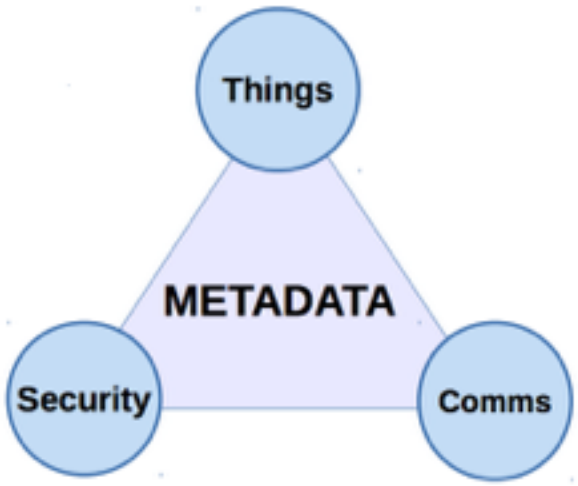
Semantics as basis for discovery and interoperability

W3C's vision for the Web of Things focuses on the role of Web technologies for a platform of platforms as a basis for services spanning IoT platforms from microcontrollers to cloud-based server farms. Shared semantics are essential for discovery, interoperability, scaling and layering on top of existing protocols and platforms.

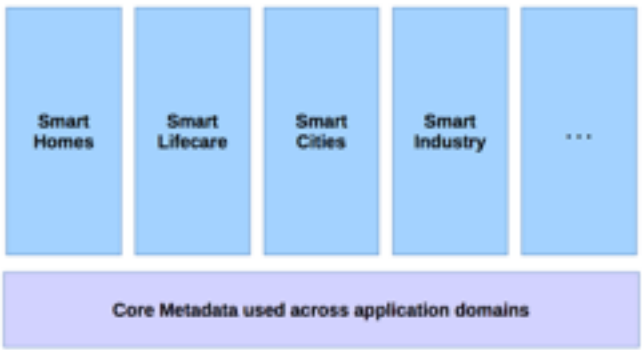
For this purpose, metadata can be classified into: things, security and communications, where things are considered to be virtual representations (objects) for physical or abstract entities.



- Thing descriptions
  - Links to thing semantics
  - Data models & relationships between things
  - Dependencies and version management
  - Discovery and provisioning
  - Bindings to APIs and protocols
- Security related metadata
  - Security practices
  - Mutual authentication
  - Access control
  - Terms & conditions
    - Relationship to "Liability"
  - Payments
  - Trust and Identity Verification
  - Privacy and Provenance
  - Resilience
- Communication related metadata
  - Protocols and ports
  - Data formats & encodings
  - Multiplexing and buffering of data
  - Efficient use of protocols
  - Devices which sleep most of the time

Things are defined as having events, properties and actions, as a basis for easy application scripting. This assumes a clean separation between the application and transport layers, which simplifies scripting by decoupling the details of protocols and message formats, allowing servers to use the protocols that best fit the particular context. Communications metadata allows servers to identify how to communicate with other servers.

Thing descriptions are expressed in terms of W3C's resource description framework (RDF). This includes the semantics for what kind of thing it is, and the data models for its events, properties and actions. The underlying protocols are free to use whatever communication patterns are appropriate to the context according to the constraints set by the given metadata.



Metadata can be further grouped into core metadata which is used across application domains and metadata which is specific to particular application domains.

Reuse of existing vocabularies/ontologies simplifies service composition as otherwise intermediaries are necessary to handle translations between vocabularies. This will often be imperfect and impede open markets of services.

W3C is exploring the use of lightweight representations of metadata that are easy to author and process, even on resource constrained devices.