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Business Plan for JTC 1/SC 6 Telecommunications and Information Exchange between Systems (Period Covered: July 2022 – March 2023)

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Description

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BUSINESS PLAN for JTC1/SC 6
Telecommunications and Information Exchange between Systems

PERIOD COVERED: July 2022 – March 2023

1.0 Executive summary

Since SC 6 was established in 1964, SC 6 has worked on standardization in the field of telecommunications dealing with the exchange of information between open systems, including system architectures, functions, procedures, parameters as well as the conditions for their use. This standardization encompasses protocols and services of lower layers including physical, data link, network, and transport as well as those of upper layers including but not limited to Directory and ASN.1, MFAN, NFC, PLC, Future Network, and OID. A considerable part of the work also has been done in effective cooperation with ITU-T SG's and other standardization bodies, including IEEE 802, ECMA International, and NFC Forum. SC 6 is responsible for 382 published International Standards and 32 open project items.

Recently SC 6 is working on (1) Future Network Architecture and its Protocols and Mechanisms which would support emerging services and applications beyond the limitations of the current networks, (2) New standards in communication protocols of Low Altitude Drone Area Network (LADAN) , with the title change to Unmanned aircraft area network (UAAN)

2.0 Chairman's Remarks

2.1 Market Requirements, Innovation

NFC standards (ISO/IEC 18092 NFCIP-1, ISO/IEC 21481 NFCIP-2) are becoming a significant success in the market. Many vendors including Google, Nokia, and Samsung are incorporating NFC technology in their smart phones. NXP, Sony, NFC Forum, and ECMA International have contributed significantly to the development of the NFC standards. SC 17 has been a close partner in developing the standards in SC 6. SC 6 following the need for advanced NFC applications, SC 6 is now in the process of revision of ISO/IEC 21481 on NFCIP-2 to be harmonized with NFC Forum specifications widely deployed in the market.

The current network has become an essential communication infrastructure not only for data transfer but also for social applications. Even though the current network is such an essential infrastructure, SC 6 notice that there are many concerns such as scalability, security, robustness, mobility, Quality of Service (QoS), reconfigurability, context-awareness, etc. Since 2010, SC 6 has studied and published nine parts of ISO/IEC TR 29181 Future Networks-Problem statement and requirements: General aspects, Naming and addressing, Switching and Routing, Mobility, Security, Media transport, Service composition, Quality of service and Networking of everything. Driven by the requirements of emerging applications, SC 6 has been working on ways to develop international standards on architectures (ISO/IEC 21558-series) and its protocols and mechanisms (ISO/IEC 21559-series) for future networks, respectively. Especially ISO/IEC 4396 on RINA (Recursive Inter-Network Architecture) which is based on the IPC. It is assumed to be implemented over quantum repeaters, providing secure and short-delay service.

Directory standards have been designed to permit deployment of large directory databases distributed in many systems with a very efficient, flexible and reliable replication mechanism. It constitutes a very good solution for enterprise directory particularly if it is completed with LDAP protocol (Directory servers can be accessed with DAP or LDAP protocols) and requests can be chained between X.500 Directory servers and LDAP servers. Directory standard is continuously improved to be usable by emerging applications like tag-based or cloud computing. Public-key and attribute certificates which are also part of X.500 standards are now widely used for security in transactions.

The ASN.1 standard is used in many protocols (directory, network management, security) and permits usage of multiple encoding rules particularly PER for narrow bandwidth, XER for communications with XML applications, OER for fast and efficient encoding (particularly for financial applications), JER for interoperability with JSON applications.

2.2 Accomplishments

SC 6 is responsible for 397 published International Standards and 47 open project items. Since established, SC 6 has recognized new types of service requests as they arose, and have standardized the protocols and services or telecommunications and information exchange between systems timely and appropriately. As new applications emerge over the network through diverse communication technologies, more new work times have been proposed and standardized in SC 6 in effective cooperation with related TCs/SCs of ISO and IEC, ITU-T Study Groups, and other standardization bodies, including IEEE 802, ECMA international and NFC forum.

2.3 Resources

At present, there are 19 P-members and 34 O-members in SC 6. Especially SC 6 has the characteristics that experts with new technologies lead the standardization activities of hot issues like NFC, PLC and Future Networks, while dozens of experts with a long past continue to maintain and revise the existing standards like X.500 and ASN.1 at each regular and interim working group meeting. As many services emerge, more expert groups with diverse backgrounds are needed; more close collaborations with global SDO's and local SDO's are essential for successful global standardization.

2.4 Competition and Cooperation (including consortia)

The main role of SC 6 has been standardizing the communication protocols and applications for telecommunications and information exchange among systems for various networks environments using diverse technologies. However as conventional services or devices which were traditionally not related to the communication facilities like home appliances or car have come to integrate with ICT technologies and consequently each group develops its own standards, it caused unnecessary competition between groups. From the past lesson, SC 6 tries to collaborate in close liaison with other SDOs, especially Category C liaison, based on detailed topic. Currently SC 6 is working to strengthen cooperation with IEC TC 124, ISO TC 20/SC 16, ITU-T SG17 and ITU-T JCA-DCC in SC 6 and its WGs.

3.0 Working Groups

3.1 WG 1 – Physical and data link layers

The main role of SC 6/WG 1 is to deliver the standards on services and protocols in the physical and data link layers. As the new types of the communication technologies are emerged, it extends the working boundary and delivers standards the market requires.

3.1.1 WG 1 Accomplishments

WG1 has successfully completed following works:

- NFC-series: ISO/IEC 18092, 21481, 22536, 23917, 28361, 19369, 13157-series, 13158, 16353
- MFAN-series: ISO/IEC 15149-1, 15149-2, 15149-3, 15149-4
- PLC: ISO/IEC 12139-1, ISO/IEC 21228

ISO/IEC 21228 on coexistence mechanism for broad powered line communication technologies was published on May 24th, 2019. This standard is not only to improve the ISO/IEC 12139-1:2009, but to achieve the harmonized coexistence between ISO/IEC 12139-1, IEEE 1901, and ITU-T G.9960.

ISO/IEC 21481:2021 on Near field communication interface and protocol 2 (NFCIP-2) was published on April 20th 2021. This new edition aims to be harmonized with NFC Forum specifications widely deployed in the market.

ISO/IEC 17982:2021 on Close capacitive coupling communication physical layer (CCCC PHY) was published in April 2021. This standard specifies the CCCC PHY for full duplex and broadcast communication in time slots on frequency division multiplex channels. This new edition improves the interoperability of the International Standard by integrating the International Technical Report ISO/IEC TR 22512.

3.1.2 WG 1 Deliverables

WG 1 is undertaking revision of ISO/IEC 18092 (NFCIP-1), ISO/IEC 23917 (NFCIP-1 Protocol Test Methods) and ISO/IEC 19369 (NFCIP-2 test method).

In 2020, WG 1 has started to work on a new standard subject on Low Altitude Drone Area Network (LADAN), which is ISO/IEC 4005. ISO/IEC 4005 series have been divided into 4 sub-parts. In June 2022, the title was changed to Unmanned aircraft area network (UAAN) based on consensus in DIS Comment resolution meeting.

3.1.3 WG 1 Strategies/risks/opportunities/lessons learned (if any)

Since the work of WG1 is closely related to all sorts of physical communication technologies, it is highly recommended to work closely with other SDO's or fora. WG 1 will take advantages of the liaison relationship with other SDOs or fora.

Recent years, WG 1 has made effort on seeking more opportunities for improving its standardization work through diverse mechanisms of standardization activities under frame work guided by ISO/IEC consolidated Directives JTC 1 supplement. WG 1 has encouraged establishment of ad hoc groups like ad hoc Group on security (AHGS), study group on wearable devices. WG 1 and WG 7 also have a joint ad hoc group on Networking for Blockchain. The outputs of these ad hoc groups strengthened vitality of WG 1.

In Aug 2021 and June 2022, WG 1 confirmed to start the work on Preliminary Work Items, which are PWI-DWIN (Deterministic Wireless Industrial Network), PWI-WRAN (Wearable Robot Area Network), PWI on PHY specification based on licensed narrowband in field area network for Smart Grid, and PWI on Control Protocol for Radio Frequency Directional Signal Transmission (RF-DST). It is encouraged to contribute to PWIs to improve and accelerate the possible international standard projects.

WG 1 also encourages more flexible means such as organizing interim meetings/E-meetings and drafting liaison reports for experts to adequately discuss issues relevant to standard development.

3.2 WG 7 – Network, Transport, and Future Network

WG 7 was established by merging WG 2 for network layers and WG 4 for transport layer and upper layers including applications. Since WG 7 had developed lots of protocols on OSI network and transport by early 1990s, WG 7 had focused on Enhanced Communications Functions and Facilities, aka ECFF, to provide enhanced communication protocols including multicasting architecture and protocols that solve many well-known problems of existing transport protocols. Currently, WG 7 has been working on Future Network including other emerging networking issues to prepare the future of the networks since 1998. A new standardization work on wireless LAN access control and networking for blockchain is being progress. In June 2022, WG 7 started the work on Preliminary Work Item on communication protocols in low earth orbit inter-satellite networks.

3.2.1 WG 7 Accomplishments

WG 7 has studied to figure out new network architecture to support newly emerging applications and services for a long time since the issues regarding next generation internet were raised. Collaborating with ITU-T SG17 (formerly SG7) and SG11, SC 6 published many relevant standards by 2010;

- ISO/IEC 13252 – Enhanced communications transport service (ECTS) definition
- ISO/IEC 14476-series - Enhanced communications transport protocol (ECTP): Protocol specifications, support multicast and enhanced QoS.
- ISO/IEC 16512-series – Relayed Multicast Protocol (RMCP) specifications
- ISO/IEC 24793-series – Mobile Multicast Communications (MMC) specifications

Then based on the lessons, a series of TR documents, ISO/IEC TR 29181-series, have been developed to specify problem statement and requirements for the various issues of Future Network; Part 1 - General Aspects, Part 2 - Naming and Addressing, Part 3 - Switching and Routing, Part 4 - Mobility, Part 5 - Security, Part 6 - Media Transport, Part 7 - Service Composition, Part 8 - Quality of Service, and Part 9 - Networking of Everything.

Also, WG 7 studied and developed a framework for managed peer-to-peer communications, ISO/IEC TR 20002 in 2012. ISO/IEC TR 20002 has been used as a reference standard by ITU-T SG11 for development of lots of ITU-T X.609-series Recommendations, specifying architecture and protocols for managed P2P communications as well as hybrid P2P communications. ISO/IEC 17811-series standards on architecture and protocols for device control and management are other achievements of WG7 for networking and control of home devices over network. ISO/IEC 17821 standard on low power wireless mesh network over channel-hopped TDMA Links is another achievement of WG 7.

3.2.2 WG 7 Deliverables

Based on ISO/IEC TR 29181-series standards "FN problem statement and requirements", WG 7 has been developing international standards on protocols and mechanisms as well as architectures for future network. Future Network related work program was reorganized considering establishment of the new ISO/IEC 4396 projects, FN architecture and protocols based on Recursive Inter-Network Architecture (RINA). Access control architecture and protocols in WLAN has been developing actively;

- ISO/IEC 21558-series: Future Network Architecture
- ISO/IEC 21559-series: Future Network Protocols and mechanisms

- ISO/IEC 4396-series: Recursive Inter-Network Architecture (RINA)
- ISO/IEC 5021-series: Wireless LAN Access Control

ISO/IEC 21558/21559-1 on FN switching and routing and ISO/IEC 21558/21559-3 on FN NoE (Networking of Everything) proceeded to the publication stage. Also, ISO/IEC 21558/21559-2 (FN QoS) are decided to proceed to the FDIS stage.

ISO/IEC 4396-series reorganized as nine parts, which are reference model, common application connection establishment protocol, common distributed application protocol, Incremental enrollment procedures, Data Transfer Service, flow allocator protocol, general delimiting procedures and error and flow control protocol based on RINA. They are currently in the DIS balloting stage.

Since the approval of ISO/IEC NP 5021-series in 2020, it is decided to proceed to DIS balloting stage A new PWI work has been progressing to study networking related standardization issues for blockchain applications. WG 7 started a new study work with PWI on communication protocols in low earth orbit inter-satellite networks in June 2022.

3.2.3 WG 7 Strategies/risks/opportunities/lessons learned (if any)

Due to the new idea and expertise are required for future network project, WG 7 plans to invite experts from liaison organizations to participate in the relevant WG 7 activities, as well as contributions to be submitted from 'in-active' P-member national bodies. For the successful achievement of WG 7 work on Future Network related subjects, close collaboration with other SDOs, especially ITU-T SG11 (protocols) and SG13 (requirements and architectures) on Future Networks and IMT-2020 network, should be strengthen. Also, considering recent market requirements and activities of other SDOs on 5G/IMT-2020 network technologies, WG 7 needs to challenge this important technical area as well as future networking technologies including multi-access edge computing, communication protocols in low earth orbit inter-satellite networks and application of AI to networks to support emerging new applications and services such as Blockchain, and metaverse.

3.3 WG 10 – Directory, ASN.1 and Registration

Experts with a long experience on Directory, ASN.1, and Registration in WG 10 have worked to provide and update standards since 1990, and still continue to assist other groups with use of ASN.1-related texts and use of object identifiers and respond to their needs

3.3.1 WG 10 Accomplishments

The 9th edition of ISO/IEC 9594 incorporates the technical corrigenda on Edition 8. This edition can use encoding rules other than Basic Encoding Rules (BER). The interworking with LDAP has been improved and the part 8 of the standard (Public-key and attribute certificates) has been updated to include usage of quantum resistant algorithms in public key and attributes certificates, certificate lists and validation lists. A new part ISO/IEC 9594-11 Protocol specifications for secure operations related has been balloted in 2020. An Amendment to strengthen the security and usability of this protocol in under development.

A new edition of all ASN.1 text ISO/IEC 8824 and ISO/IEC 8825 has been published.

A new edition of ISO/IEC 29168-1 (Object Identifier Resolution System) is under development.

A new Edition of ISO/IEC 29168-2 (Procedures for the Object Identifier Resolution System operational agency) is under development.

3.3.2 WG 10 Deliverables

Directory:

- Maintenance of Edition 9 (2020): progression of technical corrigenda.

PKI and PMI:

- New edition of ISO/IEC 9594-8 (Public-key and attribute certificate frameworks).
- New part of ISO/IEC 9594 (part 11, Protocol specifications for secure operations) has been published.

ASN.1:

- Continue to assist other groups with use of ASN.1-related texts and use of object identifiers and respond to their needs.
- Resolution of current defects.
- New 2021 edition of ISO/IEC 8824 and ISO/IEC 8825 which integrate amendments and technical corrigenda on the 2015 edition has been published.

Registration:

- New usage of object identifiers for resolution of heterogeneous identifiers and locators in network.
- Usage of object identifiers for Internet of Things
- New edition of Object Identifier Resolution System standard (ISO/IEC 29168-1 and ISO/IEC 29168-2).

3.3.3 WG 10 Strategies/risks/opportunities/lessons learned (if any)

Directory, particularly part 8 of ISO/IEC 9594, are largely used for security in Public Key Infrastructure (PKI) and Privilege Management Infrastructure (PMI). X509 certificates have been updated to include usage of quantum resistant algorithms. A new part of ISO/IEC 9594 (part 11) related to protocol specifications for secure operations has been added and an Amendment to strengthen security and usability of this protocol is under development. A decentralized PKI architecture, using blockchains is under development.
ASN.1 is used in many applications. The standardized encoding rules have an extension mechanism to permit interworking of successive versions of a protocol. Some of them, like PER or OER, give very compact encoding for applications using narrow bandwidth networks or applications requiring short encoding/decoding time. Others like XER and JER have been developed for compatibility with other data description schemas.
Object identifiers are used in many places like network management, Directory and LDAP object classes and attributes, cryptographic methods (to identify algorithms). In the future, object identifiers will also be used to identify various kinds of object, including IoT. Since object identifiers have a hierarchical structure with a delegation mechanism, it is easy to allocate object identifiers to new objects without any risk of clash. Resolver defined in Object Resolution System standard (ISO/IEC 29168) provides a method to automatically retrieve information about a given object identifier. The two parts of ISO/IEC 29168 are under revision have a better ORS service.

4.0 Advisory Groups and Ad hoc Groups

4.1 AG 1 on Wearable Devices

4.1.1 AG 1 Terms of Reference

AG 1 assesses the current state of standardization in wearable devices and studies the harmonized coexistence among the wearable devices. Its scope includes protocols and procedures for the physical and MAC layer to communicate with wearable sensors, devices, systems, and so on.

4.1.2 AG 1 Current Work

AG 1 has been working to establish a JWG with IEC TC 124(Wearable Devices) and study new work items and future items related to communication systems for wearable devices.

4.1.3 AG 1 Future Plan

AG 1 will call for comments of experts for CDV text of Smart Body Area Network, NP text of new work items such as Conductive Fabric Area Network, Wearable Robot Area Network, and so on, and future items such as Wearable Device Area Network, Wearable Neural Interface and so on. And AG 1 will discuss about the establishment of JWG with IEC TC 124 and a liaison with ISO TC 299 (Robotics).

4.2 AG 2 on Concepts and Terminology

4.2.2 AG 2 Terms of Reference

- Defining what types of terminological issue are to be addressed by AG 2, reflecting the needs of SC 6 and the evolving nature of concept and terminology work;
- Identifying and prioritizing terminology issues within existing and emerging projects for attention;
- Utilizing existing standards, ISO/IEC deliverables, and good practice from other TC/SCs relating to the development and management of concepts and terminology as input into resolution processes and advice;
- Establishing appropriate repositories (new or reusing) for supporting the progress, recommendations, and updating of documents;
- Providing concept and terminology advice to SC 6 WG Management, project editors, and rapporteurs.

4.2.3 AG 2 Current Work

AG 2 has developed a Standing Document: a glossary of Telecommunications and information exchange between systems Terminology, to collect all terms and definitions in published deliverables, as a basis of the

ToR defined work. The raw data is from the Online Browsing Platform (OBP) https://www.iso.org/obp/ui;
In Jul 2021, SD on Glossary has been updated to the 3rd version.

4.2.4 AG 2 Future Plan

AG 2 calls for more participation to complete the ToR defined work. It will regularly update the SD on SC 6 Glossary. The next step is to do research and give suggestions on terminology references.
Based on the initial suggestions from AG 2 members, to arrange the terminology in levels of abstraction is a higher expectation for future work of this group.

4.3 AG 3 on Systematic review process

4.3.2 Terms of Reference

AG 3 provides information to help each member NBs handle effective SR process within the SR guidelines set by ISO. In addition, through these activities, AG 3 recommends suggesting a way to communicate with the member NSB, a plan to induce active participation in inactive meetings, and whether there are any improvements in NSR handling.

4.3.3 AG 3 Current Work

AG 3 recognizes that SC6 differs from other SCs in many ways: (1) there are many standards developed by the committee itself, (2) some of them are 'old' standards, and (3) there are many standards inherited from various committees that have been disbanded. AG 3 also recognizes that this phenomenon has led to a shortage of relevant experts in SC 6, and the phenomenon is getting worse. From this recognition, AG 3 is looking for ways to effectively process SR for 'old' PISN-series standards.

4.3.4 AG 3 Future Plan

AG 3 now investigates whether the current SR procedure is suitable for SC 6, derives an SR treatment plan to be improved, and is reorganizing it into a part that can be processed in SC 6 and another part that can be processed in JTC 1.

4.4 AG 4 on MCS Innovation

4.4.2 AG 4 Terms of Reference

The Mission of AG 1 is to study the challenges of MCS schemes, to explore ways to continuously improve MCS efficiencies of communication and network systems, and to find new MCS technologies and propose standardization projects for SC 6.

4.4.3 AG 4 Current Work

- Study MCS technological gaps (MCS deficiencies and market needs) and the gap analysis shall cover those MCS application fields that represent various levels of MCS efficiencies.
- Study on the requirements of innovation of MCS systems and make recommendations.
- Collect, identify and evaluate innovative MCS technologies and make recommendations for their adoption by SC 6 as standardization projects.
- Non-MCS features that provide system level spectral and power efficiency are excluded from the MCS innovation scope except in comparative analysis.

4.4.4 AG 4 Future Plan

MCS innovation will have broad influences on various application fields. AG 4 will identify relevant SDOs and seek to establish liaison and collaboration with them so that innovative MCS technologies standardized by SC 6 have quick access to the industry and market.