Proposal for implementation of VoIP at XYZ hospital.

Introduction

Management committee of XYZ hospital wants to implement an internal voice communication system for their hospital. At present they are using conventional PBX for connecting the help desk, font office, administrative units, clinics and department. But the hospital has recently gone through expansion and quite a good number of new persons in both medical and non-medical field have been recruited. Internal communication is vital for any such organization where one second may be life saving for individuals.

The doctors and nursing staffs are almost on move and the present system does not have any feature by which medical persons can be called when they are not in any fixed phone location. In order to solve this problem XYZ hospital management want to deploy a new internal communication system with following features.

- ➢ Highly available and easily accessible.
- ➢ Wide coverage
- ➢ Mobility of users within premises
- ➢ Cheap and easy to install maintain.

Field Report

We have conducted a site survey at XYZ hospital to find out their existing infrastructure. We also took the location diagram (i.e. building plan) and the existing network diagram. User concentration was also noted on the building map. We categorically marked the critical areas where use of mobile phones etc. could interfere with the medical equipments and collect the range of frequencies that are to avoid in these areas.

Based on our studies we found that

- ➢ The hospital already has a LAN spanning across the major locations inside the hospital.
- ➢ They also have WiFi service at administrative and front office.
- ➢ Cisco managed switches (2960) are used in LAN
- ➢ Some of the switches have PoE ports.
- ➢ XYZ is connected to another branch hospital by E1.

Proposal

Based on the requirement of the client, available infrastructure and available technologies our solution is as followed.

- ➢ Deployment of VoIP for internal use over existing network.
- ➢ VoIP call management, signaling and control would be done by using "telephony service" of existing Cisco 2811 router.
- ➢ Voice and Data would be treated separately by creating two separate VLANs one for voice and another for general LAN users.
- ➢ The entire existing infrastructure would be used and new access points would be deployed at permissible areas to increase the coverage. This is to increase the service area of the handset users
- ➢ IP Phones would replace all the Desktop phones. Users would be allowed to make receive calls from the PCs to any other PC, IP Phone or Wifi enabled PDAs by using "Cisco IP Communicator".
- ➢ VoIP service would be extended over existing WiFi network and new access points would be deployed at some new locations.
- ➢ All the doctors and medical staffs would be provided WiFi enabled PDA

Key Features of design and advantages

- ✓ The entire existing infrastructure would be utilized. This will cut down the cost of the project.
- ✓ Cisco routers have Call Manager Express integrated in IOS which offers "telephony service". It is capable of handling VoIP call management and signaling for a reasonable number of VoIP clients. Instead of PBX based solution we would utilize the existing 2811 router in this project. This would further reduce the cost of project as no dedicated VoIP PBX server and application is required. Moreover the network may be integrated to PSTN network by suitable interface.
- ✓ The PC users are also integrated in the VoIP solution and calls can be placed from a PC to other PCs, VoIP phones and wifi enabled PDAs. This would allow front desk personals to communicate with doctors and admin staff from their terminals.
- ✓ Separation of voice and data in different VLAN would ensure security of communication and preferential treatment of voice over data.
- ✓ All the doctors and medical staff would be provided Wifi enabled PDA so that they can have mobile communication and can be called in case of emergencies.
- ✓ WEP keys would ensure security of the wifi network so that only the authorized PDAs get access to the network and can make calls. This is important because nowadays many mobile phones support wifi. As everyday a large number of outsider come to the hospitals anyone having such mobile phone can get access to the wireless network if not properly secured.

Network diagram of proposed solution
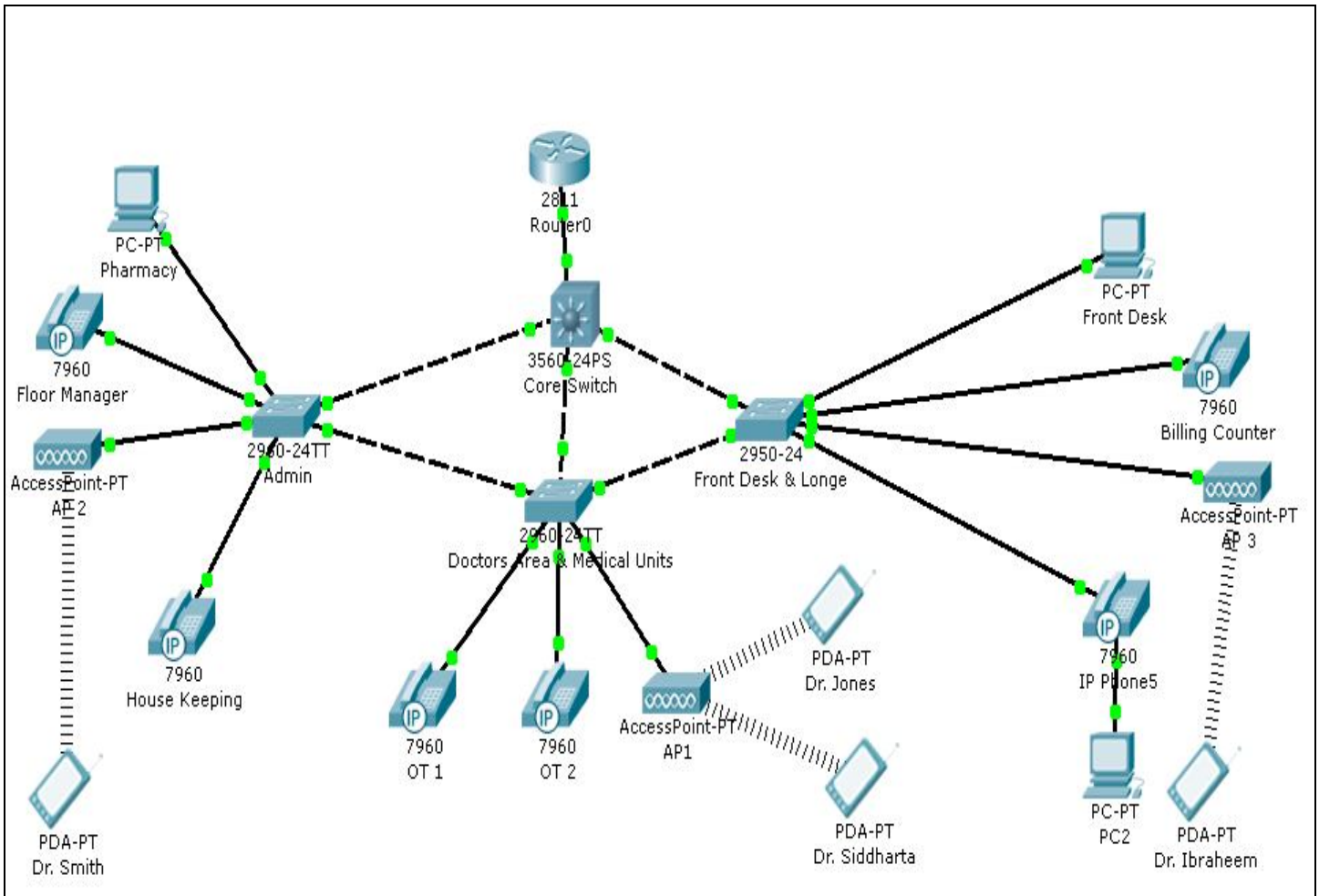
Equipments used

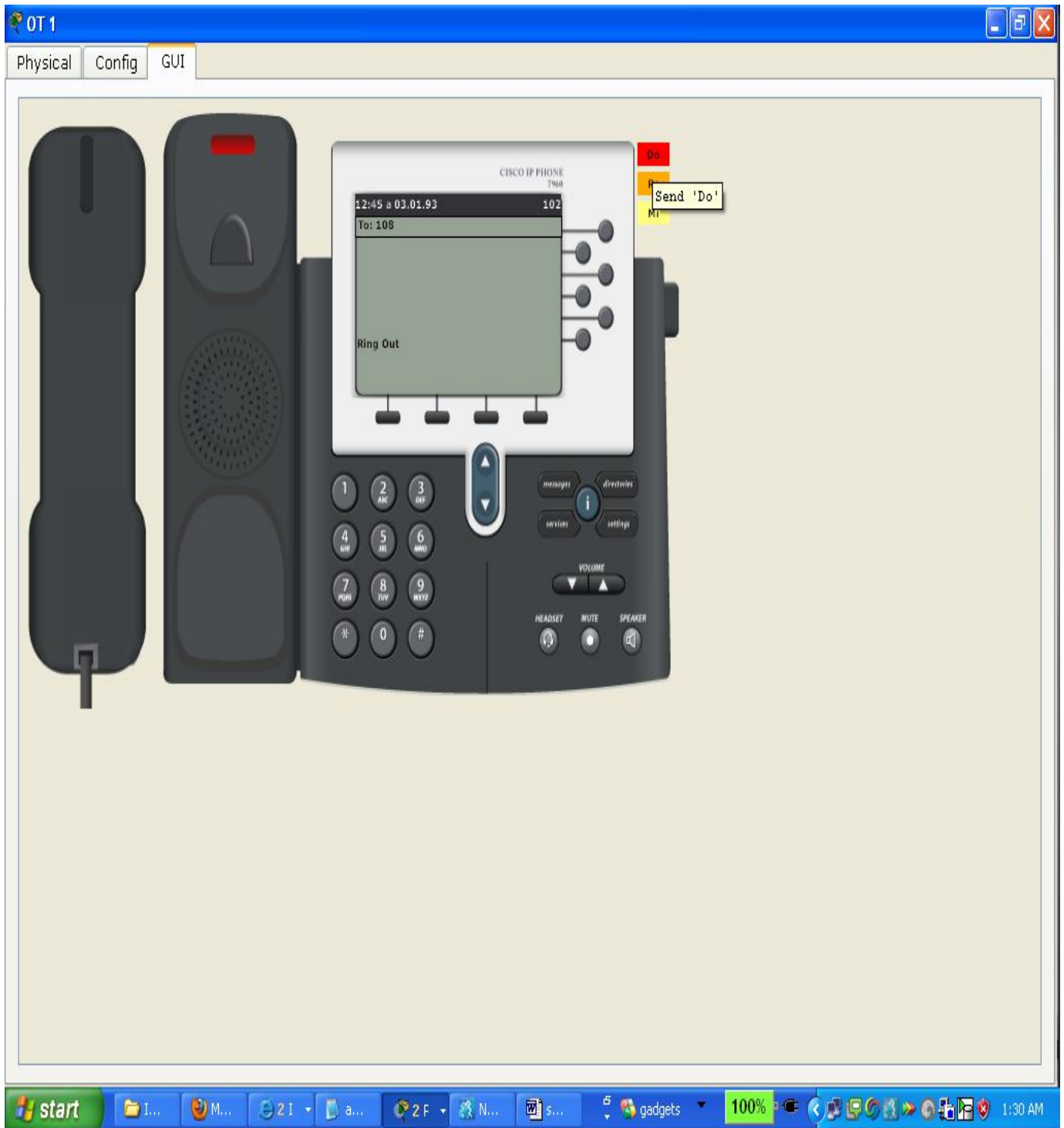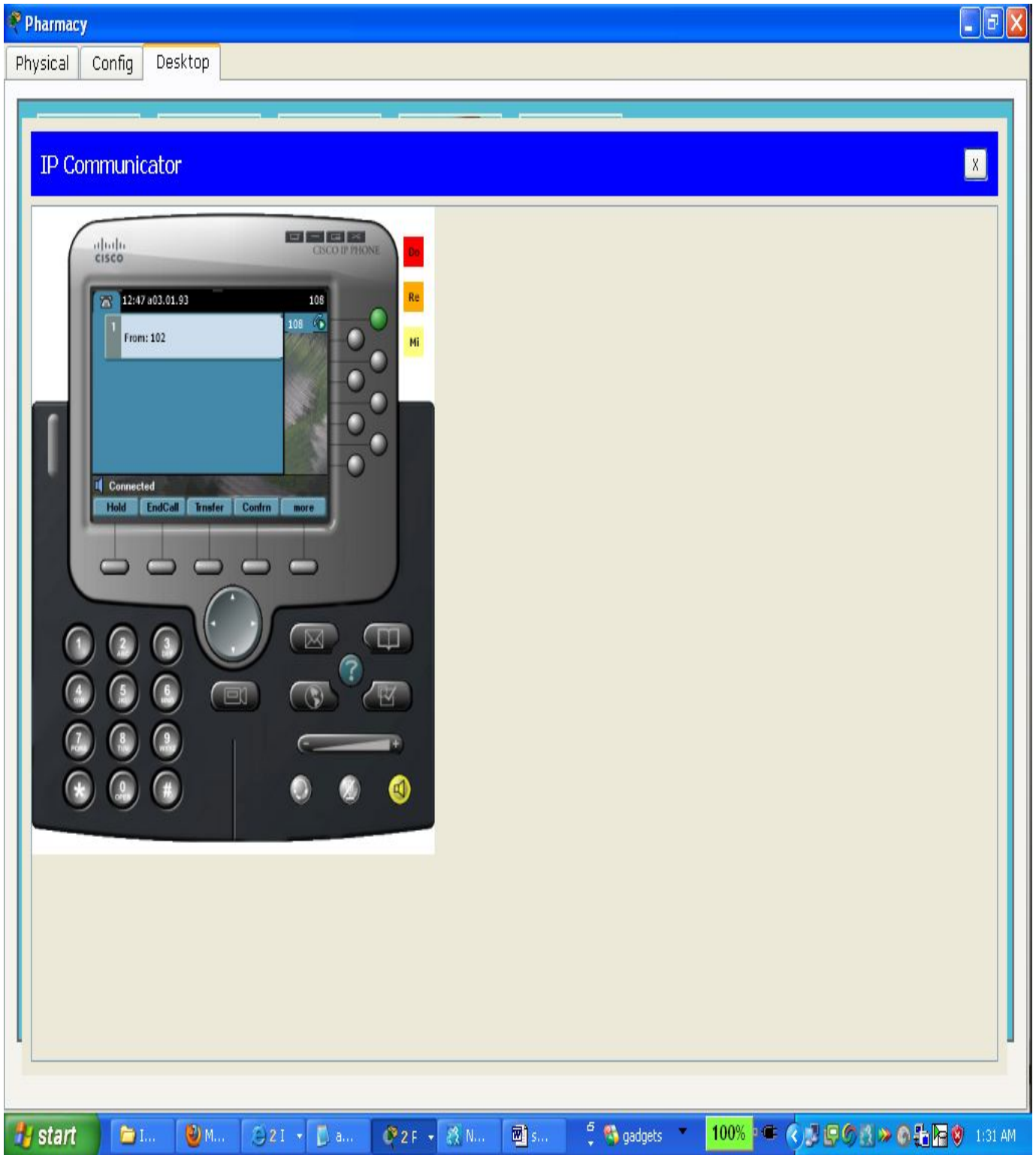| Item	Make and model	Quantity	Existing or New
Router		1	Existing
Layer 3 switch		1	New
Layer 2 managed switch		3	Existing
Wifi Access Point	*This section is deleted from this free sample to get the full document contact me at siddharta.saha@gmail.com*	3	New
Wifi enabled PDA		4 (Limited for demo installation)	New
PC		3 (Limited for demo installation)	Existing
IP Phones		6 (Limited for demo installation)	New

Extension Directory

User/Location	Extension Number	Type
Pharmacy	108	PC
Floor Manager	105	IP Phone
Dr. Smith	109	PDA
House Keeping	106	IP Phone
OT1	102	IP Phone
OT2	101	IP Phone
Dr. Siddharta	110	PDA
Dr. Jones	107	PDA
Dr. Ibraheem	111	PDA
Despatch	103	IP Phone
Front Desk	112	PC
Billing Counter	104	IP Phone

Test Cases

Calls between two IP Phones – OT1 (102) and Pharmacy (108)

Pharmacy

Physical | Config | Desktop

IP Communicator

12:47 a03.01.93   108

108

1

From: 102

Connected

Hold | EndCall | Trnsfer | Confrn | more

CISCO IP PHONE

Do
Re
Mi

start

Call between two PDAs – Dr Siddharta (110) and Dr Ibraheem (111)

Calls between IP Phone and PDA – Front Desk (112) and Dr. Smith (109)

Conclusion

This proposal is prepared on request from the management of XYZ hospital. They have expressed interest on deploying a new internal communication system with mobility.

Voice over IP provides a latest platform for internal and external communication. The technology is cheap, simple, and scalable and has high degree of fault tolerance.

One of our most difficult challenges is to provide mobility of users. Existing wifi network offers mobility in data service accessed by the users.

We have suggested deployment of VoIP inside the existing network and extension of the service over Wifi network.

The solution is justified with points and test cases have shown that users are able to communicate with each other from various platforms i.e. IP Phones, PDAs and PC. Our solution meets all the requirement of the client and with consent of client final rollout of the project may be carried out.

ANNEXURE

Configurations of equipment

Router

Current configuration : 2704 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!

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!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
!
interface FastEthernet0/0.1
 description "network for PC users"
 encapsulation dot1Q 1 native
 ip address 192.168.1.1 255.255.255.0
!
interface FastEthernet0/0.100
 description "network for VoIP"
 encapsulation dot1Q 100
 ip address 192.168.100.1 255.255.255.0
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Modem0/1/0
 no ip address
!
interface Modem0/1/1
 no ip address
!
interface Vlan1

```
 no ip address
 shutdown
!
ip classless
!
!
!
no cdp run
!
!
telephony-service
```

Core switch

```
Current configuration : 1111 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname "Core Switch"
!
!
interface FastEthernet0/1
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
```

```
end
```

Medical Area Switch (Other switch configurations would be same and so this one is only taken)

```
Current configuration : 1188 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
```

```
hostname "Medical area"
!
!
!
interface FastEthernet0/1
 switchport mode trunk
!
interface FastEthernet0/2
 switchport mode access
 switchport voice vlan 100
!
interface FastEthernet0/3
 switchport mode access
 switchport voice vlan 100
!
```