

Plenary Meeting #7, Madrid, Spain

13th – 15th March 2000.

Technical Specification Group Services and System Aspects

AIP(00)0043

All-IP Workshop, Nice, France, 07-09 February 2000

Source: Secretary (M. Pope, MCC)

Title: Draft Report of the All-IP Workshop, version 0.0.2

1 Opening of Workshop

The Workshop was opened by Mr. Niels Peter Skov Andersen, Chairman of TSG SA.

Mr David Gurle, Microsoft, welcomed delegates to the workshop and explained the arrangements for the workshop and the interest of Microsoft in the All-IP network initiative.

The workshop Chairman explained that the target of the workshop was to establish a common vision for 3GPP's "All-IP" network and to identify the requirements for 3GPP's "All-IP" network. This vision should be a longer term vision, which reaches further than Release 2000/2001. Release 2000 should be considered as a step toward this longer term vision. He added that we should not set the ambitions of the workshop too high, but to produce a first vision to be further built upon and developed afterwards.

The workshop was planned to start with a 1½ day presentation part. This presentation part will be run in a "conference style", i.e. with a 15-20 minute presentation followed a short session (<5 minutes) for questions for clarification. This style was chosen in order to allow many different perspectives, ideas, visions and requirements to be presented. It was hoped that this would assist in obtaining a common understanding of the ideas of the "All-IP" network.

The presentation part was to be followed by a "Establishment of the vision" and "collection of the requirements" part:

- The 3GPP "All-IP" vision, long term and short term;
- Requirements identified for the 3GPP "All-IP" network.

The output of the workshop is intended to be forwarded to the normal process of 3GPP, i.e. decisions and conclusions can first be considered final after confirmation by TSG-SA.

2 Approval of Agenda

The draft agenda, given in AIP-000018 was approved.

3 Presentations of 'Visions of All-IP'

A preliminary schedule for 3GPP IP workshop is provided in AIP-000019.

AIP-000011: 'Business Drivers for the IP based 3G vision' BT

This presentation described the growth of the internet, the role of IP in support of seamless services, the changing customer relationship, and the direction of future technology and standards development. The vision was not tied to any particular "Release", and represented a long-term vision.

The 'New Wave' services were questioned, and it was explained that the traditional services as presently known will probably disappear or migrate, to be replaced by a large number of new services over the IP Networks.

AIP-000007: 'Next Generation Wireless: Business Drivers for an All IP Network' Lucent Technologies

The presentation highlighted various changes and trends in the mobile market and identified the need for fast development of new services, rapid growth of Internet traffic and the need to adopt technology which is able to provide the best cost/performance. The development of IP routing technology is increasing rapidly due to higher funding, stimulated by the increase in IP usage and traffic.

A question about application dropping due to the choice of technology (i.e. IP temporary drop-outs). It was explained that the vision was technology independent.

The cost reduction in the presentation was questioned - was this Capital Expenditure (Capex) or Operational Expenditure (Opex). It was explained that initial internal analysis demonstrates the advantages of the All-IP in the Capex domain. The increased growth of voice can be more easily accommodated in a PS NW rather than additional investments in CS. As far as Operational Cost saving is concerned, this is operator dependent - an operator which is willing to migrate its legacy traffic to All-IP NW or is a new entrant (no legacy) is expected to gain more operational cost savings.

AIP-000009: 'Requirements for IP based UMTS – A Consensus View from the Industry' UMTS Forum

This presentation details the results of a UMTS Forum workshop which was conducted to discuss and reach consensus on the Forum's view on Release 2000 (IP Based UMTS), including both radio access and core network aspects.

The UMTS Forum recommendations to 3GPP on IP based UMTS are based on some key benefits to the Operators and Vendors community:

- Strong drive towards introducing an architecture that would considerably reduce Operators costs, including equipment, network deployment, maintenance, etc.;
- Flexibility in service creation especially in the area of Internet integration e.g. opportunity to quickly provide value added services and create new service revenue streams;
- An effective way to make available to mobile users integrated services such as multimedia.

The UMTS Forum supports an IP-based solution for the Release 2000 architecture. In this respect, the UMTS Forum would ask the 3GPP to analyse the following issues:

- Quality of services for real-time services: including voice and music;
- IP version to be used in standardisation (IPv4 vs. IPv6);
- Security aspects;
- Mobility management;
- Global roaming including terminal circulation.

The presentation outlined the UMTS Forums views as follows:

- 3GPP should clarify what level of IP introduction in the UMTS system, with all the related issues solved, could be achieved in the time frame of Release 2000.
- Phased introduction of the IP technology in the UMTS system. As an example UMTS Forum has identified four possible phases:
 - Phase 1: IP as the technology to be used in the interconnection of 3G networks (i.e., NNI);
 - Phase 2: IP introduced within the UMTS Core Network, down to and including the Radio Network Controller;
 - Phase 3: IP introduced also within the RAN, down to the Node B;
 - Phase 4: IP down to the terminal, over the radio interface.
- Smooth evolution from Release 99. The IP solution, which can be seen as a revolutionary approach, should be evolvable from current solutions.
- Support of backward compatibility for Release 99 circuit-oriented services.
- Compatible solutions across different Releases.
- Single global IP solution preferred. The number of options must be minimised both within 3GPP and world-wide.
- The UMTS Forum emphasises that stabilisation of Release 99 should be achieved during the Release 2000 work, especially in the Radio Access Network area.

- 3GPP should clarify the level of interconnection between 2G (GSM/GPRS) and 3G networks that is being specified (at the RAN level or at the Core Network level).
- 3GPP should consider a system approach including services, applications and network.
- The UMTS Forum stresses the importance of network management, billing and service provisioning issues.
- 3GPP should develop test requirements for all the standardised modules.
- In developing an IP network, 3GPP should be open to incorporate IETF working methods as appropriate.

Q&A:

Phasing issue: Phase 1 - Does this mean IP MAP, Phase 4 - IP to terminal - how does this relate to e.g. H.323?

The Phasing opinion was considered as a loose suggestion by the UMTS Forum and should be understood as an example. These examples were intended to provide possibilities of future developments, based upon possible scenarios of IP in the network, air interface etc. in the future, rather than to restrict to what is feasible today. It was also recognised that using IP over the air interface is inefficient at present and more work is needed on IP to make it efficient over the air interface, rather than H.323.

Expansion on the UMTS Forum requirements on Releases - it was considered that R99 will be Circuit switched based and that the future releases, should be able to support these CS terminals.

The stabilisation of R99 during R2000 was questioned. It was explained that R99 should not be forgotten, and the maintenance of the R99 system must not be forgotten, as many operators will have invested in this.

It was mentioned also that the mobile base should not be forgotten, as this is much more difficult to replace, and terminal backward compatibility is very important.

AIP-000025: 'Requirements for All-IP The View of a 'Legacy Network' Operator' Mannesmann Mobilfunk

This presentation described the current status and pace of network expansion of the Mannesmann Mobilfunk GSM Network. Voice is still the basis for revenue, SMS is gaining ground and a steep growth from WAP services is expected. Current growth mainly stems from pre-paid customers served by IN-Platforms.

The migration from GSM CS network via GPRS towards Release 1999 3G network fits rather smoothly into Mannesmanns current network expansion strategy.

The "All-IP" approach was understood as an end-to-end approach and was supported by Mannesmann Mobilfunk, in principle, as the way ahead.

From Mannesmann Mobilfunk point of view it seemed questionable whether partially completed specifications can be implemented and provide any benefit, and that it is not currently proven that the claimed benefits can be realised. Much complexity is added in terms of numerous additional functional entities, interfaces and protocols (for example, the Pre-paid service, which is considered as a "must" for Mannesmann Mobilfunk, is very complex for 2G migration).

Mannesmann Mobilfunk were in favour of a serious road map with feasible time frames with the quality they are used to from GSM. The "All-IP" concept must offer necessary service quality and should be applicable, possibly with some limitations, to 2G networks as well.

In addition the presentation addressed some key issues for MMO in the area of Services, System and Radio.

Mannesmann Mobilfunk recommend system performance and complexity analysis, QoS solutions, billing concepts, identification of protocols (less options), availability and stability of third party protocols in order to carry out the detailed specification work in 2001 for completion of stable quality specifications for the end of 2001. They propose 3 steps towards this:

Step 1: To complete the first set of specifications for 2001. This should comprise Core Network specifications, including all interworking/gateway function;

Step 2: Then Access Network between RNC/BSC and Node B/BTS;

Step 3: Then Radio Interface - equals the "All-IP" end-to-end solution.

The presentation details the requirements and issues to be tackled for the System, Services, Security and Radio aspects.

Q&A:

Clarification on the perceived complexity of All-IP was asked for. It was clarified that the additional network elements

over Release 1999 that is required requires some firm ground work in order to avoid the unacceptable situation experienced in the addition of GPRS to the GSM system. Because of this it is considered that this will be achieved by the end of 2001, rather than end of 2000.

It was asked when Mannesmann are expecting to deploy a 3GPP system and when they will plan to migrate to All-IP. Mannesmann are expecting to implement if they receive a licence and expect to migrate to All-IP as soon as the specifications are stabilised, or to upgrade the existing GSM system to provide the required services.

AIP-000034: 'End-to-End Wireless Mobile Networks Vision' Siemens

This presentation provided a long term vision of end-to-end wireless IP networks relating to a time frame > 2005. The basic architectural principles of this long term vision were shown, together with the key motivations. The vision should provide guidance on which steps to undertake in the coming years, in order to come closer to it.

The vision took into account communications environments which are beyond cellular wireless communication and provided a link to services and applications. Some important market requirements were recalled which act as drivers towards this vision. This presentation was provided as a basis to a second presentation from Siemens on ways to achieve the vision (see AIP-000035).

Due to the inhomogeneous networks currently found, and expected to continue to be found, throughout the world, IP is seen as the harmonising protocol to provide transparency of services.

It was thought that this vision is the current vision of Siemens, which would require tailoring and updating as the networks evolve towards it. The Release 2000 was considered the starting point and its current reference architecture fits into the path to the Siemens vision.

Q&A:

Release 1999 and release 2000 discrepancy needs to be tackled. The closing of the gap between R99 and R00 needs to be done in 2000.

AIP-000028: 'Vision of Mobile Information Society' Nokia

This presentation provides Nokias vision on Global IP Mobility:

- Exploding Connectivity = New Mobile Applications & Application Categories
- Many New Roles for the Network Operator

The Target Setting:

- Create a world-class all-IP system with rapid time-to-market and future-proof design;
- Flexibility for providing new, revolutionary services, while ensuring smooth network evolution and service continuity;
- Access independent design for globally seamless services;
- Enable growth of revenue-generating streams now by leveraging the newly-emerged wireless data market;

This requires the combination of the best of both cellular and IP technologies.

To achieve the Mobile Information Society, we need:

- Global Specifications;
- Mobile System Specifications in 3GPP;
- Mobile community to take the lead in development of new services.

Q&A:

(none)

AIP-000032: 'Expectation to All IP NW and its evolution' NTT DoCoMo

This presentation describes the evolution scenario to the All-IP network from the NTT DoCoMo point of view. It shows the evolution of mobile telecommunications since 1997 to present and onwards to 2010. It proposes two steps of IMT-2000, step 1 based upon release 1999 and a second step based upon an evolved Release 1999 network. The evolution in step 2 will enrich and enlarge the core network and service content.

Q&A:

What kind of Evolution do you perceive from R99 to R00, as many speakers have envisioned a revolution between these Releases. - It is considered that the most important thing is to allow addition of new functions in R2000, but already defined functions in R99 should not be changed in order to allow easy evolution from R99 to R2000.

Mannesmann commented that the conclusions reached by NTT DoCoMo were similar to their own, in that R99 should be stabilised and a clear migration path was envisaged.

AIP-000031: 'Requirements for an all IP network' France Telecom

This presentation covered only the main issues, and was not intended to give the full requirements for an all-IP network. It asked why we should want an IP Mobile Network. The challenge is to define fixed-mobile internet convergence. The price reduction for transport and service development and increased homogeneous services are seen as main opportunities of IP. The main requirements for the future systems are seen as:

- migration of existing mobile networks (including Release 1999 networks);
- the co-existence of 2G, R99 and all-IP networks;
- Continuity of existing services (SS, ...);
- New multimedia services;
- Same or better QoS than the one experimented in existing networks;
- Same or better security than in Release 99.

The basic architectural principles were detailed, including the evolution of circuit domain with separation of transport control, use of MAP as the mobility protocol inside mobile networks (mobile IP being used for inter-network mobility) and the independence of services and technology.

Problems which still need to be solved include:

- QoS;
- Security (equivalent or better to Release 1999 security mechanisms);
- Charging and billing;
- Efficient use of radio spectrum.

Q&A:

It was asked about the security aspects of the internet - there are security tools available on the internet to protect against security problems. The IETF are working on security issues and have fixed many problems already. It was clarified that the radio link is a critical point and an efficient security mechanism is needed over this. IPSEC have also produced many solutions for different requirements and protocols.

Convergence of telecomms and internet domains - it needs to be ensured that equivalent security to what exists for GSM and the internet or better should be sought (taking the strengths developed for both systems). This is also needed for charging and billing systems which need to be secure and reliable.

The separation of transport and switching was questioned. It was clarified that this was done for GSM GPRS and this could be done for the 2G and 3G Release 1999 working in a future all-IP network.

AIP-000030: 'Defining standards that merge Mobile Systems with internet' Ericsson

This presentation proposed that the next major standardisation 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 represents the most attractive access form for the end user. So, the challenge for 3GPP is to increase the end user value by combining mobile systems with IP/Multimedia.

In order to facilitate this, 3GPP needs to take a number of steps. Firstly, 3GPP should continue its leadership role in defining and elaborating an architecture on an appropriate level from the 3GPP perspective where functionalities are access dependent vs. access independent. Secondly, establish a long term working arrangement with the IETF on how to handle the issues associated with adopting IP to the mobile environment (QoS also for wireless, radio adaptations of IP protocols, etc.). 3GPP should not define their IP systems in isolation of IETF, and then expect to be able to modify the

IETF protocols for use in mobile radio networks - they should be involved in the IETF in order to combine the wireless requirements within the IETF. The header compression work is a model for such 3GPP/IETF working arrangement. And finally, 3GPP needs to establish a long term vision, perhaps in line with the proposals of this presentation, but also a work plan on which issues shall be handled when. e.g. to prioritise key issues, based on operators' requirements (see also AIP-000003 which defines the IETF co-operation requirements in text).

AIP-000003: Defining standards that merge Mobile systems with Internet (Ericsson). This was provided as support to AIP-000030 for information.

Q&A:

It was considered that the IETF working methods are different from that of 3GPP which is driven on a contribution basis rather than via liaison. It was suggested that the best method of contributing to the IETF is on a company-contribution basis.

It was asked if the registration was intended to be within the core network as well as the IP side for the AAA-SIP. This requires further discussion.

AIP-000008: 'All IP: Issues Requiring Direction and Decision' Lucent Technologies

This presentation intended to define what is intended to be in Release 2000 and Release 2001 and stressed the need to exploit opportunities for new innovative services and applications that will generally be available via Internet and via technology associated with Internet. A definition is provided of the "All IP architecture" in this context and consideration was given to the support of circuit mode terminals. The presentation concluded by highlighting a number of issues relating to direction, scope and release planning. It was hoped that these issues will be discussed and that the Workshop would reach a number of conclusions related to these issues.

Q&A:

ANSI-136 - the statement that AMSI-136 operators generally have no plans to support circuit mode via GERAN - the following bullet "therefore the standard needs to allow deployment of a pure All-IP architecture (i.e. no circuit mode terminal support" was questioned. It was explained that it meant that it may be necessary to build a network without circuit mode support for such a case as this and whether we need to support circuit mode terminals in the first release of the All-IP architecture (as most operators will need to have a hybrid network anyhow to support both terminal types).

The presenter was asked his company's preference between no circuit mode terminal support and the hybrid network. - The presenter clarified that the paper was not intended to give any particular views, but to raise questions and areas which need to be decided upon before progressing. He added that if they were to support circuit mode terminals in the All-IP network, then they would prefer the first solution, i.e. "support of circuit mode terminals (1)" slide. The main question being asked in this is whether operators would want to define an all-IP network including Circuit mode terminal support, or would they accept that an All-IP network without support would be used, and hybrid networks implemented where necessary.

Clarification was requested on the call control model: - is this to be different from GSM call control, and if so, will it be compatible or incompatible. It was explained that this has to be discussed and decided. One way is to build the H.323 call control protocol to sit above the GPRS protocol (e.g. a hybrid system with both call control protocols existing in the network). The architecture will depend entirely upon the type of network required.

AIP-000033: 'Mobile Wireless Internet Forum (MWIF) - Architectural Principles' Vodafone Airtouch

This presentation describes the mission and charter of the MWIF.

The MWIP Forum intend to:

- be open to all operators, service providers and suppliers who have a desire to produce a global, common vision for an Internet-based mobile wireless network and related service capabilities;
- act as a driver that is complementary to the existing standards working groups and will provide a common voice of global operators;
- ensure that key regional and global standards groups address requirements that global operators see critical to early and economic deployment of IP-based mobile wireless network;

- be mobile technology neutral and not biased towards any particular standards.

The goal of the MWIF is to drive adoption of a single, open mobile wireless internet architecture that can:

- lower infrastructure cost;
- accelerate services development;
- facilitate multi-vendor interoperability;
- complement and harmonize global mobile wireless and Internet standardization.

The attributes of the target network are:

- support multiple services in a globally seamless manner;
- access technology independence (2G and 3G, W-CDMA vs. cdma2000, mobile or fixed);
- leverage innovations and cost curves of Internet and VoIP technologies by aligning mobile network architecture with the internet;
- remove classical separation of core and access networks via uniform adoption of IP technologies.

The MWIF near-term milestone is the development of reference architecture for consideration by 3GPP and 3GPP2.

Q&A:

It was mentioned that TIPHON appreciated the initiatives of MWIF and that MWIF have been invited to the TIPHON meetings to co-operate in their work.

The question of "Billing Partners" brings up the question many operators are asking: "Are they going to have customers to bill, or will they become content carriers?". This needs further study and is being studied by bodies such as the GSM Association at present.

There are so many bodies dealing with the all-IP architecture: In what way are the MWIF distinguishing themselves from the others and do you think there will be a better solution? - It was agreed that there are many groups and we should be careful of creating too many groups, dividing the available manpower. However this group has grown fast since its creation with many important members who can co-operate and represent a strong voice. The presenter was hopeful of successful positive results from this group.

Harmonisation of 3GPP and 3GPP2 possible? - The presenter saw some sense in the companies who are members of both groups to improve efficiency by merging the Projects, but this can only be done if there is no impact on the timescales for Releases.

AIP-000017: 'Cisco's view of All-IP Network' Cisco

This presentation generally covered the following topics:

- the scope of the "All-IP" network and Cisco's design goal;
- description of "ALL-IP" Functional Architecture;
- network components, their functionality and interface with each other;
- interworking support for other legacy networks (e.g. PSTN);
- QoS.

The goals and objectives were:

- One Network
 - Delivering services consistently across wireless and wireline networks
- Distributed Peer to Peer IP Network
 - Flexible logical network structure
 - Modular & incremental infrastructure growth
- Unified Service Infrastructure
 - Seamless end user service delivery

- Unified Management Scope

Q&A:

SIGTRAN - Clarification of the SIGTRAN was described as 2 layers: layer 1 is the adaptation layer and layer 2 the specific API of the signalling interface to convey a specific signalling protocol.

The need for header compression on the air interface by the mobile was questioned: it was clarified that if IP is done over the radio interface then the mobile needs to do the header compression over the air interface, and this is a non-computational function.

The IN under voice services was questioned - was the IN not also relevant for other services. It was clarified that other services would also use IN but voice was the principle user.

AIP-000029: 'Nokia All-IP System Design Principles' Nokia

This presentation outlined the future requirements for the system and was not intended to go into detail on the requirements. The presentation provided the Nokia vision of All-IP network system design principles, showing that IPv6 should be aimed for in order to provide adequate addressing space and benefits of embedded security, mobility and management facilities. A layered approach of Service layer, architectural layer and transport layer should be used to ease the handling of the complex system that needs to be built.

Q&A:

The common network for RT and non-RT services was questioned. The service core will be there in the future, but the Packet core will be able to provide both RT and non-RT traffic. Therefore in the future there will be two networks that can provide non-RT. This means that there will be a hybrid system. The evolution of this will depend upon future market requirements.

The mix of IETF and ITU interfaces on the presentation was questioned. It was explained that the MegaCall and H.248 are the same document in the 2 bodies.

AIP-000004: 'Architectural principles' Ericsson

This presentation addressed the key architectural characteristics of the combined Mobile-Multimedia system. The main goals for "All IP" standardization effort were:

- to enable cost effective high quality IP-based multimedia services (including wireless voice over IP as a volume service);
- rationalized teleservices with service continuity of GSM/UMTS teleservice speech (and GSM/UMTS CS data).

There will be 2 different service domains with 2 different purposes, the circuit and packet domain. Service continuity within each domain:

- Cost effective high quality IP-based multimedia services, including VoIP, is the fundamental requirement for "All IP" networks;
- The market driver for "All IP" is the development of mobile IP based services supporting new end user needs;
- Few market drivers for copying all "old" CS end-user services to new IP services;
- The battle of VoiceOverIP vs. GSM/UMTS-TeleserviceSpeech;
- GSM/UMTS-TeleserviceSpeech will be a tough competitor to voice on IP.

The basic requirements for internet services are:

- IP end-to-end
- IP Multimedia includes call control of one (or several) types (H.323, SIP is the main candidates)
- Shall be possible to access from various access networks
 - Must thus follow mainstream IP and Internet standards
- Support for IP QoS
- Support for global roaming

- Radio optimizations shall allow IP based volume voice services
 - Header compression, Header stripping
 - General means for unequal bit protection (remotely located Codec)
 - GSM speech is the benchmark

For Teleservices:

- End - user perspective:
 - GSM teleservices (and CS data) continues
 - Full backwards compatibility
- Operator perspective:
 - Increased network flexibility for transport of user traffic and signaling
 - Develop IP transport of user traffic and signaling
 - Develop signaling network based on IP transport and IP addressing
 - Allow migration from today's networks
- Technology enablers:
 - Transport independence
 - Call and bearer separation
 - IP QoS

The presentation provided technology enablers: a reference architecture, transport independence, QoS requirements (using an end-to-end layered architecture. Global Roaming was highlighted:

- Ensure end users experience to be consistent (unaware of change in domains-within or outside of home operator's environment)
- Minimize dependencies between Home and Visiting networks regarding call/session control and services triggering
- Provide flexibility for bearer path optimization
- Support for multiple addressing schemes
- Allow better support for Operator differentiation

Q&A:

The continued support of circuit switched was questioned in terms of the value of an all-IP network. It was explained that the current IP capabilities need to be used, but that the mobility and global roaming over the radio interface is a requirement for the system which is not achievable with today's IP technology. This needs to be combined to achieve multimedia on the mobile terminal. the support of circuit switched services is required for backward compatibility to existing systems. It is expected that the packet switched services will provide enhancements to that available on the circuit switched domain.

Charging and Prepaid aspects were questioned, as they were not covered in the presentation. It was explained that this, of course, is required and was not included in the overview presentation. Existing GSM Charging, and other services will be included the IP networks. Mechanisms for this need to be covered in the chosen architecture.

AIP-000022: 'Architectures convergence' Alcatel

The presentation focused on the definition of what could be the future all-IP network. It defines some requirements to be settled from the start, to allow a maximum share of equipment/functions between fixed and mobile networks as well as between existing and next generation networks. It also indicates that the radio access network also needs to be considered in this approach. This will lead to a global (core + access) homogeneous transport technology and thus substantial optimizations can be realized from operator's point of view.

The possibility to embed as far as possible the micro mobility (hand-over) within the access network opens the door to a common transport but also control architecture for both fixed and mobile access. As an example the multimedia call server (CSCF) can under this condition be fully shared between fixed and mobile terminals.

Common (fixed/mobile, and also legacy/multimedia i.e. SIP or H.323) IN service architecture is becoming possible allowing to:

- 1) reuse of already existing services, and
- 2) develop only once new services usable for fixed, mobile, and multimedia terminals.

Moreover, other pieces of equipment can be shared, such as router, MG, MGC and subscriber database (UMS).

As a conclusion, provided that some requirements are fulfilled, an all-IP architecture allows a double convergence (fixed/mobile ; legacy/multimedia) of infrastructure control platform and service platform for the maximum benefit of operators and end users.

Q&A:

The cost of Router vs Switch was questioned. During the presentation it was explained that this statement still needs verification if the same functionality, security and reliability are compared.

Alcatels expectation for provision of IP within the RAN was questioned - how can this be achieved with the perceived reduced QoS of IP and how will synchronisation be maintained? - It was explained that the approach is not the same as circuit switched approach, but that this is thought to be achievable with the IP/queuing approach. This needs to be analysed within the RAN. It was further clarified that the handover needs to be totally dealt with within the RAN for both CS and IP approaches.

AIP-000035: 'End-to-End Wireless Mobile Networks Ways to Achieve the Vision' Siemens

The presentation discussed near term requirements relevant for 3GPP Release 2000. In addition it recalled the architectural principles, which are ready today for use as building blocks of a 3GPP Release 2000 network, which, to some extent, set the limits to what is achievable in Release 2000.

It was pointed out, how these available architectural principles can help to meet the most demanding market requirements today.

The presentation also looked at the means to evolve or grow a near term architecture like 3GPP Release 2000 towards the long term vision. To this end, enabling technologies and factors which impact the speed that progress can be made towards the overall "All-IP" vision, was considered.

Finally, major milestones were presented on a roadmap starting from the present towards a system which eventually should be close to the vision presented in the Siemens "Vision" presentation (AIP-000034).

Q&A:

None.

AIP-000012: 'Evolving towards the IP vision' BT

This presentation considered the evolution from Release 1999 towards the IP vision, the relationship with the circuit domain and the constraints and requirements for Release 2000.

Goal

- all services supported on IP
- no need for the circuit switched domain

Phased Releases

- early deployment of new services
- exploit and protect existing investment (2G, R99..)
 - specifications
 - infrastructure
 - customer base
- technology and standards need development
 - prioritise and do what is achievable for each release

Priorities for Release 2000 IP domain:

- Set realistic and achievable goals for the December release
- Develop a clear cross-TSG work plan
- Establish strong links with other standards bodies (e.g. IETF)
- Focus upon enablers for new innovative multi-media services
- Establish interworking requirements for "equivalent" services
- Don't try to mimic circuit domain

Q&A:

The achievability of the All-IP work for Release 2000 was questioned. It was clarified that we need to define the requirements in a way that they can be achieved in the available time frame.

Equivalent services were explained as, for example, those services available in GSM, which could be made more multimedia like (e.g. call divert of voice calls extended to a multimedia environment).

An estimate of what is achievable: We need to define what we can achieve as new and innovative within the time frame available.

AIP-000016: ' "All IP" Networks: Vision and Migration' Motorola

This presentation shows the Motorola view on All-IP Networks, their "interim" vision on network architecture, the advantages of an All-IP network and the opportunities for migration of existing 2G networks to an All-IP 3G network.

The main vision of Motorola was an All-IP network which has:

- IP transport everywhere;
- Common IP based multimedia call model;
- Internet's service provisioning paradigm;
- Internet's distributed architecture;

keeping Interoperability with existing networks.

End user experiences:

Superior end-user experience can be achieved, e.g.:

- Customized / Personalized Network
- Easy to Use
- Unified Services
- Speedy Access
- Ubiquitous Access

Reduced cycle time to commercialize applications, e.g.:

- Internet Applications
- Immediate Availability of Services
- Dynamic Personalized Access to Services

Operator experiences:

Orderly operator migration, e.g.:

- Smooth Migration From Existing to IP
- Superior Network Performance

Reduced cost of ownership, e.g.:

- Rapid Deployment of Applications/Services

- Reduced Cost of Provisioning of Services
- Leverage Existing Network for Reduced Cost of Migration
- Reduced Cost of distributed architecture

Applications and Services:

- Open Interface to call server
- Open Interface to application servers
- Standardized services
- Define IP based HLR
- Enable roaming and foreign serving network concepts into IP

Migration was considered a requirement:

- Operator should have flexibility in
 - Deploying the "All IP" network
 - Migrating services and applications

Enablers for migration:

- Domain Distribution Function
- Enable 04.08 call server
- Support Iu from BSC:
 - Migration of GSM/EDGE

Q&A:

How can the AMR codec be accepted as the voice codec? It may be necessary to have NW elements which do the transcoding from one end to another if the AMR codec cannot be added to the ITU IP selectable Codec list.

Is there a possibility of a migration path from ATM based UTRAN to IP based UTRAN. It was thought possible using IP tunnelling techniques. It would be necessary to move away from the current R99 standards and utilise the possibilities of the UTRAN (ATM is in essence a packet-based system and IP can run over ATM).

HLR/HSS applicability: Access independent services - Could this allow the services such as location services to be realised in e.g. the Alcatel idea that hiding the mobility makes a mobile equal to a fixed terminal? It was agreed that the HLR/HSS idea is to allow the user mobility independent of the device being used.

AIP-000023: 'Study on PS domain services and capabilities - draft 3G TR 22.976 version 0.5.0' presented by Mr. R. Wohlert of Pacific Bell Wireless

This document was the unofficial draft output of the SA WG1 ad-hoc group drafting session and was presented for information by Mr. R. Wohlert from Pacific Bell Wireless. The main features provided in the document were highlighted. An annex is included containing a feature list and timescales.

Q&A:

None.

AIP-000015: 'Voice and Data legacy Systems - IP interworking' Matra Nortel Communications

This presentation showed how heterogeneous wireless Public and Private networks, with or without a core IP Network, can be federated using an IP Voice and Data Federating Backbone (IPFB). A wireless mobile user can then roam and interwork, keeping Voice and Data Services with Security and Quality of Service maintained. The input presented the IP VPN architecture of the backbone, its added Nodes like Proxy redirect server, Meta Directory, TIPHON gateway, etc. and the Interfaces and data flows.

For communication using VPN over IP networks, the context is:

- Differentiate IP and non IP core networks
- Differentiate Interworking and Interoperability
- Interworking: users of two distant areas communicate but cannot roam as in interoperability
 - Users move within their own coverage
- User basic needs
 - Voice telephony interworking
 - Basic SS and addressing
 - Inter/intranet - data access (VPN type end to end)
 - Same Security policy
 - Same Quality of service
- Extension of coverage 'remotely' + access + services

For the IP backbone:

- An IP VPN, with specific node(s), interconnecting the Wireless networks for Voice and Data
- Different 'functional' nodes

The features:

- The Meta Directory (DEN)
- Global addressing -"@"
- Use XML (and SIP?)

Interworking:

- Gateways
- Security
- Scalability

Enable IP interworking for another dimension.

Q&A:

The openness of VPN type standards was questioned as many proprietary systems have existed. It was clarified that the proposal is for completely open standards, possibly from other sources (e.g. IETF). The functions need to be mapped into the 3GPP system and security functions need also to be included.

How can the RT services be handled in the VPN over IP and should this be end-to-end? There are known problems for the voice service which need to be solved. It was clarified that the service needs to be end-to-end (terminal to database).

For end-to-end security do you envisage having end to end encryption. This was the intention.

AIP-000027: 'IP based unified networking' Nortel Networks

This presentation described the ideas of Nortel Networks for IP based unified networking:

- **Drivers for the IP based network.**
 - The key driver is a common application and service environment across access networks.
- **Call Control in the IP based network.**
 - IP based multi media services including voice should not be restrained by existing services, but based on the long term requirements of this market segment.
- **Mobility in the IP based network.**
 - CSCF & UMS provide IP services, VoIP and multimedia
 - MSC Servers and HLR provide an evolution of R99 telephony services.

A two tier approach is suggested for mobility with the advantages:

- Promotes access independent core network.
- Provides baseline for mobility support across heterogeneous access networks.
- Provides for separation of service and application control from mobility.
- **Unified IP based networking:**
 - New IP based services common across all access technologies.
 - Evolved DTAP services benefit from efficiencies of IP transport.
- **Standardization of the IP based network.**

GSM standardisation:

- Creation of a unique standard for mobile-only application.
- Services defined in detail, consistency with the ISDN approach and concept.
- Desire for service consistency when roaming and limited technical possibilities to achieve this.
- Lack of strong competition during the early GSM-standardisation phase.

IP based standardisation:

- Services must be independent of access technology.
- Standardisation of tool kits should be favoured in place of specific services.
- Availability of existing IP telephony toolkits should be reviewed.
- Strong co-operation with other standards groups is essential. 3GPP must be careful not to standardise areas that are better covered in other groups.

It should be remembered that the development of the GSM system was done in a market where there was no real competition to the standards (within Europe) and this is not the case in the IP world of standardisation.

Q&A:

What is the mobility management to be based upon (H.323, SIP etc.)? Mobility is running at 2 layers UMTS NW based on GPRS, Release 1999 mobility. There is also mobility in the UMS (CFCS) in the multimedia IP service domain.

It was suggested that supplementary services may be supportable from existing work in the ITU.

Other proposals for mobility management have been proposed (using SIP) and convergence between the SIP mobility and the GPRS mobility may be difficult. It was suggested in the presentation that each mobility system is used where it is most effective in the two tier approach.

The two mobility entities (SIP/H.323 and GGSN/SGSN) are independent, and efficiencies of interfaces from the services point of view should be checked to decide if the entities could be combined into the same element.

AIP-000013: 'Naming and numbering issues for UMTS' BT

This presentation looked at identities in the context of evolving towards the IP vision and the relationship with legacy E.164 numbering. The presenter considered the subject to be of key significance to UMTS and had not been previously discussed in any significant depth in 3GPP.

Existing problems with consistency in naming and addressing include:

- Terminals linked to communication type
- User identifier schemes linked to communication type
- Some user identifiers linked to terminals
- Some user identifiers portable – telephony
- Some user identifiers linked to provider – email
- Terminals/user identifiers linked to users' roles
- The caller has to guess the most successful way to communicate.

- Others:
 - Many solutions lock users to 1 provider
 - Proprietary solutions are incompatible
 - Most solutions rely on fixes applied to legacy systems
 - Most solutions are unfriendly – to the caller and/or called party

The UMTS user's "identifier" requirements are:

- Uniquely identifies the user
 - independent of access network / technology
 - independent whether user is fixed or mobile.
- Uniquely identifies the user
 - independent of terminal type being used at any time.
- Network topology independent.
- Service Provider independent.
- Scalable (Enough capacity to meet expected future demands).
- Portable.
- Tariff independent.
- Human / User friendly!

The IETF, ITU, TIPHON , ETSI SPAN2 and 3GPP are among the groups currently working on numbering and addressing.

The presentation concluded with the following recommendations:

- 1 Avoid a wholly new system allow smooth market-led migration.
- 2 Work needed on privacy vs exchange of information to facilitate search engines.
- 3 UMTS is intended to be UNIVERSAL, so as well as supporting the traditional naming and numbering schemes (i.e. E.164, X.121, IP/DNS etc.) , ideally it should support a GLOBAL approach.
 - Bearing in mind the legacy schemes that will be present by the time UMTS deployment starts, probably it will not make sense to strive for a single fully global solution & 1 above may be the best option!
- 4 Co-ordinated, Collaborative Efforts in the Various Standards bodies and Forums should ensure 'best' possible solution(s).

An urgent study is needed:

- 3GPP should clearly define the naming and addressing requirements for 3G.

Q&A:

The work on this in TIPHON, has come up with problems in acceptance in the ITU. This is something that is under discussion, and good co-operation is needed with other bodies to ensure that we have a clear view of the way forward for global numbering and addressing.

The mapping of E.164 to IP addresses is being studied using the DNS. Mobility support (i.e. IP addresses which change) is being studied and shows promising results.

Is there any mechanism which addresses the problems of differing alphabets? This is one of the outstanding issues under study. Is it necessary to have a unique identifier for a user, for routing purposes? - This is what is defined as the name, and the mapping needs to be used for the routing to the user. The work on the problem of uniqueness of names was questioned. This is also being addressed in the groups, but no solution is currently agreed.

It was commented that the numbering and addressing (including the languages/alphabet problems) are important for the system and solutions need to be found to all the problems raised in the presentation. Support for these groups is needed to resolve the issues quickly.

has there been any consideration on the User Billing perspective for users who are called in areas which are not known. Many users use the E.164 number to estimate the cost of communications. This is being looked at and the "tariff

independent" numbering is taking the effect upon the User is being considered. There is likely to be a need for some indication to the user about tariffs for calls, this needs further study.

AIP-000036: 'IPv6 Advantages' IPv6 Forum

This presentation introduced the IPv6 Forum to the workshop, in order to promote their work. The IPv6 forum does not produce standards, but exists to educate and evangelise IPv6.

The IPv6 Forum is:

- A world-wide consortium of leading Internet vendors and Research and Education Networks
- The IPv6 FORUM mission
 - To promote IPv6 in order to create a higher quality and more secure Next Generation Internet.

The FORUM works closely with the Internet Engineering Task Force (IETF) which is responsible for the IPv6 technical specifications and has 66 "Founding Members".

The IPv6 was created to overcome the problems with IPv4, including the addressing space limitations, router overloading, and associated management problems and costs. IPv4 provides limited mobility management and does not take security into account sufficiently for current Internet needs. IPv6 headers have been modified from the IPv4 header to increase address lengths from 32 bits to 128 bits, and some fields removed from the IPv4 header. The new header has been designed to allow flexibility to allow for unforeseen future developments. The new header contains fewer fields than the IPv4 header which allows faster processing for basic packets. The addressing model does not change from the IP4 addressing model for backward compatibility. Addresses are given a scope to localise the addresses to link-local, site-local or Global. Separation of "who you are" from "where you are connected to" is done by the separation of the interface ID and prefix.

In summary, the presentation indicates that the IPv6 features and advantages include:

- Larger Address Space
- Efficient and Extensible IP datagram
- Efficient Route Computation and Aggregation
- Improved Host and Router Discovery
- Mandated New Stateless and Stateful Address Auto-configuration
- Easy renumbering
- Mobility support
- Mandated Security for IP datagrams

Q&A:

Can you provide timescales for completion and deployment of IPv6? There are about 40-50 independent IPv6 implementations today. This is important as the proposed RFC needs this to become a standard. The IETF only asks for a minimum of 2 independent implementations, so there is confidence shown in this and standardisation is imminent. (standards implementation expected 2000 - 2002).

Can you provide information on which parts of the network will be upgraded for IPv6/IPv4 interworking? There is a group looking at this question and proposals are being discussed. Tunnelling is used to connect IPv6 over an IPv4 backbone.

The idea that IPv6 is leaner than IPv4 was questioned, as it contains a much larger header. There is a Robust Header Compression (ROHC) working group looking into this important issue in the IETF.

If it was decided to go to IPv6 for release 2000, would the network need to do Interworking to IPv4, or would the ISP do this? - Either solution could be chosen, either in Routers or in the ISPs.

In 2002 we expect 1 billion mobile users - which addressing would be needed. 2^{32} should give many addresses in IPv4 but the space is used in a wasteful way. In IPv6 there are 2^{128} possible addresses which should give enough space for any future needs.

AIP-000014: 'Web-based Network Management for IP Networks' Motorola

This presentation identifies the Management Challenge for IP networks, and proposes a web-based network management approach.

The Network Management Challenge for IP Networks:

- Fault Management
- Configuration Management
- Performance Management
- Security Management
- Accounting Management

Benefits of Web- enabled Network Management

- Intuitive, graphical, easy to use
- Infinite vendor support
- Minimal training of staff
- Facilitates the opening up of the network for plug- and- play
- Eliminates costly software upgrades
- New management features can be rapidly developed and installed
- Easy integration with operators other business systems
- Using Web- based technologies for Enterprise management is where the industry is going

The web based technologies will be used for IP networks when telecommunications and data-communications converge.

Initiatives have been launched to study and promote web-based network management: Distributed Management Task Force (DMTF) and Web-Based Enterprise Management (WBEM). WBEM data is transported using XML. The storage of information about objects and environments can be done using Directory Enabled Networks (DEN) environment.

Involvement in this initiative is welcomed to help drive telecom requirements into WBEM, see <http://www.dmtf.org>.

TSG SA WG5 was invited by the DMTF to look into WBEM as a solution for network management in 3GPP.

Q&A:

None.

4 Establishment of 'The 3GPP "All-IP" vision, long term and short term'

Following the presentations, where there were some differing ideas presented, this session was planned as a chance to discuss these differences and come to some conclusions for agreement under agenda item 5.

The Chairman summarised the main items and topics which had been brought up during the presentations in agenda item 3. He then presented some slides which ask:

- what we want to obtain with All-IP?
- how do we get there?
- what do we need to do? and
- the issues to be resolved,

in order to stimulate discussion in order to come to a common view.

What we want to obtain with All-IP?

This is the longer-term view where we have an all-IP network, and gives what we want for this system.

Comments:

At a recent TIPHON meeting it was said that IP technology is not necessarily cheaper, but brings other benefits.

This was moved to the end of the bullet list to reduce its implied importance and changed to "Better performance relative to cost". Traffic patterns are likely to change with new applications and services, and the QoS needs to be maintained with these changing traffic patterns. The bullet was finally changed to "Leverage IP technology cost factor without compromising ..."

How much time are we to spend on the Why? - Is it not more important to work on how to get there?

The main reason for this part was to agree on what it is we want to obtain, rather than why.

Voice is thought to be still the most important application and should be included in the original "wants".

This was added as "Voice services, and other relevant legacy services".

Separation of services alone is not enough for operators and this should be expanded or clarified as a requirement.

Global roaming is inadequate as a want, as this is a clear pre-requisite.

Changed to Maintain and enhance Global Roaming.

Naming and addressing should be included in the "want" list.

This is really out of the scope of what we can achieve in 3GPP, and is dependent on other bodies work. It was considered independent from the migration to an All-IP network. A bullet was included "Study requirements for naming and addressing" under *What do we need to do?*

The same or better QoS as release 1999 should be included in the list and end-to-end spectrum efficiency should be maintained. It was argued that the IP domain would reduce QoS due to the header overhead, so this needs clarification. It was further argued that the QoS should be set at a level which provides an adequate QoS which can produce services which are delivered at an acceptable price.

These points were added to the list.

Existing Release 1999 performance and capability criteria should be moved to a new category so that they are not forgotten as a basic requirement.

This was intended to be dealt with under "*How do we get there?*"

IP Transport should be included to show where we want IP transport where advantageous. (possibly at Core Network, Iu Interface UTRAN and possibly the Um Interface) (the Um interface was disputed).

This bullet was added here and under *The issues to be resolved*.

The primary aim should be the quick creation of services/applications, and a platform to provide this will be the main driver. Compatibility with some existing services in the circuit-switched environment should also be included.

Open interfaces to ensure a multi-vendor environment should be included. A flexible service platform should be an aim to achieve this (i.e. maximum flexibility with the minimum of options within the standards).

These were added to the list.

A smooth evolutionary path from non IP to All-IP networks should be included as a requirement.

This was expected to be dealt with under *How do we get there?*

Separation of services, Control and transport should be rephrased as the benefits from this.

This item was modified to "Separation of Service, Control and Transport when beneficial".

Support of Charging mechanisms should be included.

This item was included under *How do we get there?*

It was asked that the Real Time requirement is needed for QoS and Security, and it should not be linked to Release 1999 in this "wants" section.

This was achieved by adding Real Time in the Multimedia Services bullet and changing the Security bullet to "At least the same level of security as in State-of-the-art Security level" and similarly for QoS.

The final copy of the slides after this discussion were provided in AIP-000040.

How do we get there?

Hybrid CS and PS Network as an intermediate step: This may not necessarily be an intermediate step, if such systems are found adequate.

Does this not bring us into a situation where we cannot implement Release 2000 as intended in order to have the services supported in the future networks?

The bullet was modified to read :

Hybrid CS and PS network is considered in the next release(s)

Real-time multimedia services in PS domain

Streaming

Service control

Multimedia call control model

Ensure backward compatibility

Service continuity - for relevant services

Roaming between different releases of 2G and 3G

Define relevant handover between releases of 2G and 3G

After much discussion on all the points in the slides, the Chairman summarised the status of the ideas, referring to the results of "*What we want to obtain with All-IP?*" part in order to focus the discussion. Further discussion and enhancements of the bullets followed.

A new set of interim slides were made available in AIP-000041 for further discussion.

It was considered that the hybrid networks **will** exist in the next releases, rather than *will be considered*, which leaves it up to individual operators to decide whether they implement hybrid networks or not. The vision should be *an evolution* towards All-IP.

What do we (3GPP) need to do?

This part was expected to produce a rough work plan for the creation of Release 2000.

Taking AIP-000041 as a starting point for discussions, the slides on *What do 3GPP need to do?* were considered.

It was suggested that liaison with the IETF would be advantageous, but it was pointed out that the IETF only take contributions from individual companies, rather than other bodies. It was suggested that contribution is fed into the IETF from 3GPP via individual member companies.

The relevant groups for co-operation in IP issues were identified as IETF and ITU. It was considered as important to establish a relationship with the IETF as soon as possible which should be initiated by TSG SA.

In addition, other groups with similar interests, e.g. MWIF, 3GIP, 3GPP2, etc. should be considered for the re-use of their work.

If modifications are found to be necessary for use in 3GPP, then a method needs to be found to make the changes into these bodies.

3GPP need to establish a longer-term architecture as part of Release 2000 and a work plan needs to be established for Release 2000, including identification of the content of Release 2000, including enhancements to CS and PS domains, and covering all TSGs. This needs to be done at the TSG SA level, and needs to cover all of 3GPP work. SA WG2 have ad-hoc groups set up to consider the work in all 3GPP groups in order to determine and co-ordinate the work that needs to be done in 3GPP.

From the work plan, the detailed requirements need to be established. This should be done by SA WG1.

The detailed specification work should then be done in the TSGs and WGs.

It was suggested that a clear understanding from vendors on the benefits and costs of moving from GPRS Session management to All-IP should be provided to operators. This is outside of standardisation work, but manufacturers were asked to provide such information to operators.

The work on All-IP should not take resource away from the Release 2000 work, and should build upon the work done in Release 1999 and Release 2000 (enhancement of the CS and PS domains).

It is important that delegates attending SA WG2 to determine the work plan and architecture should be well-prepared in

order to obtain quickly agreed proposals.

The issues to be resolved

The issues to be resolved were discussed, based on the slides on this topic in AIP-000041.

Naming and addressing was considered as a requirement. The slides were discussed and modified for some time and an updated set provided in AIP-000042.

5 Collection of requirements identified for the 3GPP "All-IP" network

AIP-000006: Liaison on All-IP from GSM North America.

This liaison was introduced and is a list of requirements of what the GSM North America group feel should be included in an All-IP network and was provided to the workshop for information and asks request 3GPP to incorporate these requirements as part of the All-IP Service requirements specification. It states:

All-IP networks shall:

- *Provide backwards compatibility with the services offered by the Release 99 standard (including basic telecommunication services, supplementary services, and operator specific services):*
 - *the set of services available to customers shall be no less than the set of services available to customers obtaining service using existing GPRS and circuit switched technologies.*
- *Enable provision of services with the same (or greater) quality of service as GPRS and circuit switched services:*
 - *It shall be possible to offer services over an All-IP network with a quality of service that is no less than that already experienced by customers of existing GPRS and circuit switched networks.*
 - *The enabling mechanisms (transport technology, etc.) should be transparent to the customer.*
- *Enable provision of the same (or greater) degree of privacy, security, and authentication as GPRS and circuit switched services.*
- *Support roaming between All-IP networks and non-All-IP networks (including handover / cell re-selection).*

Some questions for clarification were asked, primarily over the requirement for backward (and forward) compatibility. *Backward compatibility* means that existing services and features of a network can be handled by a later release network, but not necessarily the contrary (new Release features may not be handled in an older Release network). *Forward compatibility* was clarified to mean that enhancements are made to a system to allow future upgrade to handle new Release features to some extent.

AIP-000020: All-IP standardisation (GSM Association ISG).

This contribution expresses the GSM Associations' full support for the views and requirements in AIP-000006.

The GSMA ISG emphasise the necessity and importance of ensuring that an All-IP introduction can be accomplished in a manner allowing for an easy integration with existing technologies (GPRS and circuit switched) to provide a clear and smooth evolution path.

The contribution was noted as support for the liaison from GSM North America.

AIP-000037: Formulation of requirements to support existing GSM services (Ericsson).

This contribution was provided for approval, and proposes:

If it is required to support existing GSM services, it shall be expressed as follows:

"It shall be possible to use IP transport, for all user data and signalling, for the existing GSM services."

The definition of by which architecture, e.g. in which domain or domains this shall be implemented shall be discussed and determined by S2.

If an All-IP implementation is made, then this mandates the ability to transport GSM services over the network. In the "hybrid network" case, this should have no impact. It was argued that this means that an All-IP network would have to

support GSM 04.08 signalling to transport all GSM Supplementary Services, which was unacceptable.

It was considered that the wording of this would mean that even e.g. ASCII services need to be supported. It should be accepted that there will be some GSM services which are not required to be supported in the 3G network (due to technical or market reasons) and these still need to be fully identified. There is time to define the requirements for GSM services support in the PS domain, as initial networks will be hybrid networks with both the PS and CS domains.

The proposal should be clarified to show that the requirement is for implementations of an All-IP network only, and the services that are required for support need to be identified.

The proposal was not approved, but served to stimulate further study on the GSM services which are required to be supported in IP networks, which should be undertaken in SA WG1 and SA WG2. A clear set of definitions and migration path to All-IP is required in the near future.

6 A.O.B.

AIP-000024:

This outlines the main results from the tutorial and ad-hoc meeting held in Mexico the week before. The CN meeting was convened to study the All-IP aspects in the Core Network.

It was decided that CN will liaise with SA WG2 to progress work

- Joint meetings
- Negotiate with S2 to take responsibility for some stage 2 work
- Give early feedback on implications of requirements and architectural options
- Joint meetings set up with S2 in April to address work task planning and call control

An open item list was created:

- Used as feedback into existing S1 and S2 open items lists
- Used as a tool for working within CN

Existing CN structure is adequate for all-IP work:

- Work can be partitioned within existing CN WGs
- Minor modifications to existing WG charters
- WG2 may need to be split into several groups to handle workload

This was noted for information. More information is available in AIP-000021 which is provided for information.

AIP-000021: Report of SA WG2/CN Release 2000 ad-hoc/T WG2 Joint meeting on Release 2000.

The Chairman of SA WG2 presented the document which provides the report of the tutorial between TSG CN, SA WG2 and T WG2 on Release 2000. Any questions on the content of this report should be addressed to SA WG1 for clarification. The report was noted and SA WG1 were asked to consider the issues raised in the document for input to TSG SA.

AIP-000038: Proposed LS on Open items identified by TSG CN All IP ad-hoc (3GPP-CN All IP Ad-hoc).

This liaison is addressed to SA WG1 and SA WG2 and was presented to the workshop for information. It contains a number of questions and open items to SA WG1 and SA WG2. Definitions for inclusion in the vocabulary document are requested, the scheduling for the Release 2000, Release 2001, etc. work is requested and a question of how signalling and data can be distinguished in an all-IP stream.

A drafting session is planned between SA WG1 and CN WG1, in Helsinki, in April 2000 to deal with definitions.

7 Close of Workshop

The Chairman summarised the

We have exchanged views on the All-IP vision and received a better overview on the meaning of All-IP network. This has given delegates the opportunity to reflect on all ideas and visions presented.

The vision has been drafted with some difficulty during the workshop, the results are collected in AIP-000042. What we are talking about is an All-IP *option* rather than mandating All-IP as the network of the future. This *option* will allow at some time allow only All-IP to be implemented, but from the standardisation point of view, the specification of both CS and PS domain networks will continue.

It is accepted that in the short term we will have "hybrid networks" which can be used to prioritise our work. In the future we can decide when the All-IP *option* can be specified, to allow for the choice of implementation.

It was clarified that the 3GPP Release 2000 specifications set will allow implementation of a hybrid CS/PS network or only CS network or only PS network.

There is some important work to do: Establish a Work Programme for Release 2000, including the Architecture for Release 2000. We need to define the requirements and clarify the requirements for both the hybrid network and all-IP option. There is a difference between Release 20xx and the All-IP option from the standardisation viewpoint.

It is clear that in order to progress in the PS domain, co-operation with other relevant bodies is necessary (e.g. IETF).

Some issues have been identified (naming and addressing, which IP version to use, etc.) and some others which have not been identified will need discussion in the WGs.

It is clear that not all of the visions can be implemented in a real network and a useful compromise needs to be reached in order to achieve the goal of standardisation and implementation. Everyone will need to exercise the discipline of co-operation for quick standardisation using necessary compromises.

With this the Chairman thanked the Hosts, Microsoft, and the support staff for organising the workshop and social event, and delegates for their patience and contributions to the discussions, and closed the workshop.