

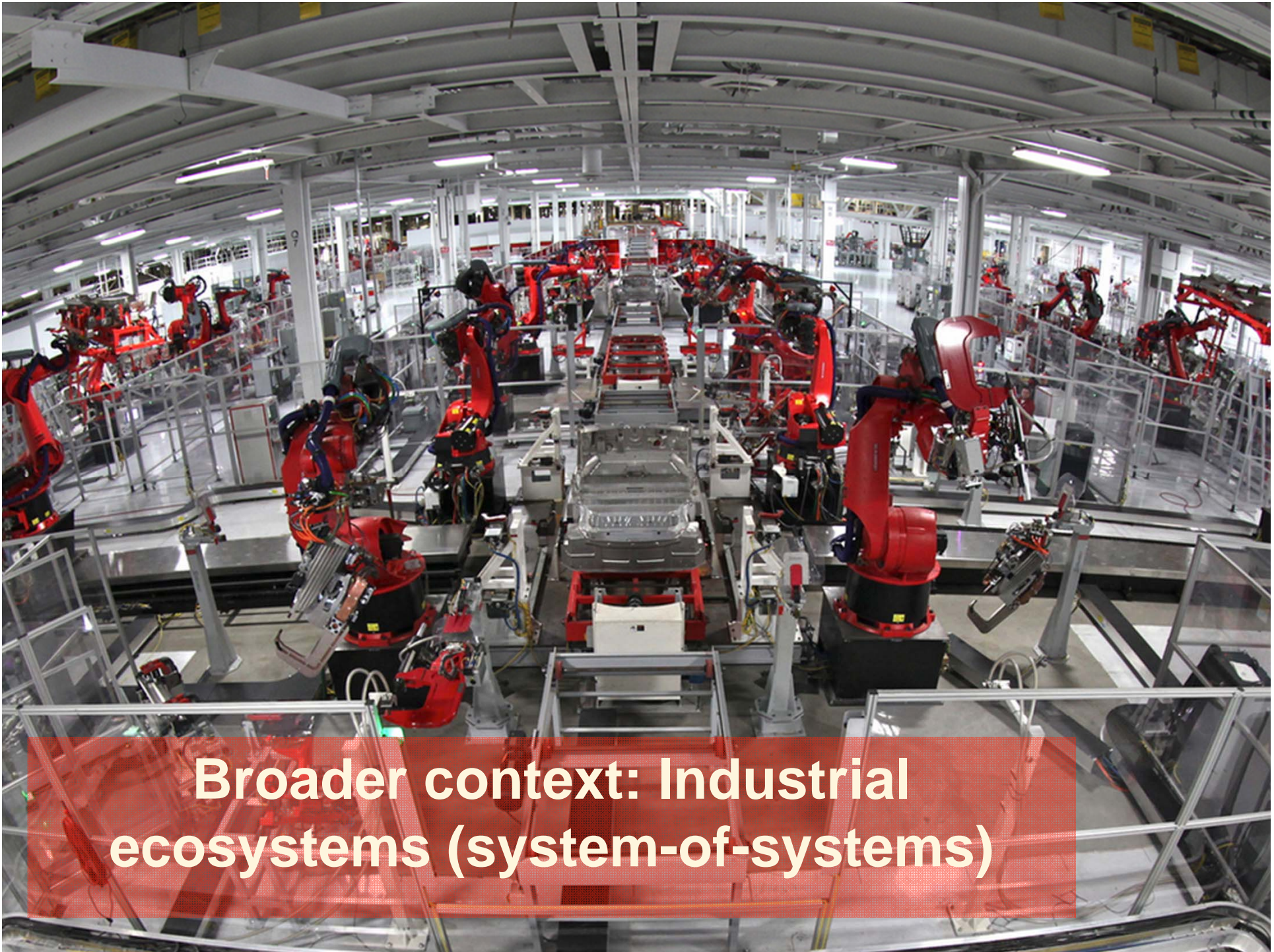






**Context: Software ecosystems in a complex system-of-system, the smart cities domain**

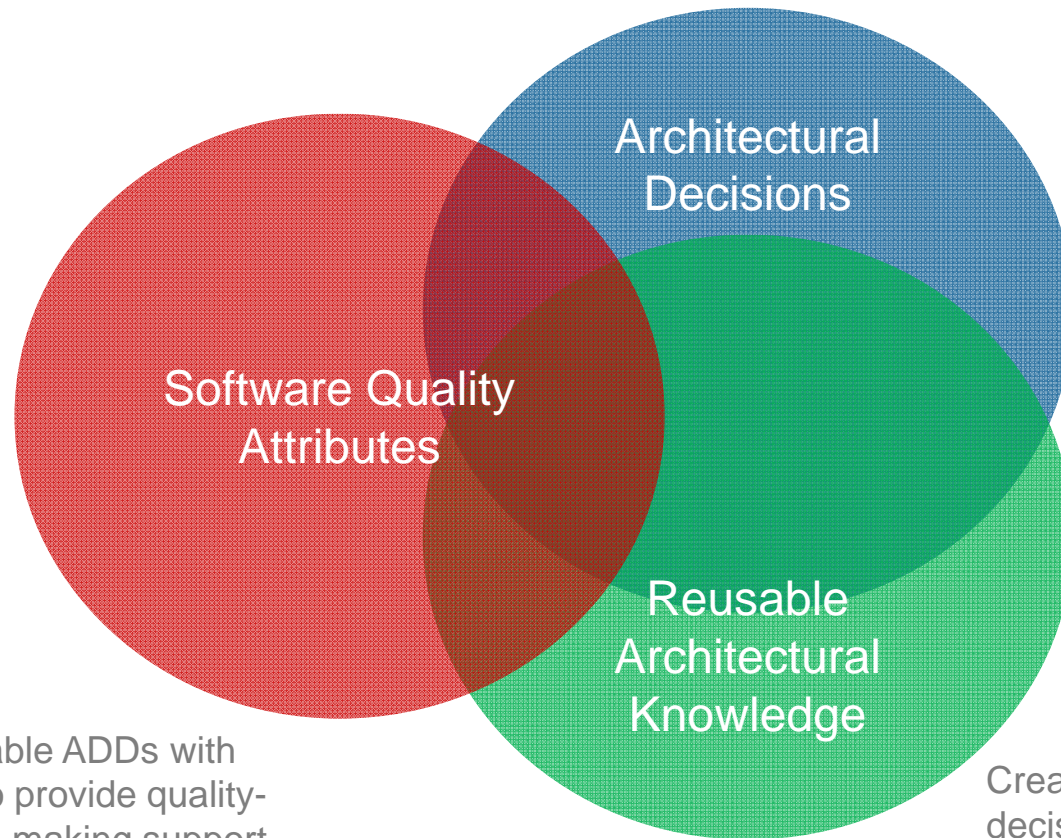




**Broader context: Industrial ecosystems (system-of-systems)**



# In such contexts, we are interested in ...

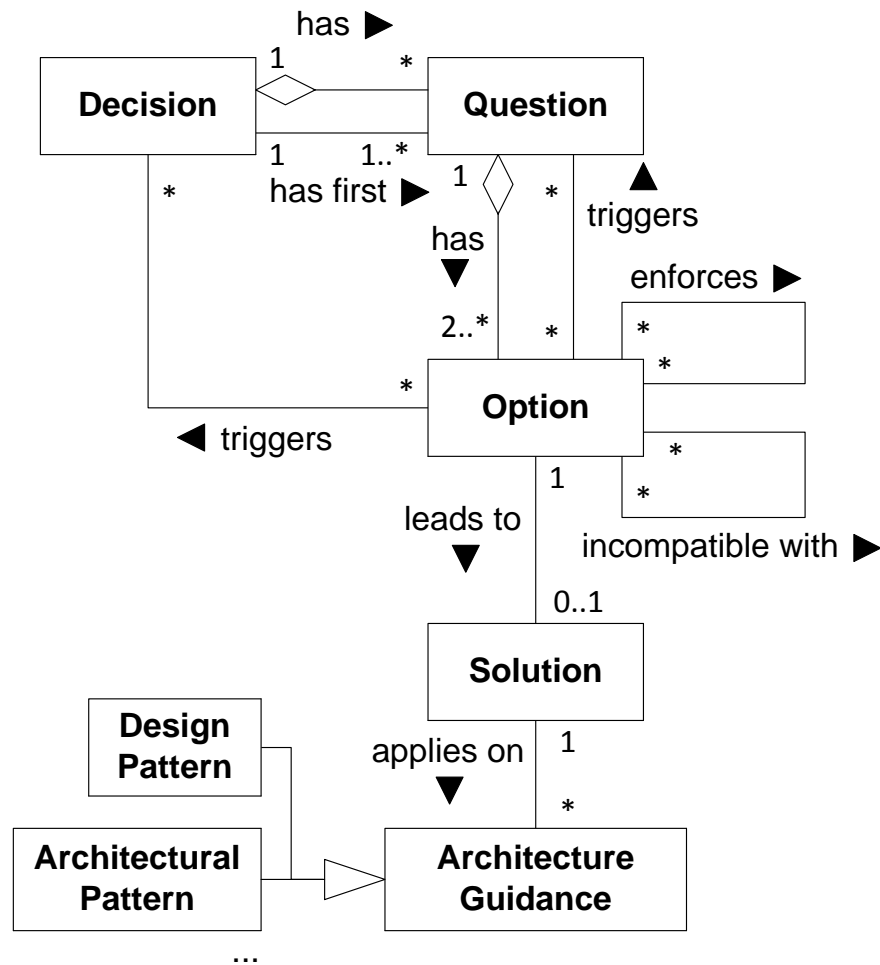


Integrate reusable ADDs with QAs in order to provide quality-driven decision making support

Create reusable architectural decision models that provide guidance for architectural decision making, whenever recurring design issues emerge

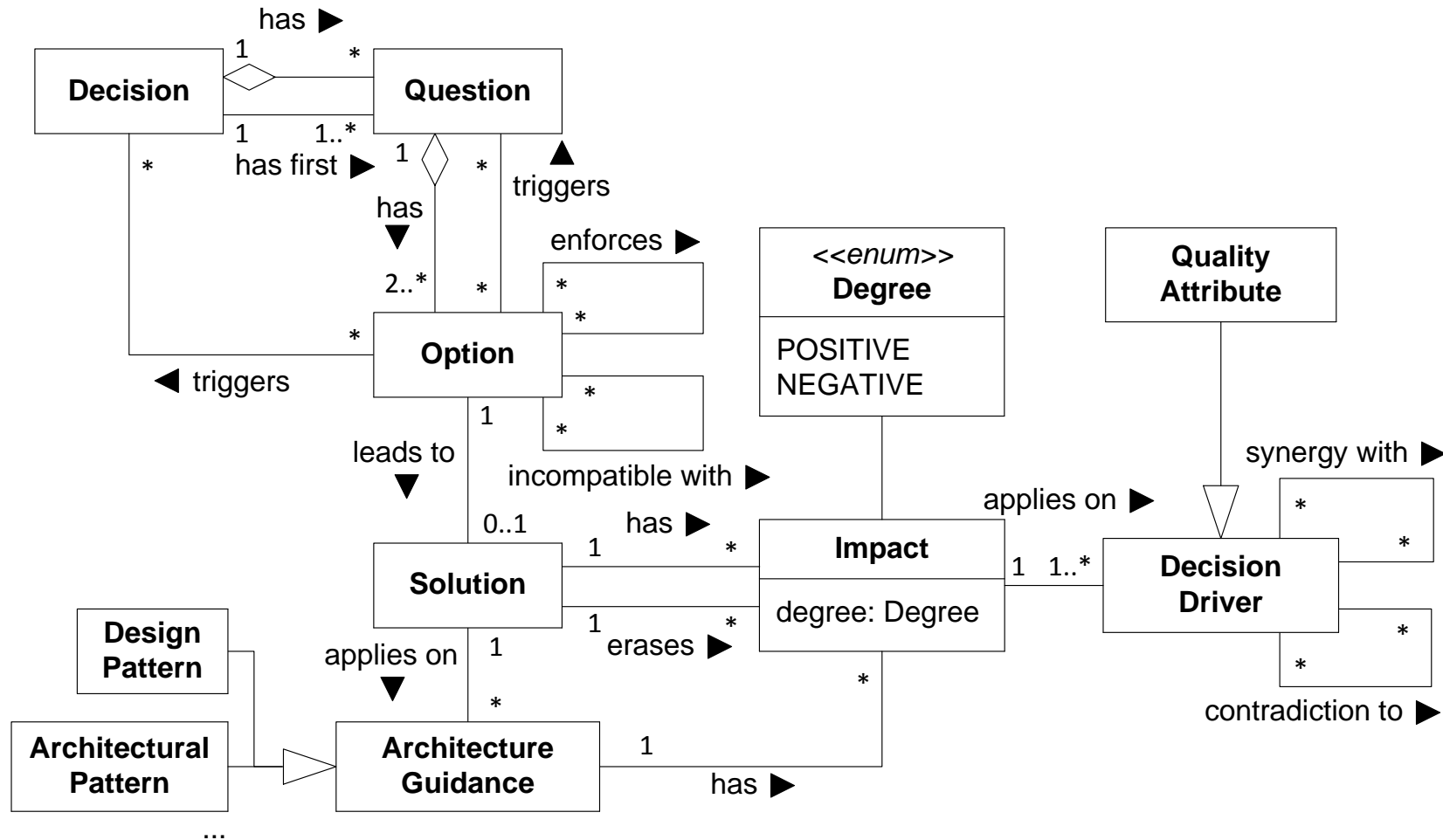


# ADD Metamodel



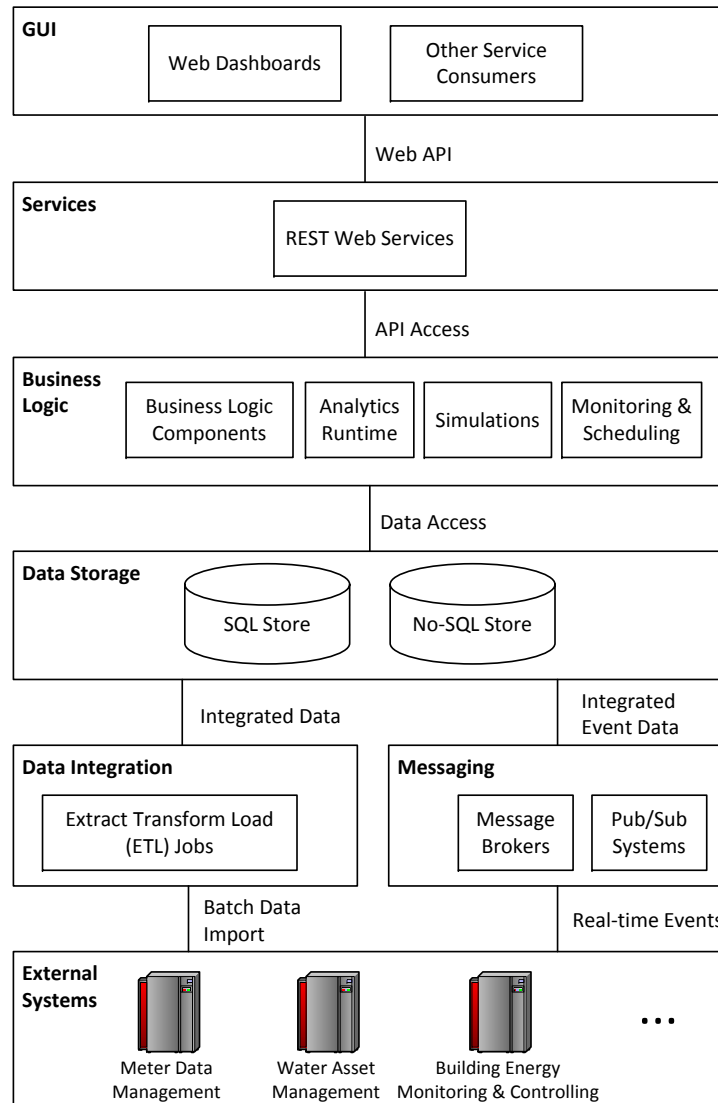


# ADD Metamodel with Decision Driver Impact



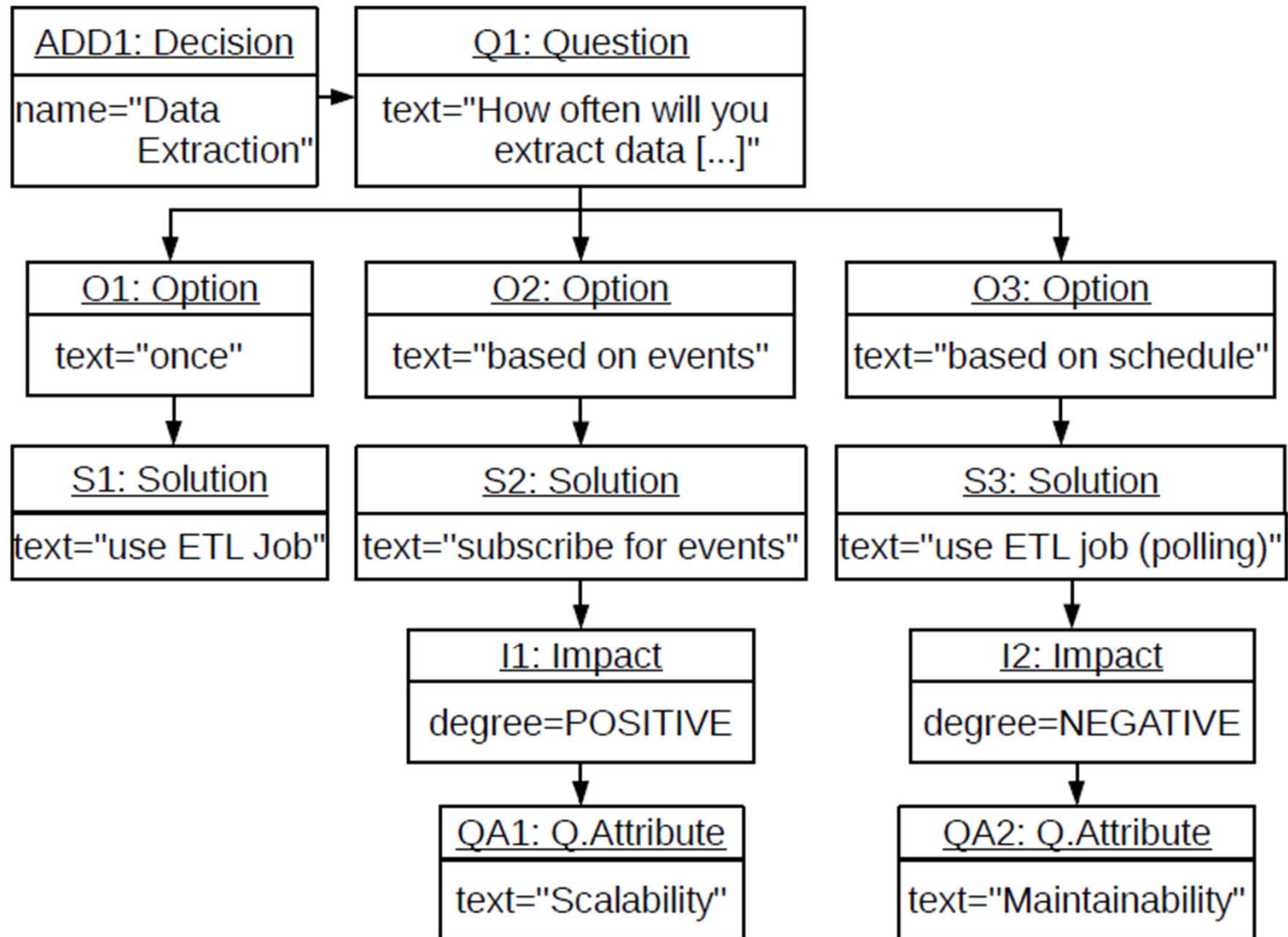


# Case Study: Data Management in Smart Cities SoS





# Sample Instance Model



# Example Decisions in our Tool

## data-management

**ADD1 - Data Extraction** Generate decision Reset

**Solution:**

- ETL polling
  - implement ETL process

Will you extract the data based on scheduling jobs or once it is available?

Schedule  
 Event-based

Will you import structured (e.g. XML) or unstructured data?

Structured  
 Unstructured

How often will you poll for data?

Every five minutes  
 Non-periodically  
 Everyday

Will the data need routing or filtering before it will be loaded in the application?

No  
 Yes

**ADD2 - Data Pre-Processing/Transformation** Generate decision Reset

**Solution:**

- Use a content enricher
  - implement [Content Enricher](#)
- Use a content filter
  - implement [Content Filter](#)
- Use a normalizer, use a canonical model for defining a common format
  - implement [Normalizer](#)
  - implement Canonical model
- Use a splitter
  - implement [Splitter](#)
- Use an aggregator
  - implement [Aggregator](#)

Do you need to translate data from different sources in a common format?

Reset All  
Remove

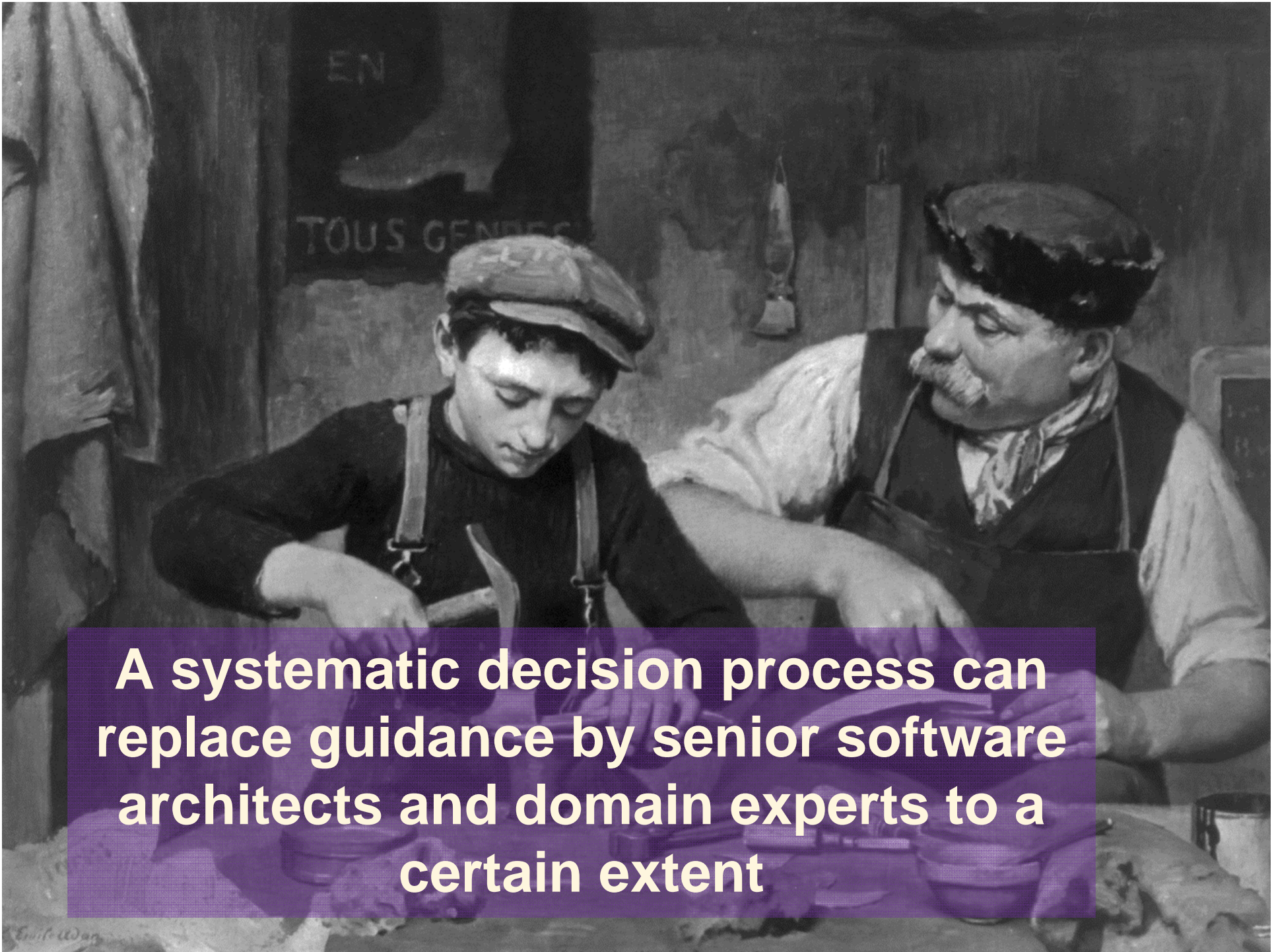
**Questions**

- ADD1 - Data Extraction ✓
  - Question 1 ✓
  - Question 2 ✓
  - Question 3 ✓
  - Question 4
  - Question 5
  - Question 6 ✓
- ADD2 - Data Pre-Processing/Transformation ✓
  - Question 1 ✓
  - Question 2 ✓
  - Question 3 ✓
  - Question 4 ✓
  - Question 5 ✓
  - Question 6
- ADD3 - Data Routing ✓

**Quality Attributes**

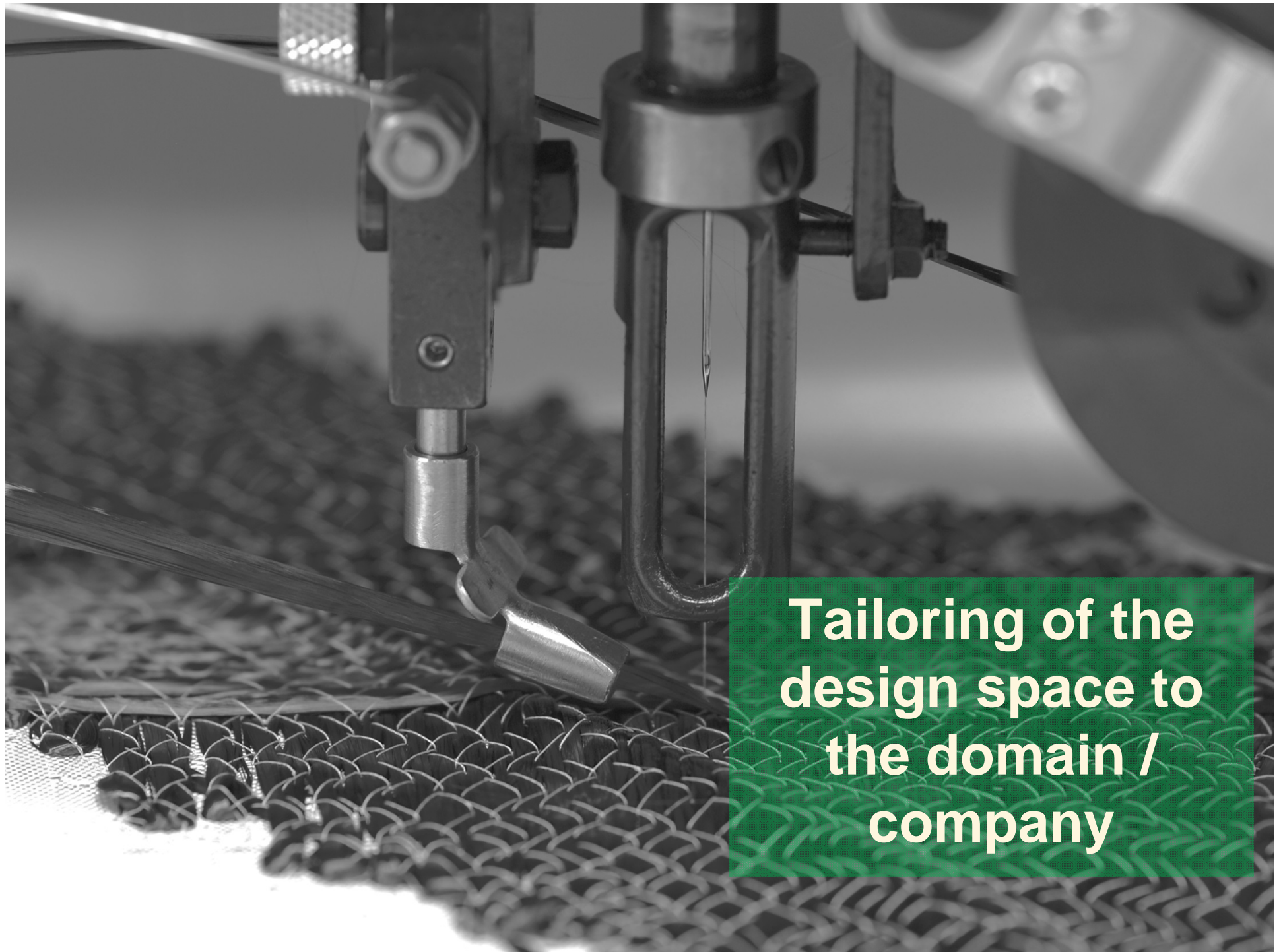
- Availability -
- Performance +
- Maintainability + - -
- Security +





**A systematic decision process can replace guidance by senior software architects and domain experts to a certain extent**





**Tailoring of the  
design space to  
the domain /  
company**



Employ

creativity

**Approach must be integrated with  
other tools to deal with creative  
decision making**





**Challenge: How to  
introduce more  
measurements?**



**Many thanks for your attention!**



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