Robotics Domain Task Force Final Agenda ver1.0.5 **robotics/2009-09-01**

OMG Technical Meeting - San Antonio, TX, USA -- Sept. 14-18, 2009

http://robotics.omg.org/

		TF/SIG				
		Host	Joint (Invited	Agenda Item	Purpose	Room
Monday: WG activites(pm)						
12:00	13:00			**LUNCH**		**Garden Terrace, 1st FL**
13:00	18:00			Architecture Board Plenary		**Chula Vista, Lobby Level**
13:00	13:45			Robotics Steering Committee	Arrangement	**Directors, 3rd FL(A)**
14:00	18:00			Robotic Infrastructure WG (4h) - Noriaki Ando(AIST) and Beom-Su Seo (ETRI)	discussion	**Pecos, 3rd FL(A)**
				Services WG(4h): User Identification Service RFP Meeting - Su-Young Chi (ETRI), and Toshio Hori (AIST)	discussion	**Directors, 3rd FL(A)**
Tuesday: WG activities and Robotics Plenary						
9:00	12:00			**Robotic Infrastructure WG (3h)** **- Noriaki Ando and Beom-Su Seo**	discussion	**Sequin, Losoya Conf Ctr**
				Services WG(3h): User Identification Service RFP Meeting - Su-Young Chi and Toshio Hori	discussion	**Maverick B, Losoya Conf Ctr**
12:00	13:00			**LUNCH**		**Garden Terrace, 1st FL**
13:00	13:15	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	**Maverick A, Losoya Conf Ctr**
13:15	14:00	Robotics		**Korean Trend in Science and Technology** **- TBA**	presentation and discussion	
14:00	14:45	Robotics		**Japanese Trend in Science and Technology** - **TBA**	presentation and discussion	
				Break (15min)		
15:00	16:30	Robotics		WG Reports and Discussion (Service WG, Infrastructure WG, Profiling Meeting)	presentation and discussion	
16:30	17:00	Robotics		Contact Reports: - Makoto Mizukawa(Shibaura-IT), and Young-Jo Cho(ETRI)	Information Exchange	
17:00	17:15	Robotics		Robotics-DTF Plenary Wrap-up Session (Roadmap and Next meeting Agenda)	Robotics plenary wrap-up	
17:15				Adjourn plenary meeting		
17:30	17:45			Robotics WG Co-chairs Planning Session (Preliminary Agenda for next TM, Draft report for Friday)	planning for next meeting	**Maverick A, Losoya Conf Ctr**
Wednesday WG activity follow-up						
9:00	12:00			Services WG(3h): User Identification Service RFP Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	**Maveric B, Losoya Conf Ctr**
12:00	14:00			**LUNCH and OMG Plenary**		**Regency East Bllrm, 2nd FL(B)**
14:00	18:00			**Robotic Infrastructure WG (2h)** **- Noriaki Ando and Beom-Su Seo**	discussion	**Maverick A, Losoya Conf Ctr**
				Services WG(4h): User Identification Service RFP Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	**Maveric B, Losoya Conf Ctr**
15:15	**15:45**	MARS		Joint Plenary with MARS - Robotic Configuration and Deployment - Noriaki Ando(AIST) and Beom-Su Seo (ETRI)	Information Exchange	**Pecan 3rd FL(A)**
18:00	20:00			**OMG Reception**		**Garden Terrace, 1st FL**
Thursday						
12:00	13:00			**LUNCH**		**Regency East Bllrm, 2nd FL(B)**
13:00	18:00			Architecture Board Plenary		**Chula Vista, Lobby Level**
Friday						
8:30	12:00			AB, DTC, PTC		**Regency East Bllrm, 2nd**
12:00	13:00			**LUNCH**		**Rio Grande East, 2nd FL(B)**

Other Meetings of Interest

Monday						
8:00	8:45	OMG		New Attendee Orientation		**Live Oak, 3rd FL(A)**
9:00	12:00	OMG		Tutorial - Introduction to OMG Specifications		
18:00	19:00	OMG		New Attendee Reception (by invitation only)		**Live Oak, 3rd FL(A)**
Tuesday						
7:30	9:00	OMG		Liaison ABSC		**Chula Vista, Lobby Level**
9:00	17:00	OMG		BPM-SOA Symposium		**Chula Vista, Lobby Level**
17:00	18:00	OMG		RTF-FTF Chair's Workshop		**Sequin, Losoya Conf Ctr**
Wednesday						
9:00	17:00	OMG		BPM-SOA Symposium		**Chula Vista, Lobby Level**
9:00	12:00	OMG		DoD Information on Relation to OMG		**Maverick A, Losoya Conf**
9:00	17:00	SA-PTF		System Assurance PTF		**Bowie C, Losoya Conf Ctr**
10:30	12:00	OMG		OMG Certification Program Overview		**Sequin, Losoya Conf Ctr**
Thursday						
9:00	12:00	LSR-DTF		Life Science Research DTF		**Brazos Brdrm**
9:00	17:00	SA-PTF		System Assurance PTF		**Bowie C, Losoya Conf Ctr**

Please get the up-to-date version from http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

Minutes of the Robotics DTF Plenary Meeting
March 23-27, 2009
Washington DC, USA
(robotics/2009-09-02)

Minutes Highlights

- **2 New Work Item Talks**
  - RTC directory service for interoperability between robotic software platforms(Kang-Woo Lee) [robotics/2009-03-06]
  - Modeling of risk assessment for service robots(Yoshihiro Nakabo) [robotics/2009-03-07]
- **1 Special Talk**
  - GearBox: Peer-reviewed open-source libraries for robotics(Geoffrey Biggs) [robotics/2009-03-08]
- **3 WG Reports [robotics/2009-03-09,-10,-11]**
- **2 Contact Reports [robotics/2009-03-12,-13]**
- **Preliminary agenda for upcoming meeting [robotics/2009-03-15]**

List of Generated Documents

robotics/2009-03-01 Final Agenda (Tetsuo Kotoku)
robotics/2009-03-02 Santa Clara Meeting Minutes [approved] (Geoffrey Biggs and Yeon-Ho Kim)
robotics/2009-03-03 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2009-03-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2009-03-05 Opening Presentation (Tetsuo Kotoku)
robotics/2009-03-06 RTC Directory Service for Interoperability between Robotic Software Platform (Kang-Woo Lee)
robotics/2009-03-07 Modeling of Risk Assessment for Service Robot (Yoshihiro Nakabo)
robotics/2009-03-08 GearBox: (Geoffrey Biggs)
robotics/2009-03-09 Robotic Functional Services WG Report (Su-Young Chi)
robotics/2009-03-10 Infrastructure WG Progress Report (Noriaki Ando)
robotics/2009-03-11 Robotic Localization Service FTF Report (Jaeyeong Lee)
robotics/2009-03-12 Contact Report: Korea Intelligent Robot Standard (Young-Jo Cho)
robotics/2009-03-13 Contact Report: ISO/TC184/SC2 (Tetsuo Kotoku)
robotics/2009-03-14 Wrap-up Presentation (Tetsuo Kotoku)
robotics/2009-03-15 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2009-03-16 DTC Report Presentation (Young-Jo Cho)
robotics/2009-03-17 Washington Meeting Minutes - DRAFT (Geoffrey Biggs and Beom-Su Seo)

MINUTES

Tuesday, March 24, 2009, Suite 1808, 18th Floor

09:00 – 09:45 Steering Committee

Tuesday, March 24, 2009, Kennedy, 3rd Floor

13:05 – 13:15 Robotics DTF Plenary Meeting, Chair: Dr Kotoku, Quorum: 4

Joined Organizations: AIST, ETRI, JARA, Shibaura-IT, Technologic Arts, Univ. of Tsukuba

- Minutes takers: Geoffrey Biggs and BeomSu Seo
- Approval of minutes of Santa Clara meeting
  Approved: AIST (motion), Shibaura-IT (second), Technologic Arts (white ballot) .

13:15 – 13:55 RTC Directory Service for Interoperability between Robotic Software Platforms,

Kang-Woo Lee, ETRI

- Benefits of RTC Directory:
- Content-based component addressing
- Content-based component tracking
- Used in component assembly, it enables an application to be more reconfigurable
- Current status
- No relevant specification in Robotics DTF
- OpenRTM-aist uses CORBA naming service
- Related OMG standards are CORBA naming service and CORBA trading service
- Two considerations for interoperability of RTCs:
- Searching for the right RTC from diverse RTMs
- Combining them into a robot application

13:55 – 14:45 Special talk: Modelling of Risk Assessment for Service Robots, Yoshihiro Nakabo, AIST

- Socially-accepted safety technology is required (new products may need almost zero risk).
- No fundamental safety principles for service robots, unlike industrial robots.
- ISO/IEC Guide 51 standard for safety of machinery.
- ISO12100 Safety of Machinery
- ISO14121 Risk Assessment
- IEC61508 Functional Safety
- Propose object-oriented modelling robot safety.
- Model all processes and safety-related concepts using UML.
- Propose standardising the UML model in OMG.

15:15 – 15:45 Special talk: GearBox: Peer-reviewed open-source libraries for robotics , Geoffrey Biggs, AIST

- Software reusability on more than one level.
- GearBox: a collection of libraries of functional robot software.
- GearBox libraries can be used by frameworks.
- Reusable libraries – Unix-like model of development

15:50 – 16:30 User Recognition Service WG report

- Structure of proposed standard
- Differences from BioAPI
- Continuous operation vs single time operation
- Multi-user vs single user
- Uncontrolled environment vs controlled environment
- User ID and position vs User ID
- Active vs passive
- Still disagreement from Dr Nishio about the need for this standard and if it is sufficiently different from the localization standard.

16:30 – 16:45 Infrastructure WG report

- Chose keywords for RFP scope.
- Deployment, configuration, QoS, fault tolerance, directory service.

- Title: "RTC Container RFP"
- Use case discussion.
- Will perform a Related Topics Survey for directory and deployment services.
- Roadmap: Aiming for 1st review of RFP in San Antonio, 2nd review in Long Beach.

16:45 – 16:55 Robotic Localization Service WG report
- So far, 76 issues raised. 2 issues still unresolved.
- Aiming for Architecture Board at Costa Rica meeting.

16:55 – 17:05 Contact report by Young-Jo Cho
- Korea Intelligent Robot Standard Forum

17:05 – 17:20 Contact report by Tetsuo Kotoku
- ISO/TC184/SC2 working group meeting in Orlando.
- Motion to create official liason with SC2 .
  ETRI (second), Shibaura-IT (white ballot), motion passed.

Closing presentation and next meeting agenda by Tetsuo Kotoku
- Call for volunteers
- Next meeting: June 23-27, San Jose, Costa Rica

Adjourned plenary meeting at 17:30

ATTENDEE (15 Participants)
- Beom-Su Seo (ETRI)
- Geoffrey Biggs (AIST)
- Hyun Kim (ETRI)
- Itsuki Noda (AIST)
- Makoto Mizukawa (Shibaura-IT)
- Noriaki Ando (AIST)
- Shuichi Nishio (JARA/ATR)
- Su-Young Chi (ETRI)
- Takashi Tubouchi (Univ. of Tsukuba)
- Takeshi Sakamoto (Technologic Arts)
- Tetsuo Kotoku (AIST)
- Toshio Hori (AIST)
- Yeon-Ho Kim (Samsung)
- Young-Jo Cho (ETRI)
- Yoshihiro Nakabo (AIST)

Prepared and submitted by Geoffrey Biggs (AIST) and Beom-Su Seo (ETRI).

Minutes of the Robotics DTF Plenary Meeting
June 22-26, 2009
Real InterContinental Hotel & Club Tower
San Jose, Costa Rica
(robotics/2009-09-03)

Minutes Highlights

1) **Because the swine flu continues to spread all over the world, most of our volunteers are NOT able to come to the meeting.**
2) **We decided all the process of WG activities bring forward to the San Antonio meeting in September.**
3) **We have one Special talk of Dr. Miwako Doi (Toshiba).**

List of Generated Documents

robotics/2009-06-01 Final Agenda (Tetsuo Kotoku)
robotics/2009-06-02 Behavior Classification for Lifestyle Support Service (Miwako Doi)
robotics/2009-06-03 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2009-06-04 DTC Report Presentation (Tetsuo Kotoku)
robotics/2009-06-05 Cosata Rica Meeting Minutes - DRAFT (Tetsuo Kotoku)

MINUTES
Wednesday, June 24, 2009, Jacaranda 2

Robotics DTF Plenary Meeting, Chair: Dr. Kotoku, Quorum: 4
Joined organizations: AIST, JARA, Thales, Toyo Univ., Univ. of Tsukuba
13:00 – 13:40 Special talk: Behavior Classification for Lifestyle Support Service, Dr. Miwako Doi, Toshiba

- Brief introduction of the Network Robot Project in Japan
- Robotic Localization Service (RLS) specification supports “Who”, “Where”, and “When” data as a uniform manner.
- We need “What” data ,“the context” for the robot-human interaction
- New trends of behavior estimation in industry
- Some examples of behavior classification
- Proposal for new behavior classification for the service robots
- Discussion of the ontology technology, the RoLo Architecture and the behavior classification

13:40-14:15 Free Discussion

- Brief introduction of robotic projects in Europe.
- Shuichi proposed to organize a workshop for the outreach activity.
- Next meeting: Sept. 14-18, 2009 at San Antonio

Adjourned plenary meeting at 14:15

Attendee: 6 Participants

- Kenji Hirata (Toyo Univ.)
- Laurent Rioux (Thales)
- Miwako Doi (Toshiba)
- Shuichi Nishio (JARA/ATR)
- Takashi Tubouchi (Univ. of Tsukuba)
- Tetsuo Kotoku (AIST)

Prepared and submitted by Tetsuo Kotoku (AIST).

Robotics Domain Task Force
Steering Committee Meeting

14th September, 2009

San Antonio, TX, USA

Hyatt Regency San Antonio

Washington DC Meeting Summary

Robotics Plenary: (15 participants)

- **2 New Work Item Talks**
  - **RTC directory service for interoperability between robotic software platforms(Kang-Woo Lee) [robotics/2009-03-06]**
  - **Modeling of risk assessment for service robots(Yoshihiro Nakabo) [robotics/2009-03-07]**
- **1 Special Talk**
  - **GearBox: Peer-reviewed open-source libraries for robotics(Geoffrey Biggs) [robotics/2009-03-08]**
- **3 WG Reports [robotics/2009-03-09,-10,-11]**
- **2 Contact Reports [robotics/2009-03-12,-13]**
- **Preliminary agenda for upcoming meeting [robotics/2009-03-15]**

Costa Rica Meeting Summary

- **Because the swine flu continues to spread all over the world, most of our volunteers are NOT able to come to the meeting.**
- **We decided all the process of WG activities bring forward to the San Antonio meeting in September.**

Robotic Localization Service FTF

- **RLS final report was recommended in AB and DTC**

Robotics Plenary: (6 participants)

- **One Special Talk**
  - **Behavior Classification for Lifestyle Support Service, Dr. Miwako Doi (Toshiba) [robotics/2009-06-02]**
- **Preliminary agenda for upcoming meeting [robotics/2009-06-03]**

Agenda

- Agenda Review
- Minutes and Minutes Taker
- Roadmap Discussion
- Next meeting Schedule

Agenda Review

Mon(Sep. 14th):

Steering Committee

WG activities(PM): Service WG, Infrastructure WG

Tue(Sep. 15th):

WG activities(AM) Service WG, Infrastructure WG

UML Profiling Meeting: CANCELED

Robotics-DTF Plenary (PM)

Wed(Sep. 16th):

WG activity: Service WG

Joint Plenary with MARS (16:00-16:30)

please check our up-to-date agenda
http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

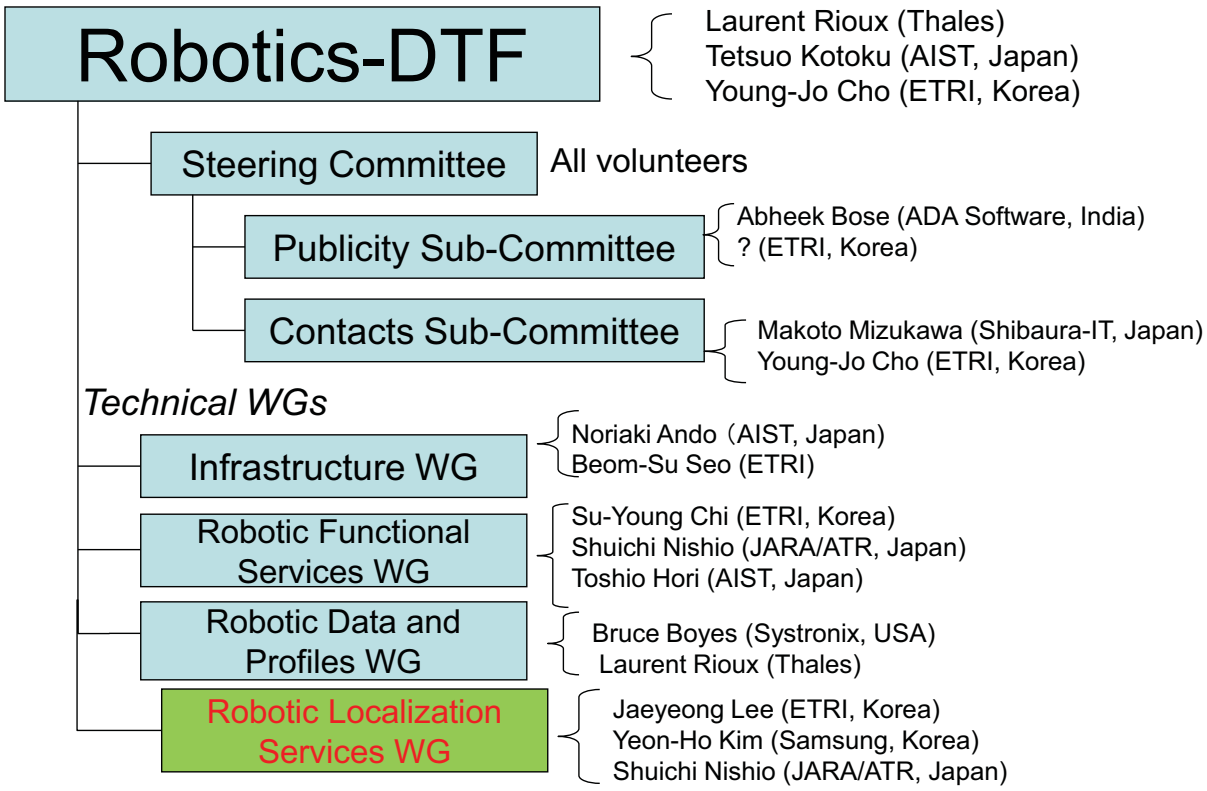
Minutes and Minutes Taker

- Process:
  - Make a draft with in 5days
  - Send the initial draft to robotics-chairs@omg.org
  - Post the draft to the OMG server within a week
  - Make an announcement to robotics@omg.org
  - Send comments to robotics@omg.org
  - Approve the revised minutes at the Next meeting

- Volunteers for this Meeting
  - Yoshihiro Nakabo
  - MyungEun Kim

We have to post our meeting minutes within a week!

Organization



AIST

Roadmap Discussion

- Confirm the process of working items
- Create new items
  (we need volunteers)

Next Meeting Agenda

Dec 7-11(Long Beach, CA, USA)

Tuesday:

WG activity [Parallel WG Session]
- Service WG
- Infrastructure WG

Wednesday:

Steering Committee (morning)

WG activity [Parallel WG Session] (am)
- Service WG
- Infrastructure WG
- UML Profiling Meeting

Robotics-DTF Plenary Meeting (pm)
- Guest and Member Presentation
- Contact reports

Thursday:

WG activity follow-up [if necessary]
- Service WG
- Infrastructure WG
- UML Profiling Meeting

Special Talk Candidates

- Introduction to DDS by Rick?

Call for Presentation

Roadmap for Robotics Activities

robotics/2009-09-05

Item	Status	San Jose, Costa Rica Jun-2009	San Antonio, TX Sep-2009	Long Beach, CA Dec-2009	Jacksonville FL Mar-2010	Minneapolis MN Jun-2010	Cambridge MA Sep-2010	POC / Comment
Flyer of Robotics-DTF [Publicity Sub-Committee]	**Suspended**							Abheek(ADA Software)
User Identification Service RFP [Robotic Functional Services WG]	**In Process**		**discussion**	**1st review RFP**	**2nd Review & RFP issue**		**Initial Submittion**	Su-Young Chi (ETRI)
RTC deployment and dynamic reconfiguration RFP(tentative) [Robotic Infrastructure WG]	**In Process**		**discussion**	**1st review RFP**	**2nd Review & RFP issue**		**Initial Submittion**	
UML profile for Archtecture Framework for Robotics/Unmanned Systems [Robotic Data and Profiles WG]	**Planned**							
The QoS and Fault-tolerance Issues on the Robot Component Execution Enviornment [Robotic Infrastructure WG]	**Planned**							
Robotic Map Services RFP [Robotic Functional Services WG	**Planned**							
Hardware-level Resources: define resource profiles RFP [Profile WG]	**Future**							
etc…	**Future**							
Robotics Information Day [Technology Showcase]	**Future**							
RLS Finalization Task Force	**done June-2009**	Report						

Related Events

Deployment and Configuration in OMG CORBA Component Model

National Institute of Advanced Industrial Science and Technology
Noriaki Ando

Robotics DTF, Infra. WG
robotics/2009-09-06

Outline

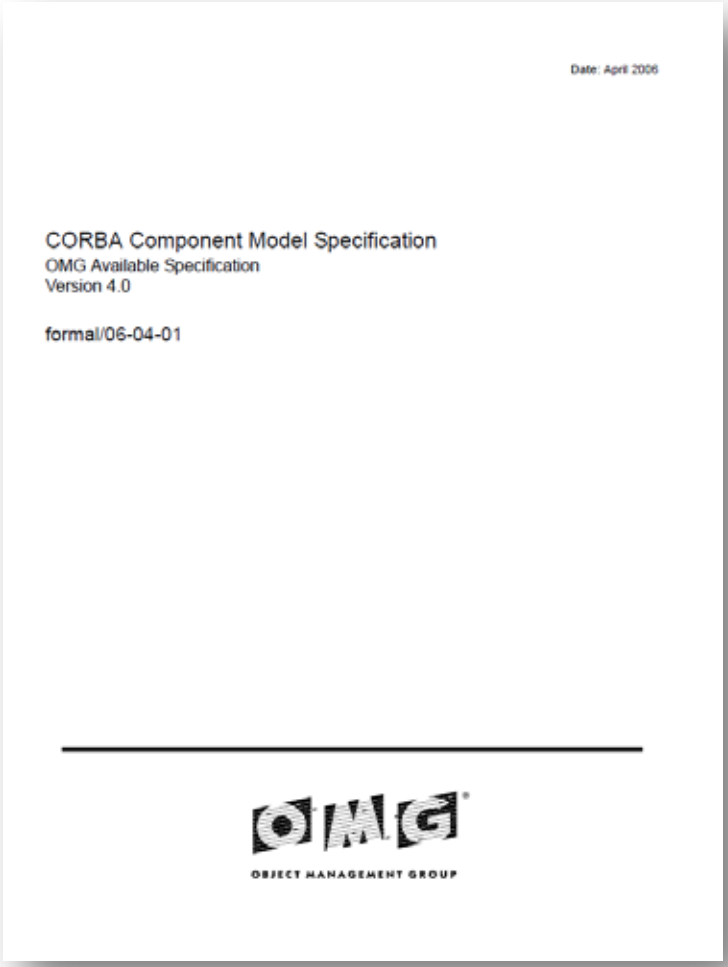
- About CORBA CCM
- Descriptors in CCM
- Packaging
- Implementation example: OpenCCM
- Summary

A CORBA Component is …

- A component is specified.
- A component is implemented.
- A component is packaged.
- A component may be assembled with other
- components (usually in a design tool).
- Components and assemblies are deployed.

CORBA CCM

- Describes client view of component; surface features
  - facet/receptacle
  - event sink/source
  - attributes
  - container
- Extensions to IDL
  - map to equivalent pre-component (retro) IDL


Date: April 2006

CORBA Component Model Specification
OMG Available Specification
Version 4.0

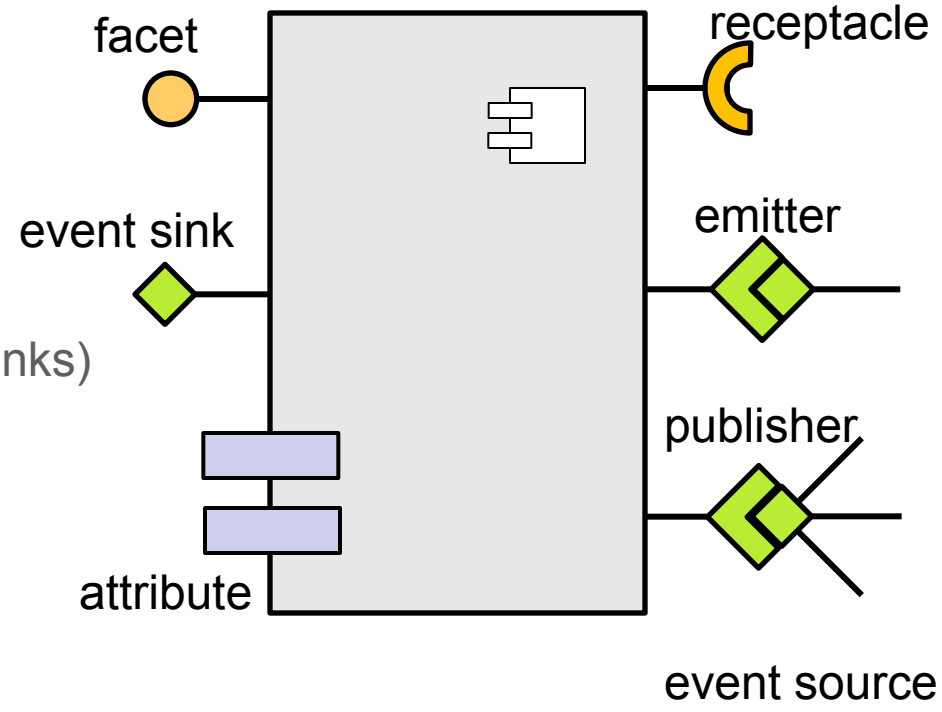
formal/06-04-01

OMG
OBJECT MANAGEMENT GROUP

CORBA Component Model Specification Version 4.0, formal/06-04-01

Component Model

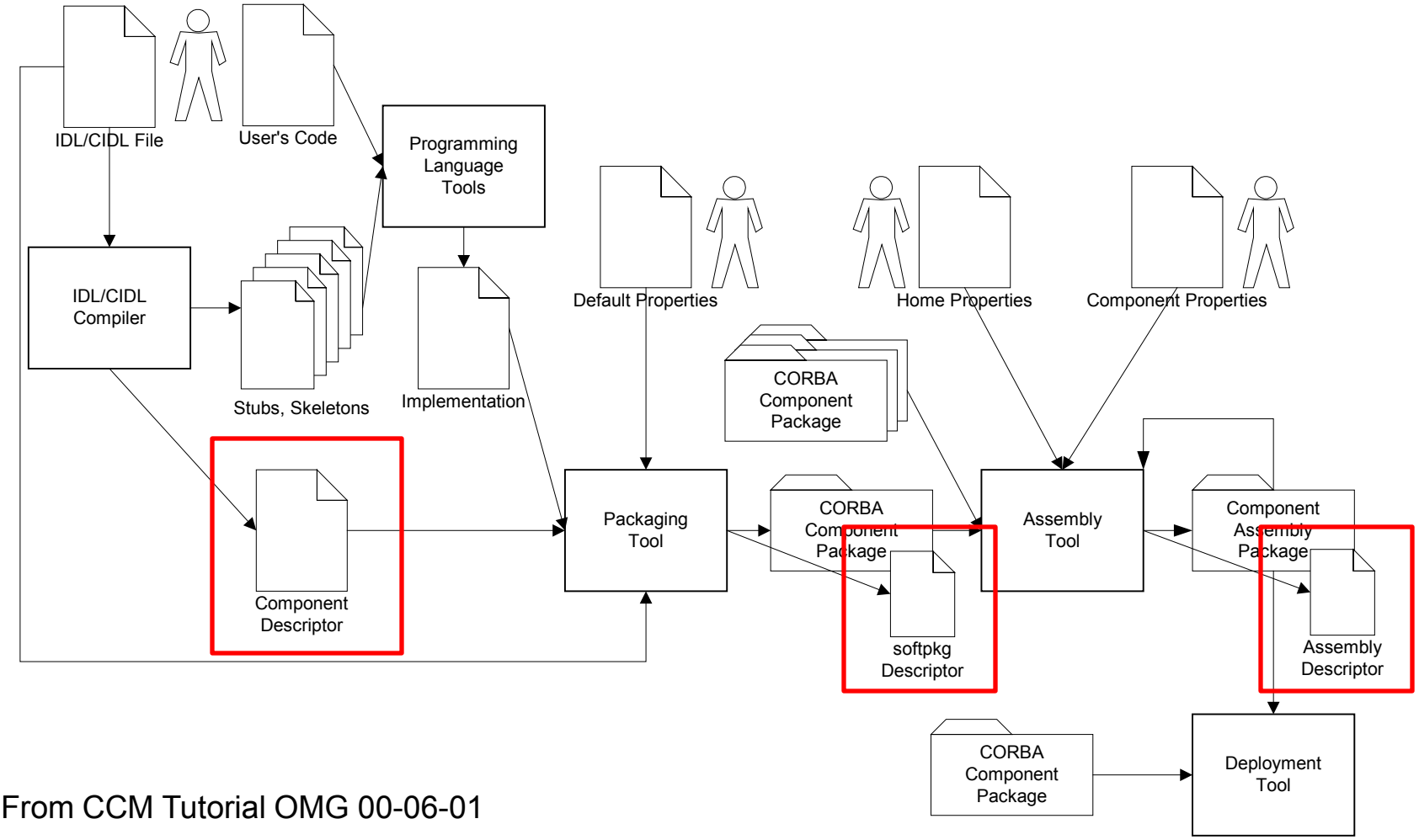
- Facets
  - Provided interface
- Receptacles
  - Required interface
- Attributes
- Event sources
  - Publisher (push to many sinks)
  - Emitter (push to one sink)
- Event sinks



CCM Lifecycle

- A component is specified in IDL and CIDL.
- A component is implemented.
- A component is packaged.
- A component may be assembled with other components (usually in a design tool).
- Components and/or assemblies are deployed.

The Big Picture



From CCM Tutorial OMG 00-06-01

Descriptors for CCM

- Component Package Descriptor (.cpd)
- Component Implementation Descriptor (.cid)
- Implementation Artifact Descriptor (.iad)
- Component Interface Descriptor (.ccd)
- Domain Descriptor (.cdd)
- Deployment Plan Descriptor (.cdp)
- Package Configuration Descriptor (.pcd)
- Toplevel Package Descriptor (.tpd)

CORBA Component Model, v4.0, formal/06-04-01

IDL & XML PIMs are provided

XML schema: CORBA Component Model, v4.0 formal/07-02-02
IDL definition: CORBA Component Model, v4.0 IDL formal/07-02-01

Component Package Descriptor

```
struct ComponentPackageDescription {
   string label;
   string UUID;
   ComponentInterfaceDescription realizes;
   Properties configProperty;
   PackagedComponentImplementations implementation;
   Properties infoProperty;
};
```

Component Implementation Descriptor

```
struct ComponentImplementationDescription {
    string label;
    string UUID;
    ComponentInterfaceDescription implements;
    ComponentAssemblyDescriptions assemblyImpl;
    MonolithicImplementationDescriptions monolithicImpl;
    Properties configProperty;
    Capabilities capability;
    ImplementationDependencies dependsOn;
    Properties infoProperty;
};
```

Deployment Plan Descriptor

```
struct DeploymentPlan {
    string label;
    string UUID;
    ComponentInterfaceDescription realizes;
    MonolithicDeploymentDescriptions implementation;
    InstanceDeploymentDescriptions instance;
    PlanConnectionDescriptions connection;
    PlanPropertyMappings externalProperty;
    ImplementationDependencies dependsOn;
    ArtifactDeploymentDescriptions artifact;
    Properties infoProperty;
    PlanLocalities localityConstraint;
};
```

Description groups

- Roughly four descriptor groups
  - Component
  - Package
  - Assembly
  - Deployment

Each description is related each other

Component Packaging

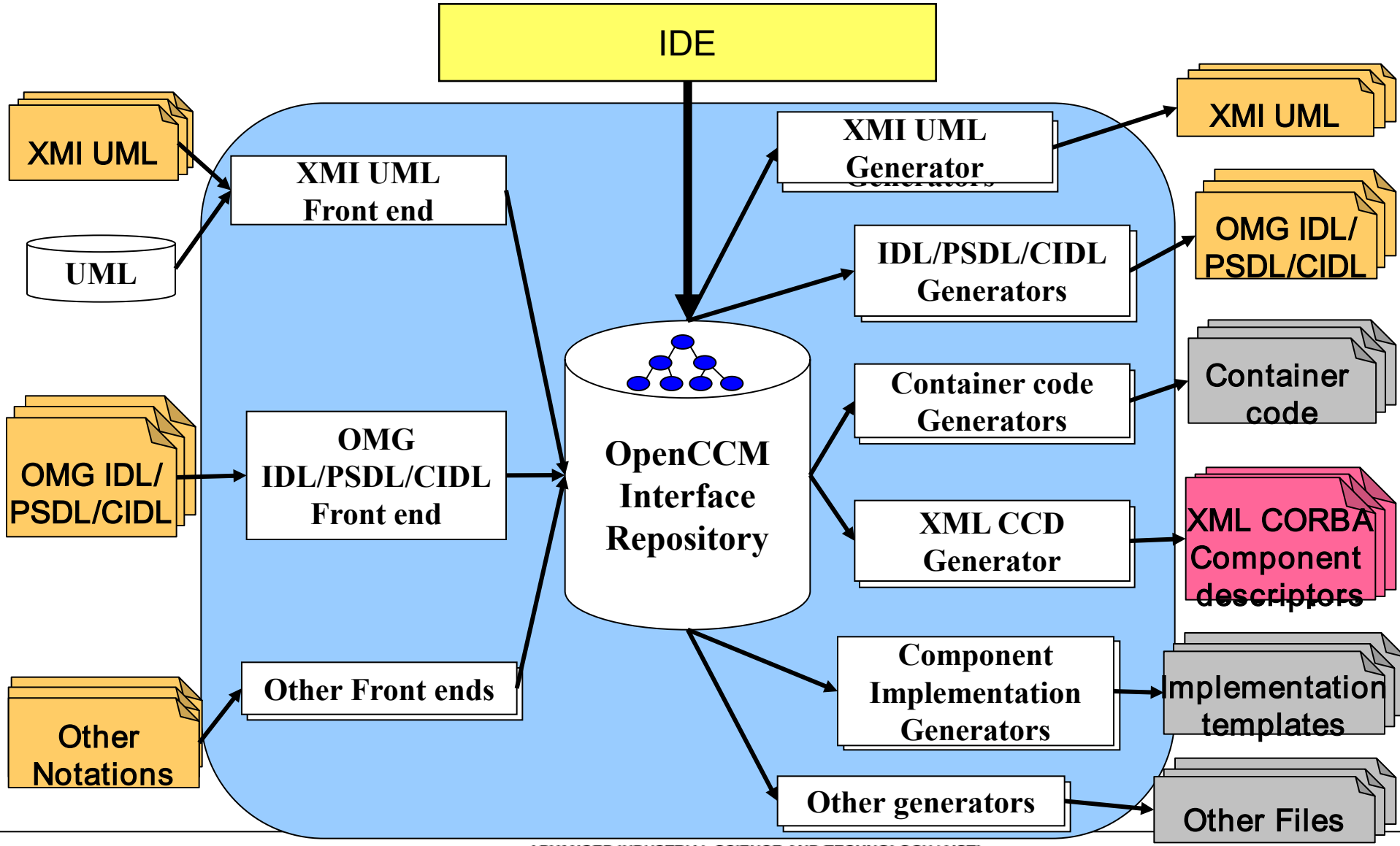
- A CORBA component is, among other things, a unit of deployment.
- A packaged component may be deployed alone or in conjunction with other components in a component assembly.
- Two types of archive files are specified, one for components and the other for assemblies.
- These archive files are ZIP format files.

CCM Implementation (OpenCCM)

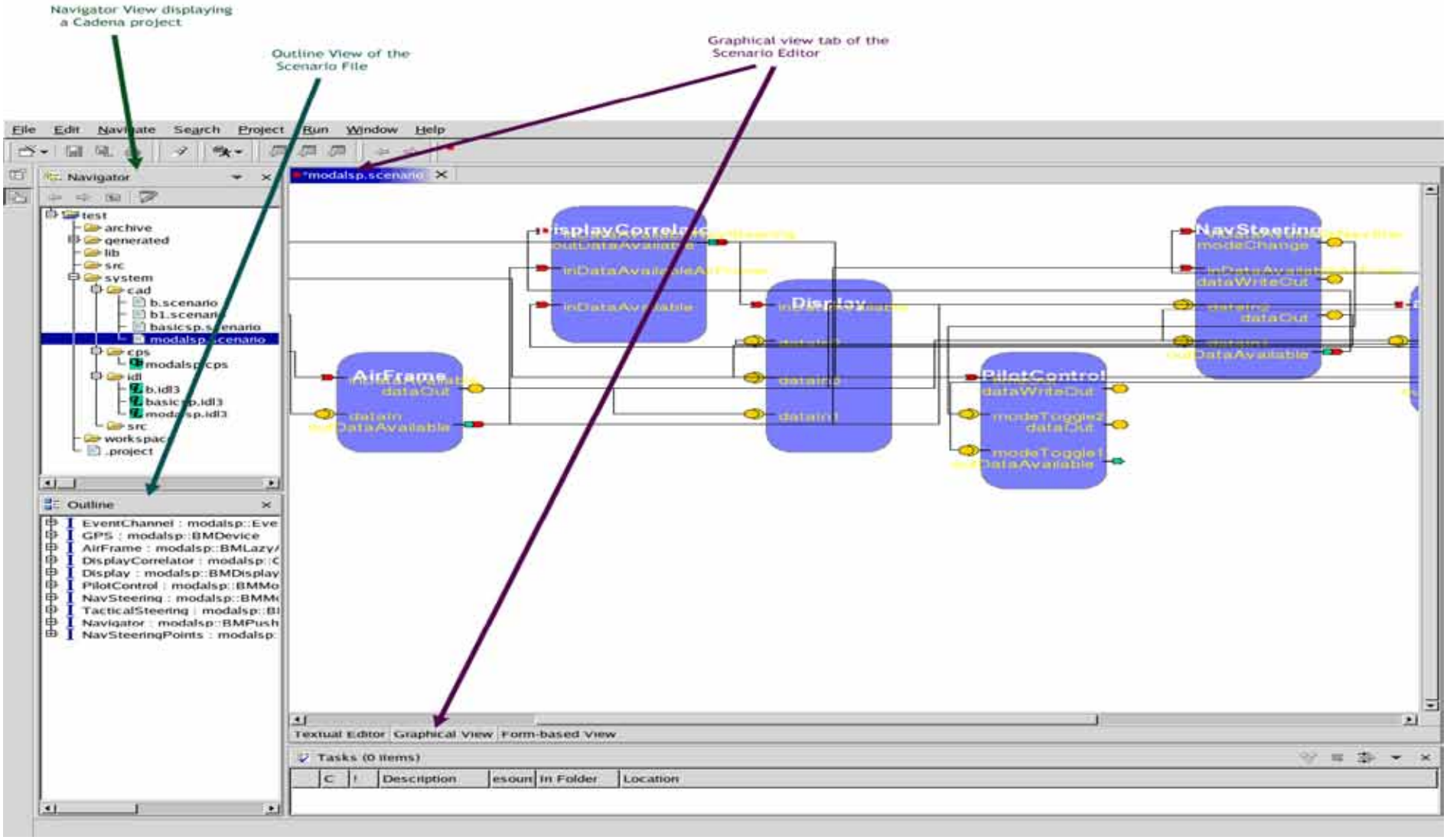
- Generic CCM implementation for Java CORBA
- Supports the following Java CORBA implementation
  - Borland Enterprise Server for Java
  - JacORB
  - OpenORB
  - ORBacus for Java
- Some tools are provided

The following slides are available from
2003_11_20_3rd_ObjectWeb_Conference_OpenCCM.ppt

OpenCCM Tool Chain

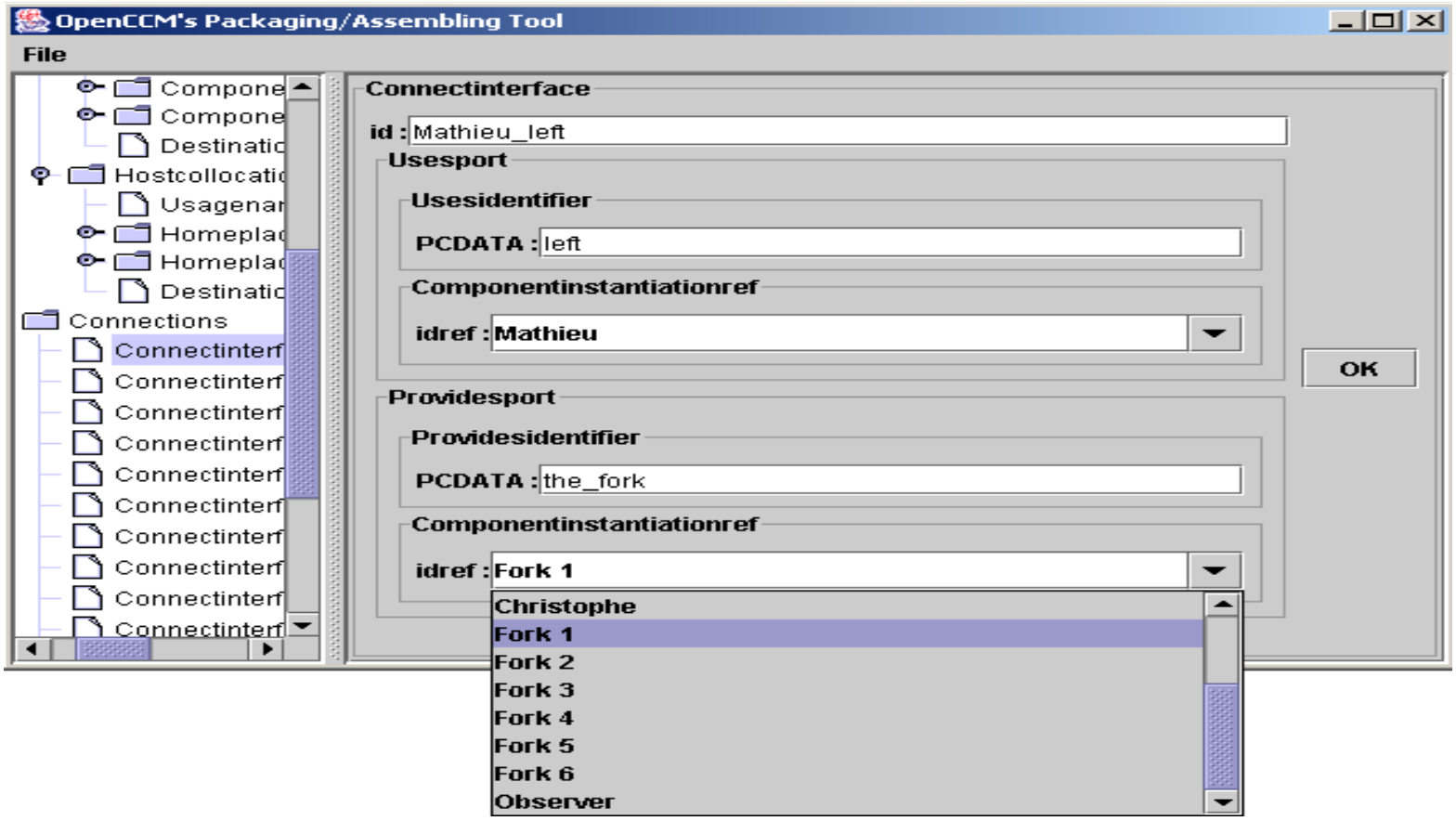


Eclipse + OpenCCM



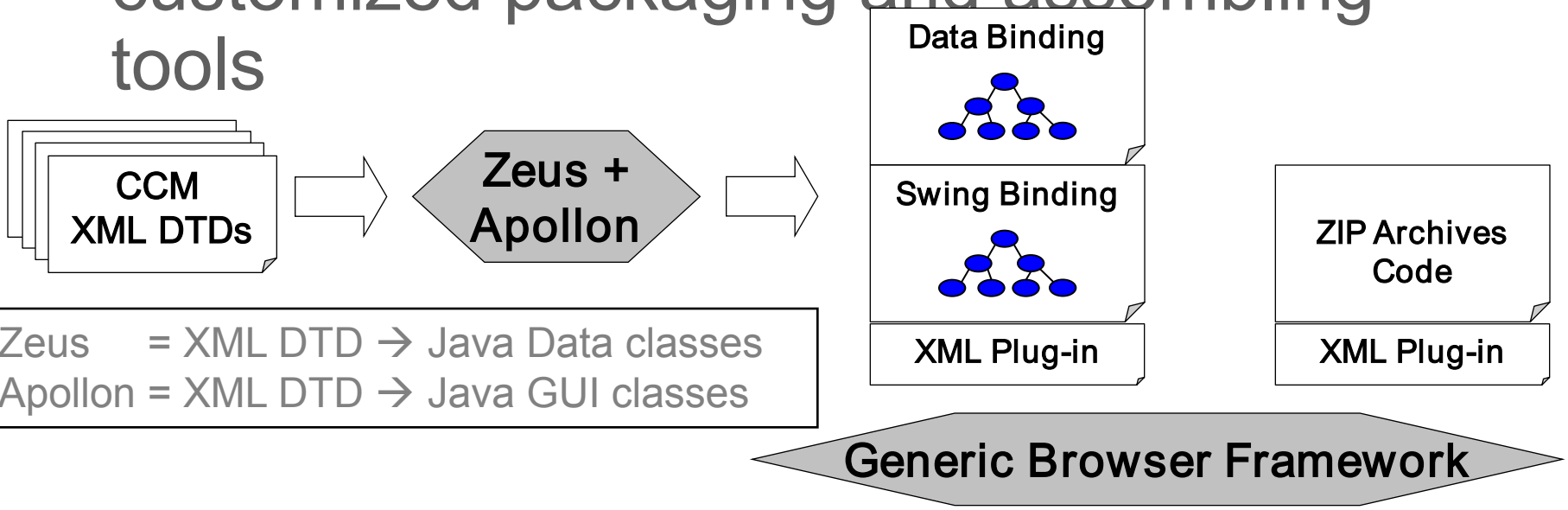
The Open Packaging and Assembling Tool Chain

- A stand-one packaging and assembling tool
  - All CCM XML descriptors and ZIP archives supported



The Open Packaging and Assembling Tool Chain

- A software framework for building customized packaging and assembling tools



Zeus = XML DTD → Java Data classes
Apollon = XML DTD → Java GUI classes

- Users can build their own P&A tool

The Open Distributed Deployment Infrastructure

- Main supported features
  - All CCM XML descriptors and ZIP archives
  - CosNaming, CosTrading, and HomeFinder services
  - All `Components::Deployment` API
- Component-based deployment infrastructure
  - IST COACH Distributed Computing Infrastructure (DCI)
  - Possible injection of non functional properties as persistency, transactions, security, etc. via containers
- Transactional distributed deployment
  - Rollback deployment when failures

D&C features for CCM and RTC

- CCM D&C
  - No hardware profile
  - No device profile
  - No real-time or time constraints description
  - No starting order in assembly description
    - In robotic application it is needed because of hardware constraints
  - No specific directory service
    - CORBA naming service or trading service

Facets

- Interfaces that provide the component's application functionality to clients
- Each facet embodies a view of the component, corresponds to a role in which a client may act relative to the component
- A facet represents the component itself, not a separate thing contained by the component

Navigation

- From any facet to component facet with CORBA::Object::get_component()
  - returns nil if target isn't a component facet
  - returns component reference otherwise
- From component reference to any facet
  - via generated facet-specific operations
  - via generic navigation operations on ComponentBase

Receptacles

- Describe possible connectivity, ability to specialize by delegation, compose functions
  - the bottom of the Lego, if you will
- No inherent life cycle dependencies or ownership relationship implied
  - no operations are inherently transitive across receptacle connection
- Not intended as a relationship service

Events

- Simple event model
- Events are all value types derived from Components::EventBase (empty, abstract)
- Push model
- Container mediates access to CosNotification channels
  - scalability, quality of service, transactional, etc.

Event Sources

- Two types: *publisher* and *emitter*
- *Publisher* is intended for client access
  - client subscribes to event source directly on component
  - component mediates access to event channel
  - component is only source of events for channel
- *Emitter* is a simple push consumer proxy
  - intended for connection to an arbitrary event channel during configuration

Attributes

- Intended use is for configuration
  - existing successful re-use strategies rely heavily on configuration (e.g., optional behaviors, modality, resource hints, etc.) via properties or attributes
  - can be supported by visual property sheet mechanisms in assembly or deployment environments
  - cover details later in discussion of homes

Homes

- The term home is used to refer to
  - a type (a home interface type)
  - a specific home instance
- A home is an object that manages a set of similar components
  - life cycle management
  - maps key values to entity components
  - extensible with arbitrary user-defined operations

Homes

- A home manages a specified component type
  - home definition is distinct from component
  - more than one home type can manage the same component type (not true of instances!)
  - allows life cycle characteristics or key type to vary/evolve without changing component definition

Primary Keys

- A primary key is a value assigned by the application that uniquely identifies a component instance in the scope of a home
  - assign at create time, or in pre-existing database
  - must be a value type derived from Components::PrimaryKeyBase (empty, abstract)
  - can be used to find, destroy

Primary Keys

- Association between a primary key and a component is defined and maintained by a home
  - primary key is not necessarily a part of the component's state
  - different home types may define different key types (or no key) for the same component type

Home Finders

- A brokerage of homes to clients
  - home implementations register with home finder
  - clients request homes from home finder
- Home finder makes determination of what is the “best” home for a client, based on the client’s request and any available environmental or configuration data
- A home finder constitutes a domain of home/container/implementation visibility

Configuration and Homes

- As described earlier, attributes are intended for component configuration
  - set during initialization, possibly readonly thereafter
  - determine behavior (within range of possible behaviors)
  - vital for re-usability

Ice features related to the component repository concept

Geoffrey Biggs

RT Synthesis Group
Intelligent Systems Research Institute
National Institute of Advanced Industrial Science and Technology
Japan

September 16, 2009

Introduction

- Evaluate features of Ice
- Determine what features apply to a component repository service
- Determine how useful those features are
- Version evaluated: 3.3.1

Ice

- **I**nternet **C**ommunications **E**ngine
- Created by ex-CORBA designers and implementors
- Commercial product, free (GPL) for non-commercial use
- Simpler to use than CORBA, but just as powerful (ZeroC claim)
  - The learning curve is certainly shallower
- Simpler to use and faster than SOAP (ZeroC claim)
- Standard and embedded versions available
- Wide range of languages supported

Slice

- **S**pecification **L**anguage for **Ice**
- c.f. IDL
- Clean language mappings using modern features of the languages (e.g. STL)
- Inheritance (no Any type)
- Can be used to describe persistent state
- Modern language mappings

```
module Example
{
    interface Converter
    {
        string toUpper(string s);
    };
};
```

Utilities

- Several utilities are included with Ice
  - IceGrid
  - IceStorm
  - Freeze
  - Glacier2
  - IcePatch2
  - IceBox

Relevant utilities

- No single utility acts as a component repository

IceBox	Application server. Loads application components as shared libraries.
IcePatch2	Patch manager. Can be used to deploy application components to remote servers.
Freeze	Object persistence. Save object state to a DB, restore it later.
IceGrid	Distributed system manager. Deploy objects to servers, location service, etc.

IceBox

- Application server
- Replaces monolithic, single-server-per-component
  - Reduces resource usage
- Application components ("services") loaded as shared libraries into an IceBox instance
- Services create servants using a provided Communicator to handle requests
- Integrated into IceGrid

Service Interface

- Simple interface for managing services
- Used to start and stop services on demand

```
module IceBox {
    local interface Service {
        void start(string name,
            Ice::Communicator communicator,
            Ice::StringSeq args);
        void stop();
    };
};
```

Service Interface

- `start()` is used by the service as initialisation
- `stop()` is for tidying up (freeing resources, etc)
- Services only interact with world outside the IceBox instance via servants

Coding services

- Service must have an entry point

```
1 extern "C" {
2     HELLO_API IceBox::Service*
          create(Ice::CommunicatorPtr
              communicator)
4         {
              return new HelloServiceI;
6         }
      }
```

- Entry point name is specified as a configuration property

```
IceBox.Service.name = entry-point symbol [args]
IceBox.Service.hello = hellointerface,10:create
```

Coding services

- `start()` creates servants

```
1  void HelloServiceI::start(
2      const string& name,
       const Ice::CommunicatorPtr& communicator,
4      const Ice::StringSeq& args)
       {
6          _adapter =
               communicator->createObjectAdapter(name);
           Ice::ObjectPtr object = new
               HelloI(communicator);
8          _adapter->add(object,
               communicator->stringToIdentity("hello"));
           _adapter->activate();
10     }
```


Startin services

- IceBox server can be configured to launch services at startup
- XML configuration
- Failure to launch a service results in initialised services being terminated
- Services can be launched on demand
  - First request causes service to be loaded
  - Subsequent requests will have no delay
  - Services can be automatically unloaded after a period of time (or other heuristic)

Administration interface

- Slice-defined administration interface
- Start, stop, and otherwise manage services in the server
- Add observers that are notified when services start/stop
- Client-accessible

Freeze Map

- Object persistence
- State of an object stored in a database
- Slice description describes the state to store
  - Only Slice-definable data types can be stored
- Quite a bit of coding involved

Freezing process

1. Choose key and value types in defined interfaces
2. Add new ones if necessary
3. Generate freeze map using Freeze compiler
4. Implement freeze operations using freeze map (store, restore data)

Freeze Evictor

- Activates/deactivates servants on demand
- While inactive, servant state is stored in persistent storage
- When reactivated, state is restored
- Like a persistent version of IceBox
- Saves resources
  - Can have thousands of Ice objects in the DB, but only a few resident in memory

IcePatch2

- Patch manager and deployer
- Secure replication of a directory tree
- Server sends compressed objects and checksums to client
- Simplifies deployment, even of undeployed objects
- Can create custom clients that integrate patch deployment

IceGrid

- Location and activation service
- Manages a grid of networked computers, each running one or more nodes
- Architecture:
  - Registry and one or more nodes
  - These cooperate to manage the server processes of an application
  - Registry performs the name service function
- Integrated with IceBox
- XML configuration
  - Templates aid in deploying multiple instances of a service

IceGrid facilities

- Location service
- On-demand server activation
- Application distribution with IcePatch2 integration
- Replication and load balancing
- Resource allocation with sessions
- Automatic failover
- Dynamic queries for locating objects
- Deploment control to individual nodes

Putting it together

- IceGrid to manage computers that make up a system
- IceBox on each node
  - Reduce resource usage
  - Allow on-demand service activation
- Freeze on each node to allow object persistence
  - Can reduce resource usage
  - Unload objects when not using them, but still keep their state
- IcePatch2 for deployment of new objects and updates to existing objects

Good features

- On-demand object loading (at first request to the interface)
  - Relevant to finding available components for use?
- Ability to securely deploy whole directory trees
- Object persistence
  - Possibly not related to component repository concept

Infrastructure WG

EJB Deployment Service

2009. 9

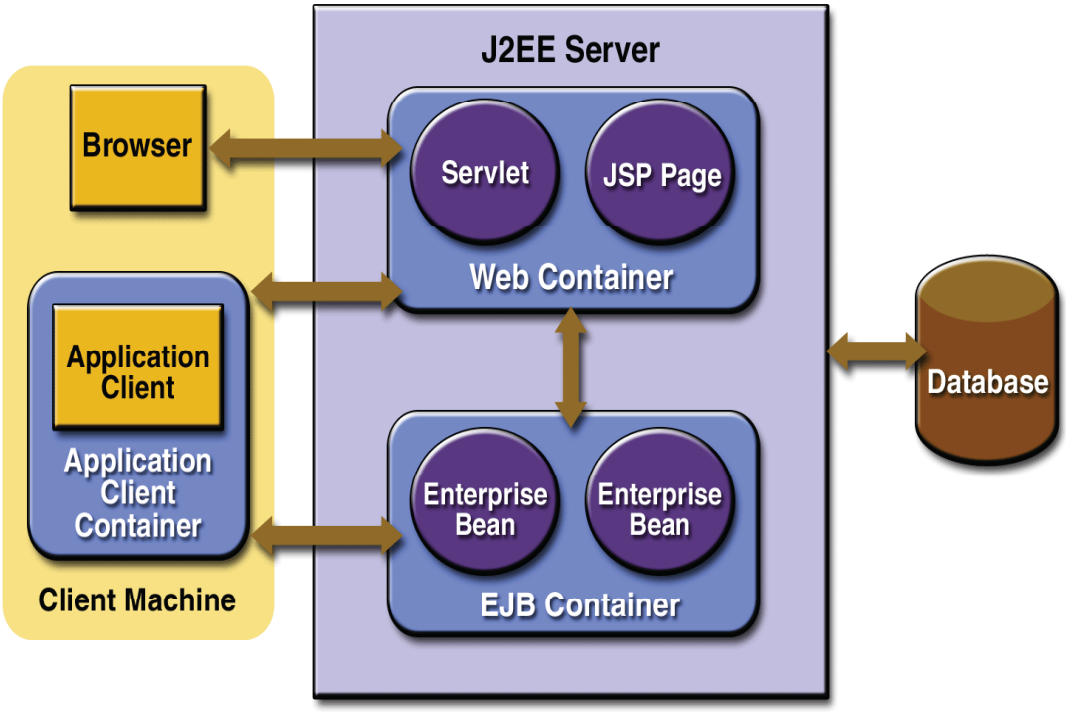
Seung-Woog, Jung (swjung@etri.re.kr)

ETRI, KOREA

Contents

- J2EE Architecture
- EJB Deployment Process
- EJB Deployment Descriptor
- Conclusion

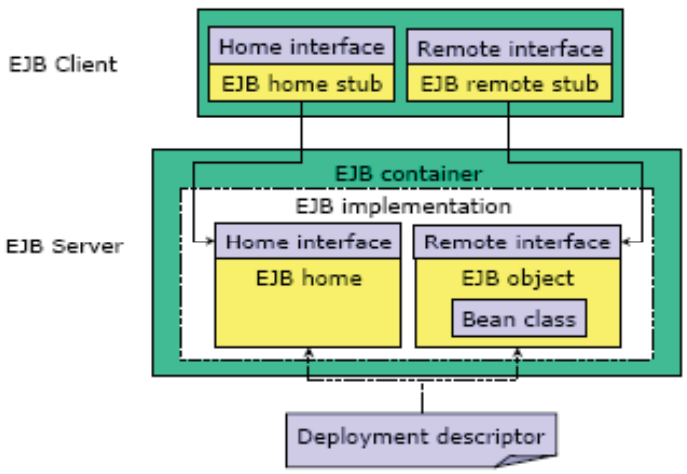
J2EE Architecture



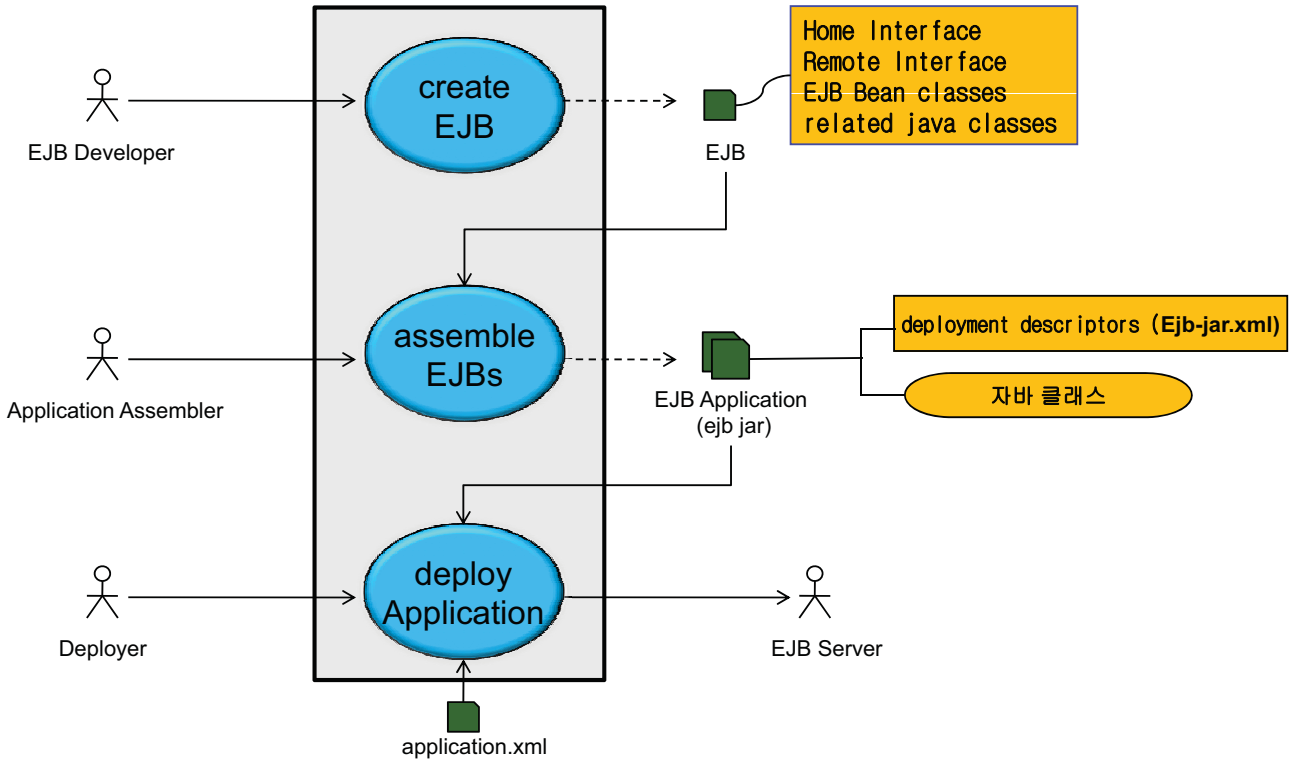
* © Sun Microsystems' Enterprise JavaBeans spec 3.0

EJB(Enterprise Java Beans)

- Server side component architecture
- Separation of business logic from middleware services:
  - networking, transactions, persistence, logging, resource pooling, etc



EJB Deployment Process



EJB Deployment Process

❑ Packaging

- ❖ All components and deployment descriptors have to be packaged in a specific way (EJB jar)
- ❖ XML is used for specifying deployment descriptor information

❑ EJB JAR

- ❖ JAR file manifest entries
- ❖ Java class files for the enterprise Beans
- ❖ Enterprise Beans deployment descriptors
- ❖ Enterprise Beans environment properties

EJB Deployment Descriptor

❑ EJB deployment descriptor example (ejb-jar.xml)

```
<ejb-jar>
  <description>This is my BeeShirts.com EJB Application</description>
  <display-name>BeeShirts.com Application Service</display-name>
  <small-icon> beeshirtsSmall.jpg </small-icon>
  <large-icon> beeshirtsLarge.jpg </large-icon>

  <enterprise-beans>
    <session> ... </session>
    <session> ... </session>
    <entity> ... </entity>
    <entity> ... </entity>
    ...
  </enterprise-beans>

  <assembly-descriptor>
    ...
  </assembly-descriptor>
  <ejb-client-jar> beeshirtsClient.jar </ejb-client-jar>
</ejb-jar>
```


EJB Deployment Descriptor

```
<ejb-jar>
  <enterprise-beans>
    <entity>
      <ejb-name>CustomerBean</ejb-name>
      <home>mypkg.CustomerHome</home>
      <remote>mypkg.Customer</remote>
      <ejb-class>mypkg.CustomerBean</ejb-class>
      <persistence-type>Container</persistence-type>
      <prim-key-class>java.lang.Integer</prim-key-class>
      <reentrant>false</reentrant>
      <abstract-schema-name>CustomerBean</abstract-schema-name>
      <cmp-field><field-name>customerId</field-name></cmp-field>
      <cmp-field><field-name>customerName</field-name></cmp-field>
      <cmp-field><field-name>address</field-name></cmp-field>
      <primkey-field>customerId</primkey-field>
    </entity>
…
```

EJB Deployment Descriptor

```
<ejb-jar>
  <enterprise-beans>
    …
  </enterprise-beans>

  <assembly-descriptor>
   <container-transaction>
      <method>
        <ejb-name>RuleEnt</ejb-name>
        <method-name>*</method-name>
       </method>
        <trans-attribute>Required</trans-attribute>
  </container-transaction>
    <container-transaction>
      <method>
       <ejb-name>CorpAuditSes</ejb-name>
       <method-name>*</method-name>
      </method>
      <trans-attribute>Required</trans-attribute>
    </container-transaction>
    …
  </assembly-descriptor>
</ejb-jar>
```


Vender-specific Descriptors

```
 <weblogic-rdbms-bean>
   <ejb-name>CustomerBean</ejb-name>
   <data-source-name>OracleDS</data-source-name>
   <table-map>
     <table-name>TB_CUSTOMER</table-name>
     <field-map>
       <cmp-field>customerId</cmp-field>
       <dbms-column>CUST_ID</dbms-column>
     </field-map>
     <field-map>
       <cmp-field>CustomerName</cmp-field>
       <dbms-column>NAME</dbms-column>
     </field-map>
     <field-map>
       <cmp-field>Address</cmp-field>
       <dbms-column>ADDRESS</dbms-column>
     </field-map>
   </table-map>
 </weblogic-rdbms-bean>
```

EJB Deployment Descriptor

❑ Application descriptor (application.xml)

```
<application>
  <application-name>Bidding_App</application-name>
  <description>Bidding application</description>

  <modules>
    <module>
          <module-name>Orders</module-name>
          <type>ejb</type>
          <archive-file>Orders.zip</archive-file>
    </module>
    <module>
          <module-name>supplier</module-name>
          <type>ejb</type>
          <archive-file>supplier.zip</archive-file>
    </module>
    <module>
          <module-name>Bidding Web Module</module-name>
          <type>web</type>
          <archive-file>bidding-web.war</archive-file>
    </module>
  </modules>
</application>
```

EJB modules

WEB module

Conclusion

❑ EJB Deployment

- ❖ **Lack of component connection description (port connection)**
  - ✓ **Port connection is hidden in the java class file**
  - ✓ **There should be the information of port connections when deploying an RTC application**
- ❖ **The EJB component, the application and the assembly descriptions are mixed in a single deployment descriptor**
  - ✓ **Complex and difficult to reuse the description**
- ❖ **Does not support multi-node distribution**

Infrastructure WG

OPRoS Deployment Service

2009. 9

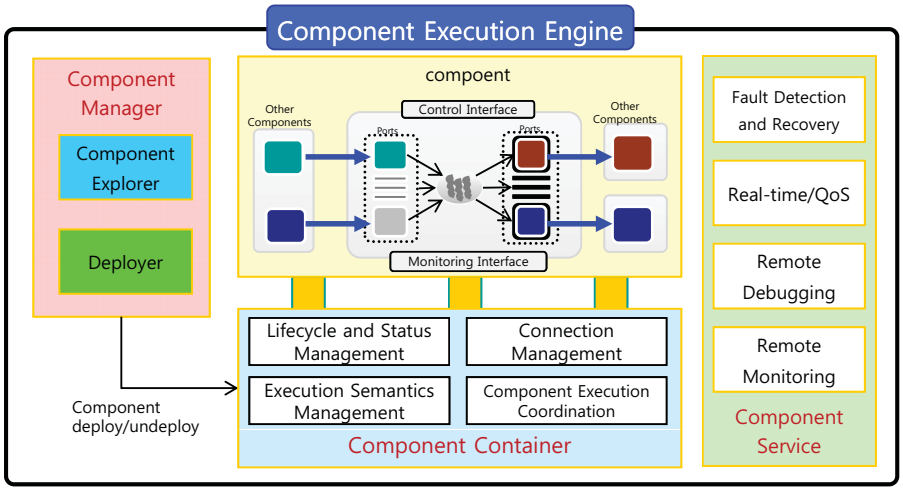
Seung-Woog, Jung (swjung@etri.re.kr)

ETRI, KOREA

Contents

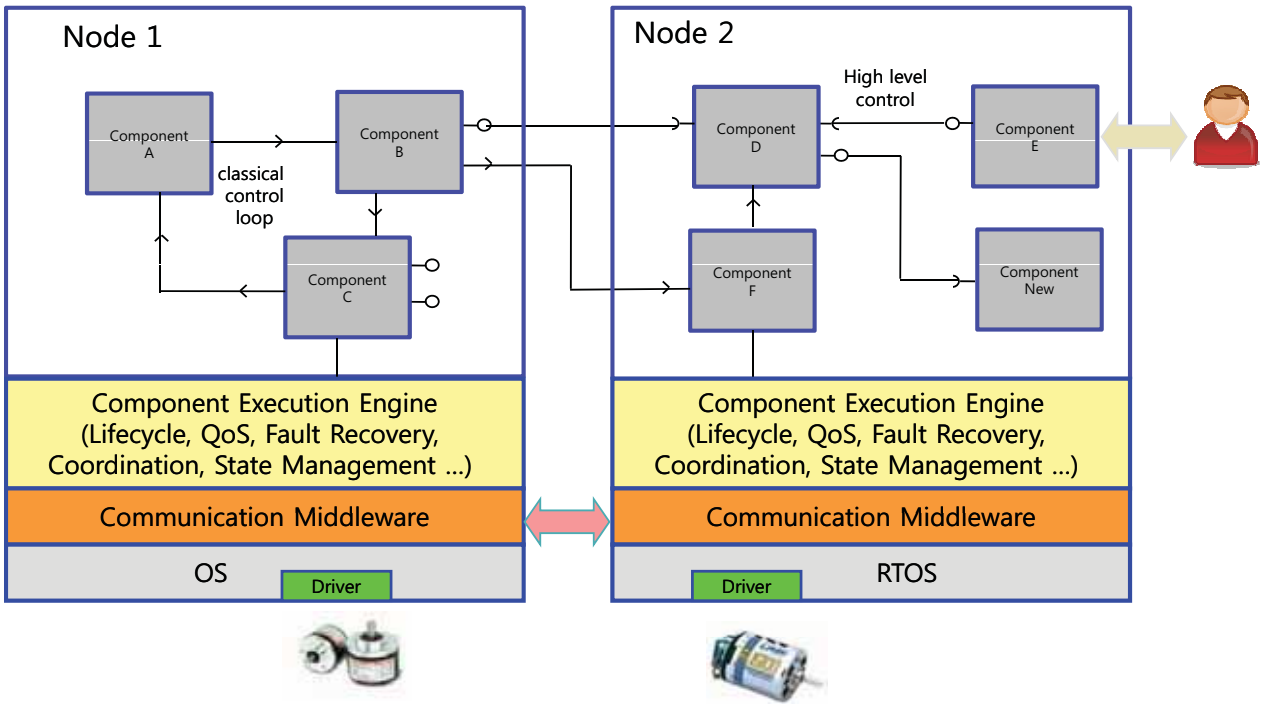
Introduction of OPRoS Component

1st year	2nd year	3rd year
▪Development of component execution specification supporting various execution semantics ▪Development of execution engine for the robot component	▪Development of execution coordinating technology for robot components ▪Development of fault detection and recovery for components	▪Development of real-time and QoS supporting technology for robot components ▪Development of remote debugging and monitoring technology

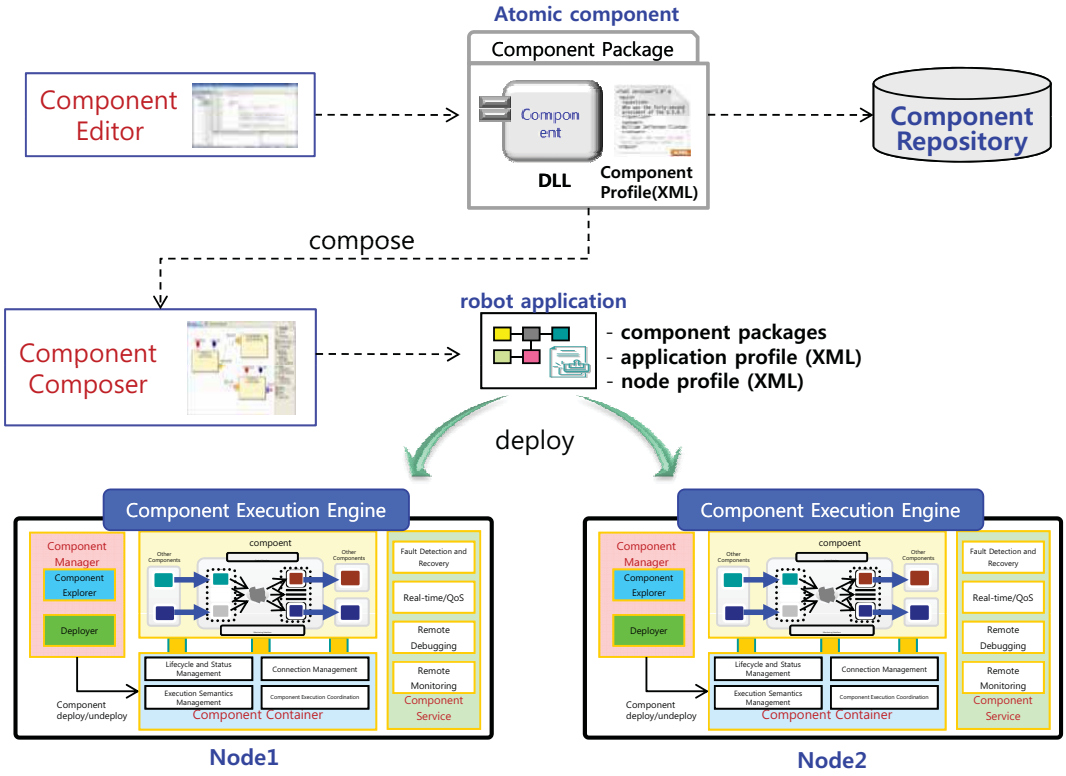


Introduction of OPRoS Component

Role of Component Execution Engine



OPRoS Component Development Process



OPRoS Component Profile

```
<?xml version="1.0" encoding="UTF-8"?>
<component_profile>
  <name>HelloMaker</name>
  <description>HelloMaker Sample Component</description>
  <execution_environment>
    <os name="WindowsXP" version="sp3"></os>
    <cpu>x86</cpu>
    <library_type>dll</library_type>
    <library_name>HelloMakerComp.dll</library_name>
    <impl_language>c++</impl_language>
    <compiler>MINGW</compiler>
  </execution_environment>
  <execution_semantics>
    <type>periodic</type>
    <period>1000</period>
    <priority>1</priority>
  </execution_semantics>

  <properties>
    <property name="TimeOut" type="long">10</property>
    <property name="PortName" type="string">COM1</property>
    <property name="BaudRate" type="long">57600</property>
    <property name="DataBits" type="int">8</property>
    <property name="StopBits" type="int">0</property>
    <property name="Parity" type="int">0</property>
    <property name="FlowControl" type="int">0</property>
  </properties>
```

```
  <ports>
    <data_port>
        <name>DataOut</name>
        <data_type>std::string</data_type>
        <usage>output</usage>
    </data_port>
    <event_port>
        <name>EventOut</name>
        <data_type>std::string</data_type>
        <usage>output</usage>
    </event_port>
    <service_port>
        <name>MessagePrint</name>
        <type>MessagePrint</type>
        <usage>required</usage>
        <reference>MessagePrintRequired.xml</reference>
    </service_port>
  </ports>
</component_profile>
```

OPRoS Application Profile

```
<!-- application_profile.xml-->
<application_profile>
   <name>hello</name>
   <description>Hello World Application</description>

   <copyright>
     <license_policy>OPRoS</license_policy>
     <version>1.0</version>
   </copyright>

   <subcomponents>
     <subcomponent>
       <node_id>hello_node</node_id>
       <name>HelloMaker</name>
       <reference>HelloMaker.xml</reference>
     </subcomponent>

     <subcomponent>
       <node_id>print_node</node_id>
       <name>MessagePrinter</name>
       <reference>MessagePrinter.xml</reference>
     </subcomponent>
   </subcomponents>
```

```
 <port_connections>
    <port_connection port_type="service">
      <source component_name="HelloMaker" port_name="MessagePrint"/>
      <target component_name="MessagePrinter" port_name="MessagePrint"/>
    </port_connection>

    <port_connection port_type="data">
      <source component_name="HelloMaker" port_name="DataOut"/>
      <target component_name="MessagePrinter" port_name="DataIn"/>
    </port_connection>

    <port_connection port_type="event">
      <source component_name="HelloMaker" port_name="EventOut"/>
      <target component_name="MessagePrinter" port_name="EventIn"/>
    </port_connection>
  </port_connections>

</application_profile>
```


OPRoS Node Profile

```
<node_profile>
  <node id="hello_node" protocol="tcp">
          <prop name="ip.addr">192.168.0.10</prop>
          <prop name="ip.port">2000</prop>
          ….
          <!– node resources -->
  </node>

  <node id="print_node" protocol="tcp">
          <prop name="ip.addr">192.168.0.11</prop>
          <prop name="ip.port">2000</prop>
          …
          <!– node resources  -->
  </node>
</node_profile>
```

Conclusion

❑ OPRoS Deployment

- ❖ Component connection description (port connection) in application profile
  - ✓ Port connection is described in the application profile
- ❖ The component profile, the application profile are separated in its own profile
  - ✓ Easy to reuse the component profile
- ❖ Support multi-node distribution

- ❖ lack of resource description
  - ✓ For checking if a component can be deployed to a node or not

❑ What should be standardized?

- ❖ application profile
  - ✓ how to assemble or compose components for making a robot application
- ❖ deployment profile
  - ✓ how to deploy a robot application

Directory Service
(OSGi & Web Service)

Kim, MyungEun

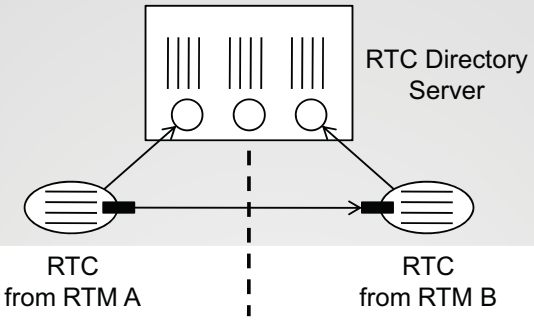
Network Robot Research Team
ETRI, Korea

Contents

- RTC Directory Service
- Directory Service in OSGi
- Directory Service in Web Service
- Conclusion

RTC Directory Service

- Remind "RTC Directory Service"
  - A step toward "Interoperation of RTCs"
    - Clients can search appropriate RTCs from different RTMs and weave them to build applications
    - Inter-RTC Directory lookup protocol enables to combing RTCs from a larger geographical area



RTC Directory Service(Cont'd)

- Provide "property-based RTC search" without accessing remote RTCs directly
  - Enable power and easy search method
  - Save unnecessary communications during the search

query string:
`location='Room L89' && comp_id='Camera' && type='robot'`

means:
All camera components in any robot located at the 'Room L89'

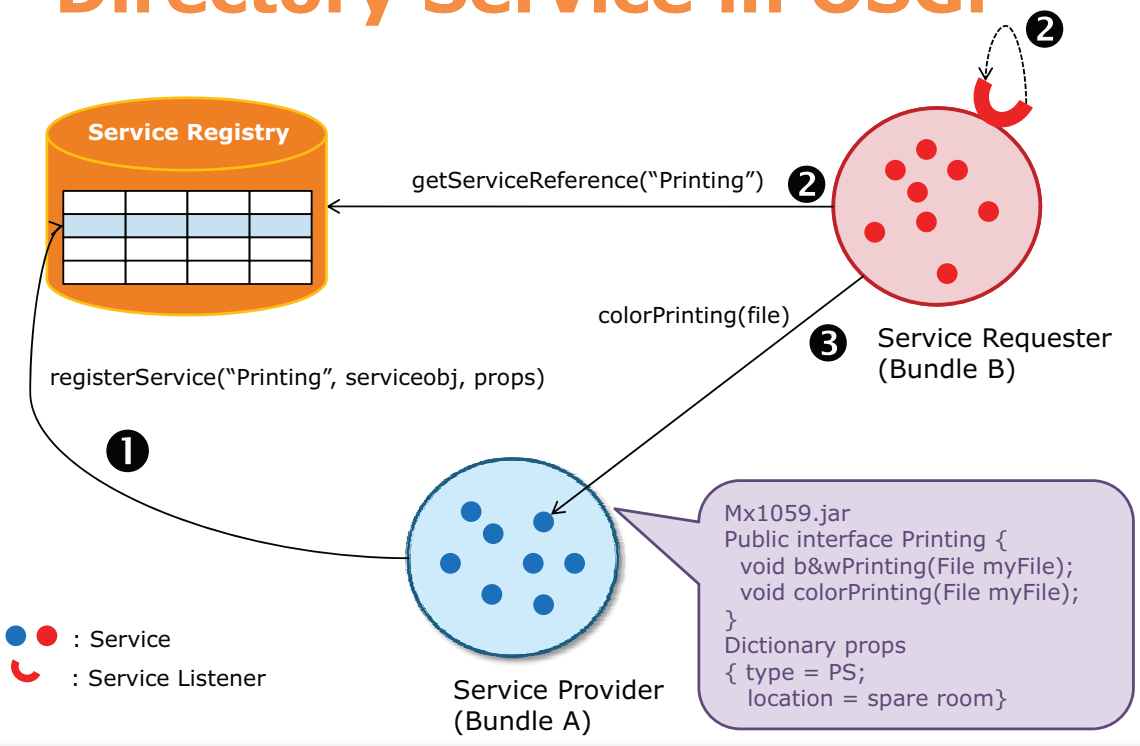
RTC Directory Service(Cont'd)

- Enable clients to keep track of their target RTCs
  - Clients get notified when the status of the RTCs are changed

matcher string:
`location='Room L89' && comp_id='Camera'`

means:
Notify me whenever a camera component at 'Room L89' is registered or unregistered

Directory Service in OSGi



Directory Service in OSGi(Cont'd)

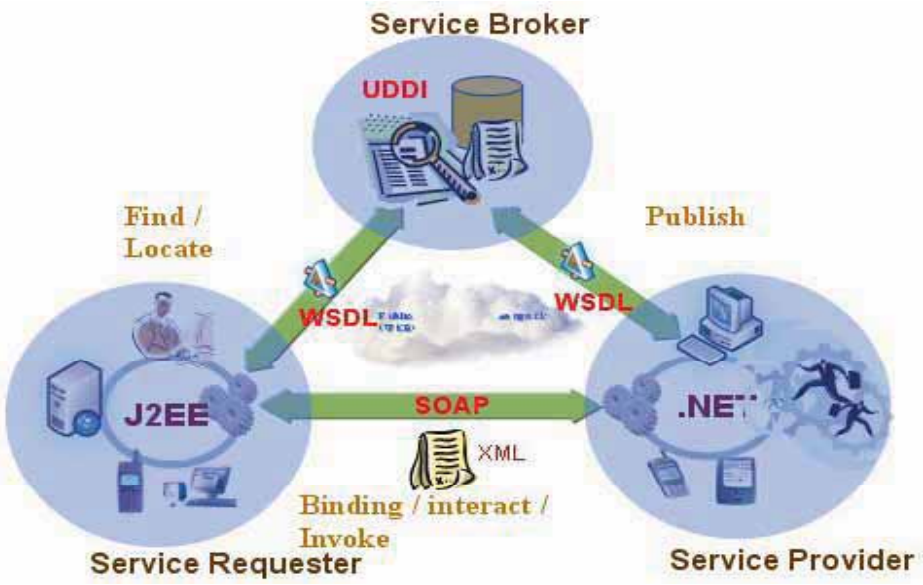
❖ **Service Registration Properties**

Property key	Type	Description
objectClass	String[]	Set of class and interface names set by framework automatically
service. description	String	Service description(optional)
service.id	Long	Unique service.id is assigned by framework
service.pid	String	A persistent, unique name(optional) by the bundle
service. ranking	Integer	If multiple qualifying service interfaces exist, framework determines which service returned by ranking (optional)
service. vendor	String	Vendor name(optional)

Directory Service in OSGi(Cont'd)

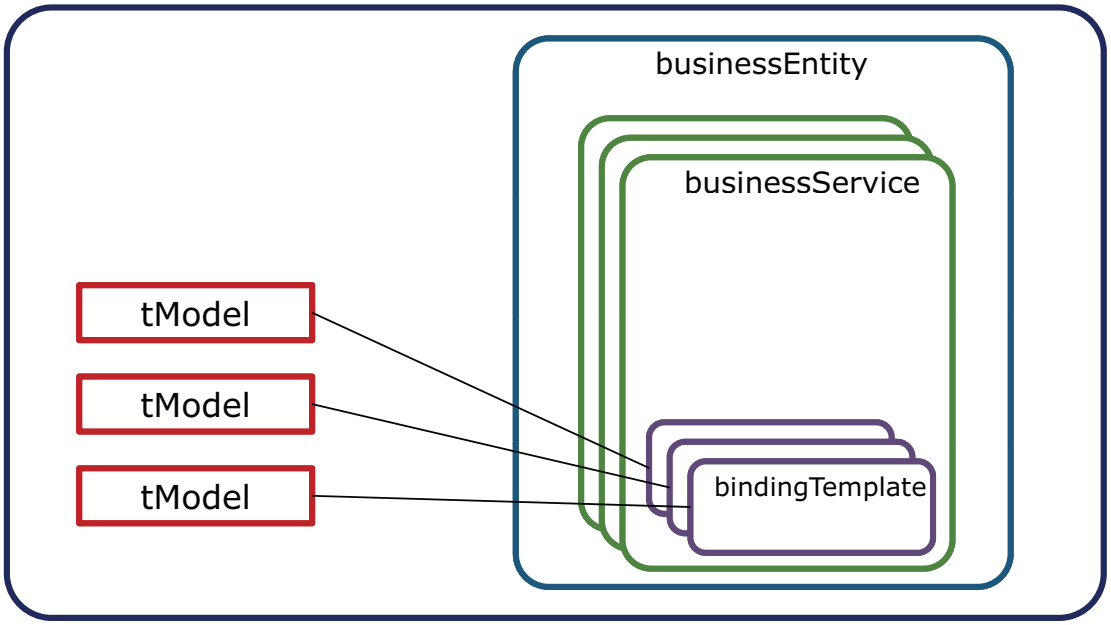
- ***Discovery***
  - The current discovery mechanism can only retrieve service reference that ***exactly match the service name in the query***
- ***Selection***
  - To add filtering information can aid the selection process. However there is ***only user defined properties***.
- ***Service Track***
  - The current service track mechanism can only monitor service which ***requester already know the service name***

Directory Service in Web Service



Directory Service in Web Service (Cont'd)

- **UDDI Data Structure**



Directory Service in Web Service (Cont'd)

Name	Description
businessEntity	Information about the party who publishes information about a service (**name**, description, contacts, address…)
businessService	Descriptive information about a logical grouping of web services (**name**, description…)
bindingTemplate	Technical information about a service entry point and implementation specs (description, tModelInstanceDetails…)
tModel	Description of specifications for services or value sets (**name**, description, **overviewURL**…)

Directory Service in Web Service (Cont'd)

- ***Discovery***
  - Web service provides exact match, approximate match using wildcard to find a service
  - Service requester can only find services that ***already know their name or key***
- ***Service Track***
  - Web service can monitor a particular set of data in registry which requester ***already know the service name or key***

What to do…

- OSGi and Web service are very well-defined standard specification
- However, we need a new directory service to find and share services intellectually between networked robots
  - The new directory service could provide not service name based search but "***property-based search***"
  - The new directory service could notify when the service which clients want is ***newly registered or unregistered/updated***, even though they don't know the exact service name

Robot isn't a super-hero who Can have & do everything!

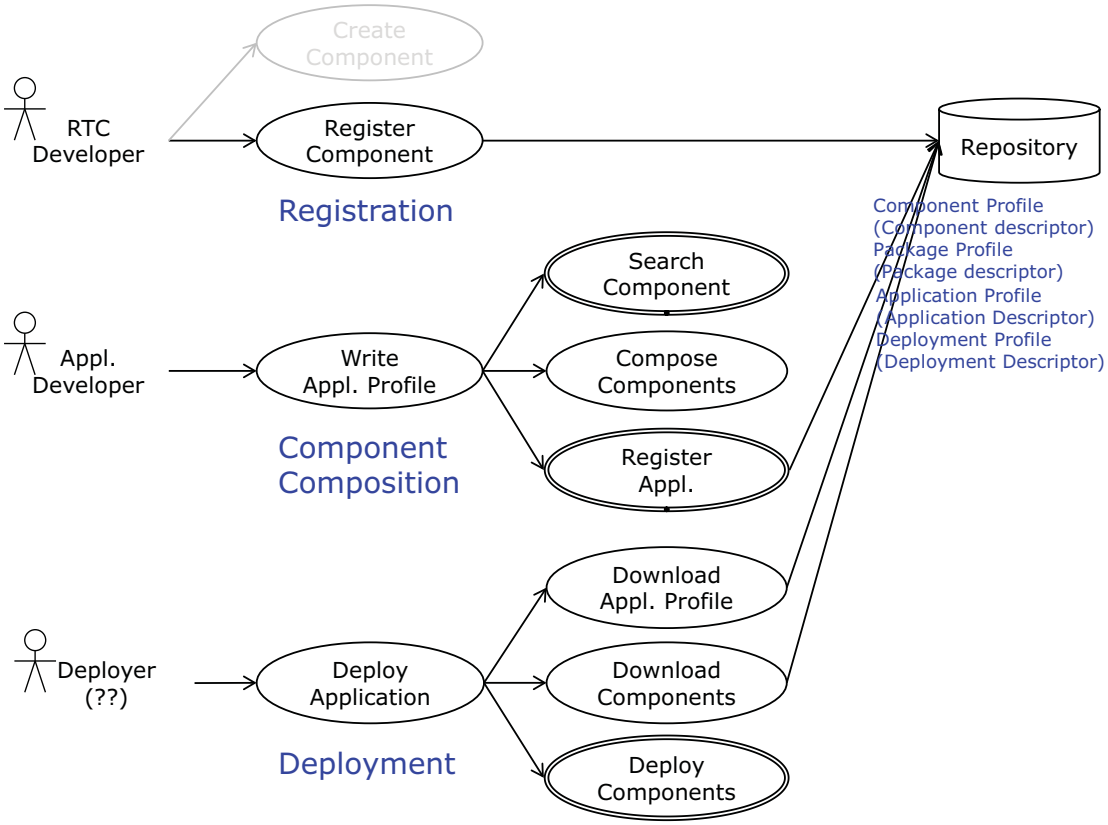
However, Robot could cooperate and share their resources with Each other to do better!

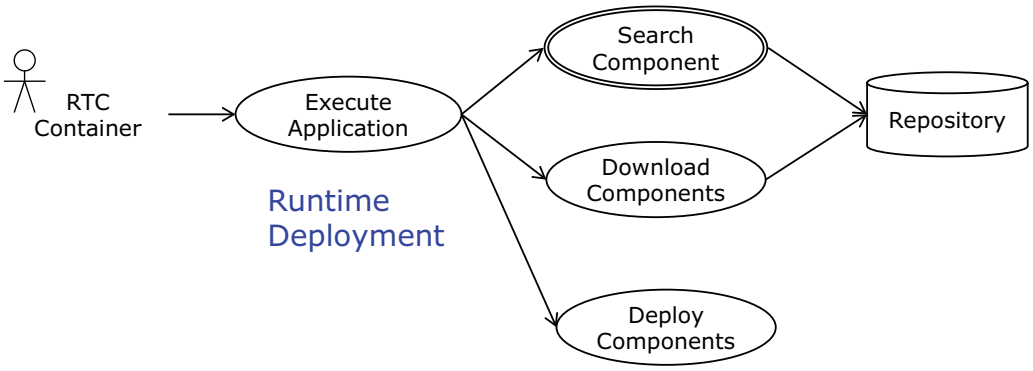
Thank you!!

RTC Deployment and Dynamic Reconfiguration

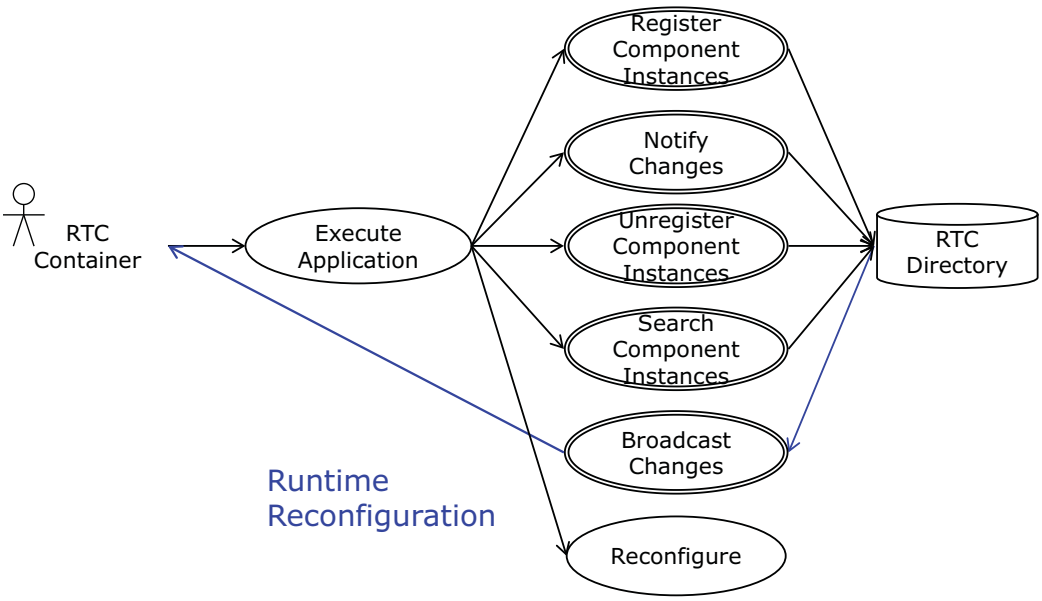
Infrastructure WG
Robotic DTF, OMG

Hyun Kim
ETRI

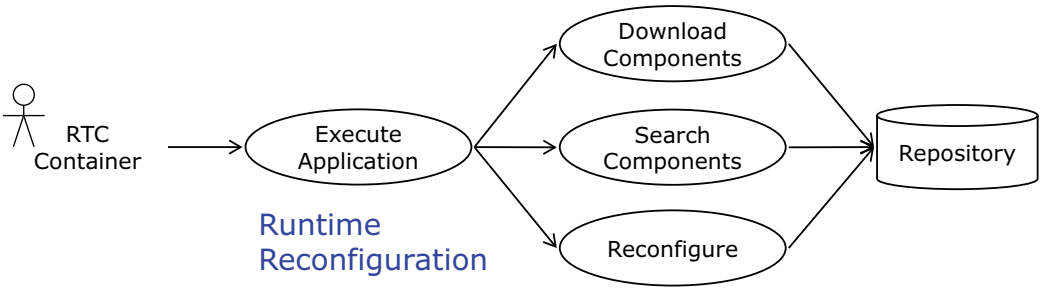




Runtime
Deployment



Runtime
Reconfiguration



Runtime
Reconfiguration

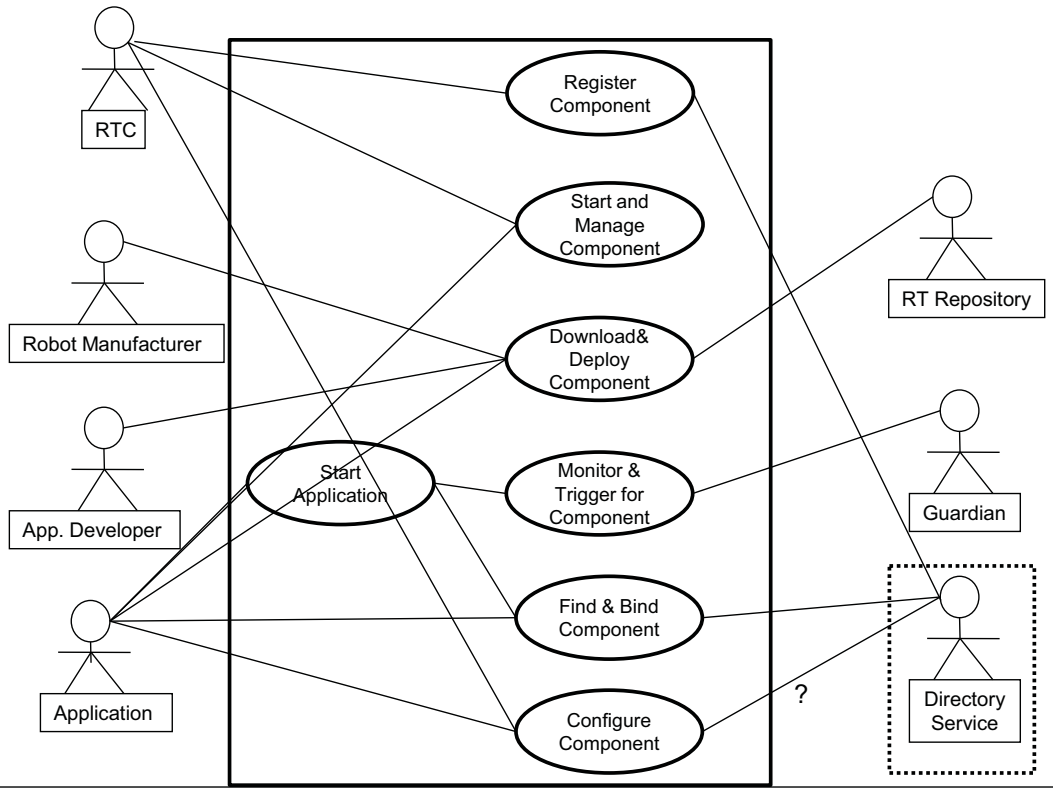
Infrastructure WG Progress Report

(San Antonio meeting)

Noriaki Ando (AIST)

robotics/2009-09-12

Use case for infrastructure



Use case

- Subject is middleware or platform
- Middleware provides the following functionality
  - RTC registration
  - RTC lifecycle management
  - Download and deployment RTC
  - Monitoring and triggering RTC
  - Find and bind component
  - Configure component
- More concrete use case will be proposed and discussed in the next meeting

Discussion in this meeting

- Related technology survey
  - Four presentations
- Use case discussion
- Scope of RFP
- Homework assignment

Related Technologies Survey

- About
  - Directory and discovery
  - Deployment and configuration
- OMG related standard
  - CCM (Dr. Ando)
  - Software radio (Dr. Ando)
- Other
  - Web service (Ms.Kim (Dr. Lee))
  - Ice Box (Dr. Biggs)
  - OSGi (Ms. Kim (Dr. Lee))
  - EJB (Dr. Jung (Dr. Soo))
- What is robotic specific functionality?
- Mailing list discussion.
- Presentations will be made in the next meeting.

D&C features in CCM

- CCM D&C
  - No hardware profile
  - No device profile
  - No real-time or time constraints description
  - No starting order in assembly description
    - In robotic application it is needed because of hardware constraints
  - No specific directory service
    - CORBA naming service or trading service

D&C features in Ice

- No single utility acts as a component repository
- IceBox
  - Application server. Loads application components as shared libraries.
- IcePatch2
  - Patch manager. Can be used to deploy application components to remote servers.
- Freeze
  - Object persistence. Save object state to a DB, restore it later.
- IceGrid
  - Distributed system manager. Deploy objects to servers, location service, etc.

D&C features in EJB

- EJB Deployment
  - Lack of component connection description (port connection)
  - Port connection is hidden in the java class file
  - There should be the information of port connections when deploying an
- RTC application
  - The EJB component, the application and the assembly descriptions are mixed in a single deployment descriptor
  - Complex and difficult to reuse the description
  - Does not support multi-node distribution

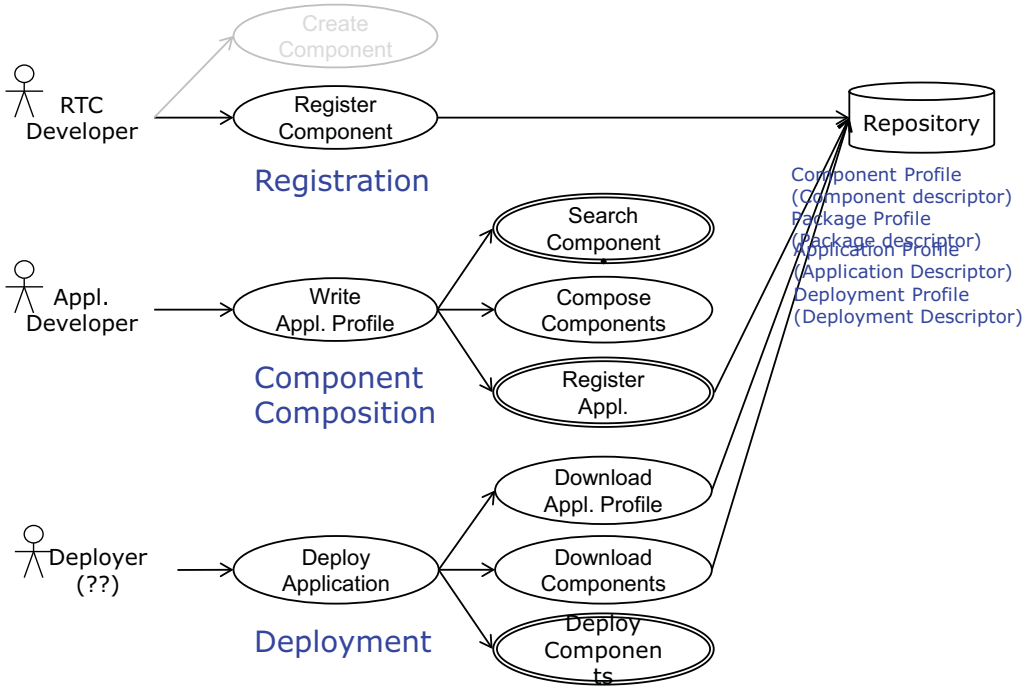
D&C features in OSGi

- Discovery
  - The current discovery mechanism can only retrieve service reference that exactly match the service name in the query
- Selection
  - To add filtering information can aid the selection process.
  - However there is only user defined properties.
- Service Track
  - The current service track mechanism can only monitor service which requester already know the service name

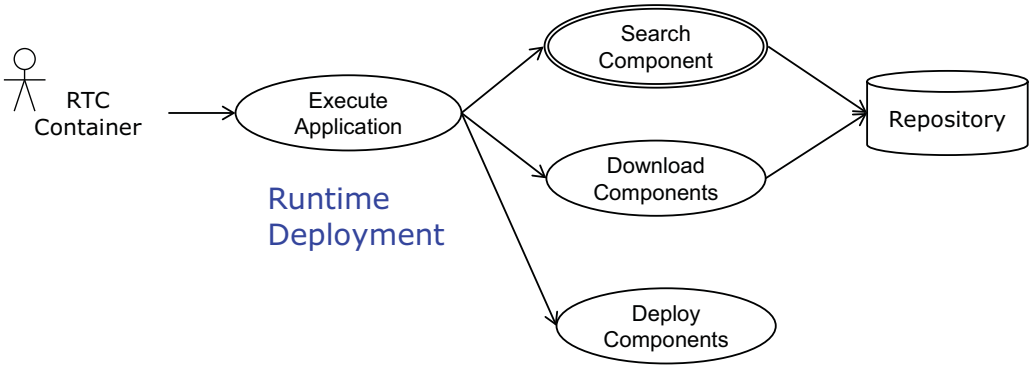
Scope of the RFP

- RFP Title: RTC deployment and dynamic reconfiguration (tentative)
  - Deployment (repository)
    - Repository is DB server to store component binary, application profile etc…
  - Reconfiguration (directory)
    - Directory service is a rich name service.

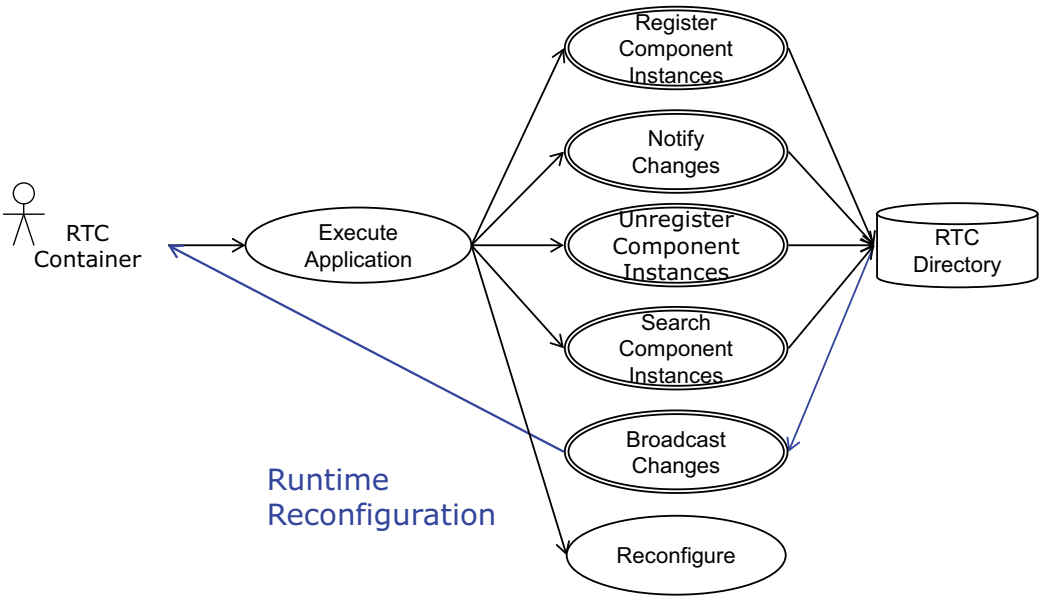
Deployment Use Case



Deployment Use Case

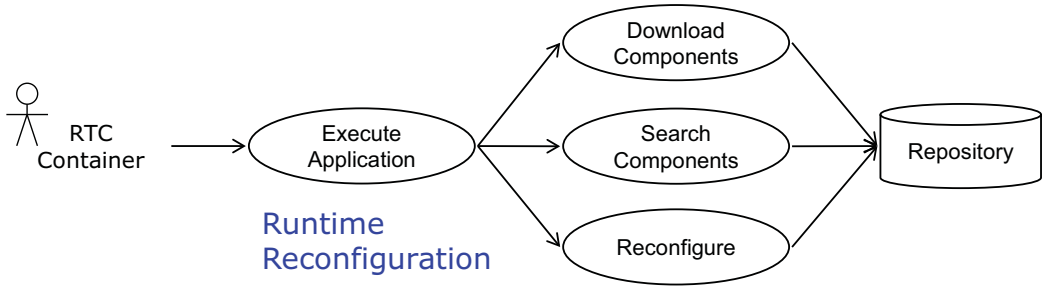


Use Case



AIST RT MIDDLEWARE

Use Case



NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

Discussions

- We need a new directory service to find and share services intellectually between networked robot.
  - The new directory service could provides not service
- Robot has its own characteristics
- We need dynamic re-configuration

Why Need New Standards?

- Repository (for deployment)
  - Profiles
    - Component Profile (Component descriptor)
    - Package Profile (Package descriptor)
    - Application Profile (Application Descriptor)
    - Deployment Profile (Deployment Descriptor)
    - Device Profile (Device Descriptor) (cf. C4I)
    - Hardware Profile (Hardware Descriptor)
  - Questions
    - How to register component to repository?
    - How to search appropriate component? (search syntax)
    - How to download component from repository?
    - How to deploy component?
    - How to compose components?
  - Action
    - Registration (to repository)
    - Search
    - Download
    - Deployment
    - Component Composition

Why Need New Standards?

- Directory (reconfiguration)
  - Profiles
    - Resource Profile (Resource Descriptor)
    - Component Profile (Component descriptor)
    - Application Profile (Application Descriptor)
    - Device Profile (Device Descriptor) (cf. C4I)
    - Hardware Profile (Hardware Descriptor)
  - Questions
    - How to register component instance to directory?
    - How to search appropriate component instance? (search syntax)
    - How to notify changes to directory?
    - How to broadcast chages to other RTCs?
  - Action
    - Registration (to directory)
    - Search
    - Download
    - Notification
    - Assembly

Why Need New Standards?

- Existing specifications are not suitable for robotics.
- They are general purpose specifications, and oriented towards static systems.
- But robotic standard should consider dynamic systems.
  - Software components and system structure can be deployed and reconfigured at runtime according to the environmental changes.
- It should also consider hardware and device properties and real-time restrictions.

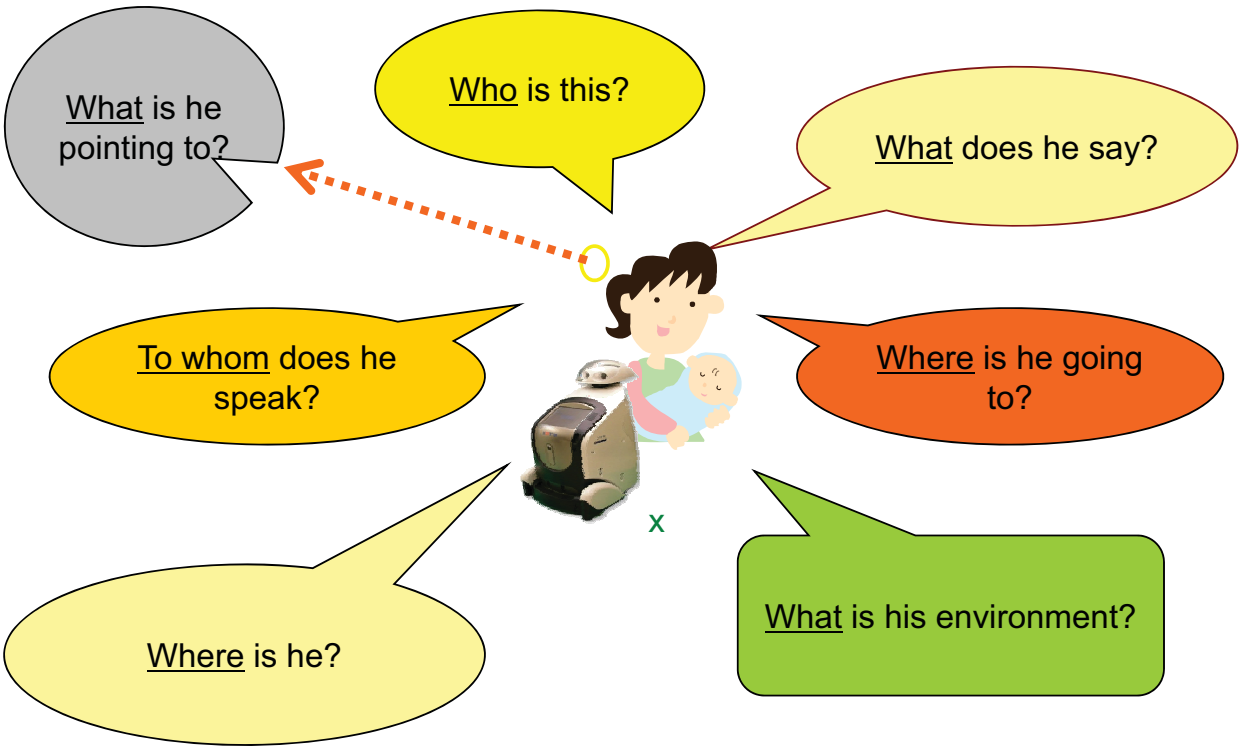
Next step

- Draft of 1st draft (Wednesday morning)
  - Objective
  - Problem statement
  - Scope
- Use case discussion
  - More concrete use case
  - Make clear scope of our RFP
- Survey
  - CCM/D&C
  - MARTE (Modeling and Analysis of Real-time and Embedded systems)
  - AADL (Architecture Analysis Design Language)
  - East ADL
- Roadmap
  - RFP for new specification (Title is needed)
  - 1st review RFP in Long Beach
  - 2nd Review and issue RFP in Jacksonville
  - (RTF for RTC specification (if needed))

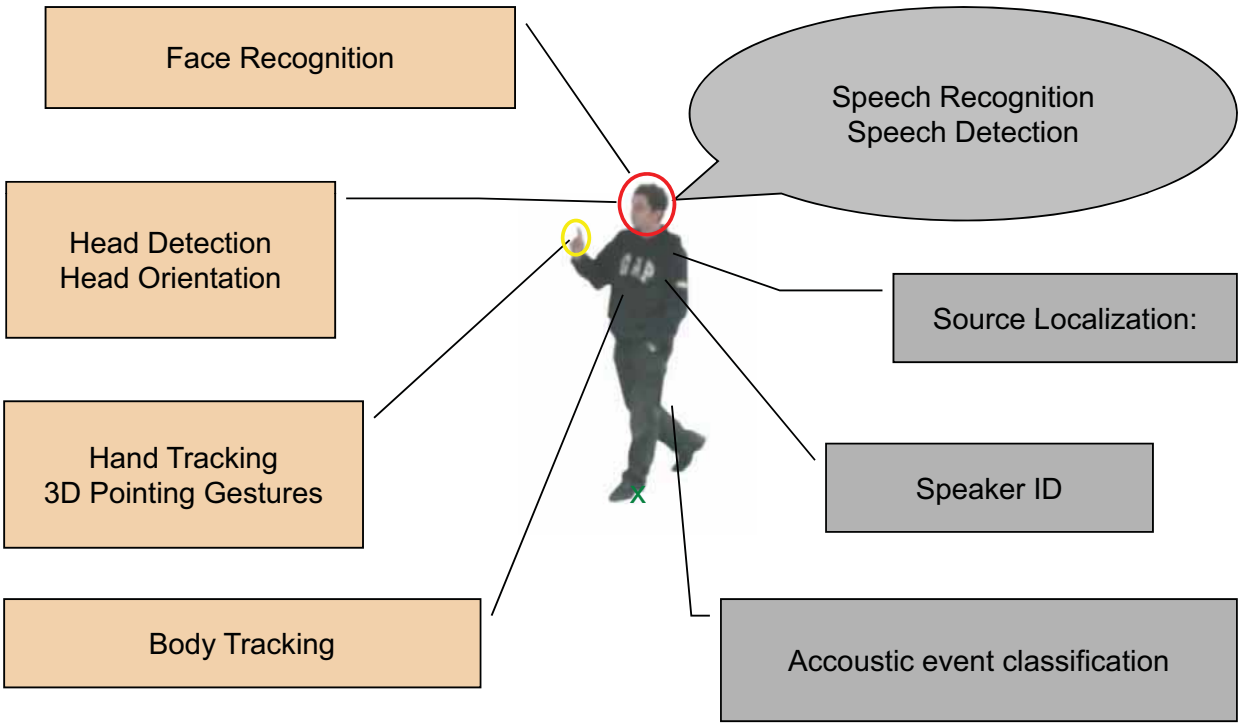
Review of
User Identification Service Interface

2009-09-14
Dr. SuYoung, Chi
ETRI

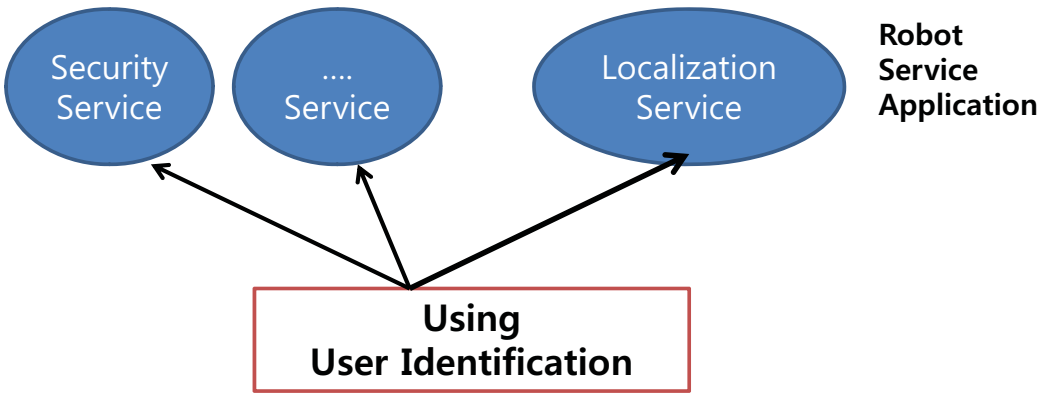
User identification technology



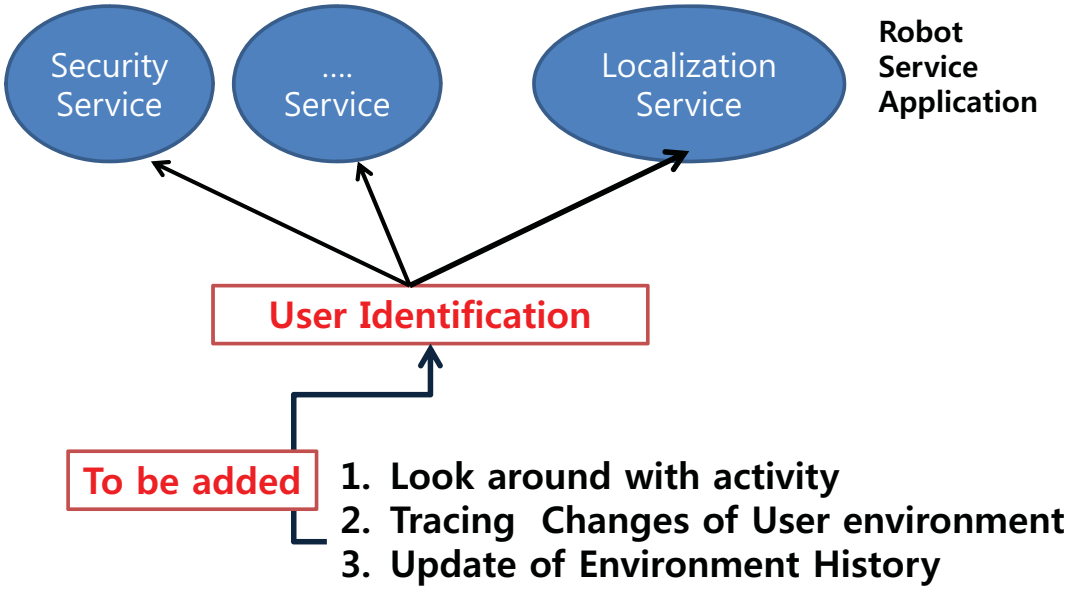
UI technology



Necessity



Change



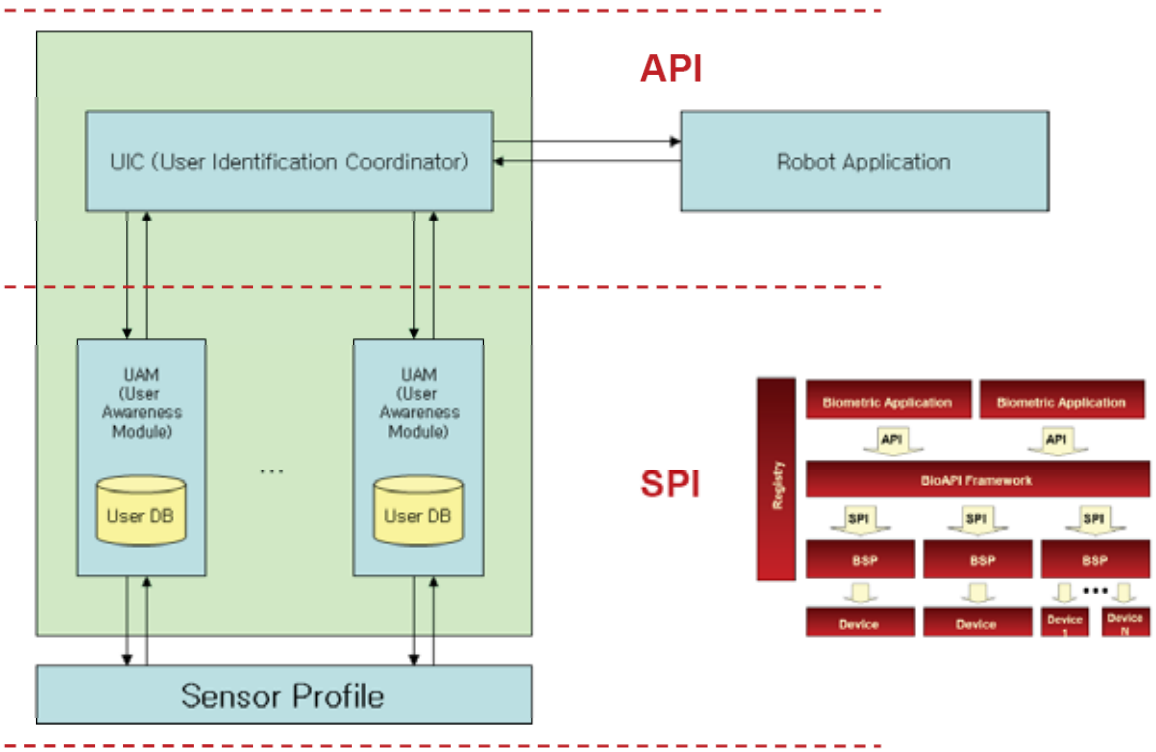
User Identification Service Interface

- **Objective**
  - User Identification Service API for Human Robot Inter action that specify common interfaces for user identifi cation service to transfer data and commands a set of common information to represent user identification.

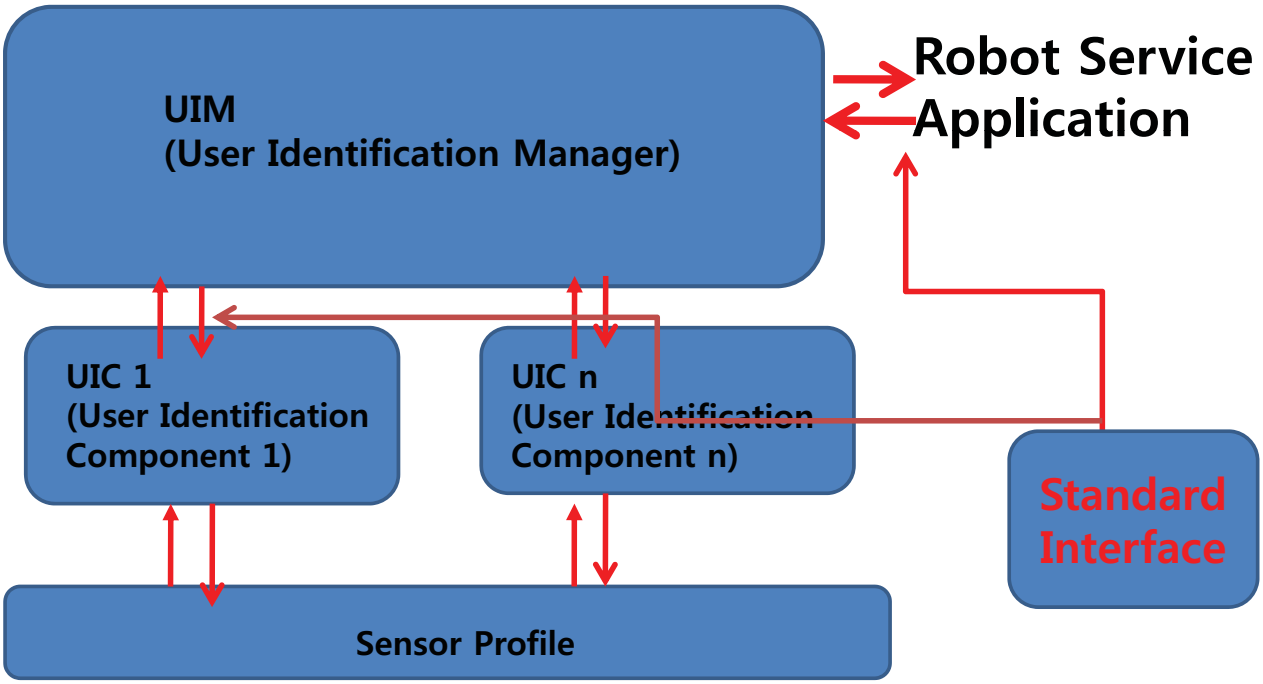
User Identification Service Interface

- **Scope**
  - Framework for supporting flexible configuration of its own functionalities
  - Interface specification to incorporate various user ide ntification on sensors and algorithms.
  - Data representation for its external application interfa ce as well as its internal functionalities
  - Interoperability, Reusability
  - Real-time operations

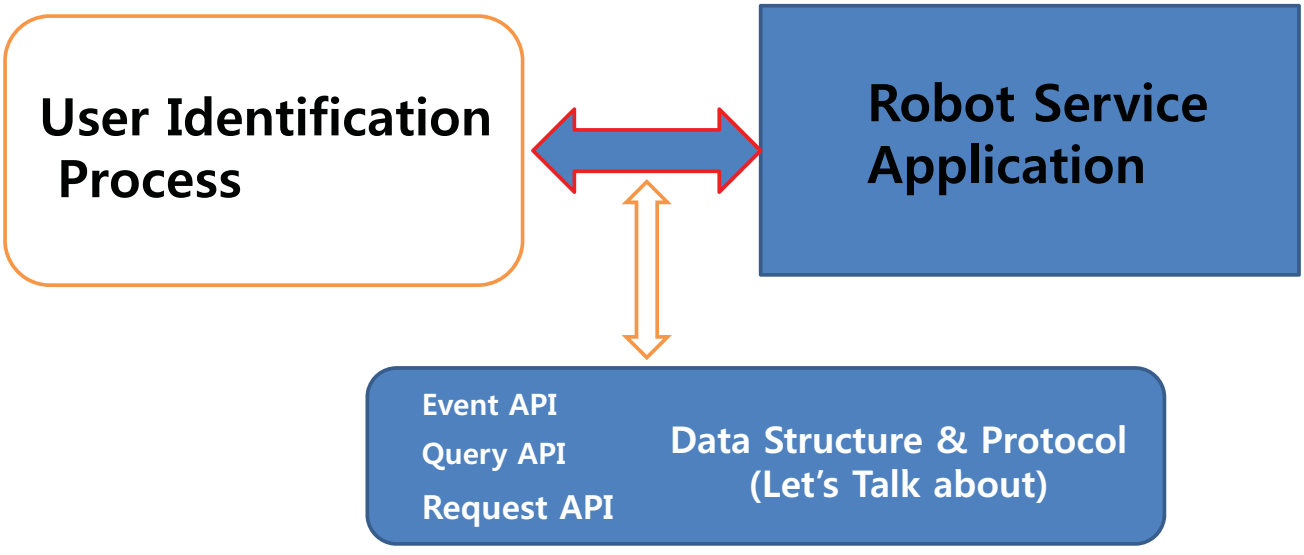
UIS Interface Structure



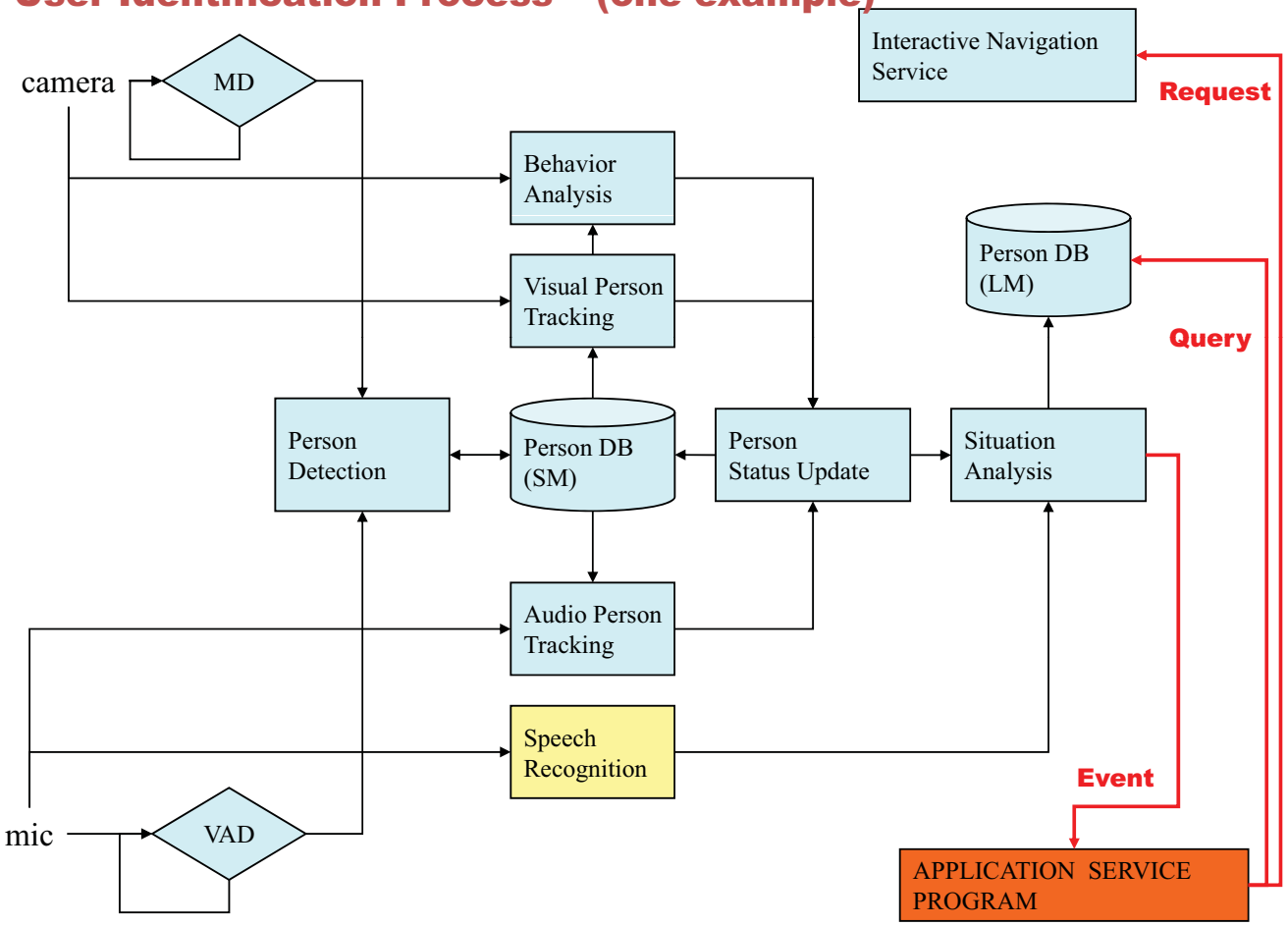
The Structure of Proposal Standard



How can we make a Standard Interface? (Basic Idea)



User Identification Process – (one example)



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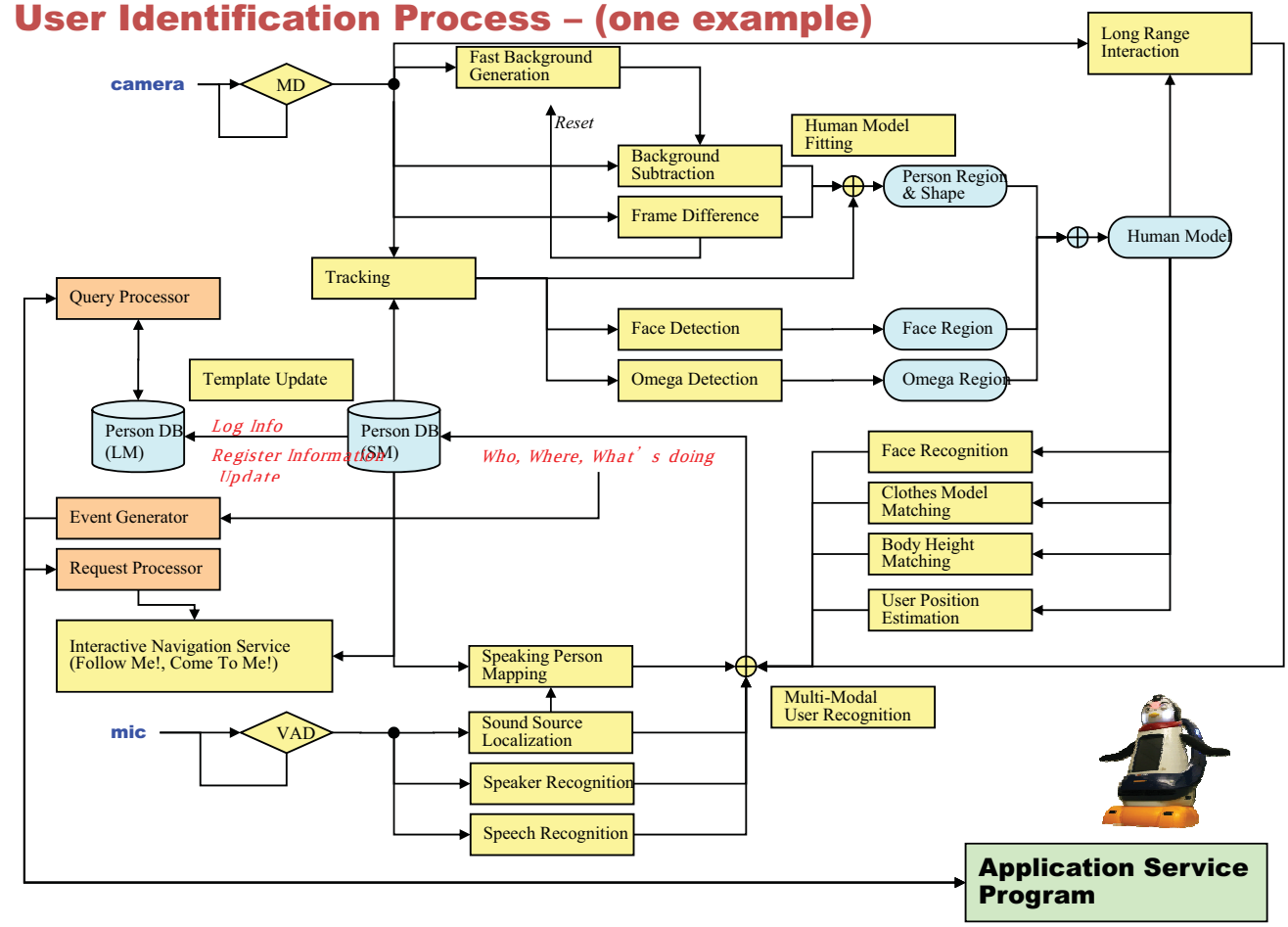


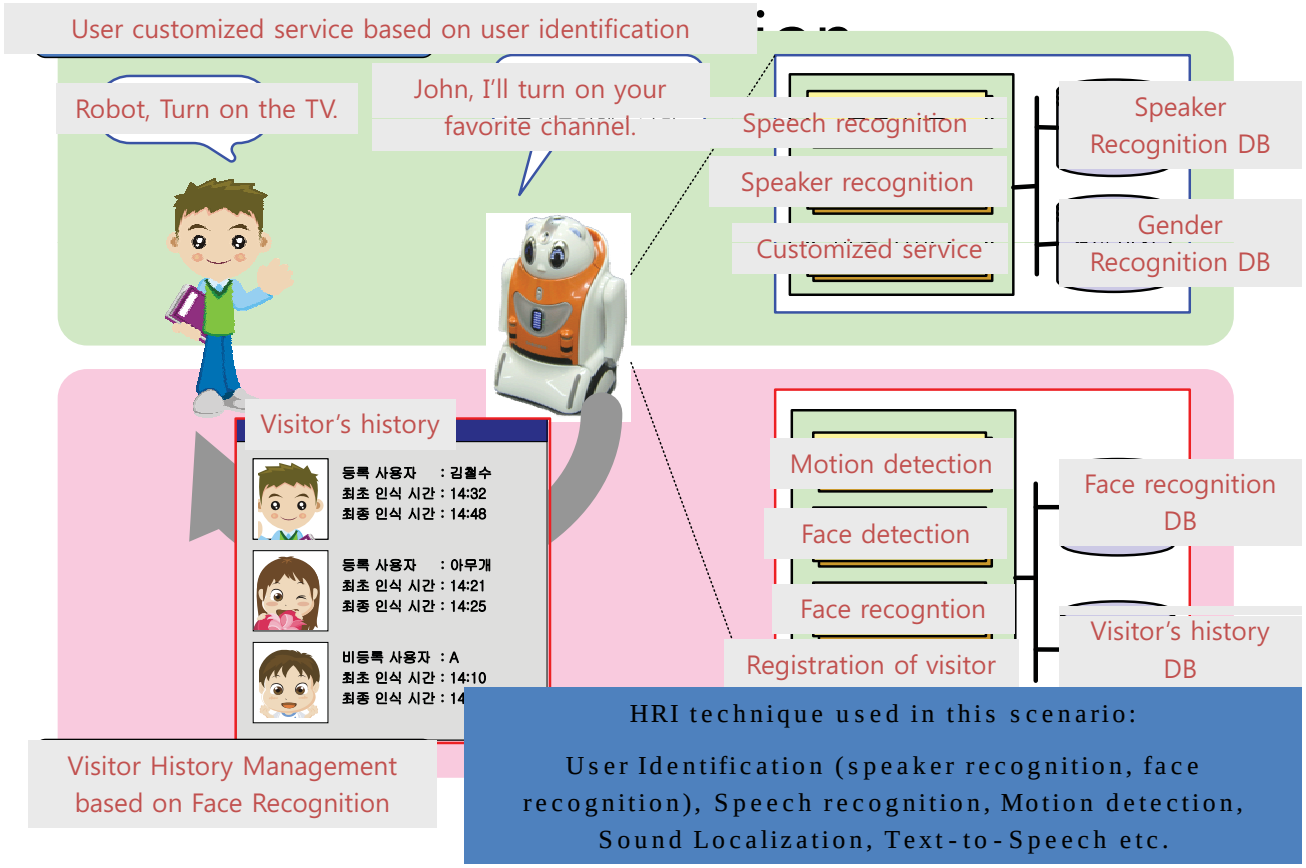
Difference

BioAPI	Robot Application
Single Time Operation User identification is a one-time event. Once a user is authorized, the intended transaction starts, and the authentication module no longer intervenes.	**Continuous Operation** Interacting users change continuously. Thus the process should be able to track the users appropriately.
Single User Recognize single user	**Multi-user** In many cases, more than one user exists for which the robot should be aware
Controlled Environment The capturing process is strictly regulated and the users are extremely cooperative because the failure in authentication results in inconvenience or even a danger for that user.	**Uncontrolled Environment** The robot must recognize the users continuously. Thus, it is unrealistic to expect users to cooperate constantly for the robots.
User ID Answer the question "Who is the person?"	**User ID and Position** Answer not only "Who is the person?" but also "Where is that person?"
Passive The authentication function is called when it is needed.	**Active** The authentication function should be running continuously. The function not only responds to the request of the application to identify a certain user, but also raises events when a new user appears or disappears.

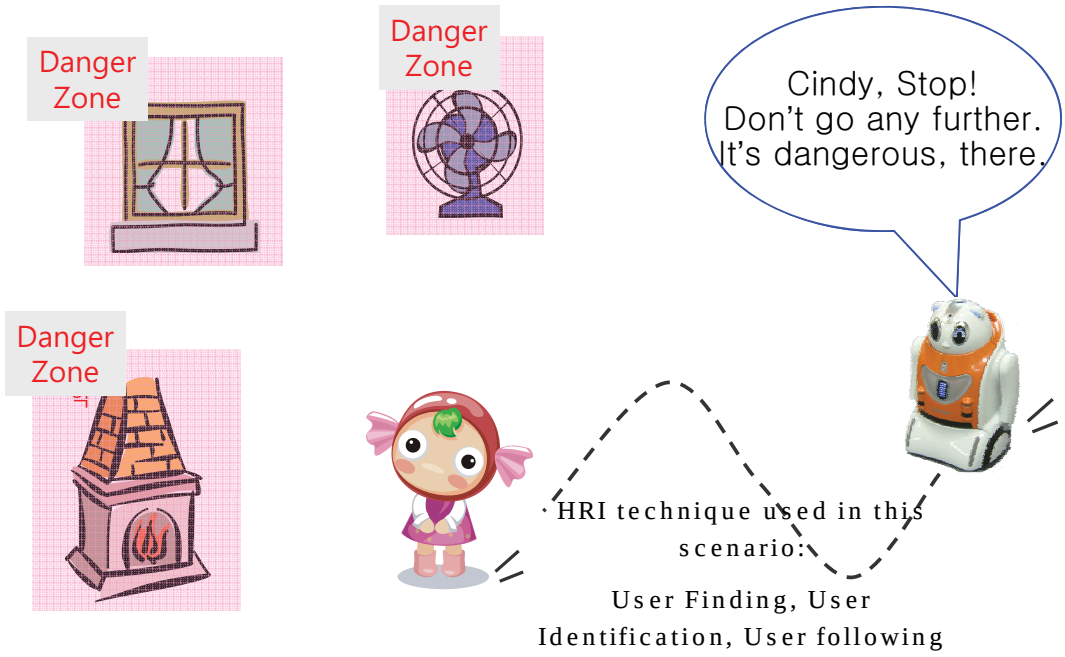
Compare BioAPI to UIS Interface

Items	UIS	BioAPI
Platform	Robot(Independent)	Security Device
Application	HRI + Security	Security
Language	CORBA	JAVA
Purpose	Robot Application	Interworking between components
Data Capture	Automatic	Human Support
Status	NWIP	IS
Committee	OMG(Consortium)	ISO(International Standard)

Typical Scenario based on User



Kid protection service based on User Identification



UIS Strategy

- **Robot Specified Functions**
  - **BioAPI + Robot Specified Functions**
  - **Human Detection & Tracking**
  - **Biometric Data Detection (Face, Voice, Gait, etc)**
  - **Problems on Moving Platform**
  - **Robotic Applications**
  - **Conformance Methodology**
- **Issues : Vocabulary, Biometric Data Format, Performance, …**
- **Standard Activity**
  - **OMG UIS ->SC37 19784 Amendment Part N : BioAPI-Robot**

How can we communicate between User Identification Process and Robot Service Application?

- Event from Application Service to User Identification Process
  - "Identify the person who have just asked to play a music"
  - "Where is your mother?"
  - "Who is calling me from the right hand side?"
  - "Who is that person visible from the camera image?"
- Event from User Identification Process to Application Service
  - "We have found (possible person's ID with likelihood list) from the 60 degree direction"
  - "(possible person's ID with likelihood list) is calling you from 130 degree direction"
  - "(possible person's ID with likelihood list) has disappeared from our camera view"

User Identification Process to Application Service(1)

Event List

- SoundDetected
  - The direction of the sound is detected
- MotionDetected
  - The position of the motion is detected
- PersonFound
  - A user is found, but not identified
- UserIdentified
  - The user is identified
- UserProbabilityChanged
  - The likelihood of the user ID has been changed
- SpecificUserAppeared
  - The specific user that Applciaton has requested, has appeared.

User Identification Process to Application Service(2)

- User Identification Process needs events for user disappearance, since it has the user tracking feature.

- PersonDisappeared
  - A user has disappeared (including multiple user cases)
- SpecificUserDisappeared
  - Specific user that Application requested, has disappeared.

- Separate Event may be needed according to the relative position between the user and the robot
- PersonInsideArea
  - When somebody approached within certain distance from the robot.

User Identification Process to Application Service(3)

Events more specific than "PersonFound", may be needed.

- FaceDetected
  - The user's face is detected, but not identified (including the position information)
- VoiceDetected
  - The user's voice is detected, but not identified (including the position information) – this is when the speech/non-speech discrimination is possible.

Auxiliary information of the user recognition

- UserGenderClassified
  - User is not identified, but the gender is classified.
- UserAgeClassified
  - User is not identified, but the age is classified.

Application Service to User Identification Process (1)

Enumeration

- int GetNumberOfUAM();
- UAMInfo GetUAMInfo(int nth);
  - Function for UAM Enumeration in the HRI Demon System
- UAMInfo {
  - Int UAMID;
  - Int Media; (such as image, sound, distance, human sensor)
  - BOOL NeedEnrollment;
  - };
- BOOL Initialize()
- BOOL Destroy()
- Void SetProperties(UAMID, Properties p)
  - Property is used when certain information is to be set for a specific UAM
- Properties GetProperties(UAMID)
  - Get property information assigned for a specific UAM.

Application Service to User Identification Process (2)

Enrollment

- BOOL EnrollUser(UAMID, UserInfo);
  - Enrol process is assigned to the UAM, including user interface for enrollment.
  - The result indicates success or fail, using BOOL.
  - The registered data is managed by the UAM itself.

- EnrollInfo GetEnrollmentData(UAMID, UserInfo);
- EnrollInfoArray GetEnrollmentData(UAMID);
  - These two functions are used when the registered data is needed for backup etc.
  - The first one is used for separate data, and the second one is used for all user's data registered at the UAM.
- BOOL DeleteEnrollment(UAMID, UserInfo);
  - This is used to delete the registered data.

Application Service to User Identification Process (3)

Matching

- BOOL AddCandidate(UserInfoArray);
  - To pre-set the specific users as the matching candidate. In this case, the users need to be pre-registered.
- BOOL RemoveCandidate(UserInfoArray);
  - To remove the specific user from the matching candidate list.
- UserInfoArray GetCandidateList();
  - To get the user list, registered as the matching candidate.
- UserInfoArray MatchUser(UAMID);
- UserInfoArray MatchUser();
  - To perform the user identification.
  - This can give command for user identification to a specific UAM.
  - This can also give command to all UAM available to UIC, and get the combined results.
  - When the user is more than one person, the return value is UserInfoArray (User ID with likelihood list and the position information may be transmitted.).

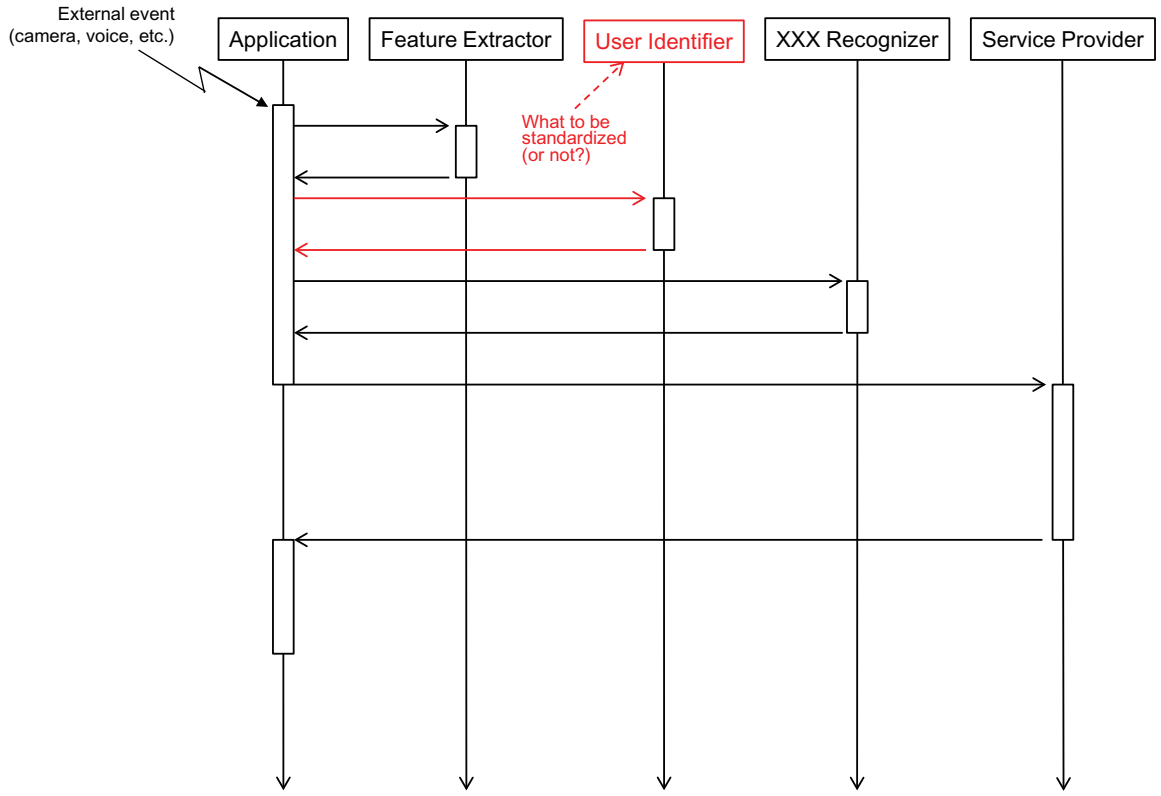
Application Service to User Identification Process (4)

- PositionInfo FindUser(UserInfo);
  - To find the specific user (if the user can be found, the position of that user can be returned) – even if the user is not found, the system may return the previous history of that user, such as “your mother has moved into the main bedroom five minutes ago”.
- UserInfoArray GetUserMap();
  - This returns the list of visible users, including the position info.

Event Control

- Void SetEvent(UAMID, EventInfo, CallBack, OnOff);
  - This set or reset a certain Event.
  - This is the self-controlled Event of UIC to Application, without the request of Application.
  - It should be noted that only the pre-set Event may happen
    (pre-set Event : Events that was set by Application by “SetEvent”.)
- Void RaiseEvent(EventInfo);

Sequence diagram



2009.09.15 by Toshio Hori

Robotics DTF Function Service WG

OMG User Identification Service Interface

Dr. Su Young, Chi in ETRI

2009-09-14

September 14-18, 2009, San Antonio, TX USA

Co-Chairs: Su-Young Chi (ETRI), **Toshio Hori**(AIST), **Shuichi Nishio** (JARA/ATR)

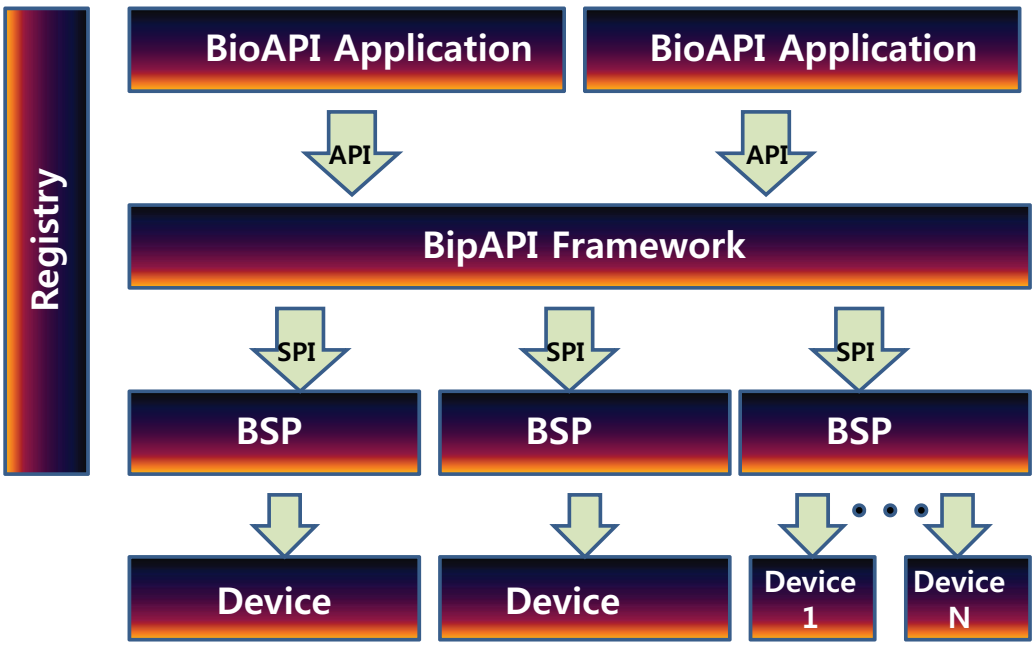
OMG : User Identification Service Interface

- **Objective**
  - The User Identification Service Interface specify common interfaces with a rich variety service robot applications for user identification Service
  - The User Identification Service Interface defines an open system standard application progra m interface(API) that allows software applications to communicate with a broad range of service robot technologies in a common way
- **Scope**
  - Framework for supporting flexible configuration of its own functionalities
  - Interface specification to incorporate various user identification on sensors and algorithms.
  - Data representation for its external application interface as well as its internal functionalities
  - Interoperability, Reusability
  - Real-time operations

OMG : User Identification Service Interface

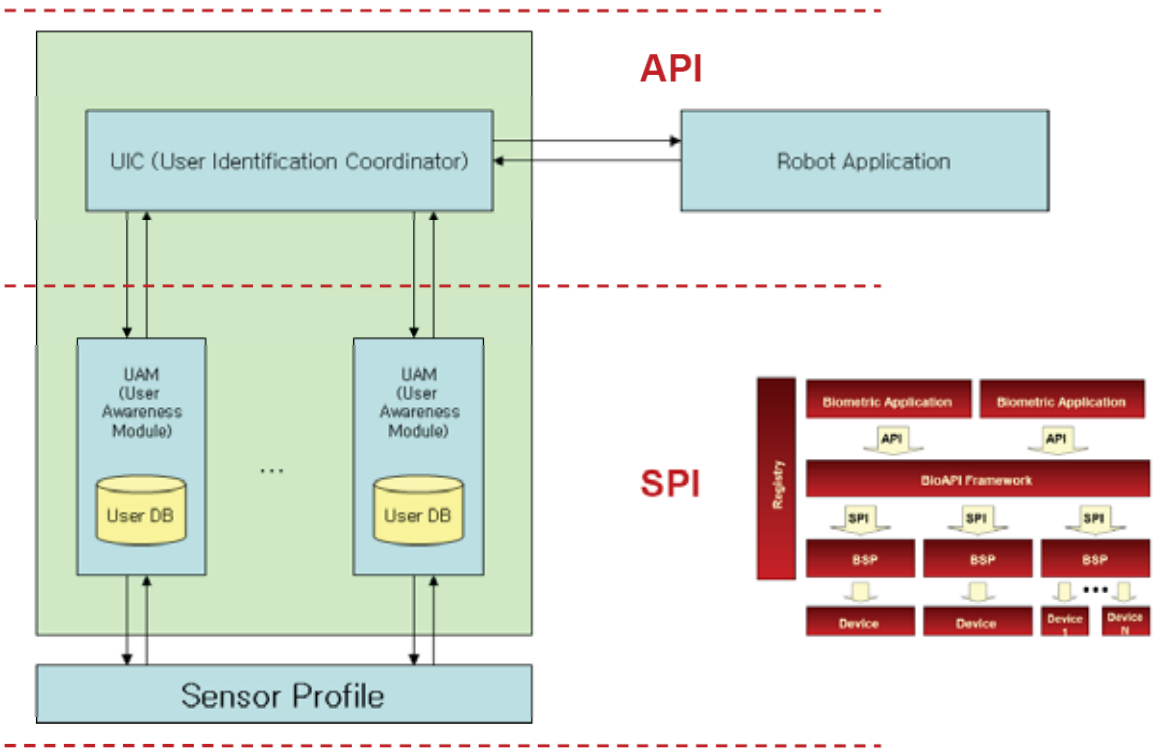
- **Main Functions**
  - **UIS Data Structures**
  - **UIS Functions**
  - **UIS Service Provider Interface**
  - **Component Registry Interface**
  - **UIS Error Handling**

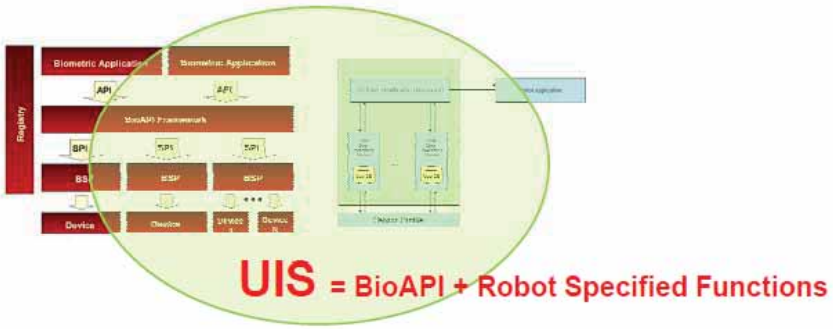
[Ref] BioAPI Interface Architecture



- SPI : Service Provider Interface
- BSP : BioAPI Service Provider

UIS Interface Structure





- **Robot Specified Functions**
  - **BioAPI + Robot Specified Functions**
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    - Problems on Moving Platform
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    - Conformance Methodology
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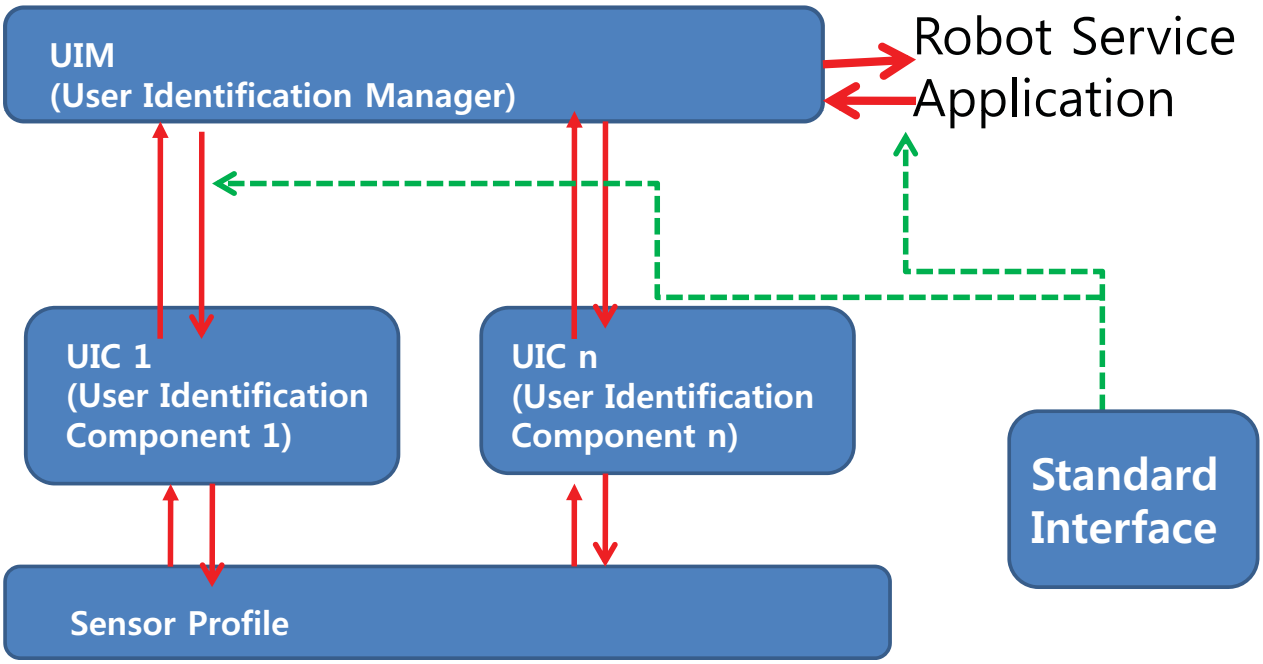
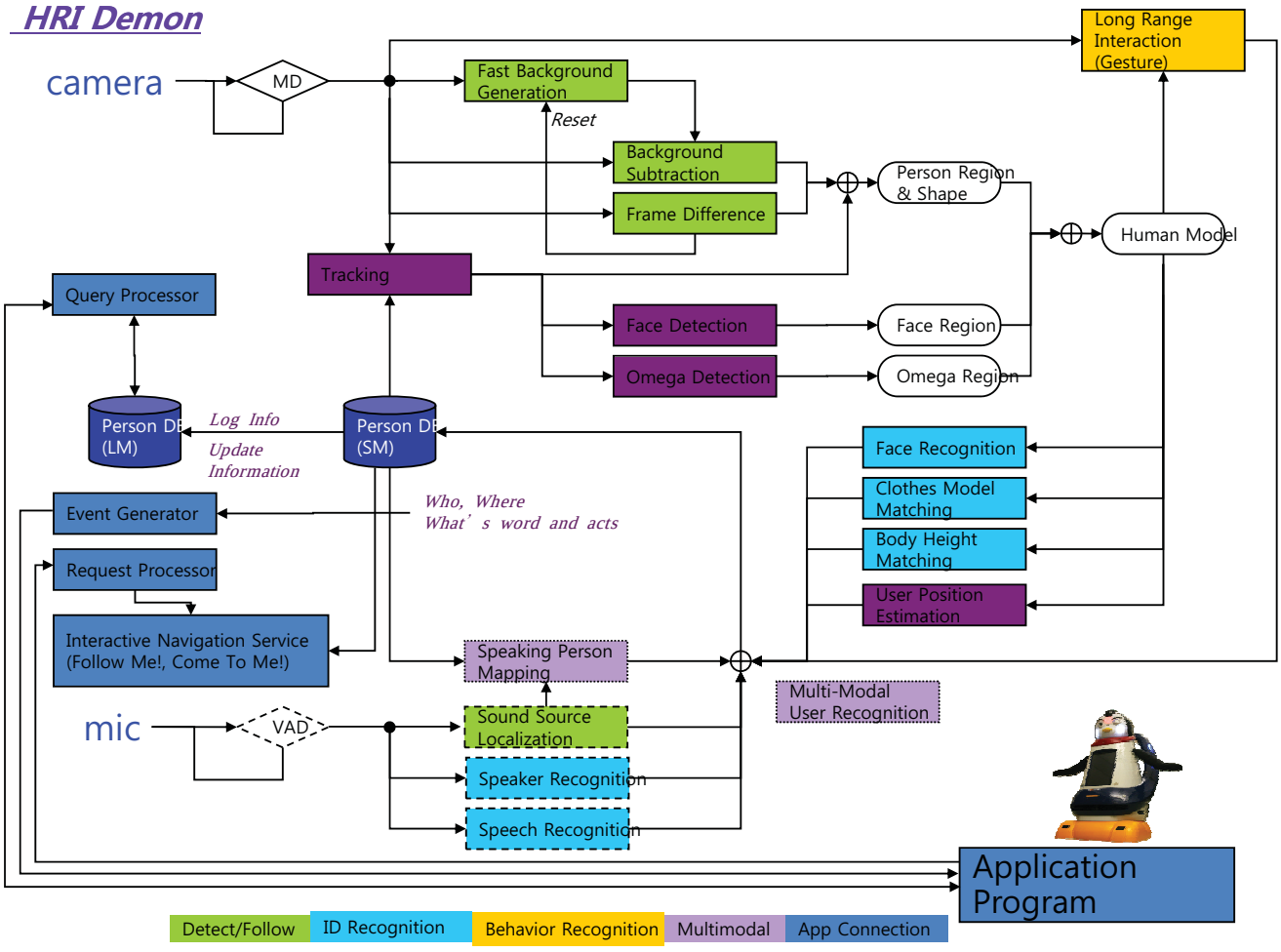
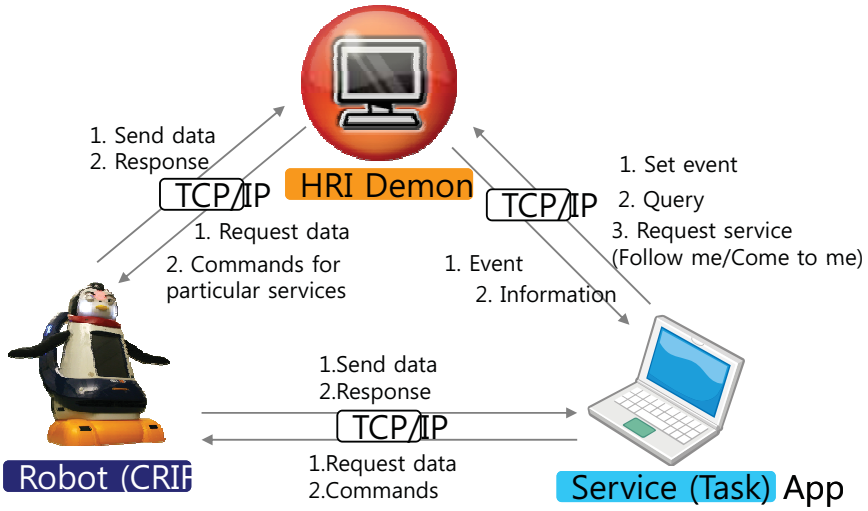
The Structure of Proposal Standard





HRI Test Package



Robotics-DTF Plenary Meeting
Opening Session

15th September, 2009

San Antonio, TX, USA

Hyatt Regency San Antonio

Approval of Minutes

Meeting Quorum : 4

AIST, ETRI, JARA, Samsung, Shibaura-IT, Univ. of Tsukuba, Technologic Arts, UEC

Minutes taker(s):
Minutes review

- **Yoshihiro Nakabo**
- **MyungEun Kim**

Washington DC Meeting Summary

Robotics Plenary: (15 participants)

- 2 New Work Item Talks
  - RTC directory service for interoperability between robotic software platforms(Kang-Woo Lee) [robotics/2009-03-06]
  - Modeling of risk assessment for service robots(Yoshihiro Nakabo) [robotics/2009-03-07]
- 1 Special Talk
  - GearBox: Peer-reviewed open-source libraries for robotics(Geoffrey Biggs) [robotics/2009-03-08]
- 3 WG Reports [robotics/2009-03-09,-10,-11]
- 2 Contact Reports [robotics/2009-03-12,-13]
- Preliminary agenda for upcoming meeting [robotics/2009-03-15]

Costa Rica Meeting Summary

- Because the swine flu continues to spread all over the world, most of our volunteers are NOT able to come to the meeting.
- We decided all the process of WG activities bring forward to the San Antonio meeting in September.

Robotic Localization Service FTF

- RLS final report was recommended in AB and DTC

Robotics Plenary: (6 participants)

- One Special Talk
  - Behavior Classification for Lifestyle Support Service, Dr. Miwako Doi (Toshiba) [robotics/2009-06-02]
- Preliminary agenda for upcoming meeting [robotics/2009-06-03]

Contact Report

Dr. Su Young, Chi
ETRI
2009.09.

ROBOT WORLD BUSAN

- ROBOT WORLD BUSAN
  - Sep 2(Wed) - 5(Sat), 2009
  - BEXCO, Busan, Korea

첨단로봇들 '부산 총출동'

'로보월드 2009' 개막… 50개업체 170개 부스 마련

로봇산업의 발전을 위해 힘쓰고 계신 산학연 전문가 그리고 유관기관 관계자 여러분께 먼저 감사의 말씀 올립니다. 우리나라는 지난 2003년에 지능형로봇산업을 국가 10대 차세대 성장동력산업으로 선정한 이후 집중 투자와 연구를 통해 국민의 삶의 질을 개선하고 국가경쟁력을 강화시키고자 역량을 결집하고 있습니다.

새로운 정부 출범 이전부터 21세기를 책임질 새로운 먹거리로 대두되었던 로봇산업은 미래 21세기의 대표적 엔도퓨처(End-user)제품으로 분류하고 관리를 해왔습니다. 이에 선제적 시장 창출을 위한 다양한 정보의 마련, 추진되며 법제정비 등을 통해 '제 2의 반도체 신화창조'의 주역으로 발전할 것이라 믿고 있습니다.

현재 1500억불 정도인 로봇산업시장이 2020년에는 5,000억불로 지속을 전망이지만 현재로서는 세계시장의 약 3%를 점유하고 있는데 불과하여 향후 지속적인 국가의 관심과 지원이 요구되는 산업분야로 판단하고, 새 정부의 21세기 국가경제를 견인하는 전략 집중 육성 산업으로 추진하고 있습니다.

이를 위해 '로보월드' 와 같은 국제적인 행사의 지속적인 개최와 이를 통한 업계의 실수요 창출은 로봇산업이 첨단기술의 융합체로 시장창출 구도를 선점할 수 있는 입거름이 될 것으로 믿습니다.

올 해를 시작으로 지방순회 개최되는 '로보월드' 를 통해 대한민국의 로봇산업이 전국적인 유통망을 형성하고 보다 활발한 국제교류를 할 수 있는 계기를 마니가 대국민 홍보의 기회가 될 것이라는 확신을 바탕으로, 투자와 수요를 촉진하여 성장적인 비즈니스의 창출에도 크게 기여하는 국제적인 로봇 행사가 될 수 있도록 로봇전문가 여러분과 관계기관 여러분의 뜨거운 성원과 관심을 부탁드립니다.

감사합니다.

로보월드 부산 2009 사무국 일동

International
Robot Industry Show 2009

International
Robot Contest 2009

International
Robot Conference 2009

The 6th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2009)

October 28-31, 2009 Gwangju, KOREA

ETRI- AIST MOU

- Event : The 2nd Presenting of OPRos & MOU(ETRI - AIST)
- When : 2009. 8. 28(Fri) 11:00 ~ 16:00
- Where : KIST Convention Center, Seoul


디지털타임스
2009년 08월 28일 금요일
002면 종합
5.1 x 21.0 cm

로봇SW 분야 기술
한-일 협력 MOU

ISO/ IEC JTC1 1 /SC24
London Meeting (2009.07)

- **New Work Item Lunching**
  - Collaboration between TC 184/SC 2 end SC 24 for joint working group
- **23. Reissue Invitation for Liaison with OMG Robotics DTF**
  - ISO/IEC JTC 1/ SC 24 requests the SC 24 Secretary to reissue an invitation to the OMG Robotics Domain Task Force (DTF) to apply for the status of a Category C Liaison with ISO/IEC JTC 1/SC 24 for the purposes of information exchange addressing imagery and visual recognition as applied in robotics software standards. ISO/IEC JTC 1/SC 24 appoints
  - Dr. Yun Koo Chung as the liaison from SC 24.
- **24. Support for New Work on Robotics Image Processing**
  - ISO/IEC JTC 1/SC 24 supports the proposal for new work on image processing for robotic applications planned by WG7 based on the proposal contained in 24n3161 entitled **"User Identification Service APIs for Intelligent Service Robots"** by Dr. Y. Chung of ETRI and requests that he prepare a new work item proposal for this work.

NZ-Japan-Korea Joint workshop

- May be held within 1 April 2010
- Prof. Bruce MacDonald apply for funding for a joint workshop by Sept 9.
- Topic
  - ETRI
    - OPRos, Healthcare, User Identification Service API
  - KIST
    - New propose to Joint workshop New Zealand, Korea, Japa n, Italy (by Dr. Oh)

Meeting for IEEE standardization activity in Robotics between ETRI and IEEE-SA

- Meeting Held on August 24 in ETRI
- There be two staffs and one IEEE-SA representative visi ting.
  - The names are; Jennie Steinhagen, Soo Hyun Kim, and Malcol m Thaden (past Standards Board member).
- Discuss
  - Make a working Group for Service Robot

Robotics-DTF Plenary Meeting
Wrap-up Session

15th September, 2009

San Antonio, TX, USA

Hyatt Regency San Antonio

Document Number

robotics/2009-09-01 Final Agenda (Tetsuo Kotoku)
robotics/2009-09-02 Washington DC Meeting Minutes [approved] (Geoffrey Biggs and Beom-Su Seo)
robotics/2009-09-03 Costa Rica Meeting Minutes [approved] (Tetsuo Kotoku)
robotics/2009-09-04 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2009-09-05 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2009-09-06 Deployment and Configuration in OMG CORBA Component Model (Noriaki Ando)
robotics/2009-09-07 Ice features related to the component repository concept (Geoffrey Biggs)
robotics/2009-09-08 EJB Deployment Service (Seung-Woog Jung)
robotics/2009-09-09 OPRoS Deployment Service (Seung-Woog Jung)
robotics/2009-09-10 Directory Service (OSGi and Web Service) (MyungEun Kim)
robotics/2009-09-11 RTC Deployment and Dynamic Reconfiguration (Hyun Kim)
robotics/2009-09-12 Infrastructure WG Progress Report (Noriaki Ando)

Document Number (cont.)

robotics/2009-09-13 Review of User Identification Service Interface (Su-Young Chi)
robotics/2009-09-14 User Identification Service Sequence Diagram (Su-Young Chi)
robotics/2009-09-15 OMG User Identification Service Interface (Su-Young Chi)
robotics/2009-09-16 Opening Presentation (Tetsuo Kotoku)
robotics/2009-09-17 Contact Report (Su-Young Chi)
robotics/2009-09-18 Wrap-up Presentation (Tetsuo Kotoku)
robotics/2009-03-19 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2009-09-20 Robotics-DTF Infrastructure WG Activity - MARS-Robotics Joint Plenary Presentation (Noriaki Ando)
robotics/2009-03-21 DTC Report Presentation (Tetsuo Kotoku)
robotics/2009-03-22 Washington Meeting Minutes - DRAFT (Yoshihiro Nakabo and MyungEun Kim)

Organization

Robotics-DTF
- Laurent Rioux (Thales)
- Tetsuo Kotoku (AIST, Japan)
- Young-Jo Cho (ETRI, Korea)

Steering Committee — All volunteers

Publicity Sub-Committee
- Abheek Bose (ADA Software, India)
- Call for Volunteer

Contacts Sub-Committee
- Makoto Mizukawa (Shibaura-IT, Japan)
- Call for Volunteer

Technical WGs

Infrastructure WG
- Noriaki Ando (AIST, Japan)
- Beom-Su Seo (ETRI)

Robotic Functional Services WG
- Soo-Young Chi (ETRI, Korea)
- ~~Hyunsoo Kim (Samsung, Korea)~~
- Shuichi Nishio (JARA/ATR, Japan)
- Toshio Hori (AIST, Japan)

Robotic Data and Profiles WG
- Bruce Boyes (Systronix, USA)
- Laurent Rioux (Thales)

Robotic Localization Services WG
- Jaeyeong Lee (ETRI, Korea)
- Yeon-Ho Kim (Samsung, Korea)
- Shuichi Nishio (JARA/ATR, Japan)

Next Meeting Agenda

Dec 7-11(Long Beach, CA, USA)

Tuesday:

WG activity [Parallel WG Session]
- **Service WG**
- **Infrastructure WG**

Wednesday:

Steering Committee (morning)

WG activity [Parallel WG Session] (am)
- **Service WG**
- **Infrastructure WG**
- **UML Profiling Meeting**

Robotics-DTF Plenary Meeting (pm)
- **Guest and Member Presentation**
- **Contact reports**

Thursday:

WG activity follow-up [if necessary]
- **Service WG**
- **Infrastructure WG**
- **UML Profiling Meeting**

Agenda Review

Mon(Sep. 14th):

Steering Committee

WG activities(PM): Service WG, Infrastructure WG

Tue(Sep. 15th):

WG activities(AM) Service WG, Infrastructure WG

UML Profiling Meeting: CANCELED

Robotics-DTF Plenary (PM)

Wed(Sep. 16th):

WG activity: Service WG , Infrastructure WG(PM)

Joint Plenary with MARS (16:00-16:30)

please check our up-to-date agenda
http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

Related Events

- International Robot Exhibition (iREX2009)
  Nov. 25 (Wed.) – 28 (Sat.), 2009 in Tokyo
  http://www.nikkan.co.jp/eve/irex/english/index.html
- IEEE International Symposium on System Integration (SII2009)
  Nov. 29 (Sun.), 2009 in Tokyo
  http://www.openrtm.org/sii2009/

Demonstration in iREX2009

http://www.nikkan.co.jp/eve/irex/english/index.html/

Attendee (15 participants)

- Geoffrey Biggs (AIST)
- Hyun Kim (ETRI)
- Makoto Mizukawa (Shibaura-IT)
- MyungEun Kim (ETRI)
- Noriaki Ando (AIST)
- Seung-Woog Jung (ETRI)
- Shuichi Nishio (JARA/ATR)
- Su-Young Chi (ETRI)
- Takashi Tsubouchi (Univ. of Tsukuba)
- Takashi Suehiro (UEC)
- Takeshi Sakamoto (Technologic Arts)
- Tetsuo Kotoku (AIST)
- Toshio Hori (AIST)
- Yeon-Ho Kim (Samsung)
- Yoshihiro Nakabo (AIST)

Robotics Domain Task Force Preliminary Agenda ver0.0.2 **robotics/2009-09-19**

OMG Technical Meeting - **Long Beach, CA, USA** -- Dec. 7-11, 2009

http://robotics.omg.org/

		TF/SIG				
		Host	Joint (Invited)	Agenda Item	Purpose	Room
Monday:						
12:00	13:00	**LUNCH**				
13:00	18:00			Architecture Board Plenary		
13:00	18:00			Robotics new work item discussion meeting	discussion	
Tuesday: WG activites						
9:00	9:45			Robotics Steering Committee	Arrangement	
10:00	12:00			Robotic Infrastructure WG (2h) - Noriaki Ando(AIST) and Beom-Su Seo (ETRI)	discussion	
				Robotic Services WG(2h): - Su-Young Chi(ETRI), Hyunsoo Kim(Samsung), and Toshio Hori(AIST)	discussion	
12:00	13:00	**LUNCH**				
13:00	18:00			Robotic Infrastructure WG (5h) - Noriaki Ando(AIST) and Beom-Su Seo (ETRI)	discussion	
				Services WG(5h): - Su-Young Chi (ETRI), and Toshio Hori (AIST)	discussion	
Wednesday: WG activities and Robotics Plenary						
9:00	11:00			Robotic Infrastructure WG (2h) - Noriaki Ando(AIST) and Beom-Su Seo (ETRI)	discussion	
				Robotic Services WG(2h) - Su-Young Chi and Toshio Hori	discussion	
11:00	12:00			Robotic UML Profiling Meeting (1h) - Laurent Rioux (Thales)	presentation and discussion	
12:00	14:00	**LUNCH and OMG Plenary**				
14:00	14:15	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	
14:15	15:00	Robotics		**Special Talk: Introduction to DDS and its appreciation in Robotics (tentative)** **- Rick Warren (RTI)**	presentation and discussion	
				Break (30min)		
15:30	16:15	Robotics		**Special Talk: <Call for Presentation>** - **TBA**	presentation and discussion	
16:15	17:15	Robotics		WG Reports and Discussion (Service WG, Infrastructure WG, Profiling Meeting)	presentation and discussion	
16:30	17:15	Robotics		Contact Reports: - Makoto Mizukawa(Shibaura-IT), and Young-Jo Cho(ETRI)	Information Exchange	
17:15	17:30	Robotics		Robotics-DTF Plenary Wrap-up Session (Roadmap and Next meeting Agenda)	Robotics plenary wrap-up	
17:30				Adjourn plenary meeting		
17:30	17:45			Robotics WG Co-chairs Planning Session (Preliminary Agenda for next TM, Draft report for Friday)	planning for next meeting	
18:00	20:00	**OMG Reception**				
Thusday: WG activity follow-up						
9:00	12:00			Services WG(3h): User Identification Service RFP Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
12:00	13:00	**LUNCH**				
13:00	18:00			Architecture Board Plenary		
12:00	14:00	**LUNCH and OMG Plenary**				
14:00	18:00			Robotic Services WG(4h): - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
Thursday						
12:00	13:00	**LUNCH**				
13:00	18:00			Architecture Board Plenary		
Friday						
8:30	12:00			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)		

Please get the up-to-date version from http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

mars/2009-09-14
robotics/2009-09-20

Robotics DTF Infrastructure WG Activity

Noriaki Ando
National Institute of Advanced Industrial Science and Technology, Japan

Purpose of Infra. WG

- The purpose of the Infrastructure Working Group of the Robotics Domain Task Force is *to standardize fundamental models, common facilities, and middleware to support the development and integration of a broad range of robotics applications*.

OMG RTC Specification

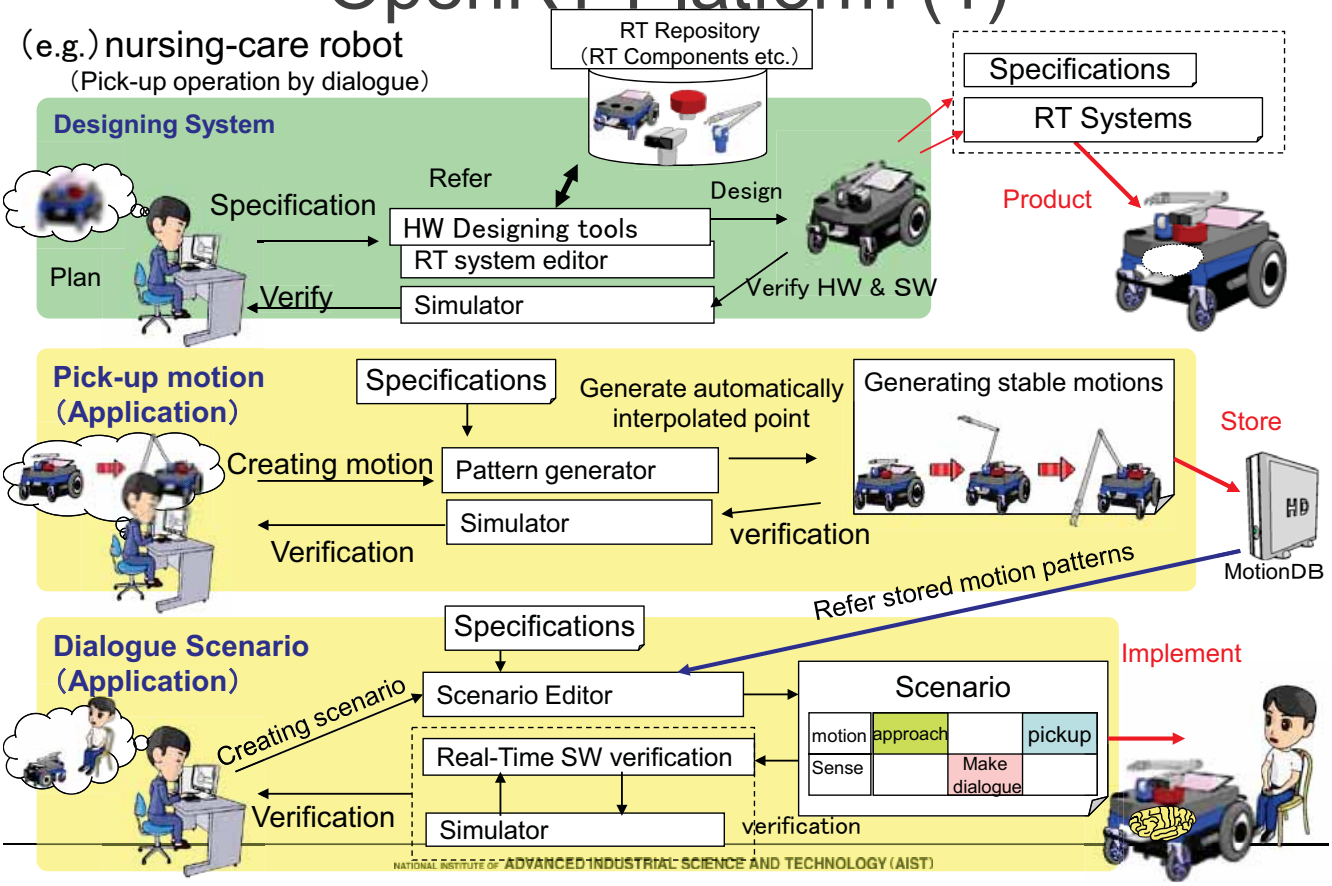
- A Robotic Technology Component (RTC) is a logical representation of a hardware and/or software entity that provides well-known functionality and services.
  - "Robotic Technology Component Specification" [formal/2008-04-04]
- Implementations:
  - OpenRTM-aist (C++, Java, Python) by AIST
  - OpenRTM.NET (C#, VB, etc..) by SEC
  - Korean OPRoS Project is implementing a middleware partially compliant with RTC specification.

RTC users

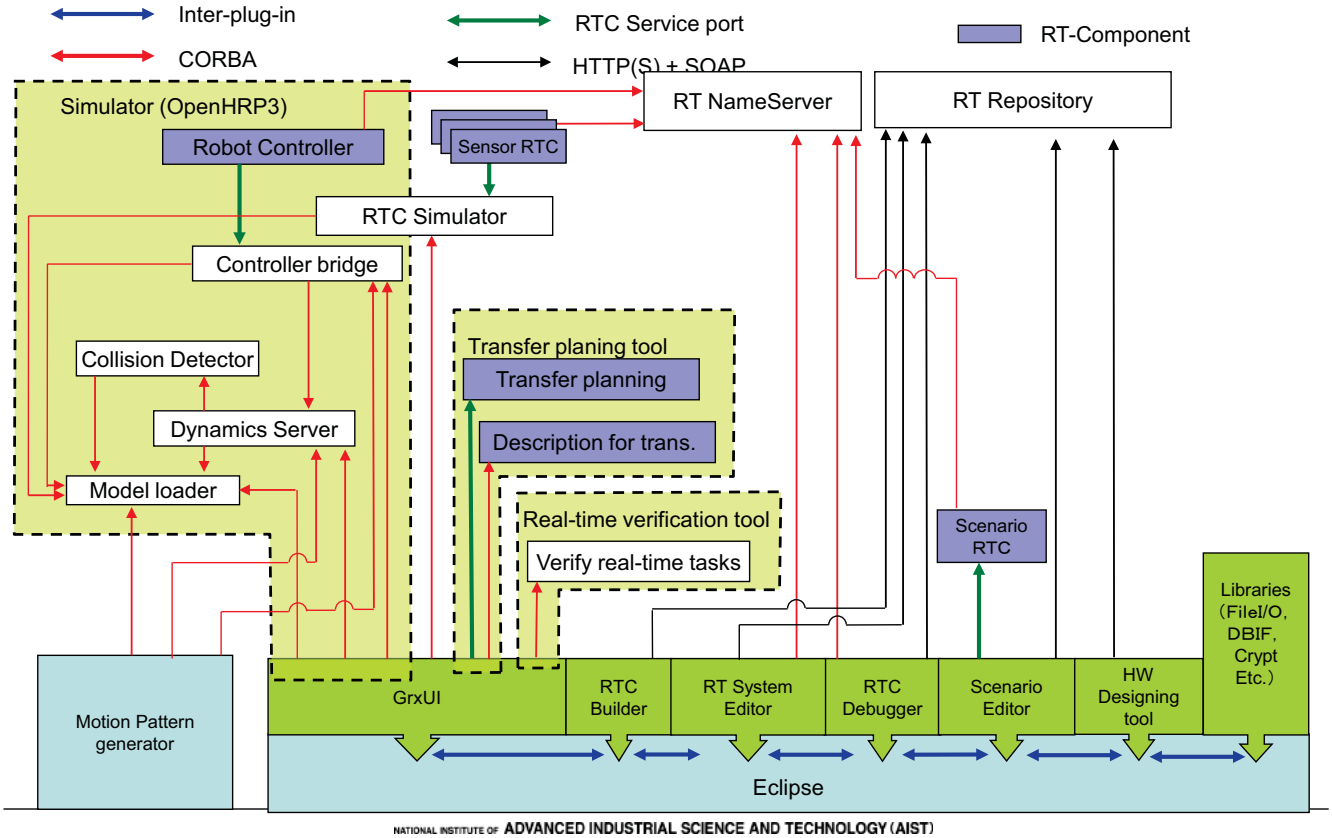
- OpenRT Platform Project (Japan)
  - 15 consortium, more than 40 organizations and companies
  - Robot software platform development
  - RTC development for service robots
- OPRoS (Open Platform for Robot Services) Project (Korea)
  - More than 25 organizations and companies
  - Robot software platform development

OpenRT Platform (1)

(e.g.) nursing-care robot
(Pick-up operation by dialogue)

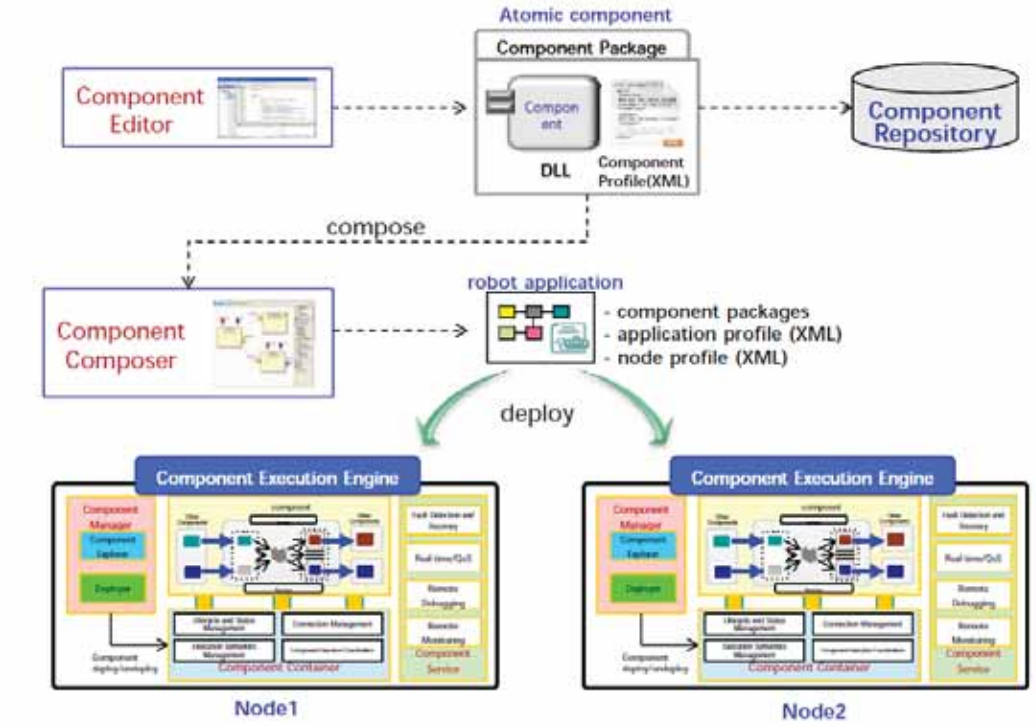


OpenRT Platform (1)

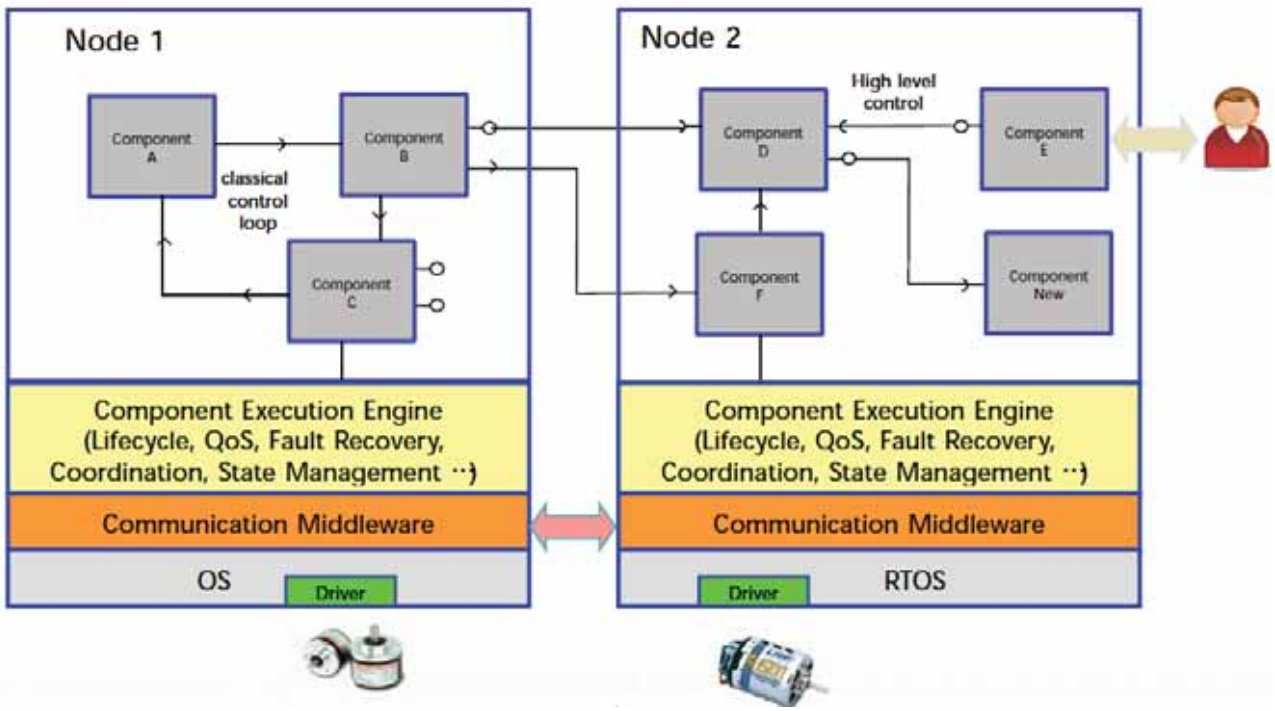


NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

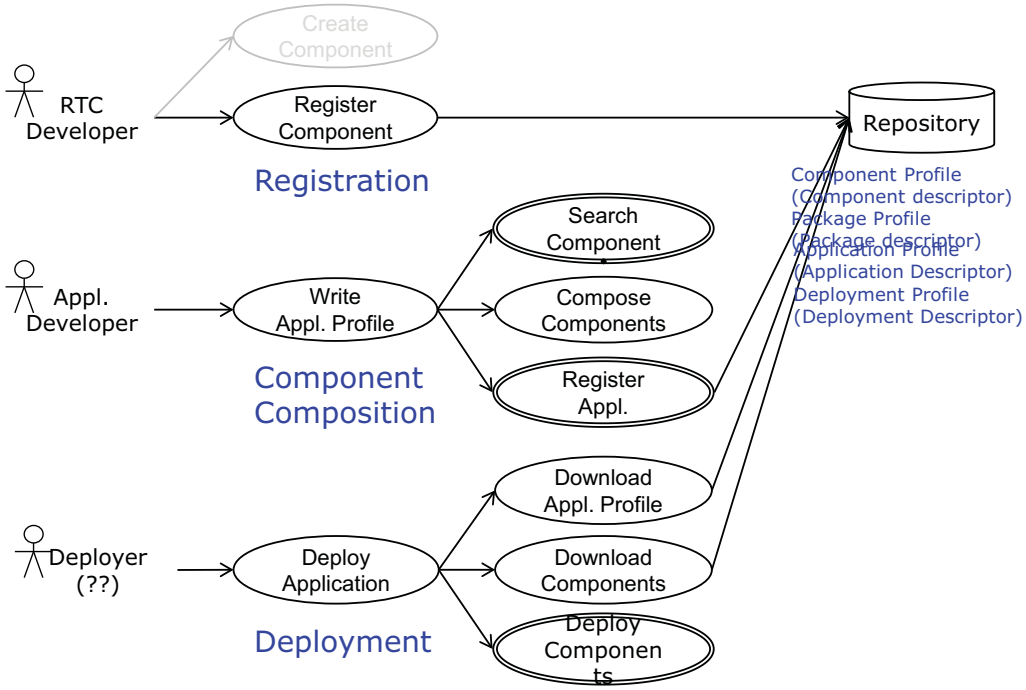
OPRoS


Atomic component
Component Package
Component Editor
Compon ent
DLL
Component Profile(XML)
Component Repository
compose
Component Composer
robot application
- component packages
- application profile (XML)
- node profile (XML)
deploy
Component Execution Engine
Component Container
Node1
Component Execution Engine
Component Container
Node2

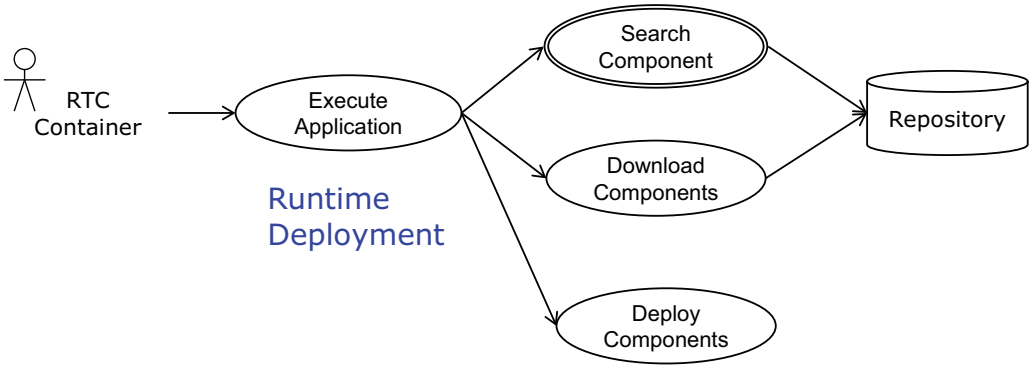
OPRoS


Node 1
Component A
Component B
classical control loop
Component C
Node 2
High level control
Component D
Component E
Component F
Component New
Component Execution Engine (Lifecycle, QoS, Fault Recovery, Coordination, State Management ···)
Communication Middleware
OS
Driver
Component Execution Engine (Lifecycle, QoS, Fault Recovery, Coordination, State Management ···)
Communication Middleware
Driver
RTOS

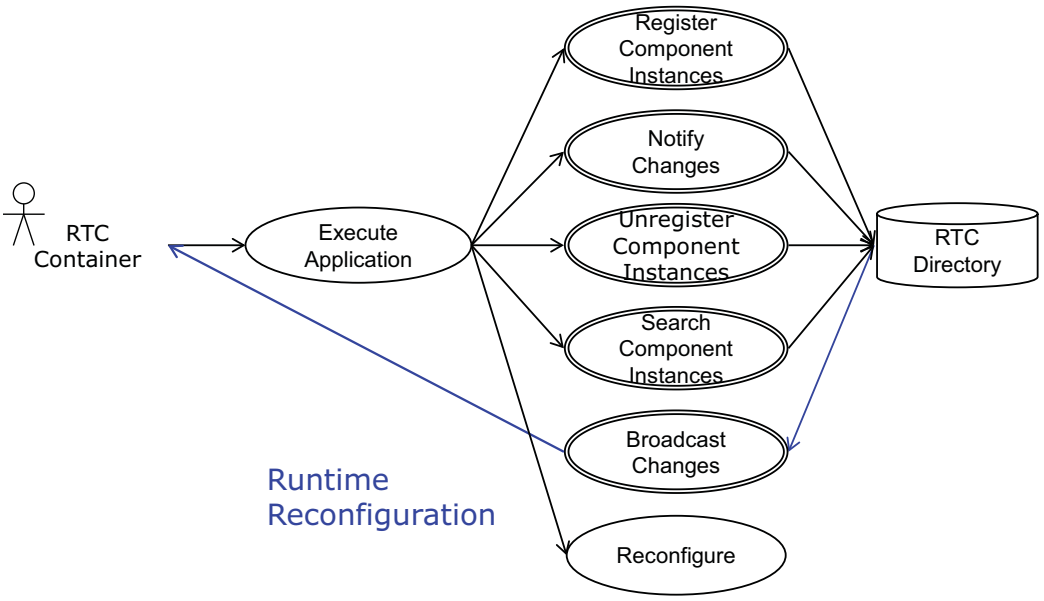
Deployment Use Case



Deployment Use Case

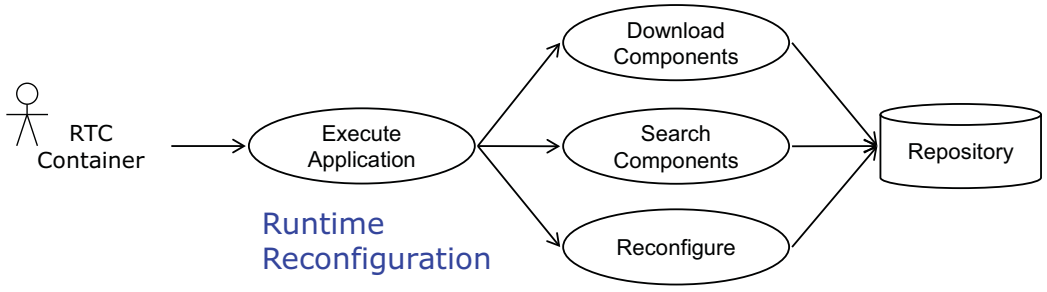


Use Case



AIST RT MIDDLEWARE

Use Case



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Related Technologies Survey

- About
  - Directory and discovery
  - Deployment and configuration
- OMG related standard
  - CCM (Deployment and Configuration)
  - Software radio
  - MARTE
- Other
  - Web service
  - Ice Box
  - OSGi
  - EJB
- What common robot specific functionality?

Discussions

- We need a new directory service to find and share services intellectually between networked robot.
  - The new directory service could provides not service
- We need dynamic re-configuration
- Robot has its own characteristics (geometrical, physical, etc…)

Why Need New Standards?

- Repository (for deployment)
  - Profiles
    - Component Profile (Component descriptor)
    - Package Profile (Package descriptor)
    - Application Profile (Application Descriptor)
    - Deployment Profile (Deployment Descriptor)
    - Device Profile (Device Descriptor) (cf. C4I)
    - Hardware Profile (Hardware Descriptor)
  - Questions
    - How to register component to repository?
    - How to search appropriate component? (search syntax)
    - How to download component from repository?
    - How to deploy component?
    - How to compose components?
  - Action
    - Registration (to repository)
    - Search
    - Download
    - Deployment
    - Component Composition

Why Need New Standards?

- Directory (reconfiguration)
  - Profiles
    - Resource Profile (Resource Descriptor)
    - Component Profile (Component descriptor)
    - Application Profile (Application Descriptor)
    - Device Profile (Device Descriptor) (cf. C4I)
    - Hardware Profile (Hardware Descriptor)
  - Questions
    - How to register component instance to directory?
    - How to search appropriate component instance? (search syntax)
    - How to notify changes to directory?
    - How to broadcast chages to other RTCs?
  - Action
    - Registration (to directory)
    - Search
    - Download
    - Notification
    - Assembly

Why Need New Standards?

- Existing specifications are not suitable for robotics.
- They are general purpose specifications, and oriented towards static systems.
- But robotic standard should consider dynamic systems.
  - Software components and system structure can be deployed and reconfigured at runtime according to the environmental changes.
- It should also consider hardware and device properties and real-time restrictions.

Summary

- OMG RTC related activities
- Infrastructure WG activity

Robotics-DTF

Date: Friday, 18th September, 2009
Chair: T. Kotoku, L. Rioux, and Y. –J. Cho
URL: http://robotics.omg.org/
email: robotics@omg.org

➢Highlights from this Meeting:

Robotics-DTF Plenary(Tue): (15 participants)

- 2 WG Reports [robotics/2009-09-12, -15]
- 1 Contact Reports [robotics/2009-09-17]
- Preliminary agenda for upcoming meeting [robotics/2009-09-19]

Joint Plenary with MARS (Wed):

- RTC deployment and dynamic reconfiguration RFP [mars/2009-09-14, robotics/2009-09-20]

Robotics-DTF

Date: Friday, 18th September, 2009
Chair: T. Kotoku, L. Rioux, and Y. –J. Cho
URL: http://robotics.omg.org/
email: robotics@omg.org

➢Deliverables from this Meeting:

- Nothing Special

➢Future deliverables (In-Process):

- Robotic User Identification Service RFP (tentative)
- RTC deployment and dynamic reconfiguration RFP (tentative)

➢Next Meeting (Long Beach, CA, USA):

- 1st Review of RTC deployment and dynamic reconfiguration RFP
- Guest presentations
- Roadmap discussion
- Contact reports

Minutes of the Robotics DTF Plenary Meeting - DRAFT

September 14-18, 2009

San Antonio, TX, USA

(robotics/2009-09-22)

Meeting Highlights

- We came to an agreement to submit 1st draft of "RTC deployment and Dynamic Reconfiguration RFP" at the upcoming Long Beach Meeting. [robotics/2009-09-12]
- We had Joint Plenary with MARS and made a discussion about "RTC deployment and Dynamic Reconfiguration RFP". [robotics/2009-09-20]
- During the discussion of "Robotic User Identification Service RFP", Robotic Data Framework becomes one of potential RFP item.
- New item proposal about map for navigation from JARA, AIST, Univ. of Tsukuba, and ETRI

List of Generated Documents

robotics/2009-09-01 Final Agenda (Tetsuo Kotoku)
robotics/2009-09-02 Washington DC Meeting Minutes [approved] (Geoffrey Biggs and Beom-Su Seo)
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robotics/2009-09-16 Opening Presentation (Tetsuo Kotoku)
robotics/2009-09-17 Contact Report (Su-Young Chi)
robotics/2009-09-18 Wrap-up Presentation (Tetsuo Kotoku)
robotics/2009-09-19 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2009-09-20 Robotics-DTF Infrastructure WG Activity - MARS-Robotics Joint Plenary Presentation (Noriaki Ando)
robotics/2009-09-21 DTC Report Presentation (Tetsuo Kotoku)
robotics/2009-09-22 San Antonio Meeting Minutes - DRAFT (Yoshihiro Nakabo and MyungEun Kim)

Minutes
Monday, September 14, 2009, Directors, 3rd FL(A)
13:00 - 14:00 Steering Committee

Tuesday, September 15, 2009, Maverick A, Losoya Conf Ctr
13:10 - 13:20 Robotics DTF Plenary Meeting, Chair: Dr Kotoku, Quorum:4
Jointed Organizations: AIST, ETRI, JARA, Samsung, Shibaura-IT, Technologic Arts, Univ. of Tsukuba, Univ. of Electro-Communications

- Minutes takers: Yoshihiro Nakabo, Myung-Eun Kim
- Approval of Washington D.C minutes
  Approved: AIST(motion), JARA(second), shibaura-IT(white ballot)
- Approval of Costa Rica minutes
  Approved: AIST(motion), JARA(second), Univ. of Tsukuba(white ballot)

13:20 - 13:40 User Identification Service WG report

- Discussed the difference between Biometrics API and UIS API
- Sequence diagram of user identification
- Proposal of new item about map for navigation from JARA, AIST, Univ. of Tsukuba, and ETRI are interested
- Discussion on Korean patent concerns with robotic standards

13:40 - 14:00 Infrastructure WG report

- Related technical survey including CCM, Web service, Ice, EJB and OSGi
- Discussion about Use case for component deployment and dynamic reconfiguration
- The RFP title: RTC deployment and dynamic reconfiguration (tentative)
- Scope of the RFP: deployment & reconfiguration
- Draft RFP will be reviewed and discussed at the next two OMG meetings

14:30 - 14:50 Contact Report, Soo-Young Chi, ETRI

- Robot World Busan and URAI 2009 in Korea
- ETRI-AIST MOU on August 28, 2009
- Dr. Y. Chung proposed “user identification service APIs for intelligent service robot “ in ISO/IEC JCT1 1/SC24 London Meeting(2009.07)
- Prof. Bruce MacDonald applied for funding for NZ-Japan-Korea Joint Workshop in next year
- Meeting for IEEE standardization activity in Robotics between ETRI and IEEE-SA

Closing presentation and next agenda by Tesuo Kotoku

- Robotic Localization Services WG is continuing
- Call for volunteers
- Next meeting: December 7-11, Long Beach, CA, USA
- iREX2009 and SII2009 in Tokyo Japan

Adjourned plenary meeting at 15:05

ATTENDEE (15 Participants)

- Makoto Mizukawa (Shibaura-IT)
- Takashi Tsubouchi (Univ. of Tsukuba)
- Toshio Hori (AIST)
- Takeshi Sakamoto (Technologic Arts)
- Shuichi Nishio (JARA)
- Yeon-Ho Kim (Samsung)
- Su-Young Chi (ETRI)
- Myung-Eun Kim (ETRI)
- Hyun Kim (ETRI)
- Seung-Woog Jung (ETRI)
- Takashi Suehiro (UEC)
- Geoffrey Biggs (AIST)
- Noriaki Ando (AIST)
- Yoshihiro Nakabo (AIST)
- Tetsuo Kotoku (AIST)

Prepared and submitted by Yoshihiro Nakabo (AIST) and Myung-Eun Kim (ETRI).