SS ISO/IEC 29182-4: 2019 ISO/IEC 29182-4:2013, IDT (ICS 35.110)

SINGAPORE STANDARD

Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA)

- Part 4 : Entity models





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ISBN 978-981-48-9429-6

The content of this Singapore Standard was approved on 17 October 2019 by the Manufacturing Standards Committee (MSC) under the purview of the Singapore Standards Council.

First published, 2019

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5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21	Conte	ents	Page
Introduction 9 1 Scope 11 2 Normative references 11 3 Terms and definitions 11 4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.2 Gateways 20 6.3 Other networks 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7.1 Sensor node hardware layer 21 7.1 Devriew 22 <td< th=""><th>Nation</th><th>al Forewordal</th><th>7</th></td<>	Nation	al Forewordal	7
Introduction 9 1 Scope 11 2 Normative references 11 3 Terms and definitions 11 4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.2 Gateways 20 6.3 Other networks 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7.1 Sensor node hardware layer 21 7.1 Devriew 22 <td< th=""><th>Forew</th><th>ord</th><th>8</th></td<>	Forew	ord	8
1 Scope 11 2 Normative references 11 3 Terms and definitions 11 4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition 22			
2 Normative references 11 3 Terms and definitions 11 4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7.1 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition			
3 Terms and definitions 11 4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3 Overview 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22	1		
4 Abbreviated terms 11 5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.2.1 Overview 22	2	Normative references	11
5 Overview 12 6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 19 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.1 Overview 22 7.2.2 Data storage	3	Terms and definitions	11
6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.1 Overview 22 7.2.2 Data s	4	Abbreviated terms	11
6 Physical entities 16 6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.1 Overview 22 7.2.2 Data s	5	Overview	12
6.1 Sensor nodes 16 6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.1 Overview 22 7.2.2 Data communications 23 7.2.4	6		
6.1.1 Overview 16 6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.2 Data acquisition 22 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.2 Basic functions layer 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 <td>6.1</td> <td></td> <td></td>	6.1		
6.1.2 Sensors 16 6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2 Basic functions layer 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.3 Self-localization	6.1.1		
6.1.3 Actuators 19 6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25	6.1.2		
6.1.4 Communications module 19 6.1.5 Processor 19 6.1.6 Memory 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-lo			
6.1.5 Processor 19 6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.3.1 Overview 24 7.3.2<		Communications module	19
6.1.6 Memory 20 6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24	-		
6.1.7 Power supply 20 6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	_	Memory	20
6.2 Gateways 20 6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 <td></td> <td></td> <td></td>			
6.3 Other networks 20 6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 <td>_</td> <td></td> <td></td>	_		
6.3.1 Overview 20 6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions <td></td> <td>Other networks</td> <td>20 20</td>		Other networks	20 20
6.3.2 Access networks 21 6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
6.3.3 Backbone network 21 6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
6.4 Service providers 21 6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
6.5 Users 21 7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
7 Functional entities 21 7.1 Sensor node hardware layer 21 7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	_		
7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	0.5		
7.1 Sensor node hardware layer 21 7.1.1 Overview 22 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7	Functional entities	21
7.1.1 Overview 21 7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.1		
7.1.2 Data acquisition 22 7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.1.1		
7.1.3 Actuation 22 7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.1.2		
7.1.4 Power generation / energy harvesting 22 7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.1.3	Actuation	22
7.2 Basic functions layer 22 7.2.1 Overview 22 7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.1.4		
7.2.1 Overview			
7.2.2 Data processing 22 7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.2.1		
7.2.3 Data communications 23 7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	7.2.2		
7.2.4 Data storage 24 7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
7.2.5 Hardware drivers 24 7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
7.2.6 Sensor/actuator identification 24 7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25			
7.3 Service layer 24 7.3.1 Overview 24 7.3.2 Common services 24 7.3.2.1 Overview 24 7.3.2.2 Communications support functions 25 7.3.2.3 Self-localization 25	_		
7.3.1 Overview	_		
7.3.2 Common services247.3.2.1 Overview247.3.2.2 Communications support functions257.3.2.3 Self-localization25	_		
7.3.2.1Overview247.3.2.2Communications support functions257.3.2.3Self-localization25			
7.3.2.2Communications support functions257.3.2.3Self-localization25			
7.3.2.3 Self-localization 25		•••••••••••••••••••••••••••••••••••••••	25

7.3.2.5	Data management	26
7.3.2.6		
7.3.2.7		
7.3.2.8	Group management / clustering	
7.3.3	Domain specific services	28
7.4	Application layer	28
7.4.1	Overview	28
7.4.2	Applications	28
7.4.3	Software agent	28
7.4.4	Rules engine	28
7.4.5	Collaborative information processing	29
7.5	Cross-layer management	29
7.5.1	Overview	29
7.5.2	Device management	30
7.5.3	Resource management	30
7.5.4	Service management	31
7.5.5	Network management	31
7.5.6	Security management	32
7.5.7	Privacy management	32
7.5.8	Safety management	33
7.5.9	Business management	33
7.5.10	QoS management	
7.5.11	System monitoring	34
Bibliog	Bibliography	

National Foreword

This Singapore Standard was prepared by the Working Group on Smart Manufacturing Readiness Level set up by the Technical Committee on Smart Manufacturing under the purview of MSC.

This standard is identical with ISO/IEC 29182-4:2013, "Information technology – Sensor networks: Sensor Network Reference Architecture (SNRA) – Part 4: Entity models" published by the International Organization for Standardization.

NOTE – Reference to International Standards are replaced by applicable Singapore Standards and Technical References.

This standard is expected to be used by system integrators, government agencies, testing, inspection and certification bodies, professional institutions, institutes of higher learning and training providers.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

- Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "Mature Standards". Mature Standards will not be subject to further review, unless there are requests to review such standards.
- 2. An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.
- 3. Compliance with a SS or TR does not exempt users from any legal obligations.

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29182 consists of the following parts, under the general title *Information technology* — *Sensor networks: Sensor Network Reference Architecture (SNRA)*:

- Part 1: General overview and requirements
- Part 2: Vocabulary and terminology
- Part 3: Reference architecture views
- Part 4: Entity models
- Part 5: Interface definitions
- Part 7: Interoperability guidelines

The following part is under preparation:

— Part 6: Applications

Introduction

A wide range of applications has been proposed for sensor networks. In practice, however, sensor networks have been built and deployed for a relatively small number of applications. This is partly due to the lack of a business case for certain applications and partly due to technical challenges in building a non-trivial sensor network of reasonable complexity. The main reason for this impediment is the multi-disciplinary expertise – such as sensors, communications and networking, signal processing, electronics, computing, and cyber security – required to design a sensor network. Presently, the design process is so complex that one can leverage little from one sensor network design to another. It appears as if one has to start from almost scratch every time one wishes to design and deploy a sensor network. Yet, upon closer inspection, there are many commonalities in instantiations of sensor networks that realize various applications. These commonalities include similarities in the choice of network architecture and the entities/functional blocks that are used in the architecture.

The purpose of the ISO/IEC 29182 series is to

- provide guidance to facilitate the design and development of sensor networks,
- improve interoperability of sensor networks, and
- make sensor network components plug-and-play, so that it becomes fairly easy to add/remove sensor nodes to/from an existing sensor network.

The ISO/IEC 29182 series can be used by sensor network designers, software developers, system integrators, and service providers to meet customer requirements, including any applicable interoperability requirements.

The ISO/IEC 29182 series comprises seven parts. Brief descriptions of these parts are given next.

ISO/IEC 29182-1 provides a general overview and the requirements for the sensor network reference architecture.

ISO/IEC 29182-2 provides definitions for the terminology and vocabulary used in the reference architecture.

ISO/IEC 29182-3 presents the reference architecture from various viewpoints, such as business, operational, system, technical, functional, and logical views.

This part of ISO/IEC 29182 categorizes the entities comprising the reference architecture into two classes of physical and functional entities and presents models for the entities.

ISO/IEC 29182-5 provides detailed information on the interfaces among various entities in the reference architecture.

ISO/IEC 29182-6 provides detailed information on the development of International Standardized Profiles.

ISO/IEC 29182-7 provides design principles for the reference architecture that take the interoperability requirements into account.

There are no requirements for compliance in the ISO/IEC 29182 series. Users should ensure that the sensor nodes, and the related sensor network, are compliant with the application or deployment governing body.

Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 4: Entity models

1 Scope

This part of ISO/IEC 29182 presents models for the entities that enable sensor network applications and services according to the Sensor Network Reference Architecture (SNRA).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 29182-2, Information technology — Sensor networks: Sensor Network Reference Architecture (SNRA) — Part 2: Vocabulary and terminology