Super Distributed Objects DSIG Final Agenda ver.1.00 sdo/2005-04-01

OMG TC Meeting - Athens, Greece -- April 11-15, 2005

Schedules:

		TF/SIG				
		Host	Joint (Invited)	Agenda Item	Purpose	Room
Monday (April 11)						
13:00	13:15	SDO		Welcome and Review SDO Agenda	Plenary Meeting Kick-off	Rodos B, ML
13:15	14:30	SDO	(Robotics)	< Invited Talk > History of SDO DSIG and Overview of PIM and PSM for SDO - Dr. Shigetoshi SAMESHIMA (Hitachi)	Informative	Rodos B, ML
				Break		
15:00	16:00	SDO	(robotics, MARS, RTSS,	SDO and RTC(Robot Technology Components) - Dr. Takashi SUEHIRO	Discussion of RFP contents	Rodos B, ML
16:00	17:00	SDO	(Robotics)	Roadmap Discussion, Next Meeting Agenda Discussion, etc	SDO Closing session	Rodos B, ML
17:00		SDO		Adjourn		
Tuesday						
12:00	13:00	**LUNCH**				
13:00	14:00	ManTIS	Robotics, SDO	FRP discussion (SDO), RFI discussion (Robotics)	Technology exchanges	Delos, 1st FL
Wednesday						
12:00	14:00	**LUNCH and OMG Plenary**				
18:00	20:00	**OMG Reception**				
Thursday						
12:00	13:00	**LUNCH**				
13:00	18:00			Architecture Board Plenary		
15:00	15:30	MARS	RTESS, SDO,	Robotics Technology RFI Presentation		Rodos A, ML
15:30	16:30	MARS	RTESS, SDO,	Robotics Technology RFP Presentation		Rodos A, ML
Friday						
8:30	15:00			AB, DTC, PTC		
12:00	13:00	**LUNCH**				

Other Meetings of Interest						
Monday						
8:00	8:45	OMG		New Attendee Orientation		
18:00	19:00	OMG		New Attendee Reception (by invitation only)		
Tuesday (April 12)						
9:00	9:30	Robotics		Welcome and Review Robotics Agenda	Plenary Meeting Kick-off	Myconos, 1st FL
9:30	10:30	Robotics	(SDO)	<Invited Talk> Invited Talk: RSi's Activities (Robot Services Initiative) -Dr. Masahiko NARITA (Fujitsu)	Informative	Myconos, 1st FL
				Break		
11:00	12:00	Robotics	(SDO, MARS, RTSS,	Service Robotic System RFI - Mr. Olivier LEMAIRE	Discussion of RFI	Myconos, 1st FL
12:00	13:00	**LUNCH**				
13:00	14:00	ManTIS	Robotics, SDO	FRP discussion (SDO), RFI discussion (Robotics)	Technology exchanges	Delos, 1st FL
14:00	15:00	RTESS		Realtime Middleware interoperability discussion - Paul WORK(Raytheon), Dock ALLEN(MITRE)	Technology exchanges	Rodos B, ML
				Break		
15:15	16:00	Robotics	(SDO)	<Presentation by participants> Ubiquitous Robotic Companion - Dr. Seung-Ik LEE	Technology exchanges	Myconos, 1st FL
16:00	16:45	Robotics	(SDO)	Service Robotic System RFI (cont.) - Mr. Olivier LEMAIRE	Discussion of RFI	Myconos, 1st FL
16:45	17:00	Robotics		Next Meeting Agenda Discussion, etc	Robotics Closing session	Myconos, 1st FL
17:00				Adjourn		
13:00						
Wednesday						
Thursday						
17:00	19:00	MARS	all	Agenda Coordination	cooperative activity	Rodos B, ML

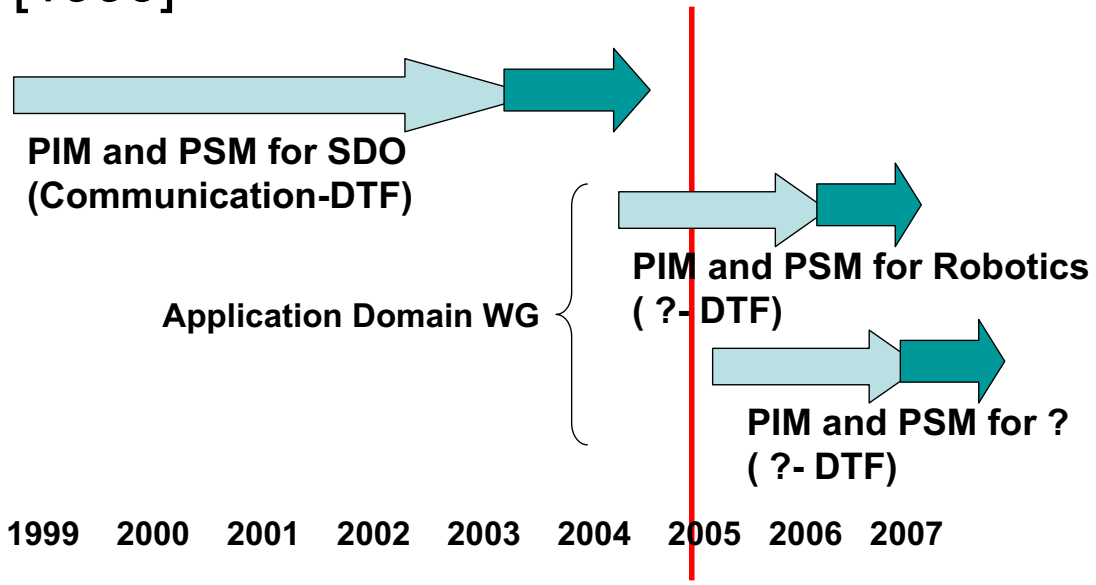
SDO (Super Distributed Objects) Plenary Meeting

April 11, 2005
Athens, Greece

Marriott Athens Ledra
Rodos B, Mezzanine Level

SDO Roadmap

Chartering SDO (Super Distributed Object) SIG [1999]



Roadmap Review

- Robotics WG inside SDO-DSIG :
  discussions about the SDO model for robotic applications.
  <focus on SDO interoperability > **RFP**
- Robotics-DSIG :
  discussions about a wide variety of standardizations on robotics domain.
  <focus on its priority>

visible

RFI => White Paper

Two activities in parallel

Review Agenda

Robotics DSIG
Tuesday, April 12, 2005
9:00 – 15:00

Monday, April 11, 2005

- **13:00- Welcome and Review Agenda**
- **13:15- Invited Talk: Introduction to SDO (Dr. Sameshima, Hitachi)**
- **15:00- SDO model for Robotics Domain (RFP discussion, Dr. Suehiro, AIST)**
- **16:00- Roadmap Discussion**
- **16:30- Next meeting Agenda**
- **17:00- Adjourn**

Next Meeting Agenda

June 20-24, 2005 (Boston MA, USA)

Monday-Tuesday

RFP WG Meeting [Mon, Jun.20 AM]

(drafting RFP)

SDO-DSIG Meeting [Tue, Jun. 21 AM]

- SDO model applying to Robotics Domain

(review RFP draft)

History of SDO DSIG and Overview of PIM and PSM for SDO

2005.4.11

Hitachi Ltd.

HITACHI
Inspire the Next

HSDL
Harmonize the Society with Digital Life

1. History of SDO

Mission statement for SDO SIG (since 2000)

- To define an application framework and the facilities to support super distributed objects. To do this it will:
  1. Investigate possible reference models, focusing on the characteristics that produce super distribution properties. Such characteristics include being massive, scalable, weakly dependent, plastic and densely embedded in the environment.
  2. Work through OMG organizations to seek extensions to OMG standards to support the super distributed system.
  3. Promote the use of OMG standards in actual applications.

History of SDO standardization

- **1999/11 Forum on Super Distributed System at OMG Cambridge meeting**
- **2000/01 SDO SIG establishment**
- **2000/06 RFI (Request for Information)**
- **2001/07 Whitepaper**
- **2002/02 RFP (Request for Proposal)**
- **2003/03 Specification adoption**

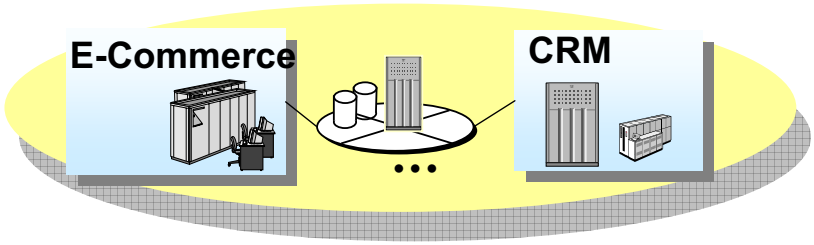
  - **PIM* and PSM* for SDO** (Platform Independent/Specific Model)
- **2004/03 Finalization**

SIG: Special Interest Group, RFI: Request for Information, RFP: Request for Proposal

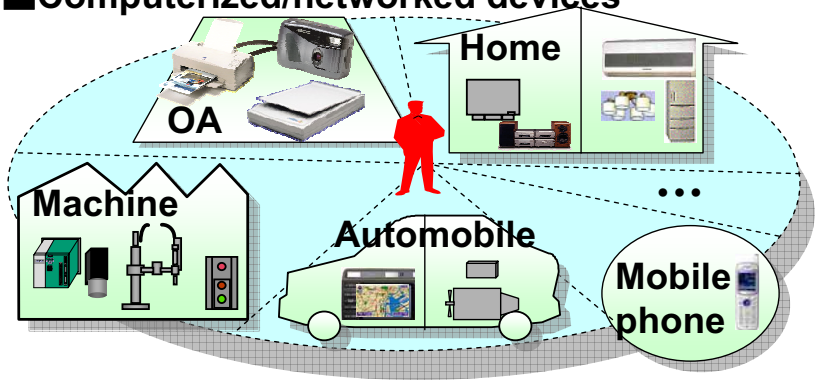
State-of-the-art & issues on Ubiquitous computing

- Increasing variety/number of devices
  ->"Islands" of standards

■Enterprise information system

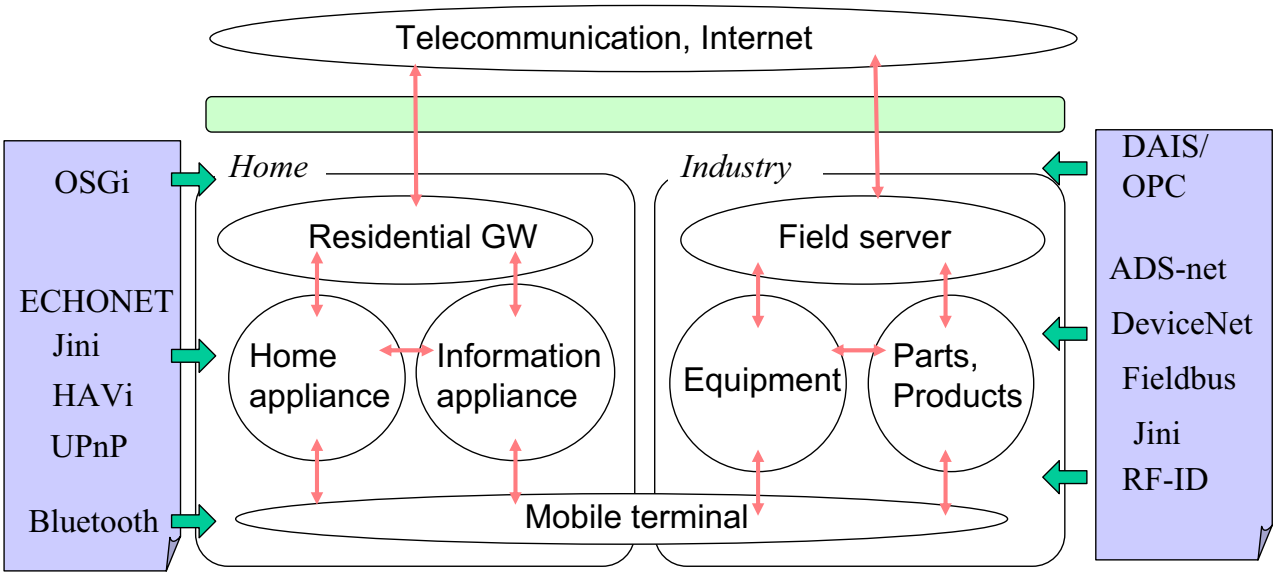


■Computerized/networked devices



Objectives

- Total system integration
  - from field system to information system
  - introducing new consumer appliances
  - establishing common model & IFs of many standards



That's why we make standards in OMG!

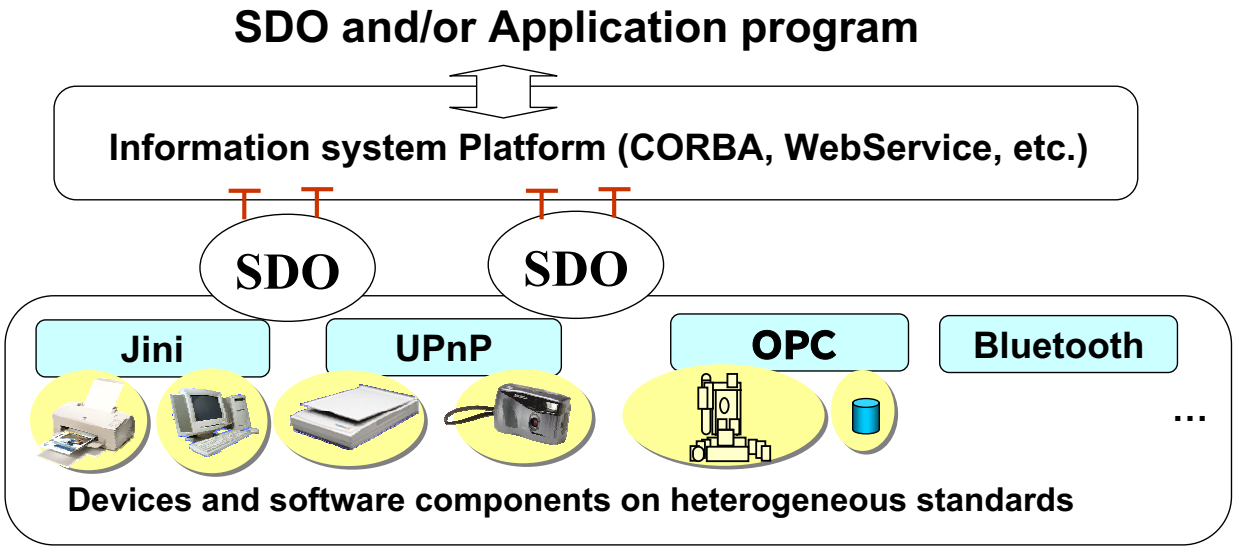
First (and the only) RFP

- Mandatory requirements
  - Resource data model for SDOs, which describes their capabilities and properties. This model shall identify all the necessary and relevant data to describe them and contain the corresponding data structures and relationships.
  - Interfaces that are common to all SDOs to monitor and configure the resource data of SDOs.
- Optional requirements
  - Model and interface for dynamic discovery of SDOs.
  - Common interface for reserving an SDO's utilization in order to gain an exclusive access to it.

2. Overview of SDO Specification

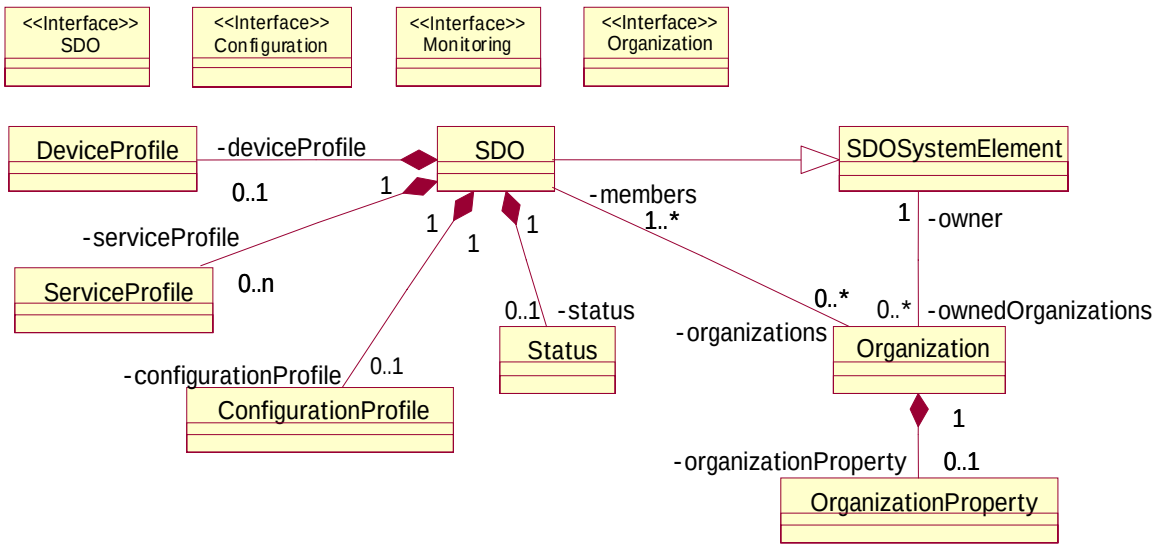
Design concept

- Common model for wrapping/adapting to heterogeneous standards
  - Resource data model
    - Core data structure and named values for extensible properties
  - Interface
    - Common management functions



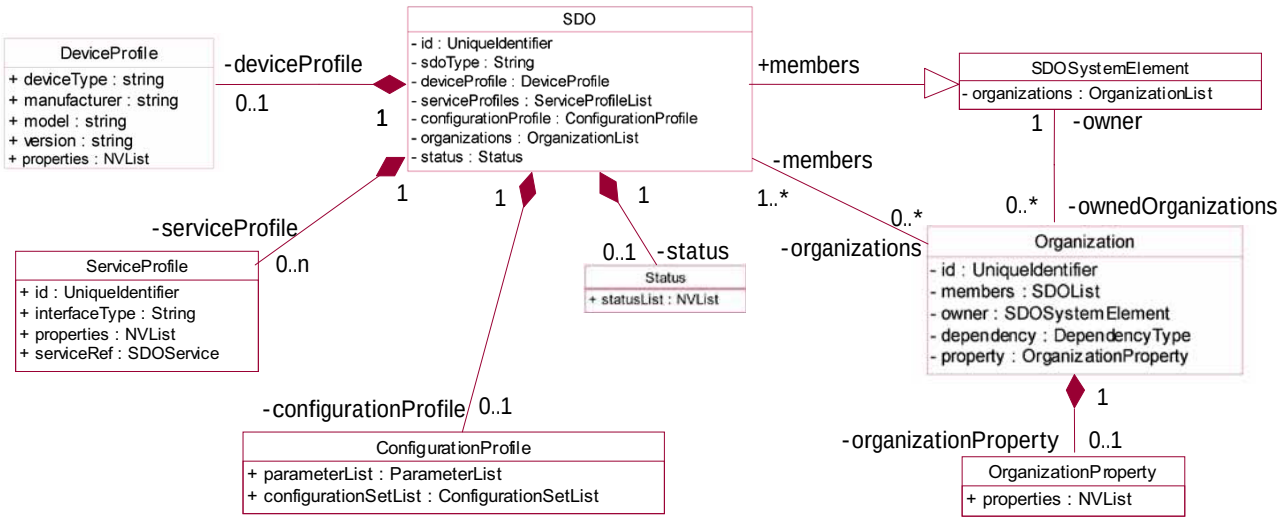
Overview

- Resource data model
  - Profiles, Status, and Organization
- Interface
  - SDO interface
    - reference point to other interfaces
    - mandatory for all SDO
  - Configuration and Monitoring interface



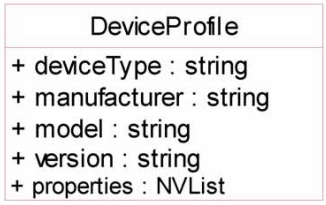
Resource data model

- Profile: data structure describing SDO's properties
- Status: internal data changed dynamically by each SDO
- Organization: mutual relationship among SDOs/non-SDOs

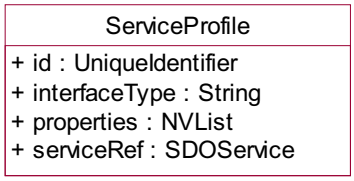


Profiles

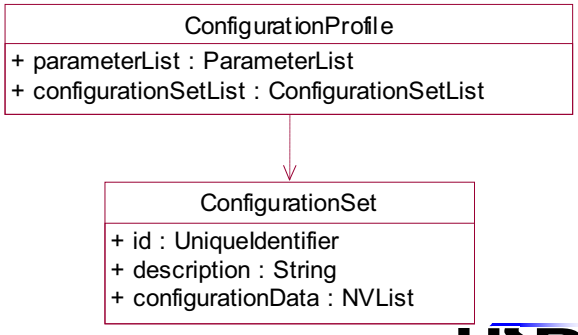
- Device profile
  - Hardware specific properties



- Service profile
  - functional properties

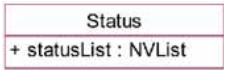


- Configuration profile
  - properties affecting the behavior of SDOs



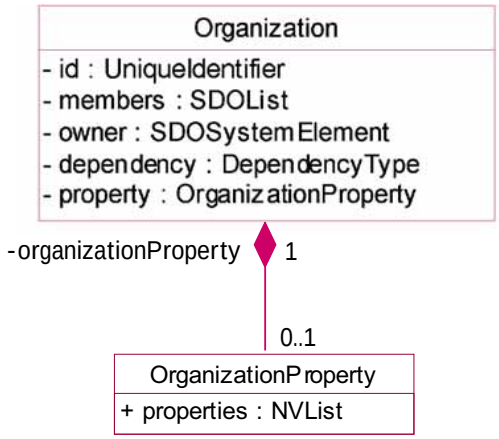
Status

- Contains internal properties
  - By named values



Organization

- Dependency among SDOs
  - Hierarchical representation of device and software component
- Relationship among SDOs and SDO-related objects
  - Factor causing relationship



Resource data model –example(1)

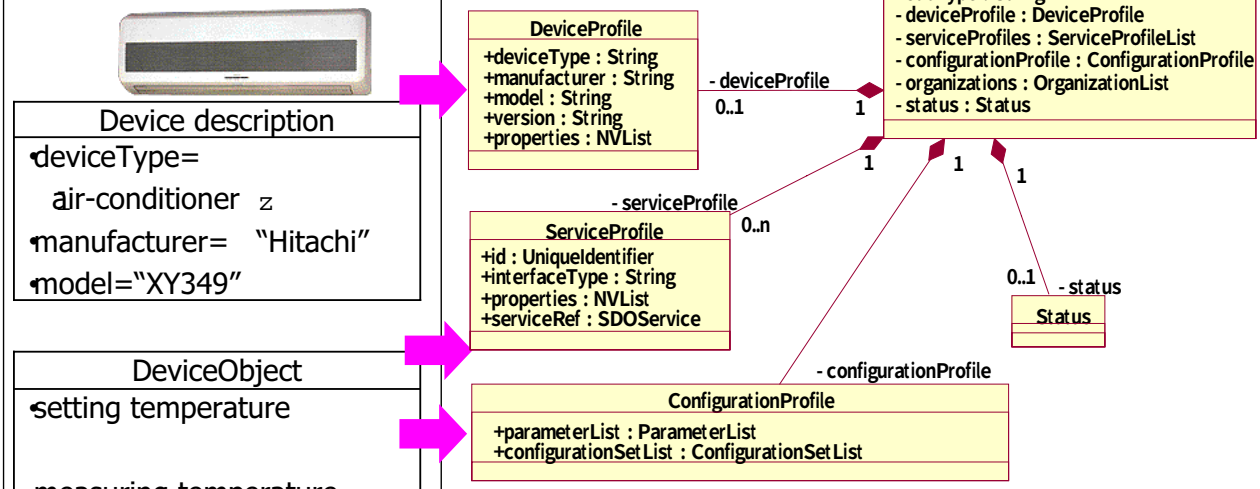
- Profiles and Status

【Example (device)】

Air-conditioner

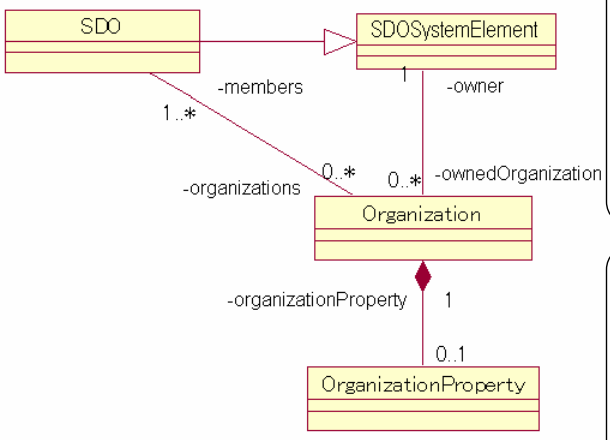
Device description
- deviceType= air-conditioner
- manufacturer= "Hitachi"
- model="XY349"

DeviceObject
- setting temperature
- measuring temperature
- on/off timer

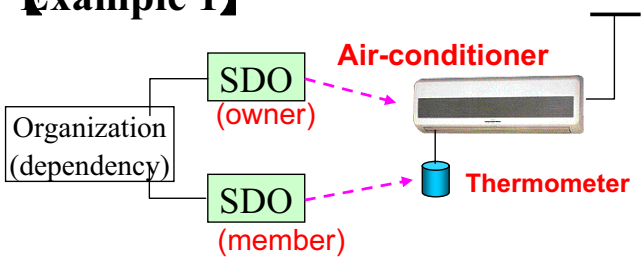


Resource data model –example(2)

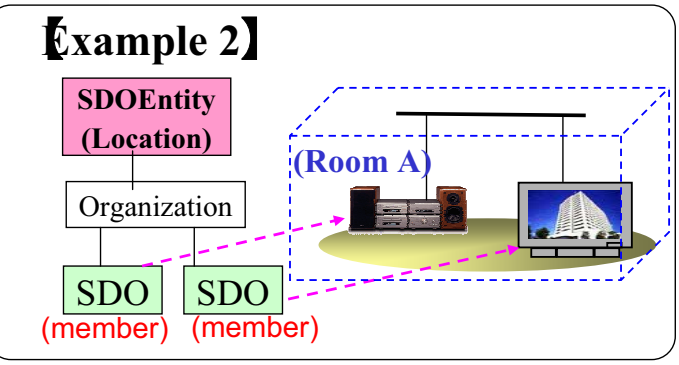
- Organization and SDOSystemElement



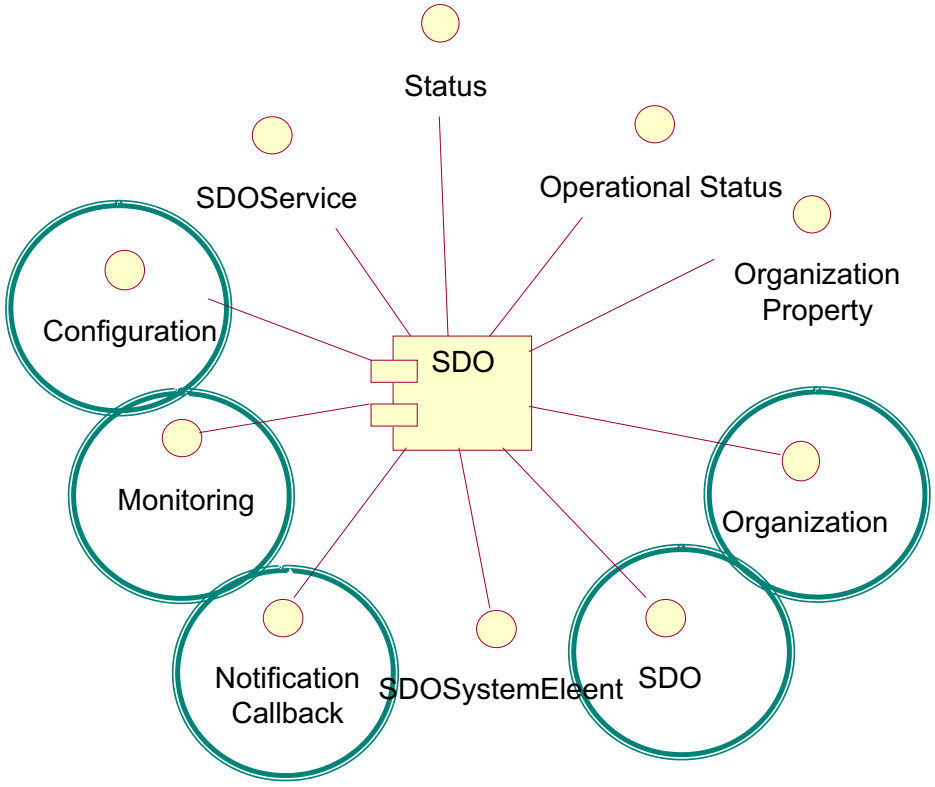
【Example 1】



【Example 2】

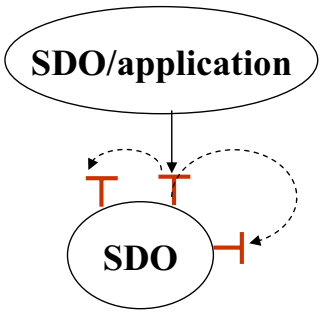


SDO Interfaces



Interfaces (1): SDO

- SDOInterface
  - Common reference point to navigate other interfaces and data structure/objects



Navigating to

SDO
+ getSDOID() : UniqueIdentifier
+ getSDOType() : String
+ getStatus(name : String) : any
+ getStatusList() : NVList
+ getDeviceProfile() : DeviceProfile
+ getServiceProfiles() : ServiceProfileList
+ getServiceProfile(id : UniqueIdentifier) : ServiceProfile
+ getSDOService(id : UniqueIdentifier) : SDOService
+ getConfiguration() : Configuration
+ getMonitoring() : Monitoring
+ getOrganizations() : OrganizationList

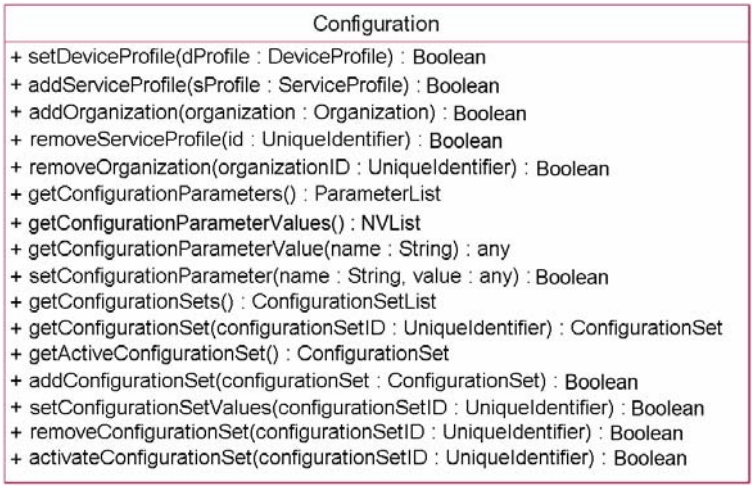
Data structures

SDOService (application dependent)

SDO functions

Interfaces (2): Configuration

- Configuring structure
  - Adding/removing
    - DeviceProfile, ServiceProfile, Organization
- Configuring parameters
  - Manipulation of ConfigurationProfile



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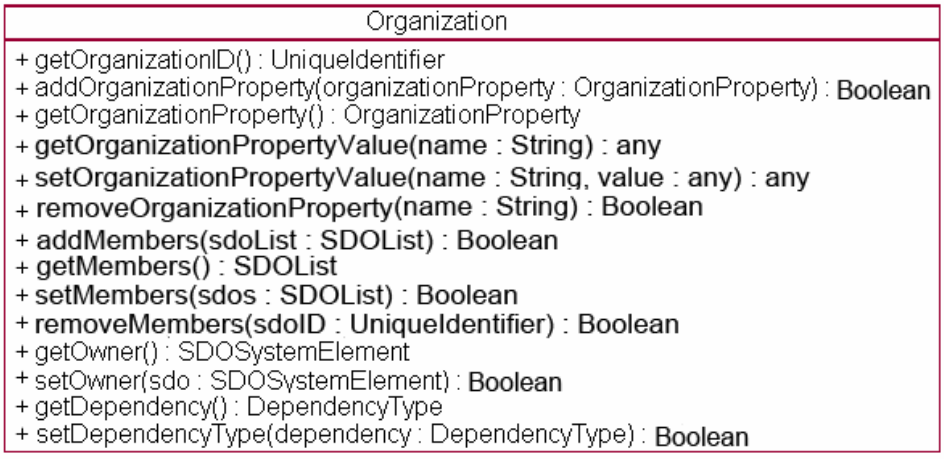
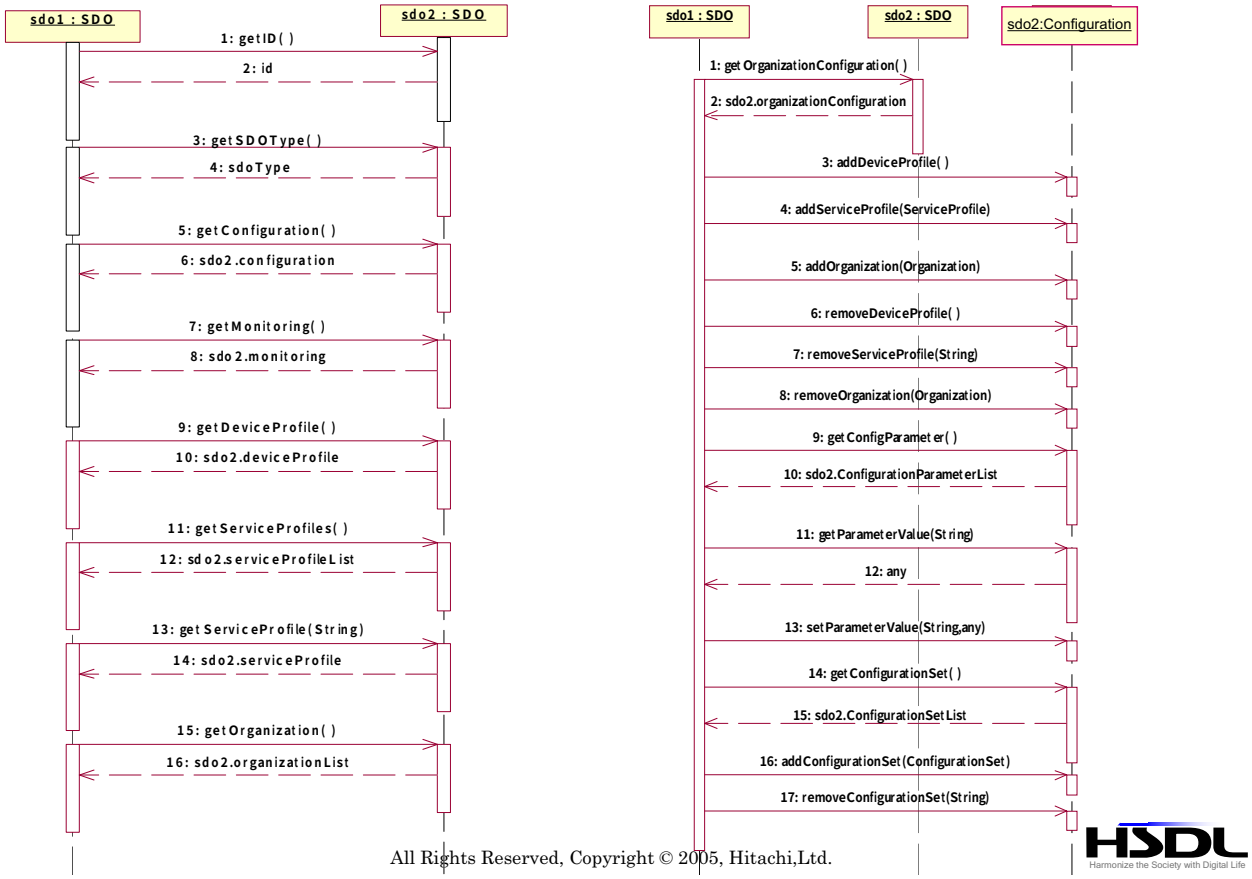
Interfaces (2): Configuration

- Configuring organization
  - Manipulation of organization among SDOs
  - Manipulation of organization among SDOs/non-SDO



Sequences



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Interface (4): Monitoring

- Monitoring interface
  - Monitoring of SDO properties
    - Status, ConfigurationProfile, and other parameters
    - Dependent on implementation
  - Monitoring type
    - Polling, subscription

Monitoring
+ getMonitoringParameterValue(name : String) : any + getMonitoringParameters( ) : ParameterList + getMonitoringParameterValues( ) : NVList + subscribe(data : NotificationSubscription) : Boolean + renewSubscription(subscriber:UniqueIdentifier, duration:unsigned long) :Boolean + unsubscribe(subscriber : UniqueIdentifier, names : StringList) : Boolean + unsubscribe(subscriber : UniqueIdentifier) : Boolean

NotificationCallback
+ notify(publisher : SDO, publisherID : UniqueIdentifier, currentStatus : NVList) : void

3. PSM mapping to other networking middlewares

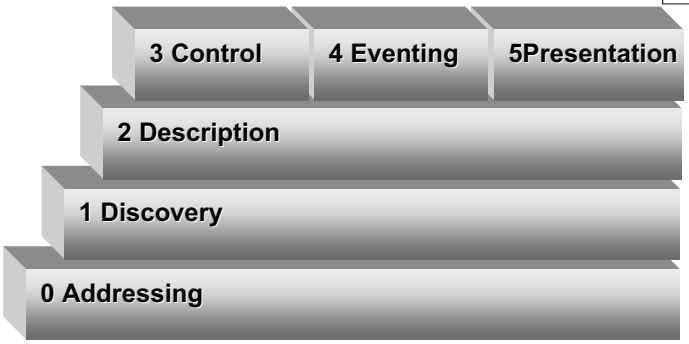
UPnP

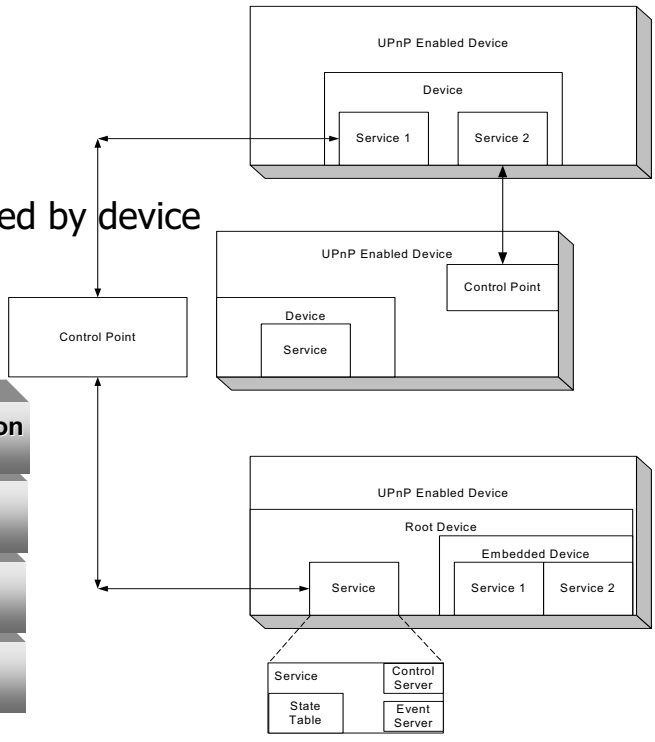
Webservice

ECHONET

PSM – UPnP overview

- PC connecting peripheral devices
- CSS architecture
  - Control point for client
  - Service for server
- Services
  - hosted by devices, device hosted by device
  - Action-arguments, state
- Protocol suites

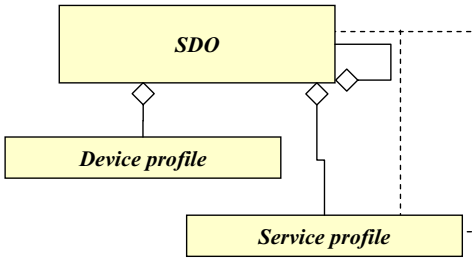




HSDL
Harmonize the Society with Digital Life

PSM - UPnP

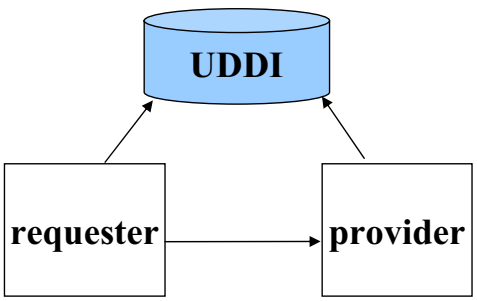
- Structural mapping

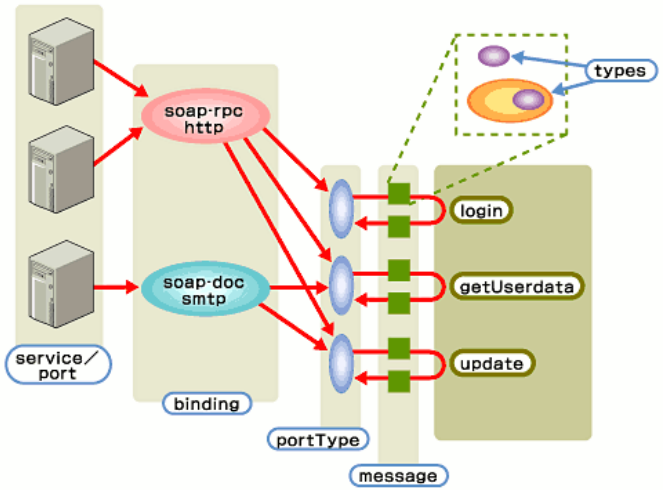



```
<?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
  <URLBase>base URL for all relative URLs</URLBase>
  <device>
    <friendlyName>short user-friendly title</friendlyName>
    <manufacturer>manufacturer name</manufacturer>
    <manufacturerURL>URL to manufacturer site</manufacturerURL>
    <modelDescription>long user-friendly title</modelDescription>
    <modelName>model name</modelName>
    <modelNumber>model number</modelNumber>
    <modelURL>URL to model site</modelURL>
    <serialNumber>manufacturer's serial number</serialNumber>
    <UDN>uuid:UUID</UDN>
    <UPC>Universal Product Code</UPC>
    <deviceType>urn:schemas-upnp-org:device:deviceType</deviceType>
    <serviceList>
      <service>
        <serviceType>urn:schemas-upnp-org:service:serviceType:v</serviceType>
        <serviceId>urn:upnp-org:serviceId:serviceID</serviceId>
        <SCPDURL>URL to service description</SCPDURL>
        <controlURL>URL for control</controlURL>
        <eventSubURL>URL for eventing</eventSubURL>
      </service>
      Declarations for other services (if any) go here
    </serviceList>
    <deviceList>Description of embedded devices (if any) go
here</deviceList>
    <iconList>
      <icon>
        <mimetype>image/format</mimetype>
        <width>horizontal pixels</width>
        <height>vertical pixels</height>
        <depth>color depth</depth>
        <url>URL to icon</url>
      </icon>
      XML to declare other icons, if any, go here
    </iconList>
    <presentationURL>URL for presentation</presentationURL>
  </device>
  <specVersion>
    <major>1</major> <minor>0</minor>
  </specVersion>
</root>
```


PSM – Webservice overview

- Broker model
  - UDDI directory
- Services are described by WSDL
  - Service/port: access URL
  - Binding: communication protocol (SOAP-RPC, HTTP, etc.)
  - Porttype: communication model (One-way, RR, Solicit, Notification)
  - Message: data structure
  - Types: data types

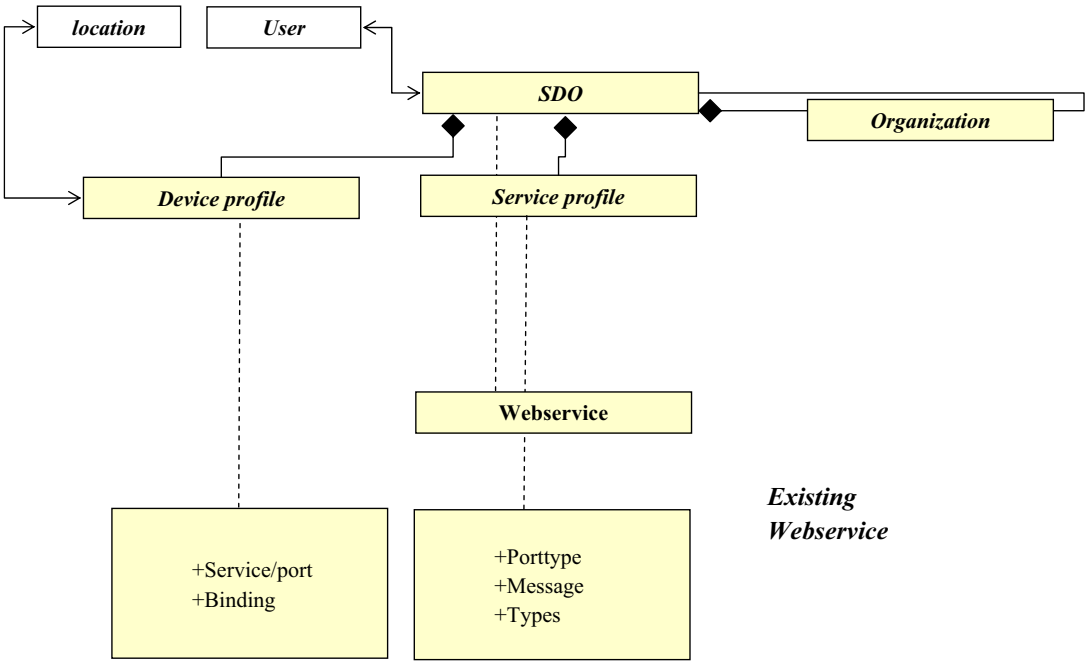




http://www.atmarkit.co.jp/fxml/rensai/soap04/soap04b.html

PSM - Webservice

- Mapping as a functional entry



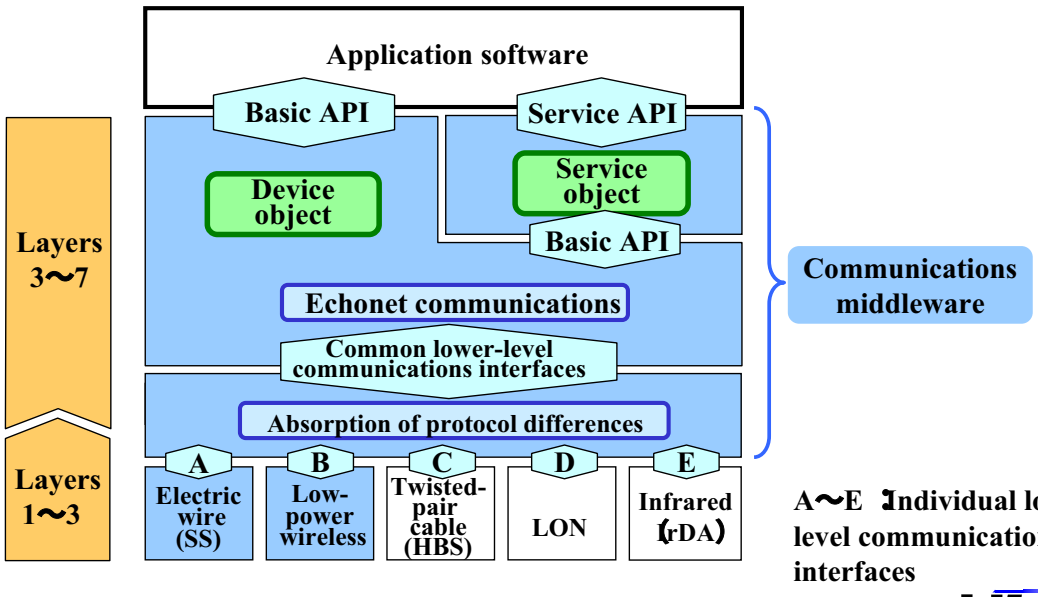
Mapping SDO to ECHONET

- What's ECHONET?
  - ECHONET connects home electric devices and supports home network.
  - The network by ECHONET uses power lines, radio frequency and infra-red to provide a low-cost implementation of data transmission without requiring additional wiring.
  - In Japan, ECHONET is becoming the defact standard.

Ref. http://www.echonet.gr.jp/english/index.html

Mapping SDO to ECHONET

- Architecture of ECHONET
  - Device object is abstraction of devices in home.
  - Service object is gateway object for outside of home.

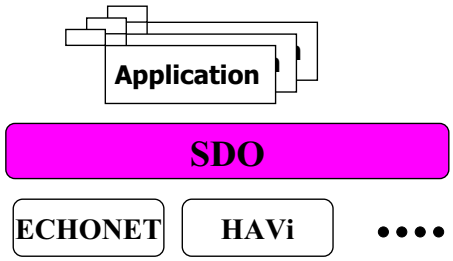


Mapping SDO to ECHONET

- In home, there are some platforms (e.g. HAVi) other than ECHONET.
- SDO can combine various platforms.

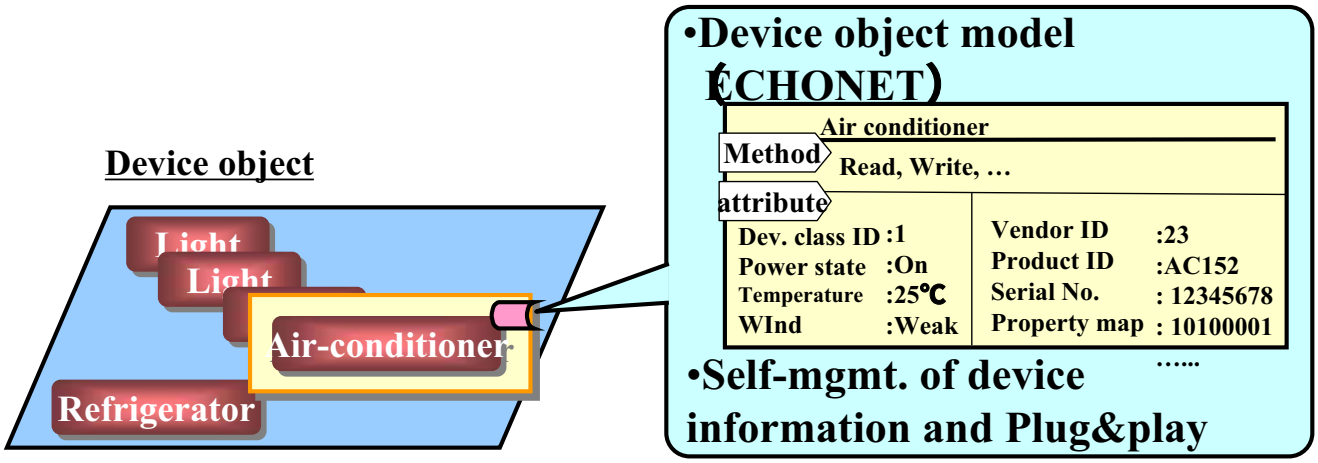
To use various devices for services

Cover the layer of ECHONET with SDO



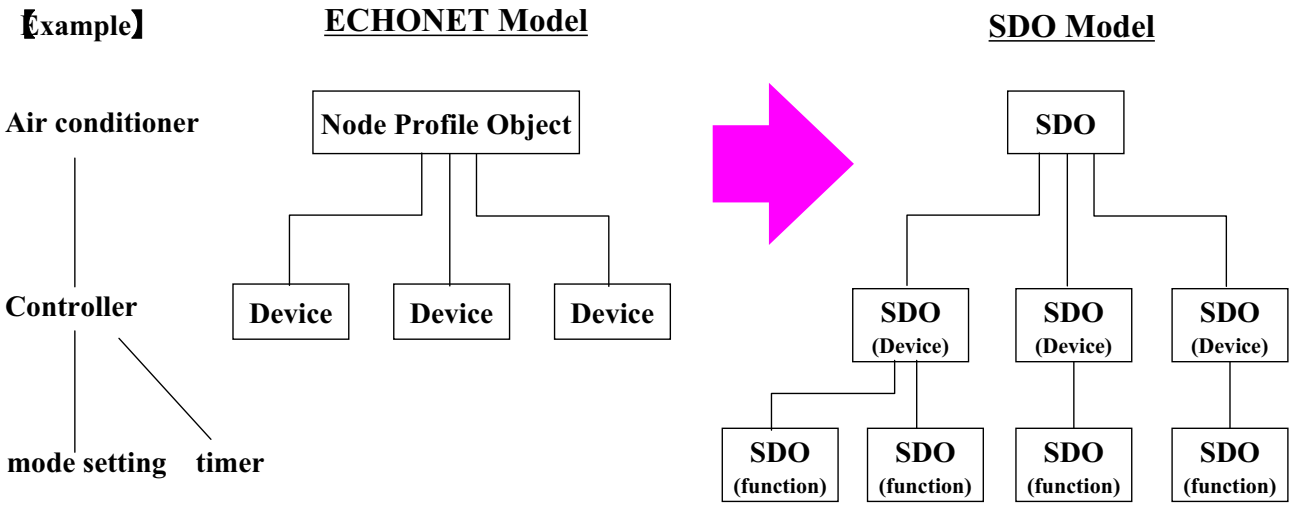
Mapping SDO to ECHONET

- Device Object
  - Devices in home are modeled as objects.
  - Device Object can be mapped to SDO.



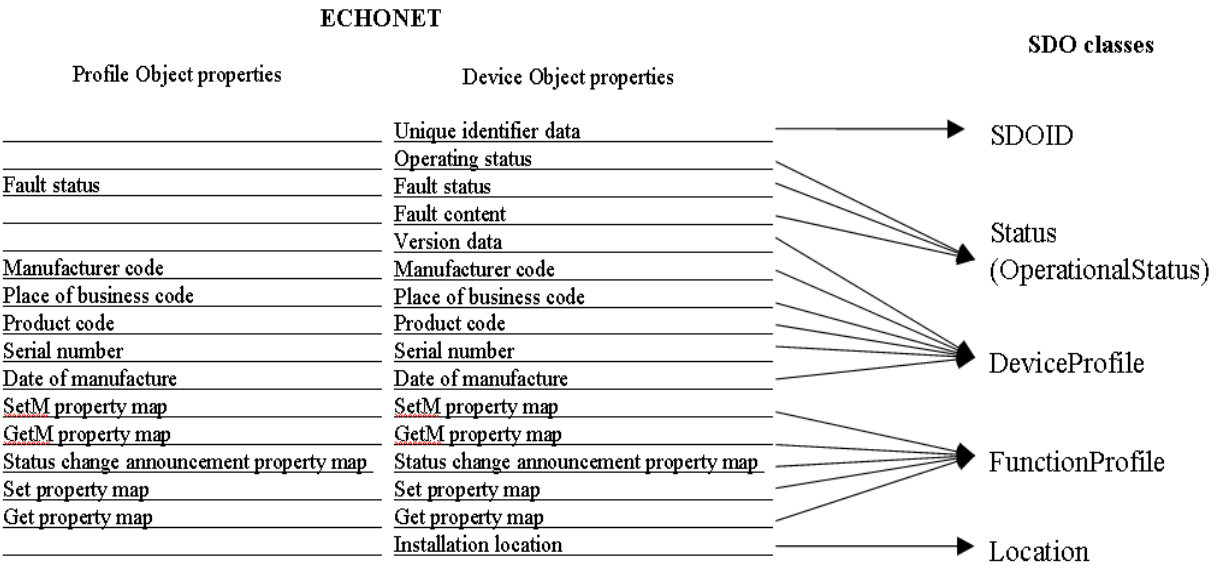
Mapping SDO to ECHONET

- Mapping SDO to ECHONET
  - Device and function are separated to use function as one of SDO.



Mapping SDO to ECHONET

- Mapping SDO to ECHONET
  - This figure is Mapping SDO to ECHONET in detail.



Future issues

- Concrete profiles for specific domain/devices?
  - Data model
  - Templates of application objects, etc.
- Binding features for specific application domains
  - Roaming, etc.
- UML profile for specific platforms
  - Inter-device networking platforms, etc.

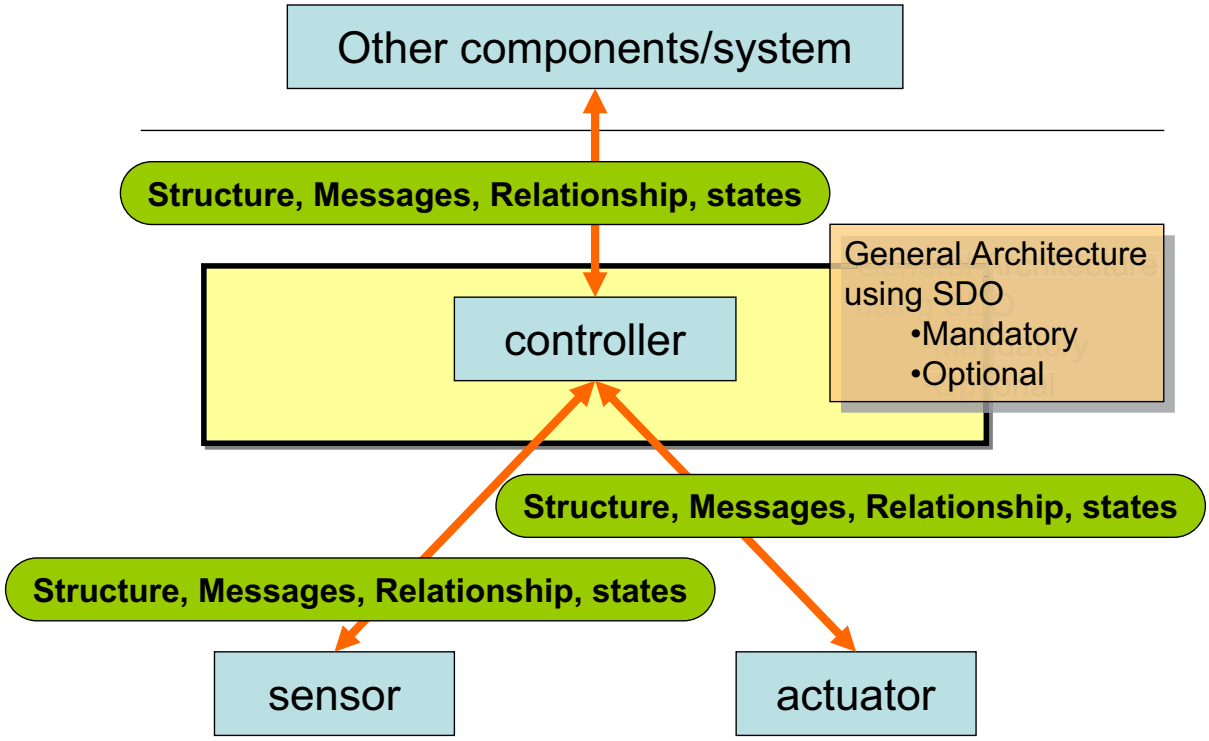
SDO and RTC (Robot Technology Components)

Takashi Suehiro
AIST, Japan
2005.4.11

What is Robot Technology

- Robot is a integration of Robot Technology functions
- Existence of hardware related components and software components
- Composition and cooperation of components
- Command flows and Data flows

Scope of Robotics in SDO



Purpose of RTC (Robot Technology Component) Specification

- Interoperability, compatibility and reusability of **abstract** Robot Objects
- General framework

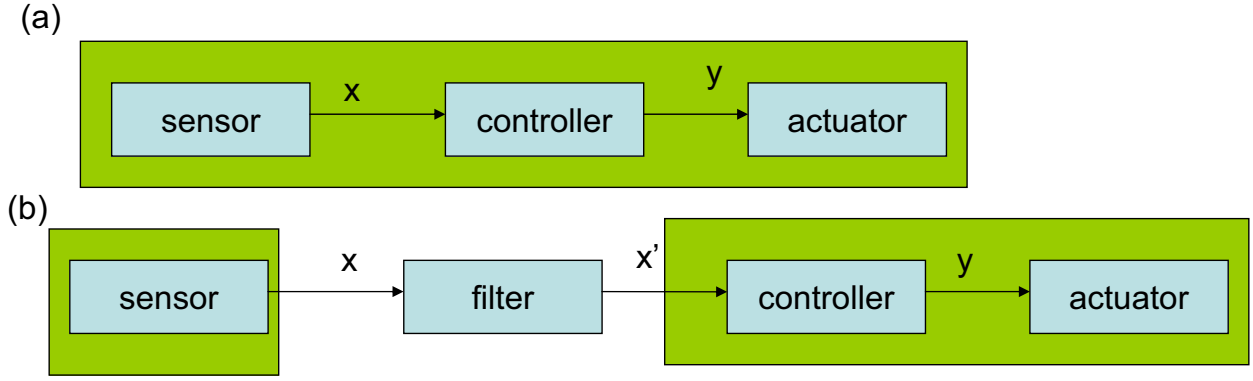
- Almost same as SDO specification

SDO

- Good Point for RTC
  - Specification of hardware related objects
  - Set of interfaces for a variety of services
  - SDO interface which navigates to every facility of objects.
- Lack of Specification for RTC
  - Too free to ensure interoperability
  - Description for ensuring interoperability
    - Vender, ...

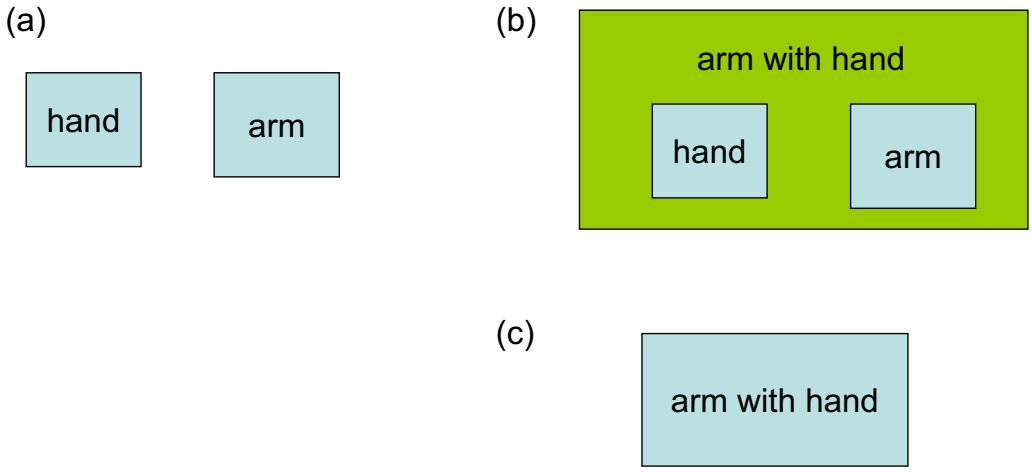
What is needed for interoperability of RTC (1)

- Interoperability in data flow
  - Access to data and access to RTC should be divided



What is needed for interoperability of RTC (2)

- Interoperability in command flow
  - Access to services and access to RTC should be divided



What is needed for interoperability of RTC (3)

- Specification of basic service of RTC
- Specification of RTC internal state

What is needed for interoperability of RTC (4)

- Divided description of RTC to which ensures interoperability and which expresses optional feature
- Simple discovery method for construction of composed RTC

What should not be specified

- Implementation dependent features
  - Real Time feature
  - Deployment
- Strongly application dependent features
  - Complex discovery method

RFP draft for Specification of PIM of RTC

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sdo/2005-04-04

Roadmap for Robotics Activities

robotics/05-04-06 & sdo/05-04-05

Item	Status	Burlingame Jan-2005	Athens Apr-2005	Boston Jun-2005	Atlanta Sep-2005	Burlingame Nov-2005	TBD Feb-2006	TBD May-2006	POC / Comment
Charter on Robotics WG in SDO	done								Kotoku(AIST), Mizukawa(Shibaura-IT)
SDO model for Robotics Domain	Planned		discussion	draft RFP	RFP			Initial Submittion	Suehiro(AIST), Sameshima(Hitachi), Kotoku(AIST)
SDO model for xxx Domain	no plan			discussion	draft RFP	RFP			??
Charter on Robotics SIG	done	issued							Kotoku(AIST), Mizukawa(Shibaura-IT)
Robotics Information Day [Technology Showcase]	pending	Showcase (US corp.)		?					Yokomachi(NEDO), Kotoku(AIST)
Robotics: Initial Survey [Clarification of Target Item]	Planned		discussion	draft RFI	RFI	RFI due Presentation		review RFI response	Lemaire, Chung, Lee, Mizukawa, Kotoku
									,
(Robot Middleware for Controller)	Future				Official Start of WG	draft RFP			to be discussed
(Robot Middleware for Specific Applications)	Future								to be discussed
(Robot Middleware Common Services)	Future								to be discussed
(Robot Middleware for Common Data Structures)	Future								to be discussed
etc…	Future								to be discussed

sdo/05-04-06

SDO

Super Distributed Objects

Date: Friday, 15th April, 2005
Reporting: Tetsuo Kotoku
Group email: sdo@omg.org

➢Highlights from this Meeting:

SDO Plenary (Mon.):

– Tutorial Talk (Mr. Sameshima, Hitachi) [sdo/05-04-03]

– RFP discussion (Dr. Suehiro, AIST) [sdo/05-04-04]

Joint Meeting with ManTIS (Tue.):

Joint Meeting with MARS/RTESS (Thu.):

SDO

Super Distributed Objects

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➢Future Deliverables (In-Process):

– **RFP (SDO model for Robotics** *(tentative)* **)**

➢Next Meeting (Boston, MA, USA):

– **RFP draft WG Meeting [Mon.]**

- SDO model applying to Robotics Domain (amend RFP draft)

– **Plenary Meeting [Tue.]**

- SDO model applying to Robotics Domain (review RFP draft)

SDO Meeting Minutes – Athens, Greece (sdo/2005-04-07)

OMG Documents Generated

sdo/2005-04-01 Final Agenda for Athens Meeting (Tetsuo Kotoku)
sdo/2005-04-02 Opening presentation (Tetsuo Kotoku)
sdo/2005-04-03 Invited Talk "History of SDO DSIG and Overview of PIM and PSM for SDO" (Shigetoshi Sameshima)
sdo/2005-04-04 RFP discussion "SDO and RTC (Robot Technology Components)" (Takashi Suehiro)
sdo/2005-04-05 SDO-DSIG and Robotics-DSIG Roadmap (Tetsuo Kotoku)
sdo/2005-04-06 DTC Report Presentation (Tetsuo Kotoku)
sdo/2005-04-07 Minutes of Athens Meeting (Tetsuo Kotoku)

Agenda

13:00-13:15 Welcome and Review SDO Agenda
13:15-14:30 Invited Talk: Introduction to SDO (Dr. Sameshima, Hitachi)
15:00-16:00 RFP discussion: SDO model for robotics (Dr. Takashi Suehiro)
16:00-16:30 Roadmap discussion
16:30-17:00 Next meeting agenda discussion

Minutes

11 April, Monday

Tetsuo KOTOKU, presiding co-chair
Meeting Week – Kick-off

- Meeting was called to order at 13:00
- Tetsuo Kotoku provided a brief guidance about SDO-DSIG.
  - ✓ sdo/2005-04-02 Opening presentation

Invited Talk "History of SDO DSIG and Overview of PIM and PSM for SDO"

- Shigetoshi Sameshima (Hitachi), the FTF chair of SDO specification, presented a brief history of SDO-DSIG and an overview of PIM and PSM for SDO.
  - ✓ sdo/2005-04-03 Invited Talk "History of SDO DSIG and Overview of PIM and PSM for SDO"

RFP discussion "SDO and RTC (Robot Technology Components)"

- Takashi Suehiro(AIST) presented the basic idea of RFP.
- Angelo Corsaro(AMS) asked its difference from CCM. Takashi Suehiro answered that CCM will be one of its implementation of Robotic SDO model.
- ***Action:*** Set up a working group (to draft RFP by 3 weeks before the Boston meeting).
  - ✓ sdo/2005-04-04 RFP discussion "SDO and RTC (Robot Technology Components)"

Roadmap Discussion

- Tetsuo Kotoku presented the Draft Roadmap.
- The roadmap was revised to keep the minimum public notification of RFP.
  - ✓ sdo/2005-04-05 SDO Roadmap

Meeting Wrap-up, Plan for Boston

- Tetsuo Kotoku presented the Draft Agenda for the next Boston meeting.
- SDO plenary meeting will be held on Tuesday.
  - ✓ sdo/2005-04-02 Opening presentation

ADJOURNED @ 16:30 pm
Prepared and submitted by Tetsuo Kotoku