International Civil Aviation Organization

MIDANPIRG Communication Navigation and Surveillance Sub-Group (CNS SG)

Sixth Meeting
(Tehran, Iran, 9 – 11 September 2014)

Agenda Item 5: Performance Framework for CNS Implementation in the MID Region

AERONAUTICAL FIXED SERVICE ISSUES AND MID IP NETWORK

(Presented by the Secretariat)

SUMMARY

This paper presents the IP address as developed by the ATN/IPS WG/5 and current Aeronautical Fixed Service (AFS) issues. The paper discusses other Regions IP network and proposes establishment of MID IP Network.

Action by the meeting is at paragraph 3.

REFERENCES

- IPS WG/2 report
- MIDANPIRG/14 Report

1. INTRODUCTION

1.1 The requirement of Regional Telecommunication Network is essential for all Aeronautical Fixed Services (AFTN, AMHS, AIDC/OLDI, surveillance data sharing etc.). MIDANPRG/14 meeting reiterated that the MID ATN implementation and MID IP Network 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.

1.2 The IP network telecommunication service has been used worldwide to provide a private network for banking and oil industries and has proved its service is reliable and affordable. The IP network is the only economical means to provide a standard telecommunication interface between ANSPs to meet the challenge of supporting ever increasing demand in information exchange required by System Wide Information Management (SWIM) and other services.

2. DISCUSSION

2.1 MIDANPIRG/14 meeting endorsed the Aviation System Block Upgrade (ASBU) Block 0, module B0-FICE "increased interoperability, efficiency and capacity through Ground-Ground Integration (AIDC)" as one of the priority modules that will bring operational improvements to the MID Region. Further details on the progress for the AIDC/OLDI implementation and the outcome of the AIDC/OLDI Seminar are discussed in detail in WP/10.

2.2 MIDANPIRG/14 meeting was apprised of the IP Network surveys results and the proposal for an IP address plans for the MID Region as at **Appendices A** and **B** to this working paper, and it was planned that AIDC/OLDI Seminar review and discuss the plan; however, the necessary experts were not in attendance of the Seminar accordingly, this subject was not discussed at the Seminar.

2.3 The meeting may wish to recall the Current Point-to-Point circuit arrangement between States to support Aeronautical Fixed Service (AFS) Enhancement has the following issues:

- Half circuit arrangement between States is increasingly difficult to order and time consuming.
- Circuit upgrade between States is also impacted due to variable pricing and bandwidth availability of the half circuit at each State.
- Dynamic routing is not supported due to limited bandwidth and no central administration of the network.
- Incompatible network protocol does not support Extended Service as specified in ICAO Doc. 9880 and IPv6 addressing as specified in ICAO Doc. 9896.
- New future Information Management as recommended by ICAO 12th Air Navigation Conference, such as System Wide Information Management (SWIM), is not supported.
- Network security measures cannot be implemented, which leads many States to implement their own security measures and policy, adding to overall costs.
- Different budget cycles and priorities between States make the synchronization of upgrades difficult and in turn limit the seamless distribution of Aeronautical Fixed Service (AFS) data.

2.4 The European Region has implemented the Pan-European Network Service (PENS) and North American Region has FAA Telecommunication Infrastructure (FTI) to support Canada and USA to distribute AFS data. Similarly, other ICAO Regions South America has REDDIG and Caribbean has MEVA and the APAC Region is planning for the implementation of Common Regional Virtual Private Network (CRV).

2.5 In the MID Region there was proposal for the feasibility study for implementing a Middle East Network Services (MENS) concept by the IPS WG/2 meeting in October 2009, this was not mature at that time. However, the last three MIDANPIRG reports highlighted on the MID IP Network and it was clearly mentioned in several reports that the MID IP Network to be established based on regional agreement and requirement.

2.6 Any MID IP Network establishment should consider:

- reduce telecommunication cost;
- enhance information security;
- support new enhancements;
- provide a dynamic network;
- minimize coordination for network management and enhancement; and
- respond to Air Traffic requirements in a timely manner.

2.7 In order to establish a private network, the following are required:

- the cost has to be equal or less than the current cost by utilizing existing commercially available infrastructure;
- a common telecommunication network provider; and
- a selected common telecommunication service provider will work with local provider for access.

2.8 It is to be noted that the network will be private network and not public internet. Any users of the network can be connected to one another as configured through the Network Administrator. The establishment of Virtual Private Network (VPN) is to be based on Multi-Protocol Label Switching (MPLS).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information related to the IP networks in other ICAO Regions;

b) review and update **Appendices A** and **B**; and

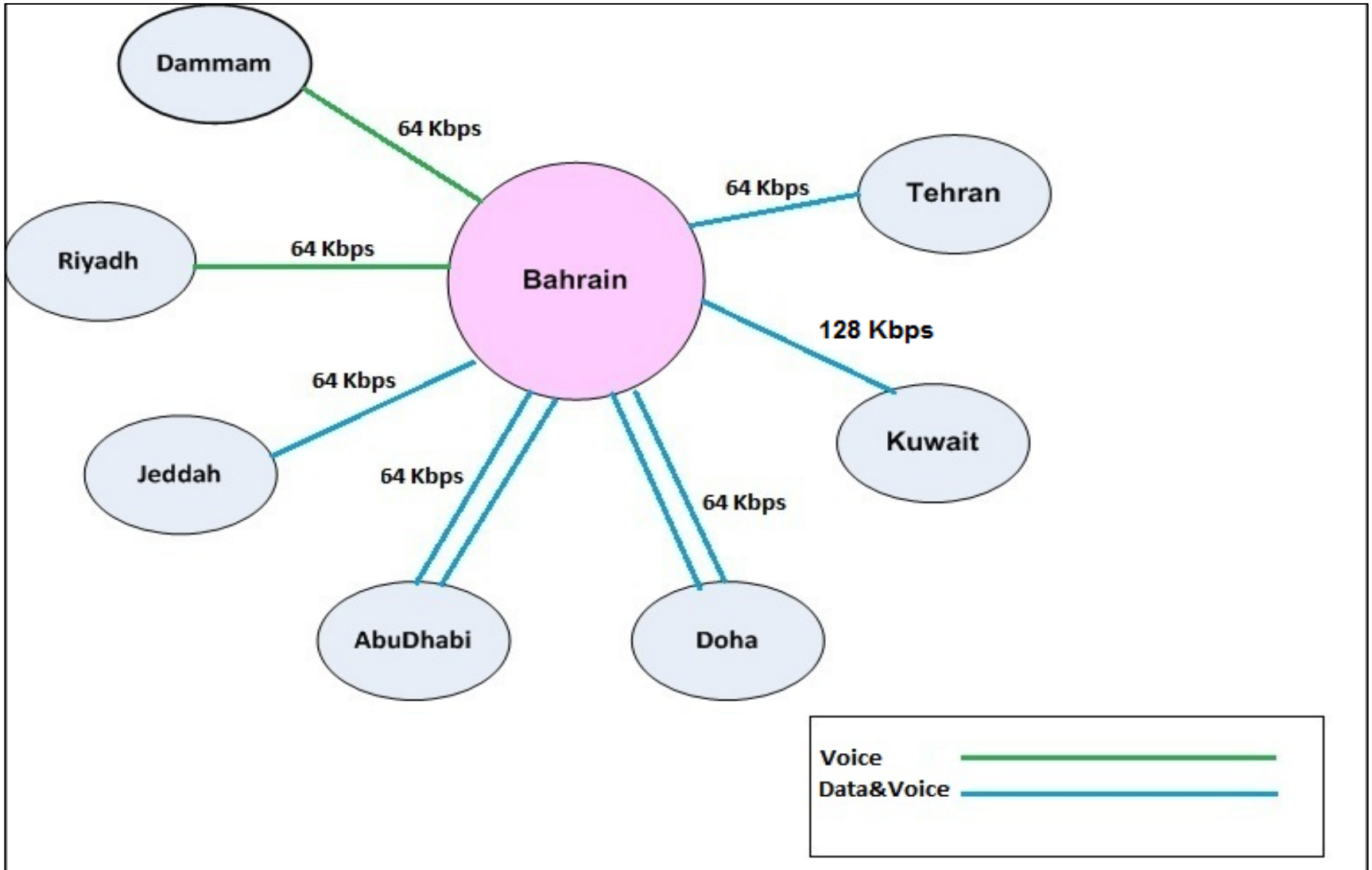
c) propose appropriate action for establishment of MID IP Network.

APPENDIX A

MIDANPIRG/14
Appendix 4.5E to the Report on Agenda Item 4.5

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
Dammam	64k	Batelco	10.61.11.44	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	128k	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
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


Dammam
64 Kbps
Tehran
64 Kbps
Riyadh
64 Kbps
Bahrain
128 Kbps
64 Kbps
Kuwait
Jeddah
64 Kbps
64 Kbps
AbuDhabi
Doha
Voice
Data&Voice

State (Cairo)

Figure 1: Bahrain Circuit Diagram

Egypt

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	AMHS
						FXO/FXS	Voice
Jeddah1	64k	Telecom Egypt (ATM)	192.168.80.2	255.255.255.0	Cisco2800	FXO/FXS	Voice
						IP	OLDI, Radar
Jeddah2	128k	Telecom Egypt (ATM)	10.10.10.1	255.255.255.0	Motorola Vangurd 6455	IP	AMHS
						FXO/FXS	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

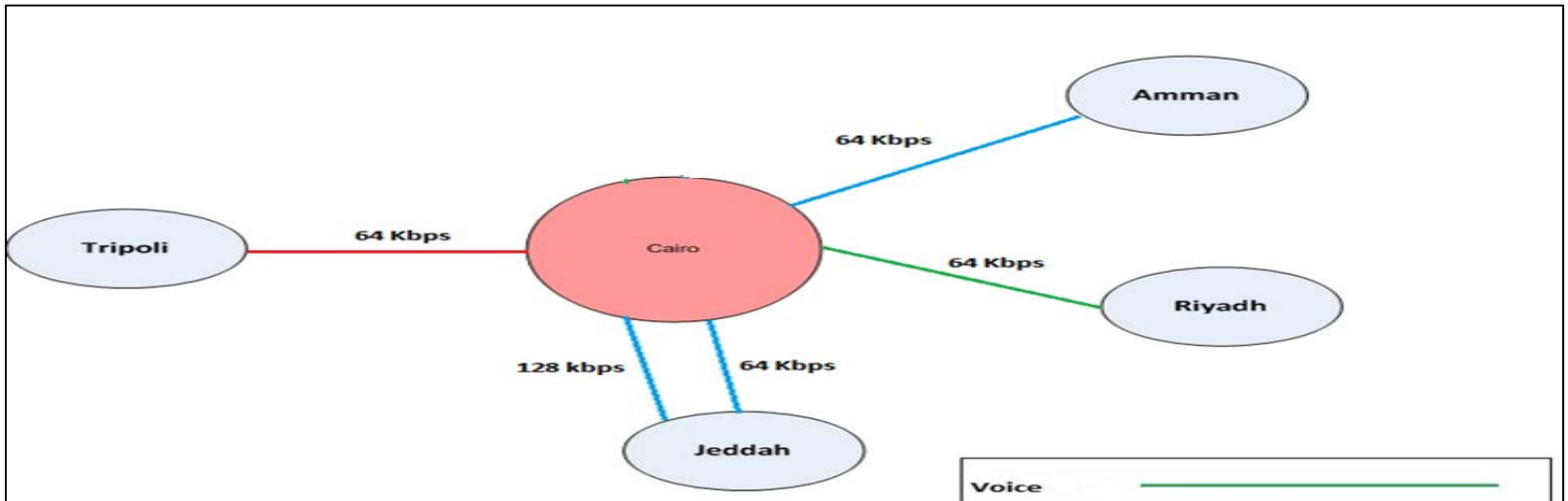
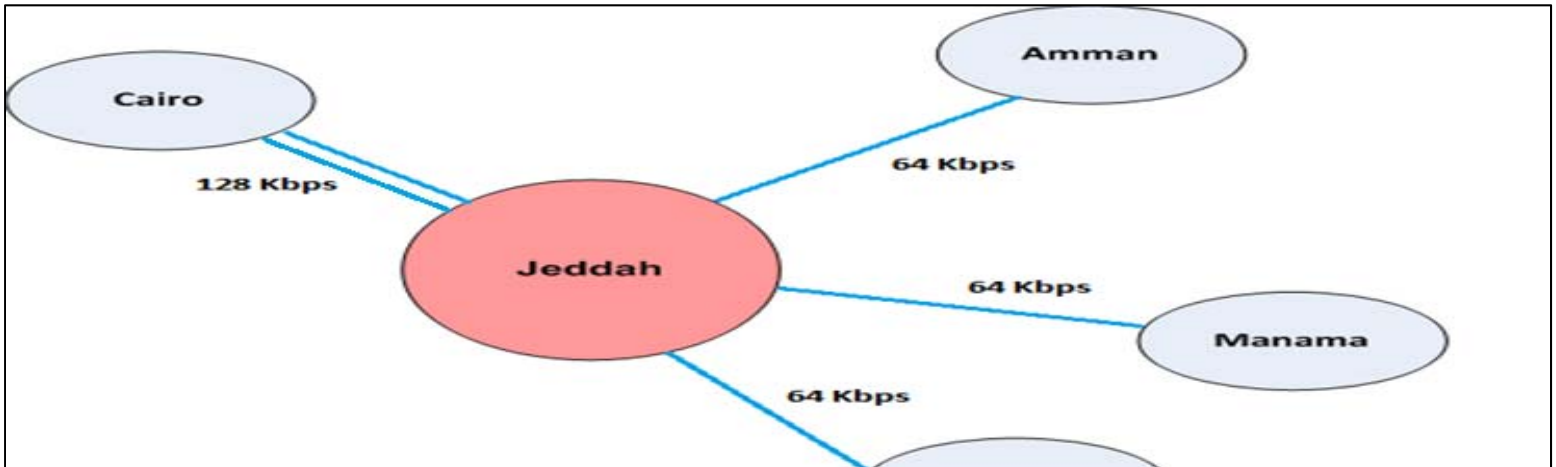


Figure 2: Cairo Circuit Diagram

State Saudi Arabia (Jeddah)

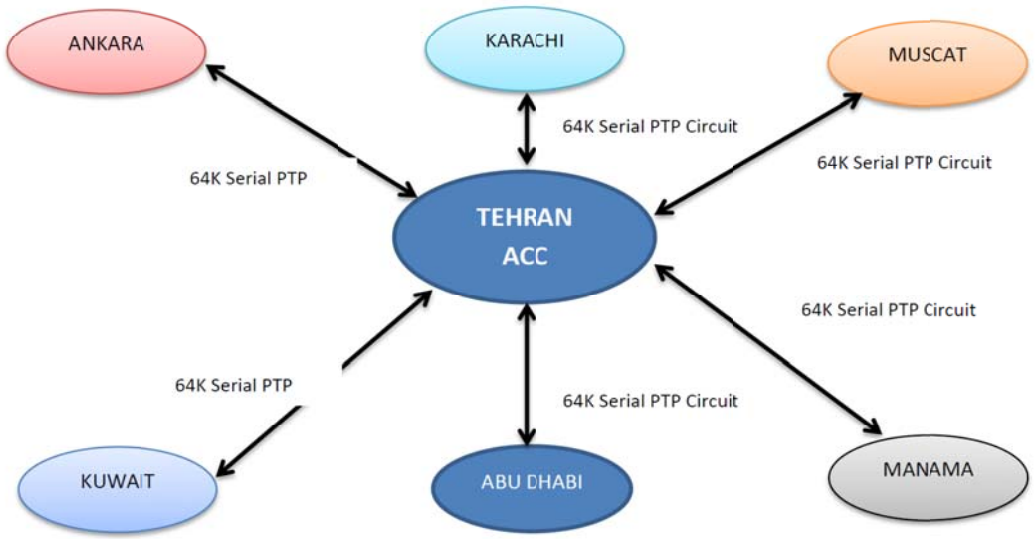
State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Cairo1	128k	N/A	192.168.12.0	255.255.255.0	Motorola Vangurd 6455	IP	AHHS
						FXO/FXS	Voice
Cairo2	64k	N/A	N/A	N/A	Motorola Vangurd 6455	IP	AMHS
					Motorola Vangurd 6455	FXO/FXS	Voice
Amman	64k	N/A	192.168.12.0	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



State IRAN(Tehran)

Figure 3: Jeddah Circuit Diagram

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Bahrain	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
Kuwait	64k	Iran PPT	172.16.12.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Abu Dhabi *	64k	Iran PPT	172.16.15.0	255.255.255.0	Cisco2811	Serial	AFTN
						FXO/FXS	Voice
Muscat *	64k	Iran PPT	172.16.14.0	255.255.255.0	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[1]	64K	Etisalat	N/A	N/A	Motorola Vangurd 6455	Serial	Radar
						FXO/FXS	Voice
Bahrain2[1]	64K	Etisalat	N/A	N/A	Motorola Vangurd 6455	Serial	AFTN/CIDIN
						FXO/FXS	Voice
Oman	64K	Etisalat	192.168.130.0	255.255.255.0	Motorola Vangurd 6455	Ethernet	AMHS
						FXO/FXS	Voice
	128K	Etisalat	192.168.131.0	255.255.255.0	Motorola Vangurd 6435	Ethernet	AMHS/OLD

Qatar							I
						FXO/FXS	Voice
Qatar[2]	256K	Etisalat	84.255.163.140	255.255.255.252	Motorola Vanguard 6840	Ethernet	AMHS
Qatar[2]	256K	Etisalat	192.168.10.0	255.255.255.252	Cisco 1921	FXS Ethernet	Voice Radar
Amman[3]	2Mb	Etisalat	94.56.192.202	255.255.255.0	Fortigate 110C firewall	Ethernet	AMHS
Iran	64K	Etisalat	N/A	N/A	Cisco 2811	Ethernet FXS	AMHS Voice

Remarks: [1] The IP addresses for Bahrain links is configured by ISP and not identified on UAE side.
[2] These are planned circuits still under test
[3] The link type between Jordan and Abu Dhabi is over an IPSec connection over the public internet (VPN)

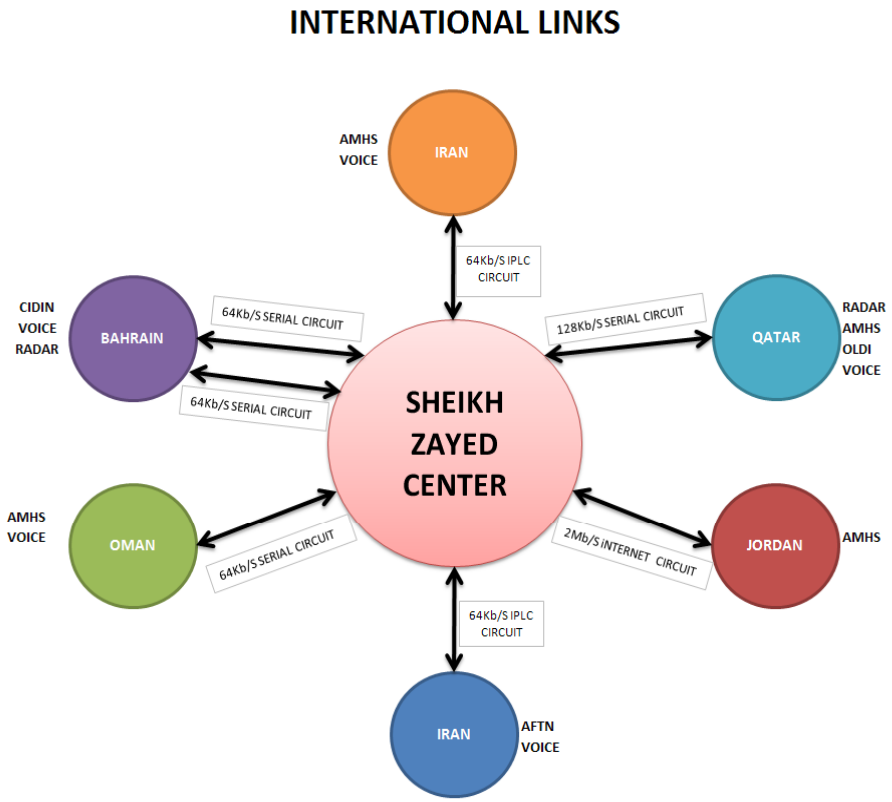


Figure 5: Abu Dhabi Circuit Diagram

State Kuwait (Kuwait)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Beirut	64K	Qualitynet	--	--	Motorola Modem 3460	N/A	AFTN
Doha	64K	Qualitynet	--	--	Motorola Modem 3460	N/A	AFTN
Tehran	64K	Qualitynet	172.16.12.2	255.255.255.252	Cisco 2800	N/A	AFTN-Voice
Damascus	64K	Qualitynet	--	--	Motorola Modem 3460	N/A	AFTN
Bahrain	128K	Qualitynet	--	--	Motorola Vanguard 6455	N/A	AFTN, Radar
							Voice
Baghdad	64K	Qualitynet	192.168..0.160	255.255.255.0	Motorola Modem 3460	N/A	AFTN-Voice

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.

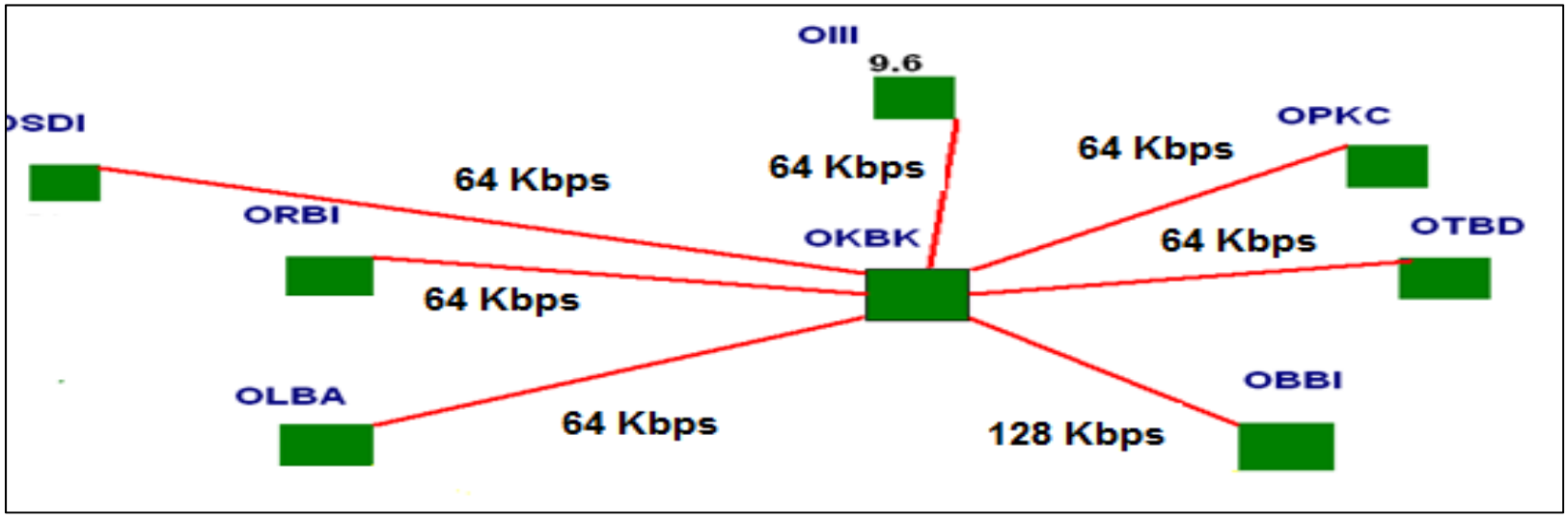


Figure 6: Kuwait Circuit Diagram

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)

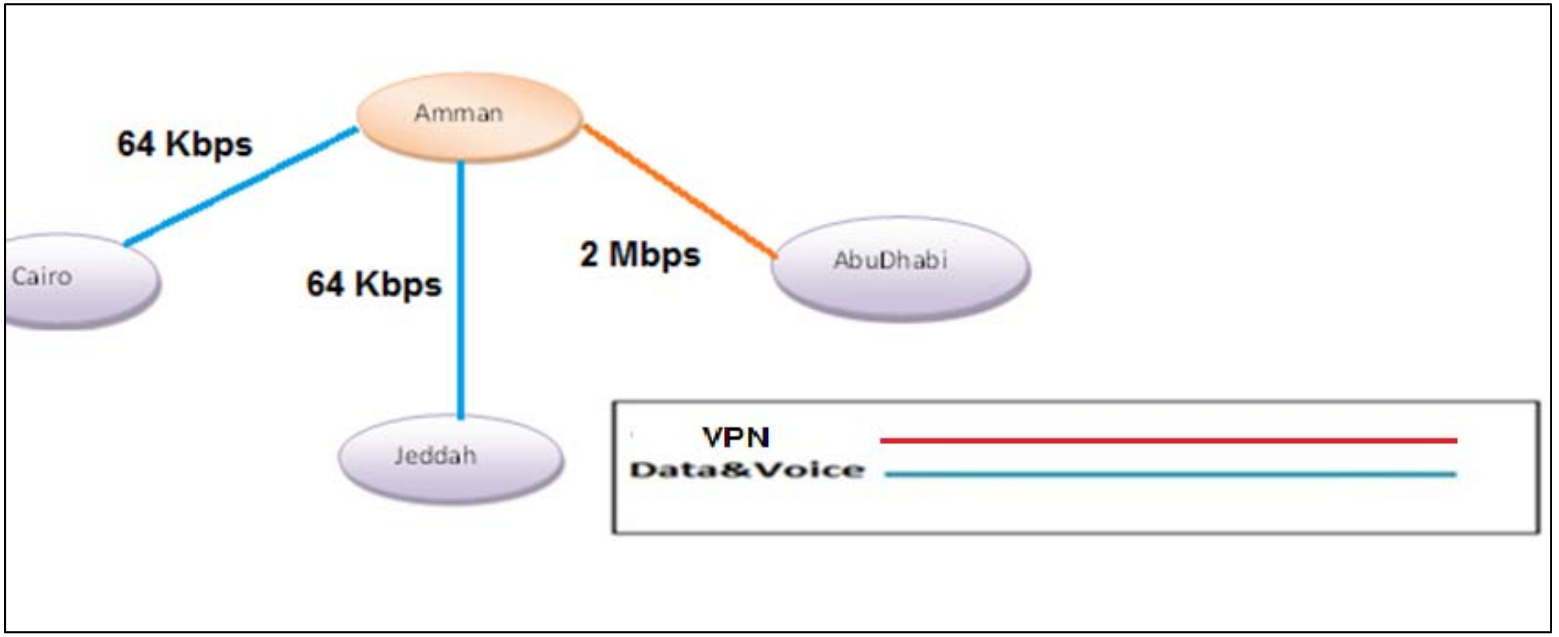


Figure 7: Jordan Circuit Diagram

State Iraq (Baghdad)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Iran	32k	Passcom	192.168.191.10	255.255.255.0	NDsatcom SkyWan 5000	FXS	Voice
Kuwait	64k	Passcom	192.168.191.2	255.255.255.0	NDsatcom SkyWan 5000	FXS	Voice
			192.168.0.60	255.255.255.0		Ethernet	AFTN

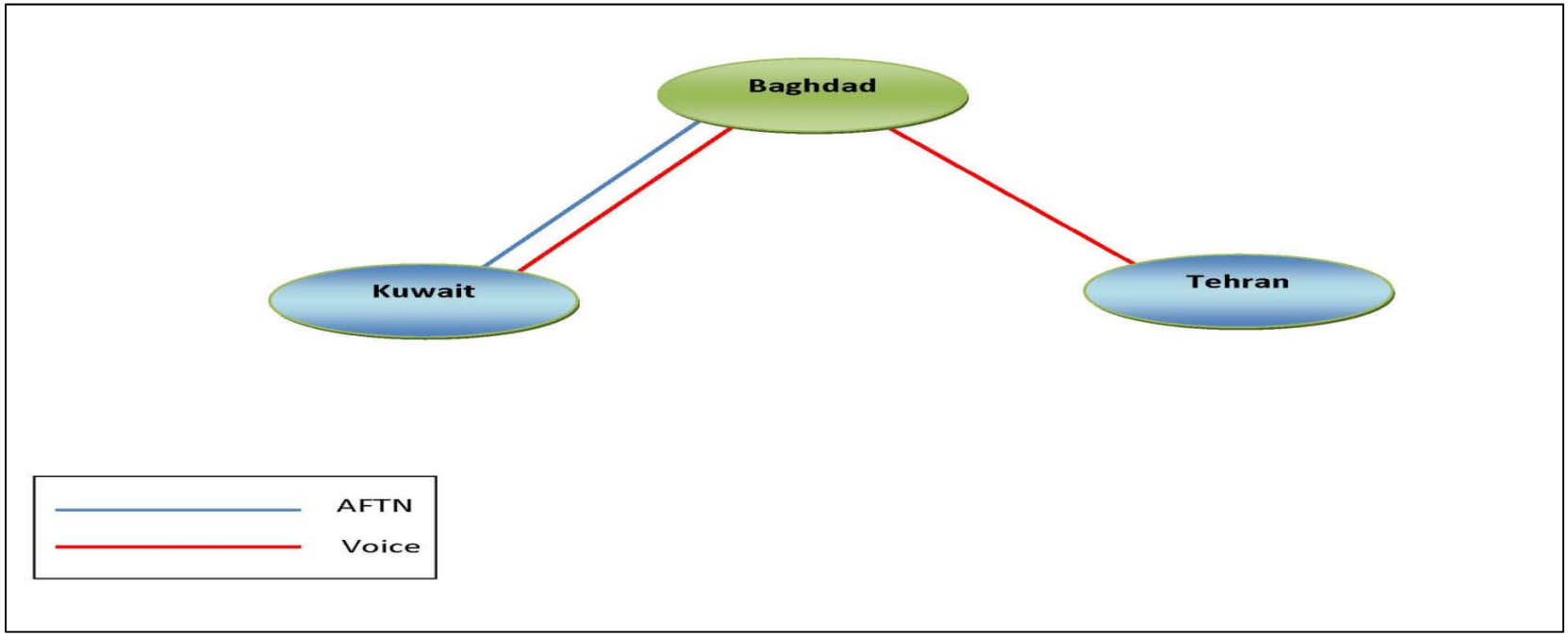


Figure 8: Iraq Circuit Diagram

State QATAR (Doha)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Abu Dhabi	128k	QTEL	200.200.200.x	255.255.255.252	Motorola Vanguard 6455	serial	AFTN, Radar
						FXO/FXS	Voice
Kuwait	64 k	QTEL	N/A	N/A	New Bridge Modem 2602	Serial	AFTN
Bahrain	64 k	QTEL	N/A	N/A	Motorola Vanguard 6840	serial	AFTN, Radar
						FXO/FXS	AFTN, Radar
Bahrain	64 k	QTEL	N/A	N/A	Motorola Vanguard 6840	FXO/FXS	Voice

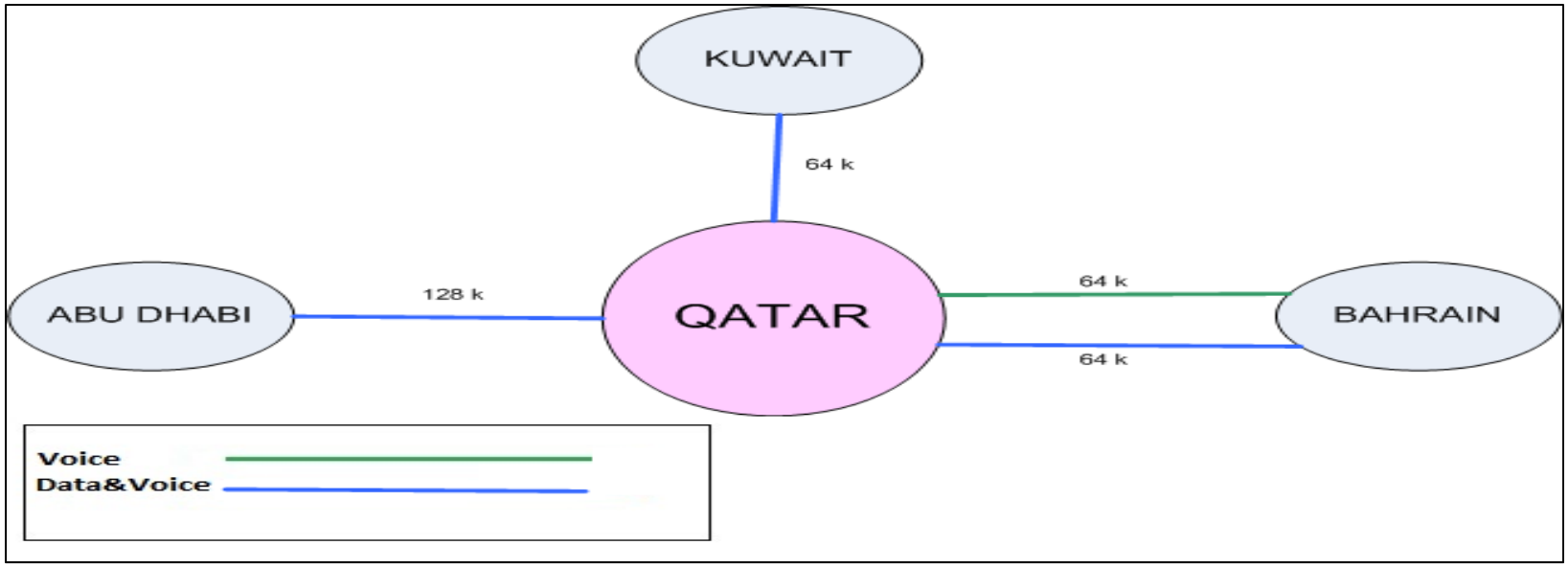


Figure 9: Qatar Circuit Diagram

State OMAN (Muscat)

State	Speed	ISP	IP Address	Net Mask	Router Type	Data end user interface	Applications in use
Abu Dhabi	64 k	OMANTEL	192.168.12.142	255.255.255.0	Motorola Vanguard 6455	serial	AFTN, AMHS
						FXO/FXS	Voice
JEDDAH	64 k	OMANTEL	10.10.10.1	255.255.255.0	Cisco 2800	serial	AFTN, AMHS
						FXO/FXS	Voice
Bahrain	64 k	OMANTEL	192.168.30.1	255.255.255.0	Cisco 2800	serial	AFTN, Radar
						FXO/FXS	AFTN, Radar
Iran	64 k	OMANTEL	172.16.14.0	255.255.255.252	Cisco 2800	FXO/FXS	Voice

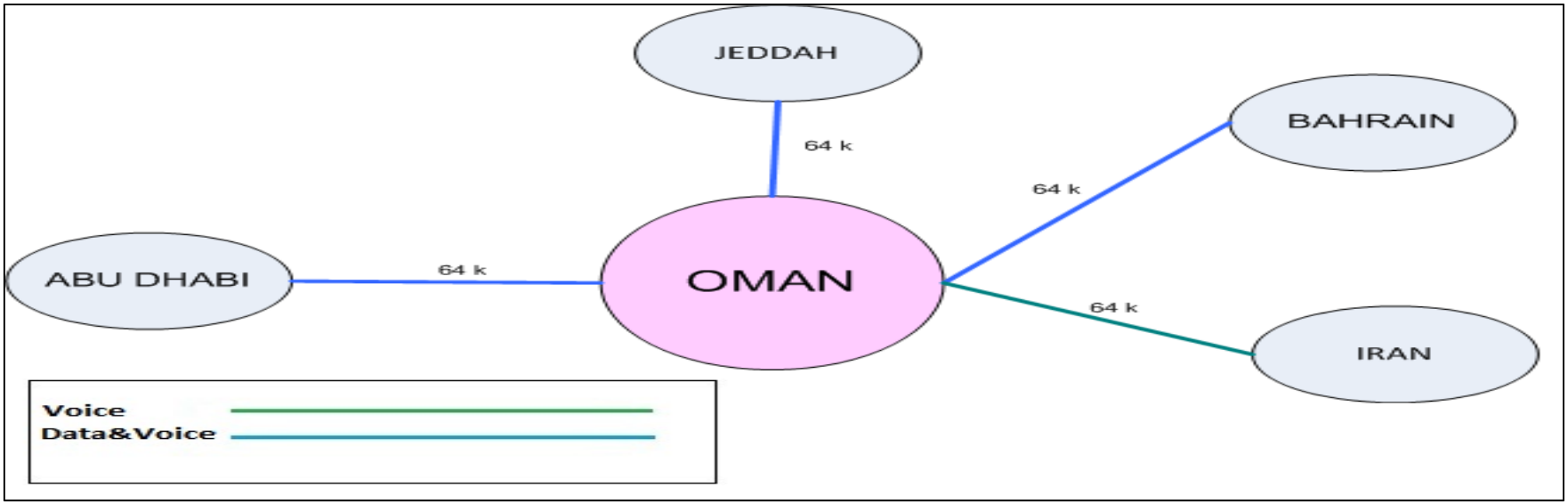


Figure 10: Oman Circuit Diagram

Remark:

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

- *Lebanon is in process of migration three circuits to IP networks (Kuwait, Bahrain, and Jeddah).*
- *Libya, Sudan, Syria and Yemen do not have IP circuits implemented*
- *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)*

APPENDIX B

MIDANPIRG/14
Appendix 4.5F to the Report on Agenda Item 4.5

THE PROPOSED IPv4 ADDRESS PLAN for MID REGION

Introduction

The IPv4 address scheme is proposed by the Caribbean and South American Regional for its ATN/IPS Network. The MID Region's plan was also part of their global IPv4 addressing assignment. The MID Region is requested to review this proposed IP addressing assignment for consideration and adoption.

Objectives

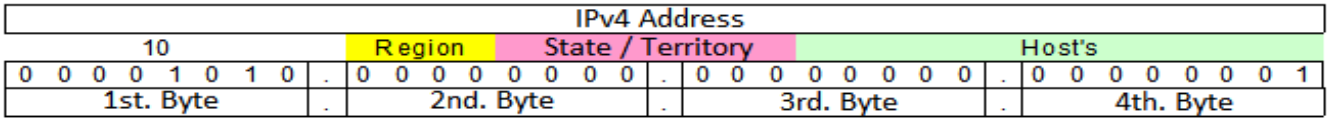
This document is meant to describe the addressing plan for IPv4 addresses throughout the MID Region. This document defines the recommended address format for IPv4 addresses. The document lists the addresses allocated to States in the MID Region and the interstate connections IP's. The implementation of the proposed plan will go into stages and should be carefully coordinated between States.

Acronyms

ICAO	-	International Civil Aviation Organization
AMHS	-	ATN Message Handling System
ARP	-	Address Resolution Protocol
ATN	-	Aeronautical Telecommunications Network
CNS		Communication Navigation Surveillance
BGP	-	Border Gateway Protocol
DNS	-	Domain Name Service
IANA	-	Internet Assigned Numbers Authority
ICS	-	ATN Internet Communication Service
IP	-	ATN Internet Communication Service

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
ANSP	-	Air Navigation Service Provider
ISP	-	Internet Service Provider
APAC	-	Asia and Pacific
CAR	-	Caribbean
SAM	-	South America
MID	-	Middle east
WACAF	-	West And Central Africa
ESAF	-	East And South Africa
PDU	-	Packet Data Unit
MTA	-	Message Transfer Agent
UA	-	User Agent
ACP	-	Aeronautical Communication Panel
SWIM	-	System Wide Information Management
PENS	-	PAN European Network Service
IMS	-	Information Management Service

Global IPv4 assignments



- 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.

IP address Scheme Characteristics:

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

- 128 States
- 8190 Hosts for each State.
- 2048 Point-to-Point links.

Network Assignments

Issue	State	Network	Direction Used	Decimal Notation	Binary Notation			
					1st Byte	*Region*	*State*	*Host*
1	Bahrain	10.48.0.0/19	First	10.48.0.1	00001010.	0011	0000.000	00000.00000001
			Last	10.48.31.254	00001010.	0011	0000.000	11111.11111110
2	Egypt	10.48.32.0/19	First	10.48.32.1	00001010.	0011	0000.001	00000.00000001
			Last	10.48.63.254	00001010.	0011	0000.001	11111.11111110
3	Iran	10.48.64.0/19	First	10.48.64.1	00001010.	0011	0000.010	00000.00000001
			Last	10.48.95.254	00001010.	0011	0000.010	11111.11111110
4	Iraq	10.48.96.0/19	First	10.48.96.1	00001010.	0011	0000.011	00000.00000001
			Last	10.48.127.254	00001010.	0011	0000.011	11111.11111110
5	Jordan	10.48.128.0/19	First	10.48.128.1	00001010.	0011	0000.100	00000.00000001
			Last	10.48.159.254	00001010.	0011	0000.100	11111.11111110
6	Kuwait	10.48.160.0/19	First	10.48.160.1	00001010.	0011	0000.101	00000.00000001
			Last	10.48.191.254	00001010.	0011	0000.101	11111.11111110
7	Lebanon	10.48.192.0/19	First	10.48.192.1	00001010.	0011	0000.110	00000.00000001
			Last	10.48.223.254	00001010.	0011	0000.110	11111.11111110
8	Libya	10.48.224.0/19	First	10.48.224.1	00001010.	0011	0000.111	00000.00000001
			Last	10.48.255.254	00001010.	0011	0000.111	11111.11111110
9	Oman	10.49.0.0/19	First	10.49.0.1	00001010.	0011	0001.000	00000.00000001
			Last	10.49.31.1	00001010.	0011	0001.000	11111.11111110
10	Qatar	10.49.32.0/19	First	10.49.32.1	00001010.	0011	0001.001	00000.00000001
			Last	10.49.63.254	00001010.	0011	0001.001	11111.11111110
11	Saudi Arabia	10.49.64.0/19	First	10.49.64.1	00001010.	0011	0001.010	00000.00000001
			Last	10.49.95.254	00001010.	0011	0001.010	11111.11111110
12	Sudan	10.49.96.0/19	First	10.49.96.1	00001010.	0011	0001.011	00000.00000001
			Last	10.49.127.254	00001010.	0011	0001.011	11111.11111110
13	Syria	10.49.128.0/19	First	10.49.128.1	00001010.	0011	0001.100	00000.00000001
			Last	10.49.159.254	00001010.	0011	0001.100	11111.11111110
14	UAE	10 .49 .160.0 /19	First	10 .49 .160.1	00001010.	0011	0001.101	00000.00000001
			Last	10 .49 .191.254	00001010.	0011	0001.101	11111.11111110
15	Yemen	10 .49 .192.0 /19	First	10 .49 .192.1	00001010.	0011	0001.110	00000.00000001
			Last	10 .49 .223.254	00001010.	0011	0001.110	11111.11111110

Range 1	Range 2	Range 3	Range 4
10 .48 .0 .0 - 10 .48 .31 .255	10 .49 .0 .0 - 10 .49 .31 .255	10 .50 .0 .0 - 10 .51 .31 .255	10 .51 .0 .0 - 10 .51 .31 .255
10 .48 .32 .0 - 10 .48 .63 .255	10 .49 .32 .0 - 10 .49 .63 .255	10 .50 .32 .0 - 10 .51 .63 .255	10 .51 .32 .0 - 10 .51 .63 .255
10 .48 .64 . 0 - 10 .48 . 95 .255	10 .49 .64 . 0 - 10 .49 . 95 .255	10 .50 .64 . 0 - 10 .51 . 95 .255	10 .51 .64 . 0 - 10 .51 . 95 .255
10 .48.96 . 0 - 10 .48 .127.255	10 .49.96 . 0 - 10 .49 .127.255	10 .50.96 . 0 - 10 .51 .127.255	10 .51.96 . 0 - 10 .51 .127.255
10 .48 .128.0 - 10 .48.159 .255	10 .49 .128.0 - 10 .49.159 .255	10 .50 .128.0 - 10 .51.159 .255	10 .51 .128.0 - 10 .51.159 .255
10 .48 .160.0 - 10 .48 .191 .255	10 .49 .160.0 - 10 .49 .191 .255	10 .50 .160.0 - 10 .51 .191 .255	10 .51 .160.0 - 10 .51 .191 .255
10 .48 .192.0 - 10 .48 .223 .255	10 .49 .192.0 - 10 .49 .223 .255	10 .50 .192.0 - 10 .51 .223 .255	10 .51 .192.0 - 10 .51 .223 .255
10 .48.224 .0 - 10 .48 . 225.255	10 .49.224 .0 - 10 .49 . 225.255	10 .50.224 .0 - 10 .51 . 225.255	10 .51.224 .0 - 10 .51 . 225.255
Range 5	**Range 6**	**Range 7**	**Range 8**
10 .52 .0 .0 - 10 .52 .31 .255	10 .53 .0 .0 - 10 .53 .31 .255	10 .54 .0 .0 - 10 .54 .31 .255	10 .55 .0 .0 - 10 .55 .31 .255
10 .52 .32 .0 - 10 .52 .63 .255	10 .53 .32 .0 - 10 .53 .63 .255	10 .54 .32 .0 - 10 .54 .63 .255	10 .55 .32 .0 - 10 .55 .63 .255
10 .52 .64 . 0 - 10 .52 . 95 .255	10 .53 .64 . 0 - 10 .53 . 95 .255	10 .54 .64 . 0 - 10 .54 . 95 .255	10 .55 .64 . 0 - 10 .55 . 95 .255
10 .52.96 . 0 - 10 .52 .127.255	10 .53.96 . 0 - 10 .53 .127.255	10 .54.96 . 0 - 10 .54 .127.255	10 .55.96 . 0 - 10 .55 .127.255
10 .52 .128.0 - 10 .52.159 .255	10 .53 .128.0 - 10 .53.159 .255	10 .54 .128.0 - 10 .54.159 .255	10 .55 .128.0 - 10 .55.159 .255
10 .52 .160.0 - 10 .52 .191 .255	10 .53 .160.0 - 10 .53 .191 .255	10 .54 .160.0 - 10 .54 .191 .255	10 .55 .160.0 - 10 .55 .191 .255
10 .52 .192.0 - 10 .52 .223 .255	10 .53 .192.0 - 10 .53 .223 .255	10 .54 .192.0 - 10 .54 .223 .255	10 .55 .192.0 - 10 .55 .223 .255
10 .52.224 .0 - 10 .52 . 225.255	10 .53.224 .0 - 10 .53 . 225.255	10 .54.224 .0 - 10 .54 . 225.255	10 .55.224 .0 - 10 .55 . 225.255
Range 9	**Range 10**	**Range 11**	**Range 12**
10 .56 .0 .0 - 10 .56 .31 .255	10 .57 .0 .0 - 10 .57 .31 .255	10 .58 .0 .0 - 10 .58 .31 .255	10 .59 .0 .0 - 10 .59 .31 .255
10 .56 .32 .0 - 10 .56 .63 .255	10 .57 .32 .0 - 10 .57 .63 .255	10 .58 .32 .0 - 10 .58 .63 .255	10 .59 .32 .0 - 10 .59 .63 .255
10 .56 .64 . 0 - 10 .56 . 95 .255	10 .57 .64 . 0 - 10 .57 . 95 .255	10 .58 .64 . 0 - 10 .58 . 95 .255	10 .59 .64 . 0 - 10 .59 . 95 .255
10 .56.96 . 0 - 10 .56 .127.255	10 .57.96 . 0 - 10 .57 .127.255	10 .58.96 . 0 - 10 .58 .127.255	10 .59.96 . 0 - 10 .59 .127.255
10 .56 .128.0 - 10 .56.159 .255	10 .57 .128.0 - 10 .57.159 .255	10 .58 .128.0 - 10 .58.159 .255	10 .59 .128.0 - 10 .59.159 .255
10 .56 .160.0 - 10 .56 .191 .255	10 .57 .160.0 - 10 .57 .191 .255	10 .58 .160.0 - 10 .58 .191 .255	10 .59 .160.0 - 10 .59 .191 .255
10 .56 .192.0 - 10 .56 .223 .255	10 .57 .192.0 - 10 .57 .223 .255	10 .58 .192.0 - 10 .58 .223 .255	10 .59 .192.0 - 10 .59 .223 .255
10 .56.224 .0 - 10 .56 . 225.255	10 .57.224 .0 - 10 .57 . 225.255	10 .58.224 .0 - 10 .58 . 225.255	10 .59.224 .0 - 10 .59 . 225.255
Range 13	**Range 14**	**Range 15**	**Range 16**
10 .60 .0 .0 - 10 .60 .31 .255	10 .61 .0 .0 - 10 .61 .31 .255	10 .62 .0 .0 - 10 .62 .31 .255	10 .63 .0 .0 - 10 .63 .31 .255
10 .60 .32 .0 - 10 .60 .63 .255	10 .61 .32 .0 - 10 .61 .63 .255	10 .62 .32 .0 - 10 .62 .63 .255	10 .63 .32 .0 - 10 .63 .63 .255
10 .60 .64 . 0 - 10 .60 . 95 .255	10 .61 .64 . 0 - 10 .61 . 95 .255	10 .62 .64 . 0 - 10 .62 . 95 .255	10 .63 .64 . 0 - 10 .63 . 95 .255
10 .60.96 . 0 - 10 .60 .127.255	10 .61.96 . 0 - 10 .61 .127.255	10 .62.96 . 0 - 10 .62 .127.255	10 .63.96 . 0 - 10 .63 .127.255
10 .60 .128.0 - 10 .60.159 .255	10 .61 .128.0 - 10 .61.159 .255	10 .62 .128.0 - 10 .62.159 .255	10 .63 .128.0 - 10 .63.159 .255
10 .60 .160.0 - 10 .60 .191 .255	10 .61 .160.0 - 10 .61 .191 .255	10 .62 .160.0 - 10 .62 .191 .255	10 .63 .160.0 - 10 .63 .191 .255
10 .60 .192.0 - 10 .60 .223 .255	10 .61 .192.0 - 10 .61 .223 .255	10 .62 .192.0 - 10 .62 .223 .255	10 .63 .192.0 - 10 .63 .223 .255
10 .60.224 .0 - 10 .60 . 225.255	10 .61.224 .0 - 10 .61 . 225.255	10 .62.224 .0 - 10 .62 . 225.255	10 .63.224 .0 - 10 .63 . 225.255

MID REGION SUB-NETWORKS

*(Orange=State Range Blue=Vacancy **Red= Reserved**)*

MID Region intra-Regional Links (Point to Point)

		--	10.63.224.0
10.63.224. 0 /30	**Bahrain - Riyadh**	Bahrain	10.63.224.1
		Riyadh	10.63.224.2
		--	10.63.224.3
		--	10.63.224.4
10.63.224. 4 /30	**Bahrain - Dammam**	Bahrain	10.63.224.5
		Dammam	10.63.224.6
		--	10.63.224.7
		--	10.63.224.8
10.63.224. 8 /30	**Bahrain - Jeddah**	Bahrain	10.63.224.9
		Jeddah	10.63.224.10
		--	10.63.224.11
		--	10.63.224.12
10.63.224. 12 /30	**Bahrain - Kuwait**	Bahrain	10.63.224.13
		Kuwait	10.63.224.14
		--	10.63.224.15
		--	10.63.224.16
10.63.224. 16 /30	**Bahrain – Doha1**	Bahrain	10.63.224.17
		Doha1	10.63.224.18
		--	10.63.224.19
		--	10.63.224.20
10.63.224. 20 /30	**Bahrain – Doha2**	Bahrain	10.63.224.21
		Doha2	10.63.224.22
		--	10.63.224.23
		--	10.63.224.24
10.63.224. 24 /30	**Bahrain – AbuDhabi1**	Bahrain	10.63.224.25
		AbuDhabi1	10.63.224.26
		--	10.63.224.27
		--	10.63.224.28
10.63.224. 28 /30	**Bahrain – AbuDhabi2**	Bahrain	10.63.224.29
		AbuDhabi2	10.63.224.30

Sub-Network	Connected Route	Host / State	IP Address
		--	10.63.224.31
		--	10.63.224.32
10.63.224. 32 /30	**Bahrain – Tehran**	Bahrain	10.63.224.33
		Tehran	10.63.224.34
		--	10.63.224.35
7 Sub-Networks are reserved for future links (10.63.224.36/30 – 10.63.224.63/30)			
		--	10.63.224.64
10.63.224. 64 /30	**Egypt – Amman**	Egypt	10.63.224.65
		Amman	10.63.224.66
		--	10.63.224.67
		--	10.63.224.68
10.63.224. 68 /30	**Egypt – Jeddah1**	Egypt	10.63.224.69
		Jeddah1	10.63.224.70
		--	10.63.224.71
		--	10.63.224.72
10.63.224. 72 /30	**Egypt – Jeddah2**	Egypt	10.63.224.73
		Jeddah2	10.63.224.74
		--	10.63.224.75
		--	10.63.224.76
10.63.224. 76 /30	**Egypt – Riyadh**	Egypt	10.63.224.77
		Riyadh	10.63.224.78
		--	10.63.224.79
12Sub-Networks are reserved for future links (10.63.224.80/30 – 10.63.224.127/30)			
		--	10.63.224. 128
10.63.224. 128 /30	**Iran - Iraq**	Iran	10.63.224. 129
		Iraq	10.63.224. 130
		--	10.63.224. 131
		--	10.63.224. 132
10.63.224. 132 /30	**Iran - Kuwait**	Iran	10.63.224. 133
		Kuwait	10.63.224. 134
		--	10.63.224. 135
14 Sub-Networks are reserved for future links (10.63.224.136/30 – 10.63.224.191/30)			
		--	10.63.224. 192

	10.63.224. 192 /30	**Jordan - Jeddah**	Jordan	10.63.224. 193	
			Jeddah	10.63.224. 194	
			--	10.63.224. 195	
	15 Sub-Networks are reserved for future links (10.63.224.196/30 – 10.63.224.255/30)				
	Sub-Network	**Connected Route**	**Host / State**	**IP Address**	
			--	10.63.225.0	
	10.63.225. 0 /30	**Kuwait - Iraq**	Kuwait	10.63.225.1	
			Iraq	10.63.225.2	
			--	10.63.225.3	
	15 Sub-Networks are reserved for future links (10.63.225.4/30 – 10.63.225.63/30)				
			--	10.63.225. 64	
	10.63.225. 64 /30	**Qatar – Abu Dhabi**	Qatar	10.63.225. 65	
			Abu Dhabi	10.63.225. 66	
			--	10.63.225. 67	
	15 Sub-Networks are reserved for future links (10.63.225.68/30 – 10.63.225.127/30)				
			--	10.63.225.128	
	10.63.225. 128 /30	**Saudi Arabia (Jeddah) - Muscat**	Jeddah	10.63.225.129	
			Muscat	10.63.225.130	
			--	10.63.225.131	
	15 Sub-Networks are reserved for future links (10.63.225.132/30 – 10.63.225.191/30)				
			--	10.63.225. 192	
	10.63.225. 192 /30	**UAE (Abu Dhabi) - Muscat**	Abu Dhabi	10.63.225. 193	
			Muscat	10.63.225. 194	
			--	10.63.225. 195	
	15 Sub-Networks are reserved for future links (10.63.225.196/30 – 10.63.225.255/30)				
			--	--	
--	10.64.226. 0 /30	**Lebanon**	--	--	
	16 Sub-Networks are reserved for future links (10.63.226.0/30 – 10.63.226.63/30)				
			--		--
--	10.63.226. 64 /30	**Sudan**	--		--
	16 Sub-Networks are reserved for future links (10.63.226.64/30 – 10.63.226.127/30)				

***Remark**: In case of a new IP link between two states, both States will have to use the next available IP address range as specified in the above table.*

MID Region intra-Regional Links (Per State)

No.	State	Connected Route	Local Interface	Next Hop Interface
1	**Bahrain**	Bahrain - Riyadh	10.63.224.1	10.63.224.2
		Bahrain - Dammam	10.63.224.5	10.63.224.6
		Bahrain - Jeddah	10.63.224.9	10.63.224.10
		Bahrain - Kuwait	10.63.224.13	10.63.224.14
		Bahrain – Doha1	10.63.224.17	10.63.224.18
		Bahrain – Doha2	10.63.224.21	10.63.224.22
		Bahrain – AbuDhabi1	10.63.224.25	10.63.224.26
		Bahrain – AbuDhabi2	10.63.224.29	10.63.224.30
		Bahrain – Tehran	10.63.224.33	10.63.224.34
2	**Egypt**	Egypt-Amman	10.63.224.65	10.63.224.66
		Egypt-Jeddah1	10.63.224.69	10.63.224.70
		Egypt-Jeddah2	10.63.224.73	10.63.224.74
		Egypt-Riyadh	10.63.224.77	10.63.224.78
3	**Iran**	Iran-Iraq	10.63.224. 129	10.63.224. 130
		Iran-Kuwait	10.63.224. 133	10.63.224. 134
		Iran-Bahrain	10.63.224.34	10.63.224.33
4	**Iraq**	Iraq-iran	10.63.224. 130	10.63.224. 129
5	**Jordan**	Jordan - Jeddah	10.63.224. 193	10.63.224. 194
		Jordan - Cairo	10.63.224.66	10.63.224.65
6	**Kuwait**	Kuwait-Bahrain	10.63.224.14	10.63.224.13
		Kuwait-Iraq	10.63.225.1	10.63.225.2
		Kuwait-Iran	10.63.224. 134	10.63.224. 133
7	**Lebanon**	--	--	--
8	**Libya**	--	--	--
9	**Oman**	--	--	--

No.		Connected Route	Local Interface	Next Hop Interface
10	Qatar	Qatar-AbuDhabi	10.63.225. 65	10.63.225. 66
		Qatar-Bahrain1	10.63.224.18	10.63.224.17
		Qatar-Bahrain2	10.63.224.22	10.63.224.21
11	Saudi Arabia	Jeddah - Muscat	10.63.225.129	10.63.225.130
		Jeddah - Cairo1	10.63.224.70	10.63.224.69
		Jeddah - Cairo2	10.63.224.74	10.63.224.73
		Jeddah - Amman	10.63.224. 194	10.63.224. 193
		Jeddah - Bahrain	10.63.224.10	10.63.224.9
12	Sudan	--	--	--
13	Syria	--	--	--
14	UAE	UAE - Muscat	10.63.225. 193	10.63.225. 194
		UAE - Bahrain1	10.63.224.26	10.63.224.25
		UAE - Bahrain2	10.63.224.30	10.63.224.29
		UAE - Qatar	10.63.225. 66	10.63.225. 65
15	Yemen	--	--	--

Impact of Changing Point-to-Point Ip address

The corresponding point-to-point IP line will be down during IP replacement process

Tips to Replace IP address

1- Coordinate with the adjacent State to agree on IPs, Routing, etc.

2- Make a backup of current configuration of the network devices (Routers, Firewalls… etc.)

3- Simulate new configuration on test network devices if possible

4- Advise AFS operators about downtime duration & time (for data line) or the controller(for voice line), the AFS operator should direct TFC to alternative CCT, and controller to use alternative voice means(dialup, Backup voice line,…etc.)

5- Configure network device with new setting

6- Send test data and decide about its reliability

7- Advise about its availability.

IP Change Schedule

No	State	Old IP	New IP	Net Mask	Router Type	Target date to change	State to connect to	Circuit speed	Circuit number	Type of Circuit	ISP	State Contact
1	**Bahrain**											
2	**Egypt**											
3	**Iran**											
4	**Iraq**											
5	**Jordan**											
6	**Kuwait**											
7	**Lebanon**											
8	**Libya**											
9	**Oman**											
10	**Qatar**											
11	**Saudi Arabia**											
12	**Sudan**											
13	**Syria**											
14	**UAE**											
15	**Yemen**											

-END-