

**Telecommunications and Information Exchange Between Systems**

**ISO/IEC JTC 1/SC 6**

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ISO/IEC JTC1/SC6 Secretariat Ms. Jooran Lee, KSA (on behalf of KATS) Korea Technology Center #701-7 Yeoksam-dong, Gangnam-gu, Seoul, 135-513, Republic of Korea ; Telephone: +82 2 6009 4808 ; Facsimile: +82 2 6009 4819 ; Email : <a href="mailto:jooran@kisi.or.kr">jooran@kisi.or.kr</a>	

ISO/IEC JTC 1/SC 6  
TELECOMMUNICATION AND INFORMATION  
EXCHANGE BETWEEN SYSTEMS

Title: Work Plan of Standardization on Future Network  
Source: Republic of Korea (Seok J. Koh and Hee Young Jung)  
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Type: Contribution

Summary:

This contribution discusses the work plan of standardization of Future Network (FN), which is being progressed in the JTC 1/SC 6/WG 7. The next steps of standardization on FN will include the design of architecture of FN (Stage 2) and the development of specific protocols for FN (Stage 3). The overall FN architecture could be designed with a set of building block components for effective standardization work, due to its intrinsic complexity. Based on the designed architecture, a set of specific protocols might be developed in the future.

It is proposed that the proposed texts should be inserted into Clause 7 of the TR-PSR document after discussion in the WG meeting.

In addition, it is expected that a new work item proposal (NWIP) on the “Architecture of Future Network” could be initiated by the SC6/WG7 after the meeting. The associated work might be done with the ITU-T Q.21/13 possibly as a common text.

## 7. Work Plan of Standardization on Future Network

This clause describes a set of promising work items of standardization on Future Network.

### 7.1 Overall Work Plan

This Technical Report has described the problem statement and requirements for Future Network (FN). From the discussion on FN, a set of requirements and design considerations have been derived for further progressing of standardization on FN.

Based on these results, the design of FN architecture and the development of specific protocols need to be progressed as the future work items, as shown in the following figure.

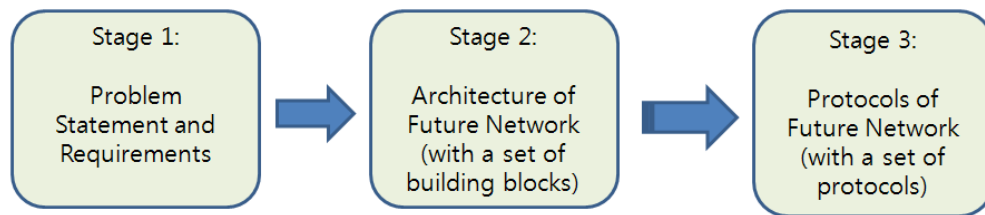


Figure – Overall milestone of standardization on FN

In Stage 1, in this TR, a set of requirements and considerations are identified for design of the FN architecture. In Stage 2, the FN architecture will be designed. The design of FN architecture can be done with a set of architectural building block (BB) components for overall FN architecture. This is because the FN architecture contains a wide variety of technical issues to be considered such as services/application, identification, naming/addressing, mobility control, QoS, security, and network virtualization, migration from the current network to FN. With this building block approach, a set of the BB architectures will result in the overall FN architecture. From the FN architecture, in Stage 3, one or more specific protocols of FN might be developed. Details of the protocols for FN to be developed are still for further study.

### 7.2 Architectures of Future Network

The FN architecture will be design with a set of component architectures as building blocks (BBs). These BBs may include the following architectural components, but not enumerative:

- ✧ Services/Network Model, including the Identification issues such as Naming and Addressing
- ✧ Functional Reference Architecture
- ✧ Mobility Control
- ✧ Security
- ✧ QoS
- ✧ Migration to FN

Some more additional BBs could be considered, if necessary. These architectural BBs will construct the overall FN architecture, as illustrated in the following figure.

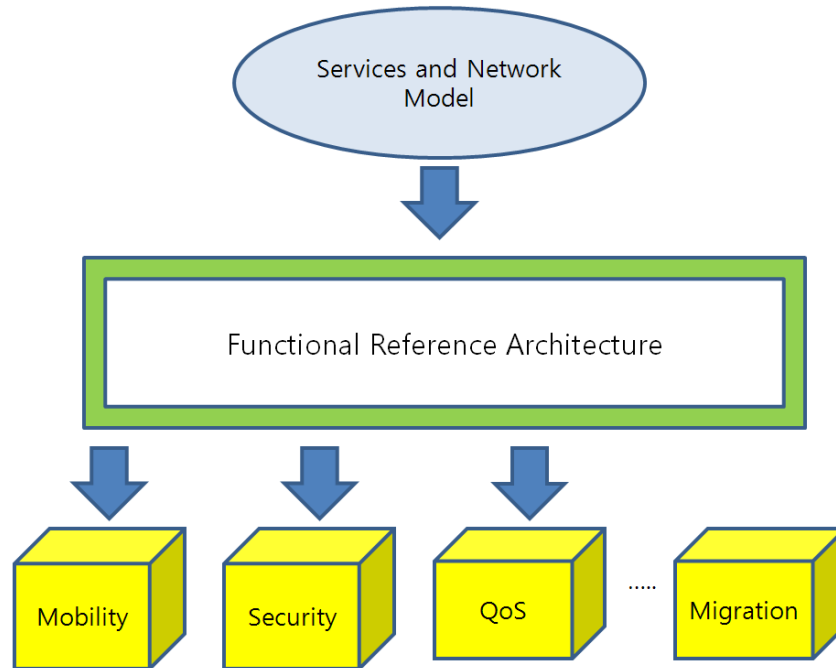


Figure – Building blocks components for FN architecture

As shown in the figure, the Services and Identification BBs will be used as substantial inputs to design the generic Functional Reference Architecture (FRA) BB. Based on the FRA BB, the following specific functional BBs could be designed: mobility, security, QoS, and migration to FN, and more additional BBs. For the standardization process, each of the BBs will be made as a part of the overall FN architecture as follows:

- ✧ Part 1: Architecture of Future Network – Services and Network Model;
- ✧ Part 2: Architecture of Future Network – Functional Reference Architecture;
- ✧ Part 3: Architecture of Future Network – Mobility Control;
- ✧ Part 4: Architecture of Future Network – Security;
- ✧ Part 5: Architecture of Future Network – Quality of Services;
- ✧ Part 6: Architecture of Future Network – Migration to Future Network.

Some more parts (BBs) may be added to the above list, depending on further progress.

### 7.2.1 FN Architecture: Services and Network Model

As a basic architecture, the services and network model for FN should be identified. This work needs to address the following issues:

- ✧ Services, including some set of target services and killer applications, to be provided in the FN environment;
- ✧ Network model to be considered for design of FN architecture, which will include the fixe/wireless access network, core/backbone network, interworking between access networks and core networks;

- ✧ Abstract protocol stack in the layered architecture, as shown in the TCP/IP Internet protocol stack;
- ✧ Identification of users, devices, services in the FN, in which a variety of naming, addressing and numbering schemes will be investigated in the viewpoint of FN;

### **7.2.2 FN Architecture: Functional Reference Architecture**

The FRA BB will be the core part of the FN architecture. The details of functionality required for FN should be identified, and the relationship or interworking between the FN functions should be described. The routing/switching schemes or principles for FN should also be examined. This work needs to address the following issues:

- ✧ Functionality required for FN, such as routing, mobility control, QoS, security, etc;
- ✧ Concrete Protocol Stack that contains the protocols of FN in the layered architecture, as illustrated in the TCP/IP protocol stack;
- ✧ FN Routing principles and schemes, which include the routing between FN routers, the relationship between optical switching and routing, and the end-to-end data delivery model using the routing and switching, and so on;
- ✧ Relationship between user data transport plane and control plane.

### **7.2.3 FN Architecture: Mobility Control**

This BB should provide the architecture of mobility control for FN. This work needs to address the following issues:

- ✧ Mobility control framework in FN;
- ✧ Location management of mobile users;
- ✧ Seamless handover support for mobile users;
- ✧ Separation of user identifier from network locator;
- ✧ Separation of user data transport function from mobility control function;
- ✧ Context-awareness;
- ✧ Multi-homing and vertical handover support;
- ✧ Heterogeneity of wireless and fixed access networks.

### **7.2.4 FN Architecture: Security**

This BB should address how to provide the security for FN users, which may include the investigation of a wide variety of legacy security schemes to FN.

### **7.2.5 FN Architecture: Quality of Services**

This BB should address how to provide the QoS for FN services and users, which may contain the investigation of a wide variety of legacy QoS provisioning schemes to FN, including the QoS signalling and network resource reservation schemes.

### **7.2.6 FN Architecture: Migration to Future Network**

This BB should describe the issues on how to migrate to the FN from the current network in the service and network point of view. This work needs to address the following issues:

- ✧ Issue on transition to FN services and networks;
- ✧ Building up a single shared infrastructure for FN;
- ✧ Deploying unconventional network architectures;
- ✧ Deploying new emerging technologies.

### **7.3 Protocols for Future Network**

As the next phase, a set of specific protocols should be developed based on the designed architecture of FN. This work should be done as a new project in the JTC1/SC6.

The final list of the FN protocols required may depend on the FN architecture, but, at this moment the promising set of protocols include the followings:

- ✧ Protocols for routing and switching the data and control packets in the FN (c.f., IP);
- ✧ Interworking of the routing/switching protocols with the heterogeneous underlying access technologies;
- ✧ End-to-end transmission protocols for user data processing and control (c.f., TCP and UDP);
- ✧ Application-specific protocols.