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Information technology — Telecommunications and information exchange between systems — Reference architecture for sensor network applications and services

3 Terms and definitions

"The following subsections are added"

3.8

Sensor Network Service Management

Sensor network service situation management and execution control process, supporting flexible execution between multi-services/multi-contents in the multi-domain environment

3.9

Sensor Network Service Ensemble

Based user profile/situation information, dynamic interoperable processes in the sensor node for services executed individually in the different multi-service domain.

3.10

Sensor Network Dynamic Configuration Management

Dynamic download and self-installation process for the required sensor network according to the service domain.

3.11

Sensor Network Semantic Translation

Meaning-based service translation process that services and contents are executed according to the suitable meaning in the service environment as defined meaning-based tags of services and contents

3.12

Sensor Network Syndicator

Real-time synchronization process supporting the situation information exchange for synchronization of sensor network services between different domains respectively and the change of the execution environments

3.13

Sensor Network Situation Analysis

Topology construction for situation defined by each service domain, domain situation

information, and user-context, based on context-aware and inference process.

3.14

Sensor Network Service Provisioning

Description of a general-purpose sensor network service, which is an abstracting services regardless of service domain.

3.15

Sensor Network Service Gateway

This node performs following operations. The node exchanges the sensing context information which are globally distributed all over the sensor networks. Though the information may contain identification, characteristics, properties, parameters, and its subnet address of each address, it may be in a single repository or distributed repositories. Based on context, the node will find the ID and the subnet address, and will transfer it. To keep integrity, these nodes will periodically exchange information. This node will also perform as an ordinary gateway to the external internet world like an sensor network gateway.

3.16

Cross-Domain Sensor Network Information Sheet (CDIS)

It is to store summary Information for all sensor networks; sensor network identification, subnet address, abstracts and repository nodes and their address which keep detailed characteristics of the sensor networks described in sensor network information sheet.

3.17

Sensor Network Information Sheet(SNIS)

It is to store Information for each sensor network; sensor network identification, subnet address, sensor devices, calibration, correction data, and manufacturer-related information.

Note: Sensor network information sheet is like a TEDS in IEEE 1451.x

3.18

Cross-Domain Sensor Network Information Server (CDI server)

The CDI server keeps the CDIS. The CDI server will keep and update its CDIS through exchange of remote CDIS's of each CDI servers and remote SNIS of each SNI servers. CDI server will provide its CDIS to sensor nodes on request.

3.19

Sensor Network Information Server (SNI server)

The SNI server keeps SNIS for its sensor network of domain. The SNI server will keep and update SNIS either by manual implementation, or by automatic measurement for each sensor node. SNI server will provide SNIS to sensor nodes on request.

3.20

Cross-Domain Convergence Middleware Information Sheet (CCMIS)

It is to store middleware information for all service domain and its related sensor networks. It contains abstract or summary of the each middleware and the location of the server that a host can download or refer to for more details. Based on this CCMIS, it will be possible to provide services of translation, ensemble, syndicator, and etc

3.21

Sensor Network Middleware Information Sheet (SNMIS)

It is to store middleware information for a specific service domain of a sensor network. Any node may download or refer to for more details.

3.22

Cross-Domain Convergence Middleware Information Server (CCM Server)

The CCM server keeps and provides CCMIS to sensor nodes on request, providing the information what kind of middleware is required. The CCM server will keep and update CCMIS either by manual implementation, or by periodic exchange of local SNMIS among SNM servers.

3.23

Sensor Network Middleware Information Server (SNM Server)

The SNM server keeps SNMIS and middleware itself, and provides them to sensor nodes on request, providing the information what kind of middleware is required. The SNM server may keep and update SNMIS by manual implementation.

5.2 Analysis of service requirements

"The following subsections are added"

5.2.7 Seamless service through multiple domains

There are many types of sensor networks connected through conventional networks as described in 5.2.1. . Each sensor network shall have communication ability between sensor nodes, between sensor nodes and a gateway, between a gateway and another gateway, However, since each of sensor networks may be operated for a specific domain by a specific business partner, a user in one domain may not communicate with a sensor node or its related device/application other domain. Even users may not know where those sensors and those sensor networks are located. In sensor networks, the available service and its availability is to be provided. The seamless service may be provided by service-transparency mechanisms, such as semantic translation, data format conversion, synchronization, context-aware decision, and etc

5.2.8 Sensor Network Service and its location mapping service

In the conventional network, there is an addressing scheme in which a subnet and its physical address are defined. For example, from an IP address, the host and its network or its network owner (enterprise) can be located. In sensor network, a new addressing scheme is required, incorporating the characteristics of the sensor network. It may include what kind of sensor network is, based on which information, a user or host may retrieve or download a pre-defined application or its related middleware. A sensor data will be transferred based on the specific sensor network information in it to an appropriate 'sensor network gateway node',

5.2.9 Sensor network and its related information repository service

When a user in a domain of a sensor network wants to communicate with others in different domain of other sensor networks, there is a case that sensor network and its related information repository services are required so that each users could know what kind of sensor services are available. The repository information will be kept in CDSI and SNIS by CDI server and SNI server, respectively. Under the cross-domain environments, before its communication, each end user may request its CDIS to its CDI server(s). From CDIS, each node will get its appropriate SNIS of detailed and required information from SNI server.

5.2.10 Cross-domain middleware convergence service

Under the cross-domain environments, a node with one specific middleware in a domain should be capable of communicate with other nodes with other middleware. Before communicating, there should be a service which provides what kind of middleware is

available in a destination domain of sensor network. Each end user may request its CCMIS to its CCM server(s). From CCMIS, each node will get its appropriate SNMIS of detailed and required information from SNM server.