



How BIM supports new ways to develop and apply regulations

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TNO



We define a Building Information Model – BIM as:

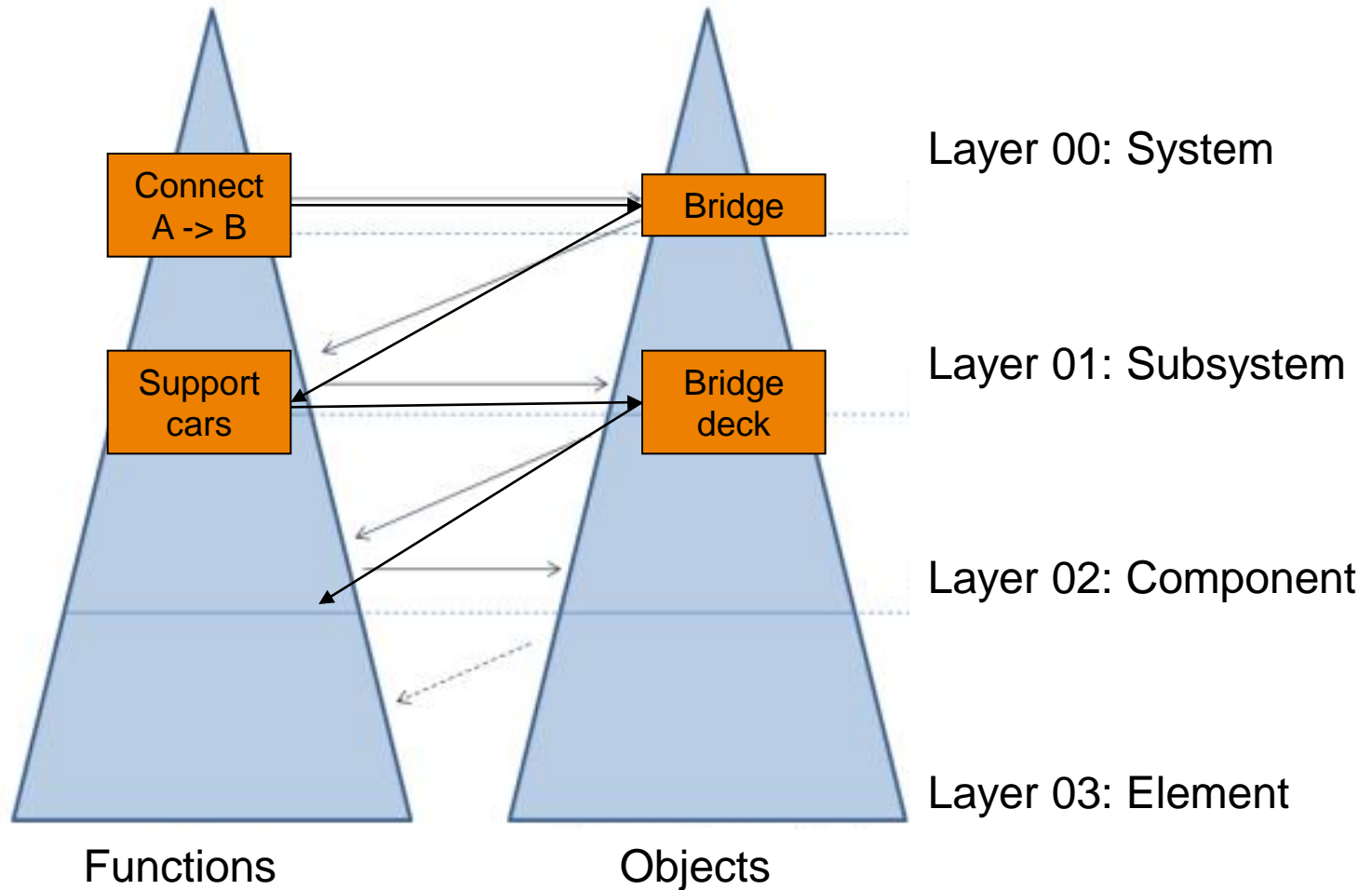
A digital description of a specific **building**
relevant for its entire **life-cycle**

This digital description contains information which is:

- Meaningful – for decision processes and software applications
- Complete – for all disciplines over the life-cycle
- Correct – unambiguous and up-to-date
- Uniform – standardized information structure and format
- Transparent – including management information

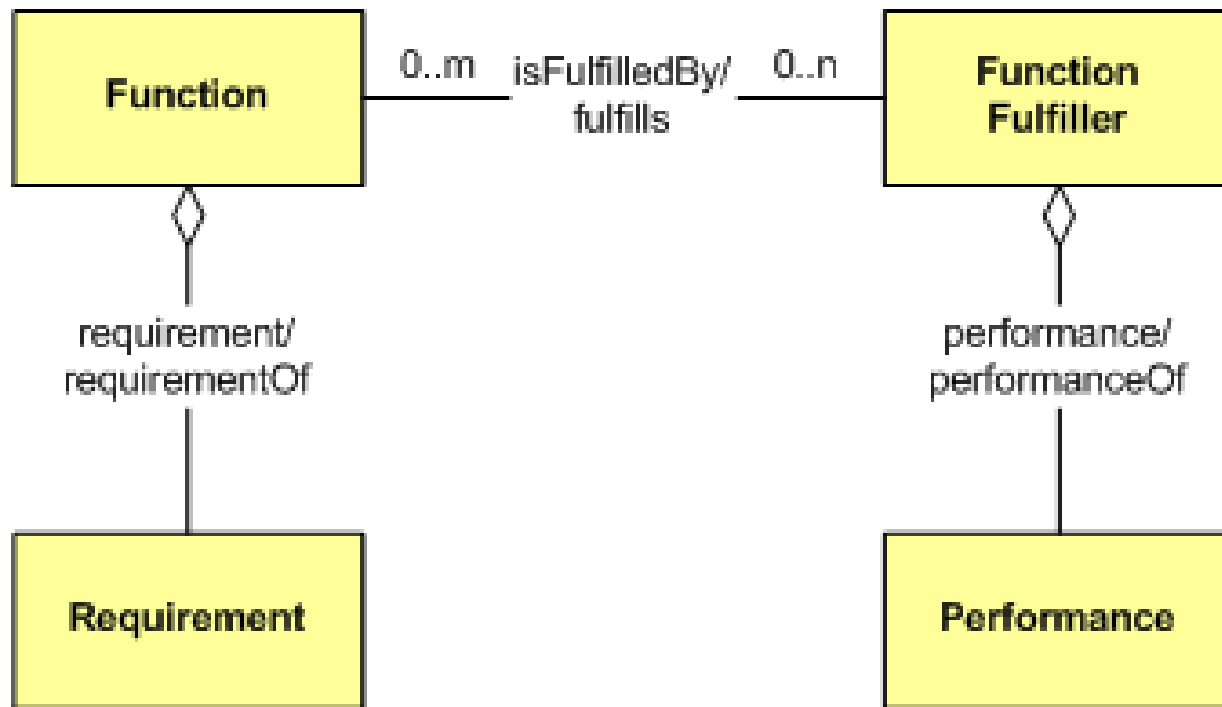


Important consequence of “entire life-cycle”: functions and objects





A BIM should contain functions and objects



E.g.
regulations



BIM can help to develop and apply regulations better and faster in practice

› Five basic levels:

1. Better recording of the designed building objects
2. Recording building functions with required performance (e.g. regulations) and linking to building objects
3. Linking building objects to proofs of compliance to regulations
4. Linking building objects to software to check compliance
5. Automatically checking compliance to regulations



For example: fire resistance of a door



1. Type of door = .., thickness =, material =
2. Fire regulations, art. x.y: fire resistance > 30 min.
3. Laboratory test that proofs: fire resistance = 37 min.
4. Link to software to calculate fire resistance
5. Rule: IF material = ... AND thickness >= THEN fire resistance > 30 min.



Suppose we are 15 years ahead, and we can do all that

- › What would have changed
 - › For the building and construction process?
 - › For the way we make and apply regulations?
 - › For the way we model our buildings in BIM's?

- › What should the authorities do to make this happen?



Process: performance based

1. Contracts => only specifying performance + monitoring methods
2. Design => optimisation based on continuous monitoring
3. Design => dynamic use of validation methods for optimisation during design in stead of static validation at the end
4. Construction process => continuous monitoring based on as built
5. Commissioning => reports in terms of performances; after one year
6. Use phase => incentives based on measured performance



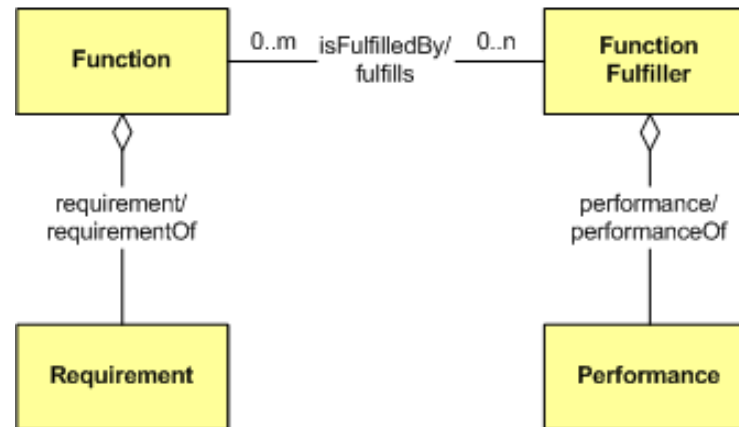
Authorities

1. Permit phasing => no more permits during design phase, only proving compliance at commissioning
2. Performance checking => automated (level 3 or higher)
3. Complexity => Optimisation of multiple, sometimes contradicting aspects (e.g. sustainability);
4. Strictly performance based with standardized verification methods
5. Publishing => Computer interpretable



BIM

1. Modelling functions and objects (see e.g. Coins)
2. Object library in line with terminology used in regulations
3. Open standards for data modeling
4. Open standards for defining rules





Next steps

- › For TNO: research and development
 - › Continue enabling 5 levels of BIM support + demonstrate, e.g.
 - › Enabling rules in BIM environment
 - › Experimenting with defining regulations in rules
- › For the BIM community
 - › Add functions (and performance etc.) to BIM standards
 - › Adding standardized rules to BIM standards
- › For the regulations community and authorities
 - › ???? Please, your suggestions ????