



# Belysningen skal være smart! Men hvad medfører det?

## IoT in Smart Cities

Anders Mynster, Head of department FORCE Technology – Leader Nordic IoT centre

16 September 2021



# FORCE Technology

Teknologi som drivkraft for samfund og virksomheder – innovation, rådgivning og serviceydelser

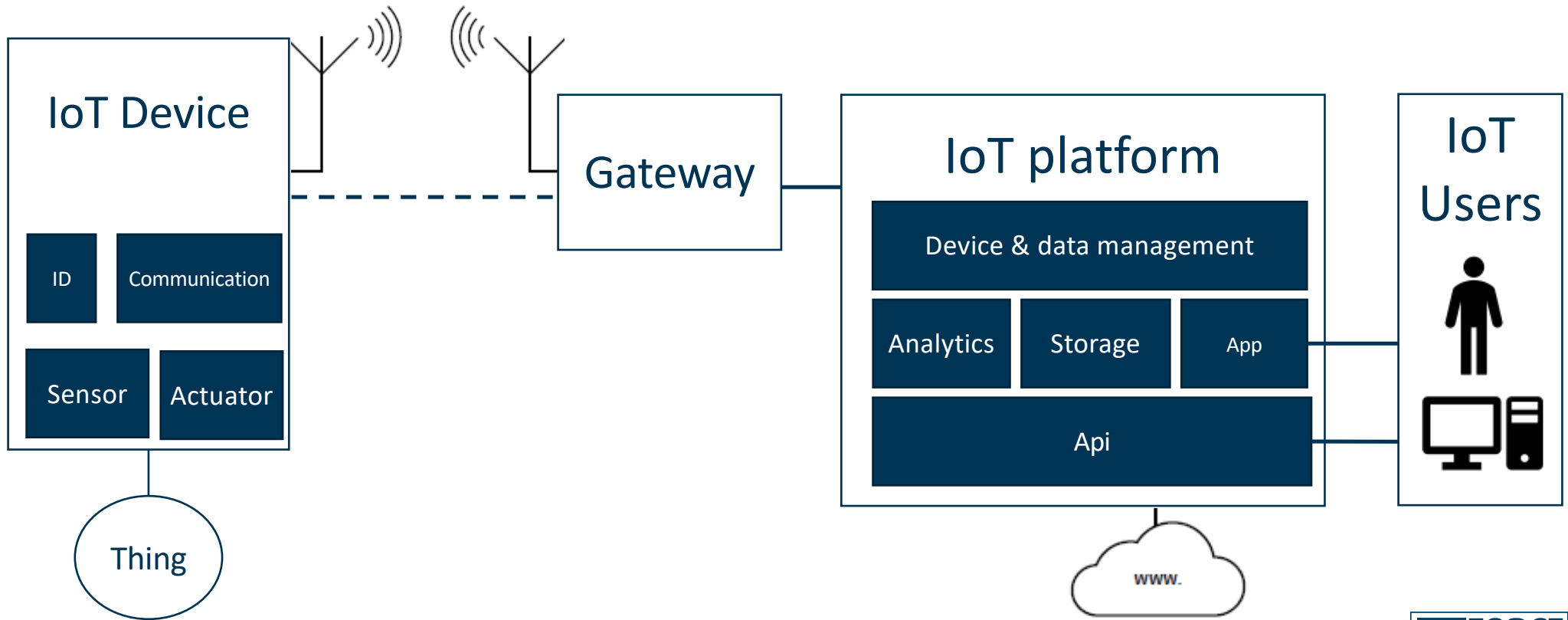


- 1.100 medarbejdere
- 9.000 kunder
- Udviklingsbudget på over 200 MDKK
- +450 unikke faciliteter
- +35 FoU-projekter
- +150 teknologiske udviklingsprojekter
- Førrende international teknologirådgiver
- Selvejende, uafhængig og uvildig
- Stærk skandinavisk base
- GTS-institut



GØDKENDT  
TEKNOLOGISK SERVICE

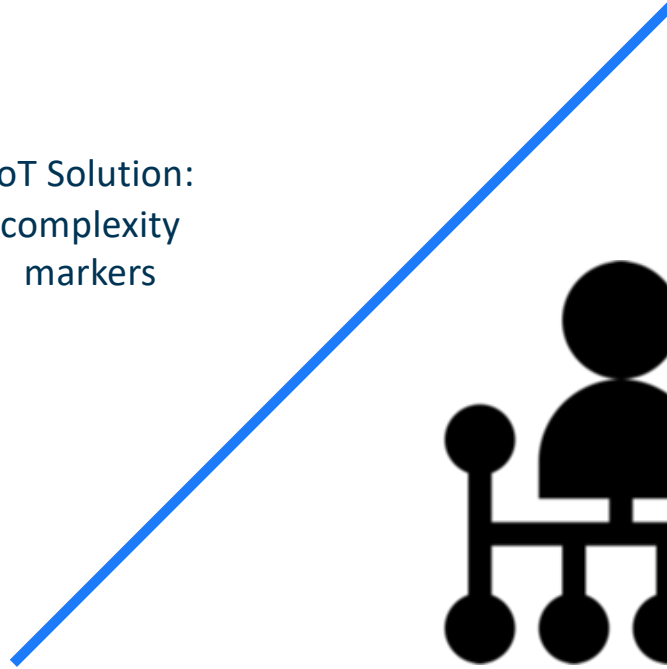
# IoT explained



# IoT Solution complexity vs organisational maturity



IoT Solution:  
complexity  
markers

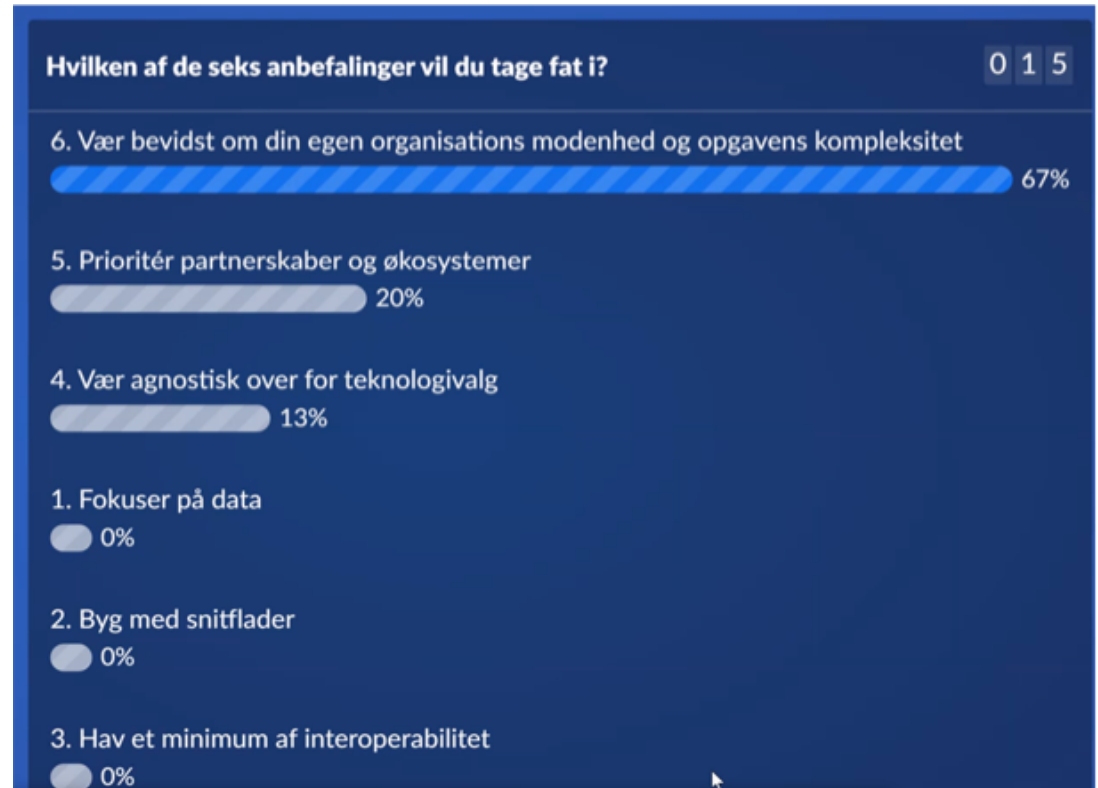


IoT Organisation:  
Maturity &  
Markers

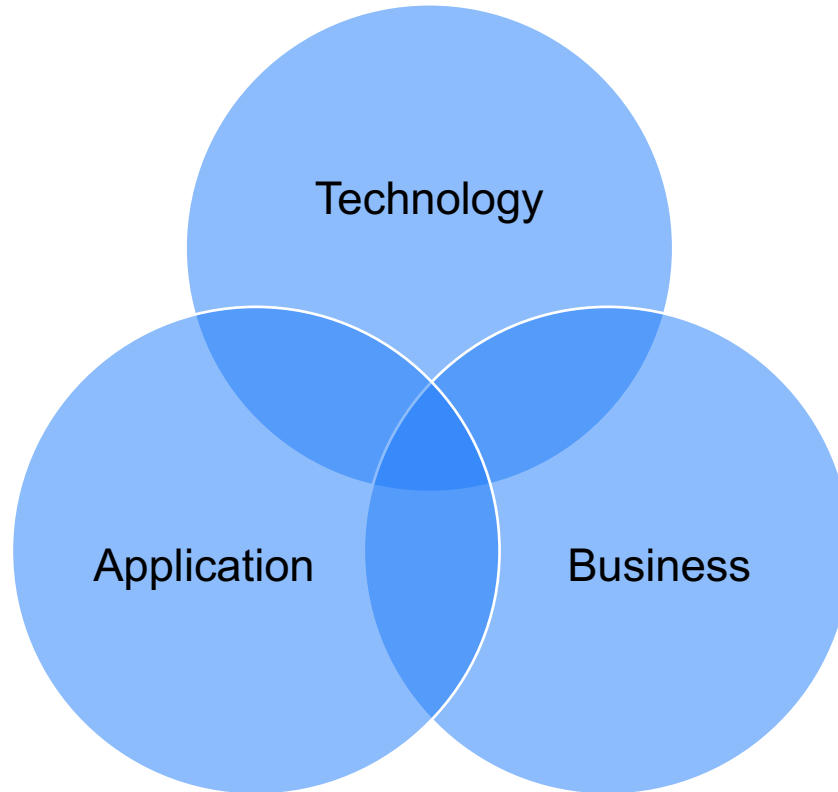
# Guideline for sustainable, digital transition in Denmark

## 6 high level recommendations for implenting IoT

- KL – Municipal association of Denmark  
Technical yearly summit
  - 43% political leaders
  - 43 % technical directors
- So how to identify the solution complexity and the organisational maturity?



# IoT solution complexity from different perspectives



# Guide til bæredygtig digital omstilling i Danmark

Marts 2021



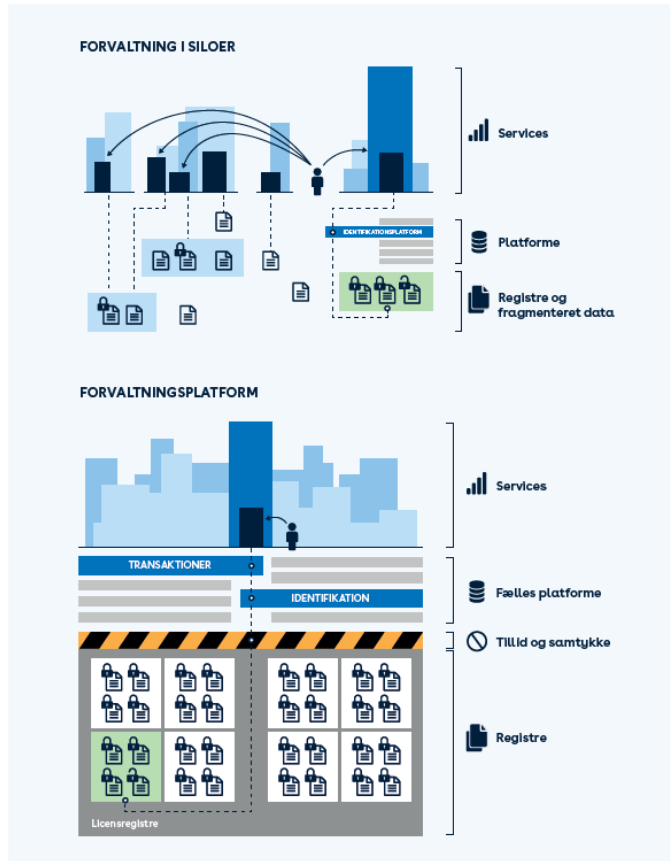
## De syv anbefalinger

1. Fokuser på data
2. Byg med snitflader
3. Hav et minimum af interoperabilitet
4. Vær åben over for teknologivalg
5. Prioritér partnerskaber og økosystemer
6. Vær bevidst om modenhed og kompleksitet
7. Start småt, tænk stort

Guiden skal ses som et første skridt på vejen til at skabe en fælles ramme for forståelse og øget brug af standarder.

<https://www.ds.dk/da/nyhedsarkiv/2021/04/ny-guide-til-baeredygtig-digital-omstilling-er-nu-gratis-tilgaengelig>

# Undgå Siloer



- Affald
- Biblioteker og andre kulturinstitutioner
- Bygge- og anlægsarbejder
- Egne bygninger (facility management)
- Fjernvarme og -køling
- Folkeskoler og fritidsundervisning
- Gadebelysning
- Klimaovervågning og -sikring
- Miljøovervågning
- Mobilitet
- Monitorering af byrum
- Parker/grønne områder
- Parkering
- Rengøring og service
- Smart ladning af elbiler - Parkeringsladere alle steder
- Tracking af aktiver, fx biler og værktøj
- Trafikselskaber og havne
- Vandforsyning og spildevand
- Ældrepleje og sundhed.



# Standarder

## SMART TEKNOLOGI - MULIGE STANDARDISERINGSLAG



### TEKNOLOGI DATA

- 1. Installation** For at løfte sikkerhed og længere holdbarhed i smart-løsningerne kan krav til installation af enheder og teknologi med fordel standardiseres.
- 2. Data** Datastrukturer og -formater, der stilles til rådighed for flere rekvirenter, bør standardiseres for at sikre åbenhed og tværgående interoperabilitet.
- 3. Software** Det er i højere grad use case-understøttelsen, dataudvekslingen og -integrationen, der skal standardiseres – end teknologien og syntaksen bag softwaren. Sikkerhed i software vil fortsat være et fokusområde.
- 4. Hardware** Hardware-standardisering er ikke umiddelbart en forudsætning for interoperabilitet. Sikkerhed og interfaces kan underlægges anbefalinger samt fx standarder for geo-information og transmission.
- 5. Infrastruktur** Netværk og connectivity bør standardiseres i højere grad for at sikre fælles kommunikerbar deling af information og sikre sammenspil mellem løsningerne.

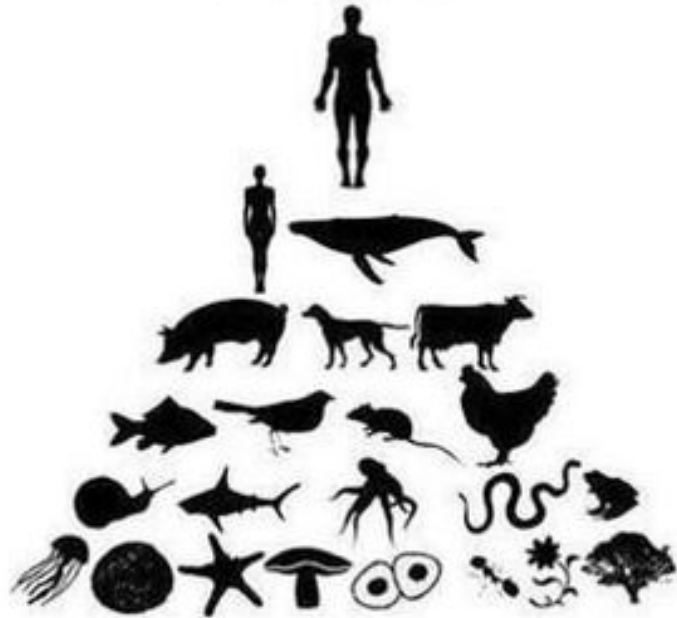
## DE JURE-STANDARDE



## DE FACTO-STANDARDE



# EGO



# ECO





# We help you release the value of IoT

- **Vision**  
Nordic IoT Centre will make the Nordics the best place in the world to use and develop IoT-enabled products and IoT-based services
- **Mission**  
Nordic IoT Centre promotes the usage and development of IoT in the Nordics – by joining and engaging the relevant actors of the IoT ecosystem, and by enforcing Nordic values such as user focus, functional design, quality assurance and accountability in the development of IoT-enabled products and IoT-based services

Nordic IoT Centre

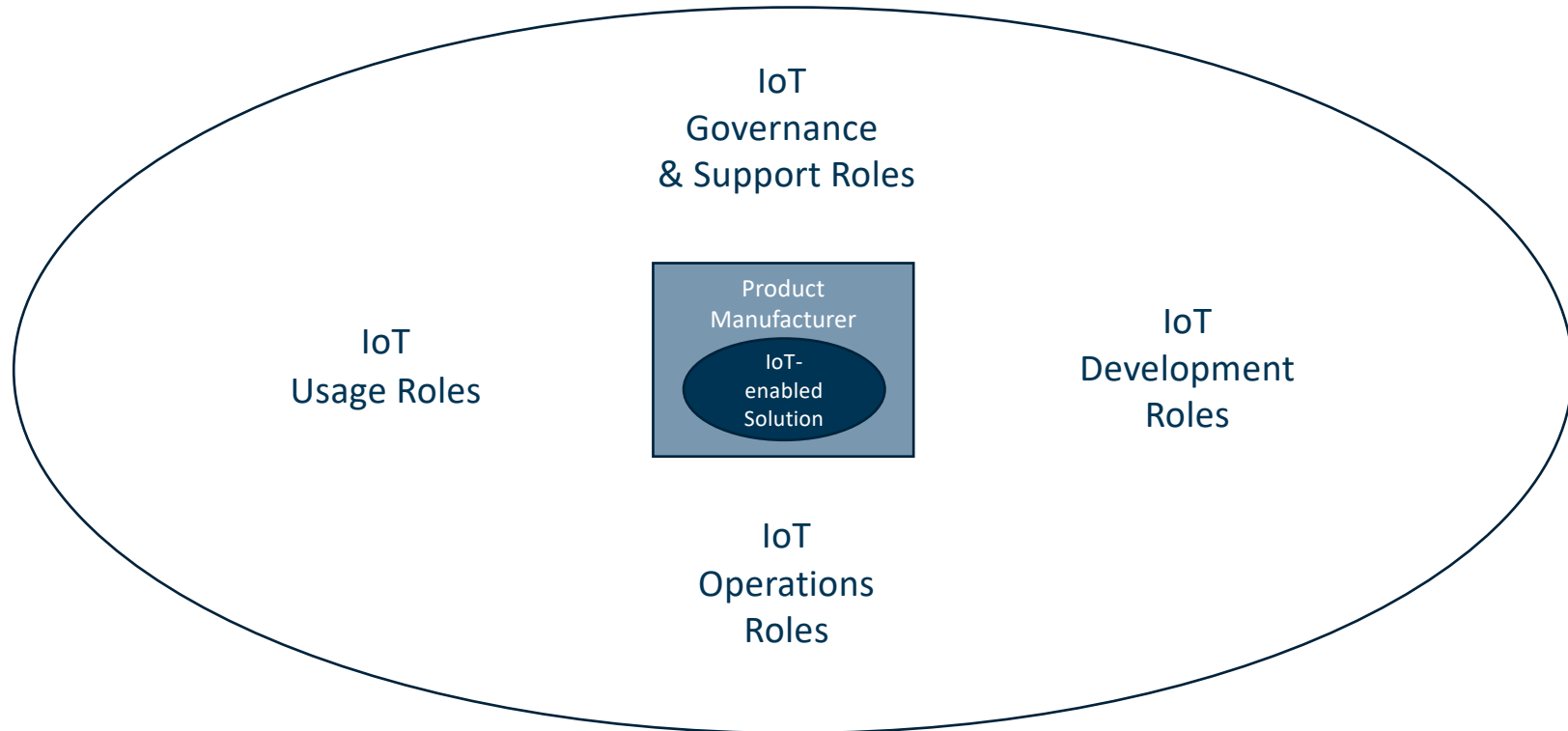


# IoT Ecosystem definition

- *The IoT ecosystem is a **network of organizations developing and adopting IoT products and services through both competition and cooperation**. Each actor in the ecosystem affects and is affected by the others, **creating a constantly evolving relationship** in which each entity must be flexible and adaptable in order to succeed, as in a biological ecosystem.*
- *To deliver maximum value when creating specific IoT products and services **it is necessary for each actor to specialize in their field of expertise** and to contribute with this specialized knowledge to the other actors in the ecosystem collaboration*
- *As more **product manufacturers IoT enable their products, they become part of the ecosystem** and potentially become suppliers of more components available to the ecosystem. Thus, enabling the ecosystem to evolve with new and more IoT products and services.*

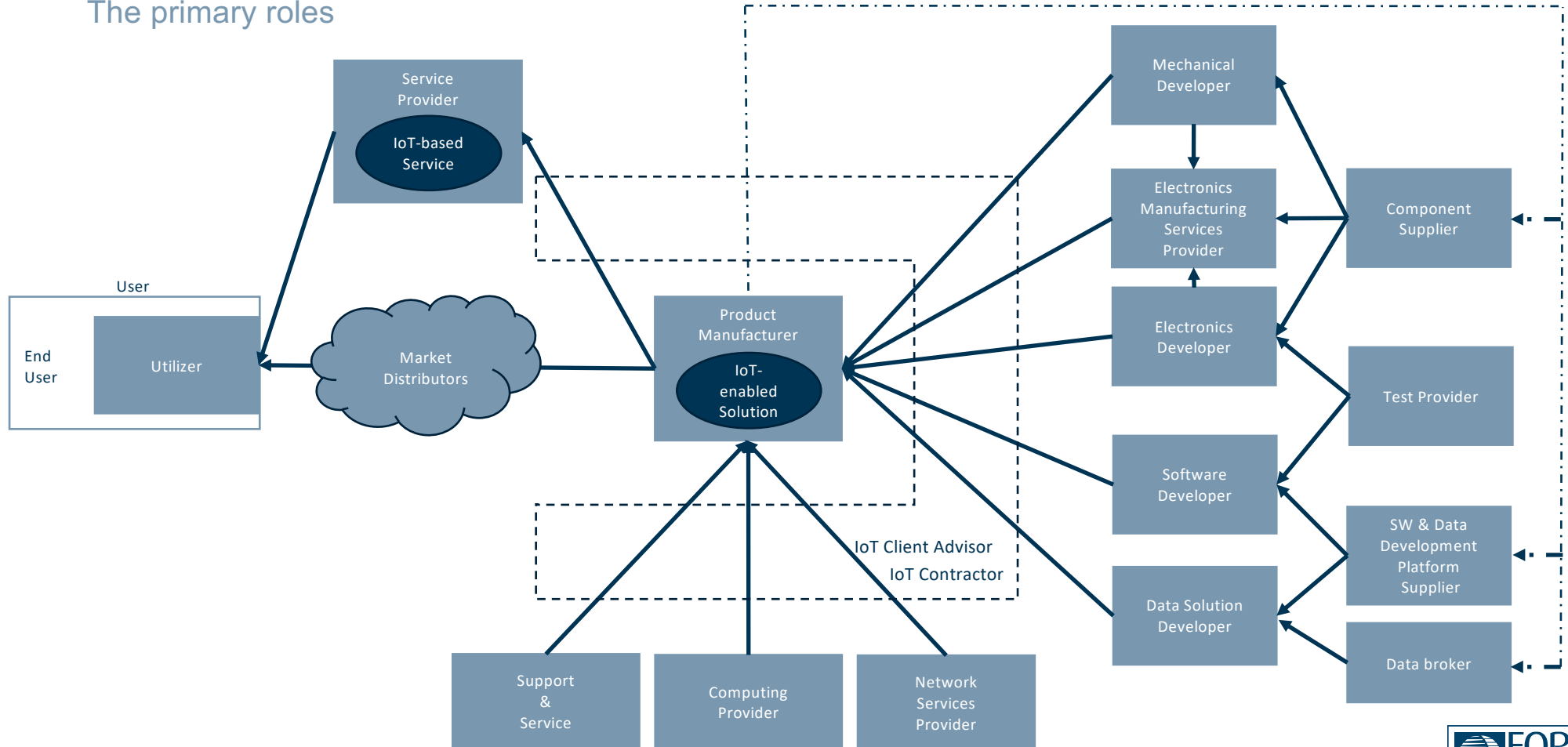
# The IoT Ecosystem

Four groups of roles



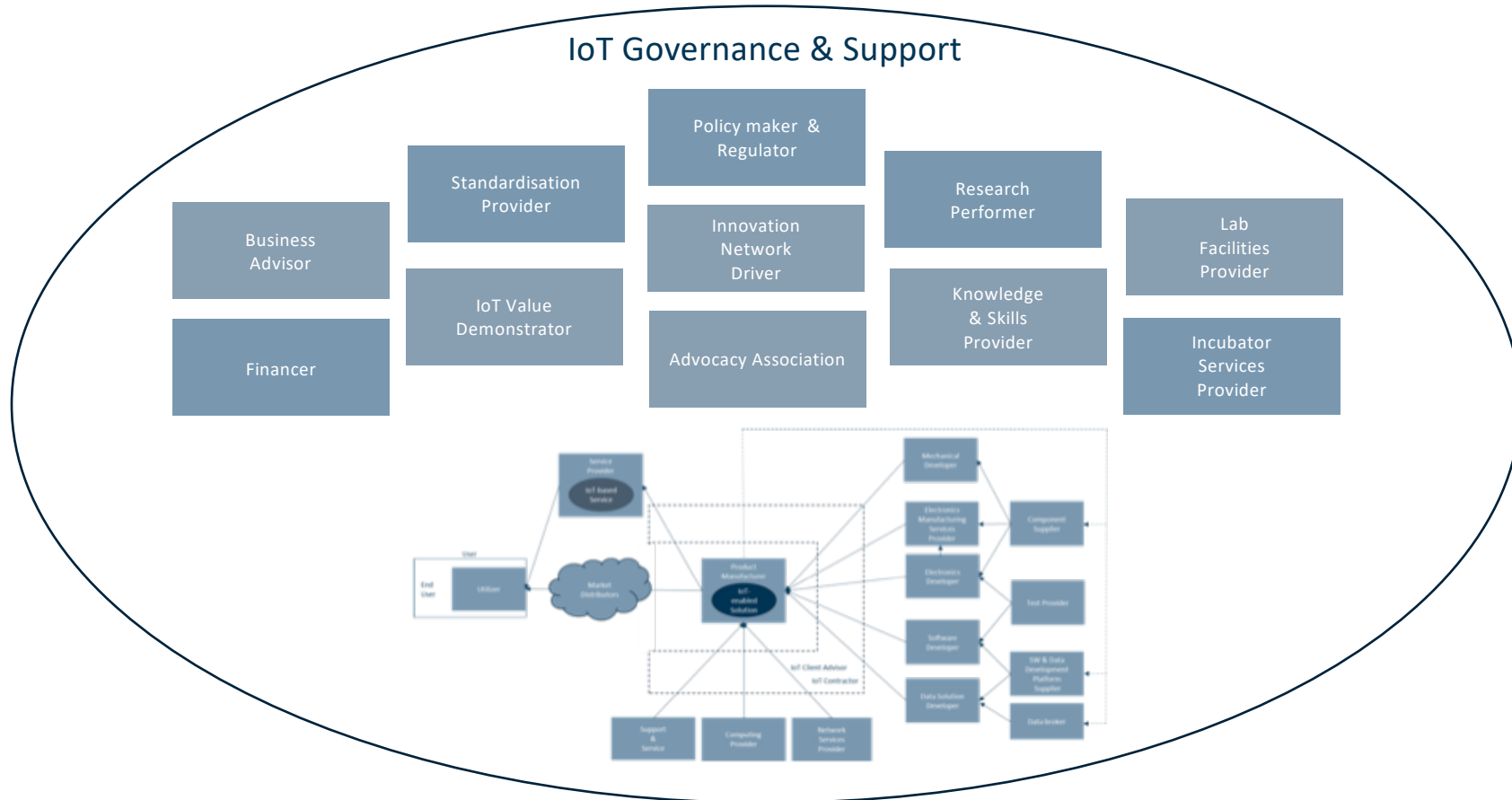
# A role-based model of the IoT Ecosystem

The primary roles



# The full IoT Ecosystem

Adding governance and support roles





# We help you release the value of IoT



EKTOS ♡ 1

kaastrup|andersen

kaastrup|andersen ♡ 1



Xtel ♡ 0



Arrow Denmark ♡ 3



Seluxit ♡ 0



Iterator IT ♡ 1



Prevas ♡ 1

design-people

design-people ♡ 0



Glaze ♡ 1



TDC Group ♡ 2



University of Southern Denmark ♡ 0

FØROYA TELE

Føroya Tele ♡ 0



3 Danmark ♡ 1



Alpha-elektronik ♡ 1



Senti ♡ 18



Develco ♡ 1



TekPartner ♡ 2



Aarhus University ♡ 0



Cibicom ♡ 2

make:net

make:net ♡ 2

seas-nve

seas-nve Holding A/S ♡ 0



IoT Denmark ♡ 2

Topdanmark

Topdanmark Forsikring A/S ♡ 0



Aalborg Universitet ♡ 1

## Nordic IoT Centre



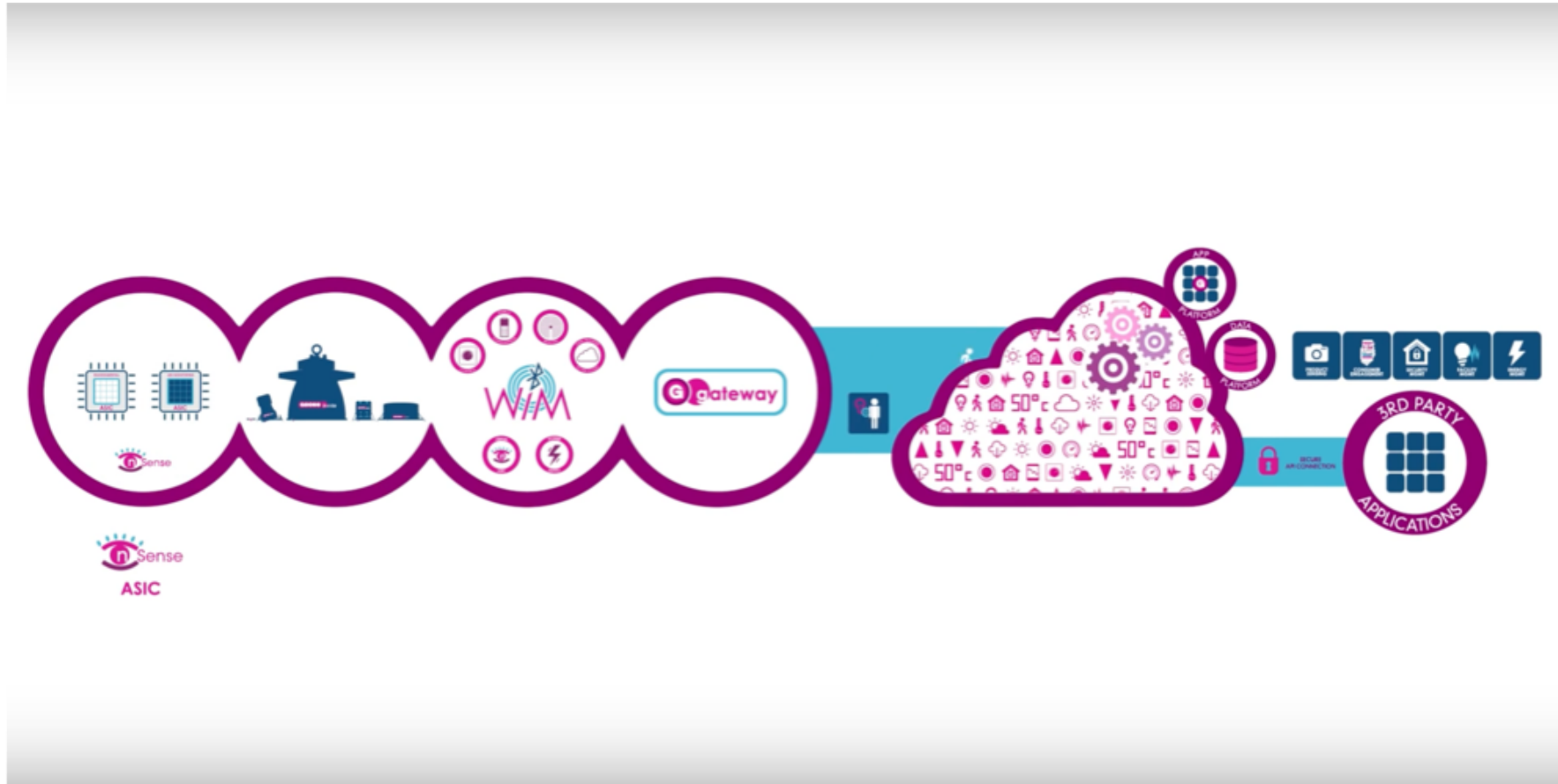
# Smart Lighting Case – Alfred Pries

- Manufacturer of intelligent lighting columns
- Solar powered
- Monitoring of energy consumption through Wi-Fi or GSM
- Equipped with sensors to measure activity and regulate brightness
- When a column detects traffic, they can communicate with the next column



Source: <https://nordiciot.dk/portfolio-item/alfred-priess/>

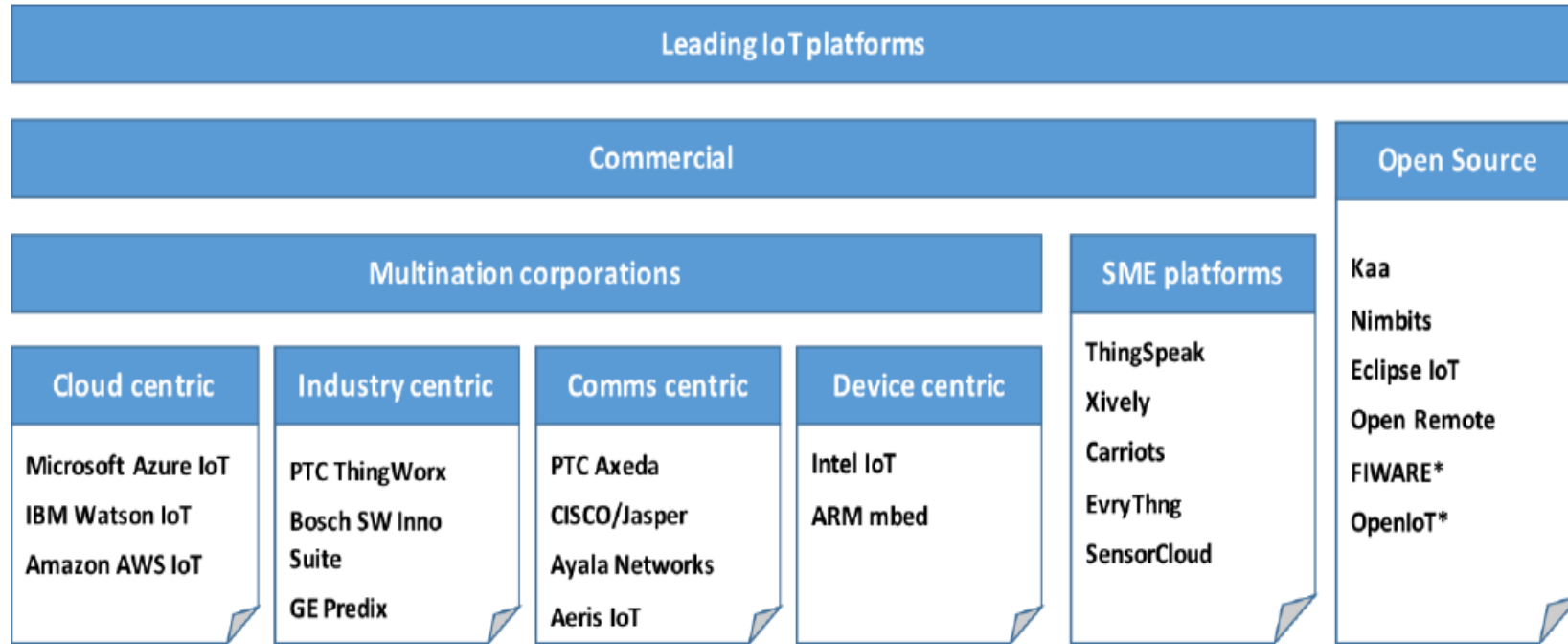
# GOOEE - from selling lamps to selling data



- [Video](#)

# IoT platforms

- Find the platforms that are dedicated to your vertical and the platforms that you need to interact with



# Smart Lighting Demonstrations – DOLL Living Lab

- Many demos of different lighting (and smart city) solutions
  - Location: Glostrup, Copenhagen
- Focus areas
  - Outdoor Lighting
  - Digital Infrastructure
  - Waste management
  - Parking & Mobility
  - Environmental Monitoring
  - And more



Source: <https://doll-livinglab.com>

# Summary

- Focus on how to engage with the ecosystem
  - Utilize the existing competences with vertical domain knowledge for your application area
  - Focus on the value creation for your clients – what are their needs also in terms of other silos
  - Be aware of the value that you bring to the table to other verticals
- Use the guideline for how to get started

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# Contact

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