IoT Standardisation in BIS

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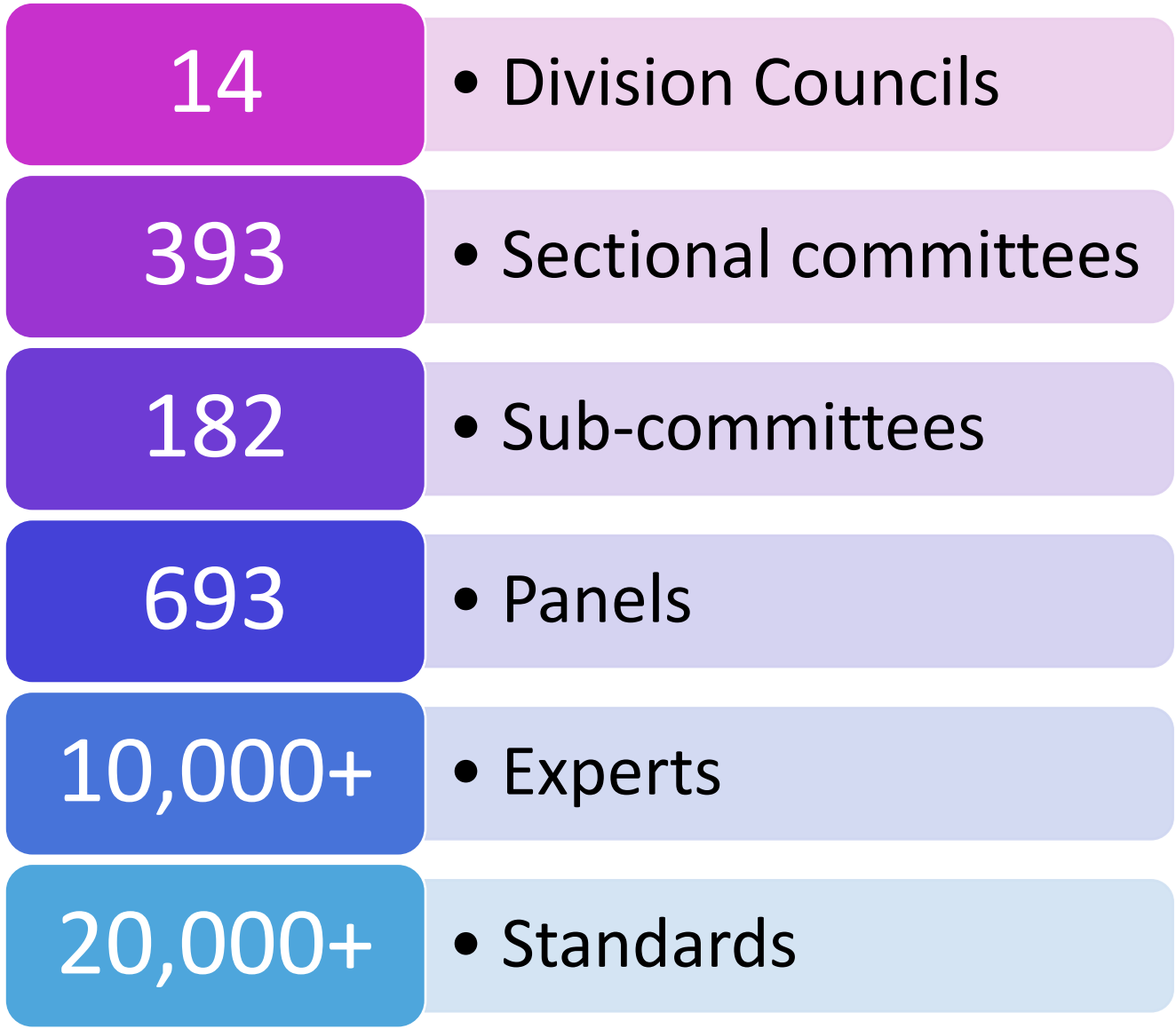
Bureau of Indian Standards

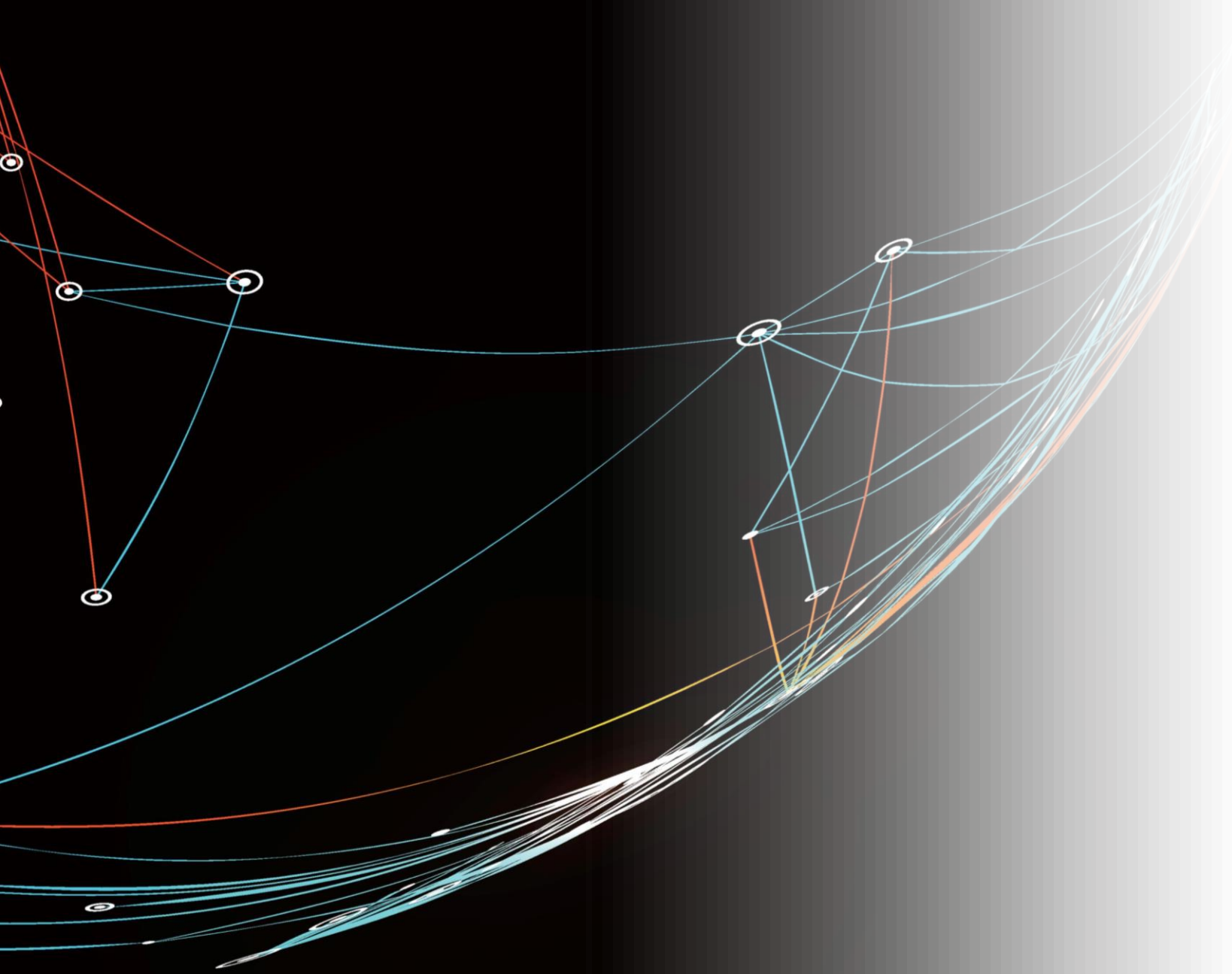
Event: Global Conference on IoT/M2M <20221214>

BIS - Functions

- Standards Formulation
- Conformity Assessment
  - Product certification
  - Self-declaration of conformity
  - Hallmarking
  - System Certification
- Testing
- Training

BIS Standards development in figures





Internet of Things BIS Standardization efforts

LITD 27 Internet of Things and Related Technologies Sectional Committee

Scope

- To develop standards in the field of Internet of Things and related technologies including sensor networks.
- Mirror the standardization work at ISO/IEC/JTC1 SC 41 Internet of things and digital twin

WG	**Group Name**
WG 3	IoT Architecture
WG 4	IoT Interoperability
WG 5	IoT Applications
WG 6	Digital Twin
WG 7	Maritime, underwater IoT and digital twin applications

Standards published

- IS/ISO/IEC/TR 22417 : 2017 Information Technology Internet of Things IOT - IOT Use Cases
- IS 18004 (Part 1):2020 Internet of Things System Part 1 Reference Architecture
- Open Connectivity Foundation OCF Specification (Series) (Under development)

Standards under development

Open Connectivity Foundation OCF Specification Series (adoption of ISO/IEC 30118 series)

- Part 1 Core specification
- Part 2 Security specification
- Part 3 Bridging specification
- Part 4 Resource type specification
- Part 5 OCF device specification
- Part 6 Resource to AllJoyn interface mapping specification
- Part 7 Wi-Fi easy setup specification
- Part 8 OCF resource to oneM2M resource mapping specification
- Part 9 Core optional specification
- Part 10 Cloud API for cloud services specification
- Part 11 Device to cloud services specification
- Part 12 Cloud security specification
- Part 13 Onboarding tool specification
- Part 14 OCF resource to BLE mapping specification
- Part 15 OCF resource to EnOcean mapping specification
- Part 16 OCF resource to UPlus mapping specification
- Part 17 OCF resource to Zigbee cluster mapping specification
- Part 18 OCF resource to Z-wave mapping specification

IS/ISO/IEC/TR 22417:2017 IOT Use Cases

Scope

- Identifies IoT scenarios and use cases based on real-world applications and requirements. This standard comprises 25 use cases for IoT

Potential beneficiaries:

- IoT service users
- IoT service providers who can learn about users IoT needs
- IoT application developers who can develop IoT applications according to the needs of the IoT service users;
- Controllable equipment and ICT device manufacturers who want to know what the IoT interface requirements are;
- Administrations and government authorities that have to act as IoT service users and IoT regulators.

Use Cases covered in IS/ISO/IEC/TR 22417

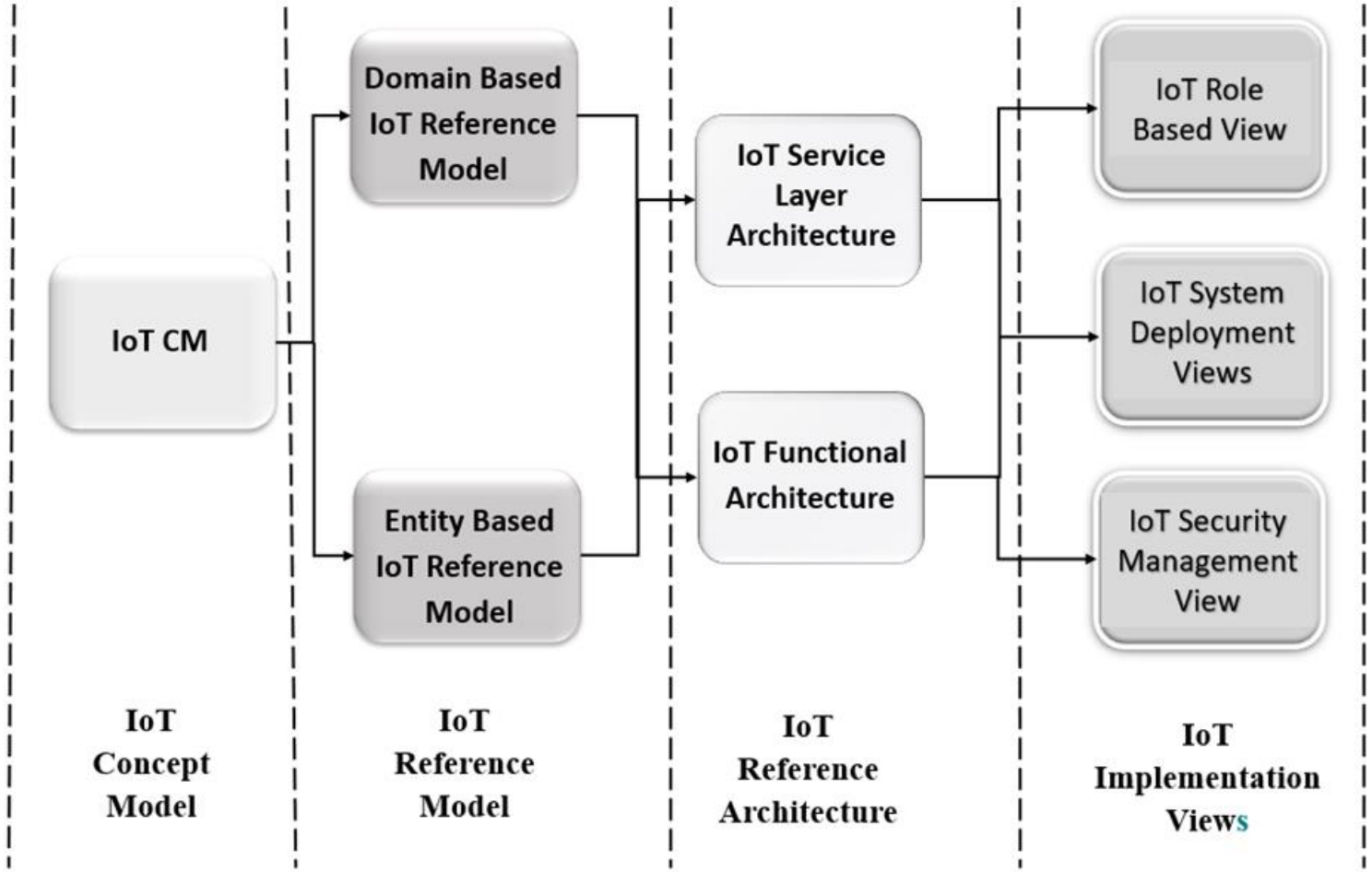
1. IoT Network Security
2. IoT Security threat detection and management
3. Remote management of large equipment in a plant
4. Automated ICC profile discovery
5. Tracking of farm products
6. IoT application for warehouse goods monitoring
7. Cooperation between Factories and Remote Applications
8. Searching system for persons with cognitive impairment
9. Sleep monitoring system
10. Smart glasses
11. IoT endpoint monitoring systems
12. Intelligent assistive parking in urban Areas
13. Integrated Smart Pump System

1. Remote Health monitoring
2. Connected car analytics
3. Real Time Motor Monitor
4. Smart Home Appliances
5. Smart Home Insurance
6. Machine Leasing
7. IoT-based Energy Management System for Industrial Facilities
8. Water Plant Management
9. Smart Home Application
10. Field Gateway Bridging IoT to Legacy Devices in Factories and Plants
11. Production Monitoring of Textile Equipment
12. Remote Management of Agricultural Greenhouses

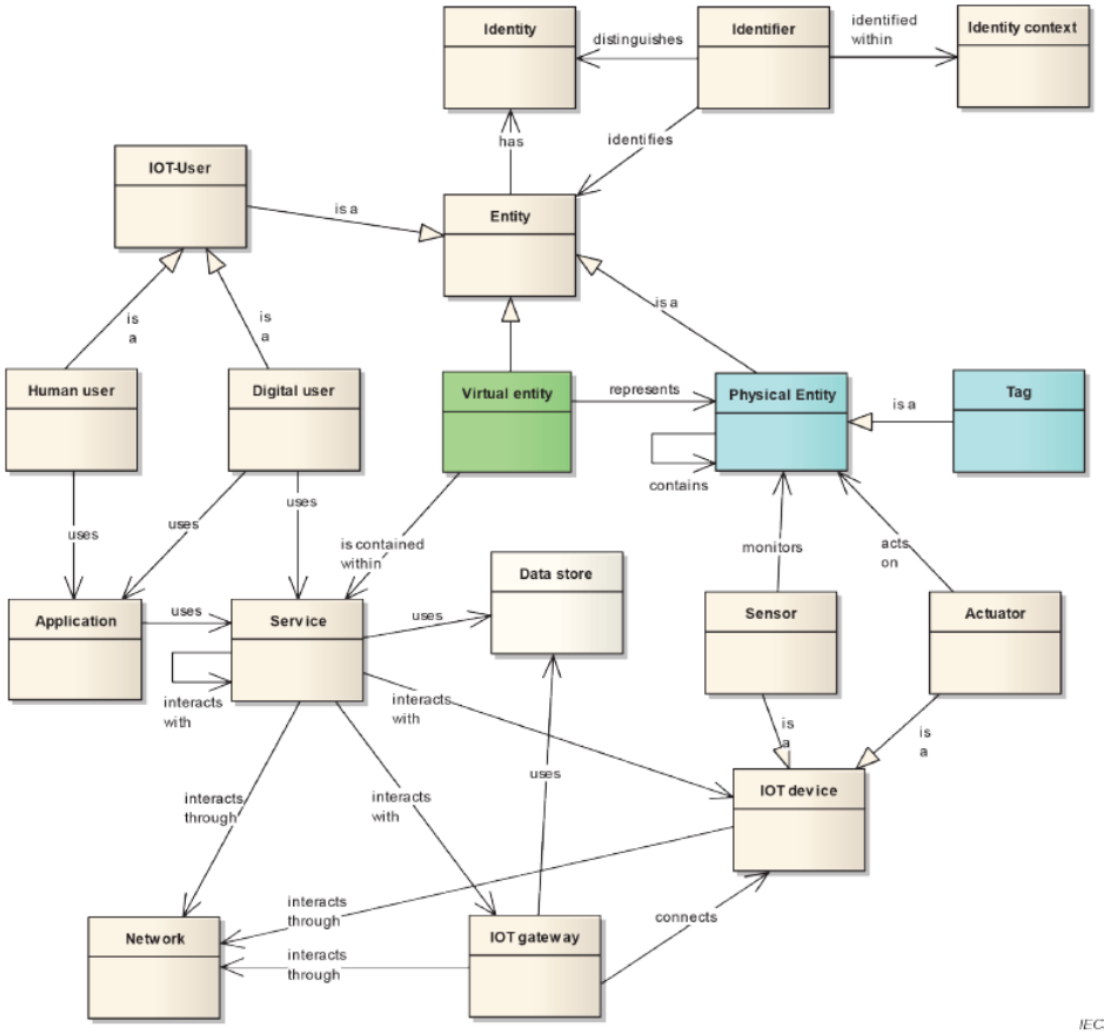
IS 18004 (Part 1):2020 IoT System Part 1 Reference Architecture

- Scope
  - This Standard describes the IoT Reference Architecture, that comprises IoT Concept Model, IoT Reference Models (Domain based IoT reference model, Entity based IoT reference model) and IoT Deployment Views.
  - IoT Concept Model and Reference models elaborate the interactions between various entities, both digital and non-digital.
- Assistance Drawn from:
  - ISO/IEC 30141 : 2018 IoT Reference Architecture
  - b) ITU-T Y.3056 Framework for bootstrapping of devices and applications for open access to trusted services in distributed ecosystems
  - TEC 30001 : 2020 **oneM2M Functional Architecture**

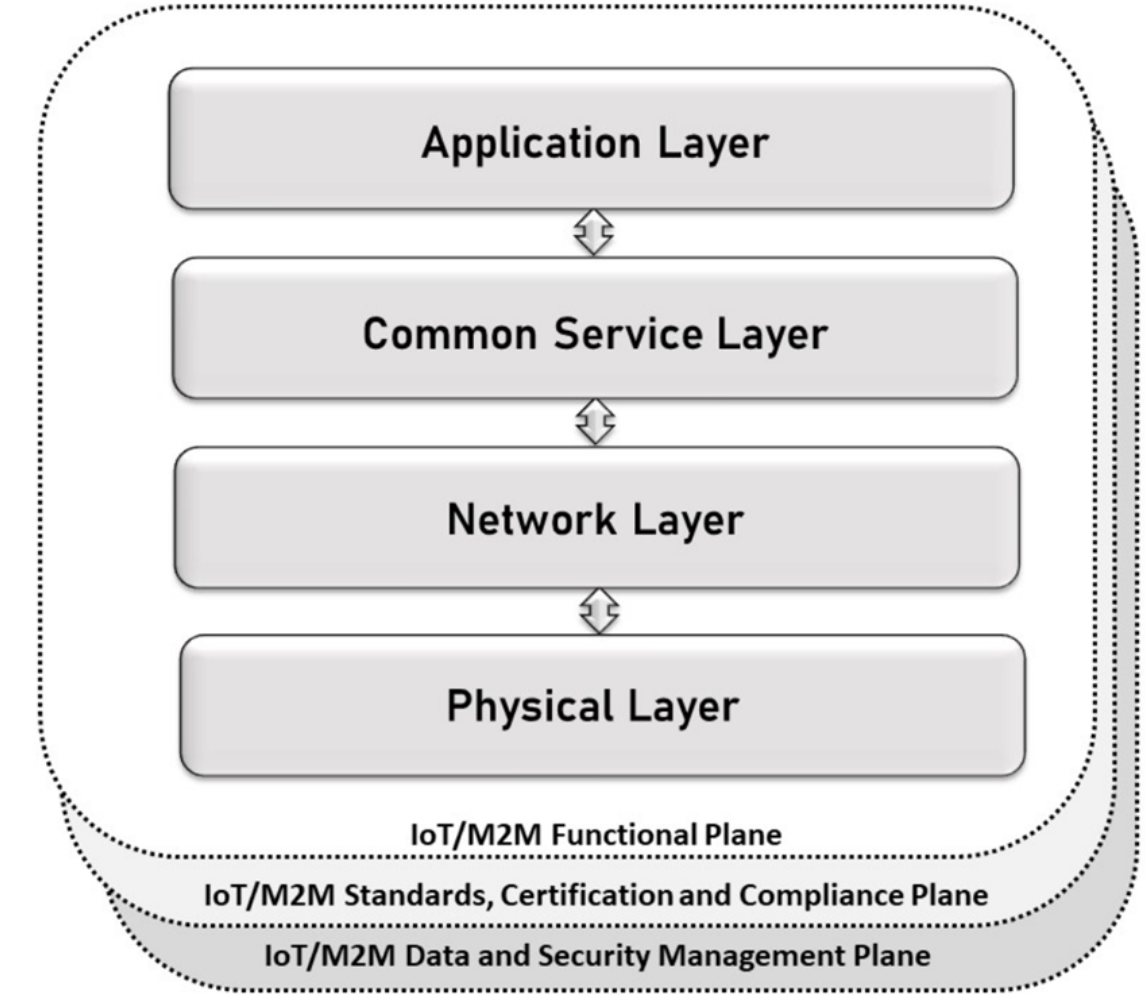
IS 18004 (Part 1) – Architecture Description



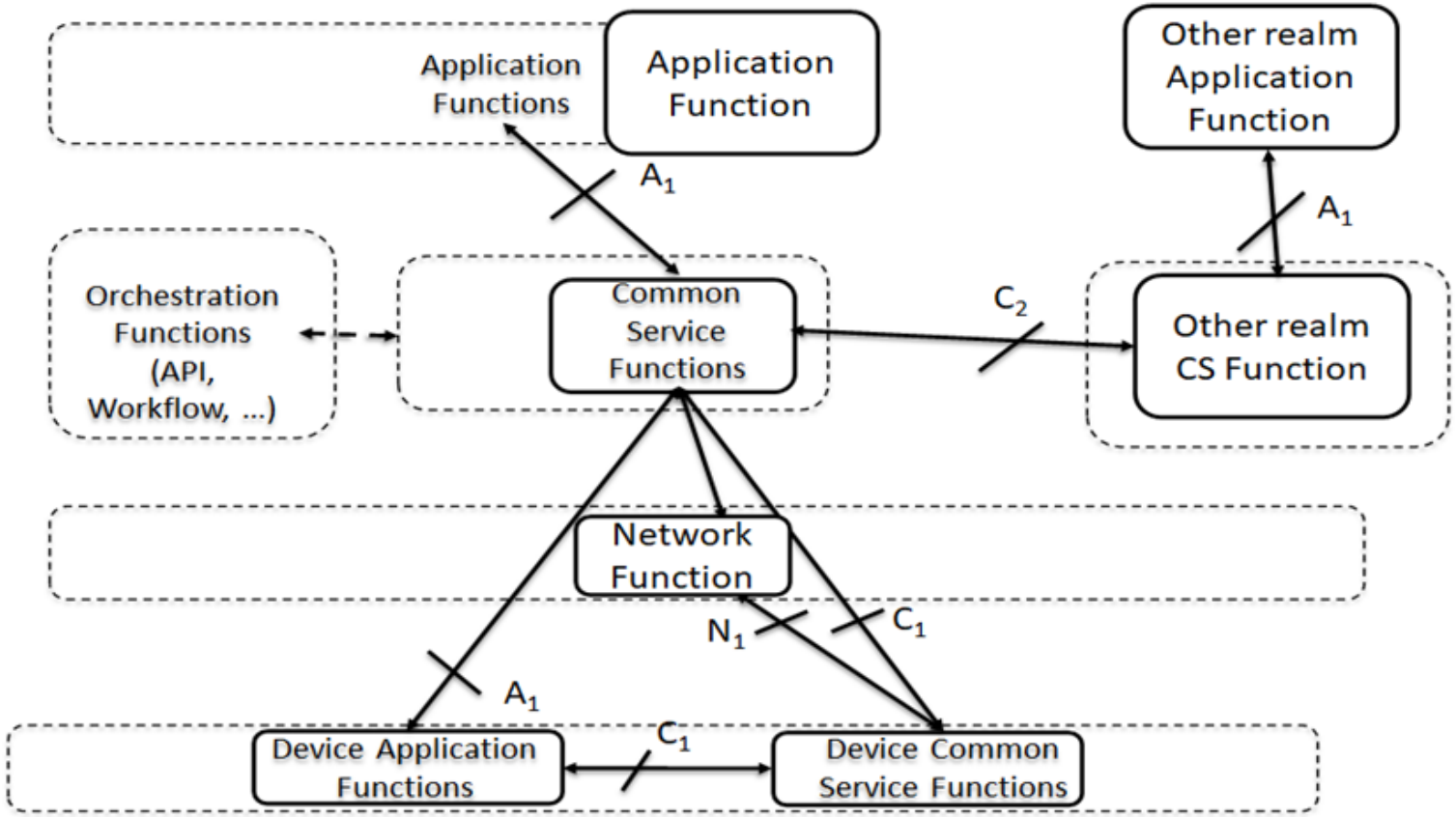
IoT Conceptual Model



IoT Service Layer Architecture



IoT Functional Architecture



Standards referred in IS 18004-1

- IS 18000:2020 Unified Digital Infrastructure ICT Reference Architecture
- IS 18002 (Part 1):2021 Unified Digital Infrastructure Data Layer Part 1 Reference Architecture
- ISO/IEC 30141 Internet of Things (IoT) - Reference Architecture
- TEC 30001:2020 oneM2M Functional Architecture
- TEC 30003:2020 oneM2M-Security Solutions
- TEC 30004:2020 oneM2M-Service Layer Core Protocol
- TEC 30009:2020 oneM2M-HTTP Protocol Binding
- TEC 30010:2020 oneM2M-MQTT protocol binding
- TEC 30015:2020 oneM2M-Testing Framework
- TEC 30020:2020 oneM2M-WebSocket Protocol Binding
- ITU-T Y.3056 (2021) Framework for bootstrapping of devices and applications for open access to trusted services in distributed ecosystems

BIS contribution to IoT standardization at the international level

ISO/IEC JTC 1/SC 41 IoT and Digital Twin

- Actively contributing to the following projects:
  - ISO/IEC 30177 ED1 Underwater network management system (U-NMS) interworking – **Project led by India**
  - ISO/IEC 30184 ED1 Autonomous IoT object identification in connected home – Requirements and framework
  - ISO/IEC 30180 ED1 IoT - Functional requirements to determine the status of self-quarantine through IoT data interfaces
  - ISO/IEC 30185 ED1 IoT) – Addressing interoperability between IPv6-based network and UWASN

ISO/IEC JTC 1/SC 41 IoT and Digital Twin

- Presently reviewing the standards published under JTC 1/SC 41 for its suitability to adopt as Indian Standards:
  - ISO/IEC 20924: 2021 IoT — Vocabulary
  - ISO/IEC 21823 series - Interoperability for IoT systems — Part 1: Framework, Part 2: Transport interoperability, Part 3: Semantic interoperability and Part 4: Syntactic interoperability
  - ISO/IEC TR 30164: 2020 Edge computing
  - ISO/IEC 30165: 2021 IoT — Real-time IoT framework
  - ISO/IEC TR 30166: 2020 Industrial IoT

Thank you!