IoT-A project: designing a reference architectural for interconnected smart objects

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2012 Sino-EU IoT Symposium, Wuxi

October 26th, 2012

IoT Domain - current status

Vertical silos

- Fragmented architectures, no coherent unifying concepts, solutions exist only for specific application silos.
- No coherent approaches to implement the IoT have been proposed, yet.
- Many island solutions do exist (RFID, Sensor nets, etc.).
- Little cross-sectorial re-use of technology and exchange of knowledge.
- In essence, today we have only Intranets of Things.

Introducing the IoT-A tree:

- a generic Reference Model, derived from Business considerations, application-based requirements and current technologies,
- able to generate different Reference architectures depending on domain-specific requirements,
- to be used as a blueprint for concrete architecture design.

Definitions

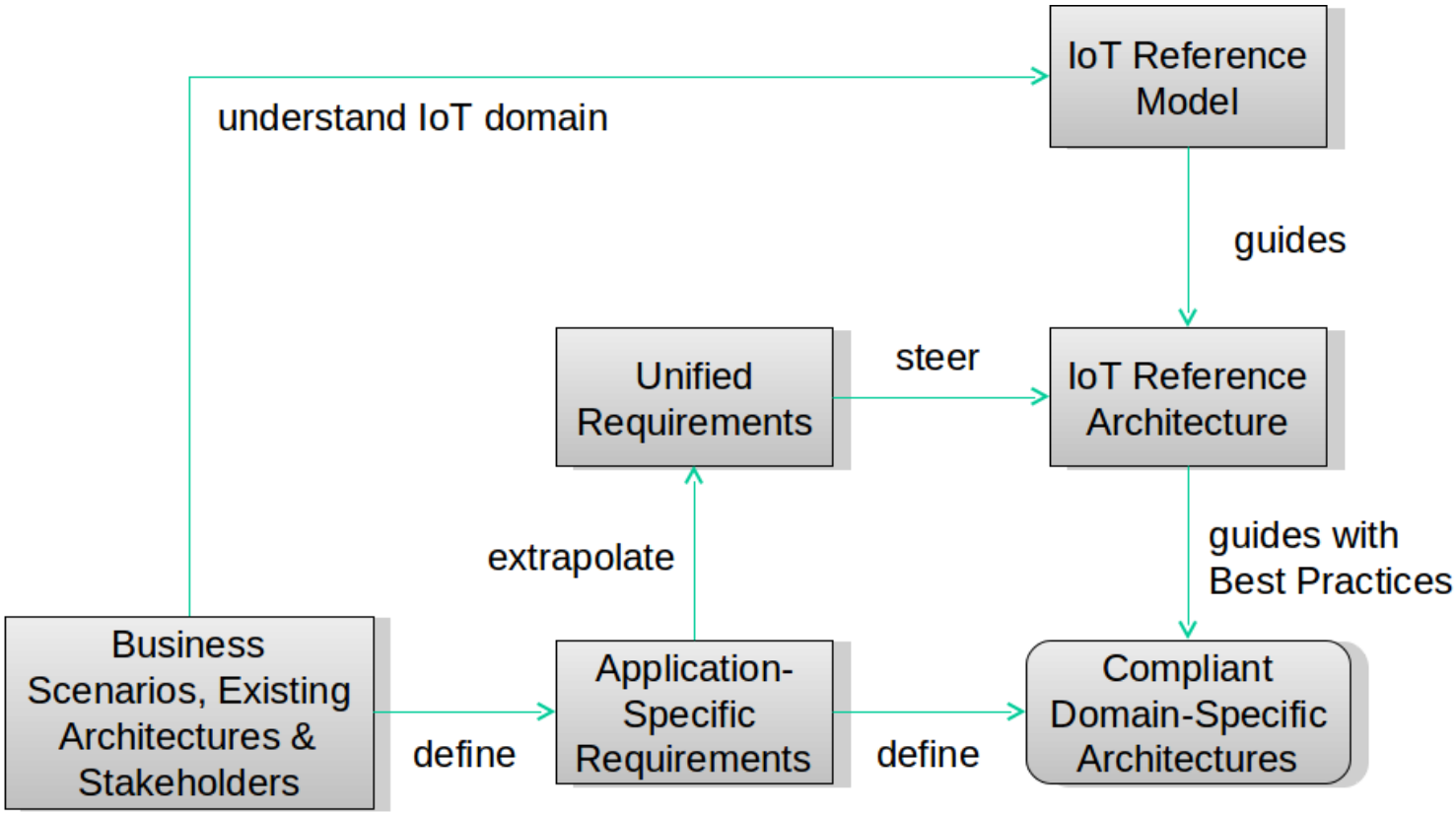
Reference Model

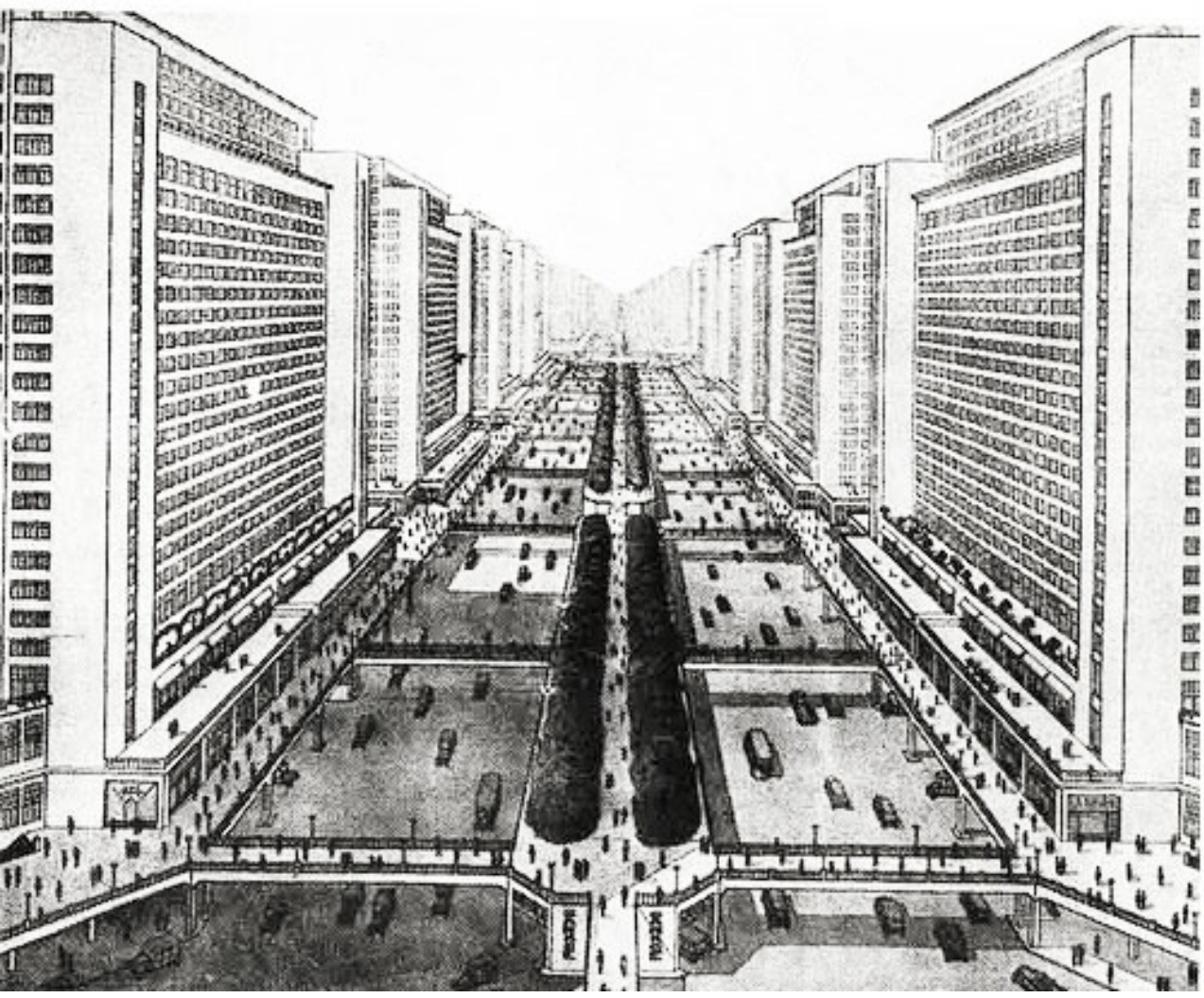
A Reference Model is an **abstract framework** for **understanding significant relationships** among the entities of some environment. It **enables the development of specific reference architectures**. A Reference Model consists of a **minimal set of unifying concepts, axioms and relationships**

Reference Architecture

A Reference Architecture is an **architectural design pattern** that indicates how an abstract set of relationships realises a set of requirements. The **main purpose** of a RA is to **provide guidance** for the development of concrete architectures. More reference architectures may be derived from a common reference model.

Architectural Reference Model

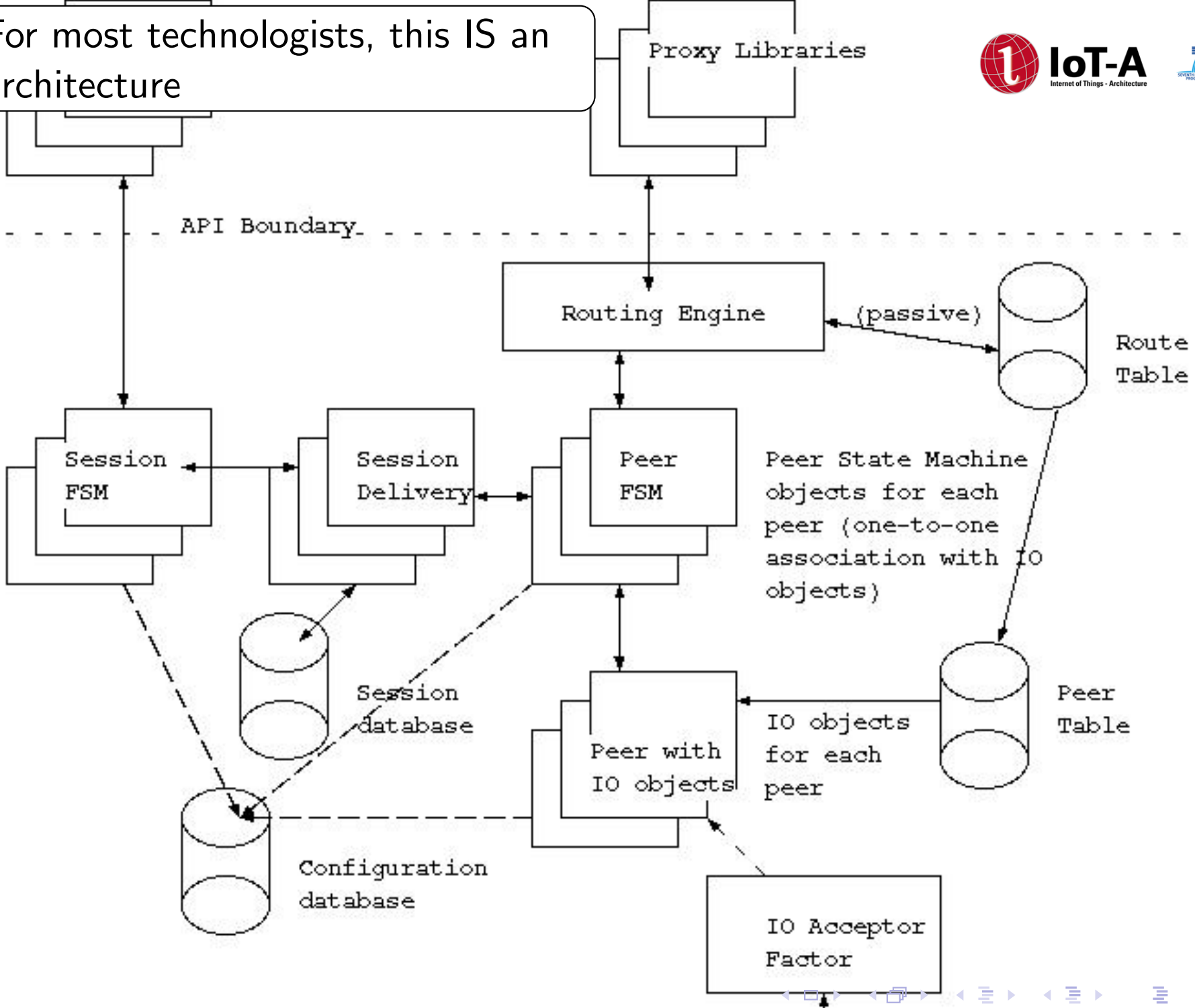




IoT-A
Internet of Things - Architecture

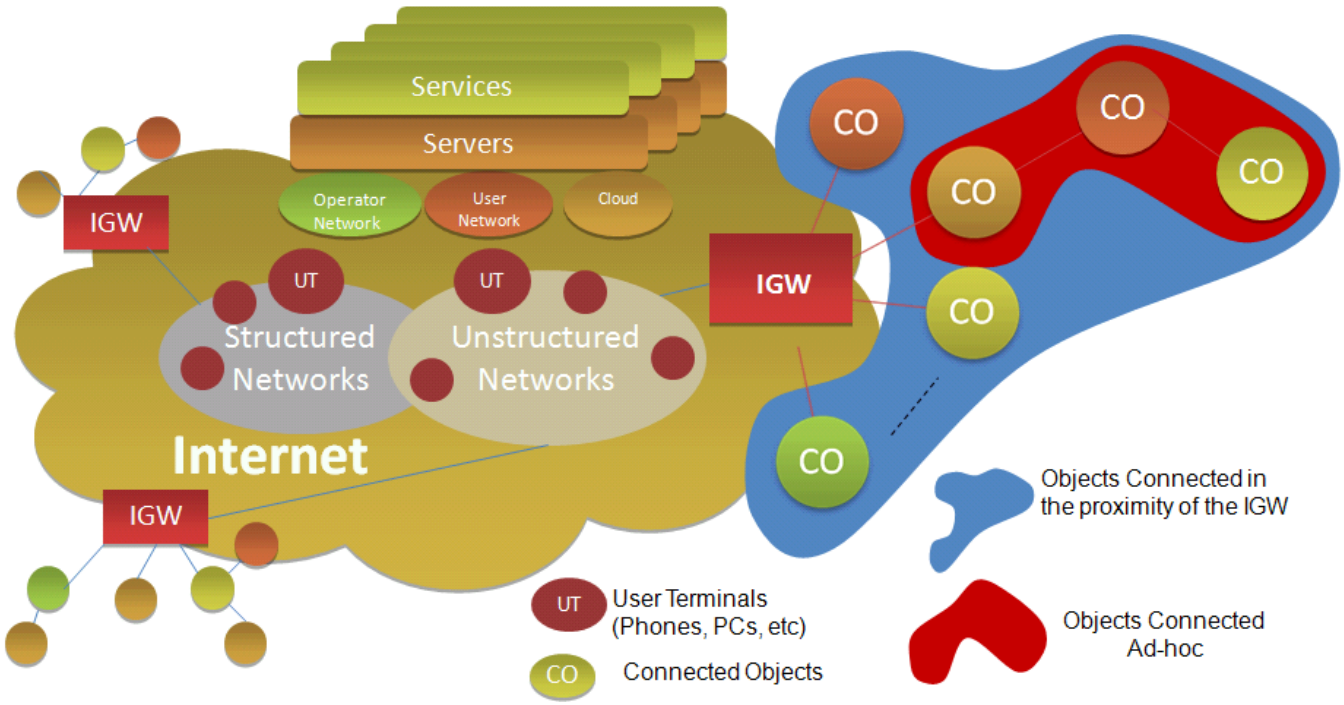
"reference Architecture" from Le Courbusier, the most influential architect (and urbanist) of our era

For most technologists, this IS an architecture



The final target: the IoT cookbook

Heterogeneous Architectures

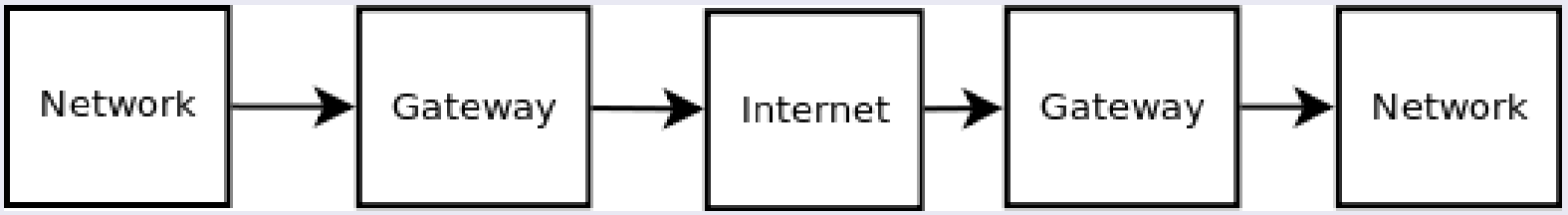


Matching views and perspectives

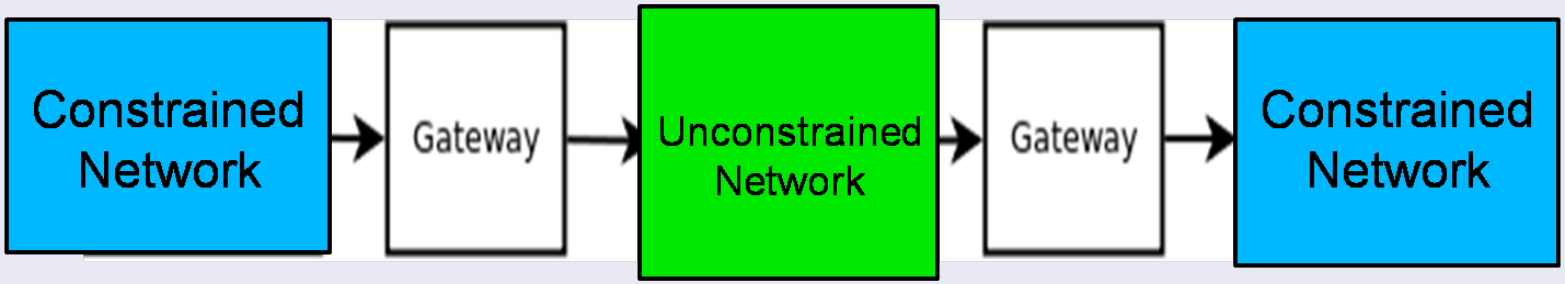
Topic	Design Choice	Impact on: Trust, Security & Privacy	Performance & Scalability	Availability & Resilience	Evolution & Interoperability
IoT Business Process Management / Application support	DC1.1 Business Process Modelling according to BPMN 2.0	+/-	+	+	+
	DC1.2 Business Process Execution by BPMN 2.0 execution engine	+/-	+	+	+
Service Organisation	DC2.1 Service Orchestration with mandatory security	+/-	0	+	0
	DC2.2 Service Orchestration with optional security	-	0	-	0
VE Resolution	DC3.1 VE Resolution with mandatory security	+/-	0	+	0
	DC3.2 VE Resolution with optional security	-	0	-	0
	DC3.3 VE Resolution with QoS	0	0	+	0
	DC3.4 VE Resolution domain-oriented	+	+	+	+
	DC3.5 VE Resolution location-oriented	-	+	+/-	+/-
	DC3.6 Resolution Semantic Web-oriented	0	0	+	+/-

Communication Model: Channel Analysis

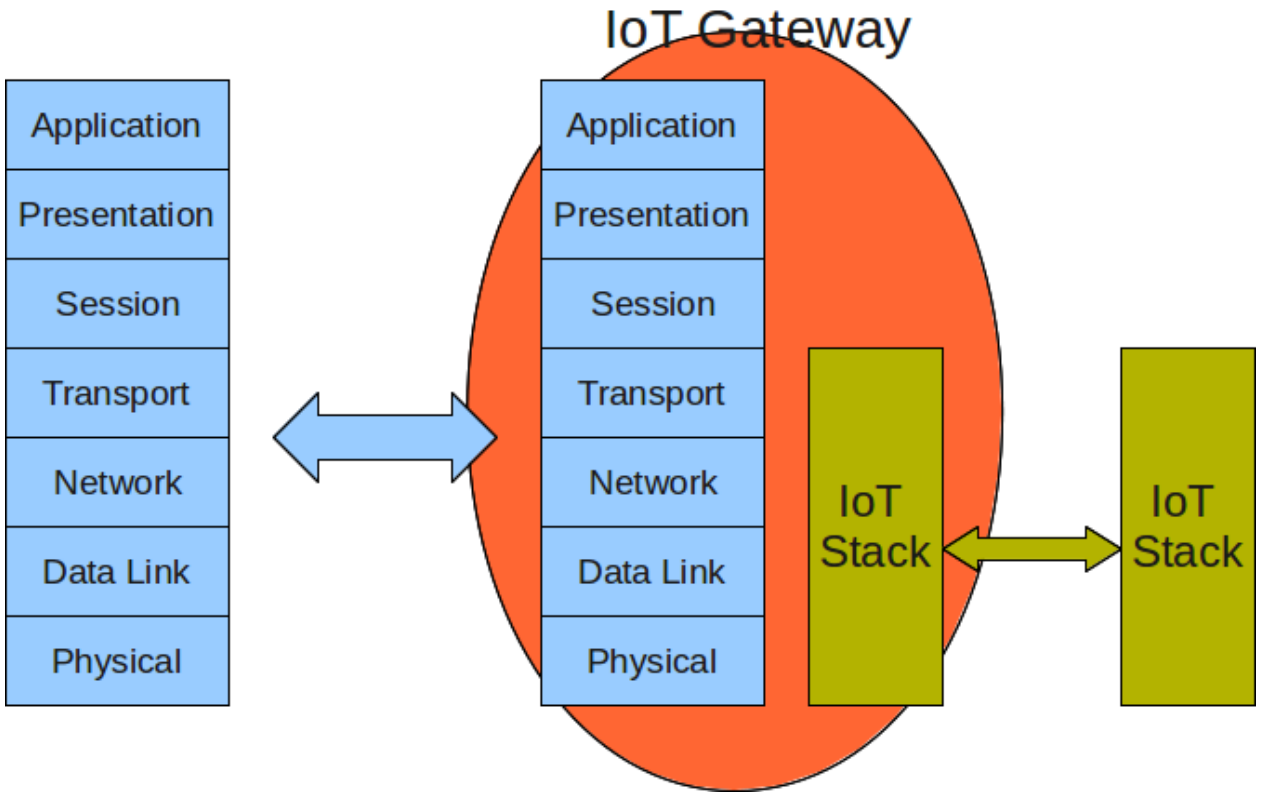
Standard Internet Model



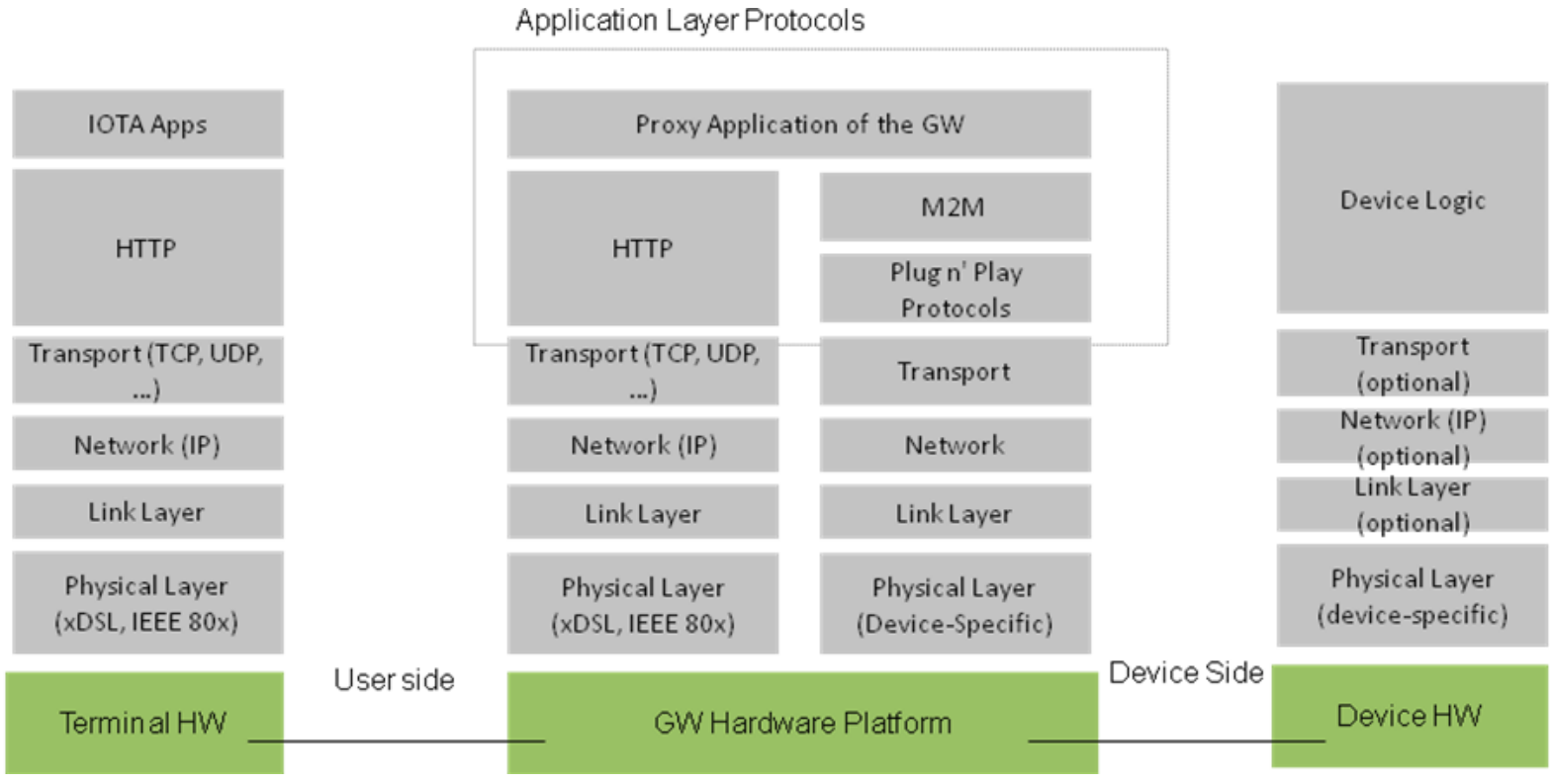
IoT Model



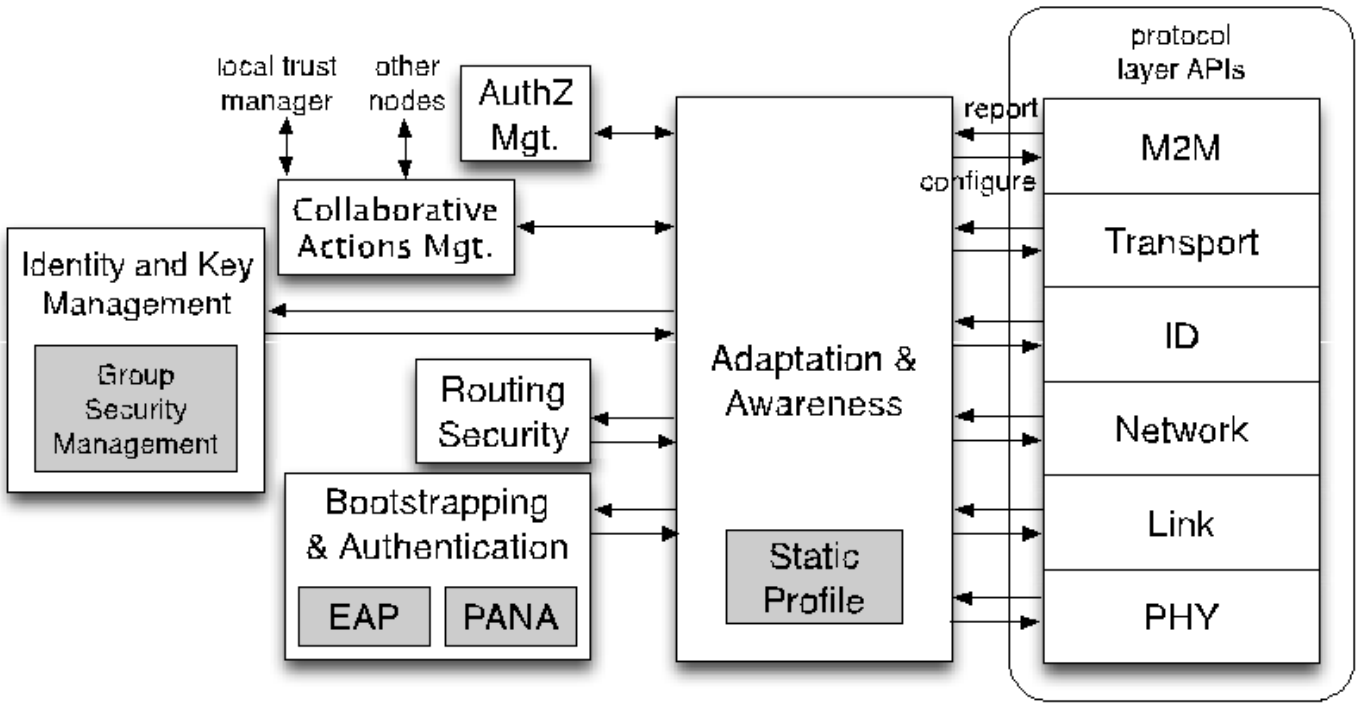
A gateway for IoT



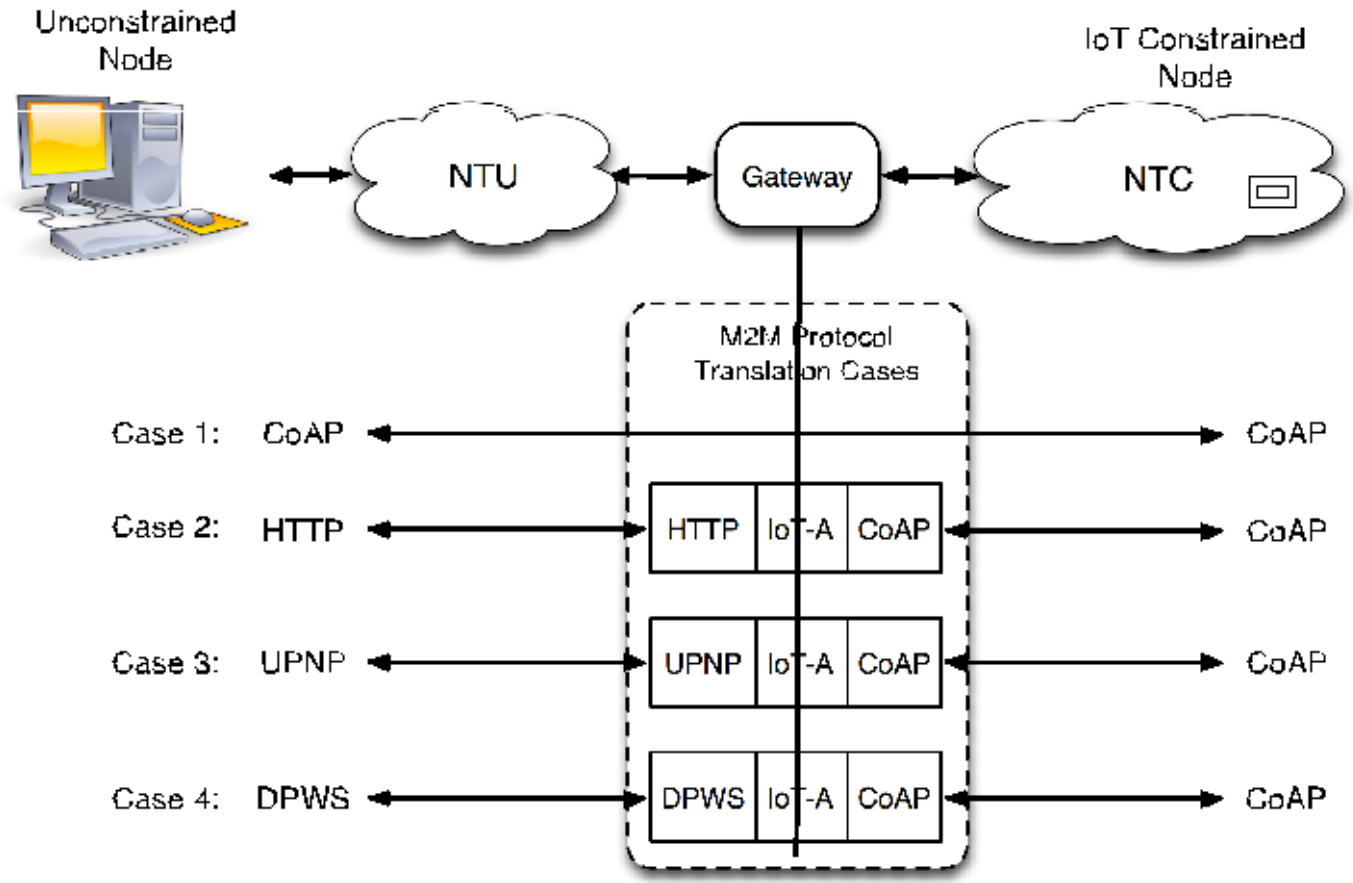
A gateway for IoT

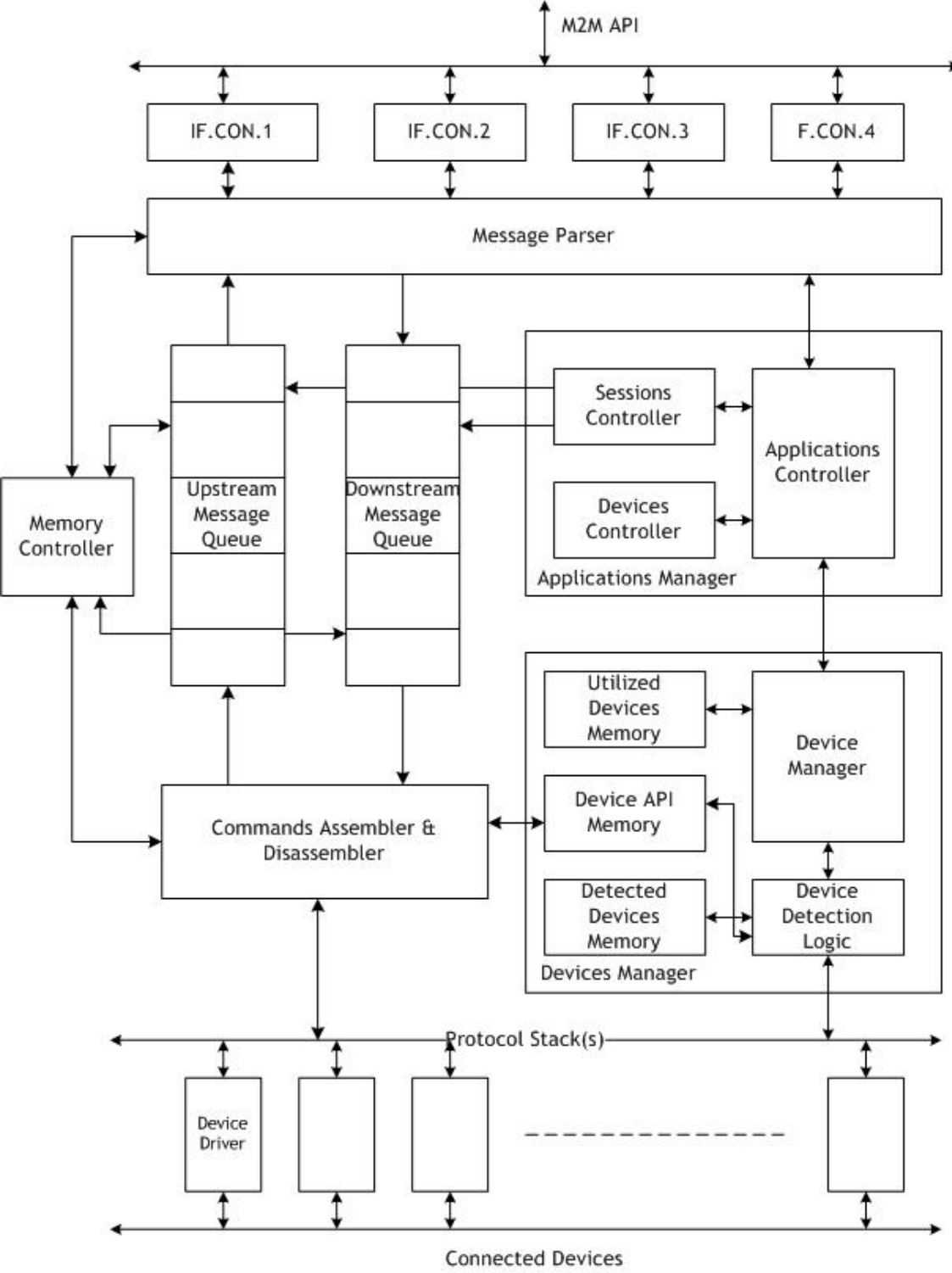


Gateway, Illustrated



IoT Translator

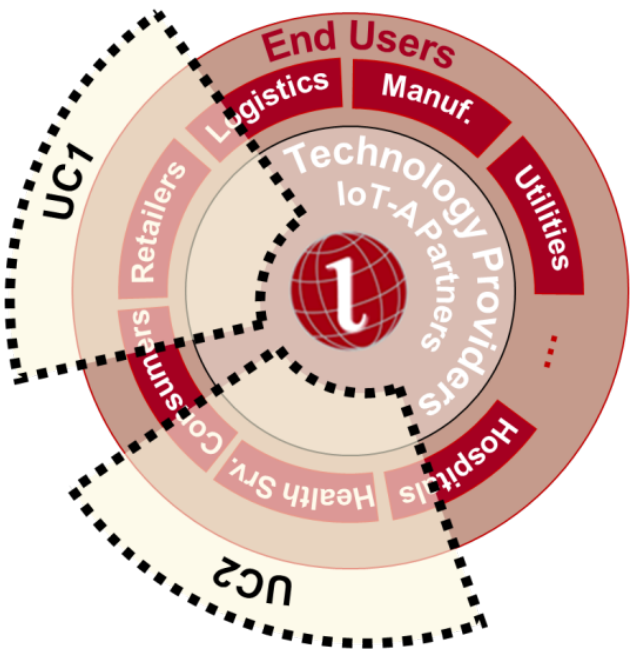




M2M Engine - Functional Architecture

- M2M protocol translation is handled per-application and per-device
- Device drivers handle device-specific protocols

IoT-A is not a closed project



- IoT-A consortium mainly composed by technology companies (or departments of)
- As IoT-A aims at realising something useful, interaction with end users is a necessity
- Therefore, we established a "Stakeholders Group"
- More info at www.iot-a.eu/stakeholders

Thank you for your attention