



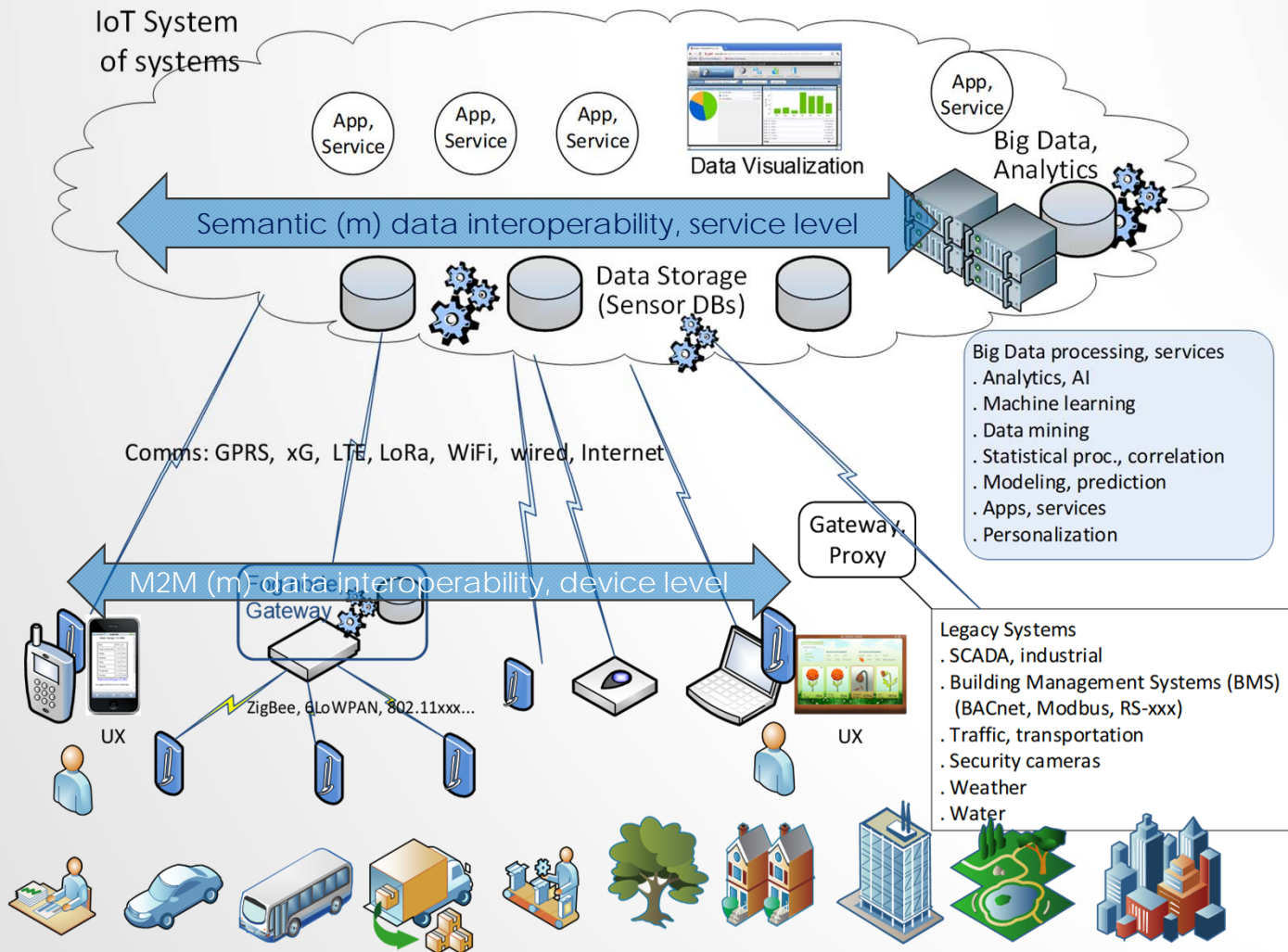
IoT Semantic Interoperability and Project Haystack: Beginning of a Beautiful Friendship

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Narrative, outline

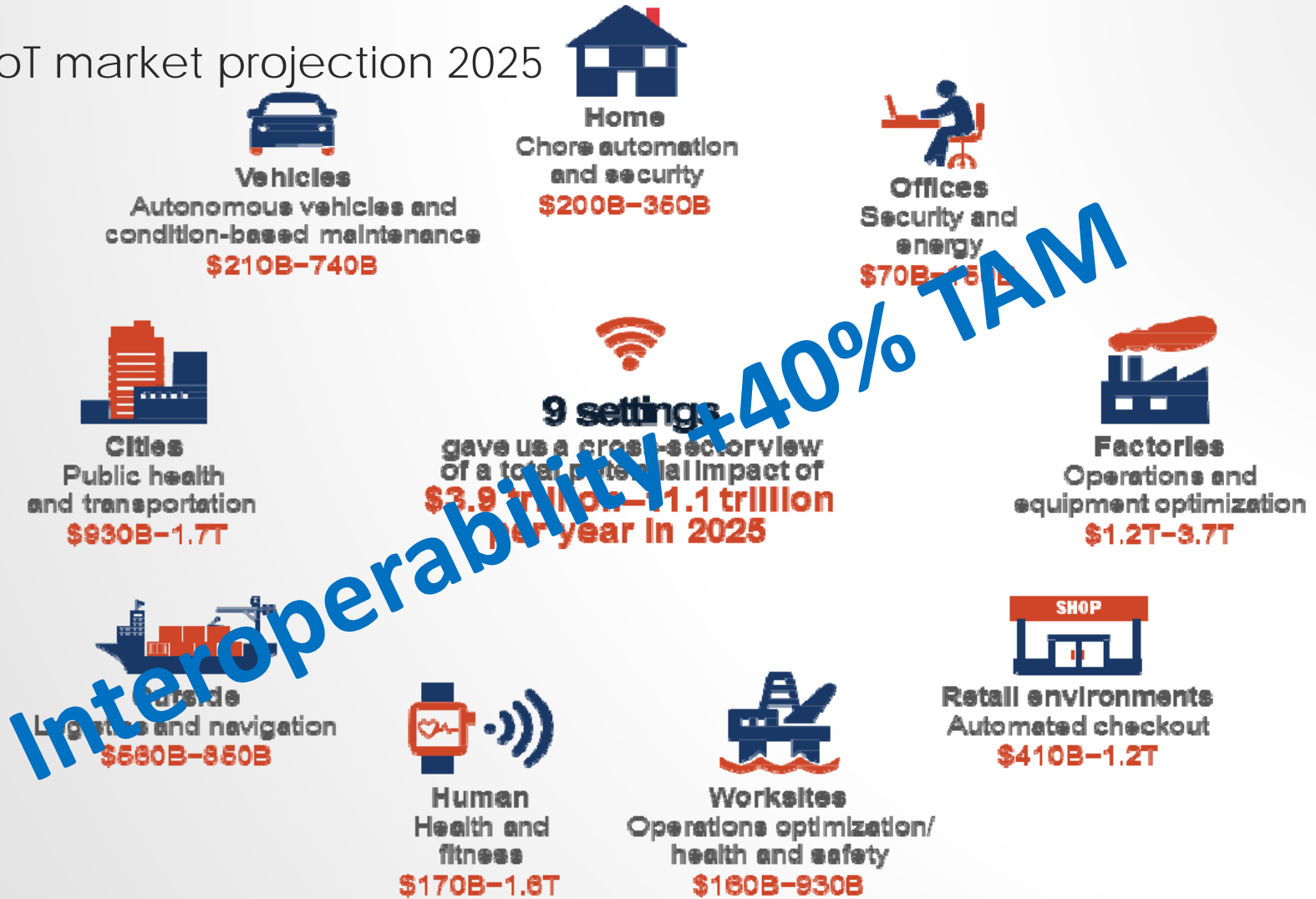
- Goal: IoT semantic data and meta-data interoperability
- Why: problem solved?
 - Deliver on IoT big data promise, enable customer data ownership, apps portability
- IoT (m)data standards: proliferating, fragmented, incompatible
- Too late for one to rule them all: diverse domains, overlap, legacy
- Next best thing: (semantic) IoT data interoperability
across specifications and domains
- How?
 - Technology: similar to Haystack approach
 - Politics: work across standards bodies
 - Feasibility: interop POC
- Call to action: Let's do this together



Goal: Semantic Interoperability

- Goal: IoT data and meta-data semantic interoperability
 - Not just buildings, IoT...
- Data interoperability, multiple flavors
- **Device-level**, M2M. aka “syntactic” (most current standards)
 - Structured objects and properties to reflect physical objects
 - Interoperability intra-domain (spec), monoculture
 - Some specs also cover discovery, management, provisioning, security
- **Semantic, “service-level”** (our focus) – interoperable data format across specifications, providers, and domains
- [IIC] conceptual interoperability: represent information in a format whose meaning is independent of the application generating or using it

McKinsey IoT market projection 2025



McKinsey & Co report "[IoT: Mapping the Value Beyond the Hype](#)"

Why?

- That 40% IoT TAM increase, and
- Enable IoT data aggregation across verticals and domains
 - Deliver IoT big-data promise: interoperable large, diverse data sets
 - Portable apps/services: data mining, analytics, optimization, ML, viz
 - Customers own their data – avoid vendor and cloud lock-in
- Who needs this? (few examples)
 - Smart buildings: HVAC, lighting, occupancy, elevators, security
 - Building operators: optimize across a portfolio of buildings, BMSs
 - Smart cities: holistic view of disparate systems: buildings, energy, transportation, lighting, security, emergency response
 - Industrial: optimize processes with multi-vendor machinery, tools
 - Transportation: collect data on traffic, mapping across vendors
 - Others ...

A Subset of IoT Standards, with data defs



OCF



here



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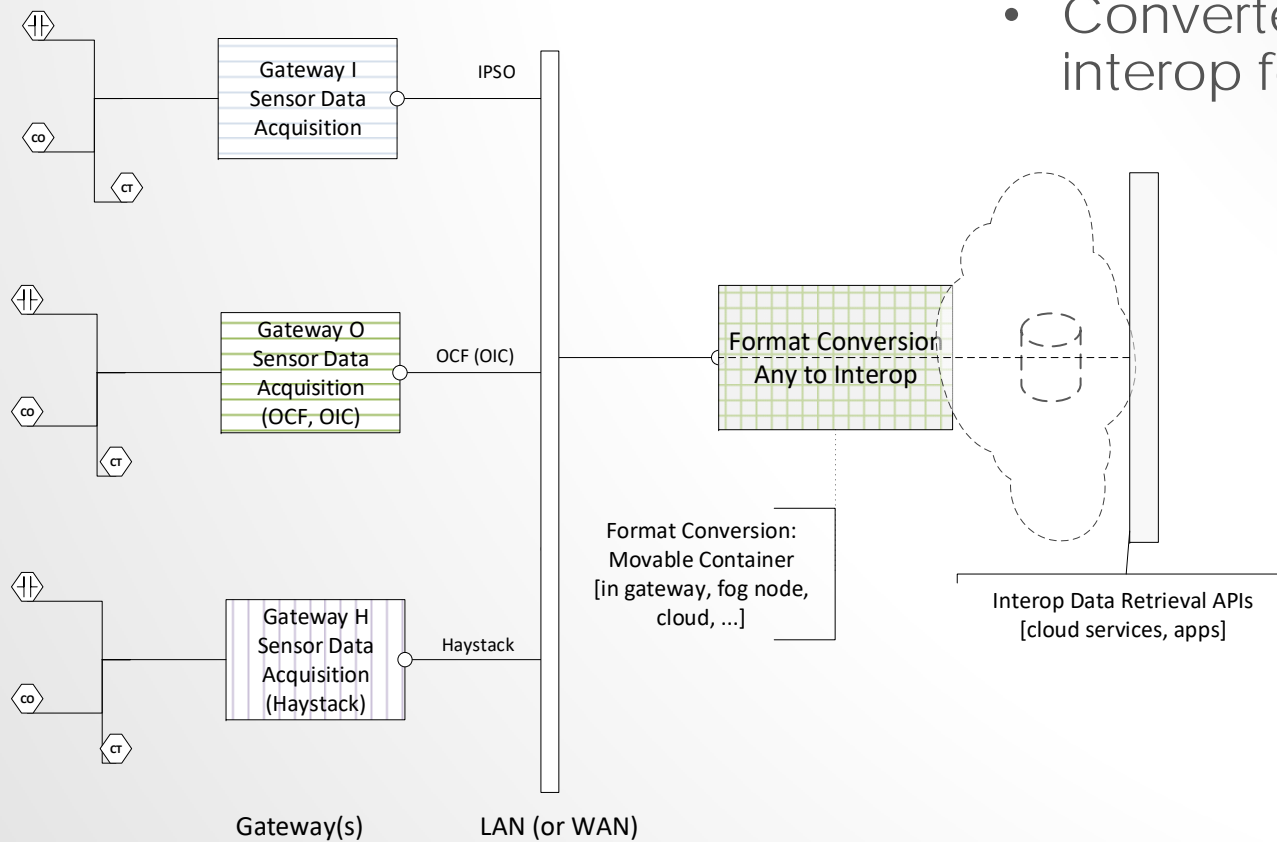
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How?

- IoT standards: competing, fragmented, overlapping, legacy...
- Not one to rule them all
- Next best thing: semantic interoperability
- Wip approach
 - Meta-format, annotation; not yet another (OO) data model
 - Data/payload only
 - Other layers: protocols, security, management, provisioning, discovery
 - Internet-inspired, minimalist approach
 - (payload) Data and meta-data annotation, tagging
 - Descriptive, not prescriptive – common format, naming for what is used

Interop POC Architecture

- Common sensors (few)
- Data in different stds
- Converted in flight to interop format



POC Components



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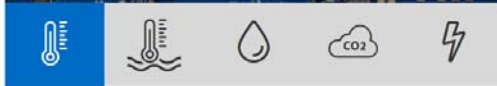
POC UI



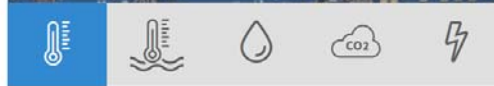
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```

Interop

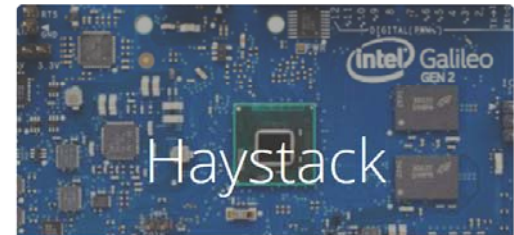
Pause/Resume animation



```
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}
```

Next steps, logistics

- Need standard body(s) to add interop to charter
- Interop format principles, design, tools?
- Promotion, proof POCs, call to collaboration
 - to relevant standards – OCF, IPSO, lwm2m, W3C
 - Industry organizations, interop adopters: Open Fog, IIC, ...
- Get some influential corporate backers
 - Technology providers and users
- Observation
 - Conceptually similar to Haystack approach
 - Be the driver or the first mover, approach other standards

Summary and Call to Action

- Goal: IoT semantic data and meta-data interoperability
- Why: problem solved?
 - Deliver on IoT big data promise, enable customer data ownership, apps portability
 - IoT TAM and usefulness increase
- IoT (m)data standards: many, fragmented, incompatible
 - Too late for one to rule them all: diverse domains, overlap, legacy
- Next best thing: semantic interoperability, across specifications
- How?
 - Technology: extensions similar to Haystack approach
 - Politics: work across standards bodies
 - Feasibility: interop POC
- **Call to action: Let's do this together**



Q & A

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