

Smart-M3: platform for smart environments

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Business from technology

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VTT TECHNICAL RESEARCH CENTRE OF FINLAND

M3 – revolution in application development

What if I know that he is answering the call? Should I turn the sound off? Automatically?

With M3 your environment knows what's happening!

What if I know that he can not hear the incoming call? Should I flash lights? Automatically?



What if I know that music is loud in the room? Could I alarm louder? Use vibration? Automatically?

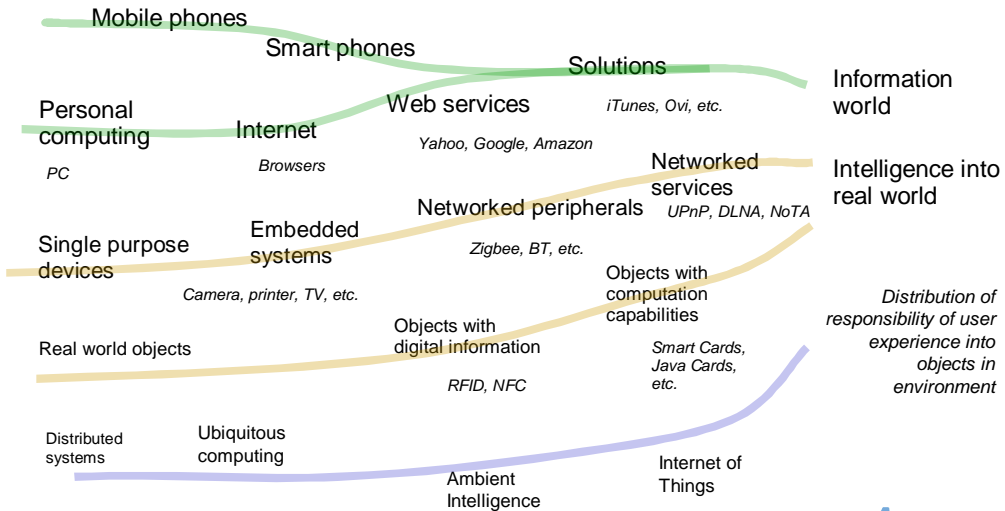
M3 makes it possible to mash-up and integrate information between all applications and domains spanning from embedded domains to the Web.

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Distribution of computation into environment

Background

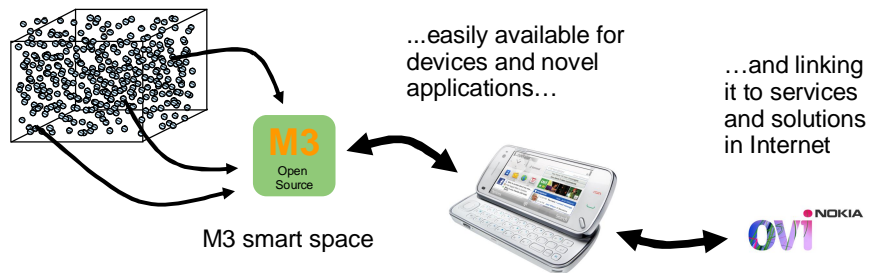


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Vision: fusion of physical and information worlds

Information from physical world...



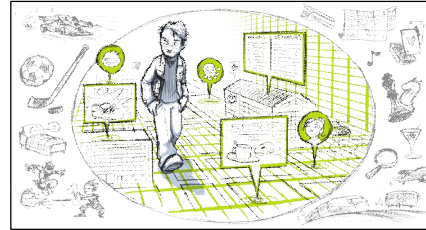
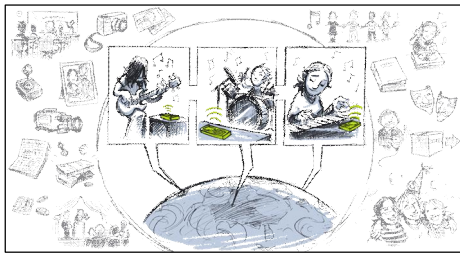
...and doing all this **vendor independently**, **device independently** and **domain independently**

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Mission

Open embedded data in various devices to applications to create local services in millions of places...

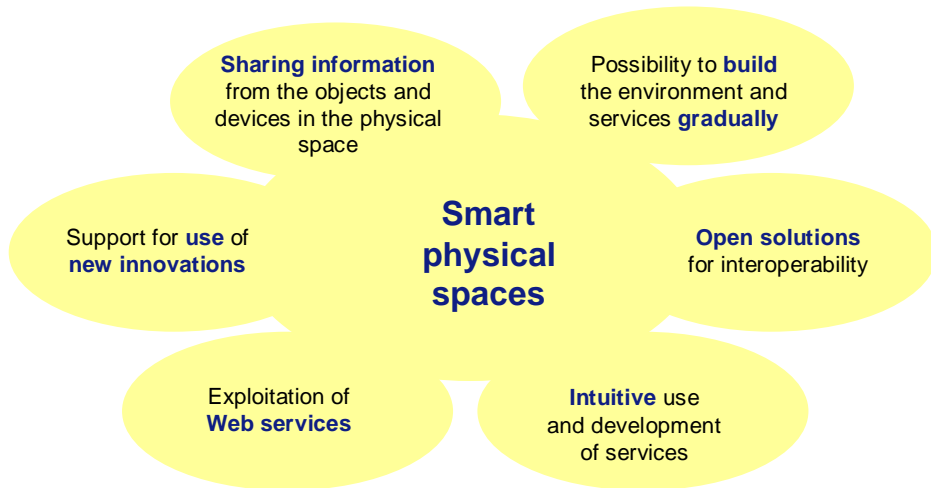


... and monetize it by using the web tools and business models

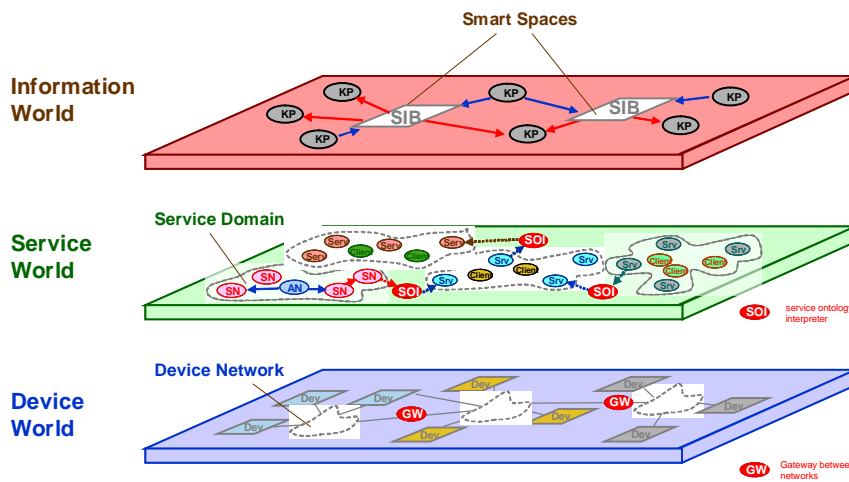
“Smart Environment Axioms”

- Interoperability is unavoidable step in the evolution of information world
- There is no single technology that can master the variety of needs
- World can not be built/changed instantaneously
- The cost of interoperability agreements increases when moving towards implementations
- A single company can not build the world

What is needed for smart environments



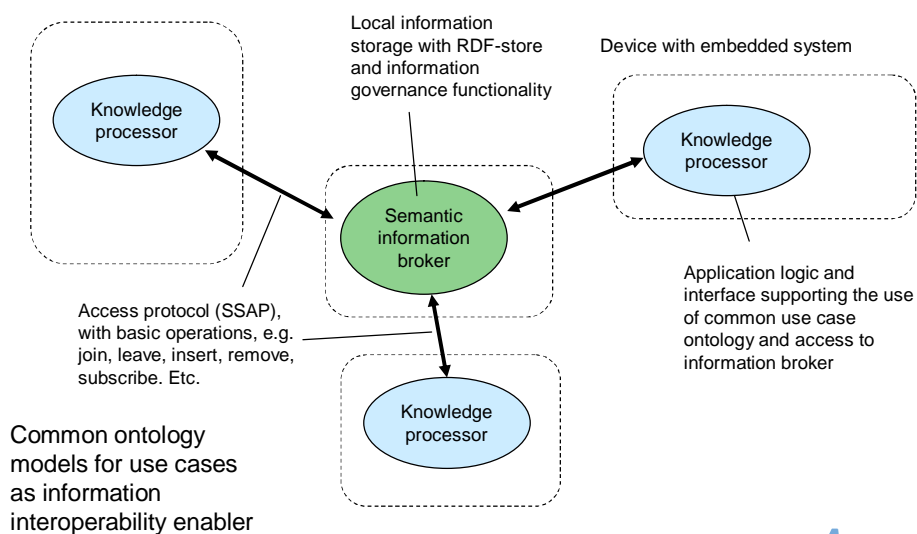
M3 interoperability layers



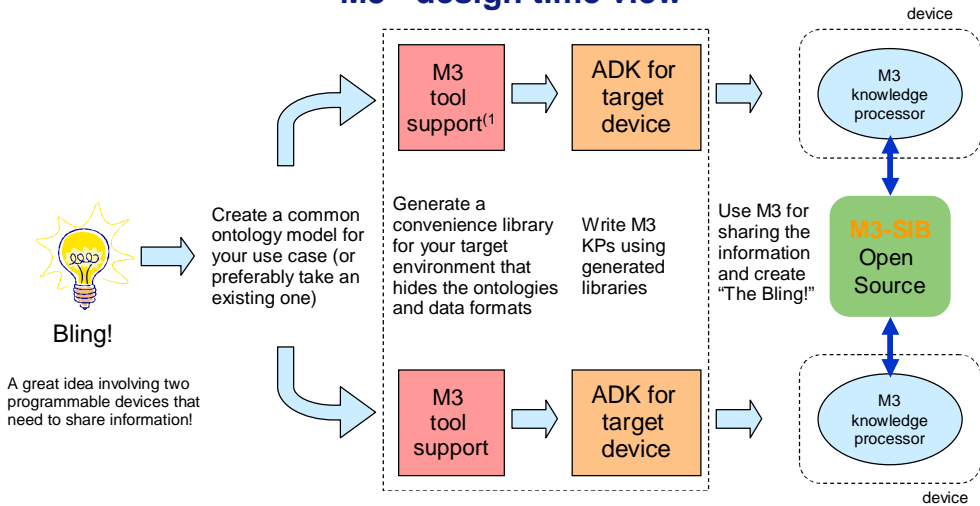
M3 principles

- Voluntary sharing of information by objects in physical space
 - Publish-subscribe/query architecture
 - It is up to information owner only to decide what and how information is published
 - Respecting the integrity and independence of devices
- Interoperability agreements on information level
 - Common ontology model and data presentation format are the main requirements
 - Exploitation of existing service and device world solutions
- Enabling cross-domain use cases
 - Means and techniques must be use case independent
 - Support for enforcement to device and smart object manufacturers

M3 functional information level architecture



M3 - design time view

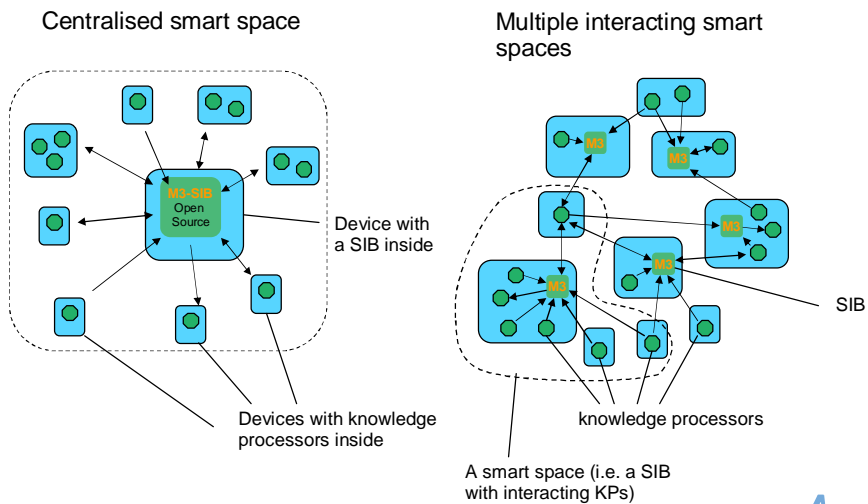


¹⁾ Published in Open Source

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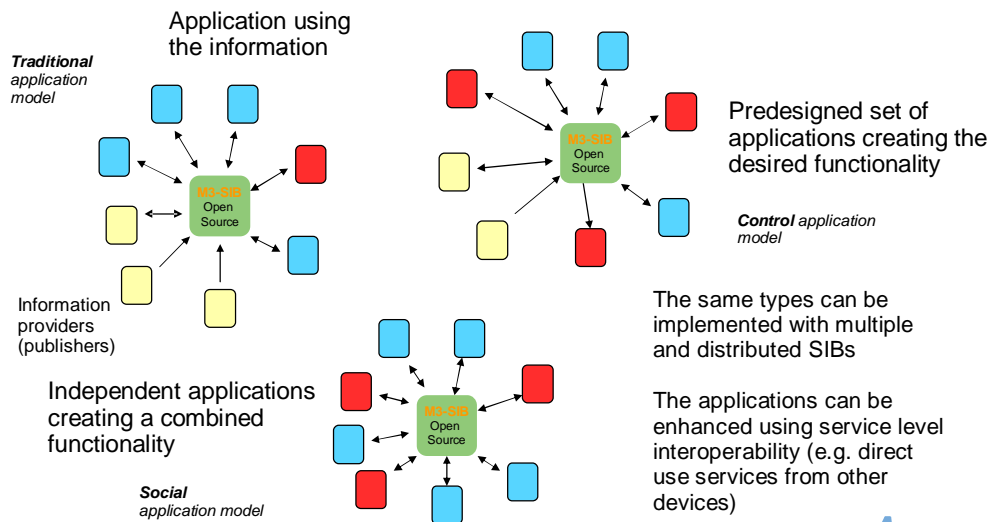
M3 based smart environments



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M3 based applications



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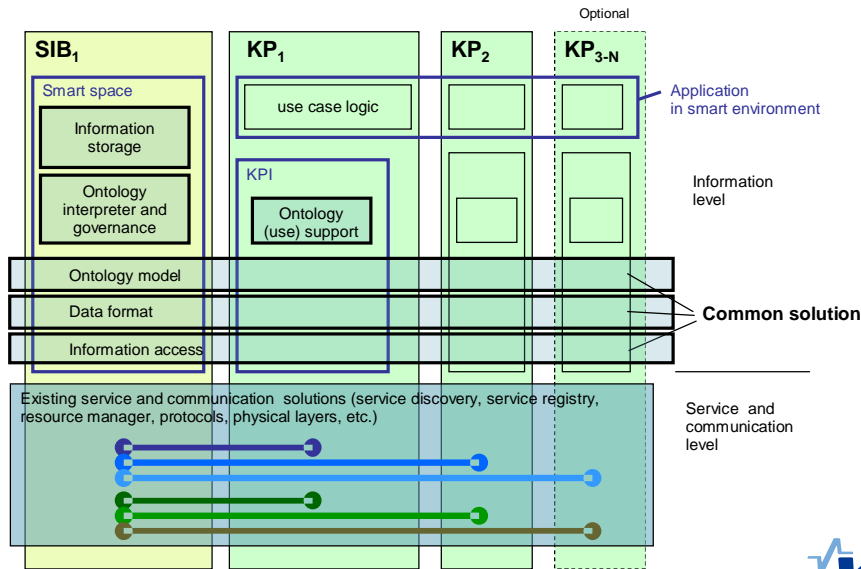
M3 enforcement support

- M3 will distributed as Open Source under BSD licence
 - Maximum flexibility, simple availability
 - Minimum dependencies between organisations and companies
- M3 use will be supported with tools
 - Reference implementations to ease up the first experiments
 - Convenience library generators for hiding the ontologies and data storage formats from embedded system developers
- M3 application development support under development
 - Ontology model based application development
 - Domain dependent supporting function libraries

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Architecture of M3 smart environment



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M3 – Value Offering

- **USERS: Freedom of choice**
 - I want to select my device freely from any vendor knowing that it works with all devices I already have. – M3 = multi vendor
- **DEVICE MANUFACTURERS: Seamless operation with all devices**
 - I want to create innovative products that consumers want to buy because they work seamlessly with other devices wherever he goes. – M3 = multi device
- **SERVICES COMPANIES: Gaining competitive edge**
 - My company develops novel services using mash-up approach and we want seamless data portability to effortlessly create winning solutions for cross domain user experience. - M3 = multi domain
- **APPLICATION DEVELOPERS: Focus on consumer 'wow'**
 - As an application developer I want to focus on creating consumer 'wow' instead of porting my code to all different platforms. I also want develop cross-domain mash-up services as easy as internet services are created today! – M3 = multi domain

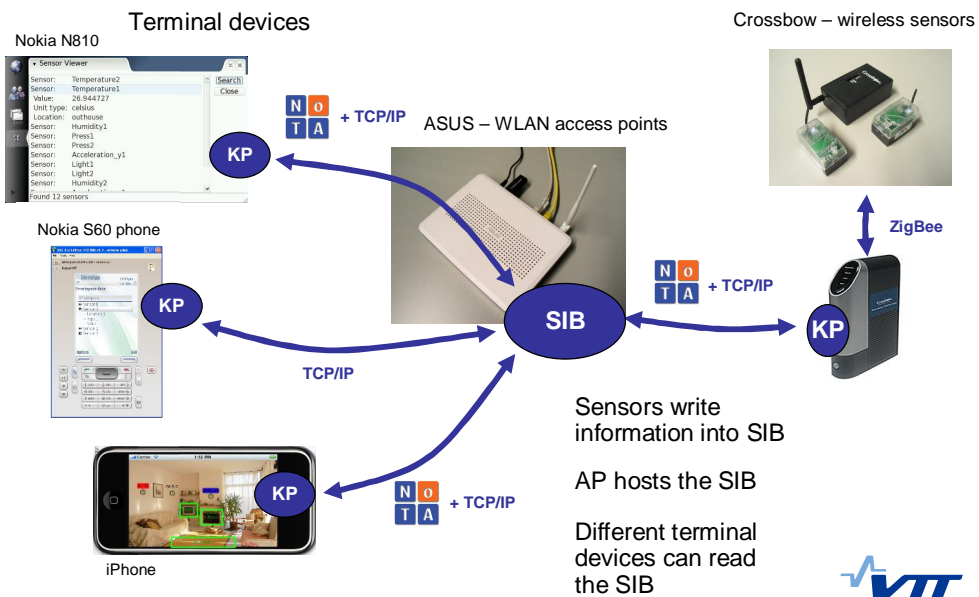
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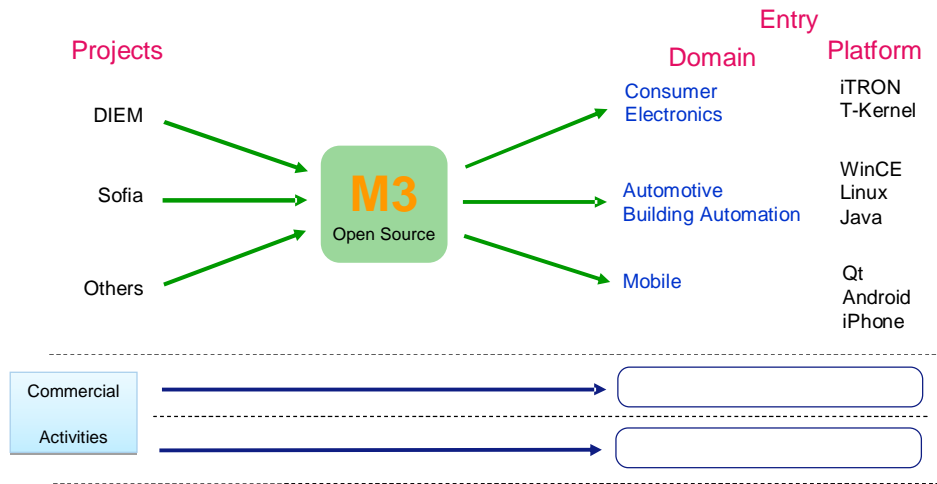
Smart-M3 status

- Smart-M3 solution in **SourceForge.net**
 - Software architecture and service interface
 - Reference implementations
- M3 tool support
 - Convenience library generator (Open source distribution)
 - Application development environment
- OpenM3 demonstration example (available 11/09 in SourceForge.net)
 - SIB implementation for ASUS Linux WLAN access point
 - KP implementation for Crossbow sensor network netbridge
 - KP implementation examples for iPhone, Nokia Internet tablet (N810) and S60 phone (N97)
 - Ontology model for the demonstrator use case

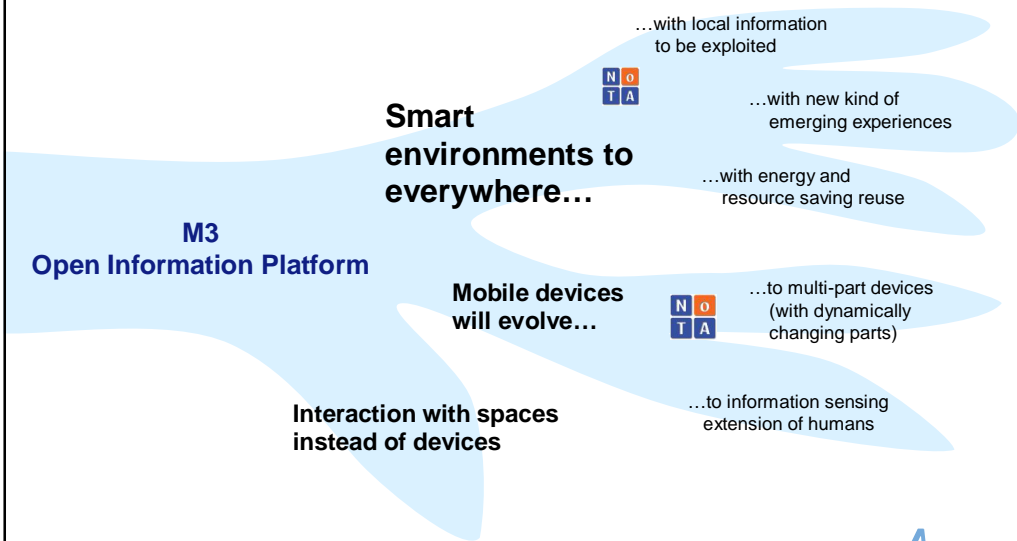
OpenM3 Smart Environment Demonstration



Open Source and Ecosystem



Path to success



Summary

- M3 – multi-vendor, multi-device, multi-domain solution for information interoperability
- Link between physical and information worlds
- Open source distribution with maximum flexibility and easy access and adaptation
- First demos available – portfolio of projects using M3 exists
- M3 does to smart environments what the HTTP/TCP/IP did for Internet

Thank you



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