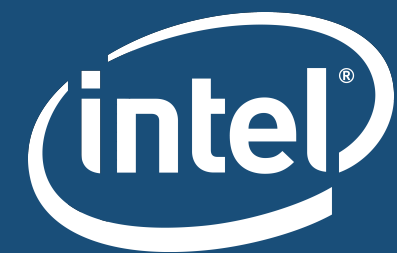


General Session Keynote Presentation



BEYOND BUILDINGS: DATA MODELS & PROJECT HAYSTACK

RITA H. WOUHAYBI, SYSTEM ARCHITECT, INTERNET OF THINGS GROUP,
INTEL CORPORATION



AHEAD OF THE GAME

- Haystack in Buildings
- Outside the Buildings
- The fast path of data

HAYSTACK IN BUILDINGS: A THIRD PARTY STORY

- Empirical methodology for assessing the effectiveness and completeness of standards in buildings
- 89 applications, grouped into 8 categories and 5 graphs representing relationships
- Three vectors:
 - Complete
 - Relationship
 - Flexible

* Source: Analyzing Metadata Schemas for Buildings: The Good, The Bad and The Ugly
Arka Bhattacharya, Joern Ploennigs, David Culler. BuildSys 2015

SCORE CARD

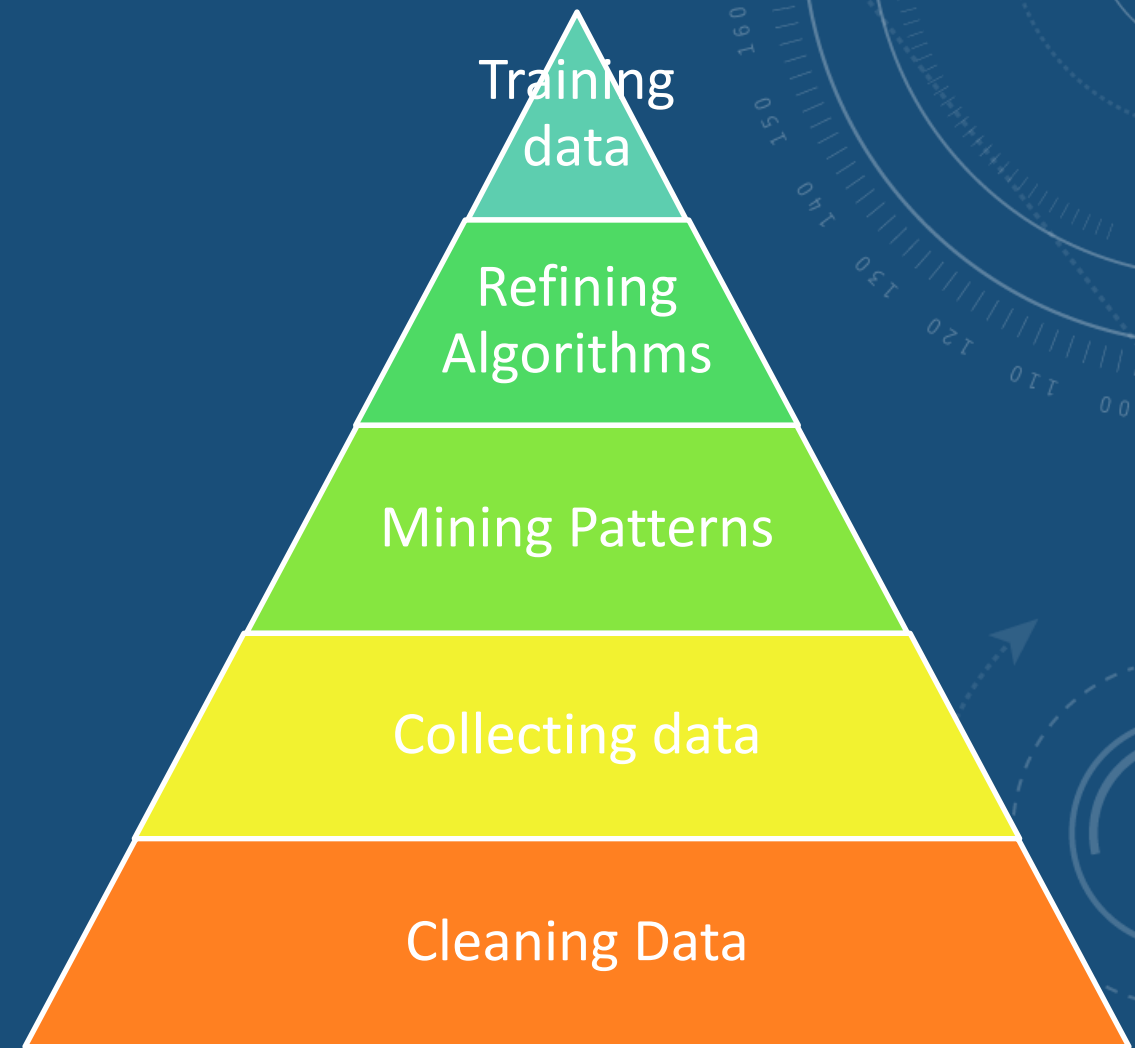
- Excellent coverage in well-comprehended use cases
- Modeling and analytics show some concerns
- Some of the low numbers are too stringent since they could potentially be solved with a wider taxonomy

Coverage	Haystack	IFC	Semantic
Feedback / MPC / FDD	100%	100%	40%
Web Displays	75%	100%	100%
NILM / DR	50%	50%	50%
Energy Apportionment	57%	86%	57%
Occupancy Modelling	42%	58%	25%

IS METADATA SLOWING THE DATA FLOW?

Metadata adds overhead, when:

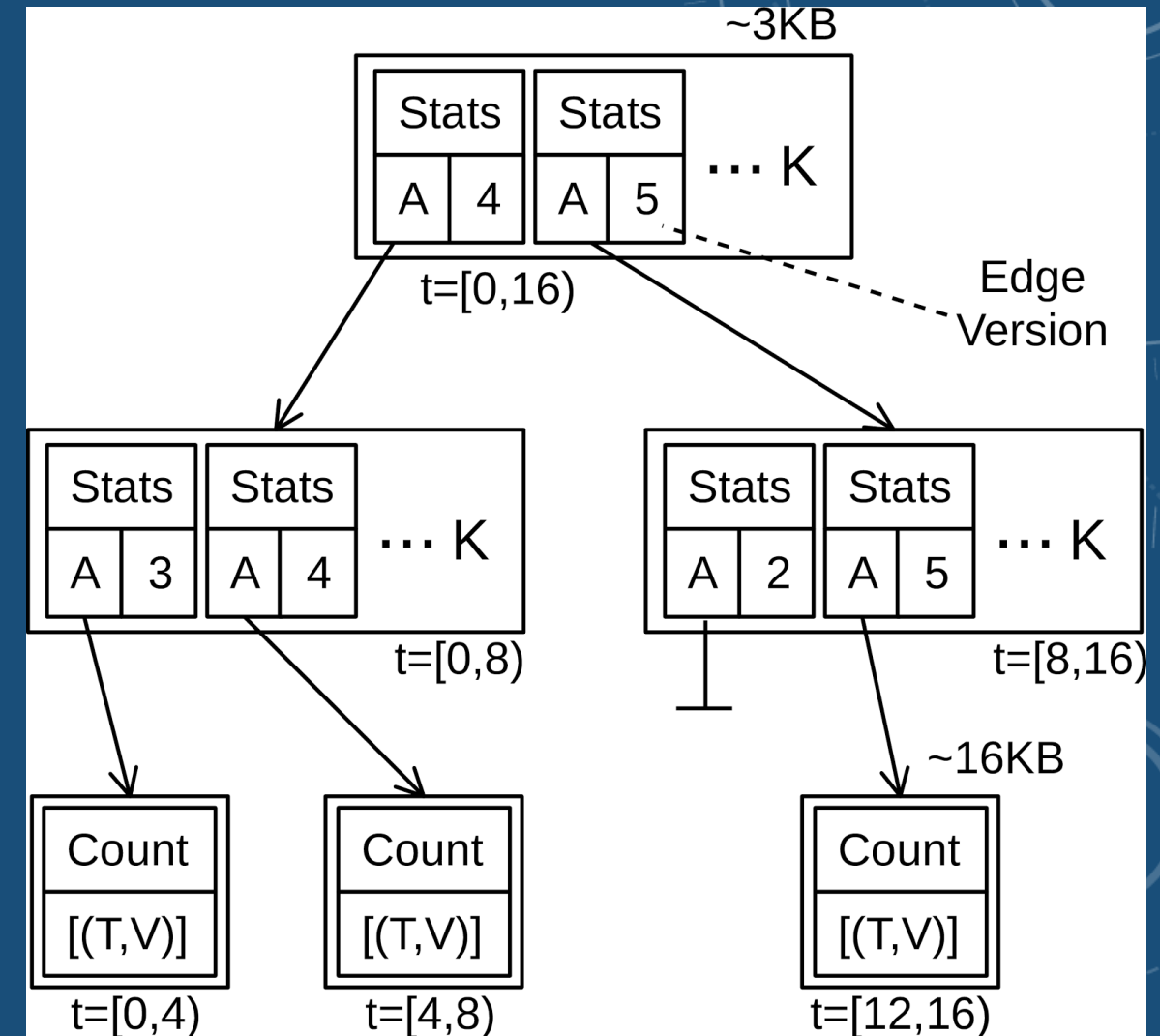
1. Too Hard to develop
2. Poorly defined (LI02_T1_KG1)
3. Analytics incompatible*



The life of a data scientist (Forbes)

NEW GENERATION OF STORAGE

- Increase efficiency in database read and write (tree structures)
- Pre-compute based on use cases and arrange accordingly.
- How would the metadata play a role? => open research problem!



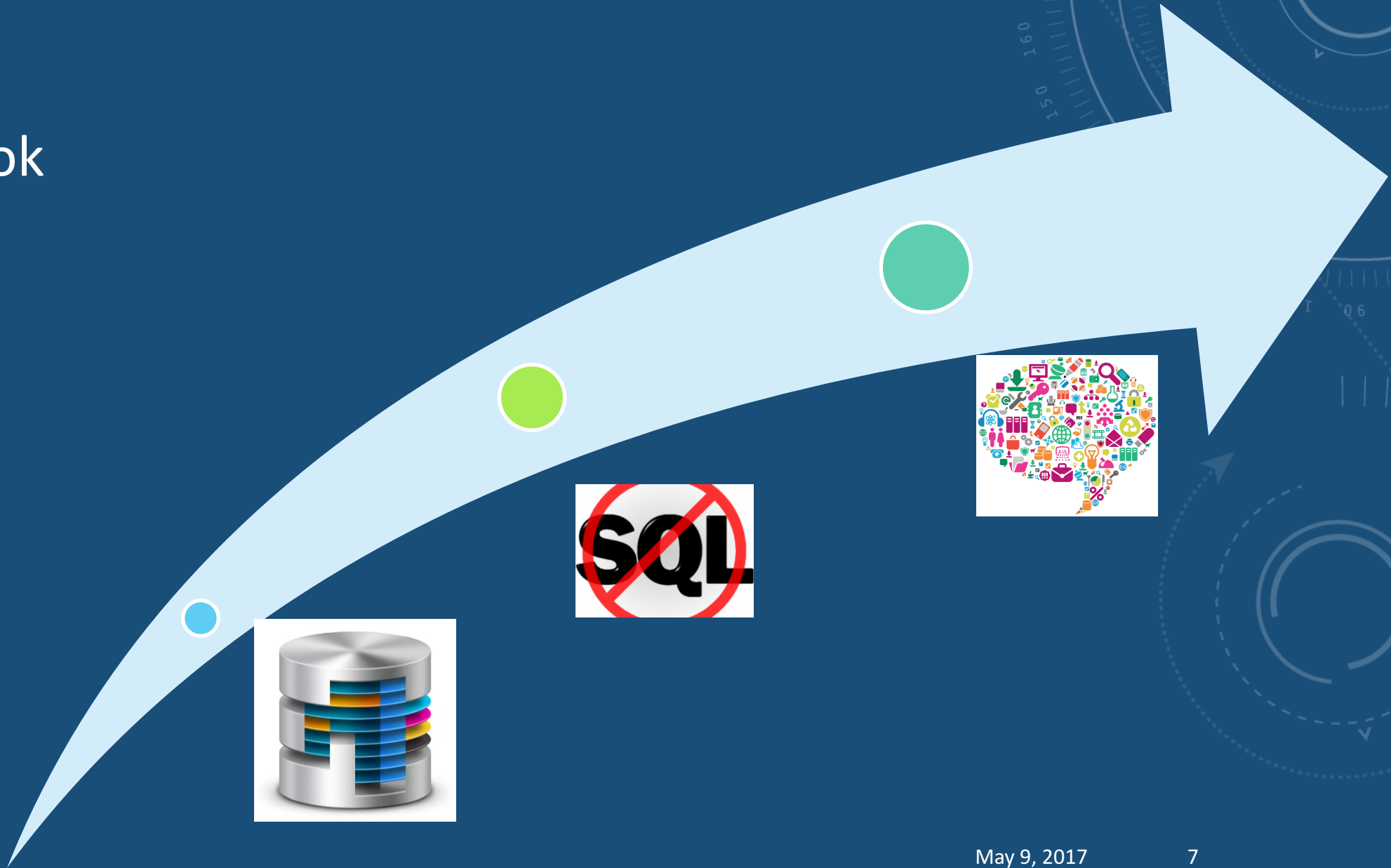
* Source: BTrDB: Berkeley Tree Database <http://btrdb.io/>

DATA FLOW

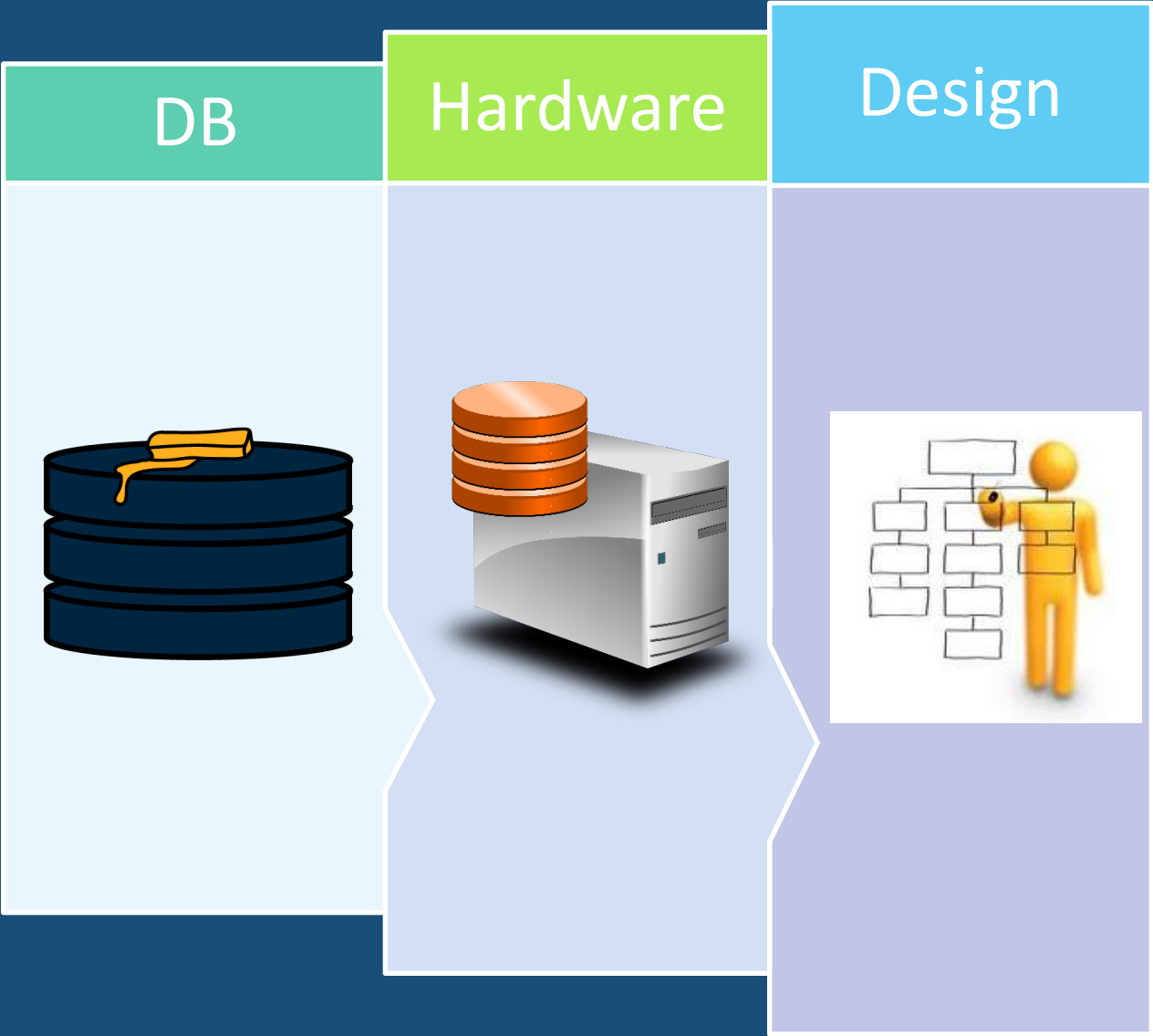
Analytics should not look like JOIN operations

Stay flexible and open

Use case driven

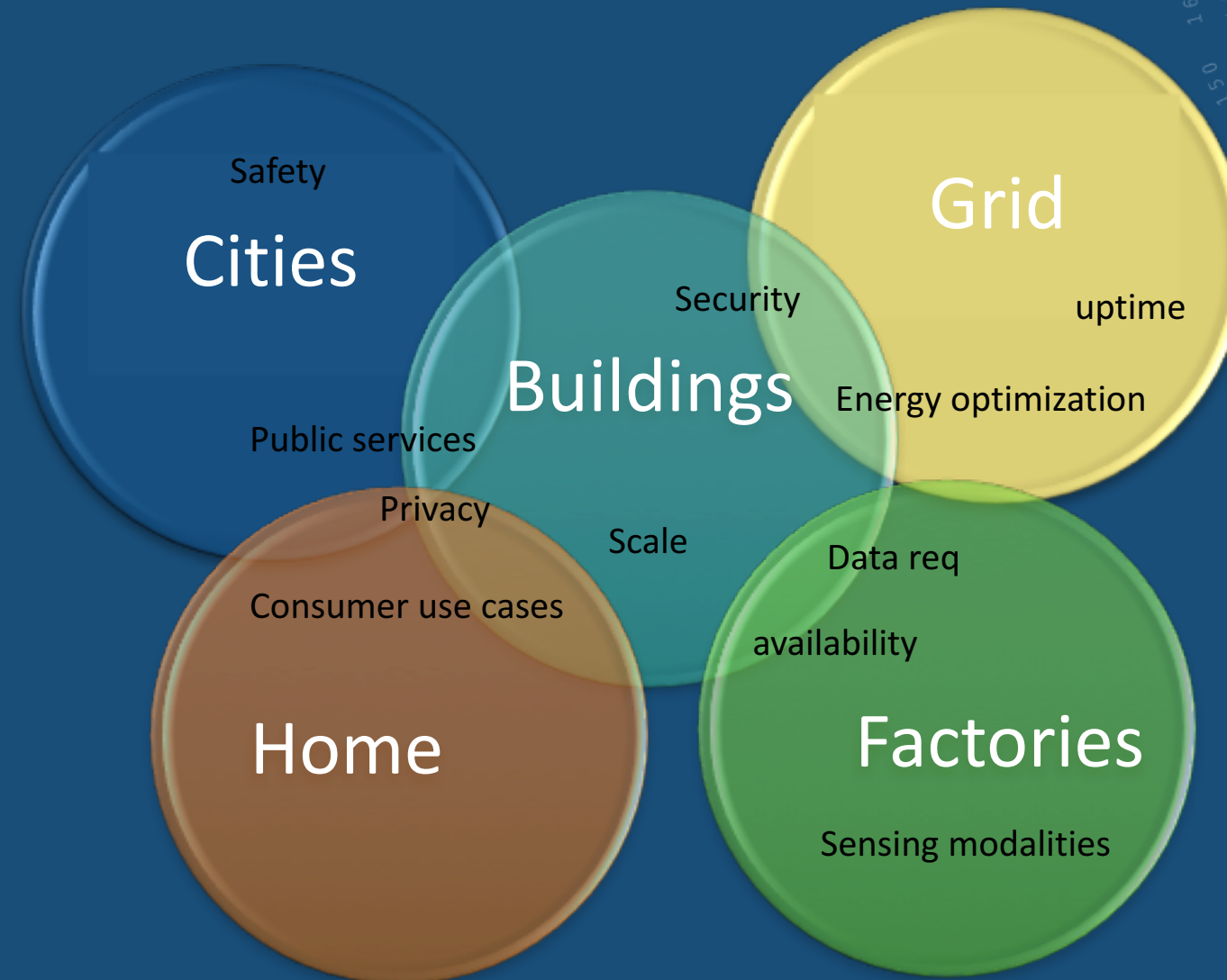


DATA ON THE FAST PATH



WHERE ARE THE BUILDING BOUNDARIES

- Characteristics shared with other segments
 - Common devices
 - Overlap in use cases
 - Similar requirements
- Translate lessons and port knowledge



OPPORTUNITIES

Worldwide Internet of Things Revenue Opportunity

2018



2014

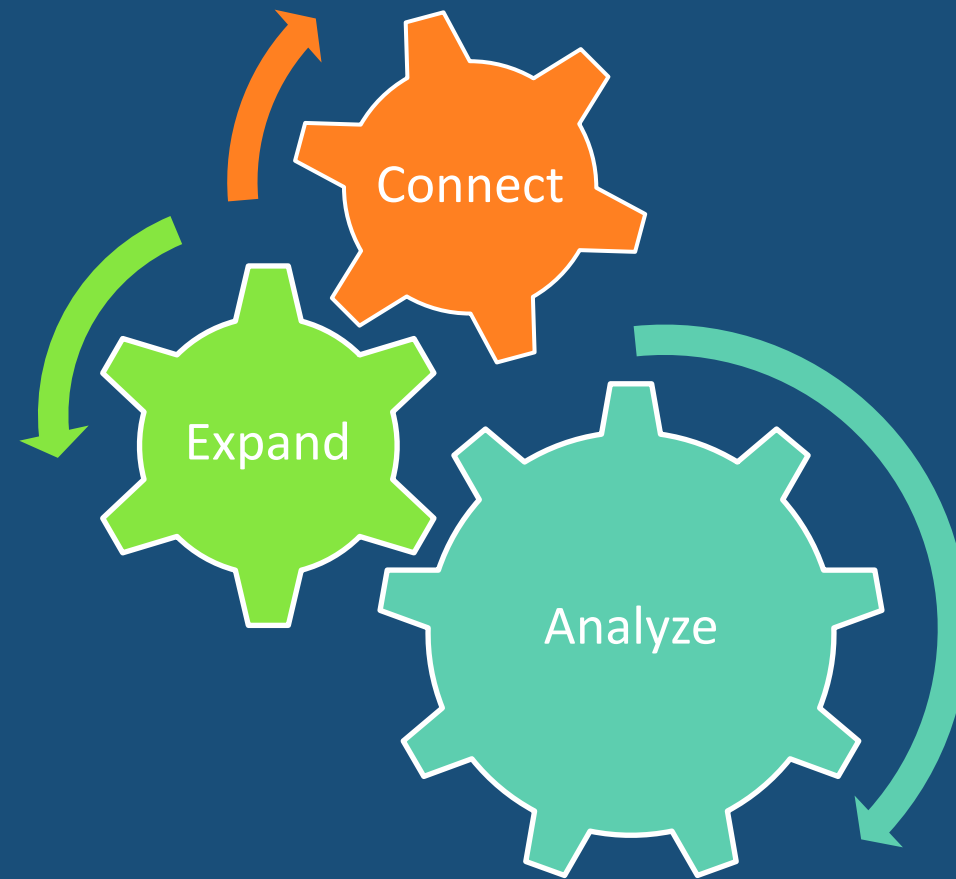


IDC, Internet of Things Spending Guide by Vertical Market, 2014

SCALING STRATEGIES

- Expand taxonomies (2+2 > 4)
- Align with the community (standard bodies, embracing of culture, supporting use cases)
- Well positioned for interoperability

THE FUTURE IS OURS TO MAKE



**“Don’t be encumbered by history.
Go off and do something wonderful.”
- Robert Noyce**

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