaries exist, but not “sustainable” i.e. one-off efforts

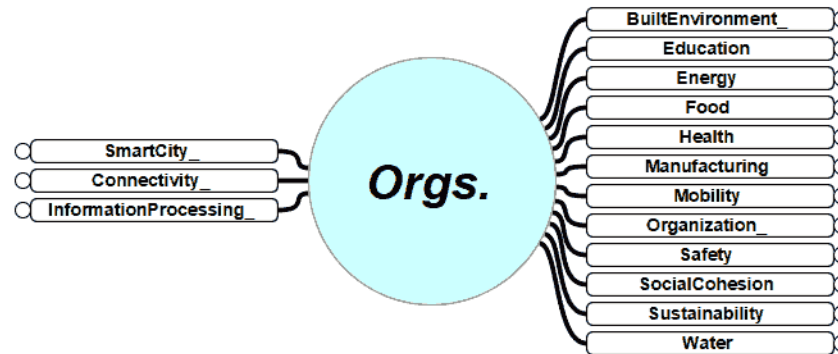
- e.g. PICASSO project: '[Panorama of ICT landscape in EU and US: ICT, Policies, regulations, programmes and networks in the EU and US with Updates for Latest US Announcements on 5G Initiative](#)'
- [AIOTI WG03 Reports on IoT Standards](#)
- <https://www.standict.eu/standards-watch>

# Vision for “Open List of Specs” for IoT and Smart Cities

**It starts here, with you, to edit/prioritize :**

- Filterable, sortable, annotatable, shareable
- Regularly updateable from respective SDOs (transparently)

Excel table gives mindmap of organisations for IoT

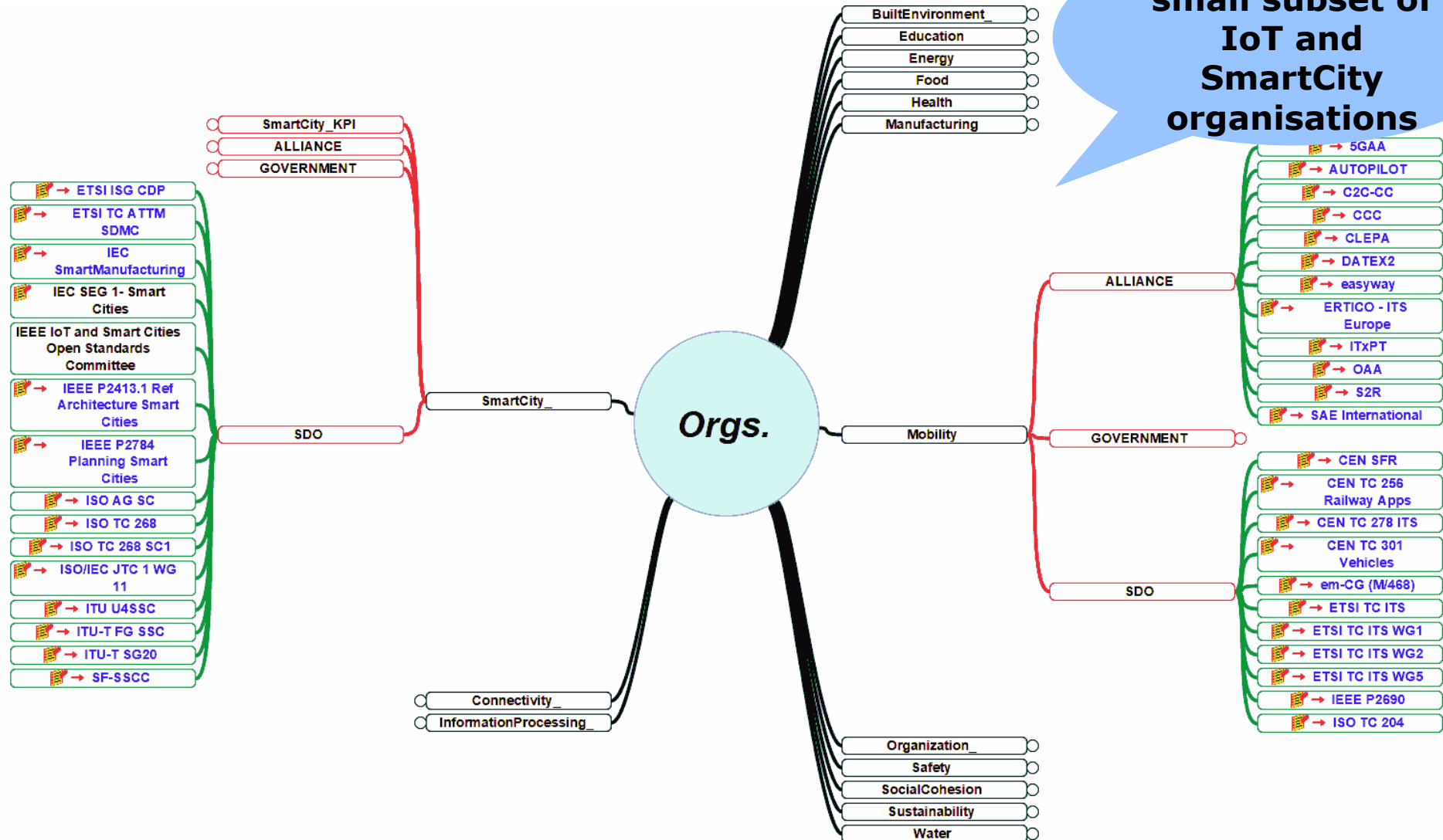


Excel table gives mindmap of specifications for IoT

	A	B	C	D	E	F	G	H	I	J
1		Org_Short	Webpage	Org_Full	Abstract		SF-SSCC_Tag1	SF-SSCC_Tag2	OrgType	Org_Level1
340		IoF2020	<a href="https://iof2020.org">https://iof2020.org</a>	Internet of Food	Internet of Food & Farm 2020		Food		ALLIANCE	EC
341		IO-Link	<a href="http://www.io-link.org">http://www.io-link.org</a>	IO-Link	IO Link promotes the IO-Link		InformationProcessing_	InformationProcessing_IoT	ALLIANCE	
342		IoT Forum	<a href="http://www.iotforum.org">http://www.iotforum.org</a>	IoT Forum	IoT Forum		InformationProcessing_	InformationProcessing_IoT	ALLIANCE	
343		IoT M2M Council	<a href="http://www.iotm2m.org">http://www.iotm2m.org</a>	IoT M2M	IoT M2M Council		InformationProcessing_	InformationProcessing_IoT	ALLIANCE	
344		IoT6	<a href="http://www.iot6.eu">http://www.iot6.eu</a>	IoT6	IoT6 was a 3 years FP7 Europ		InformationProcessing_	InformationProcessing_IoT	ALLIANCE	EC
345		IOTA	<a href="https://www.iota.org">https://www.iota.org</a>	IOTA	IOTA is an alliance to promot		InformationProcessing_	InformationProcessing_CyberSecurityPr	ALLIANCE	
346		IoTivity	<a href="http://www.iotivity.com">http://www.iotivity.com</a>	IoTivity	IoTivity is an open source sof		InformationProcessing_	InformationProcessing_IoT	ALLIANCE	OSS
347		IoTSec	<a href="https://www.iotsec.org">https://www.iotsec.org</a>	IoT Security	IoT Security Foundation is a c		InformationProcessing_	InformationProcessing_CyberSecurityPr	ALLIANCE	

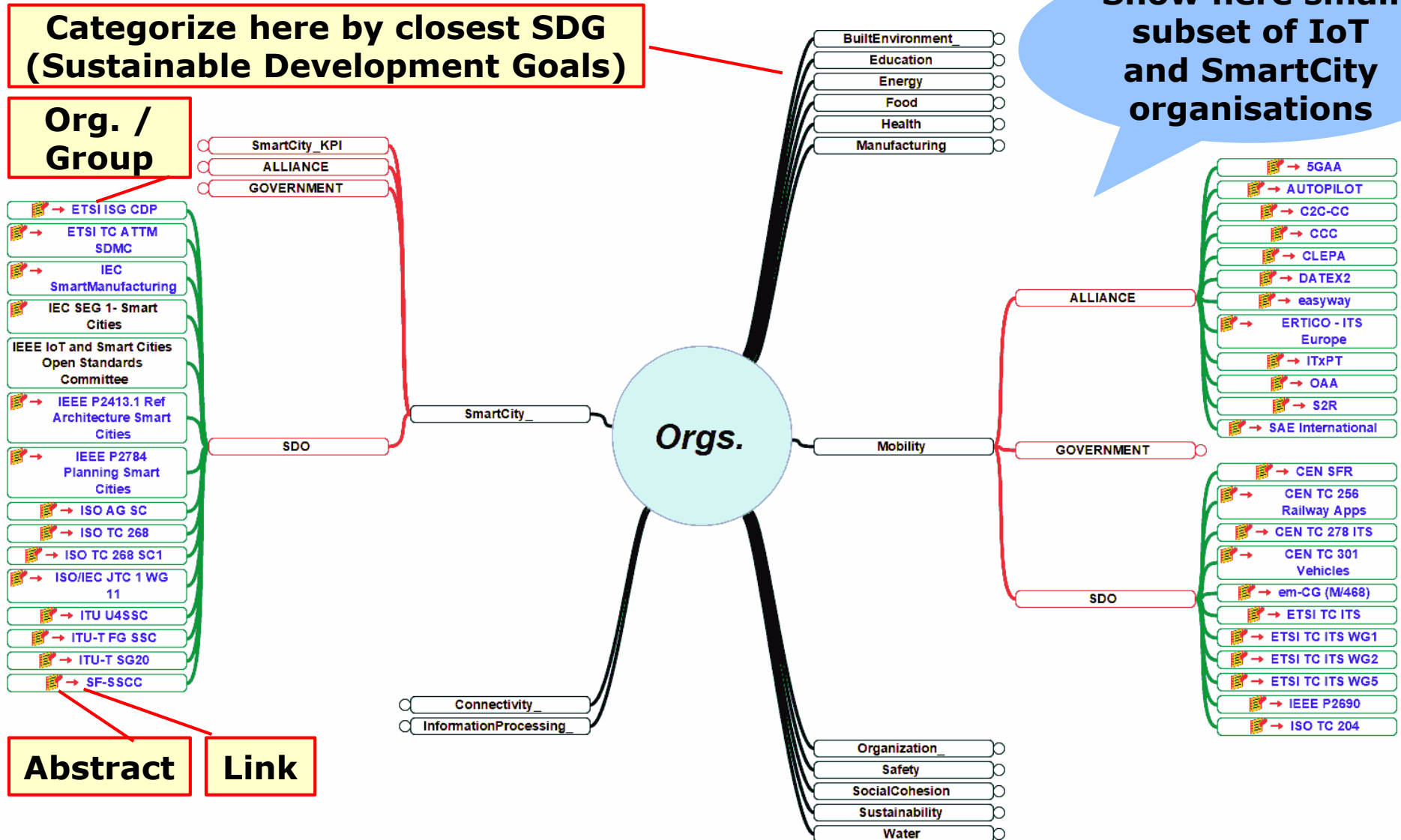
So far 600+ organisations/groups with URL, abstract ...

Shown here is  
small subset of  
IoT and  
SmartCity  
organisations





So far 600+ organisations/groups with URL, abstract ...



Tools are in place, now we need a crowd-sourced and transparent review!

# Conclusions

- Smart Cities using IoT need solutions which are integrated, flexible, replicable, scaleable, standards-based
- Standards development **is** achieving Minimum Interop Methods (but in many, many different ways and organisations!)
- Simple tools exist to compile, share, crowd-source filter the specs
- **Volunteers needed to adapt/improve/share list of specs** (... and one size does NOT fit all !)

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[Context Information Management](#))

**ETSI Board Member**

**ETSI Delegate for:**

**CEN/CENELEC/ETSI SF-SSCC**

([Sector Forum on Smart and Sustainable Cities and Communities](#))

**CEN/CENELEC/ETSI CG-Smart Energy Grid**

**CEN/CENELEC/ETSI CG-Smart Meters**

**CEN/CENELEC/ETSI CG-Smart Manufacturing**



**Thanks for listening.**  
**Thanks for volunteering**  
**;-)**

*Lindsay Frost's previous roles: research manager in physics facilities in Germany, Italy and Australia; manager NEC R&D teams for 3GPP; for WiMAX, fixed-mobile convergence, WLAN; group chairman in Wi-Fi Alliance; Chairman ETSI TISPAN WG5 Home Networks; Board Member of Home Gateway Initiative; co-chair of the HGI Smart Home group.*

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