Use Cases

Michael McCool
Intel

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Outline

- Discuss Process and Goals
- Gather/Brainstorm
- Prioritize
- Derive Requirements
- Incorporate into Plan
  - Security Objectives

Goals

- Use cases as a basis for justifying design choices in our specifications
  - For example, for security
- Use cases as a basis for growing mindshare and building a concrete understanding
- Use cases to drive recruiting
  - Concrete examples and demonstrations of value

Needs

- Drive requirements and test cases
  - Simple use cases to explore the base data types, interactions, and architecture needs
  - Complex use cases to test boundaries
    - Including “pathological” test cases to find failure modes
  - Distributed use cases
  - Multi-device use cases
  - Lifecycle use cases
  - Different audiences and contexts
  - Use cases that demonstrate value of advanced processing
    - For example, contextual information, semantic modelling and processing, etc.

Example Contexts

- Smart Home
- Smart Building
- Smart City
- Smart Factory
- Smart Ship…
- Smart {{Noun}}

Other Dimensions

- Simple to Complex
- Local to Global
- Trusted to Untrusted
- Number of Devices
- Number of Ecosystems
- Asynchronous (Deliver Whenever) vs Synchronous (Real Time Delivery)
- Lossy vs Guaranteed

Issues to Test

- Dependency Chains
- Distributed Race Conditions
- Translation of information and possible loss of meaning and capabilities
- Performance
  - Time
  - Quality of Service
  - Scaling to “Big Data”
- Streaming Data and Real Time

Context: Smart Home

- Connection of personal devices owned by a family (need to develop personas…)
- Some devices installed in house, some owned by family, some by individual family members
- Behind a gateway/firewall, connected by WiFi
  - Assume gateway has adequate but not perfect security
  - Firewall with port 80 open, non-default password
  - WiFi using WPA2 security
  - Gateway with some capability for running computations, eg. bridges, small services
- Scenarios:
  - Onboarding a new device, controlling a single device, services coordinating multiple devices from different ecosystems, family member moving to a new household, visiting guest needing access to a subset of devices

Context: Smart City

- Constellation of smart buildings as well as city infrastructure: roads, lighting, water, electricity, transit, police and fire control.
- System integrator needs to combine systems from various manufacturers
- Needs to deal with large-scale system monitoring and maintenance, mass upgrades, etc.
- Use of system to coordinate and inform maintenance, security, and safety activities
- Combinations of communications technologies: 4G, LoRA, WiFi, Zigbee, wired ethernet, etc.
- Scenarios:
  - Adding new devices, retiring old devices, upating devices, reponse to need for maintenance of monitored infrastructure, emergency response to earthquake, coordination of police/fire response.

Context: Smart Factory

- Combination of IT and OT services – See IIC SF
- Need to satisfy strict safety requirements
- Brownfield systems, pre-IoT OT systems
- Need to enable data-driven decision making
- Scenarios:
  - Onboarding and offboarding, monitoring, safety notifications, functional safety certification, real-time control, security monitoring
  - See IICSF

Discussion

- Large number of possible use cases — need to focus on ones that add value
- What are we going to do with them? Do we publish them? Just to drive requirements?
- Can we reuse use cases from elsewhere? BIGIoT (city, automotive); IIC (industrial)
- Use cases to use for marketing need to demonstrate differentiation and key value.
- Architecture scenarios:
  - T2T, T2C, T2B; which are “typical”
- Demonstrate how interoperability can enable a larger cross-domain ecosystem
  - Eg Smart Home in the Smart City (eg OCF device in the home, connects to city emergency infrastructure)

Discussion

- How should be describe use cases?
  - General or specific? What granularity?
  - Atomic use cases: small scenarios that occur in many domains.
- Handover between domains
  - Example of an issue a use case would let us explore
- Use cases can take a long time to develop, normally done early

Next Steps (Proposals)

- Do a study of existing Use Case collections in IoT (AR: MM to create Pull request in IG github)
  - Identify use cases where WoT would add value
  - Where do we already have use cases? Historical, down in arch document, security, etc.
- Key Value → Brainstorm some example use cases that demonstrate it → build Demos/Simulations
  - Permanently running HW; online simulation; downloadable sim; Instructables to build; WoT SDK
- Build database
  - Optionally publish, link to requirements, using template etc. But: infinite scope
- Collaborate within W3C
  - eX: Autmotive group, device and sensor group