Technical Specification Group Services and System Aspects **TSGS#27(05) 0072**
Meeting #27, Tokyo, Japan, 14-17 March 2005

TSG-SA WG1 #27 **S1-050188**
Cape Town, South Africa, 17th – 21st January 2005 **Agenda Item: 10.1**

Title: Update of All-IP Network (AIPN) Feasibility Study Work Item (proposed changes)

Source: AIPN Rapporteur

Contact: Chris Sachno, NTT DoCoMo Inc.

mailto:c.masyu@nttdocomo.co.jp

Work Item Description

Title

All-IP Network (AIPN) Feasibility Study

1 3GPP Work Area

X	Radio Access
X	Core Network
X	Services

2 Linked work items

Related Work Items:

TSG SA2: 3GPP System Architecture Evolution (SP-040928)

TSG SA1: IMS Phase 2 (with unique ID 32021)
TSG SA1: WLAN-UMTS Interworking (with unique ID 31012)

3 Justification

The 3GPP system currently supports GERAN and UTRAN based Access Networks in conjunction with Circuit-Switched and Packet-Switched Core Network domains and IP Multimedia CN subsystem from Rel-5. The All-IP concept was initially introduced within 3GPP in Rel-4 with the standardisation of the MSC Server - MGW split core network architecture for the CS domain and extended from Rel-5 by the standardisation of the IP Multimedia CN subsystem. WLAN as an alternative access technology to access services in the mobile core network is recognized from Rel-6 onwards.

In order for the 3GPP system to cope with the rapid growth in IP data traffic, the packet-switched technology utilised within 3G mobile networks requires further enhancement. A continued evolution and optimisation of the system concept is also necessary in order to maintain a competitive edge in terms of both performance and cost. It is anticipated that the progression towards an ~~All-IP Network~~AIPN may enable leverage of information technology (IT) hardware and software with general-purpose, and mobile network specific software that should provide cost reduction (CAPEX and OPEX) for infrastructure

equipment and applications of 3GPP based mobile networks. Moreover, it is important to ensure compliance with Internet protocols within future developments of the 3GPP system.

Motivations for further evolving the 3GPP system to an ~~All-IP Network~~AIPN include (non-exhaustive list):

- Rapid increase in IP traffic
- Potential network and traffic cost reduction
- Industry trend towards IP services
- Convergence of telecommunications and IT industries towards IP technology
- IP technology being mainstream technology
- Flexible accommodation and deployment of existing and new access technologies with mobility by a common IP-based network
- Ability to offer enhanced and flexible IP services (e.g. PtP, integrated services) increasing revenues for network operators
- Leverage of existing capabilities to evolve the 3GPP system towards an ~~All-IP Network~~AIPN

Additionally, the following aspects identified within TR 21.902 “Evolution of 3GPP System” are considered relevant to the long-term evolution of the 3GPP system:

- *A seamless integrated network comprising a variety of networking access systems connected to a common IP based network supported by a centralised mobility manager*
- *A similarity of services and applications across the different systems is beneficial to users*
- *3GPP should focus on the inter-working between 3GPP Mobile Networks and other Networks considering mobility, high security, charging and QoS management*

Taking the above into consideration it is necessary to further define the ~~All-IP Network~~AIPN concept, explore business and technological drivers and evaluate the feasibility of evolving the 3GPP system towards an ~~All-IP Network~~AIPN. Furthermore, aspects of the 3GPP system requiring enhancement need to be identified and developed in accordance with this common vision. The reuse of existing standards also needs to be investigated.

4 Objective

The objectives of this work item are to study further application of the ~~All-IP Network~~AIPN concept. Identify and evaluate needs/drivers and identify work required to satisfy the short term and long term needs of 3GPP, specifically:

1) *Investigate the ~~objective and~~ user, business and technological drivers for progression of the 3GPP system to an ~~All-IP Network~~AIPN:*
   - *~~i)~~Study ~~m~~High level Objectives, Motivations and Drivers and*
   - *~~ii)~~i) ~~Study~~ impacts on current models (e.g. business/charging/service models)*
   - *~~iii) Study the leverage of technological convergence and introduction of new technology in a cost effective way i.e. study if and how the introduction of a 3GPP All-IP Network will give a significant cost reduction (CAPEX and OPEX)~~*
   - *~~iv)Identify any short and long term issues~~*

2) *To define and develop the end-~~-~~user and operator aspects of a 3GPP ~~All-IP Network~~AIPN concept:*

i) *Investigate the feasibility of evolving the 3GPP system towards an ~~All-IP Network~~AIPN from existing functionalities:*

i. *Produce an ~~ideal 3GPP All-IP~~ AIPN vision, taking into account the special requirements for the mobile community e.g. carrier grade, optimisation for the radio environment, recognizing support of multiple access ~~network~~ system scenarios.*

ii. *Investigate needs and requirements associated with the evolution of the 3GPP System to an ~~All-IP Network~~AIPN ~~and to identify a 3GPP view on how IP technology and associated transport technologies should be evolved towards an enhanced multi-service network~~.*

Investigate requirements associated with the reuse of legacy infrastructure and support of legacy terminals

iii.

iv. *Study* migration and cost effective introduction of new technology ~~*the leverage of technological convergence and introduction of new technology in a cost effective way i.e. study if and how the introduction of an AIPN will give a significant cost reduction (CAPEX and OPEX)*~~

~~*iv.*~~*3)* *Identify the capability expansion required to introduce the ~~All-IP Network~~AIPN concept into the 3GPP system (migration and co-existence).*

~~*v.*~~*4)* *Define the scope, target, and roadmap for work to be undertaken within Rel-7and future 3GPP releases~~rther~~.*

~~*ii)*~~*5)* ~~*Subsequent steps to be identified during the concluding phases of the Feasibility Study*~~*Technical Specification work based on feedback received from other groups, in particular SA2, on the conclusions of the AIPN Feasibility Study (TR 22.978).*

5 Service Aspects

The expected advantages of an ~~All-IP Network~~AIPN for network operators from a service provisioning point of view (e.g. rapid application development, service diversity, ubiquitous and seamless services) and potential Service Requirements for an ~~All-IP Network~~AIPN shall be investigated.

Potential service aspects to be investigated (non-exhaustive list):

- *QoS (e.g. End-to-end QoS, policy coordination)*
- *Multiple Access ~~Network~~ System scenarios*
- *Network/Domain/Access System Selection principles and policies*
- *Mobility ~~modes (e.g. 'idle'and 'connected' modes)~~ enhancements*
- *Network resiliency, redundancy and reliability*
- *Resource availability and optimisation*
- *Network management (e.g. 'back-office' considerations for new services)*
- *Service Interoperability*

~~*Efficient methods for packet inspection purposes*~~

Compatibility and reuse of existing standards (e.g. OMA, Web Services/Liberty Alliance Project, IETF, etc…) should be investigated where appropriate.

Interactions with, and impacts upon existing features, service enablers and services (e.g. IMS, Presence, MMS, SMS, CS voice, etc.) should be investigated.

The role~~s of IP-address and its relation to~~ of existing and future addresses/identities/numbers (e.g. IMSI, MSISDN, e-mail address, web-address, SIP URI) should be investigated.

6 MMI-Aspects

The usage of existing and possible new identities (e.g. IP address, IMSI, MSISDN, e-mail address, web-address, SIP URI) including their integration and interoperation should be investigated.

7 Charging Aspects

Charging ~~requirements and charging architecture for~~aspects and impacts to charging models of an ~~All-IP Network~~AIPN should be studied.

8 Security Aspects

Security policies and requirements to protect the network itself and users from threats associated with an ~~All-IP Network~~AIPN should be studied. ~~Mechanisms to p~~Protection of user privacy (in particular, user location privacy) should be studied. In addition, security, authentication and trusted environments based on the USIM should be studied.

Note: Security needs the reliable identification of the calling/sending party and the originating network. All the relevant information needs to be conveyed to the terminating network.

9 Impacts

Affects:	UICC apps	ME	AN	CN	Others
Yes	X	X	X	X	Legal Intercept
No					
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
TR 22. 9~~XX~~78	All-IP Network (AIPN) Feasibility Study	SA1		SA#26	SA#27	It is understood that e.g. SA2, SA3 and SA5 may be affected by the result of the TR. This work should however be done under~~in~~ separate WIDs. (e.g. the work item for 3GPP System Architecture Evolution in SA2)
TS 22.xxx	Service requirements for an All-IP Network (AIPN)	SA1		SA#30	SA#31	Schedule and scope of this work to be clarified based on feedback received from other groups, in particular SA2, on the conclusions of TR 22.978.

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
		CRs to existing specifications as appropriate.		Schedule and scope of this work to be clarified based on feedback received from~~-~~ other groups, in particular SA2, on the conclusions of TR 22.978.

11 Work item rapporteurs

Chris Sachno (NTT DoCoMo)

12 Work item leadership

SA1

13 Supporting Companies

3, NTT DoCoMo Inc., TIM, T-Mobile International, Vodafone Group, Ericsson, Fujitsu, Motorola, NEC, Nokia, Siemens, Samsung, Panasonic

14 Classification of the WI (if known)

This WI is a Feasibility Study followed by Technical Specification work.

X	Feature (go to 14a)
	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature
(list of Work Items identified as building blocks)

14b The WI is a Building Block: parent Feature

(one Work Item identified as a feature)

14c The WI is a Work Task: parent Building Block

(one Work Item identified as a building block)

form change history:
2002-07-04: "USIM" box changed to "UICC apps"