Deep-Knowledge Integration: Automated Knowledge Production and Consumption in an Internet-of-Everything World

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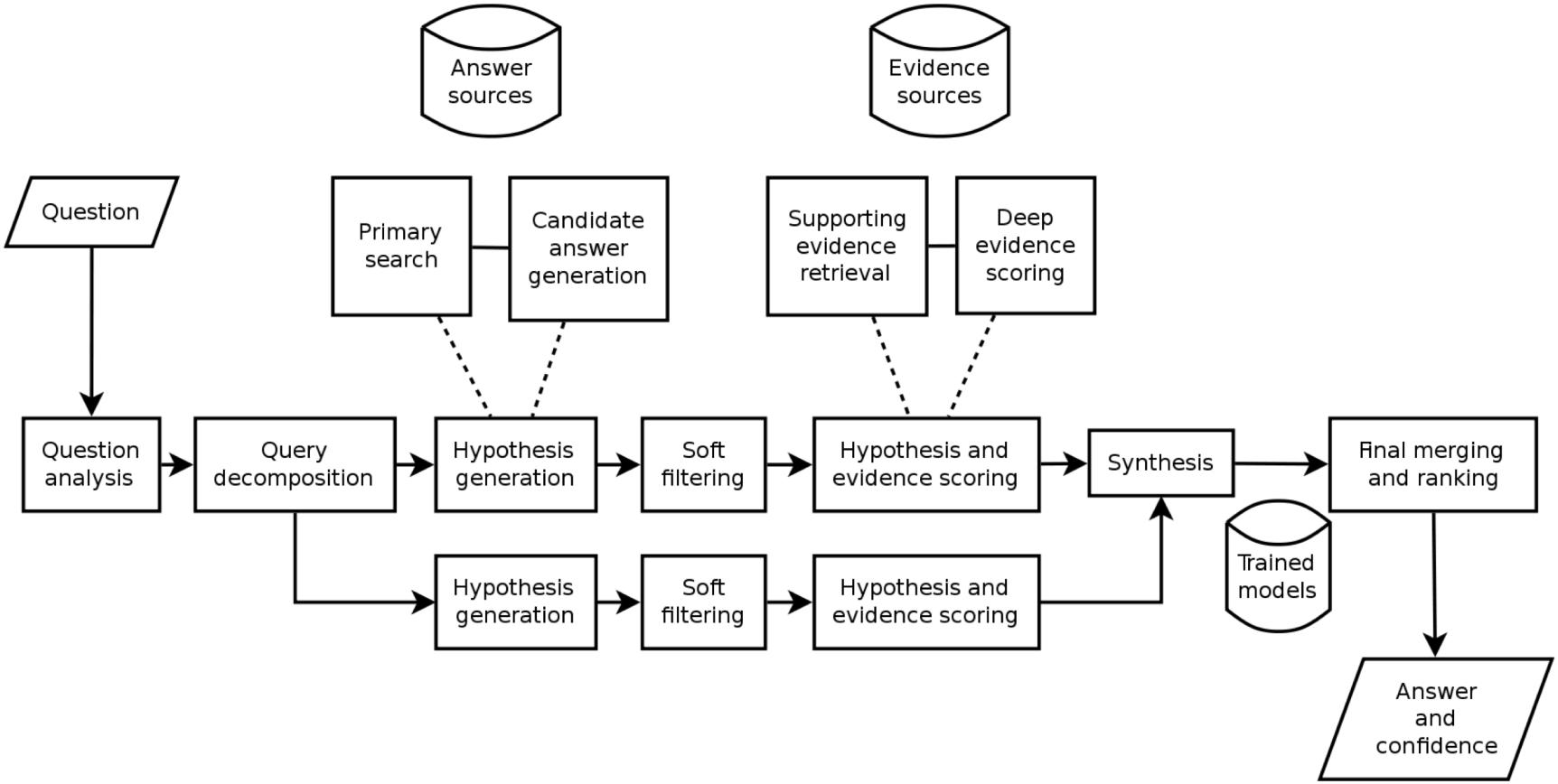
Expectations: Upcoming IoE World

- Connected everything
- Integrated everything
- Knowledge accessible everywhere anytime
  - Knowledge produced “automagically”
- AI and ML
  - Natural intelligent assistants
  - Automation
  - Smart learning for knowledge consumption

Watson's HL architecture of IBM DeepQA



- 4.6M entities
- 4.2M classified in a consistent ontology
  - 1.4M persons, 735K places, 123K albums, 87K films, 19K video games, 241K organizations, 251K species and 6K diseases.
- labels/abstracts in up to 125 languages
- 30M links to external web pages
- 50M links to RDF datasets
- 81M links to Wikipedia categories
- 41M YAGO2 categories
- 3B RDF triples

Yet Another Great Ontology

- 10M entities
- 120M facts about these entities

So what's the problem with the Semantic Web?

- Fundamental knowledge issues still unresolved?
  - Insufficient community uptake and traction? Why?
- Knowledge engineering?
  - Top-down. From experts for experts?
- Niche technologies
  - And semantic products that come with consultants…
- Everyone waiting to see what catches on…
- Labor intensive and internal domain-specific custom project and solutions
  - Insufficient business value vs. cost/risk
- High friction, high maintenance

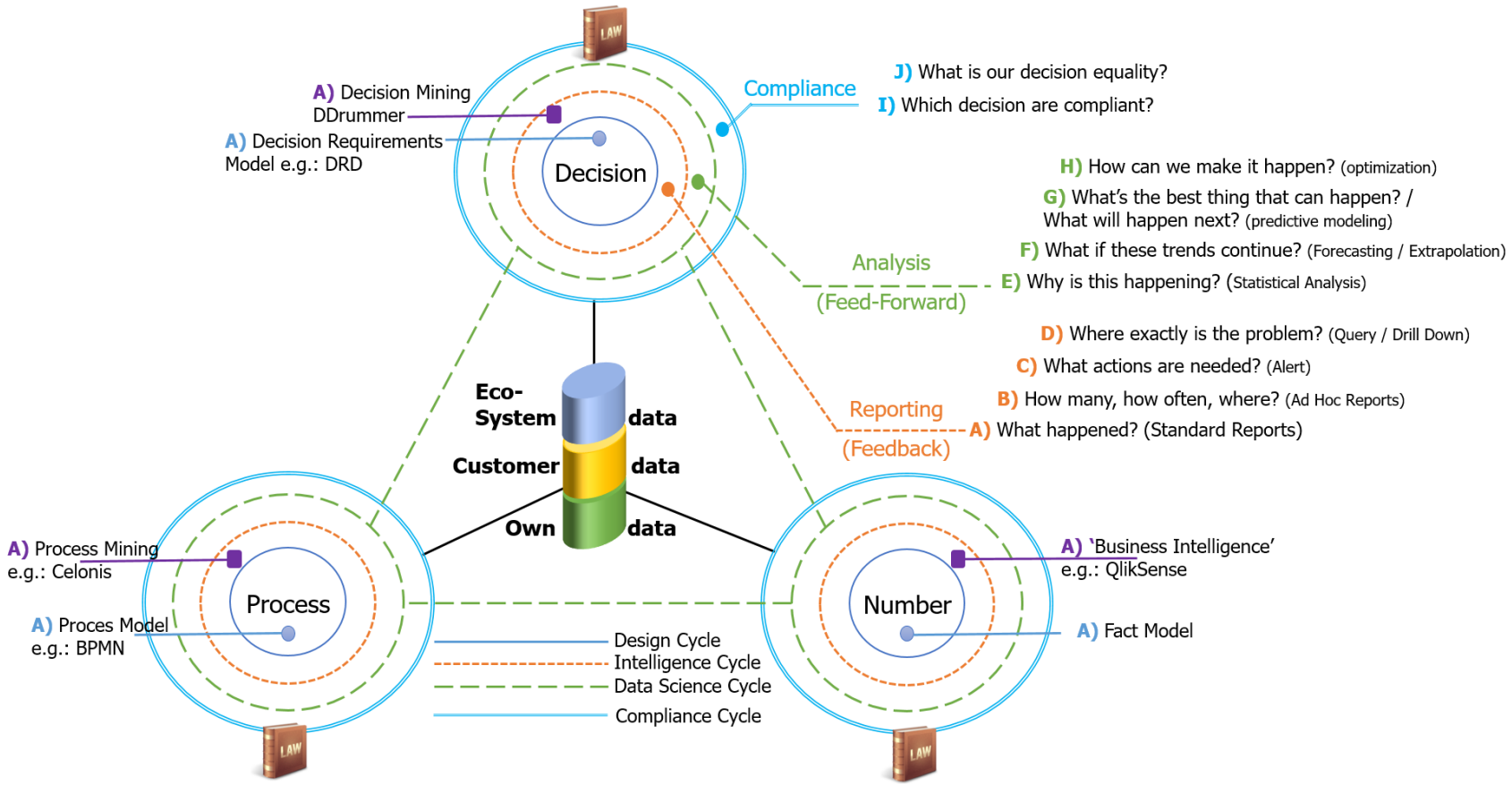
Maybe *this is* what the
trough of disillusionment is supposed to feel like

Towards "frictionless knowledge" & deep-knowledge integration

- Low-level challenges: struggling with
  - Formats, knowledge representation & discovery
- High-level challenges:
  - Epistemological relativism/conflict (in disciplines)
  - Situated, partial, and temporal knowledge
  - Knowledge versioning and traceability
  - Fuzzy/ambiguous knowledge
  - Identifying knowledge gaps
  - Knowledge hacking and provenance
    - Crowd-vetting unseen, fake, or new knowledge
  - Dependence on super search engines & big players?
  - Sustainable knowledge maintenance

The Data Triangle

How to realize decision transparency?



"Working together to develop and spread new insights and solutions for practical problems."

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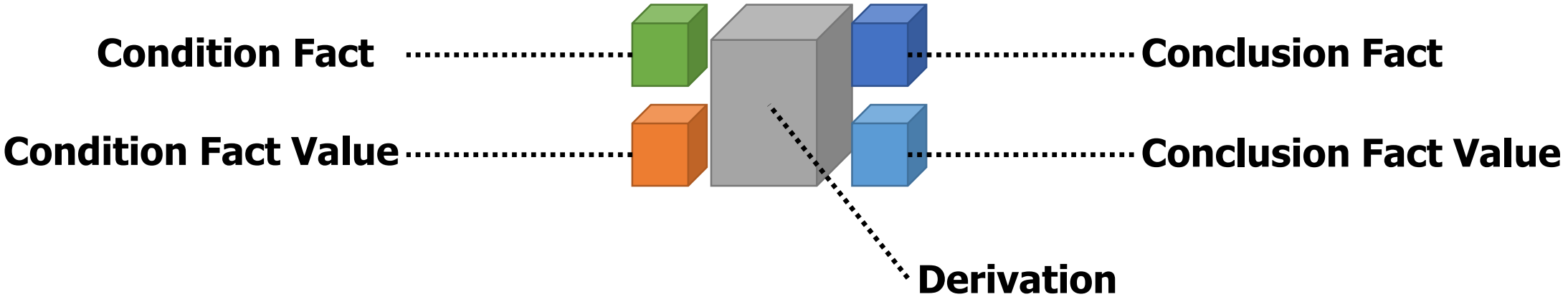
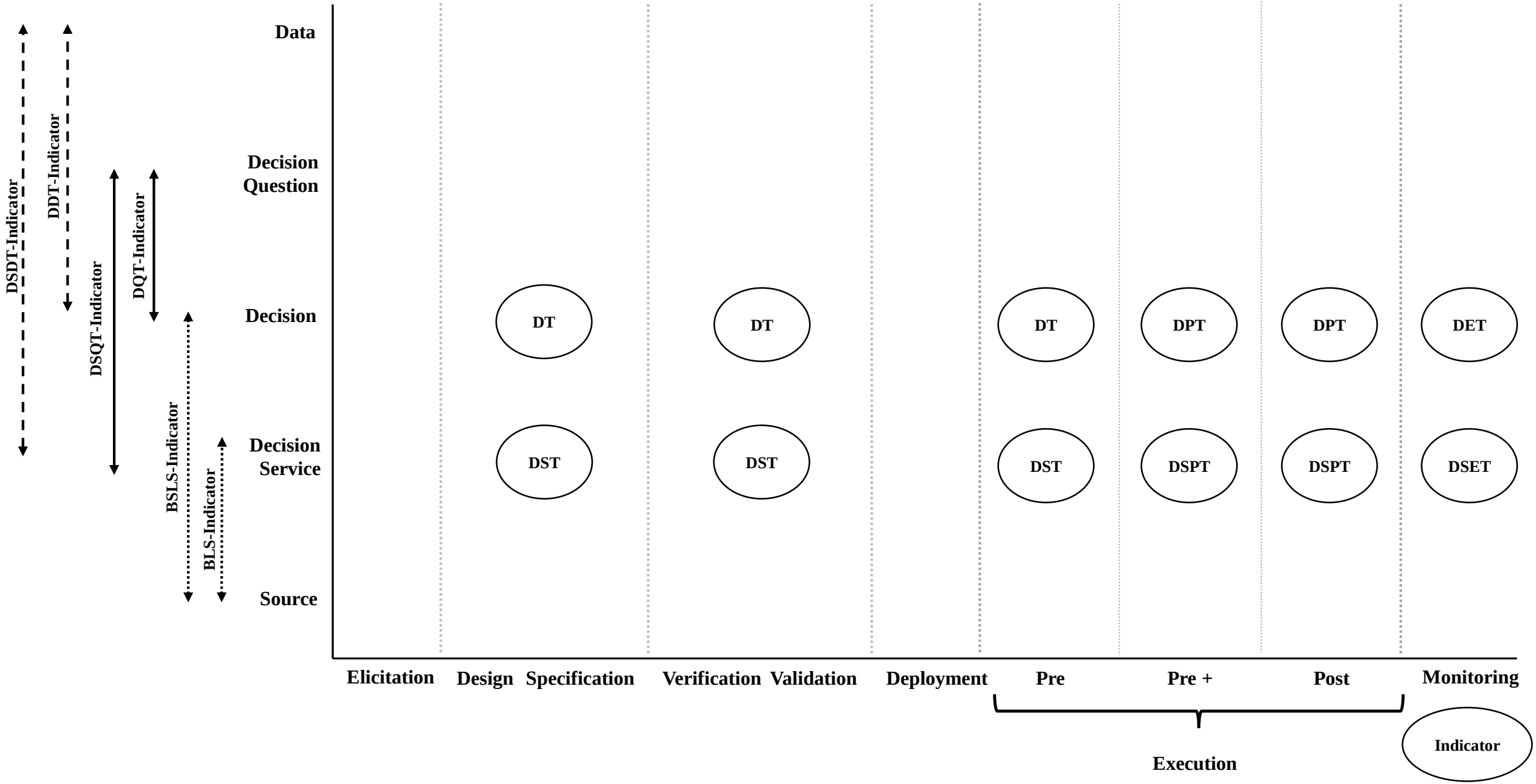
EDM-Competence Centre


Condition Fact
Condition Fact Value
Conclusion Fact
Conclusion Fact Value
Derivation


DSDT-Indicator
DDT-Indicator
DSQT-Indicator
DQT-Indicator
BSLS-Indicator
BLS-Indicator
Data
Decision Question
Decision
Decision Service
Source
DT
DT
DT
DPT
DPT
DET
DST
DST
DST
DSPT
DSPT
DSET
Elicitation
Design
Specification
Verification
Validation
Deployment
Pre
Pre +
Post
Monitoring
Execution
Indicator

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The Future of IoT for Active Learning in Safety@Work

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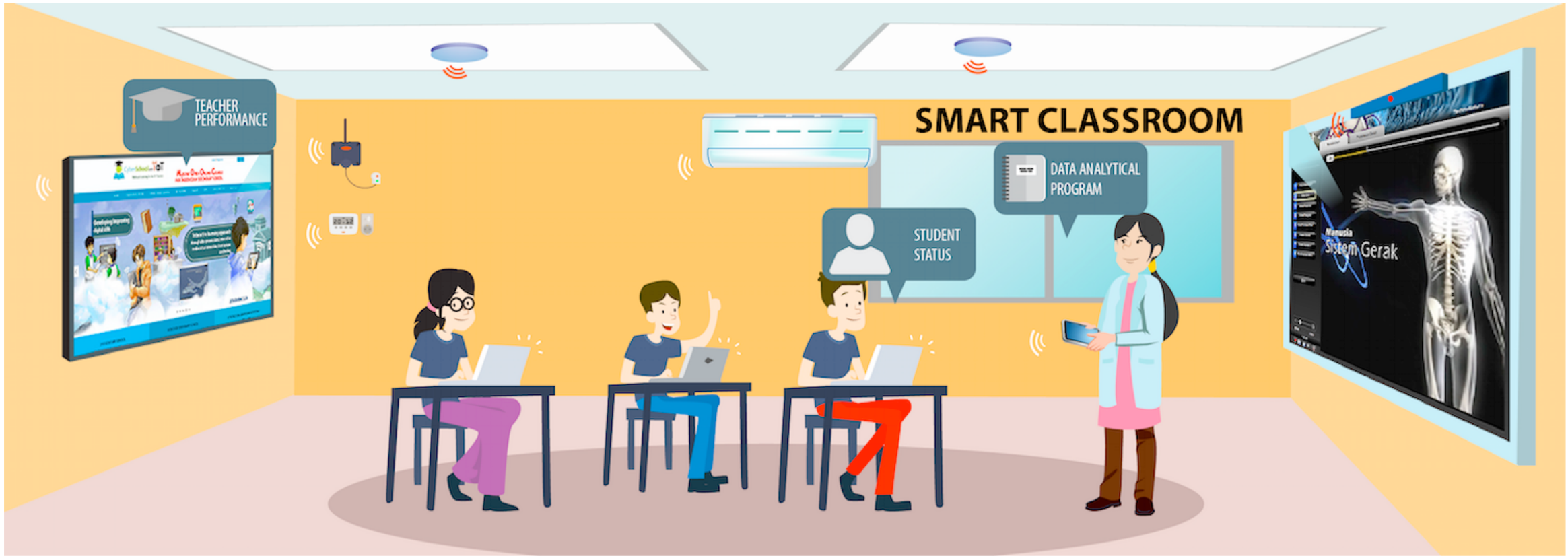
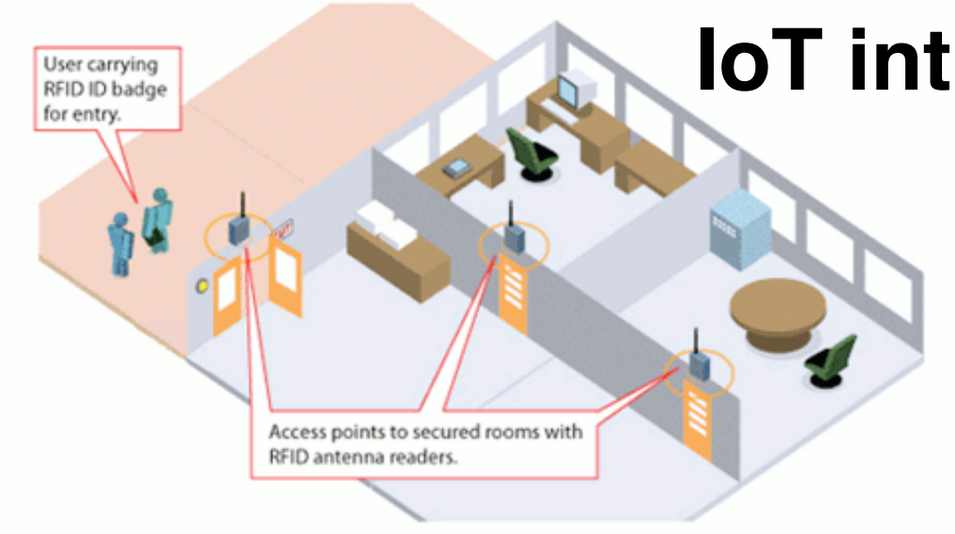
Active learning
Safety at Work

- Safety Training *in the lab*

- Safety/Work Learning *in the class*

IoT for Smart classroom





IoT introduction in the SMART Classroom

- RFID ID technology
- monitored areas

IoT for Safety Learning

working/safety knowledge

- tracce humans as robot
  - (for safety reasons)
- data/rules mining challenge
- our IDEA: Hyper TAGS extending RDIF