Searching in a Web-based Infrastructure for Smart Things

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Enabling Smart Environments in the Internet of Things

Goal: Interconnection of services offered by smart things in everyday environments

Web of Things: Web technologies for application-layer interoperability of smart things

Thing + Internet connection + embedded Web server + resource-oriented modeling + REST

A Web-based Infrastructure for Smart Things

→ Support discovery, selection, and usage of services offered by smart things
→ Desired Properties: Scalability, Load-balancing, Self-management, User-friendliness
→ Example applications: User interfaces, body sensor networks, robotic devices,...

Infrastructure Properties

→ Hierarchical structure based on logical place identifiers to exploit the locality of thing interactions!

→ Self-management:
  ✓ Self-stabilization algorithms arrange nodes according to the topology induced by logical place identifiers
  ✓ Ability to recover from temporary node failures, eventually re-establishing the original structural configuration

Searching for Smart Things

→ Multiple query types for different scopes
→ Request-for-Query to enable searching outside the scope of the current authoritative node

→ Resource-oriented view on querying and query routing

Conclusions

Application of REST patterns in the design of an Internet of Things infrastructure
✓ Register services as resources (resource-oriented architecture)
✓ Annotate these resources to enable their automated discovery
✓ Benefits: Scalability, interoperable APIs,...

Next steps
→ Find smart things’ locations w.r.t. management nodes: Integrate with relative indoor localization system!
→ Enable targeted searching for machine clients: Integrate semantics in device and service descriptions!

References