International Civil Aviation Organization

Aeronautical Telecommunication Network/Internet Protocol Suite Working Group

Fifth Meeting (ATN/IPS WG/5)
(Cairo, Egypt, 11 - 13 March 2013)

Agenda Item 4: Review and update of MID ATN plans and Implementation issues

MID IP NETWORK

(Presented by the Secretariat)

SUMMARY

This paper presents the results of the analysis of the MID IP Network survey along with other ICAO Region IP address plans and proposes development of MID IP address plan, in order to progress the MID IP Network.

Action by the meeting is at paragraph 3.

REFERENCES

- ACP Reports
- CNS SG/5 Report
- MIDANPIRG/13 Report

1. INTRODUCTION

1.1 The Working Group I (IPS) Meeting of Aeronautical Communication Panel (ACP WGI-16) was held from 28 to 30 Jan 2013 in Montreal, Canada. The meeting reviewed and discussed 7 Working and 4 Information Papers and 6 flimsies, mainly related to information security in SESAR, IPv6 Implementation Issues for Fixed Network, Proposed change to ATN/IPS Document 9896 to support implementation of VoIP and other applications over IP network, the Information papers related to SWIM over AMHS and ANConf12 outcome related to SWIM.

1.2 The Aeronautical Communication Panel (ACP) Working Group M – Maintenance held its Eighteenth Meeting (ACP WG M-20) in Montreal, Canada from 23 to 25 January 2013.

1.3 The MIDANPIRG/13 Meeting was held in Abu-Dhabi, UAE 22-26 April 2012. The ATN/IPS WG/4 and CNS SG/5 Meeting were held at the ICAO MID Regional Office in Cairo, Egypt, 21-23 May 2012 and 11 – 13 December 2012 respectively.

2. DISCUSSIONS

2.1 The meeting may wish to note that the PAN European Network Service (PENS) implemented in Europe is a common facility that allows ANSPs two different IP interconnection possibilities. In cases where the ANSPs have their own IP networks, they can connect their national IP networks to PENS. However, in other cases where the ANSPs do not have their own IP network, the PENS project can install an access point, consisting of a PENS router, at each location where an IP connection needs to be implemented, in order to provide connectivity with the PENS network. Furthermore, the meeting was informed that other ICAO Regions are planning for implementing IP networks.

2.2 The meeting may wish to note that MIDANPIRG/13 was appraised that the complete implementation of IPv6 will take time and consequently, there will be a long period for both protocols IPv4 and IPv6 to co-exist. The meeting agreed that careful attention to the current implementation of AFTN, CIDIN and ISO/OSI based ATN is required. Accordingly, the provisions for the AFTN, CIDIN, and ISO/OSI should continue to be developed to secure these implementations. Furthermore, the meeting agreed that the MID ATN implementation should take place on the basis of regionally agreed requirements, taking into consideration, the System Wide Information Management (SWIM) concept and any other new developments.

2.3 MIDANPIRG/13 Meeting recalled, that MIDANPIRG/12 agreed to the development of the MID IP Network, where it was agreed that an IP Network survey be conducted, the ATN/IPS WG/4 and CNS SG/5 consolidated and analyzed the replies of the survey as at **Appendix A** to this working paper.

2.4 The meeting may wish to recall that it was agreed that the MID ATN implementation should take place on the basis of regionally agreed requirements, specially the MID IP Network taking into consideration, the System Wide Information Management (SWIM) concept along with Information Management Service (IMS) implementation as indicated in AN Conf/12 Roadmap 2 calling for IMS environment in 2020 and the IMS/SWIM Operational Concept that need to be developed to specify the messages distribution and operational requirements.

2.5 The meeting may wish to further recall that SWIM is listed in Block 1 (target timeline for implementation starting from 2018), in the ASBU concept introduced by ICAO. SWIM has close relation with ASBU module B0-30 which is being introduced starting from 2013. The CNS SG/5 Meeting agreed on the principle on the regional approach in planning for the implementation of SWIM, and identified the need for a study on an appropriate network to support SWIM including possibility of using public internet and/or using a common network service provider, where it is to be noted that the SWIM concept is huge and beyond the scope ATN/IPS WG, as it incorporates ATM, AIM, AGA and CNS Infrastructure and not only the network.

2.6 With regard to the ATN/IPS WG/4 proposal for organizing MID–SWIM Workshop, the meeting may wish to note that ICAO MID Regional Office is planning to hold ICAO EUR/MID AIM/SWIM Seminar in Istanbul form 14 to 17 May 2013. Accordingly, the meeting may wish to encourage CNS experts and engineers to participate in this seminar.

2.7 The meeting may wish to note that other ICAO Region activities on the IP networks vary, where as indicated in Para 2.1 Europe had already implemented PENS, while other ICAO Region APAC and CAR/SAM developed IP address plans as at **Appendices B and C** respectively to this working paper

2.8 Based on the above the meeting may wish to develop IP address plan region for the for the MID Region for short-to-medium term taking into consideration the following:

- the coordination required to obtain a global IPv6 address prefix for the region, and the cost in acquiring and maintaining such address prefix;
- the desirability of an ICAO global IPv6 addressing scheme, which must be coordinated through the Aeronautical Communication Panel; and
- the urgent need to migrate from AFTN to the AMHS, and the need for non-backbone States to use the Internet Protocol Suite (IPS) to reduce their implementation costs; and

2.9 The meeting may wish to recognize the increasing important role of the public Internet that is played in the provision of MET and digital NOTAM information in lieu of dedicated circuits/links, therefore a need for a study was identified for an appropriate network to support SWIM including possibility of using public internet and/or using a common network service provider.

2.10 Based on the above, the CNS SG/5 Meeting recommended that a study of an IP based network be conducted in order to support SWIM as one of the tasks for ATNIPS WG. The initial defined activity which should be performed is to incorporate SWIM into the ATN/AMHS Infrastructure.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) analyze the feedback of the IP Network Survey;

b) develop MID IP Network address plan for the MID Region;

c) recommend further actions for the development of MID IP Network taking into consideration the developments (ASBU, SWIM etc.); and

d) provide suggestion on para 2.10.

APPENDIX A

State Bahrain (Manama)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Riyadh	64k	Batelco	10.61.11.12	255.255.255.252	Motorola Vangurd 6435	FXO/FXS	Voice
Tehran	64k	Batelco	172.16.10.2	255.255.255.0	Cisco2800	Serial	AFTN
						FXO/FXS	Voice
Kuwait	64k	Batelco	10.61.11.8	255.255.255.252	Motorola Vangurd 6435	Serial	AFTN-Radar
						FXO/FXS	Voice
Jeddah	64k	Batelco	10.61.11.48	255.255.255.252	Motorola Vangurd 6435	Serial	CIDIN
						FXO/FXS	Voice
Doha-1	64k	Batelco	10.61.11.32	255.255.255.252	Motorola Vangurd 6455	Serial	Radar
						FXO/FXS	Voice
Doha-2	64k	Batelco	10.61.11.56	255.255.255.252	Motorola Vangurd 6455	Serial	AFTN
						FXO/FXS	Voice
Dammam	64k	Batelco	10.61.11.44	255.255.255.252	Motorola Vangurd 6435	FXO/FXS	Voice
AbuDhabi-1	64k	Batelco	10.61.11.12	255.255.255.252	Motorola Vangurd 6435	Serial	Radar
						FXO/FXS	Voice
AbuDhabi-2	64k	Batelco	10.61.11.16	255.255.255.252	Motorola Vangurd 6435	Serial	CIDIN
						FXO/FXS	Voice

Remarks: ……

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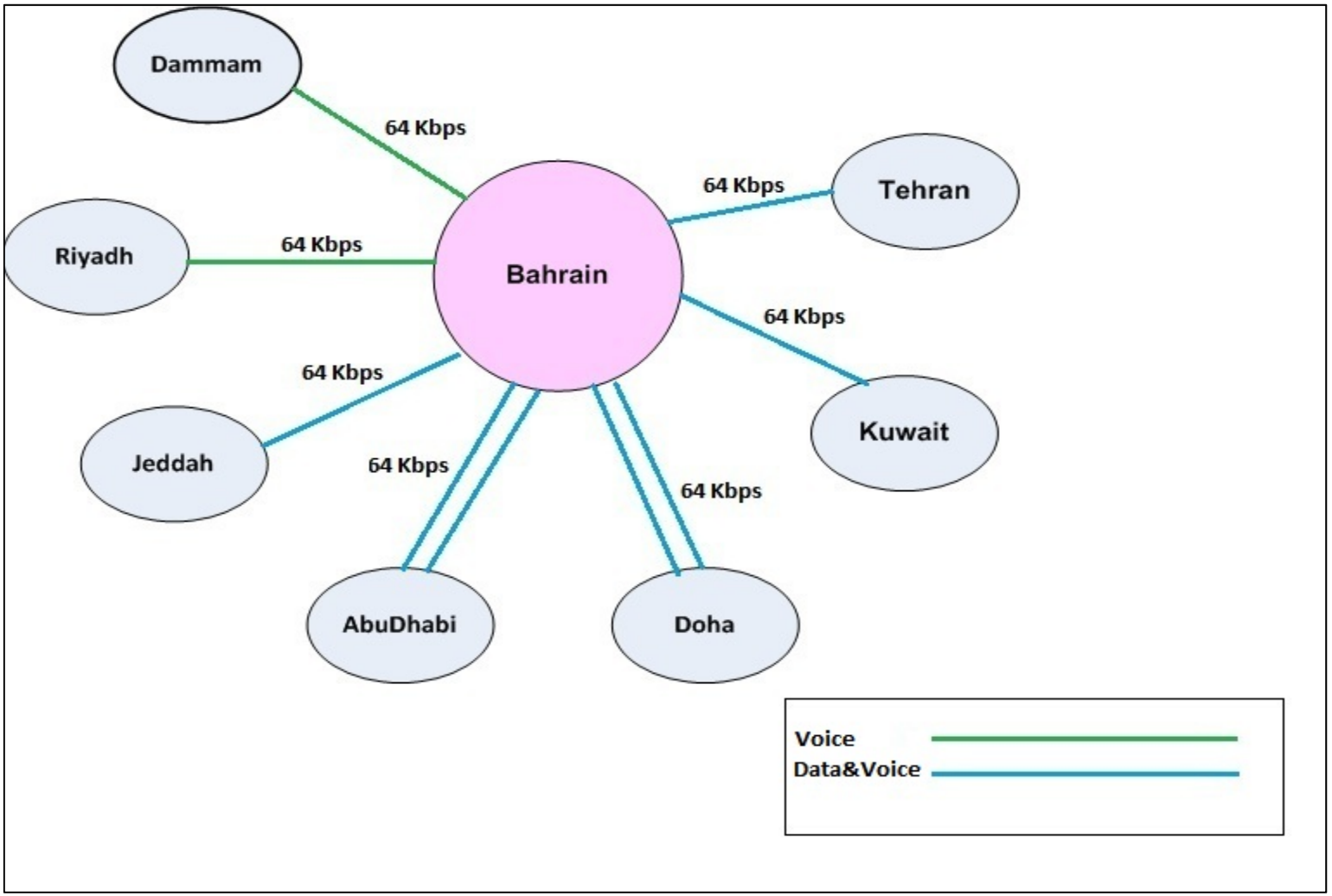

Figure 1: Bahrain Circuit Diagram

State Egypt (Cairo)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Amman	64k	Telecom Egypt (ATM)	10.10.10.2 192.168.12.7	255.255.255.0 255.255.255.0	Motorola Vangurd 6800	IP FXO/FXS	AMHS Voice
Athens	64k	Telecom Egypt (ATM)	192.168.80.2	255.255.255.0	Cisco2800	FXO/FXS	Voice
Athens	64k	Telecom Egypt (ATM)	10.10.10.1	255.255.255.0	Cisco2800	Serial FXO/FXS	CIDIN Voice
Jeddah	64k	Telecom Egypt (ATM)	192.168.80.2	255.255.255.0	Cisco2800	FXO/FXS IP	Voice OLDI, Radar
Jeddah	128k	Telecom Egypt (ATM)	10.10.10.1	255.255.255.0	Motorola Vangurd 6455	IP FXO/FXS	AMHS Voice
Riyadh	64k	Telecom Egypt (ATM)	192.168.80.2	255.255.255.0	Cisco2800	FXO/FXS	Voice
Tripoli	64k	Telecom Egypt (ATM)	10.10.10.1	255.255.255.0	Cisco1700	Serial	AFTN

Remarks: ……

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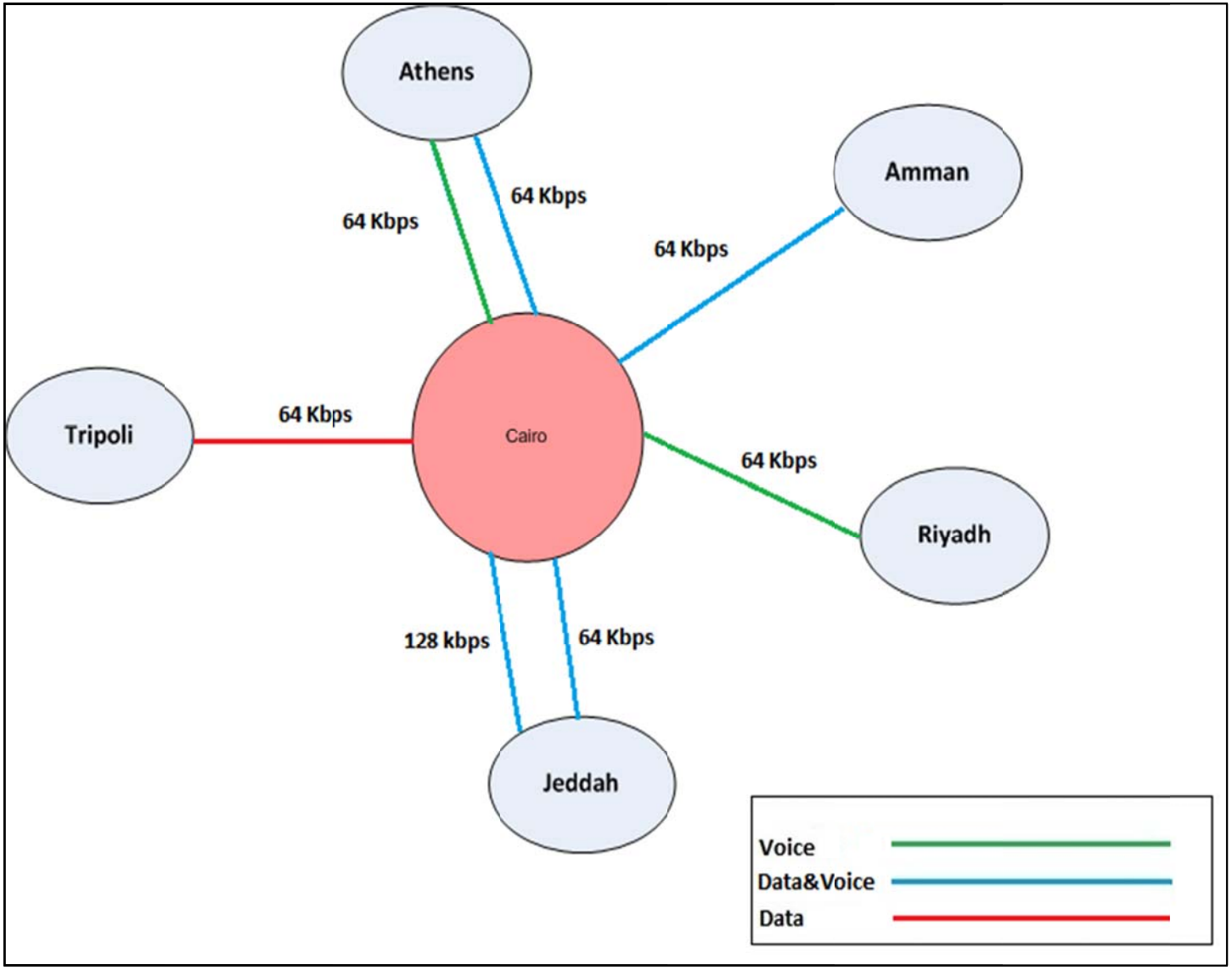
Athens
Amman
64 Kbps
64 Kbps
64 Kbps
Tripoli
64 Kbps
Cairo
64 Kbps
Riyadh
128 kbps
64 Kbps
Jeddah
Voice
Data&Voice
Data

State Saudi Arabia (Jeddah)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Cairo	128k	N/A	192.168.12.0	255.255.255.0	Motorola Vangurd 6455	IP	AHHS
						FXO/FXS	Voice
Amman	64k	N/A	192.168.12.0	255.255.255.0	Motorola Vangurd 6455	IP	AHHS
						FXO/FXS	Voice
Muscat	64k	N/A	192.168.12.0	255.255.255.0	Cisco 2811	IP	AHHS
						FXO/FXS	Voice
Manama	64k	N/A	TBD	TBD	Motorola Vangurd 6435	Serial	CIDIN
						FXO/FXS	Voice

Remarks: .....

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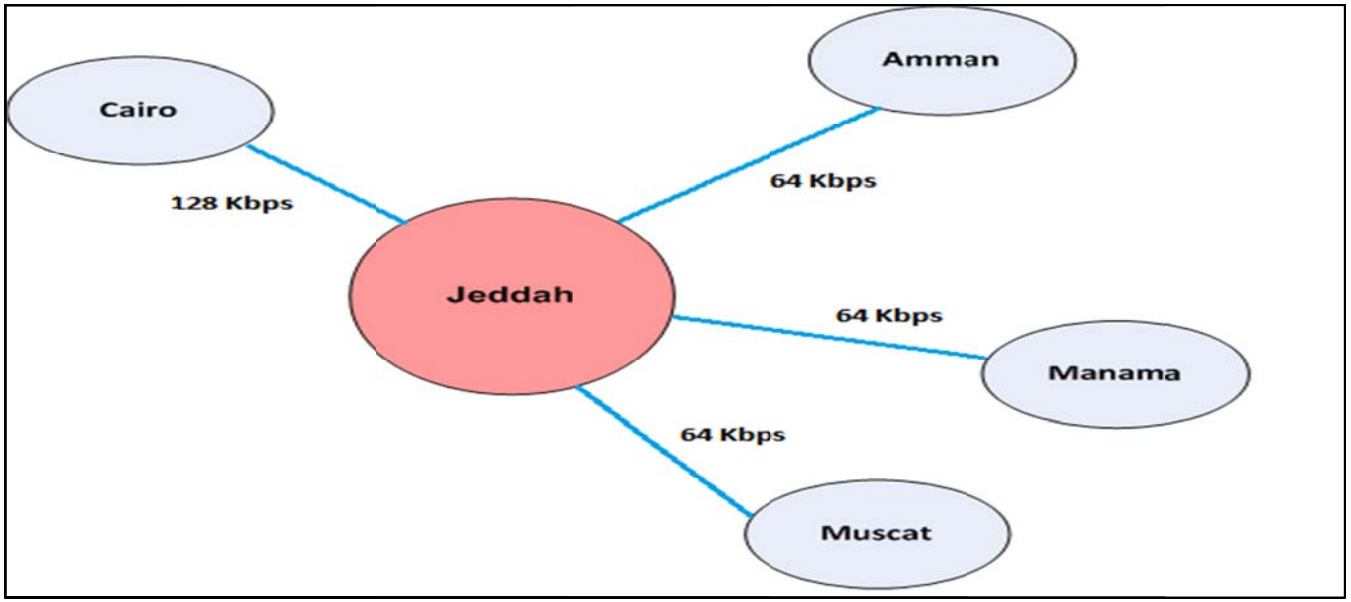


State IRAN(Tehran)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Manama	64k	Iran PPT	172.16.10.2	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Baghdad	32k	Iran PPT	192.168.191.14	255.255.255.0	Cisco2811	FXO/FXS	Voice
Ankara	64k	Iran PPT	172.16.13.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Kabul	32k	IATA	192.168.10.12	255.255.255.0	Cisco2811	FXO/FXS	Voice
Karachi	64k	Iran PPT	172.16.11.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Kuwait	64k	Iran PPT	172.16.12.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Bahrain	64k	Iran PPT	172.16.12.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Abu Dhabi *	64k	Iran PPT	To be determined	To be determined	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Muscat *	64k	Iran PPT	To be determined	To be determined	Cisco2811	Serial	AFTN
						FXO/FXS	Voice

Remarks: * The lines will be established by end of July, 2012

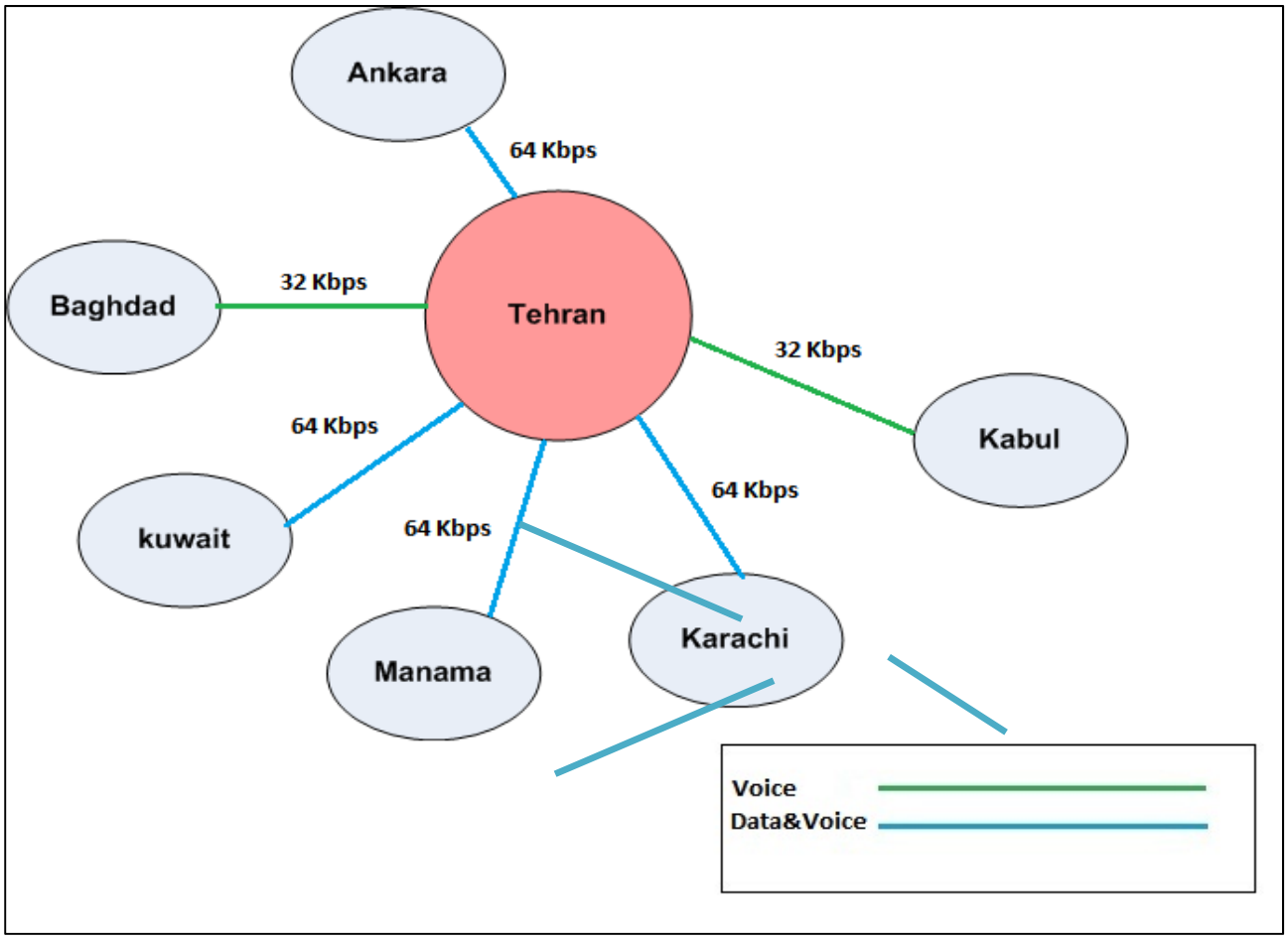


Figure 4: Tehran Circuit diagram

State UAE (Abu Dhabi)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Bahrain1	64K	Etisalat	N/A	N/A	Motorola Vangurd 6455	Radar/	Serial
Bahrain2	64K	Etisalat	N/A	N/A	Motorola Vangurd 6435	AFTN/CIDIN	Serial
Oman	64K	Etisalat	N/A	N/A	Motorola Vangurd 6455	IP	AMHS
						FXO/FXS	Voice
Qatar	128K	Etisalat	N/A	N/A	Motorola Vangurd 6435	Serial	AMHS/radar /OLDI
						FXO/FXS	Voice
Amman**	N/A	Etisalat	94.56.192.202	255.255.255.0	N/A	N/A	AMHS

Remarks: ***** The IP addresses for Bahrain links is configured by ISP and not identified on UAE side.

** The link type between Jordan and Abu Dhabi is over public internet (VPN)

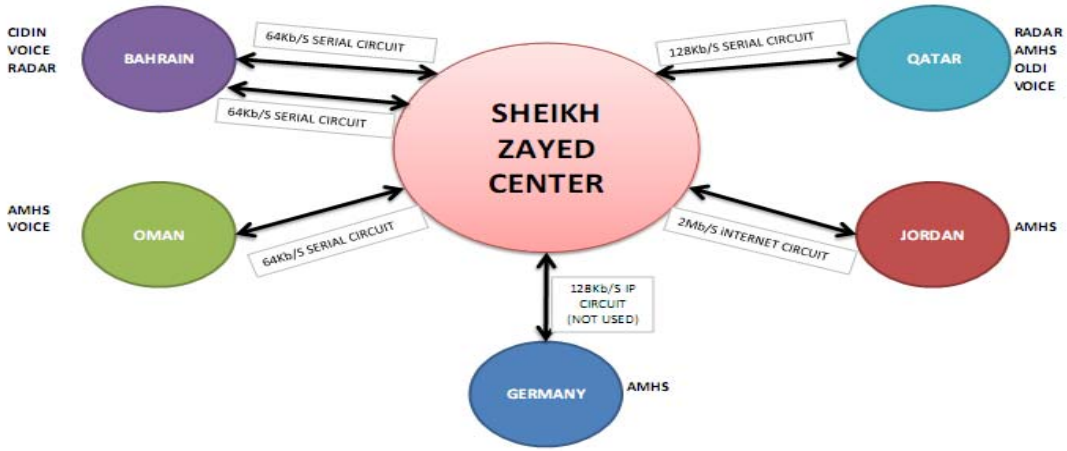


Figure 5: Abu Dhabi Circuit Diagram

State Kuwait(Kuwait)

State							Applications in use
						interface	
Beirut	64K	N/A	--	--	Motorola Modem 3460	N/A	AFTN
Doha	64K	N/A	--	--	Motorola Modem 3460	N/A	AFTN
Tehran	64K	N/A	172.16.12.0	255.255.255.252	Cisco 2800	N/A	AFTN-Voice
Damascus	64K	N/A	--	--	Motorola Modem 3460	N/A	AFTN
Karachi	64K	N/A	--	--	Motorola Modem 3266	N/A	AFTN
Bahrain	128K	N/A	--	--	Motorola Vanguard 6455	N/A	AFTN, Radar& Voice
Baghdad	64K	N/A	192.168..0.160	255.255.255.0	Motorola Modem 3460	N/A	AFTN-Voice

Figure 6: Abu Dhabi Circuit Diagram

Remarks:

- The connectivity for circuits (Beirut, Doha, Damascus, Karachi and Bahrain) is pure layer 2 there is no IP configuration on these circuits.
- For Tehran circuit there is IP configuration on the WAN side 172.16.12.2/30 (between Qualitynet and Tehran provider), but there is no IP configuration between Qualitynet and DGCA Kuwait.

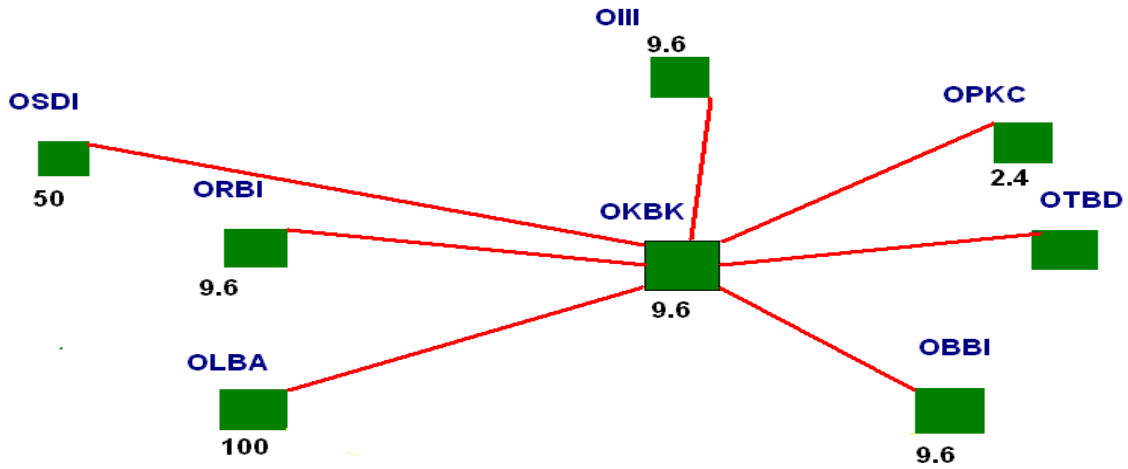
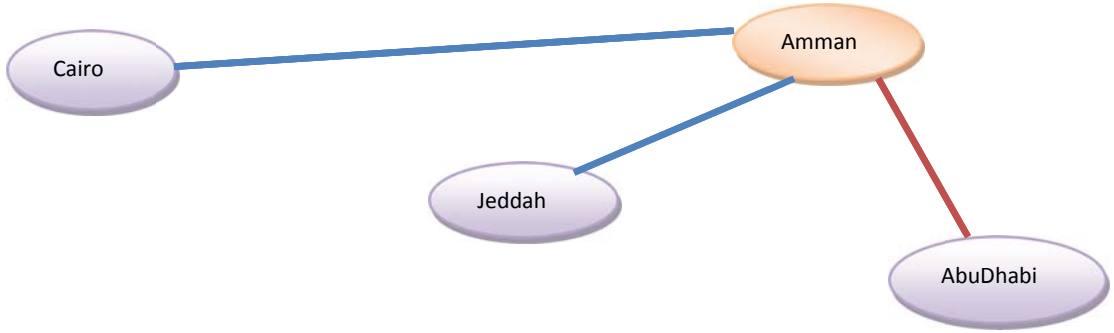


Figure 6: Kuwait Circuit Diagram

State Jordan (Amman)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Cairo	64k	N/A	10.10.10.1	255.255.255.0	Vanguard	N/A	AMHS
						FXO/FXS	Voice
Jeddah	64k	N/A	10.10.10.1	255.255.255.0	Vanguard	N/A	AMHS
						FXO/FXS	Voice
Abu Dhabi*	2M	NITC	193.188.93.19	255.255.255.0	Cisco 5510	N/A	AMHS

* ***The*** link type between Jordan and Abu Dhabi is over public internet (VPN)



Remark: After conducting the IP network Survey, *Common infrastructure characteristics in all states have been found as follows:*

- *Security Measure: Not implemented)**
- *Voice interfaces: FXO/FXS*
- *Voice Protocol Supported: SIP,H.323*
- *All IP circuits is using IPv4*

- *Link Type: Leased Line.*
- *Router interfaces:* Async Serial, Sync Serial ,Ethernet

**Jordan has a firewall device CISCO ASA5510 for Abu Dhabi link(VPN)*

State Iraq

State	Speed		IP Address	Net Mask	Router Type	IP.V	

Iraq did not submit -IP network Survey

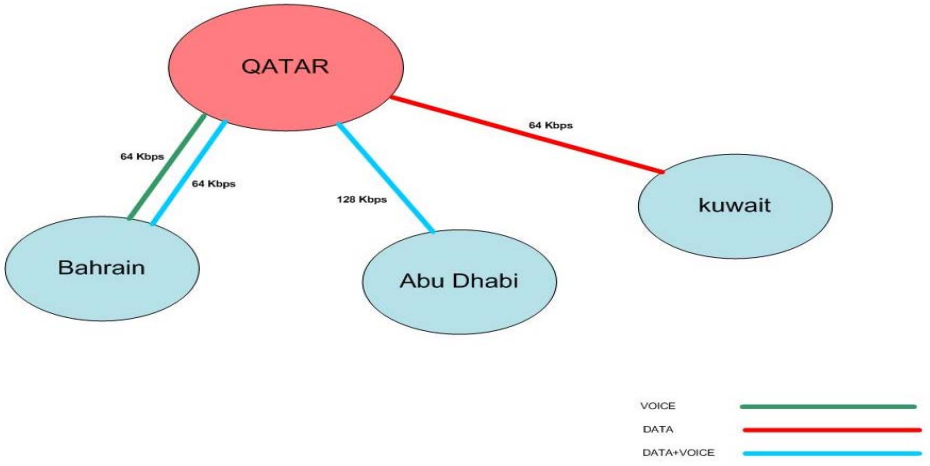
State Oman

State	Speed		IP Address	Net Mask	Router Type	IP.V	

Oman did not submit -IP network Survey

State Qatar

State	Speed		IP Address	Net Mask	Router Type	IP.V	
Bahrain1	64k	Qtel	N/A	N/A	Vanguard6455	FXO/FXS	Voice
Bahrain2	64k	Qtel	N/A	N/A	Vanguard6840	Serial FXO/FXS	AFTN/Radar Voice
AbuDhabi	128k	Qtel	192.168.131.0	255.255.255.0	Vanguard6840	Serial FXO/FXS	AMHS/Radar Voice
Kuwait	64k	Qtel	N/A	N/A	N/A**	Serial	AFTN



State Syria

State	Speed		IP Address	Net Mask	Router Type	IP.V	

Syria did not submit -IP network Survey

State Yemen

State	Speed		IP Address	Net Mask	Router Type	IP.V	

Yemen did not submit -IP network Survey

Remark: After conducting the IP network Survey, *Common infrastructure characteristics in all states have been found as follows:*

- *Security Measure: Not implemented)**
- *Voice interfaces: FXO/FXS*
- *Voice Protocol Supported: SIP,H.323*
- *All IP circuits is using IPv4*
- *Link Type: Leased Line.*
- *Router interfaces:* Async Serial, Sync Serial ,Ethernet

APPENDIX B

APANPIRG/21
Appendix E to the Report on Agenda Item 3.4

THE PROPOSED IPv4 ADDRESS PLAN

1 Introduction

The IPv4 address scheme is proposed by the Caribbean and South American Regional for its ATN/IPS Network. The Caribbean and South American region also proposed in their plan for a global IPv4 addressing assignment which includes Asia/Pacific region. The Asia/Pacific Region is requested to review this proposed IP addressing assignment for consideration and adoption.

1.1 Objective

This document is meant to describe the addressing plan for IPv4 addresses throughout the Asia/Pacific Region. This document defines the recommended address format for IPv4 addresses. The IPv4 network is to be used within region.

1.2 References

[1]	ICAO Doc 9705-AN/956	Manual of Technical Provisions for the ATN
[2]	ICAO Doc 9896	Manual for the ATN using IPS Standards and Protocols
[3]	ICAO Doc 7910	ICAO Location Indicators
[4]	RFC 1518	An Architecture for IP Address Allocation with CIDR
[5]	RFC 1918	Address Allocation for Private Internets
[6]	RFC 2050	BGP-4 Internet Registry IP Allocation Guidelines
[7]	RFC 3330	Special-Use IPv4 Addresses
[8]	RFC 4271	BGP-4 Specification

1.3 Terms Used

Administrative Domain	–	An administrative entity in the ATN/IPS. An Administrative Domain can be an individual State, a group of States, an Aeronautical Industry Organization (e.g., an Air-Ground Service Provider), or an Air Navigation Service Provider (ANSP) that manages ATN/IPS network resources and services. From a routing perspective, an Administrative Domain includes one or more Autonomous Systems.

Autonomous System	–	A connected group of one or more IP prefixes, run by one or more network operators, which has a single, clearly defined routing policy.
Intra-domain (interior gateway) routing protocol	–	Protocols for exchanging routing information between routers within an AS.
Inter-domain (exterior gateway) routing protocol	–	Protocols for exchanging routing information between Autonomous Systems. They may in some cases be used between routers within an AS, but they primarily deal with exchanging information between Autonomous Systems.
Local Internet Registry	–	A Local Internet Registry (LIR) is an IR that primarily assigns address space to users of the network services it provides. LIRs are generally ISPs, whose customers are primarily end users and possibly other ISPs. [LACNIC]

1.4 Acronyms

AMHS	–	ATN Message Handling System
ARP	–	Address Resolution Protocol
ATN	–	Aeronautical Telecommunications Network
BGP	–	Border Gateway Protocol
DNS	–	Domain Name Service
IANA	–	Internet Assigned Numbers Authority
ICS	–	ATN Internet Communication Service
IP	–	Internet Protocol
IPv4	–	Internet Protocol Version 4
IPv6	–	Internet Protocol Version 6
IPS	–	Internet Protocol suite
LACNIC	–	Latin American and Caribbean Internet Address Registry
LIR	–	Local Internet Registry
OSPF	–	Open Shortest Path First
RIR	–	Regional Internet Registry

1.5 Overview of Addressing Issues

The following subsections present issues that affect the completion of the addressing plan for operating the IPS-based AMHS network.

1.5.1 Public or Private Address

An important decision for the region is whether to use private or public addresses. Private addresses can be used if coordinated by all participating States and Organization; however, it is possible that existing networks already use addresses in the private block ranges. Public addresses must be obtained from a Regional Internet Registry (RIR). The Internet Assigned Numbers Authority (IANA) has delegated responsibility for administration of Internet numbering to the Latin American and Caribbean Internet Address Registry (LACNIC).

1.5.2 Address of Systems in External Regions

Systems in external regions could be assigned an address from the APAC address space rather than use an address in their regional address block. Note however that this must be coordinated with private addresses so as to avoid collisions.

2 IPv4 Addressing Overview and Fundamentals

In the Internet Protocol a distinction is made between names, addresses, and routes. A name indicates what we seek. An address indicates where it is. A route indicates how to get there. The Internet protocol deals primarily with addresses. Its main task is to forward data to a particular destination address. It is the task of higher-level protocols to make the mapping from names to addresses, for example using a domain name service (DNS). The Internet protocol forwards packet data units (PDU) to a destination address using routing tables maintained by a routing protocol. The routing tables contain the address of the next hop along the route to the destination. There are in general two classes of routing protocols: inter-domain or exterior routing protocols such as the Border Gateway Protocol (BGP) and intra-domain or interior routing protocols such as the Open Shortest Path First (OSPF) protocol. In order to forward PDUs to the next hop address, there must be a mapping from this address to the link level address, for example, an Ethernet address. This mapping is maintained by an address discovery protocol such as the Address Resolution Protocol (ARP).

An IPv4 address consists of four bytes (32 bits). These bytes are also known as octets. For readability purposes, humans typically work with IP addresses in a notation called dotted decimal. This notation places periods between each of the four numbers (octets) that comprise an IP address. For example, an IP address that a computer sees as

00001010 00000000 00000000 00000001

is written in dotted decimal as

10.0.0.1

Because each byte contains 8 bits, each octet in an IP address ranges in value from a minimum of 0 to a maximum of 255. Therefore, the full range of IP addresses is from 0.0.0.0 through 255.255.255.255. That represents a total of 4,294,967,296 possible IP addresses.

A network may be set up with IP addresses to form a private or public network. On a private network a single organization controls address assignment for all nodes. On a public network there must be some conventions to assure that organizations do not use overlapping addresses. In the Internet this function is performed by the Internet Assigned Numbers Authority (IANA), which delegates authority to Regional Internet Registries (RIR). For the CAR/SAM Region the RIR is the Latin American and Caribbean Internet Address Registry (LACNIC).

IPv4 Addresses are a fixed length of four octets (32 bits). An address begins with a Network ID, followed by a Host ID as depicted in Figure 2-1.

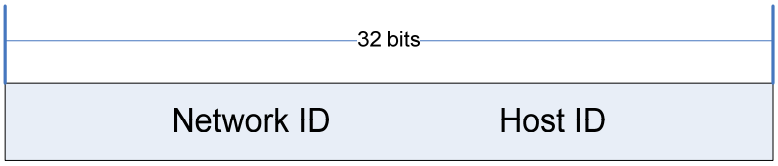


Figure 2-1. IPv4 Address Format

The original IP addressing scheme divided the Network ID from the Host ID is in a several octet boundaries. In this scheme the main classes of addresses were differentiated based on how many octets were used for the Network ID. This method is called classful addressing. Classful addressing was by convention further modified so that the Host ID could be split into subnet ID and sub host ID. This is typically accomplished using a subnet mask and is called classful addressing with subnetting. This eventually evolved into classless addressing where the division between the Network ID and Host ID can occur at an arbitrary point, not just on octet boundaries. With classless addressing the dividing point is indicated by a slash (/) followed the number of bits used for the Network ID. This value is called the prefix length of the address and the address value up to that point is called the network prefix.

Private Addressing is defined in RFC 1918. IANA has reserved the following three blocks of the IP address space for private Internets:

10.0.0.0 - 10.255.255.255 (10/8 prefix)
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

Because of the number of bits available to users, these blocks are referred to as a "24-bit block", a "20-bit block", and a "16-bit" block. An enterprise that decides to use IP addresses out of the private address space defined by RFC 1918, can do so without any

coordination with IANA or an Internet registry. Addresses within this private address space will only be unique within an enterprise or a group of enterprises (e.g., an ICAO region), which chose to cooperate over this space so they may communicate with each other in their own private Internet.

3 IPv4 Addressing

3.1 Overview CAR/SAM

3.1.1 During the fourth meeting of ATN/TF4 (Santo Domingo, Dominican Republic, 27 to 28 June 2008) the group analyzed different alternatives for the implementation of the TCP/IP in the CAR/SAM Regions identifying the available options that would facilitate this implementation in the AMHS Service and future applications. This was reviewed in accordance with Document 9880 Part IIB of the ICAO. In this respect the Meeting decided two viable options for the implantation the TCP/IP:

a) AMHS using the RFC1006 on Guiders TCP/IP (IPv4) to allow AMHS to directly interface with IPv4 Guiders for the intra-regional connections.

b) Configurating AMHS, as specified in a) with capacity for IPv4 conversion to IPv6 through the implementation of a function of IP router as gateway for the interregional connections.

3.1.2 The Sixth Meeting of Committee ATM/CNS (ATM/CNS/6) (Santo Domingo, Dominican Republic, 30 June to the 04 July 2008) analyzed this Plan of IP Addressing for CAR/SAM Regions and considered that such a plan would be sent to the ICAO for revision.

3.1.3 During the ACP/WG/I/8 (Montreal, Canada, 25 to 29 August 2008) it was concluded that it is possible to consider a regional scheme of IPv4 addressing. Taking into consideration that the private sector would be using the propose addressing scheme in other applications, the Meeting considered nonviable to apply the IP addressing scheme at a global level.

3.1.4 The Third Meeting of the Group of Regional Implementation SAM/IG/3 (Lima, Peru, 20 to 24 April 2009) considered that, taking into account specified in Table CNS 1Bb from the FASID, the AMHS system to be installed in the SAM Region will use IP protocol and will initially use the IPv4 version. The block of used IPv4 addresses will follow the format established during the ATM/CNS/SG/6 Meeting.

3.2 IP Addressing Plan

When we began to work on the plan of IP addressing, we once again reviewed the scheme that was originally proposed, analyzed the amount of States/Territories by

Region, the amount of addressing that each State/Territory could use and the amount of addressing reserved for the interconnection between States/Territories. The result of this study concluded that:

3.2.1 1 bit would be reduced to State/Territory level. This means the transfer of 256 States to 128 States by region. In the EUR/NAT Region, which is most numerous, has 53 States/Territories, means that there are many vacant numbers.

3.2.2 1 bit at Host's level would be added. This would allow the transfer from 4096 to 8190 hosts per State/Territory. This was considered due to the amount of future applications that would be implemented, mainly in the more developed States, and could cause the amount of directions not to be sufficient. The structure is shown below:

IPv4 Address																															
10									Region				State / Territory								Host's											
0	0	0	0	1	0	1	0	.	0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	0	1
1st. Byte								.	2nd. Byte								.	3rd. Byte								.	4th. Byte							

3.2.3 It should be noted the networks assigned to each State are private networks (RFC 1918). The first Bytes that integrate the assigned address will always maintain a decimal value of 10. Whereas the other three Bytes are used to distribute, in hierarchic form, the blocks of directions corresponding to each State.

3.2.4 The first four bits of the second Byte (4 bits) will be used to identify the regions in around which the States/Territories of the world are grouped:

- 0000 => SAM: South American Office.
- 0001 =>. NACC: North American, American Power station and Caribbean Office.
- 0010 => APAC: Asia and Pacific Office.
- 0011 => MID: Middle East Office.
- 0100 => WACAF: Western and Central African Office.
- 0101 => ESAF: Eastern and Southern African Office.
- 0110 => EUR/NAT: European and North Atlantic Office.

3.2.5 On the other hand, the last four bits of the second Byte, and the first three bits of the third Byte (7 bits) will be used to identify the States/Territories of each region.

3.2.6 Whereas the last five bits of the third Byte and the eight bits that compose the fourth Byte (13 bits) will be used by each one of the States/Territories to assign addressing to their terminals/servers

3.2.7 The proposed IPv4 address allocation scheme will be able to cover:

- 16 Regions.

- 128 States/Territories by each Region.
- 8190 Host' s for each State/Territory

3.2.8 The proposed IPv4 addressing plan would allow each State/Territory tobe able to make use of the block of directions assigned as needed.

a) Each State has been assigned 8190 usable Network addresses, which seem to be sufficient to cover existing needs.

b) In the development of the mentioned scheme, a flexible margin has been designated so that it will allow the future growth or change in the network in the future. For example, if a region were subdivided in two or more regions, or the emerging of a new State/Territory.

c) Argentina has already implemented its ATN network with a scheme of addresses different from the proposed one, prior to the publication of this document, has placed a border devise with the intention that this devise will make the address translation between the outer directions .

3.3 Network Assignment by Region (ASIA/PACIFIC)

Region	Issue	State/ Territory	Network	Direction Used	Decimal Notation	Binary Notation			
							Region	State/Territory	Host's
APAC	1	Australia	10 . 32 .0.0 / 19	First	10 . 32. 0 . 1	00001010.	0010	0000 . 000	00000 . 00000001
				Last	10 . 32. 31 . 254	00001010.	0010	0000 . 000	11111 . 11111110
	2	Bangladesh	10. 32. 64 .0 / 19	First	10 . 32. 32 . 1	00001010.	0010	0000 . 001	00000 . 00000001
				Last	10 . 32. 63 . 254	00001010.	0010	0000 . 001	11111 . 11111110
	3	Bhutan	10. 32. 64.0 / 19	First	10 . 32. 64 . 1	00001010.	0010	0000 . 010	00000 . 00000001
				Last	10 . 32. 95 . 254	00001010.	0010	0000 . 010	11111 . 11111110
	4	Brunei Danussaian	10. 32. 96.0 / 19	First	10 . 32. 96 . 1	00001010.	0010	0000 . 011	00000 . 00000001
				Last	10 . 32. 127 . 254	00001010.	0010	0000 . 011	11111 . 11111110
	5	Cambodia	10. 32. 128. 0 / 19	First	10 . 32. 128 . 1	00001010.	0010	0000 . 100	00000 . 00000001
				Last	10 . 32. 159 . 254	00001010.	0010	0000 . 100	11111 . 11111110
	6	China	10. 32. 160. 0 / 19	First	10 . 32. 160 . 1	00001010.	0010	0000 . 101	00000 . 00000001
				Last	10 . 32. 191 . 254	00001010.	0010	0000 . 101	11111 . 11111110
	7	Cook Islands	10. 32 . 192. 0 / 19	First	10 . 32 . 192 . 1	00001010.	0010	0000 . 110	00000 . 00000001
				Last	10 . 32 . 223 . 254	00001010.	0010	0000 . 110	11111 . 11111110
	8	Cook Islands	10. 32 . 224. 0 / 19	First	10 . 32 . 224 . 1	00001010.	0010	0000 . 111	00000 . 00000001
				Last	10 . 32 . 255 . 254	00001010.	0010	0000 . 111	11111 . 11111110
	9	Democratic people's Republic of Korea	10. 33 . 0 . 0 / 19	First	10 . 33 . 0 . 1	00001010.	0010	0001 . 000	00000 . 00000001
				Last	10 . 33 . 31 . 254	00001010.	0010	0001 . 000	11111 . 11111110
	10	Fiji	10. 33 . 32 . 0 / 19	First	10 . 33 . 32 . 1	00001010.	0010	0001 . 001	00000 . 00000001

				Last	10 . 33 . 63 . 254	00001010.	0010	0001 . 001	11111 . 11111110
	11	India	10. 17 . 64 . 0 / 19	First	10 . 33 . 64 . 1	00001010.	0010	0001 . 010	00000 . 00000001
				Last	10 . 33 . 95 . 254	00001010.	0010	0001 . 010	11111 . 11111110
APAC	12	Indonesia	10. 33 . 96 . 0 / 19	First	10 . 33 . 96 . 1	00001010.	0010	0001 . 011	00000 . 00000001
				Last	10 . 33 . 96 . 254	00001010.	0010	0001 . 011	11111 . 11111110
	13	Japan	10. 33 . 128 . 0 / 19	First	10 . 33 . 128 . 1	00001010.	0010	0001 . 100	00000 . 00000001
				Last	10 . 33 . 159 . 254	00001010.	0010	0001 . 100	11111 . 11111110
	14	Kiribati	10. 33 . 160 . 0 / 19	First	10 . 33 . 160 . 1	00001010.	0010	0001 . 101	00000 . 00000001
				Last	10 . 33 . 191 . 254	00001010.	0010	0001 . 101	11111 . 11111110
	15	Lao People's Democratic Republic	10. 33 . 192 . 0 / 19	First	10 . 33 . 192 . 1	00001010.	0010	0001 . 110	00000 . 00000001
				Last	10 . 33 . 223 . 254	00001010.	0010	0001 . 110	11111 . 11111110
	16	Malaysia	10. 33 . 224 . 0 / 19	First	10 . 33 . 224 . 1	00001010.	0010	0001 . 111	00000 . 00000001
				Last	10 . 33 . 255 . 254	00001010.	0010	0001 . 111	11111 . 11111110
	17	Maldives	10. 34 . 0 . 0 / 19	First	10 . 34 . 00 . 1	00001010.	0010	0010 . 000	00000 . 00000001
				Last	10 . 34 . 31 . 254	00001010.	0010	0010 . 000	11111 . 11111110
	18	Marshall Islands	10. 34 . 32 . 0 / 19	First	10 . 34 . 32 . 1	00001010.	0010	0010 . 001	00000 . 00000001
				Last	10 . 34 . 63 . 254	00001010.	0010	0010 . 001	11111 . 11111110
	19	Micronesia	10. 34 . 64 . 0 / 19	First	10 . 34 . 64 . 1	00001010.	0010	0010 . 010	00000 . 00000001
				Last	10 . 34 . 95 . 254	00001010.	0010	0010 . 010	11111 . 11111110
	20	Mongolia	10. 34 . 96 . 0 / 19	First	10 . 34 . 96 . 1	00001010.	0010	0010 . 011	00000 . 00000001
				Last	10 . 34 . 127 . 254	00001010.	0010	0010 . 011	11111 . 11111110

	21	Myanmar	10. 34 . 128 . 0 / 19	First	10 . 34 . 128 . 1	00001010.	0010	0010 . 100	00000 . 00000001
				Last	10 . 34 . 159 . 254	00001010.	0010	0010 . 100	11111 . 11111110
	22	Nauru	10. 34 . 160 . 0 / 19	First	10 . 34 . 160 . 1	00001010.	0010	0010 . 101	00000 . 00000001
				Last	10 . 34 . 191 . 254	00001010.	0010	0010 . 101	11111 . 11111110
	23	Nepal	10. 34 . 192 . 0 / 19	First	10 . 34 . 192 . 1	00001010.	0010	0001 . 110	00000 . 00000001
				Last	10 . 34 . 223 . 254	00001010.	0010	0001 . 110	11111 . 11111110
	24	New Zealand	10. 34 . 224 . 0 / 19	First	10 . 34 . 224 . 1	00001010.	0010	0001 . 111	00000 . 00000001
				Last	10 . 34 . 255 . 254	00001010.	0010	0001 . 111	11111 . 11111110
	25	Palau	10. 35 . 0 . 0 / 19	First	10 . 35 . 0 . 1	00001010.	0010	0010 . 000	00000 . 00000001
				Last	10 . 35 . 31 . 254	00001010.	0010	0010 . 000	11111 . 11111110
	26	Papua New Guinea	10. 35 . 32 . 0 / 19	First	10 . 35 . 32 . 1	00001010.	0010	0010 . 001	00000 . 00000001
				Last	10 . 35 . 63 . 254	00001010.	0010	0010 . 001	11111 . 11111110
	27	Philippines	10. 35 . 64 . 0 / 19	First	10 . 35 . 64 . 1	00001010.	0010	0010 . 010	00000 . 00000001
				Last	10 . 35 . 95 . 254	00001010.	0010	0010 . 010	11111 . 11111110
	28	Republic of Korea	10. 35 . 96 . 0 / 19	First	10 . 35 . 96 . 1	00001010.	0010	0010 . 011	00000 . 00000001
				Last	10 . 35 . 127 . 254	00001010.	0010	0010 . 011	11111 . 11111110
	29	Samoa	10. 35 . 128 . 0 / 19	First	10 . 35 . 128 . 1	00001010.	0010	0010 . 100	00000 . 00000001
				Last	10 . 35 . 159 . 254	00001010.	0010	0010 . 100	11111 . 11111110
	30	Singapore	10. 19 . 160 . 0 / 19	First	10 . 35 . 160 . 1	00001010.	0010	0010 . 101	00000 . 00000001
				Last	10 . 35 . 191 . 254	00001010.	0010	0010 . 101	11111 . 11111110
	31	Solomon Islands	10. 35 . 192 . 0 / 19	First	10 . 35 . 192 . 1	00001010.	0010	0010 . 110	00000 . 00000001
				Last	10 . 35 . 223 . 254	00001010.	0010	0010 . 110	11111 . 11111110
	32	Sri Lanka	10. 35. 224 . 0 / 19	First	10 . 35 . 224 . 1	00001010.	0010	0010 . 111	00000 . 00000001
				Last	10 . 35 . 255 . 254	00001010.	0010	0010 . 111	11111 . 11111110

	33	Thailand	10. 36 . 0 . 0 / 19	First	10 . 36 . 00 . 1	00001010.	0010	0011 . 000	00000 . 00000001
				Last	10 . 36 . 31 . 254	00001010.	0010	0011 . 000	11111 . 11111110
	34	Timor Leste	10. 36. 32 . 0 / 19	First	10 . 36. 32 . 1	00001010.	0010	0011 . 001	00000 . 00000001
				Last	10 . 36. 63 . 254	00001010.	0010	0011 . 001	11111 . 11111110
	35	Tonga	10. 36 . 64 . 0 / 19	First	10 . 36 . 64 . 1	00001010.	0010	0011 . 110	00000 . 00000001
				Last	10 . 36 . 95 . 254	00001010.	0010	0011 . 110	11111 . 11111110
APAC	36	Vanuatu	10. 36 . 96 . 0 / 19	First	10 . 36 . 96 . 1	00001010.	0010	0011 . 011	00000 . 00000001
				Last	10 . 36 . 127 . 254	00001010.	0010	0011 . 011	11111 . 11111110
	37	Vietnam	10. 36 . 128 . 0 / 19	First	10 . 36 . 128 . 1	00001010.	0010	0011 . 100	00000 . 00000001
				Last	10 . 36 . 159 . 254	00001010.	0010	0011 . 100	11111 . 11111110
	38	Isla de Pascua (Chilie)	10. 36 . 160 . 0 / 19	First	10 . 36 . 160 . 1	00001010.	0010	0011 . 101	00000 . 00000001
				Last	10 . 36 . 191 . 254	00001010.	0010	0011 . 101	11111 . 11111110
	39	French Polynesia	10. 36 . 192 . 0 / 19	First	10 . 36 . 192 . 1	00001010.	0010	0011 . 110	00000 . 00000001
				Last	10 . 36 . 223 . 254	00001010.	0010	0011 . 110	11111 . 11111110
	40	New Caledonia (French)	10. 36 . 224 . 0 / 19	First	10 . 36 . 224 . 1	00001010.	0010	0011 . 111	00000 . 00000001
				Last	10 . 36 . 255 . 254	00001010.	0010	0011 . 111	11111 . 11111110
	41	Wallis & Futuna Islands (French)	10. 37 . 0 . 0 / 19	First	10 . 37 . 0 . 1	00001010.	0010	0100 . 000	00000 . 00000001
				Last	10 . 37 . 31 . 254	00001010.	0010	0100 . 000	11111 . 11111110
	42	Niue (New Zealand)	10. 37 . 32 . 0 / 19	First	10 . 37 . 32 . 1	00001010.	0010	0100 . 001	00000 . 00000001
				Last	10 . 37 . 63 . 254	00001010.	0010	0100 . 001	11111 . 11111110
	43	Pecan Island (United Kingdom)	10. 37 . 64 . 0 / 19	First	10 . 37 . 64 . 1	00001010.	0010	0100 . 010	00000 . 00000001
				Last	10 . 37. 95 . 254	00001010.	0010	0100 . 010	11111 . 11111110

	44	American Samoa (United States)	10. 37 . 96 . 0 / 19	First	10 . 37. 96 . 1	00001010.	0010	0100 . 011	00000 . 00000001
				Last	10 . 37. 127 . 254	00001010.	0010	0100 . 011	11111 . 11111110
	45	Guam (United States)	10. 37 . 128 . 0 / 19	First	10 . 37. 128 . 1	00001010.	0010	0100 . 100	00000 . 00000001
				Last	10 . 37. 159 . 254	00001010.	0010	0100 . 100	11111 . 11111110
	46	Johnson Island Kingman Reef (United States)	10. 37 . 160 . 0 / 19	First	10 . 37. 160 . 1	00001010.	0010	0100 . 101	00000 . 00000001
				Last	10 . 37. 191 . 254	00001010.	0010	0100 . 101	11111 . 11111110
	47	Midway (United States)	10. 37 . 192 . 0 / 19	First	10 . 37. 192 . 1	00001010.	0010	0100 . 110	00000 . 00000001
				Last	10 . 37. 223 . 254	00001010.	0010	0100 . 110	11111 . 11111110
APAC	48	Northern Mariana Islands (United States)	10 . 37 .224. 0 / 19	First	10 . 37 . 224 . 1	00001010.	0010	0100 . 111	00000 . 00000001
				Last	10 . 37 . 255 . 254	00001010.	0010	0100 . 111	11111 . 11111110
	49	Palmyra (United States)	10 . 38 . 0 . 0 / 19	First	10 . 38 . 0 . 1	00001010.	0010	0101 . 000	00000 . 00000001
				Last	10 . 38 . 31 . 254	00001010.	0010	0101 . 000	11111 . 11111110
	50	Wake Islands (United States)	10. 38. 32 . 0 / 19	First	10 . 38 . 32 . 1	00001010.	0010	0101 . 001	00000 . 00000001
				Last	10 . 38 . 63 . 254	00001010.	0010	0101 . 001	11111 . 11111110
	51	VACANCY	10.37. 64 .0 / 19	First	10 . 38 . 64 . 1	00001010.	0010	0101 . 010	00000 . 00000001
				Last	10 . 38 . 95 . 254	00001010.	0010	0101 . 010	11111 . 11111110
	-	-	-						

	-	-	-						
	128	RESERVE	10. 47 . 2244 . 0 / 19	First	10 . 47 . 224 . 1	00001010.	0010	1111 . 111	00000 . 00000001
				Last	10 . 47 . 255 . 254	00001010.	0010	1111 . 111	11111 . 11111110

3.4 Using IPv4-Compatible Address Formats

In many instances, you can represent a 32-bit IPv4 address as a 128-bit IPv6 address. The transition mechanism defines the following two formats.

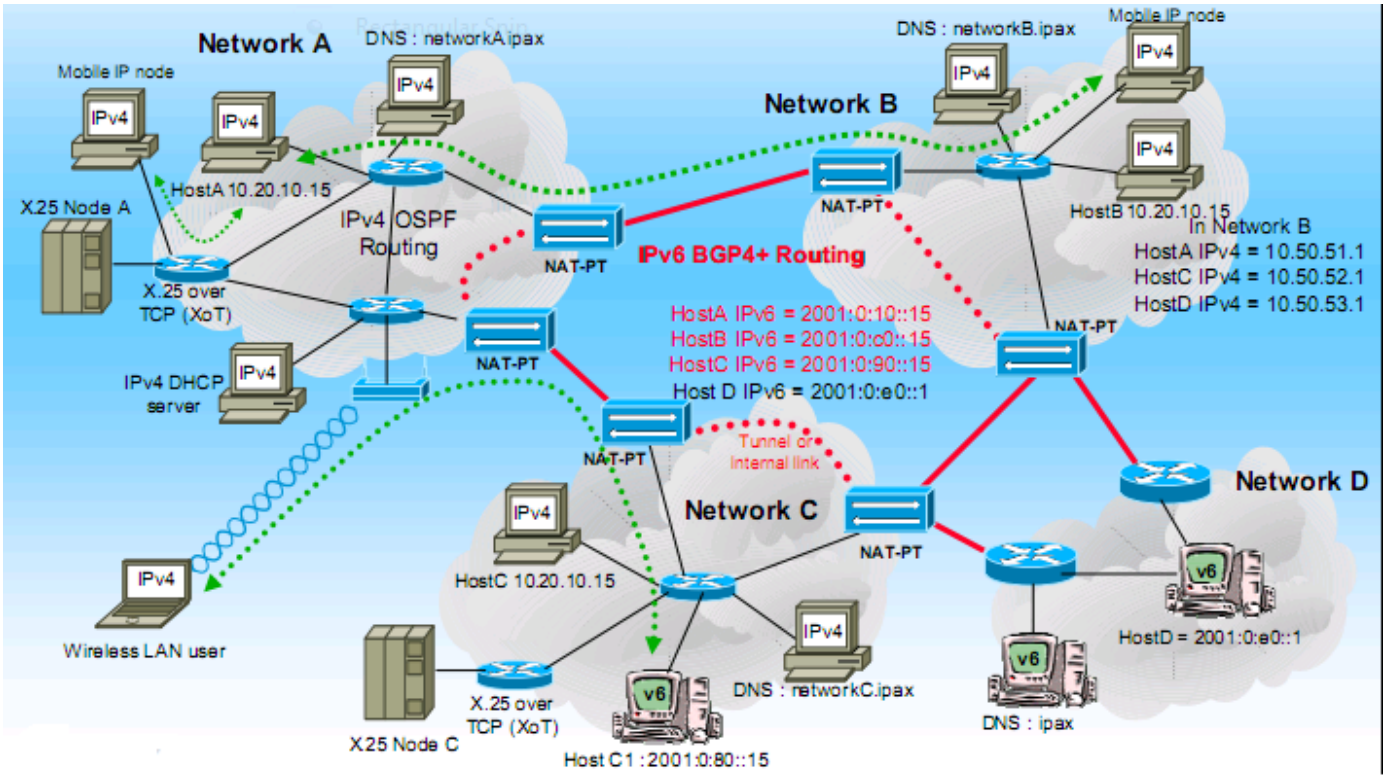
IPv4-compatible address

000 ... 000	IPv4 Address

IPv4-mapped address

000 ... 000	0xffff	IPv4 Address

The mapped address format is used to represent an IPv4 node. The only currently defined use of this address format is part of the socket API. An application can have a common address format for both IPv6 addresses and IPv4 addresses. The common address format can represent an IPv4 address as a 128-bit mapped address. However, IPv4-to-IPv6 protocol translators also allow these addresses to be used.



4. CONCLUSION

The meeting is invited to consider the proposed private network IPv4 address assignment for adoption. It is further recommended that the IPv4 address assignment table be modified to include States using Message Transfer Agent (MTA) only, since the connection between MTA and their associated User Agent (UA) is considered a local matter.

APPENDIX C

IPV4 ADDRESSING SCHEME
ESQUEMA DE DIRECCIONAMIENTO IPV4

SAM REGION INTER-/INTRA-REGIONAL LINKS
ENLACES INTER-/INTRA-REGIONALES CORRESPONDIENTES A LA REGION SAM

NETWORK/ RED	LINK / ENLACE				
	No.	SUBNETWORK/ SUBRED	CONNECTED ROUTERS/ ENCAMINADORES CONECTADOS	ADDRESSES TO USE / DIRECCIONES A UTILIZAR	
1	2	3	4	5	
10.15.224.0 / 19	1	10.15.224.0 / 30	Argentina-Bolivia	-	10 - 15 - 224 - 0 / 30
				Argentina	10 - 15 - 224 - 1 / 30
				Bolivia	10 - 15 - 224 - 2 / 30
				-	10 - 15 - 224 - 3 / 30
	2	10.15.224.4 / 30	Argentina-Chile	-	10 - 15 - 224 - 4 / 30
				Argentina	10 - 15 - 224 - 5 / 30
				Chile	10 - 15 - 224 - 6 / 30
				-	10 - 15 - 224 - 7 / 30
	3	10.15.224.8 / 30	Argentina-Paraguay	-	10 - 15 - 224 - 8 / 30
				Argentina	10 - 15 - 224 - 9 / 30
				Paraguay	10 - 15 - 224 - 10 / 30
				-	10 - 15 - 224 - 11 / 30
	4	10.15.224.12 / 30	Argentina-Peru	-	10 - 15 - 224 - 12 / 30
				Argentina	10 - 15 - 224 - 13 / 30
				Peru	10 - 15 - 224 - 14 / 30
				-	10 - 15 - 224 - 15 / 30
	5	10.15.224.16 / 30	Argentina-Uruguay	-	10 - 15 - 224 - 16 / 30
				Argentina	10 - 15 - 224 - 17 / 30
				Uruguay	10 - 15 - 224 - 18 / 30
				-	10 - 15 - 224 - 19 / 30
	6	10.15.224.20 / 30	Argentina-AFI	-	10 - 15 - 224 - 20 / 30
				Argentina	10 - 15 - 224 - 21 / 30
				AFI (Johannesburgo)	10 - 15 - 224 - 22 / 30
				-	10 - 15 - 224 - 23 / 30
	7	10.15.224.24 / 30	Brasil-Colombia	-	10 - 15 - 224 - 24 / 30
				Brasil	10 - 15 - 224 - 25 / 30
				Colombia	10 - 15 - 224 - 26 / 30
				-	10 - 15 - 224 - 27 / 30
	8	10.15.224.28 / 30	Brasil-Guyana	-	10 - 15 - 224 - 28 / 30
				Brasil	10 - 15 - 224 - 29 / 30
				Guyana	10 - 15 - 224 - 30 / 30
				-	10 - 15 - 224 - 31 / 30

NETWORK/ RED	LINK / ENLACE				
	No.	SUBNETWORK/ SUBRED	CONNECTED ROUTERS/ ENCAMINADORES CONECTADOS	ADDRESSES TO USE / DIRECCIONES A UTILIZAR	
1	2	3	4	5	
10.15.224.0 / 19	9	10.15.224.32 / 30	Brasil-French Guiana	-	10 - 15 - 224 - 32 / 30
				Brasil	10 - 15 - 224 - 33 / 30
				French Guiana	10 - 15 - 224 - 34 / 30
				-	10 - 15 - 224 - 35 / 30
	10	10.15.224.36 / 30	Brasil-Peru	-	10 - 15 - 224 - 36 / 30
				Brasil	10 - 15 - 224 - 37 / 30
				Peru	10 - 15 - 224 - 38 / 30
				-	10 - 15 - 224 - 39 / 30
	11	10.15.224.40 / 30	Brasil-Suriname	-	10 - 15 - 224 - 40 / 30
				Brasil	10 - 15 - 224 - 41 / 30
				Suriname	10 - 15 - 224 - 42 / 30
				-	10 - 15 - 224 - 43 / 30
	12	10.15.224.44 / 30	Brasil-Venezuela	-	10 - 15 - 224 - 44 / 30
				Brasil	10 - 15 - 224 - 45 / 30
				Venezuela	10 - 15 - 224 - 46 / 30
				-	10 - 15 - 224 - 47 / 30
	13	10.15.224.48 / 30	Brasil-AFI	-	10 - 15 - 224 - 48 / 30
				Brasil	10 - 15 - 224 - 49 / 30
				AFI (Dakar)	10 - 15 - 224 - 50 / 30
				-	10 - 15 - 224 - 51 / 30
	14	10.15.224.52 / 30	Brasil-EUR	-	10 - 15 - 224 - 52 / 30
				Brasil	10 - 15 - 224 - 53 / 30
				EUR (Madrid)	10 - 15 - 224 - 54 / 30
				-	10 - 15 - 224 - 55 / 30
	15	10.15.224.56 / 30	Brasil-NAM	-	10 - 15 - 224 - 56 / 30
				Brasil	10 - 15 - 224 - 57 / 30
				NAM (Atlanta)	10 - 15 - 224 - 58 / 30
				-	10 - 15 - 224 - 59 / 30
	16	10.15.224.60 / 30	Brasil-Argentina	-	10 - 15 - 224 - 60 / 30
				Brasil	10 - 15 - 224 - 61 / 30
				Argentina	10 - 15 - 224 - 62 / 30
				-	10 - 15 - 224 - 63 / 30
	17	10.15.224.64 / 30	Brasil-Bolivia	-	10 - 15 - 224 - 64 / 30
				Brasil	10 - 15 - 224 - 65 / 30
				Bolivia	10 - 15 - 224 - 66 / 30
				-	10 - 15 - 224 - 67 / 30
	18	10.15.224.68 / 30	Brasil-Paraguay	-	10 - 15 - 224 - 68 / 30
				Brasil	10 - 15 - 224 - 69 / 30
				Paraguay	10 - 15 - 224 - 70 / 30
				-	10 - 15 - 224 - 71 / 30
	19	10.15.224.72 / 30	Brasil-Uruguay	-	10 - 15 - 224 - 72 / 30
				Brasil	10 - 15 - 224 - 73 / 30
				Uruguay	10 - 15 - 224 - 74 / 30
				-	10 - 15 - 224 - 75 / 30

NETWORK/ RED	LINK / ENLACE				
	No.	SUBNETWORK/ SUBRED	CONNECTED ROUTERS/ ENCAMINADORES CONECTADOS	ADDRESSES TO USE / DIRECCIONES A UTILIZAR	
1	2	3	4	5	
10.15.224.0 / 19	20	10.15.224.76 / 30	Chile-PAC	-	10 - 15 - 224 - 76 / 30
				Chile	10 - 15 - 224 - 77 / 30
				PAC (Christchurch)	10 - 15 - 224 - 78 / 30
				-	10 - 15 - 224 - 79 / 30
	21	10.15.224.80 / 30	Chile-Peru	-	10 - 15 - 224 - 80 / 30
				Chile	10 - 15 - 224 - 81 / 30
				Peru	10 - 15 - 224 - 82 / 30
				-	10 - 15 - 224 - 83 / 30
	22	10.15.224.84 / 30	Colombia-NAM	-	10 - 15 - 224 - 84 / 30
				Colombia	10 - 15 - 224 - 85 / 30
				NAM (Atlanta)	10 - 15 - 224 - 86 / 30
				-	10 - 15 - 224 - 87 / 30
	23	10.15.224.88 / 30	Colombia-Ecuador	-	10 - 15 - 224 - 88 / 30
				Colombia	10 - 15 - 224 - 89 / 30
				Ecuador	10 - 15 - 224 - 90 / 30
				-	10 - 15 - 224 - 91 / 30
	24	10.15.224.92 / 30	Colombia-Peru	-	10 - 15 - 224 - 92 / 30
				Colombia	10 - 15 - 224 - 93 / 30
				Peru	10 - 15 - 224 - 94 / 30
				-	10 - 15 - 224 - 95 / 30
	25	10.15.224.96 / 30	Colombia-Venezuela	-	10 - 15 - 224 - 96 / 30
				Colombia	10 - 15 - 224 - 97 / 30
				Venezuela	10 - 15 - 224 - 98 / 30
				-	10 - 15 - 224 - 99 / 30
	26	10.15.224.100 / 30	Ecuador-Peru	-	10 - 15 - 224 - 100 / 30
				Ecuador	10 - 15 - 224 - 101 / 30
				Peru	10 - 15 - 224 - 102 / 30
				-	10 - 15 - 224 - 103 / 30
	27	10.15.224.104 / 30	Ecuador-Venezuela	-	10 - 15 - 224 - 104 / 30
				Ecuador	10 - 15 - 224 - 105 / 30
				Venezuela	10 - 15 - 224 - 106 / 30
				-	10 - 15 - 224 - 107 / 30
	28	10.15.224.108 / 30	French Guiana-Suriname	-	10 - 15 - 224 - 108 / 30
				French Guiana	10 - 15 - 224 - 109 / 30
				Suriname	10 - 15 - 224 - 110 / 30
				-	10 - 15 - 224 - 111 / 30
	29	10.15.224.112 / 30	Guyana-C-CAR	-	10 - 15 - 224 - 112 / 30
				Guyana	10 - 15 - 224 - 113 / 30
				C-CAR (Piarco)	10 - 15 - 224 - 114 / 30
				-	10 - 15 - 224 - 115 / 30
	30	10.15.224.116 / 30	Guyana-Suriname	-	10 - 15 - 224 - 116 / 30
				Guyana	10 - 15 - 224 - 117 / 30
				Suriname	10 - 15 - 224 - 118 / 30
				-	10 - 15 - 224 - 119 / 30

NETWORK/ RED	LINK / ENLACE				
	No.	SUBNETWORK/ SUBRED	CONNECTED ROUTERS/ ENCAMINADORES CONECTADOS	ADDRESSES TO USE / DIRECCIONES A UTILIZAR	
1	2	3	4	5	
10.15.224.0 / 19	31	10.15.224.120 / 30	Guyana-Venezuela	-	10 - 15 - 224 - 120 / 30
				Guyana	10 - 15 - 224 - 121 / 30
				Venezuela	10 - 15 - 224 - 122 / 30
				-	10 - 15 - 224 - 123 / 30
	32	10.15.224.124 / 30	Peru-NAM	-	10 - 15 - 224 - 124 / 30
				Peru	10 - 15 - 224 - 125 / 30
				NAM (Atlanta)	10 - 15 - 224 - 126 / 30
				-	10 - 15 - 224 - 127 / 30
	33	10.15.224.128 / 30	Peru-Bolivia	-	10 - 15 - 224 - 128 / 30
				Peru	10 - 15 - 224 - 129 / 30
				Bolivia	10 - 15 - 224 - 130 / 30
				-	10 - 15 - 224 - 131 / 30
	34	10.15.224.132/ 30	Peru-Colombia	-	10 - 15 - 224 - 132 / 30
				Peru	10 - 15 - 224 - 133 / 30
				Colombia	10 - 15 - 224 - 134 / 30
				-	10 - 15 - 224 - 135 / 30
	35	10.15.224.136 / 30	Peru-Venezuela	-	10 - 15 - 224 - 136 / 30
				Peru	10 - 15 - 224 - 137 / 30
				Venezuela	10 - 15 - 224 - 138 / 30
				-	10 - 15 - 224 - 139 / 30
	36	10.15.224.140 / 30	Suriname-Venezuela	-	10 - 15 - 224 - 140 / 30
				Suriname	10 - 15 - 224 - 141 / 30
				Venezuela	10 - 15 - 224 - 142 / 30
				-	10 - 15 - 224 - 143 / 30
	37	10.15.224.144 / 30	Venezuela-CAM	-	10 - 15 - 224 - 144 / 30
				Venezuela	10 - 15 - 224 - 145 / 30
				CAM (San Juan)	10 - 15 - 224 - 146 / 30
				-	10 - 15 - 224 - 147 / 30
	38	10.15.224.148 / 30	Venezuela-EUR	-	10 - 15 - 224 - 148 / 30
				Venezuela	10 - 15 - 224 - 149 / 30
				EUR (Madrid)	10 - 15 - 224 - 150 / 30
				-	10 - 15 - 224 - 151 / 30
	39	10.15.224.152 / 30	Venezuela-Trinidad & Tobago	-	10 - 15 - 224 - 152 / 30
				Venezuela	10 - 15 - 224 - 153 / 30
				Trinidad & Tobago	10 - 15 - 224 - 154 / 30
				-	10 - 15 - 224 - 155 / 30
	40	10.15.224.156 / 30	VACANTE	-	10 - 15 - 224 - 156 / 30
				-	10 - 15 - 224 - 157 / 30
				-	10 - 15 - 224 - 158 / 30
				-	10 - 15 - 224 - 159 / 30
	41	10.15.224.160 / 30	VACANTE	-	10 - 15 - 224 - 160 / 30
				-	10 - 15 - 224 - 161 / 30
				-	10 - 15 - 224 - 162 / 30
				-	10 - 15 - 224 - 163 / 30

NETWORK/ RED	LINK / ENLACE				
	No.	SUBNETWORK/ SUBRED	CONNECTED ROUTERS/ ENCAMINADORES CONECTADOS	ADDRESSES TO USE / DIRECCIONES A UTILIZAR	
1	2	3	4	5	
10.15.224.0 / 19	42	10.15.224.164 / 30	VACANTE	-	10 - 15 - 224 - 164 / 30
				-	10 - 15 - 224 - 165 / 30
				-	10 - 15 - 224 - 166 / 30
				-	10 - 15 - 224 - 167 / 30
	-	-	-	-	-
					-
					-
				-	-
	-	-	-	-	-
					-
					-
				-	-
	2048 (last/ última)	10.15.224.252 / 30	VACANTE	-	10 - 15 - 224 - 252 / 30
					10 - 15 - 224 - 253 / 30
					10 - 15 - 224 - 254 / 30
				-	10 - 15 - 224 - 255 / 30

-END-