M2M to IoT An Architectural Overview

Lecture 1-

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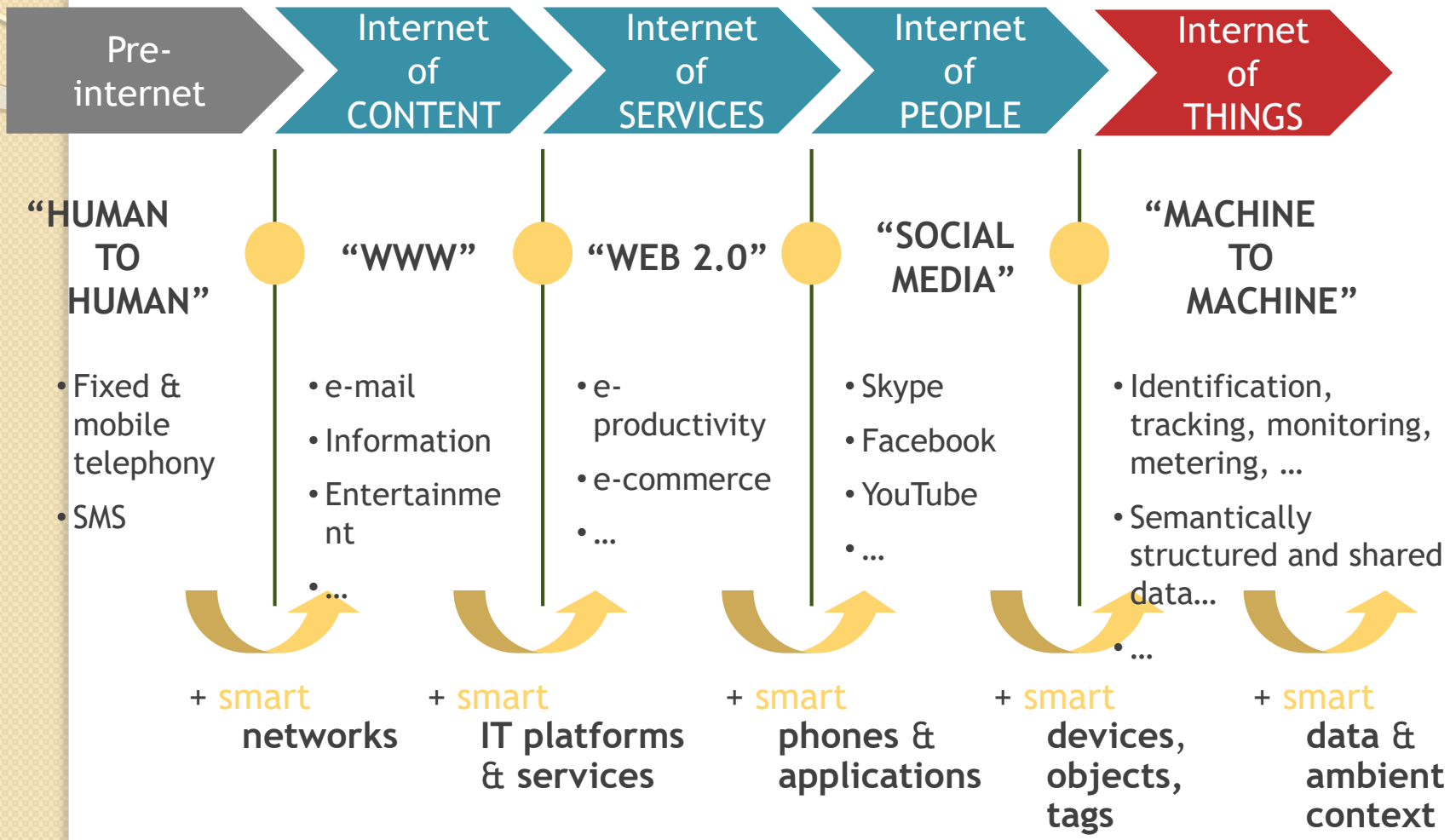
The next step for the Internet evolution



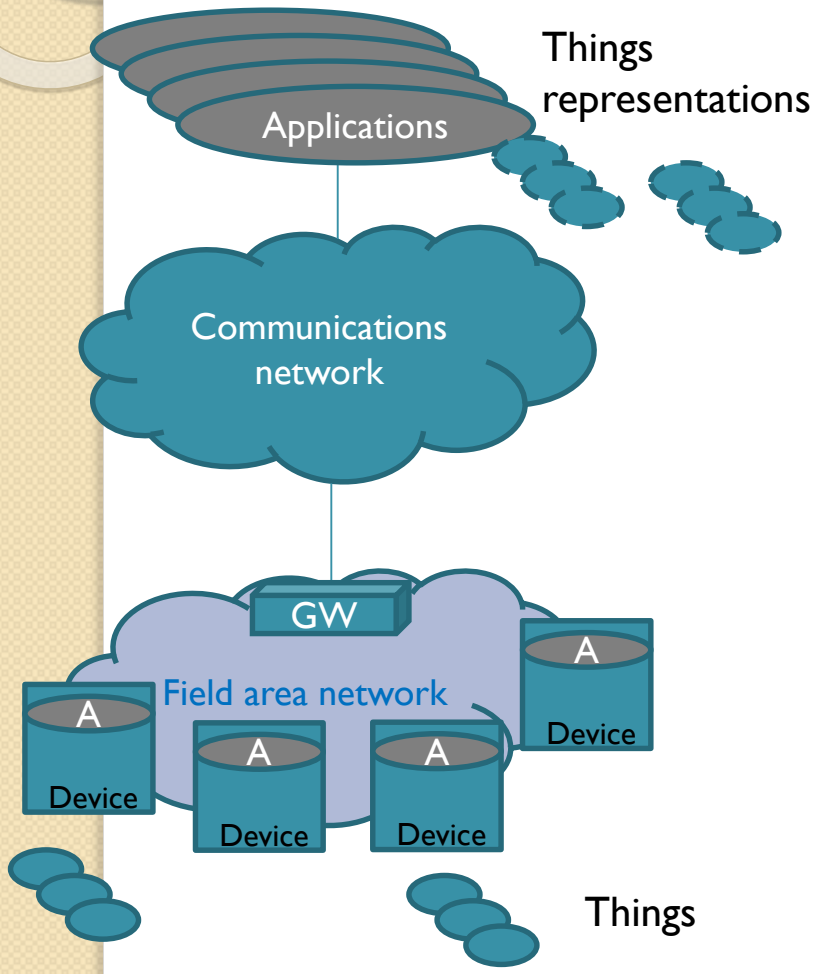
Definitions

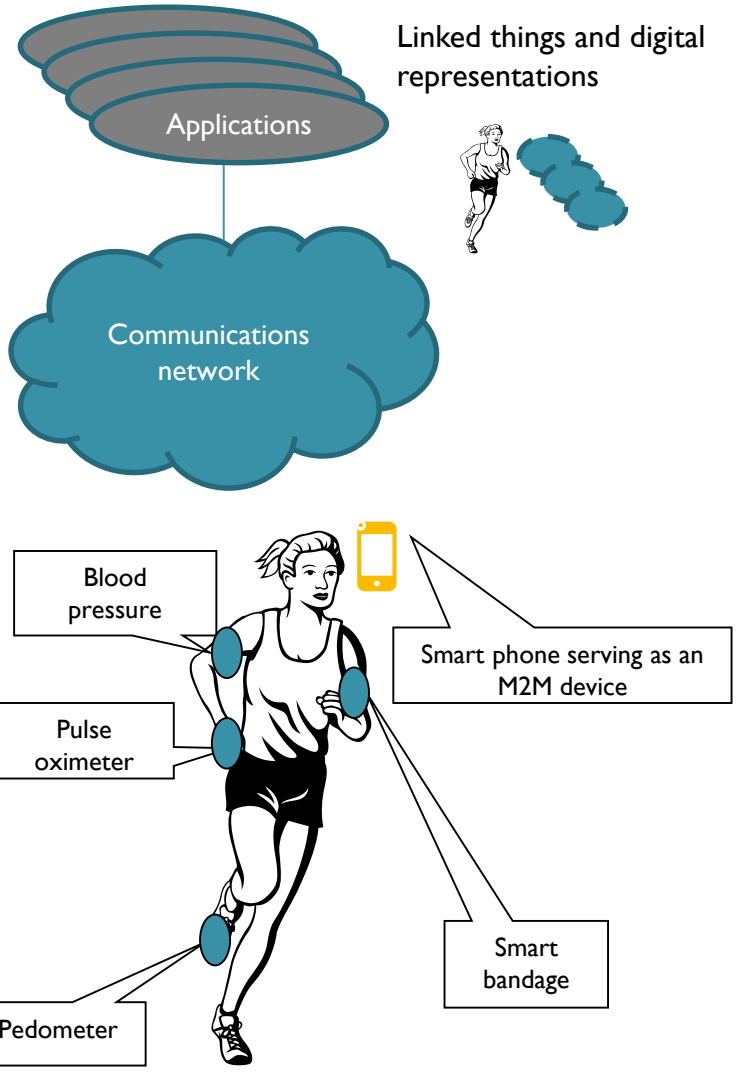
- **No single industry definition** for Internet of Things/M2M
- But **broad agreement** on following key concepts:
- The Internet of Things is the framework where "Things" have representations in the Internet. A representation may contain semantically structured data (e.g., status, capabilities, location, measurements) that can be shared, processed or acted upon. Sharing of information is governed according to privacy settings and access rights.

- The "Things" that are represented in the Internet may be active (e.g., Zigbee sensor) or passive (e.g., RFID tag).

- The representation of the "Things" to the Internet is enabled by M2M Technologies

IoT and M2M framework





Use case, multi service, application friendly approach drives market impact

IoT industry segments

- Energy
- Automotive
- Home
- Building, etc.

Multiservice

- Data exchange
- Access right
- Location
- Interworking
- Abstraction
- Semantics
- Triggering, etc.

Application friendly

- RESTful (Representational state transfer)& Web Services
- Device lifecyle management
- Security
- Leverage underlying networks, etc.

Market impact

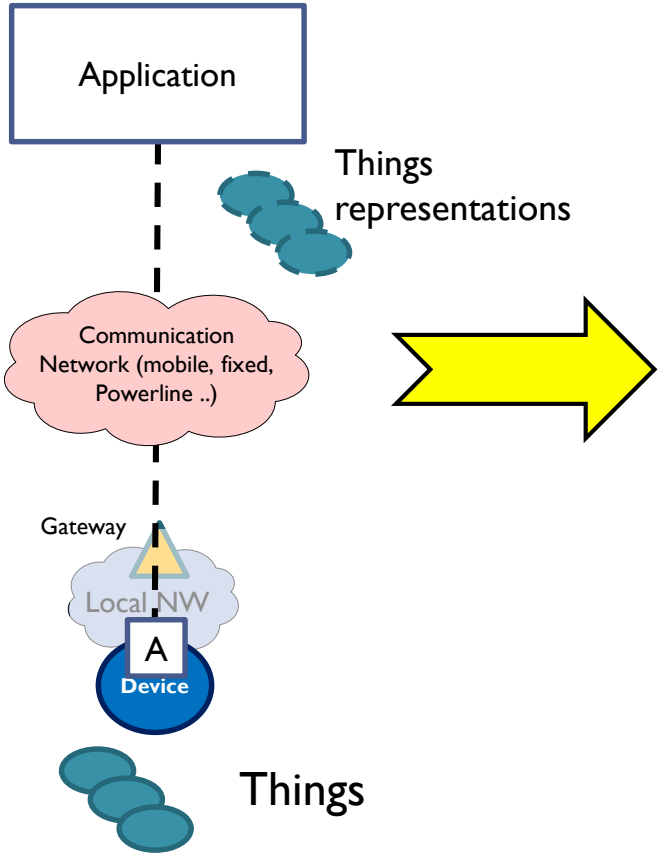
- Interop
- Open source
- Lab and field trials
- Wide scale deployment

Single communication&interworking framework - keeping the autonomy of the IoT industry segments and related innovation/differentiation potential

M2M Evolution

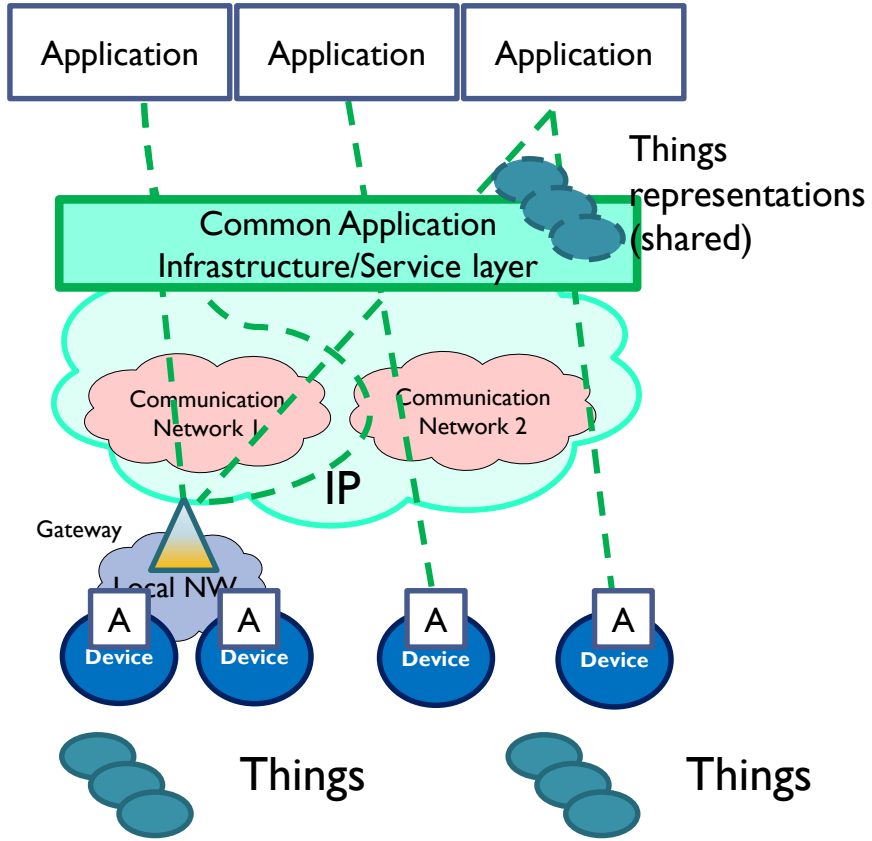
Pipe (vertical):

1 Application, 1 NW,
1 (or few) type of Device

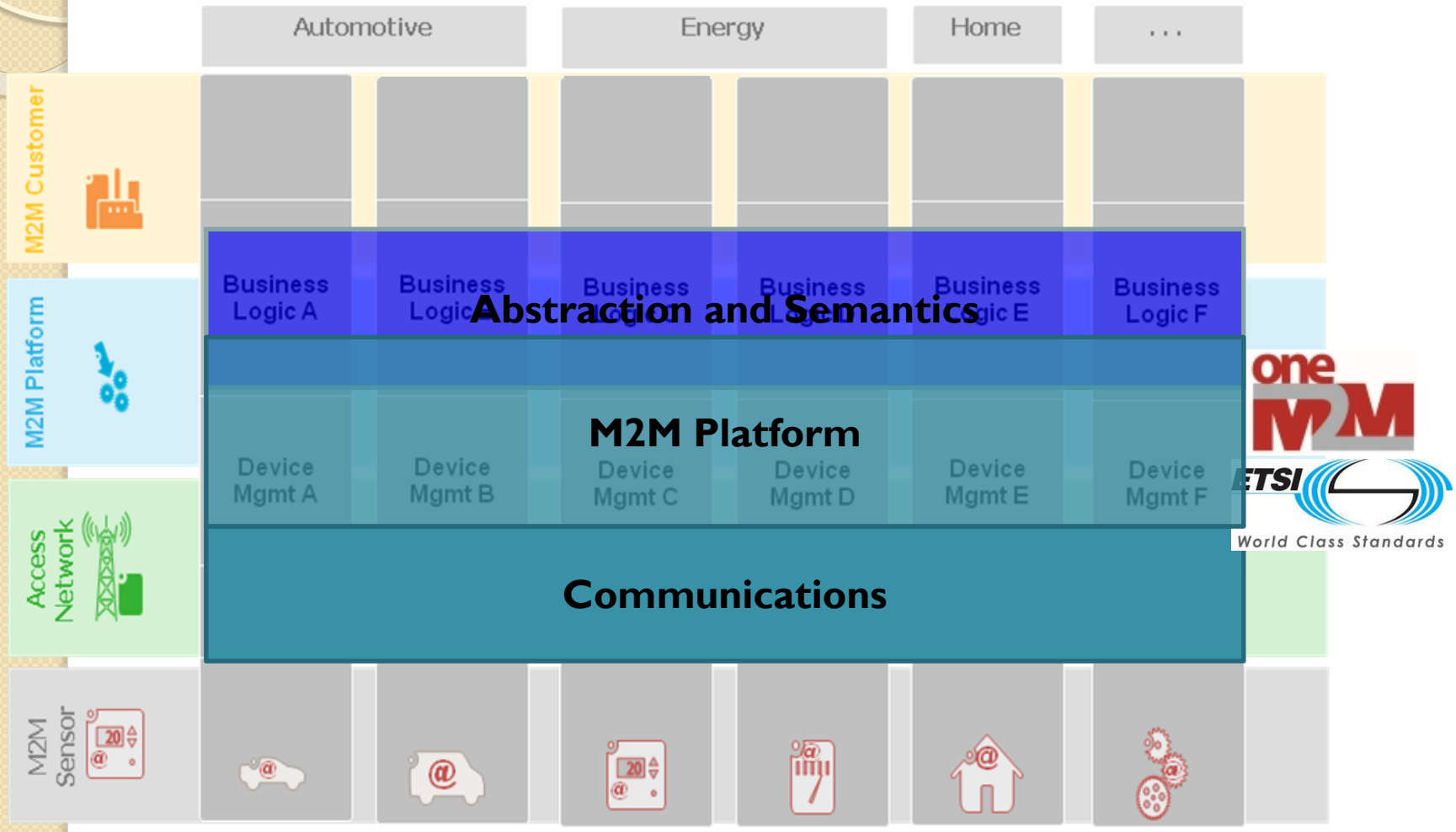


Horizontal (based on common Layer)

Applications share common infrastructure, environments and network elements



From vertical to horizontal integation
From raw data to semantic data



Principles

- IP-based, but interworks with specific IP and non IP technologies in the M2M Area networks
- RESTful resource oriented APIs (Representational state transfer)
- Some of the supported features are:
  - Authentication
  - Secure communication
  - Service and Application Registration
  - Announce and Discovery
  - Data exchange through container resources: store and share
  - Subscription and Notification
  - Group handling
  - Access Control
  - Device Management
  - Re-use of underlying network capabilities such as location, triggering, etc.

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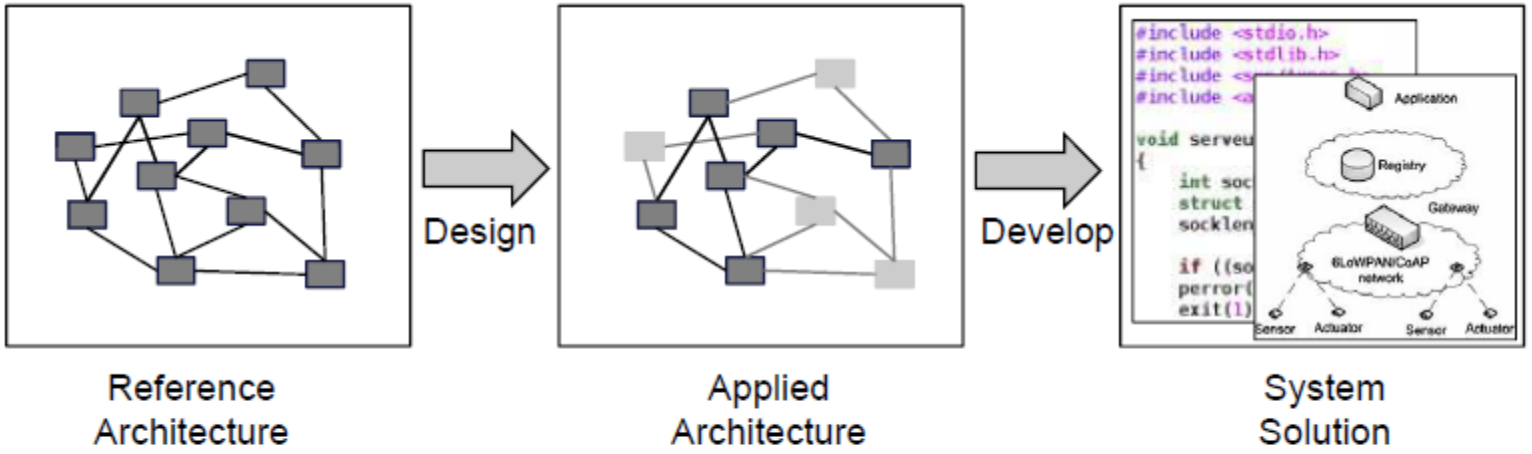

FIGURE 4.1

From a reference architecture to a system solution.

Problem and solution domain partitioning.

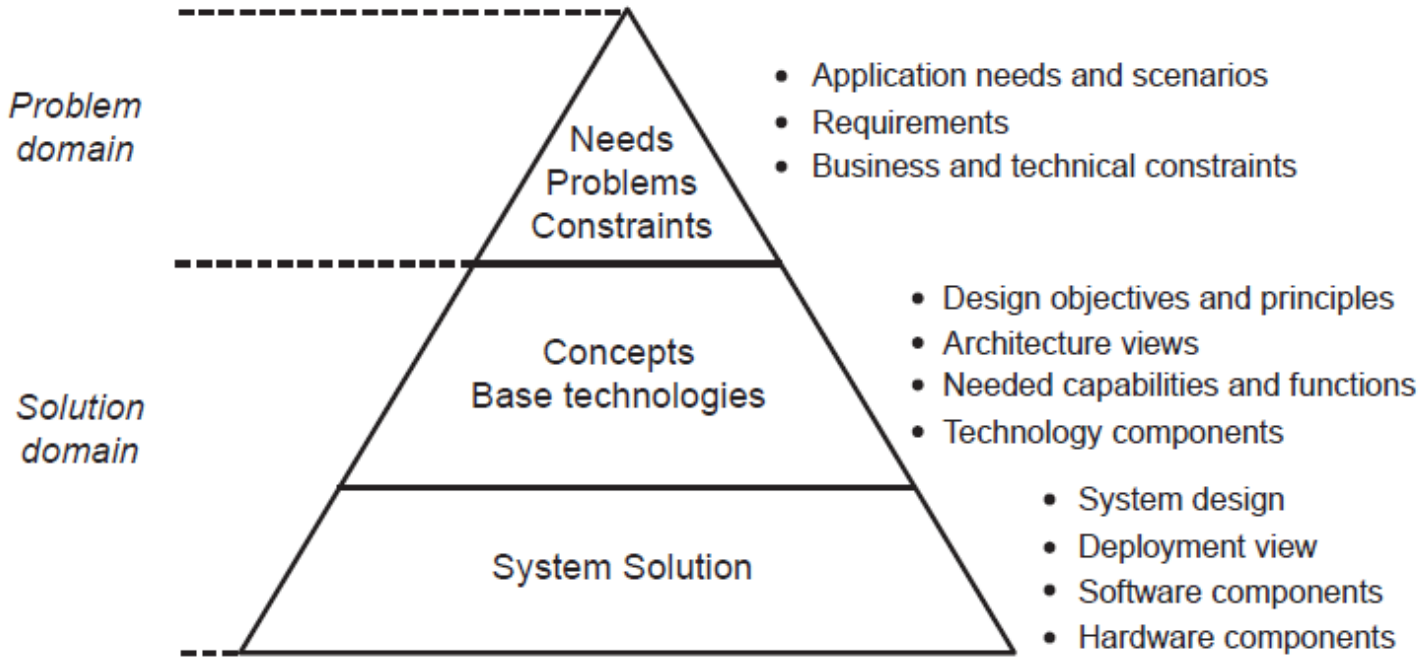

FIGURE 4.2

Problem and Solution domain partitioning.

IoT Solutions

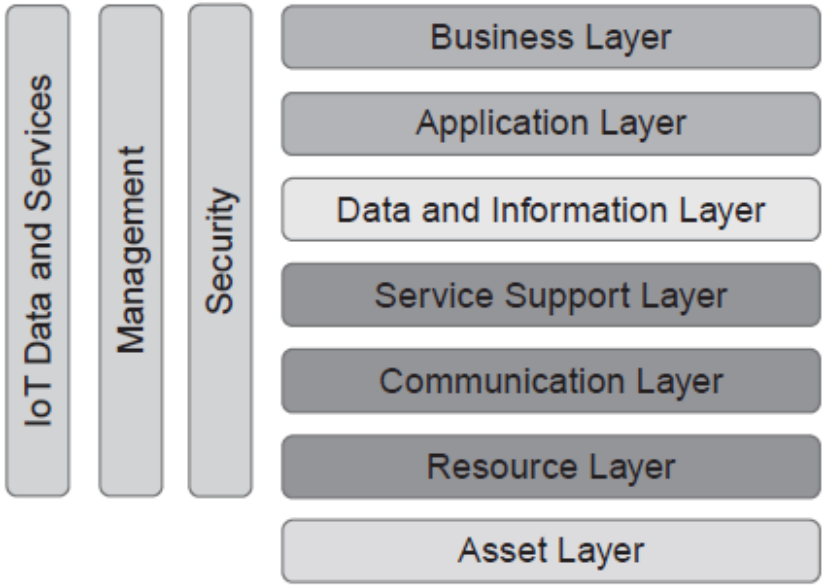

FIGURE 4.3

Functional layers and capabilities of an IoT solution.