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Working Group on Sensor Networks

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ISO/IEC JTC 1/WG 7 Convenor:
Dr. Yongjin Kim, Modacom Co., Ltd (Email: cap@modacom.co.kr)
ISO/IEC JTC 1/WG 7 Secretariat:
Ms. Jooran Lee, Korean Standards Association (Email: jooran@kisi.or.kr)

New Work Item Proposal:

Generic Interface between SN Gateway and User Network *(Rest of world)*

Marie Kim(mariekim@etri.re.kr)
RFID/USN Research Division, ETRI

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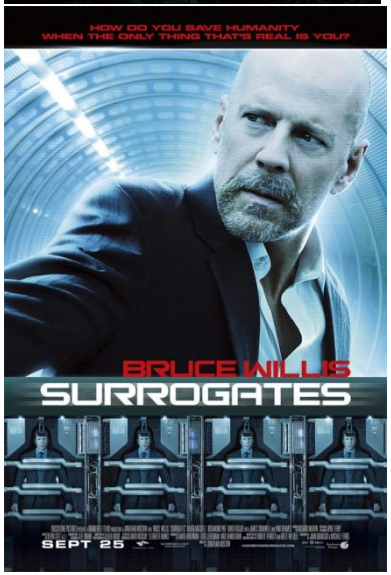
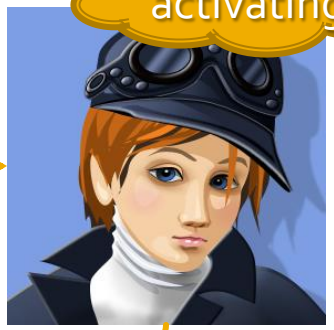
Introduction



In near future..maybe..



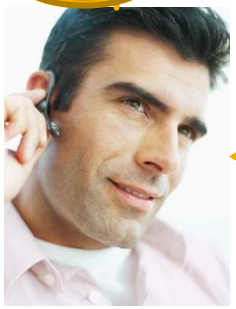
sensing & activating

control

cognition & decision

Information(visual, audio, tactual, scent, taste, etc)

Agent(avatar or surrogate)



Human being

X-reality ⇨ ***Contribute to accessibility***

Essential for realization

We need standardized interface between real world and virtual world!!!

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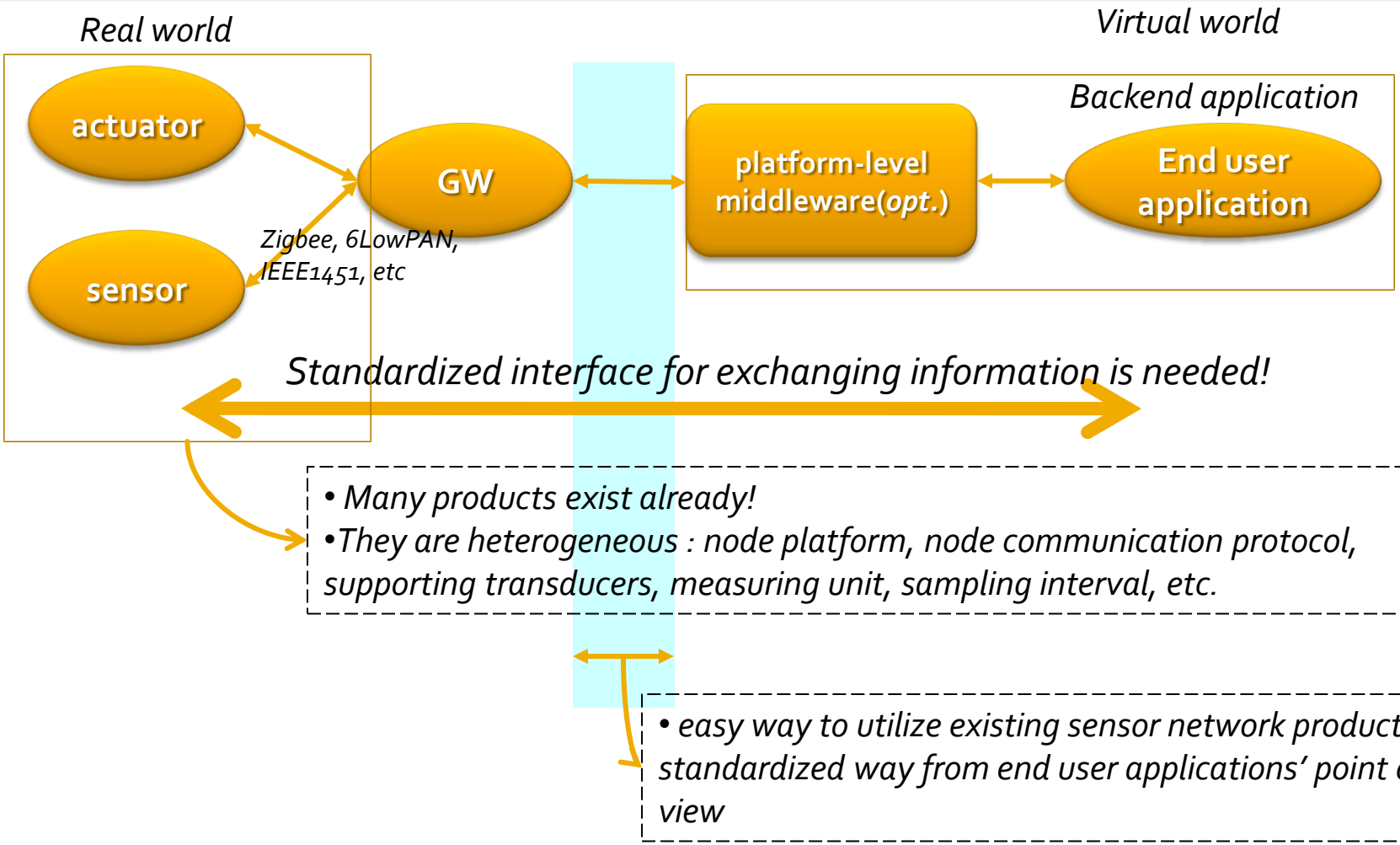
Introduction



What is "Generic interface between SN GW and User Network"?

- Sensor network service provision is a result of cooperation between backend applications(User Network) and sensor networks via SN GW.
  - Backend application can be one of followings:
    - End user application
    - End user application + platform-level middleware
  - Sensor network consists of sensor devices which is composed of node application, node middleware, hardware including transducer(s)
- Backend applications communicate with node applications via GWs.
- ***Generic interface between SN GW and User Network*** **is a communication protocol and message definitions between backend applications and node applications.**

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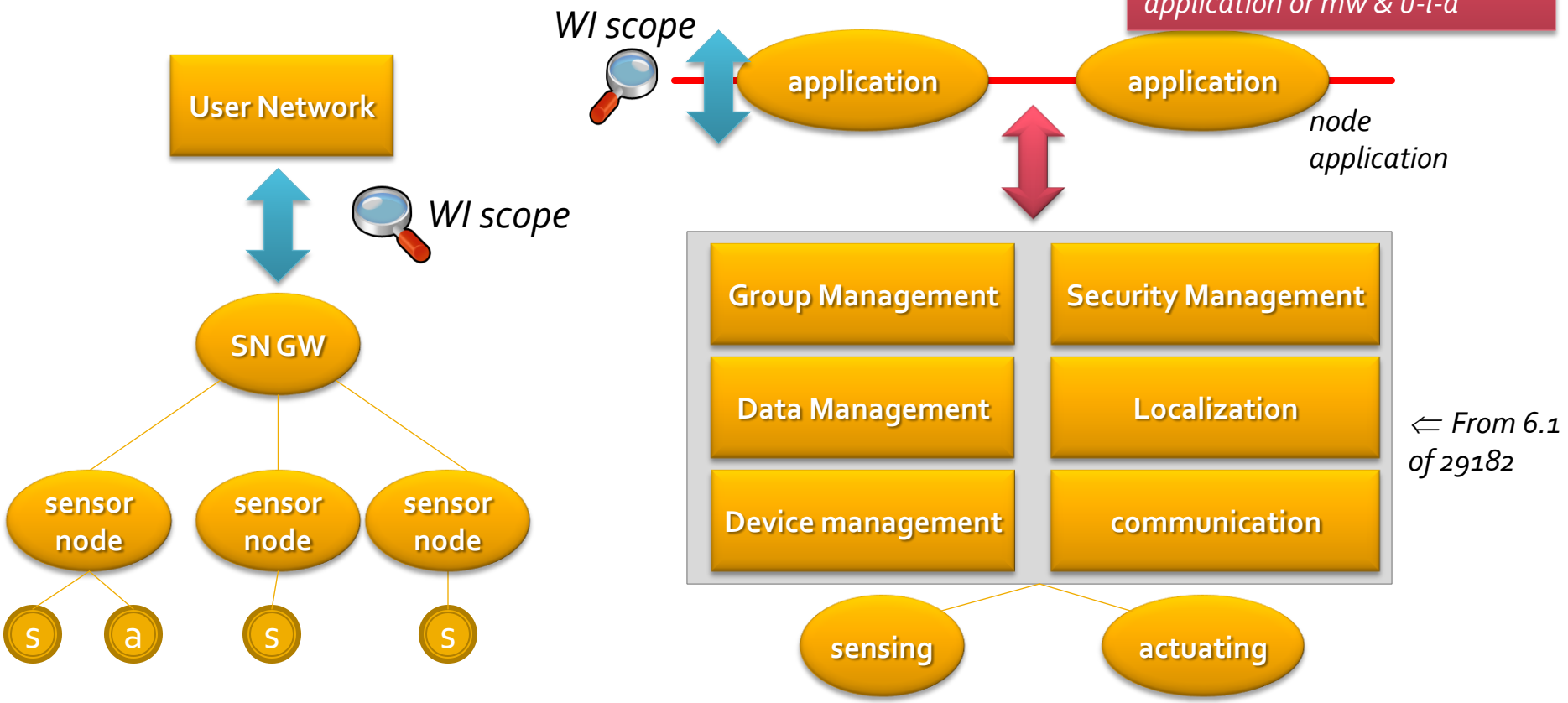
What is "Generic interface between SN GW and User Network"?



Physical SN service entities

Functional SN service entities

What is "Generic interface between SN GW and User Network"?

- Provide *interoperability* between different *SN products* and *User applications*
- Provide *development guideline* for both backend application developers and SN developers
- Provide *a way to access* node applications for backend applications
  - Based on the services which sensor devices provides and/or sensor network provides, necessary interface should be designed.
  - **Problem**: expected interactions between backend applications and sensor device applications are diverse based on the backend applications' functional requirements and supported functions by SNs. (diversity problem!)

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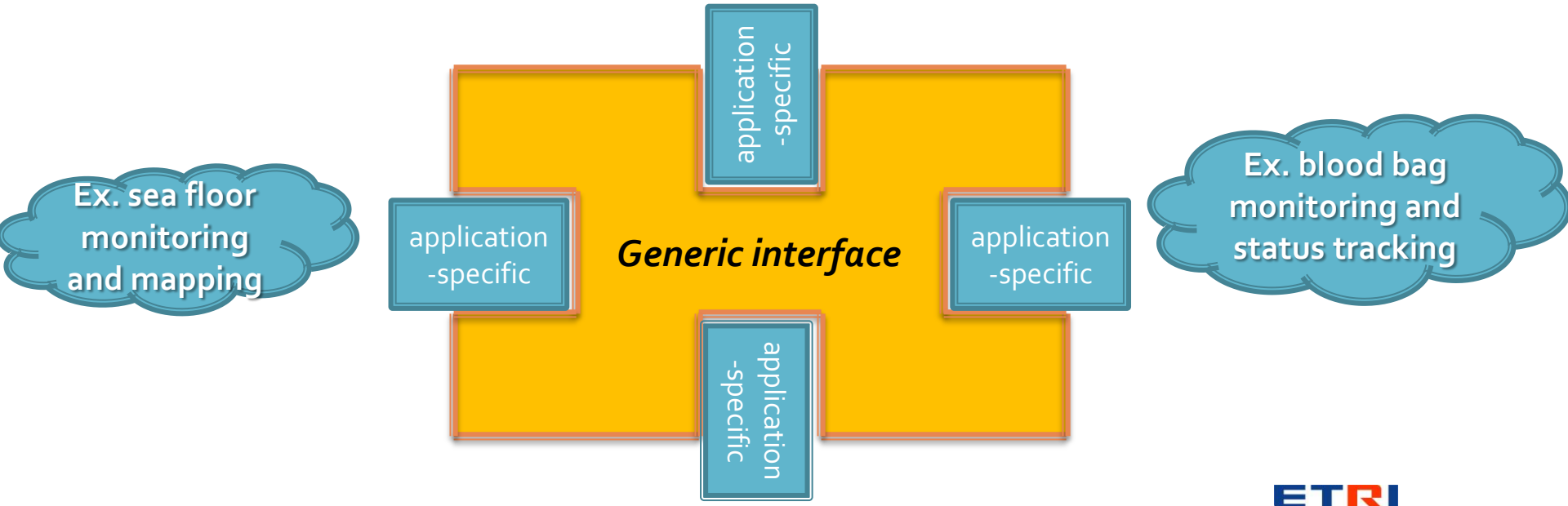
Why is it needed?

- There are various kinds of SN services such as logistics and supply chain management, energy & utility distribution industry, etc(from WGSN-N007). These services are implemented with different applications and sensor networks on their own ways. One implementation usually cannot be used by other implementation because of diversity of implementations. This diversity is caused by lack of standard interface between *backend applications* and *sensor device applications*, and results in increasing implementation cost.

- Necessity of generic interface comes from this ineffective SN services implementation environment. As a solution of ineffectiveness, this WI proposes to define generic interface between SN GW and user network to provide interoperability between different backend applications and different sensor device applications.

Which functions it should support?

- Define generic functions based on
  - *Which functions* are provided by SNs(from SNs' point of view)
  - *How to use supported functions* of SNs by backend applications(from backend applications' point of view)
- Application-specific functions can be added in a flexible way



Which functions it should support?

- Functions which backend applications can use from SNs
  - Collected-data acquisition
  - Data-collect-command submission
  - Actuator control
  - SN status information(or metadata) acquisition
  - Etc.
- Controls what SNs expect backend applications to trigger(discussible)
  - Security management
  - Device management
  - Group management
  - Localization
  - communication
  - Etc.

What is a scope?

- Description of backend applications and services
- Description of sensor network from a service provision point of view
- Use cases of sensor network services
- Generic interface framework
- Communication protocol between backend applications and sensor network via GW
- Definition of messages

Is JTC1 a right place to work?

JTC1 scope based on TD v3

- Generic and generalized interfaces
  - Node service layer and node application layer
  - Node service layer and node hardware
  - Nodes in sensor network via wired or wireless means
  - **Sensor network and rest of the world**

- Examine and specify key technical area of sensor networks to achieve the interoperability

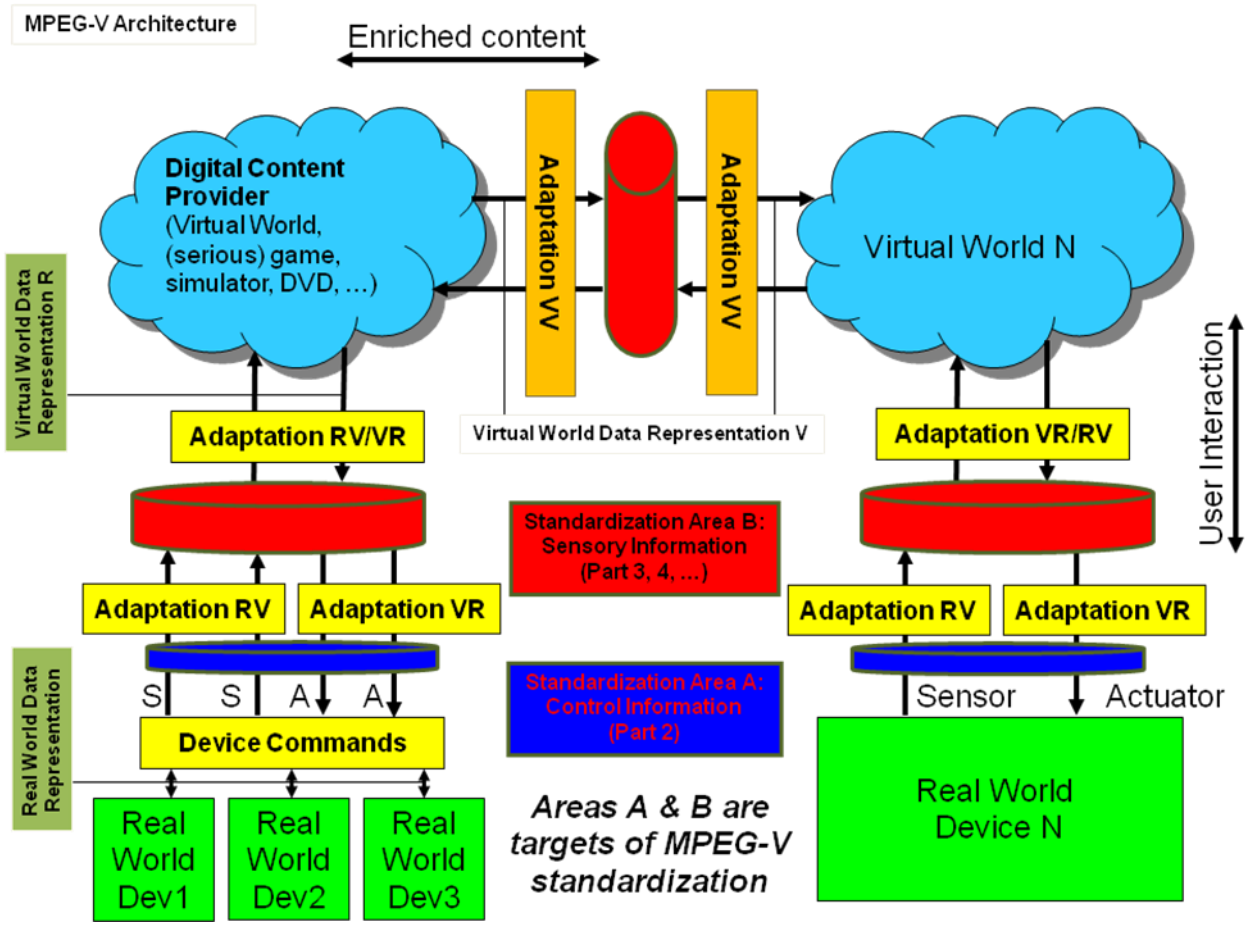
Annex-example

More works should be done regarding management of communication within SN

< Sensor network common interface defined by ETRI USN middleware >

Message Group		Messages
Channel	Connection/Disconnection	ReqConnCtrl, ConnReqCtrl, ConnResCtrl, DisConnReqCtrl
	Authentication	AuthReqCtrl, AuthResCtrl
Request	Information request	NetworkInfoReq, BufferDataReq
	Command request	CmdActionReq, UpdateCmdReq
	Network/Node Control request	ControlNetworkReq, ControlNodeReq
Response	Information response	NetworkInfoRes, BufferDataRes
	Command response	CmdActionRes, UpdateCmdRes
	Network/Node Control response	ControlNetworkRes, ControlNodeRes
Command	Sensing/Actuating Command	InstantCmd, ContinuousCmd, InstantEventCmd, InstantAggCmd, ContinuousAggCmd, RunActuatorCmd
	Monitoring Command	MonitoringStartCmd, MonitoringStopCmd
Report	Sensing value/actuation result report	SensingValueRpt, RunActuatorRpt, FinishRpt
		SensingLargeValueRpt
	Monitoring report	MonitoringRpt
	Error or Update repot	ErrorRpt, UpdateRpt
Check	Channel alive check	ChannelCheckCtrl, ChannelConfirmCtrl
	Error check	NakChk
etc	User-defined message	UserDefinedMsg

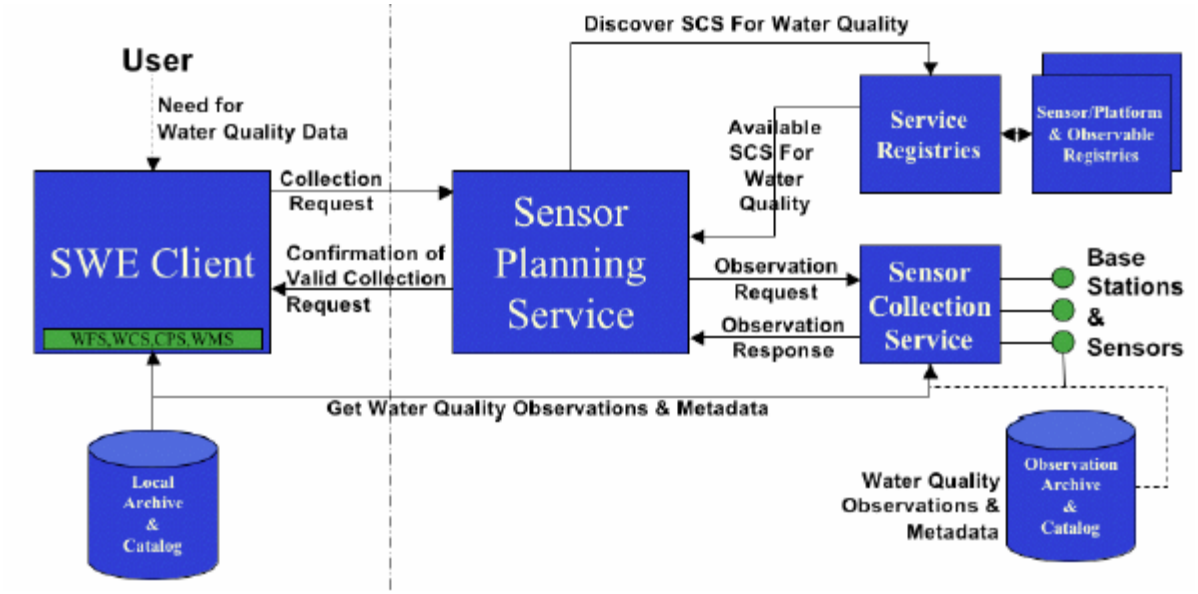
Annex-related works



ISO/IEC 23005(FCD)
-Architecture
-Control information
-Sensor information
-Avatar characteristics

From ISO/IEC 23005 part.1

Annex-related works



From OGC SWE