

Agenda Item:

Source: Ericsson

Title: Defining standards that merge Mobile systems with Internet

Document for: Discussion / Decision

1. Introduction

The next major standardization challenge is how to merge mobile systems with the Internet. Internet contains both the present and future base for the applications of the Information Society. Mobile systems represent the most attractive access form for the end user. Thus by combining mobile systems, being the specification effort of 3GPP, with IP/Multimedia, with most of the mechanisms defined by IETF, represents a major challenge, that will clearly result in extensive end user value.

In addition to the attractiveness of the wireless/mobile access, it also represents the largest difficulties, due to the well-known physical limitations associated with wireless systems and mobile terminals. Thus 3GPP represents the most difficult access form, wireless-mobile, but also the one with best end user value. This means that the systems design necessary to standardize IP/multimedia in the mobile environment represents a major effort that must be handled with the appropriate expertise. Also the aspects of mobile terminals must be catered for. I.e. the restrictions in size, weight, display, battery life etc. for a mobile terminal – one cannot assume all clients (including mobile terminals) are full function PCs.

The classical problems of radio systems design i.e. dealing with a scarce spectrum resource in a difficult radio environment plus the problems associated with terminal mobility must all be catered for. Otherwise IP protocols can not be used in the mobile environment, over an air interface. The expertise for such radio adaptation of IP protocols does reside in 3GPP. However the IP protocols are developed and maintained by IETF. Presently the IP protocols presume a wired environment, meaning a bit error and fading free world with low cost penalty to bandwidth resources. Thus the scheme on how to adopt IP to the mobile environment clearly requires that 3GPP as a radio competent body takes the lead on such aspects, and consequently cooperates with IETF to make such radio adaptations of IP protocols. The working arrangements for this (e.g. the principles regarding work distribution between 3GPP and IETF) must be defined as soon as possible.

The issue of convergence, meaning the same end user services over different access forms, is very essential in the IP environment. Presently a lot of end user value resides in the already established wired Internet; thus it is essential that these services also can be made available to the wireless user. Also the further development of the Internet with new services will be very dynamic and unpredictable; it is all up to the ingenuity of thousands of application developers for the global Internet. Therefore convergence,

meaning that IP multimedia services shall, to the extent possible, be defined in an access independent manner. How the delivery mechanisms cater for the service distribution over access forms with different characteristics should ideally be invisible to the end user.

Convergence can be handled both from the perspective of adopting a protocol for a wireless service (e.g. WAP) into the fixed domain, as well as by making the necessary radio adaptations of services from the fixed domain some pragmatic manner, conserving the applications from an end user perspective.

The above mentioned objectives can be summarized,

- 3GPP must take the lead on defining wireless adaptation of IP, in cooperation with IETF, as 3GPP holds the radio expertise and the systems responsibility for wireless services, including IP
- Convergence, meaning alignment with IETF mechanisms defining end user services over any access type, is essential

This requires that 3GPP establishes some basic architectural principles, i.e. to facilitate a functional map where technical issues can be identified, identify all issues related to radio adaptation of IP and establish some suitable working arrangement with IETF.

2. Architecture;

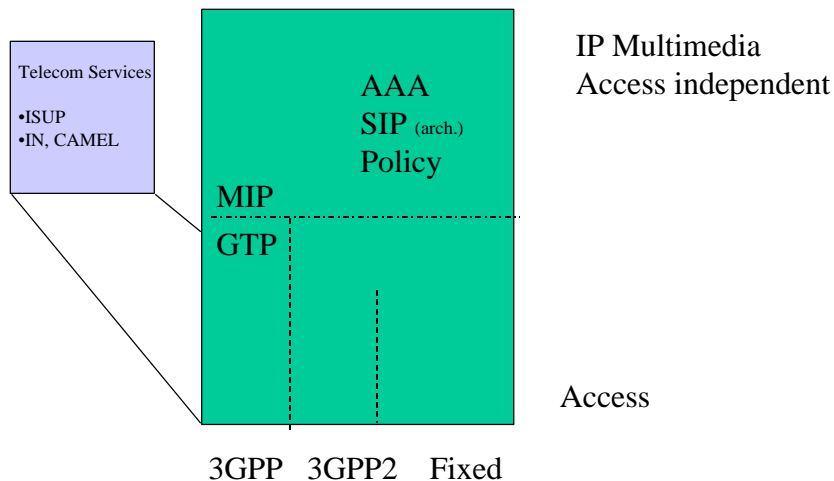


Fig 1.

This picture outlines a hi-level architecture on how to align different access forms, with particular focus to radio access, with IETF mechanisms. Therefore SIP is mentioned from the architecture perspective, thus in this picture denoting session initiation as a general concept. The protocol issue, i.e. if SIP or H.323 protocols shall be used as design base for session initiation remains an open issue.

3. Architecture assumptions and related issues

This architecture rests on the following assumptions,

- Convergence and alignment with IETF mechanisms for IP services at some access independent level
- Reuse of established GPRS mechanisms constituting a mobile packet data bearer network
- 3GPP to define the interface to the access independent part at the MIP/GTP intersection

From this architecture and the issues associated with radio adaptation the following technical issues can be identified

- Introduction of QoS classes also covering the radio environment
- Introduction of terminal classes (clients), from full function PC to a very simple device
- Introduction of real time/QoS mechanisms for GPRS, including support for fast handover. (note 2) This issue partly related to the introduction of real time/QoS for packet networks in general. However it is also likely that such mechanisms may need to be access dependent
- Radio adaptation of IP protocols, both "lower layer" aspects such as header compression as well as "higher layer" aspects involving services and applications

4. To summarize;

- 3GPP needs to establish leadership on how to combine wireless with IP
- 3GPP needs to define and establish an architecture (e.g. fig 1 above) defining an appropriate level from the 3GPP perspective where functionalities are access dependent vs. access independent
- 3GPP needs to establish a long term working arrangement with IETF on how to handle the issues associated with adopting IP to the mobile environment (QoS also for wireless, mechanism compatible with realistic terminals also for the mobile environment, radio adaptations of IP protocols). The header compression work is a model for such 3GPP/IETF working arrangement.
- 3GPP needs to establish a long-term vision, perhaps in line with the proposals of this paper, but also a workplan on which issues shall be handled when. E.g. to prioritize key issues, based on operators requirements.