

# Separating Telephony and Administration Flows

07/2023

AMT/PTD/PBX/0101/6/1/EN

OPERATING MANUAL



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# 1 FOREWARD

## 1.1 TERMINOLOGY

### 1.1.1 TERMS AND EXPRESSIONS

TERM	MEANING OF THE TERM
<b>Mitel 5000 Gateways</b>	This term refers to all XS, XL and XD PBXs
<b>MiVoice 5000 or MiVoice 5000 Server</b>	Telephone switching system hosted on a PC running with Linux Redhat
<b>XS, XL, XD</b>	MiVoice 5000 series physical gateways
<b>XS</b>	This term includes XS, XS12 and XS6 systems
<b>Mitel 500</b>	This term includes Mitel 500, A500x and A50x systems
<b>Mitel MiVoice 5000 Manager or M7450</b>	Systems management centre
<b>EX Controller</b>	A system comprising deployment tools and a MiVoice 5000 Server

### 1.1.2 ABBREVIATIONS AND TERMINOLOGY

ABBREVIATION	MEANING OF THE ABBREVIATION
<b>Web Admin</b>	Mitel 5000 Contact Center
<b>DHCP</b>	Dynamic Host Configuration Protocol.
<b>FTP</b>	File Transfer Protocol
<b>GSI</b>	Gateway SIP
<b>https</b>	Hypertext Transfer Protocol Secure
<b>LDAP</b>	Light Directory Access Protocol
<b>EAI</b>	External Application Interface
<b>IP</b>	Internet Protocol
<b>MOVACS</b>	Multiswitch Original Virtual Addressing Communication System
<b>PBX</b>	Private Branch eXchange
<b>PPP</b>	Point-to-Point Protocol.
<b>RTP</b>	Real Time Protocol
<b>SBC</b>	Session Border Controller
<b>SIP</b>	Session Initiation Protocol
<b>SNMP</b>	Simple Network Management Protocol
<b>TAPI</b>	Telephony Application Programming Interface
<b>TCP</b>	Transport Control Protocol
<b>TLS</b>	Transport Layer Security, previously SSL (secure socket layer)
<b>TMA</b>	Terminal Management Application
<b>TWP</b>	Telephony Web Portal
<b>UCP</b>	Unified Communication Platform
<b>VLAN</b>	Virtual Local Area Network
<b>VTI</b>	Virtual Terminal Interface
<b>XML</b>	eXtended Markup Language

## 1.2 REFERENCE DOCUMENTS

The information in this manual refers to the following documents:

- MiVoice 5000 Server – Implementation Manual
- MiVoice 5000 Server – Operating Manual
- MiVoice 5000 Server and Cluster Server – Redundancy
- Installation et Gestion des Postes : Mitel 6700 et 6800 SIP Phones, MiVoice 6900 IP Phones
- Rocky Linux and Double Attachment
- MiVoice 5000 solution - List of TCP and UDP ports

Also refer to technical documentation in the Mitel.com site.

## 2 INTRODUCTION

### 2.1 PRINCIPLE

The purpose of separating telephony flows from administration flows is to enhance security by assigning a dedicated and distinct IP network to each of these flows.

This solution consists in defining two separate IP networks:

- The telephony network to which all the user terminals are connected via the corresponding devices. More generally, this network may be a corporate network.
- The administration network on which the management systems are deployed.

These two networks must be distinct and may consist of several IP subnets.

The architecture is based on the following principles:

- A data flow is identified through the IP addresses of the devices and the protocol used. This protocol is identified through the UDP or TCP ports. Refer to the document **MiVoice 5000 solution - List of TCP and UDP ports**.
- Each device is connected to one of these networks, except the (Mitel 5000 Gateways or MiVoice 5000 Server) iPBXs which are connected to both networks.
- Other applications such as Mitel OMM, CC, TWP and UCP are only connected to the telephony network since the risk of loss of management data is less than with an iPBX.
- Each network is dedicated to the protocols in question.
- Communication between both networks is via an external firewall which filters data flows.
- The iPBXs can be reached via two IP addresses depending on the protocol used. A firewall integrated into the iPBXs checks the consistency of accesses and protocols.
- Remote accesses via PPP are not concerned by this environment.

The separating flows mode is available from the R5.3 SP2 release. Refer to the document **MiVoice 5000 and cluster Server - Redundancy**.

### 2.2 PREREQUISITES AND RECOMMENDATIONS

For the implementation of Telephony / Administration flow separation on a Mitel 5000 gateway system (including EX), each router connected respectively to the Telephony interface and to the Administration interface must have an address Different MAC.

This is naturally the case with dedicated routing equipment for complete flow separation.

If this is not the case and the same Router is used with just dedicated VLANs, then it must be ensured that this Router used can support this prerequisite.

If this recommendation is not respected, slowdowns or even impossibility of access may be felt on the administration interface.

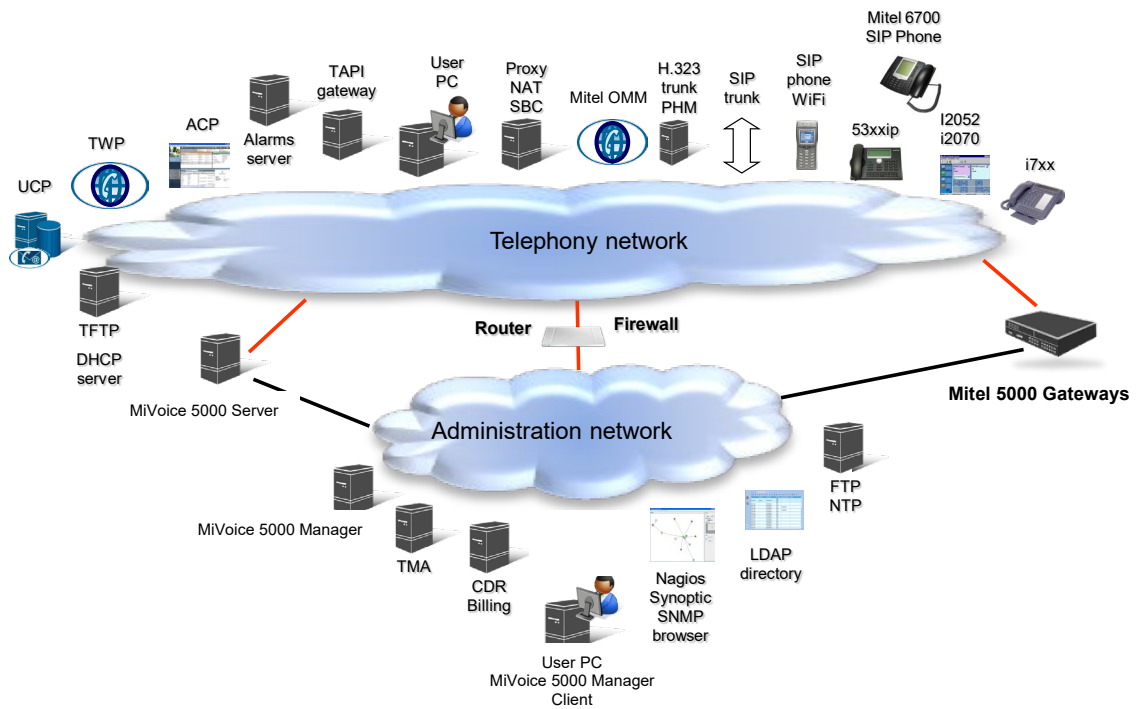
### 2.3 RULES AND RESTRICTIONS

Regarding the architecture, all iPBXs have to set in separating flows mode.

An external download server must be used in the current environment proposed. This server must be declared for terminal management (TMA).

Therefore, the integrated download server for Mitel 5000 Gateways cannot be used in this environment.

## 2.4 OVERVIEW OF THE ARCHITECTURE



## 3 FLOW SEPARATION IMPLEMENTATION

### 3.1 PREREQUISITES

Two distinct networks are working and communicating through a set of router/firewall.

Refer to section **2.2 – Prerequisites and recommendations**.



**WARNING:** The integrated download server cannot be used in this environment. An external download server must be declared for terminal management (TMA). Refer to the document **Mitel 6700 and 6800 SIP Phones MiVoice 6900 IP Phones - Installing and Managing**.

### 3.2 MAIN FLOW SEPARATION IMPLEMENTATION PHASES

Connect the different devices to and configure them on their respective networks.

#### On MiVoice 5000 Manager

Since MiVoice 5000 Manager is connected to the administration network, no configuration is required for the flow separation environment.

#### On Mitel 5000 Gateways or Mitel 500

- For a new installation:
  - The different network parameters must be defined using Ctrl + i. Refer to section **3.3.1 – First installation**.
  - The firewall integrated into Mitel 5000 Gateways is automatically configured at the end of this phase.
- For an existing installation:
  - The administration network IP address must be declared from Web Admin. Refer to the section **3.3.2 – Existing installation**.
  - The firewall integrated into Mitel 5000 Gateways must be configured. Refer to section **3.6 – Configuring the firewall** and the document **MiVoice 5000 solution - List of TCP and UDP ports**.

#### On MiVoice 5000 Server

- The administration of network IP address must be declared from the OS.
- The selection of network IP address must be declared from Web Admin.
- The firewall integrated into Mitel 5000 Gateways must be configured. Refer to section **3.6 – Configuring the firewall** and the document **MiVoice 5000 solution - List of TCP and UDP ports**.

#### On EX Controller

- The administration network IP address must be declared from Web Admin.
- The firewall integrated into Mitel 5000 Gateways must be configured. Refer to section **3.6 – Configuring the firewall** and the document **MiVoice 5000 solution - List of TCP and UDP ports**.



**Note :** Concerning the Mitel 5000 Gateways, Mitel 500 series, MiVoice 5000 server and EX Controller, if the administration network comprises several subnets, define the corresponding paths. Refer to section **4 – Configuring the IP paths of the Administration network**.

#### On the router/interconnection firewall

- Configure filtering in such a way that the flows underlined in the table in Section 6.
- If the administration network comprises several subnets, define the corresponding paths. Refer to **section 4 – Configuring the IP paths of the Administration network**.



### 3.3 CONFIGURING THE IP PARAMETERS OF TELEPHONY AND ADMINISTRATION NETWORKS FOR AN INSTALLATION OF MITEL 5000 GATEWAYS

#### 3.3.1 FIRST INSTALLATION

For a first installation, the flow separation must be configured using Ctrl +i.

Access is provided locally on the COM port of the CPU card, using a NULL MODEM cable (ref.:BHG0024A) connected between the COM port of the CPU card and the COM port of the administration PC.

##### Procedure

On the PC connected to the COM port

- Open a Hyperterminal window and configure the connection as follows:
- Bits per second: 115200 bits/s
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: none
- Power on the cabinet and follow the start-up progress on the PC.
- Upon display of "Identification starting"
- Press **Ctrl + I**.

The screen then displays the different configuration modes:

```
Configuration mode (F/T/S/P/E)

- F: Factory mode

- T: Total mode

- S: Standard mode

- P: Password reset

- U : USB provisioning mode

- E: for Exit
```

Select "**S**" mode (standard mode) then press "**Return**" to enter the network pre-configuration menu.

The screen then displays the system's default network pre-configuration.

It is from this screen, during a first installation, that the address defined gives access to the iPBX management via Web Admin; access is gained physically via the **LAN** port on the front panel of the CPU card.

If the administration and telephony flows are separated, the address indicated on this screen will be dedicated to the telephony network in association with the one defined for the administration network in the following menu: **ADMINISTRATION NETWORK**.

Concerning the physical accesses, in this case, on the front panel of the CPU card:

- The **LAN** port is dedicated to the telephony network.
- The **ETH2** port is dedicated to the administration network.

```

MITEL 5000 CONFIGURATION / NETWORK

*-----*

| ENTER IP ADDRESS: 192.168.65.1

| ENTER NETWORK MASK: 255.255.255.0

| ENTER GATEWAY: 192.168.65.254

*-----*

DO YOU WANT TO CHANGE CONFIGURATION Y(ES)/N(O)? Y

```

Answer "**y**" and validate with the "**Return**" key to access the different fields.

- Enter the network parameters successively, using the **Return** key to change line.

```

MITEL 5000 CONFIGURATION / NETWORK

*-----*

| ENTER IP ADDRESS: 10.100.40.150 |

| ENTER NETWORK MASK: 255.255.255.192 |

| ENTER GATEWAY: 10.100.40.129 |

*-----*

```

After the last line is validated, a summary of the network parameters is displayed for confirmation.

```

MITEL 5000 CONFIGURATION / NETWORK

*-----*

| RESUME |

*-----*

*-----*

| IPADR = 10.100.40.150 |

| NETWORKMASK = 255.255.255.192 |

| GATEWAY = 10.100.40.129 |

| NETWORKADR = 10.100.40.128 |

| BROADCAST = 10.100.40.191 |

*-----*

DO YOU CONFIRM (Y/N)? Y

```

**If the summary is not correct:**

- Press "**n**" to restart network preconfiguration.

If the summary is correct:

- Press "**y**" then "**Return**", to confirm.

The screen below is used to configure an additional and separate network for administration flows.

DO YOU WANT TO CONFIGURE MANAGEMENT IP NETWORK? Y/[N]



**Note :** Network separation can also be configured later from the Web Admin menu **SYSTEM>Configuration>Cards>IP card parameters**. Refer to Section 3.3.2 – Existing installation.

In case of flow separation, press "**y**" then "**Return**", to confirm.

The screen displays the flow separation configuration for the administration network access via the ETH2 connector on the front panel of the CPU card:

```
MITEL 5000 CONFIGURATION / ADMINISTRATION NETWORK

| ENTER ADMIN IP ADDRESS:

| ENTER ADMIN NETWORK MASK: |

| ENTER ADMIN GATEWAY: |

| ENTER ADMIN STATE (0/1):

*-----*
```

Enter successively the parameters of the administration network, using the Return key to change line.

**Concerning the line ENTER ADMIN STATE:**

- The option (1) allows flow separation to be activated immediately.
- The option (0) deletes the configuration entered previously.

After the last line is validated, a summary of the network parameters is displayed for confirmation.

```
MITEL 5000 CONFIGURATION / ADMINISTRATION NETWORK

| ADMIN IPADR = 20.100.42.121 |

| ADMIN NETWORKMASK = 255.255.255.192 |

| ADMIN GATEWAY = 20.100.42.65 |

| ADMIN NETWORKADR = 20.100.42.64 |

| ADMIN BROADCAST = 20.100.42.127

DO YOU CONFIRM (Y/N)? y
```

If the summary is not correct:

- Press "**n**" to restart network preconfiguration.

If the summary is correct:

- Press "**y**" then "**Return**", to confirm.

The following phases are used to complete the installation and do not concern flow separation. Refer to the document **MiVoice 5000 Server – Implementation Manual**.

At the end of the configuration process using Ctrl + i, the system restarts.

- Connect the **LAN** port to the telephony network.
- Connect the **ETH2** port to the administration network.

Therefore, Web Admin will be accessible from the URL (https://) defined for administration. The LAN port access no longer allows administration, which is now performed on ETH2.



**WARNING :** If the administration network connection switch does not manage cross-over (negotiation of transmission/reception), a twisted cable must be used between the Mitel 5000 Gateways ou Mitel 500 system and this switch.

#### Concerning the firewall integrated into the Mitel 5000 Gateways system

After this configuration using Ctrl + i, the firewall will be automatically configured for the Mitel 5000 Gateways system.

### 3.3.2 EXISTING INSTALLATION

From Web Admin, select Menu **SYSTEM>Configuration>Cards>IP board parameters**.

The list of declared IP cards appears (for MiVoice 5000 Server, there is only one line).

- Select line 0-04.
- On the next screen, tick **Use of an admin network**.
- Then enter the IP address of the telephony network in the **IP address** field on top.
- On the line **Use of an admin network**, enter the Admin network IP address (– **IP address/Mask/router** fields).
- Click **Confirmation**.



**Note :** The configuration of other fields is not specific to flow separation. Refer to the document **MiVoice 5000 Server – Operating Manual**.

Further configuration from Web Admin

- Connect the telephony network to the **LAN** port on the CPU front panel.
- Connect the Admin network to the **ETH2** port on the CPU front panel. This link will give access to Web Admin.

## 3.4 CONFIGURING THE IP PARAMETERS OF TELEPHONY AND ADMINISTRATION NETWORKS FOR AN INSTALLATION OF MIVOICE 5000 SERVER

### 3.4.1 PREREQUISITES

The PC hosting the MiVoice 5000 server must have two network accesses (one for the administration network, one for the telephony network).

MiVoice 5000 is installed and accessible via Web Admin.

### 3.4.2 PROCEDURE

From the OS, configure the IP addresses. Refer to the document **Rocky Linux and Double Attachment**, section 2.4 - Changing the network configuration after installing the OS.

From Web Admin, select Menu **SYSTEM>Configuration>Cards>IP board parameters**.

The list of declared IP cards appears (for MiVoice 5000 Server, there is only one line).

- Select line **0-00**.
- On the next screen, tick **Use of an admin network**.
- Then enter the IP address of the telephony network in the **IP address** field on top (options).
- On the line **Use of an admin network**, enter the Admin network IP address (– **IP address**) field.
- Click **Confirmation**.



**Note :** The configuration of other fields is not specific to flow separation. Refer to the document **MiVoice 5000 Server – Operating Manual**.

## 3.5 CONFIGURING THE IP PARAMETERS OF TELEPHONY AND ADMINISTRATION NETWORKS FOR AN INSTALLATION OF EX CONTROLLER

### 3.5.1 PREREQUISITES

The PC hosting the MiVoice 5000 server must have two network accesses (one for the administration network, one for the telephony network).

MiVoice 5000 is installed and accessible via Web Admin.

The security patch 8.X 05 or a later version is installed on the EX Controller.

### 3.5.2 PROCEDURE

From the Web Admin, Menu **Network config. Service**:

- Enter the IP address and the netmask of the Administration network in the **Ethernet VM WAN** section.
- Click the **Apply** button.
- Go back to the homepage of the Web Admin.

Menu **Telephony service>System>Configuration>Cards>IP board setting**:

- Select the **0-00** line.
- Check the **Use of an admin network** box.

New fields appear.

- Choose the IP address for the administration network in the **IPv4 address** dropdown menu, below the **Use of an admin network** box.

To verify if the configuration is properly applied:

- Configure the PC to be in the chosen administration network for the EX Controller.
- Connect the PC to the ETH1 port of the EX Controller.
- Try to access the Web Admin with the IP address for the Administration network.

## 3.6 CONFIGURING THE FIREWALL FOR THE MIVOICE 5000 SERVER AND THE EX CONTROLLER

A firewall is necessary for the operating system in the MiVoice 5000 Server to distribute data flows.

### 3.6.1 PREREQUISITES

This firewall can be configured only from the OS by the administrator.

The administration network is activated and configured. Refer to the paragraphs:

- **3.4 - Configuring the IP parameters of the telephony and administration networks for an installation of MiVoice 5000 Server** for the MiVoice 5000 Server.
- **3.5 - Configuring the IP parameters of the telephony and administration networks for an installation of EX Controller** for the EX Controller.

### 3.6.2 PROCEDURE

Create an **iptables.conf** files with all the required ports open. Refer to the document **MiVoice 5000 solution - List of TCP and UDP ports**.

To implement the new **iptables.conf** file:

- Log in to the Linux terminal in **root**.
- Go to the **/tmp/** directory.

- Copy the new **iptables.conf** file in the **tmp** folder.
- Enter the **dos2unix iptables.conf** command to convert the **iptables.conf** file to a Unix format.
- Enter the **iptables-restore iptables.conf** command to apply the configuration of the **iptables.conf** file.
- Enter the **iptables-save > /etc/sysconfig/iptables** command to save the new **iptables.conf** file in the proper directory.
- Enter the **systemctl enable iptables** command to activate **iptables** when Linux launches.
- Reboot the Linux server.

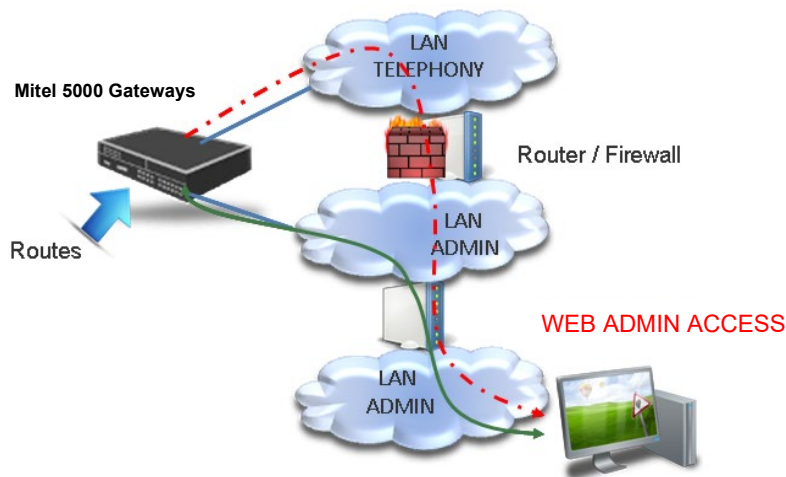
## 4 CONFIGURING THE IP PATHS OF THE ADMINISTRATION NETWORK

When the administration network contains several subnets, a client terminal may reach the Mitel 5000 Gateways device on the administration network through different paths (to access Web Admin, for instance).

Therefore, it is necessary to define a path used to reach this client, or else the Mitel 5000 Gateways device may set up a path via the telephony network because it does not know that this subnet address (and default gateway) used is the default gateway of the telephony network.



**Note :** So, the administration network gateway will always be used during route creation. If the Web Admin, SNMP, EXT DIRECTORY, SYSLOG, DATE&TIME are not located in the same local network, it is necessary to define the paths to reach these servers.



- The mixed red line corresponds to the default path.
- The green straight line corresponds to the path once configured.

### 4.1 CONFIGURING PATHS ON MITEL 5000 GATEWAYS

Menu **SYSTEM>Configuration>Cards>Admin network IP paths**

- This command is not available for MiVoice 5000MiVoice 5000 Server.

#### **PATH X: IP ADDRESS**

X: 1 to 120.

This line is used to enter the IP address of the subnet to be reached with this path.

The system checks the syntax and displays the error diagnosis "SYNTAX ERROR" if the value entered is not in the w.x.y.z form, or if 0.0.0.0 or 255.255.255.255 is entered.

The first time an IP address is entered, the associated mask is forced to 255.255.255.0.

When an IP address is deleted, the associated mask is deleted as well.

#### **MASK**

This line is only displayed if an IP address has been entered for this path.

This line is used to enter the mask which defines the area to be reached with this path.

The system checks the syntax and displays the error diagnosis "SYNTAX ERROR" if the value entered is not in the w.x.y.z format, or if 0.0.0.0 is entered. Moreover, the MMC checks that the value entered is a subnet mask, that is that the significant bits are contiguous and the important bit is on 1. If this is not the case, or if the mask is deleted, the error report "INCORRECT VALUE" is displayed.



**Note :** In this menu, the system does not check whether several paths access the same area (case of network inclusion). On the other hand, the system will delete double entries so only the required routes are configured.

Up to 120 routes can be created (IP address and mask).

The changes are saved when the menu is closed.

## 4.2 CONFIGURING PATHS ON MIVOICE 5000 SERVER

You must be the Linux server administrator.

Administration network routing must be programmed using the User menu:

Configuration

You can access the a5000 server from `https://10.148.66.3`

```
1) Reboot           6) Standard          11) Keyboard
2) Network          7) Backup-Specific  12) Language
3) Password         8) Restore-Specific 13) Logout
4) UpdateOS-Security 9) Restore-Full
5) Total            10) Identification
```

Select an option and press Enter: █

Refer to document **MiVoice 5000 Server – Implementation Manual**, section **1.3.2 Configuring the network interfaces via the User menu**.

## 4.3 CONFIGURING PATHS ON EX CONTROLLER

You must be the Linux server administrator.

To configure the IP paths of the Administration network on the EX Controller:

- Log in to the Linux terminal in **root**.
- Go to the **/etc/sysconfig/network-scripts** directory.
- Add the IP addresses for the IP routes in the **route-eth0** file in this format: **<subnet>/<netmask> via <gateway>**



## 5 APPENDICES

### 5.1 DATA FLOW FOR THE MIVOICE 5000 SOLUTION

#### 5.1.1 DATA FLOWS FOR DEVICES CONNECTED TO THE TELEPHONY NETWORK

This table gives a list of data flows in the MiVoice 5000 R5.2 solution and for requests made by some equipment connected to the telephony network.

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
<b>i7xx</b>	signalling	PBX/MiVoice 5000 Server (SERVIP)	I over IP (port 3199)	Tel
	configuration	DHCP server	DHCP	Tel
	software download	Download tool	TFTP	Tel
	voice flow	End points	RTP	Tel
<b>Download tool</b>	software download	i7xx	Proprietary (port 9410)	Tel
<b>i2052 or i2070</b>	Signaling i2052	PBX/MiVoice 5000 Server	VTI/XML (port 3199)	Tel
	Signalling i2070	PBX/MiVoice 5000 Server (SERV-POWIN)	Gateway TCP/X.25	Tel
	configuration	PBX/MiVoice 5000 Server (EAI)	Gateway TCP/X.25	Admin
	directory	LDAP directory	LDAP read only	Admin
	date & time	PBX/MiVoice 5000 Server (NTP server)	NTP	Tel
	voice flow (i2052 only)	End points	RTP	Tel
<b>MiVoice 5300 IP Phone</b>	signalling	PBX/MiVoice 5000 Server (GSI or proxy)	extended SIP (18060)	Tel
	software download	FTP server	FTP	Admin
	configuration	DHCP server	DHCP	Tel
	voice flow	End points	RTP	Tel
<b>Mitel 6700 SIP Phone</b>	signalling	PBX/MiVoice 5000 Server (GSI or proxy)	SIP (5060)	Tel
	software download	FTP - TFTP server	FTP – TFTP	Admin and Tel
	configuration	DHCP server	DHCP	Tel
	telephony services	PBX/MiVoice 5000 Server (XML proxy)	Proprietary http / https	Tel
	date & time	PBX/MiVoice 5000 Server (NTP server)	NTP	Tel
	voice flow	End points	RTP	Tel
<b>SIP phone &amp; WiFi</b>	signalling	PBX/MiVoice 5000 Server (GSI)	SIP (5060)	Tel
	voice flow	End points	RTP	Tel
<b>SIP Trunk</b>	signalling	PBX/MiVoice 5000 Server	SIP (5060)	Tel

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
		(GSI)		
	voice flow	End points	RTP	Tel
<b>H.323 Trunk</b>	signalling	PHM	H.323 (H.225/H.245)	Tel
	voice flow	End points	RTP	Tel
<b>PHM</b>	PHM - signalling	PBX/MiVoice 5000 Server	TCP/X.25 (port 3208)	Tel
<b>DECT-IP application</b>	Mitel OMM – signalling	PBX/MiVoice 5000 Server (GSI)	Extended SIP	Tel
	Mitel OMM – resiliency	Mitel OMM	proprietary	Tel
	Mitel OMM – directory	LDAP directory	LDAP read only	Admin
	Mitel OMM – terminal list	PBX/MiVoice 5000 Server (Web Admin)	https	Admin
	Mitel RFP – configuration	DHCP server	DHCP	Tel
	Mitel RFP – voice flow	End points	RTP	Tel
<b>NAT SBC PROXY</b>	signalling	PBX/MiVoice 5000 Server (GSI)	Extended SIP (5060&5064)	Tel
	Mitel RFP – voice flow relay	End points	RTP	Tel
<b>PBX/MiVoice 5000 Server</b>	Multisite signalling	PBX/MiVoice 5000 Server (SERGIC)	Movacs (tunnel 1998)	Tel
	Multisite signalling	PBX/MiVoice 5000 Server (SERGIC)	TLS	Tel
	MiVoice 5000 Server redundancy	MiVoice 5000 Server	Heartbeat	Tel
	PBX redundancy	PBX XD	DRBD	internal
	Test	PBX/MiVoice 5000 Server (AFISER)	TCP/X.25 (port 3302)	Tel
	VOIP voice flow	End points	RTP	Tel
	E-voicemail	Mail server	SMTP/POP3/IMAP4	Tel
	TMA set configuration	Mitel 6700 SIP Phone & MiVoice 5300 IP Phone web page	HTTP	Tel
<b>User PC</b>	White pages	PBX/MiVoice 5000 Server	HTTP	Tel
	Self admin	MiVoice 5000 Manager	https	Admin
	Mail application	Mail server	SMTP/POP3/IMAP4	Tel
	Mitel OMM - configuration	Mitel OMM application	Telnet, HTTP, TFTP	Tel
<b>TAPI application</b>	signalling	TAPI gateway	Proprietary (port 5001)	Tel
<b>TAPI gateway</b>	TAPI gateway signalling	PBX/MiVoice 5000 Server (TAPI)	Gateway TCP/X.25	Tel

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
Alarm station	signalling	M7900 alarm server	Port com emulation	Tel
M7900 alarm server	signalling	PBX/MiVoice 5000 Server	VTI/XML (port 3199)	Tel
CC	signalling	PBX/MiVoice 5000 Server	VTI/XML (port 3199)	Tel
	CTI	PBX/MiVoice 5000 Server (CSTA)	Gateway TCP/X.25	Tel
	voice flow	End points	RTP	Tel
	Directory	LDAP directory	LDAP read only	Admin
	Miscellaneous Client Server relations		HTTP, DCOM, file sharing	Tel
TWP	signalling	PBX/MiVoice 5000 Server	VTI/XML (port 3199)	Tel
	CTI	PBX/MiVoice 5000 Server (CSTA)	Gateway TCP/X.25	Tel
	media flow (voice, visio)	End points	RTP	Tel
	Directory	LDAP directory	LDAP read only	Admin
	CTI	User station	https	Tel
UCP	signalling	PBX/MiVoice 5000 Server	VTI/XML (port 3199)	Tel
	CTI	PBX/MiVoice 5000 Server (CSTA)	Gateway TCP/X.25	Tel
	voice flow	End points	RTP	Tel
	Directory	LDAP enterprise database	LDAP read only	Admin
	Fax downloading		FTP	Tel
	Miscellaneous		VPIM/SMTP/POP3 IMAP/RPC/HTTP/https	Tel
Remote user via ISDN/PPP	all	all	all	PPP
Most of the equipment	Log information	Support team equipment	Syslog (514)	Admin

### 5.1.2 DATA FLOWS FOR DEVICES CONNECTED TO THE ADMINISTRATION NETWORK

This table gives a list of data flows in the MiVoice 5000 R5.2 solution and for requests made by some equipment connected to the administration network.

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
MiVoice 5000 Manager	Directory synchro.	Active directory	LDAP	Admin
	Directory replication	MiVoice 5000 Server	LDAP	Admin
	Supervision	SNMP manager	SNMP (trap)	Administration
	Polling	PBX/MiVoice 5000 Server (agent SNMP)	SNMP (get)	Administration

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
	File transfer (CDR/billing)	PBX/MiVoice 5000 Server (Web Admin)	https	Admin
	PBX/MiVoice 5000 Server configuration	PBX/MiVoice 5000 Server (Web Admin)	https (XML)	Admin
		MiVoice 5000 Manager clients	Proprietary (44555)	Admin
	MiVoice 5000 Manager clients	PBX/MiVoice 5000 Server – VT100	Proprietary (8201)	Admin
	Date & time	NTP server	NTP	Administration
	Alarm	SMTP server	SMTP	Administration
	UCP configuration	UCP	Proprietary (13888)	Admin
<b>MiVoice 5000 Manager client</b>	Management	MiVoice 5000 Manager	https (apache server)	Admin
	PBX/MiVoice 5000 Server VT100&MMI	Via MiVoice 5000 Manager	proprietary(8201/8220)	Admin
	PBX/MiVoice 5000 Server configuration	Via AM7430	vnc client (5800/5809)	Admin
	Synoptic Nagios	PBX/MiVoice 5000 Server	https	Admin
	Synoptic Nagios	AM7430	HTTP	Admin
<b>PBX/MiVoice 5000 Server</b>	SNMP agent	MiVoice 5000 Manager & other managers	SNMP	Admin
	Maintenance	SNMP managers	PPP (via ISDN)	PPP
	MiVoice 5000 Server redundancy	MiVoice 5000 Server	Heartbeat	Admin
	MiVoice 5000 Server redundancy	MiVoice 5000 Server	DRBD	Admin
	Directory	LDAP directory	LDAP	Admin
	White pages	LDAP directory	LDAP	Admin
	Date & time	NTP server	NTP	Admin
<b>User PC</b>	GDB application	PBX/MiVoice 5000 Server (debug)	Proprietary (port 1005)	Admin
	Operator	PBX/MiVoice 5000 Server (Web Admin)	https	Admin
	Operator	PBX/MiVoice 5000 Server (Linux)	SSH	Admin
	White pages	PBX/MiVoice 5000 Server	HTTP	Tel
	Self admin	MiVoice 5000 Manager	https	Admin
	Mail application	Mail server	SMTP/POP3/IMAP4	Tel
	Mitel OMM - configuration	Mitel OMM application	Telnet, HTTP, TFTP	Tel
<b>CDR/Billing</b>	Data transfer	PBX/MiVoice 5000 Server (MUFAC or KITAXE)	Gateway TCP/X.25	Admin
	File transfer	MiVoice 5000 Manager	https	Admin
	directory	LDAP directory	LDAP read only	Admin

EQUIPMENT	DEPARTMENT	REMOTE EQUIPMENT	PROTOCOL	NETWORK
	configuration	PBX/MiVoice 5000 Server (EAI)	Gateway TCP/X.25	Admin
TMA	Terminal management	FTP server	FTP	Admin
	PBX/MiVoice 5000 Server configuration	PBX/MiVoice 5000 Server (Web Admin)	https (XML)	Admin
AM7430	PBX configuration	PBX/MiVoice 5000 Server in R4.2 or previous	Proprietary (TCP/X.25)	Tel