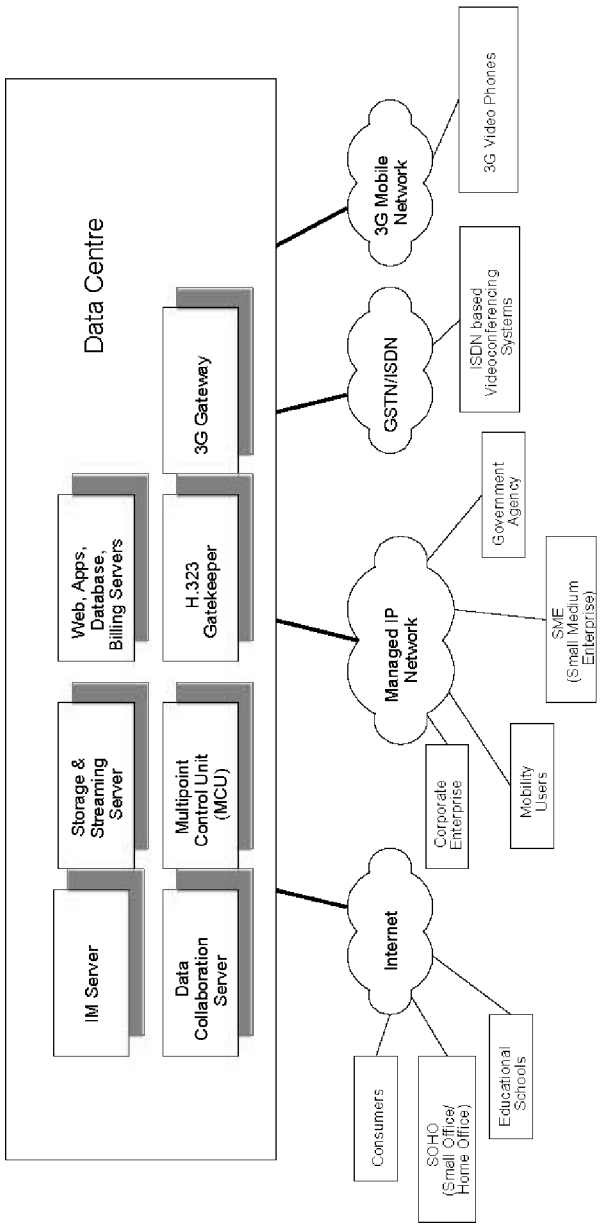

Data Centre
IM Server
Storage & Streaming Server
Web, Apps, Database, Billing Servers
Data Collaboration Server
Multipoint Control Unit (MCU)
H.323 Gatekeeper
3G Gateway
Internet
Managed IP Network
GSTN/ISDN
3G Mobile Network
Consumers
SOHO (Small Office/ Home Office)
Educational Schools
Corporate Enterprise
Mobility Users
Government Agency
SME (Small Medium Enterprise)
ISDN based Videoconferencing Systems
3G Video Phones

Fig 1

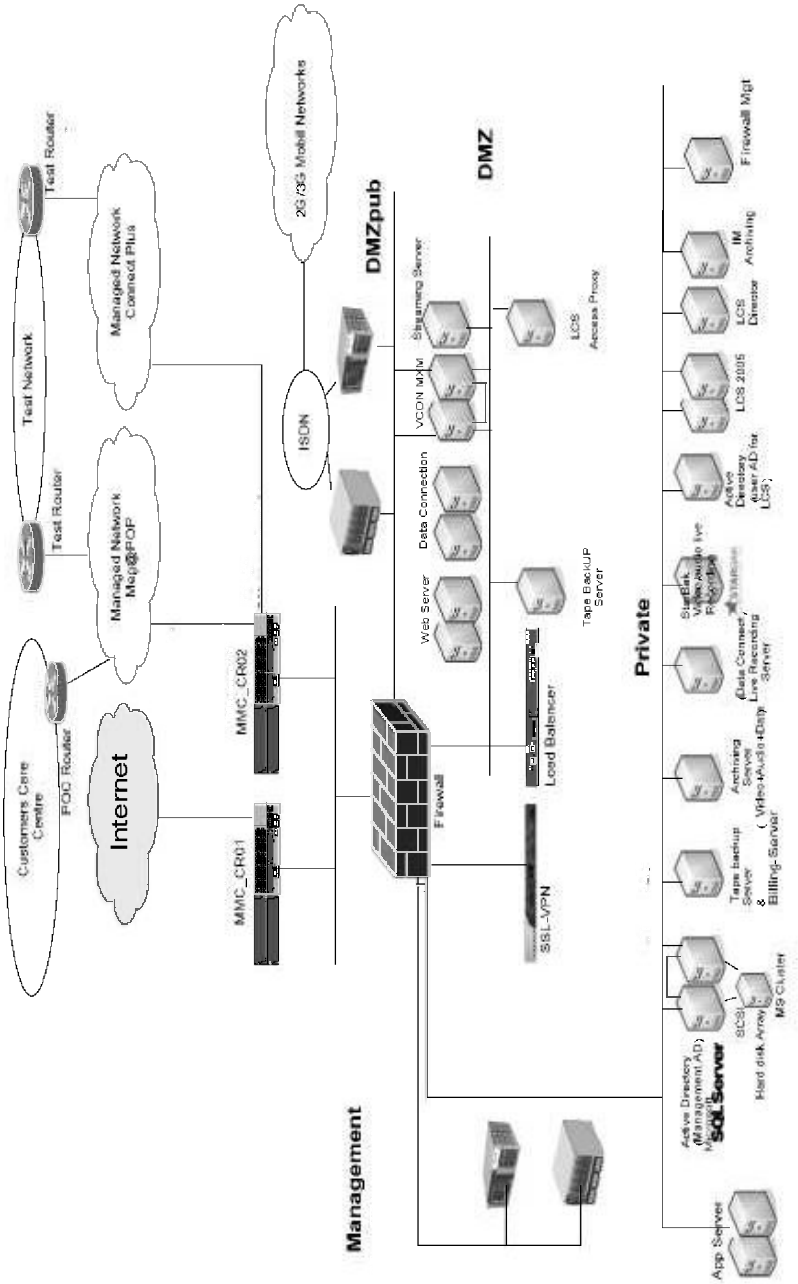

Customers Care Centre
POD Router
Internet
Test Router
Test Network
Test Router
Managed Network Connect Plus
Managed Network Mpls@POP
MMC_CR01
MMC_CR02
2G/3G Mobile Networks
ISDN
DMZpub
DMZ
Streaming Server
VCON MXM
Data Connection
Web Server
LCS Access Proxy
Tape BackUP Server
Load Balancer
SSL-VPN
Firewall
Management
Private
Active Directory (Management AD)
SQL Server
SCSI
Hard disk Array
MS Cluster
Tape backup Server
Billing Server
Archiving Server
Data Connect Live Recording Server
Active Directory (user AD for LCS)
LCS 2005
LCS Director
IM Archiving
Firewall Mgt
App Server

Fig 2

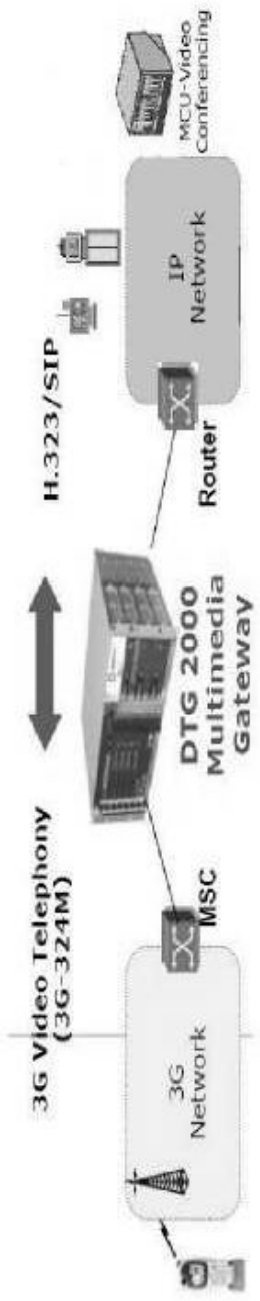

3G Video Telephony
(3G-324M)
3G
Network
MSC
DTG 2000
Multimedia
Gateway
H.323/SIP
Router
IP
Network
MCU-Video
Conferencing

Fig 3

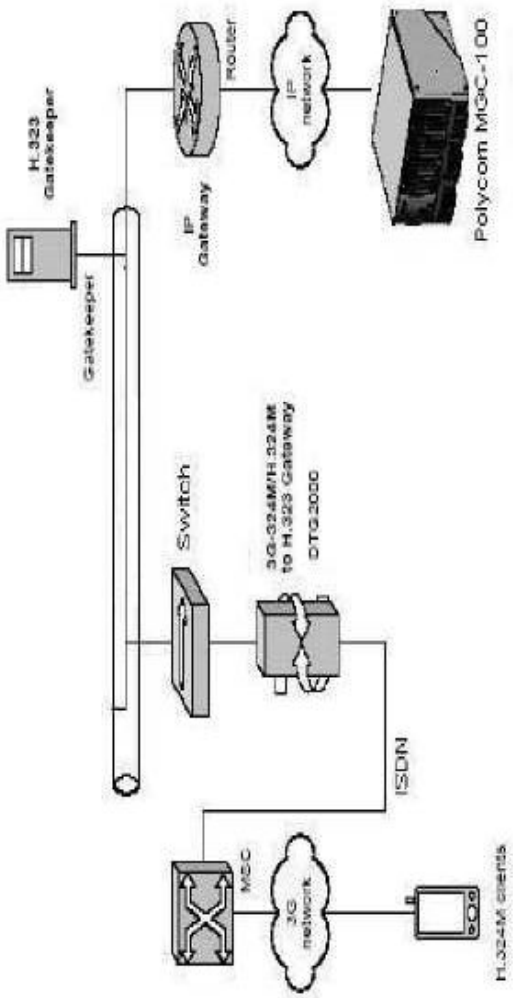

H.323
Gatekeeper
Gatekeeper
IP
Gateway
Router
IP
network
Polycom MGC-100
Switch
3G-324M/H.324M
to H.323 Gateway
DTG2000
ISDN
MSC
3G
network
H.324M clients

Fig 4

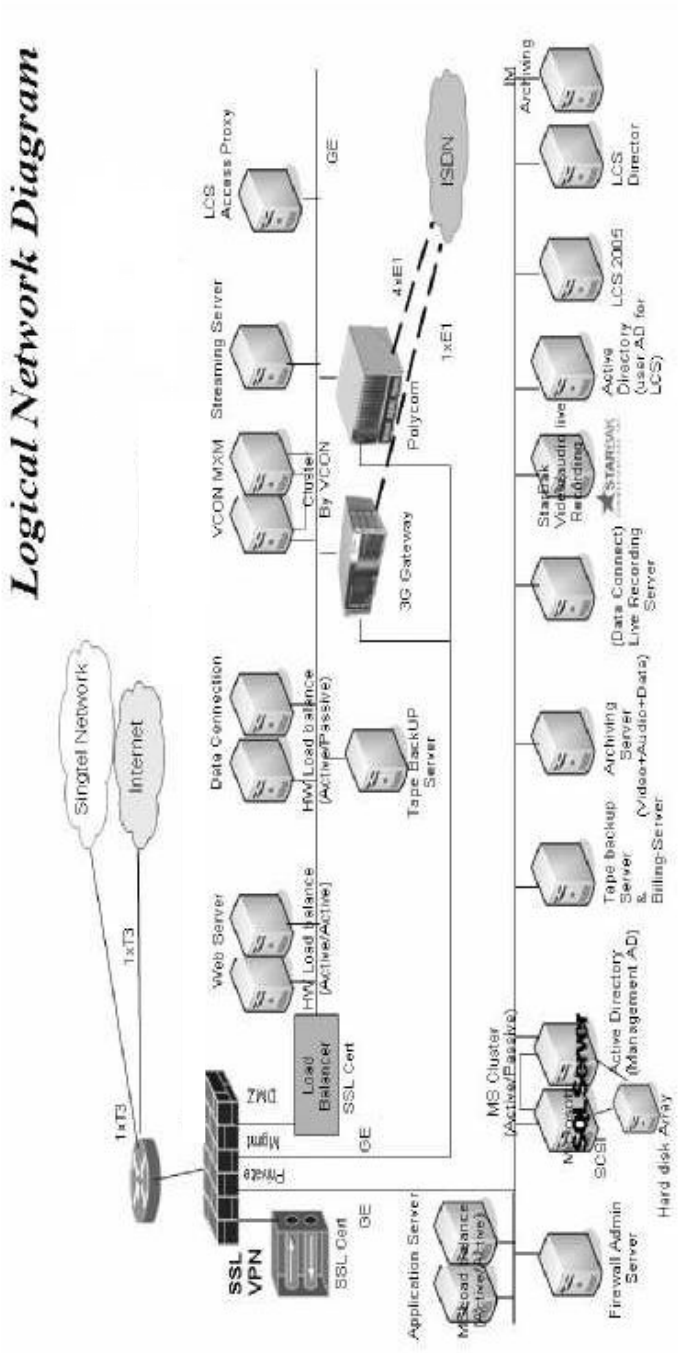

Logical Network Diagram
Singtel Network
Internet
1xT3
1xT3
SSL VPN
SSL Cert
GE
Private
Mgmt
DMZ
Load Balancer
SSL Cert
GE
Web Server
HW Load balance (Active/Active)
Data Connection
HW Load balance (Active/Passive)
Tape BackUP Server
3G Gateway
VCON MXM
Cluster By VCON
Streaming Server
LCS Access Proxy
GE
Polycom
4xE1
1xE1
ISDN
Application Server
MS Load Balance (Active/Active)
MS Cluster (Active/Passive)
Firewall Admin Server
Hard disk Array
SCSI
Active Directory (Management AD)
Tape Backup Server & Billing Server
Archiving Server (Video+Audio+Data)
(Data Connect) Live Recording Server
Starpak Video/audio live Recording
STARPAK
Active Directory (User AD for LCS)
LCS 2005
LCS Director
IM Archiving

Fig 5

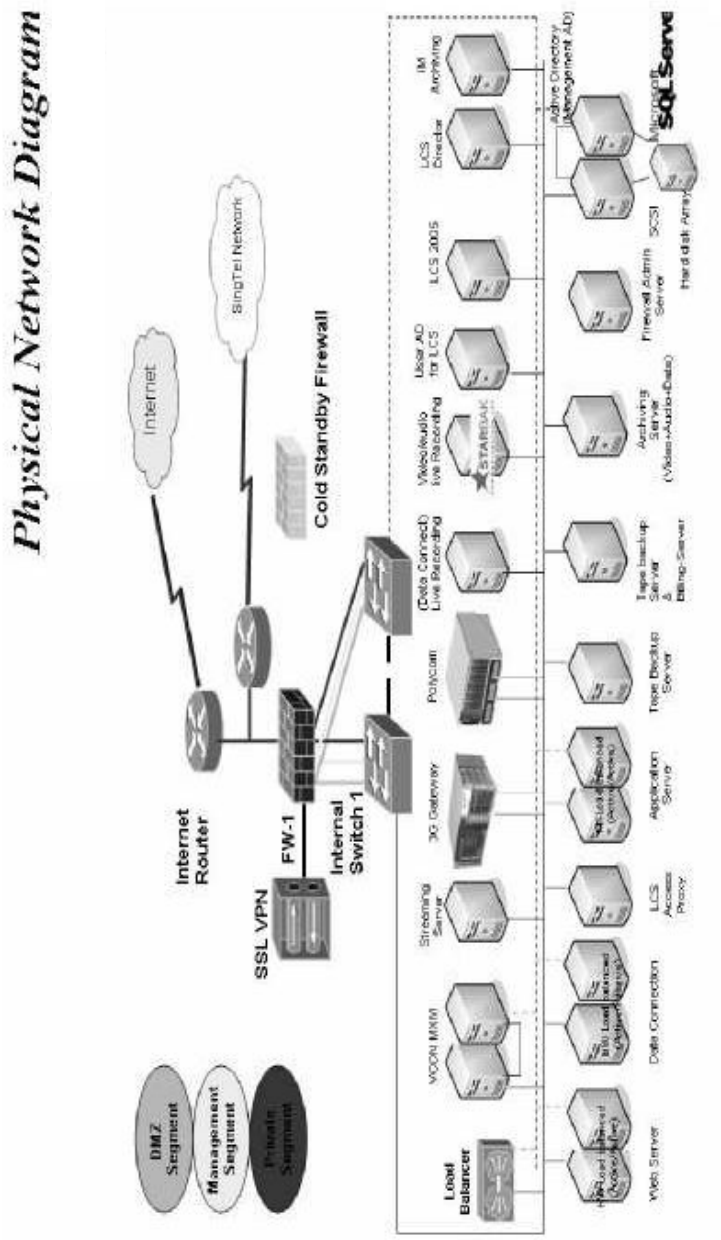

Physical Network Diagram
Internet
SingTel Network
Cold Standby Firewall
Internet Router
FW-1
SSL VPN
Internal Switch 1
DMZ Segment
Management Segment
Private Segment
Load Balancer
Web Server
Data Connection
LCS Access Proxy
Application Server
3G Gateway
Polycom
(Data Connect) Live Recording
Video/Audio live Recording
User AD for LCS
LCS 2005
LCS Director
IM Archiving
Tape Backup Server & Billing Server
Archiving Server (Video+Audio+Data)
Firewall Admin Server
SCSI Hard disk Array
Active Directory (Development AD)

Fig 6

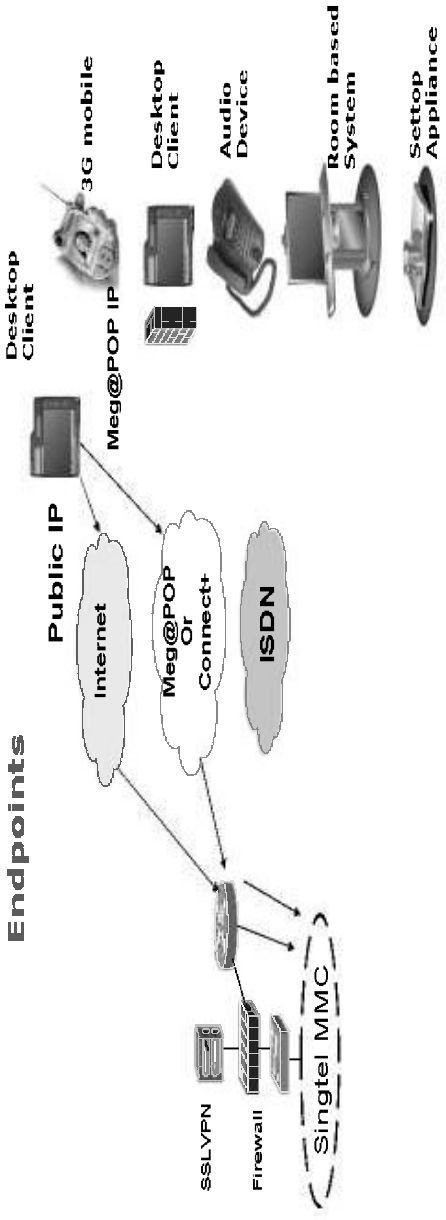

Endpoints
Public IP
Internet
Meg@POP Or Connect+
ISDN
Desktop Client
Meg@POP IP
3G mobile
Desktop Client
Audio Device
Room based System
Settop Appliance
SSLVPN
Firewall
Singtel MMC

Fig 7

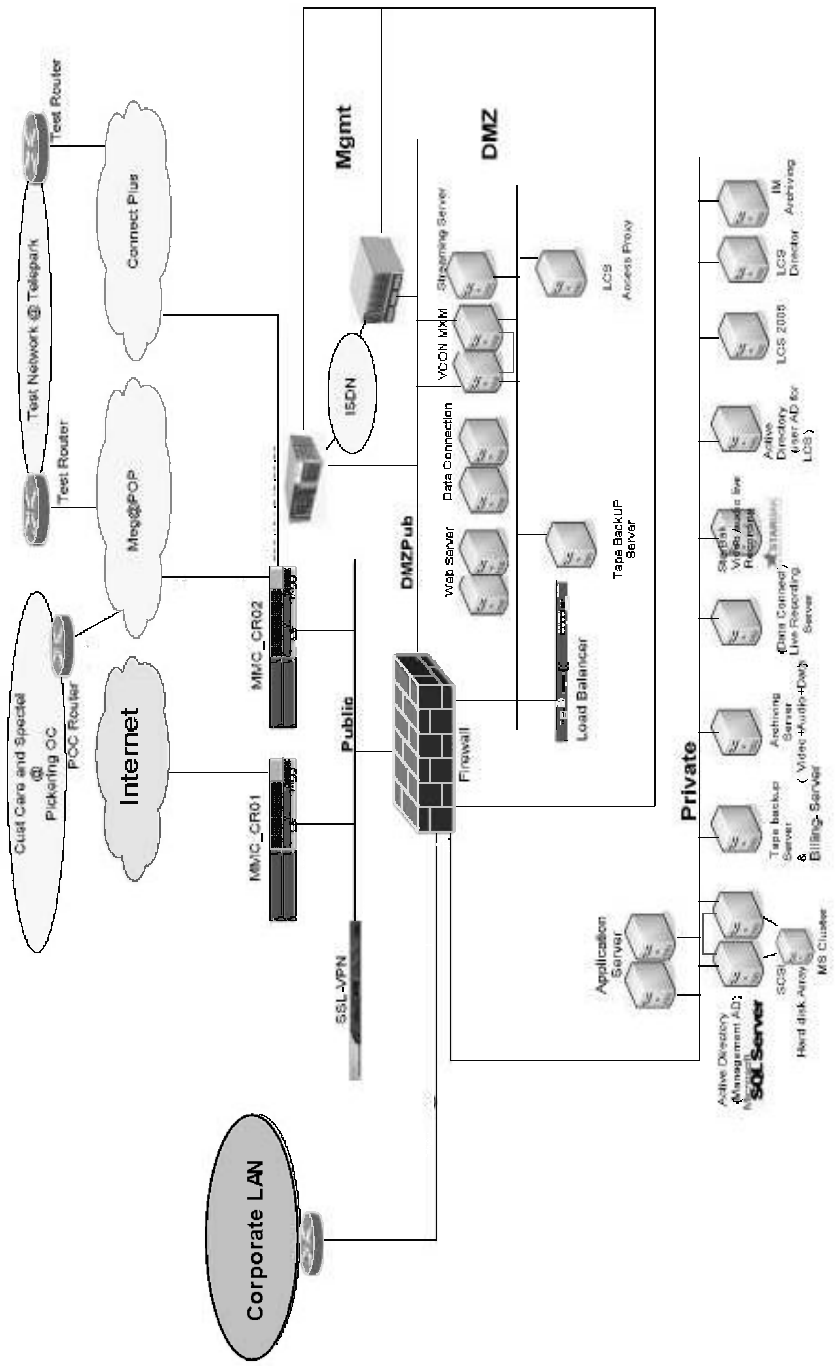

Test Router
Test Network @ Telepark
Test Router
Cust Care and Special @ Pickering OC
POC Router
Internet
Meg@POP
Connect Plus
MMC_CR02
MMC_CR01
Public
SSL-VPN
Corporate LAN
Mgmt
ISDN
DMZPub
Firewall
DMZ
Streaming Server
VCON MXM
Data Connection
Web Server
Load Balancer
Tape BackUP Server
LCS Access Proxy
Private
Application Server
Tape backup Server
Archiving Server
Billing Server
Active Directory (User AD for LCS)
LCS 2005
LCS Director
IM Archiving
SQL Server
MS Cluster

Fig 8

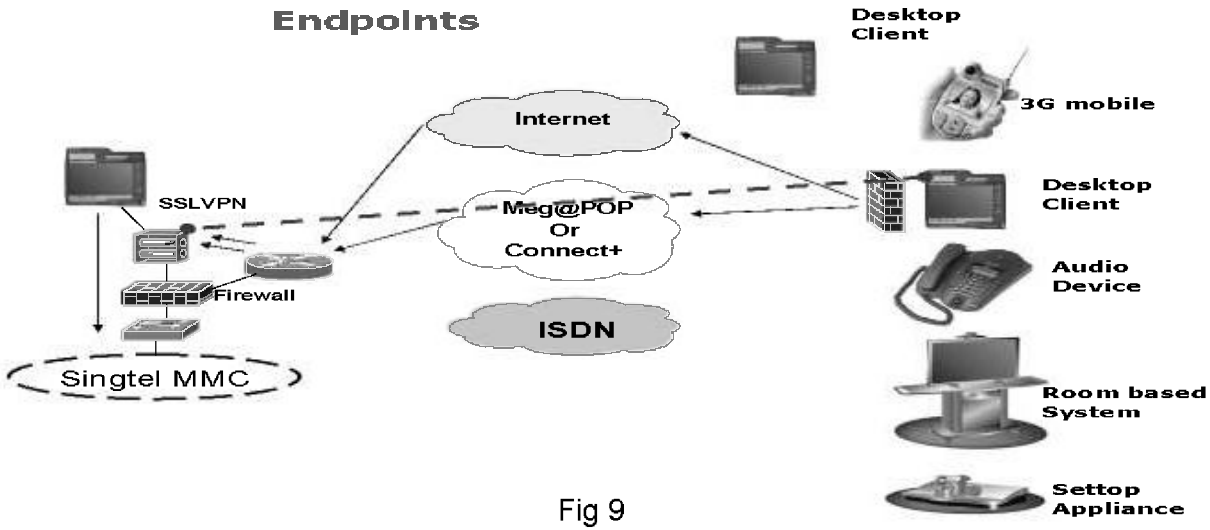

Endpoints
Desktop Client
3G mobile
Internet
SSLVPN
Meg@POP Or Connect+
Desktop Client
Audio Device
Firewall
ISDN
Singtel MMC
Room based System
Settop Appliance

Fig 9

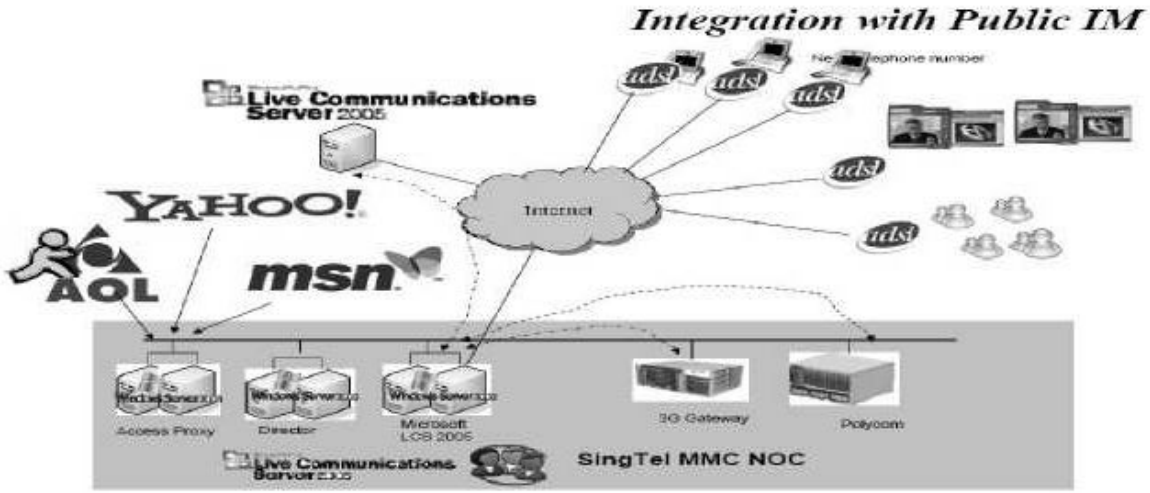

Integration with Public IM
Live Communications Server 2005
YAHOO!
AOL
msn
Internet
dsl
Access Proxy
Director
Microsoft LCS 2005
3G Gateway
Polycom
Live Communications Server
SingTel MMC NOC

Fig 10

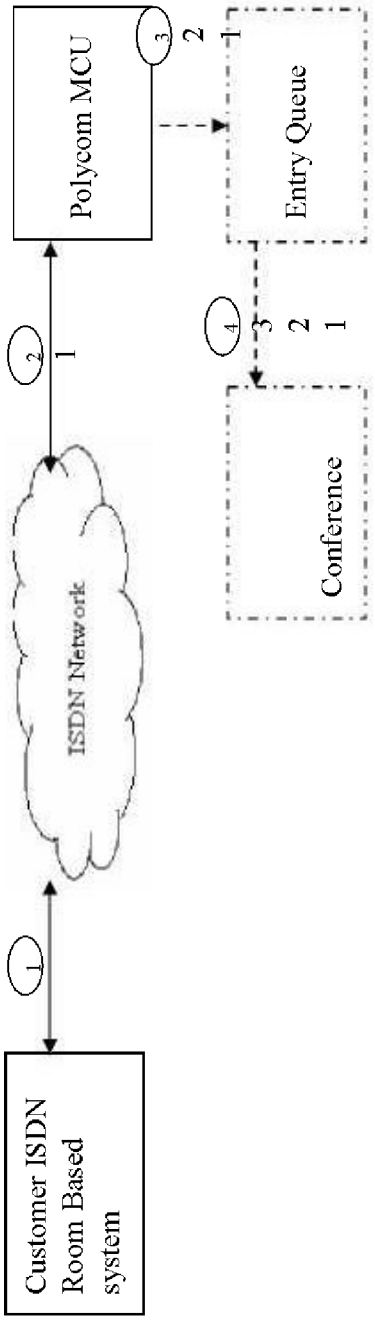

Customer ISDN Room Based system
ISDN Network
Polycom MCU
Entry Queue
Conference
1
2
3
4

Fig 11

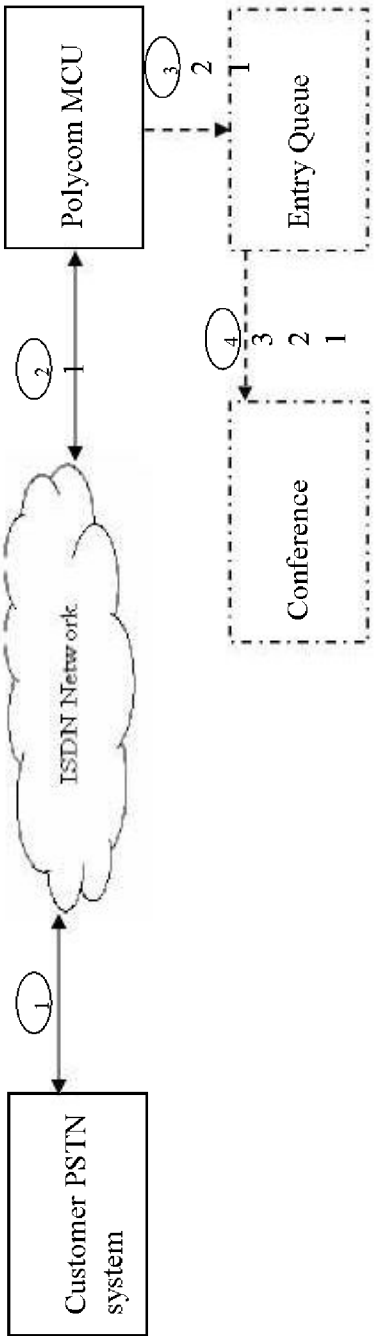

Customer PSTN system
ISDN Network
Polycom MCU
Entry Queue
Conference
1
2
3
4

Fig 12

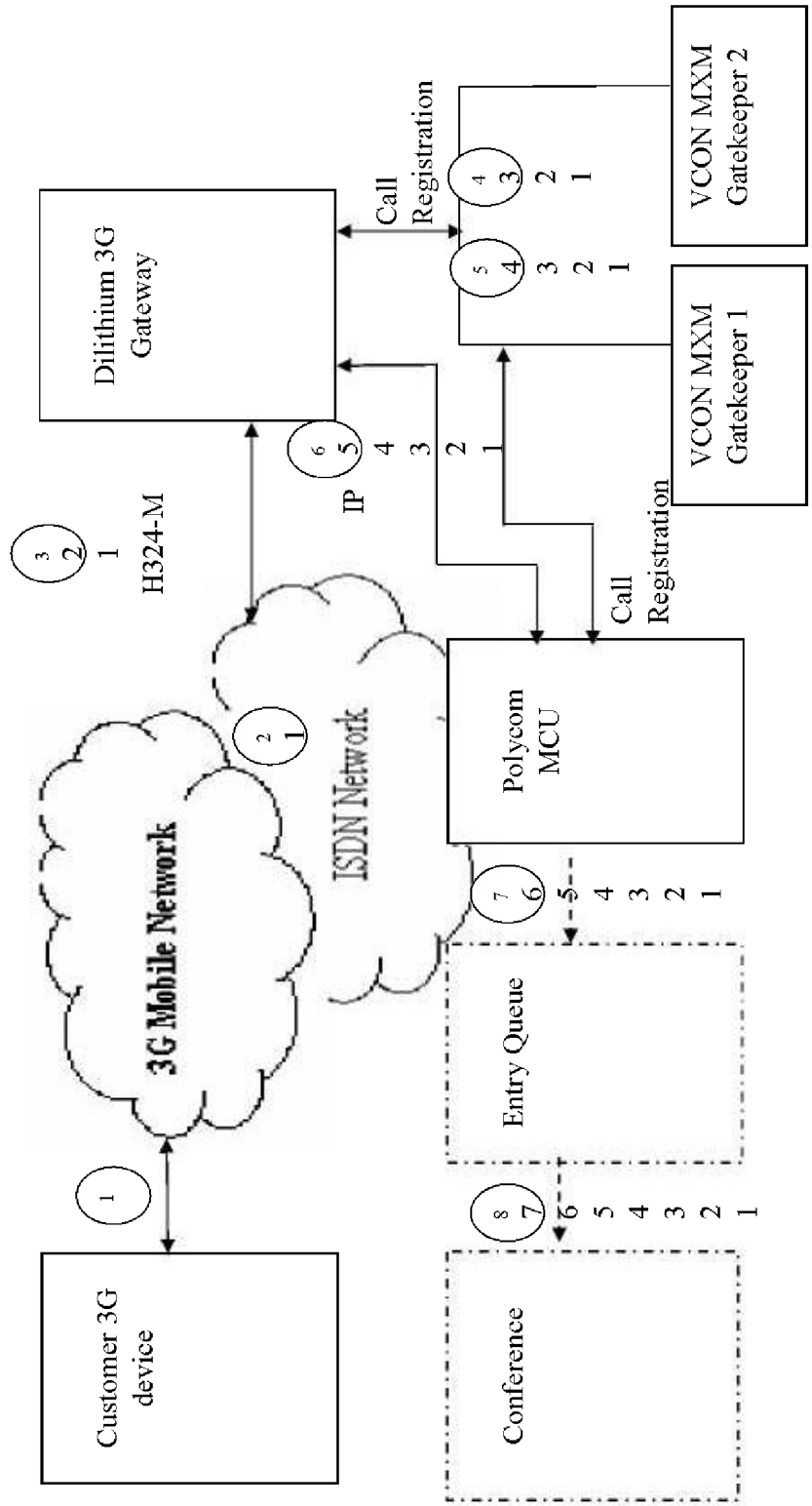

Customer 3G device
3G Mobile Network
ISDN Network
H324-M
IP
Dilithium 3G Gateway
Call Registration
VCON MXM Gatekeeper 2
VCON MXM Gatekeeper 1
Call Registration
Polycom MCU
Entry Queue
Conference

Fig 13

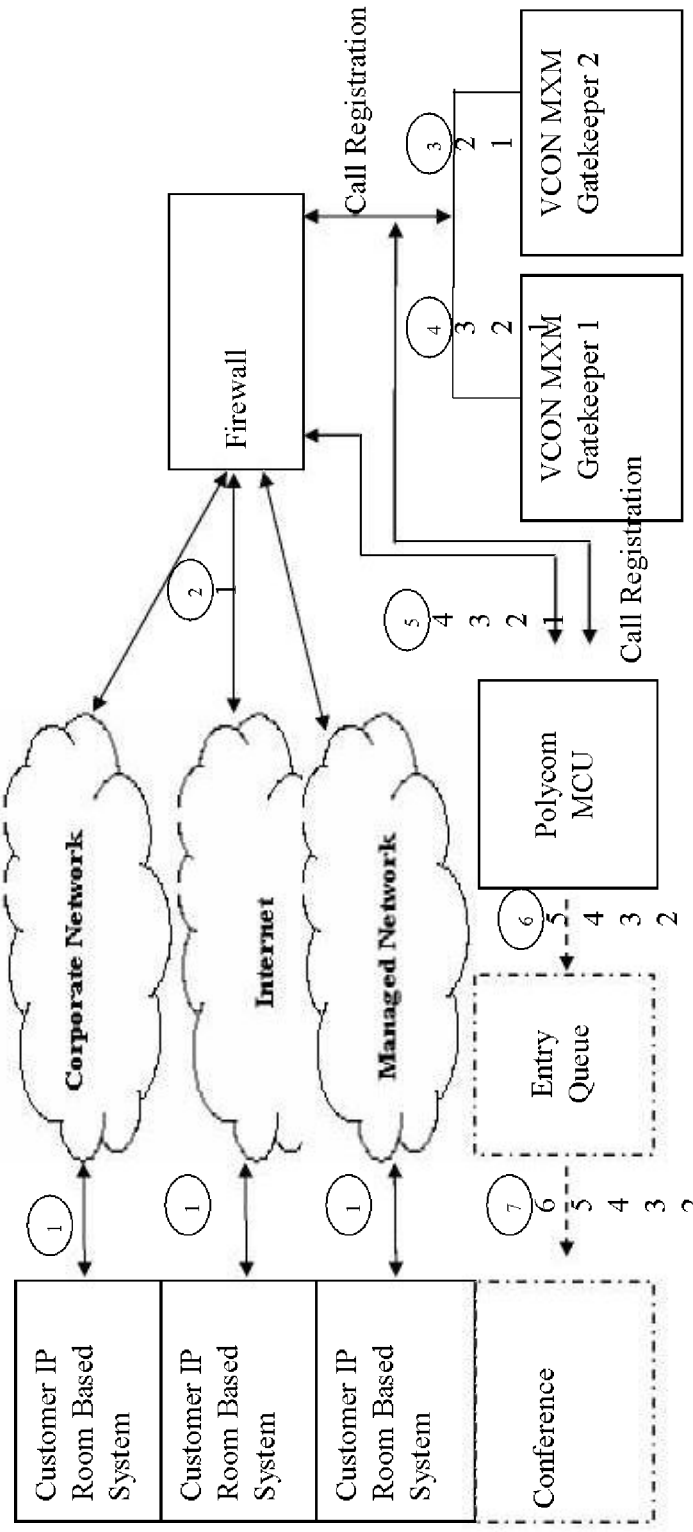

Customer IP Room Based System
Customer IP Room Based System
Customer IP Room Based System
Conference
Corporate Network
Internet
Managed Network
Firewall
Call Registration
VCON MXM Gatekeeper 2
VCON MXM Gatekeeper 1
Call Registration
Polycom MCU
Entry Queue

Fig 14

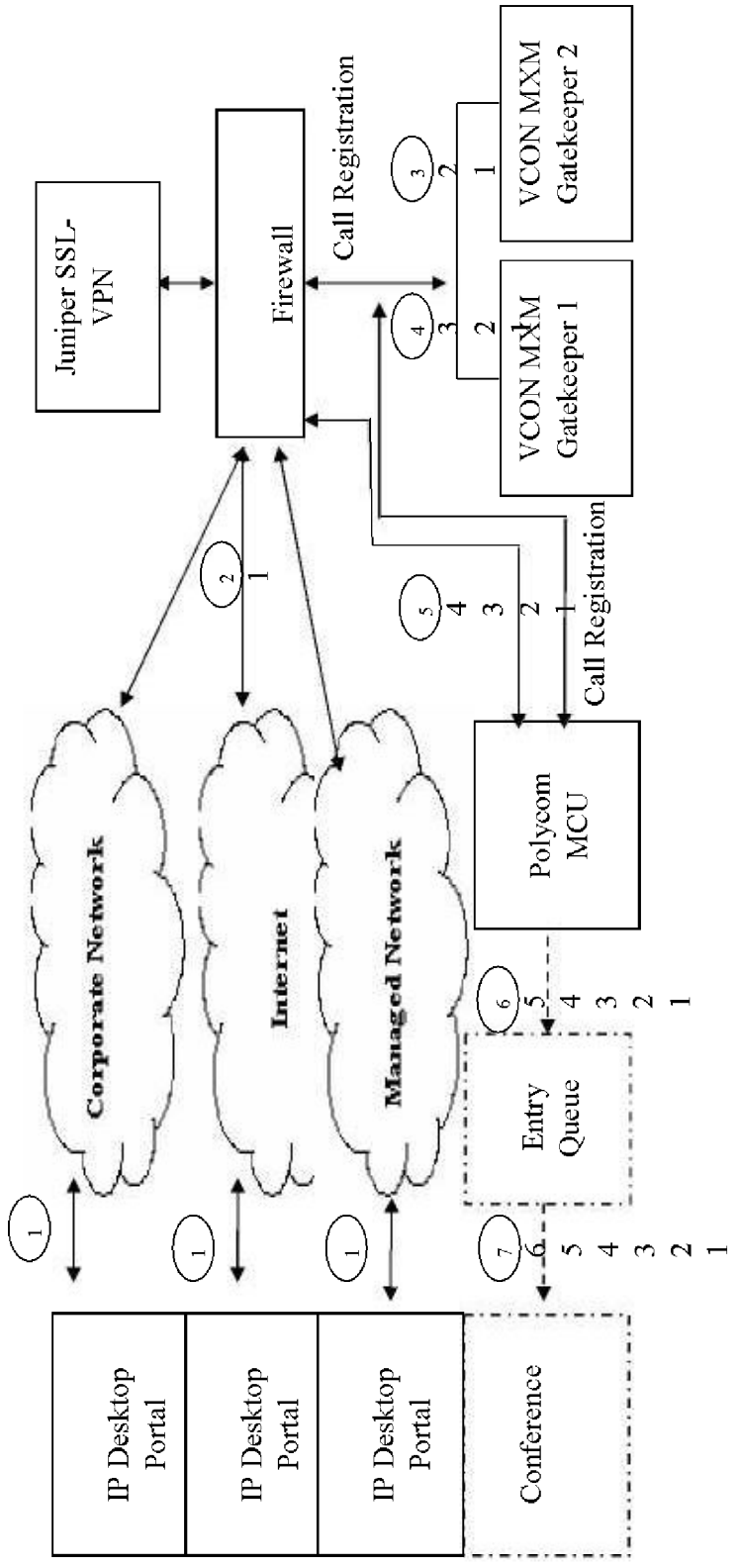

IP Desktop Portal
IP Desktop Portal
IP Desktop Portal
Conference
Entry Queue
Corporate Network
Internet
Managed Network
Polycom MCU
Juniper SSL-VPN
Firewall
Call Registration
VCON MXM Gatekeeper 1
VCON MXM Gatekeeper 2
Call Registration

Fig 15

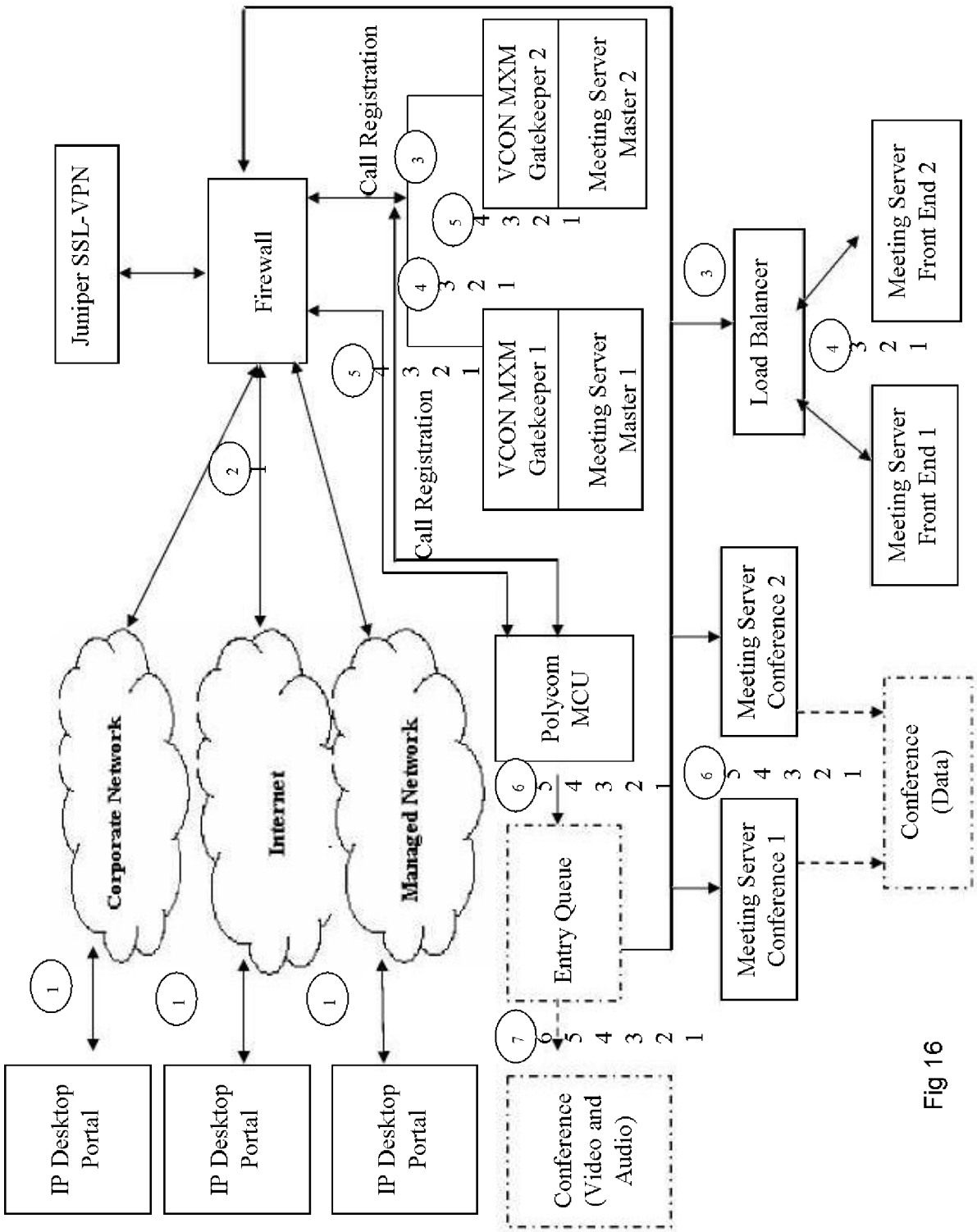

IP Desktop Portal
IP Desktop Portal
IP Desktop Portal
Corporate Network
Internet
Managed Network
Juniper SSL-VPN
Firewall
Call Registration
Call Registration
VCON MXM Gatekeeper 1
Meeting Server Master 1
VCON MXM Gatekeeper 2
Meeting Server Master 2
Polycom MCU
Entry Queue
Conference (Video and Audio)
Load Balancer
Meeting Server Conference 1
Meeting Server Conference 2
Conference (Data)
Meeting Server Front End 1
Meeting Server Front End 2

Fig 16

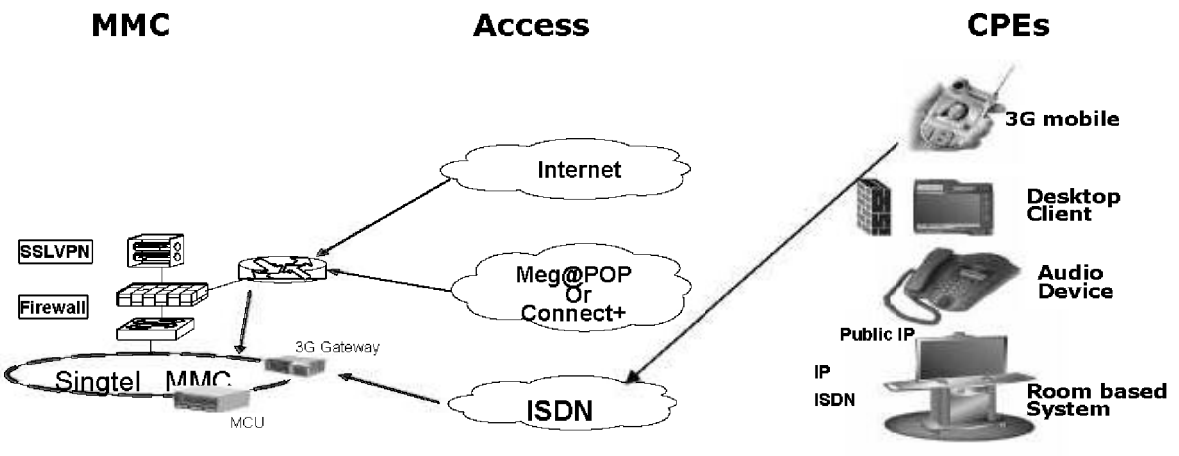

MMC
Access
CPEs
Internet
SSLVPN
Firewall
Meg@POP
Or
Connect+
3G Gateway
Singtel MMC
MCU
ISDN
3G mobile
Desktop
Client
Audio
Device
Public IP
IP
ISDN
Room based
System

Fig 17

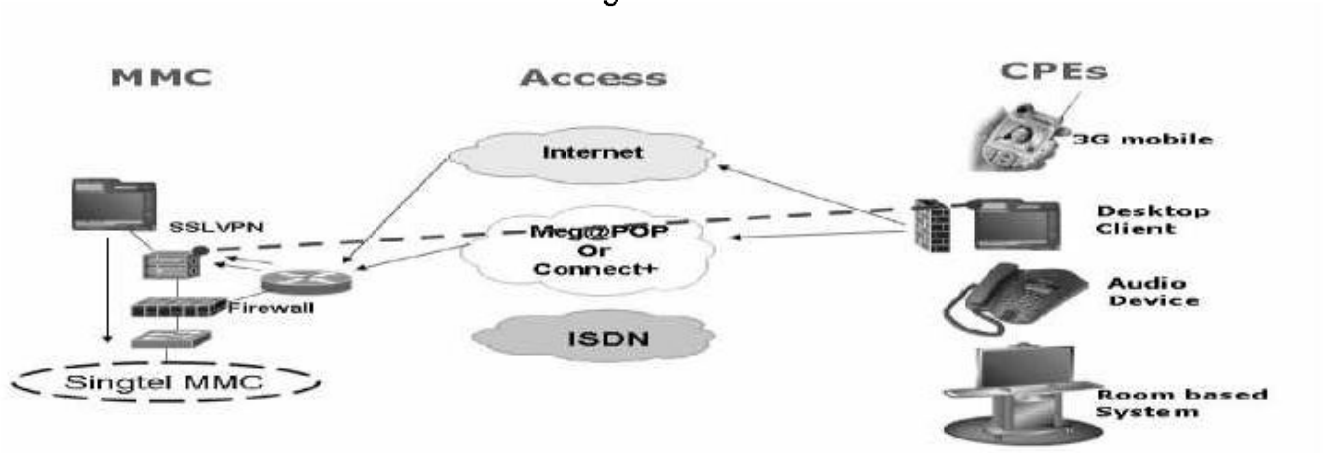

MMC
Access
CPEs
Internet
SSLVPN
Meg@POP
Or
Connect+
Firewall
ISDN
Singtel MMC
3G mobile
Desktop
Client
Audio
Device
Room based
System

Fig 18

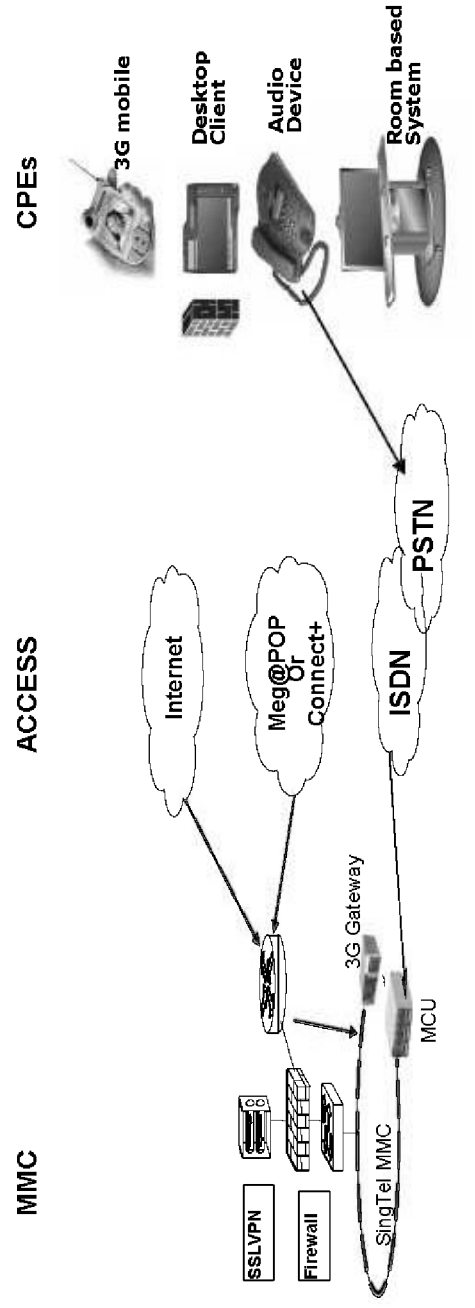

CPEs
3G mobile
Desktop Client
Audio Device
Room based System
ACCESS
Internet
Meg@POP Or Connect+
ISDN
PSTN
MMC
3G Gateway
MCU
SSLVPN
Firewall
SingTel MMC

Fig 19

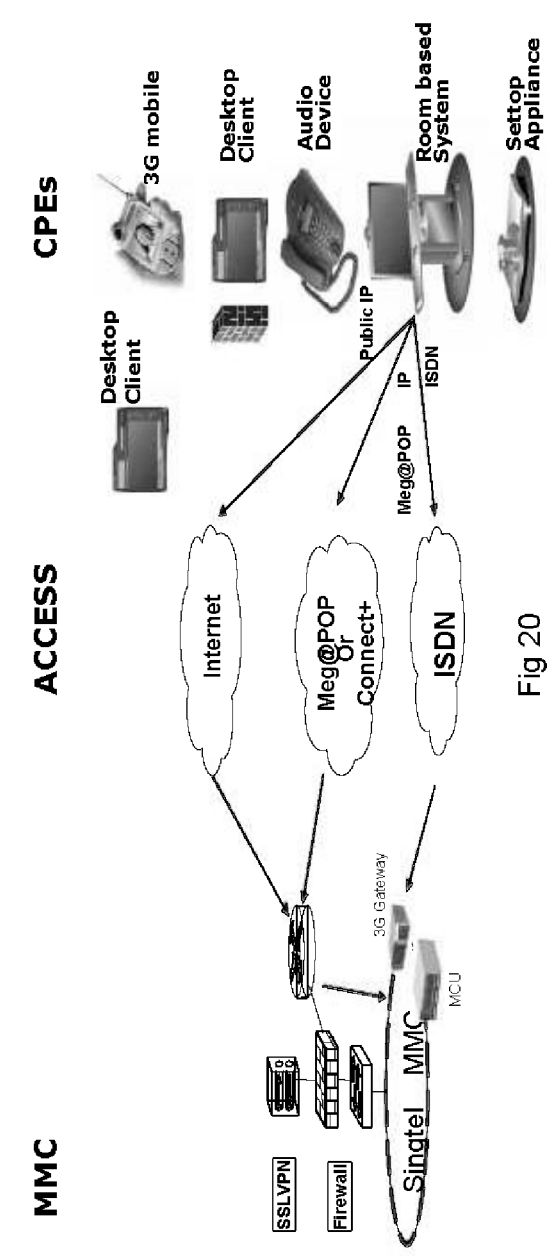

CPEs
3G mobile
Desktop Client
Audio Device
Room based System
Settop Appliance
Public IP
IP
ISDN
Meg@POP
ACCESS
Internet
Meg@POP Or Connect+
ISDN
MMC
3G Gateway
MCU
SSLVPN
Firewall
SingTel MMC

Fig 20

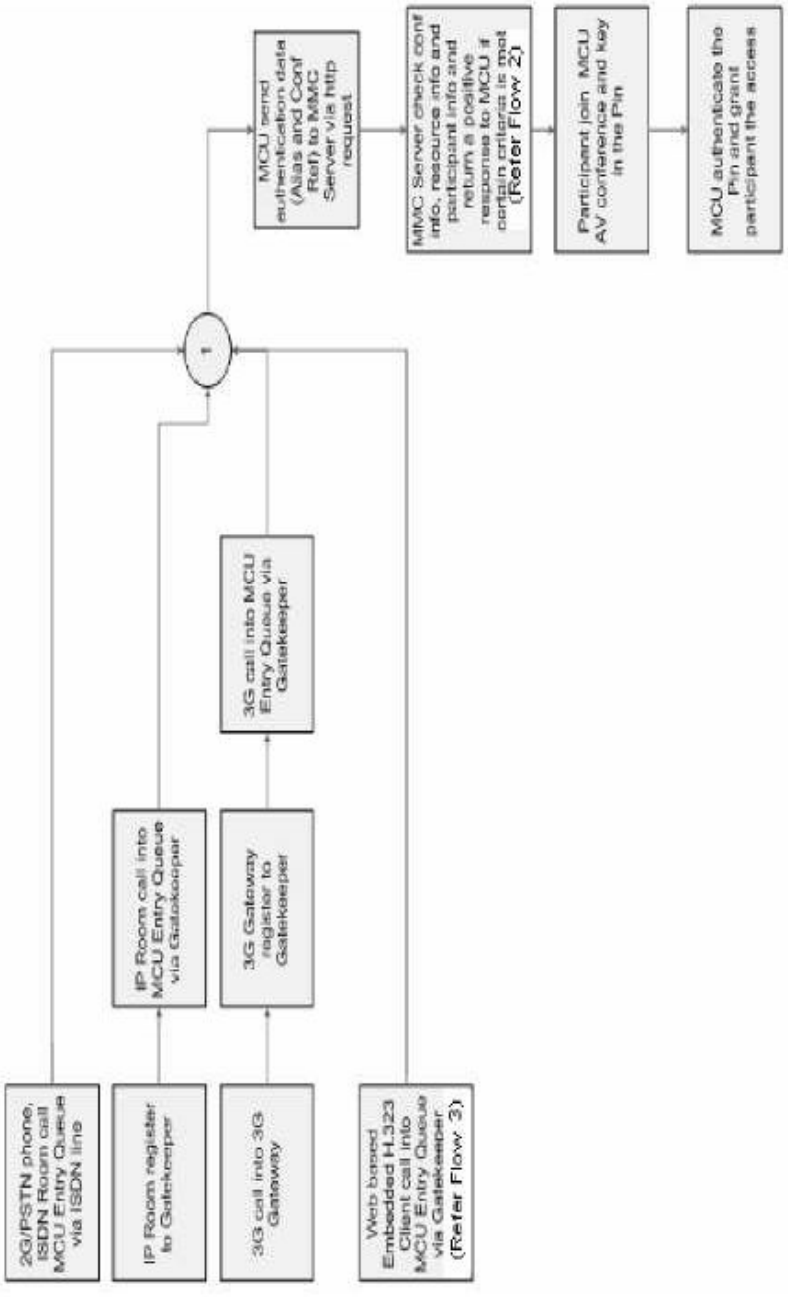

2G/PSTN phone, ISDN Room call MCU Entry Queue via ISDN line
IP Room register to Gatekeeper
3G call into 3G Gateway
Web based Embedded H.323 Client call into MCU Entry Queue via Gatekeeper (Refer Flow 3)
IP Room call into MCU Entry Queue via Gatekeeper
3G Gateway register to Gatekeeper
3G call into MCU Entry Queue via Gatekeeper
1
MCU send authentication data (Alias and Conf Ref) to MMC Server via http request
MMC Server check conf info, resource info and participant info and return a positive response to MCU if certain criteria is met (Refer Flow 2)
Participant join MCU AV conference and key in the Pin
MCU authenticate the Pin and grant participant the access

Fig 21

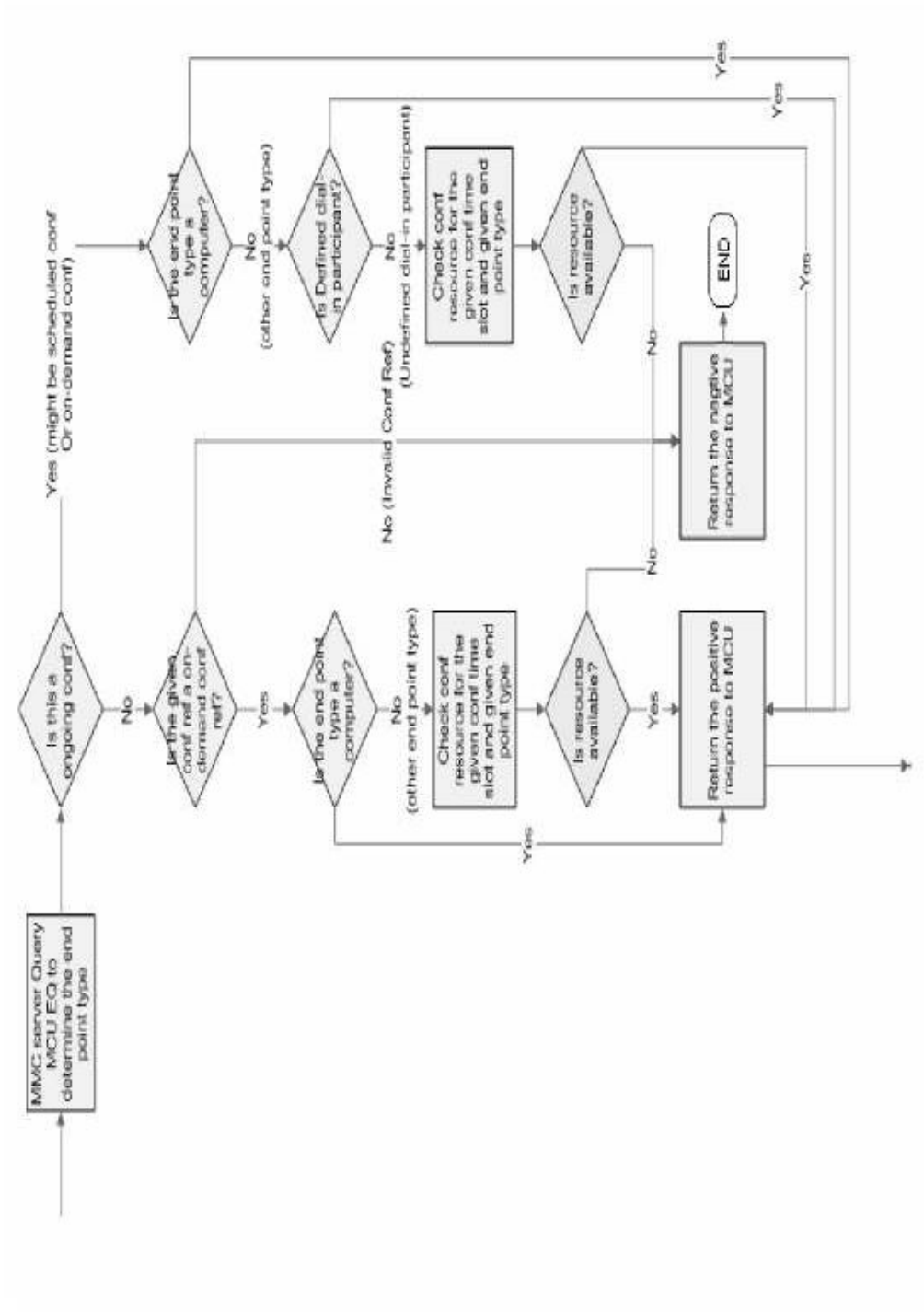

MMC server Query MCU EQ to determine the end point type
Is this a ongoing conf?
Yes (might be scheduled conf Or on-demand conf)
No
Is the given conf ref a on-demand conf ref?
No (Invalid Conf Ref) (Undefined Conf Ref)
Yes
Is the end point type a computer?
Yes
No (other end point type)
Check conf resource for the given conf time slot and given end point type
Is resource available?
No
Yes
Return the positive response to MCU
Return the negative response to MCU
END
Is the end point type a computer?
Yes
No (other end point type)
Is Defined dial-in participant?
No
Check conf resource for the given conf time slot and given end point type
Is resource available?
No
Yes
Return the positive response to MCU
Return the negative response to MCU
END

Fig 22

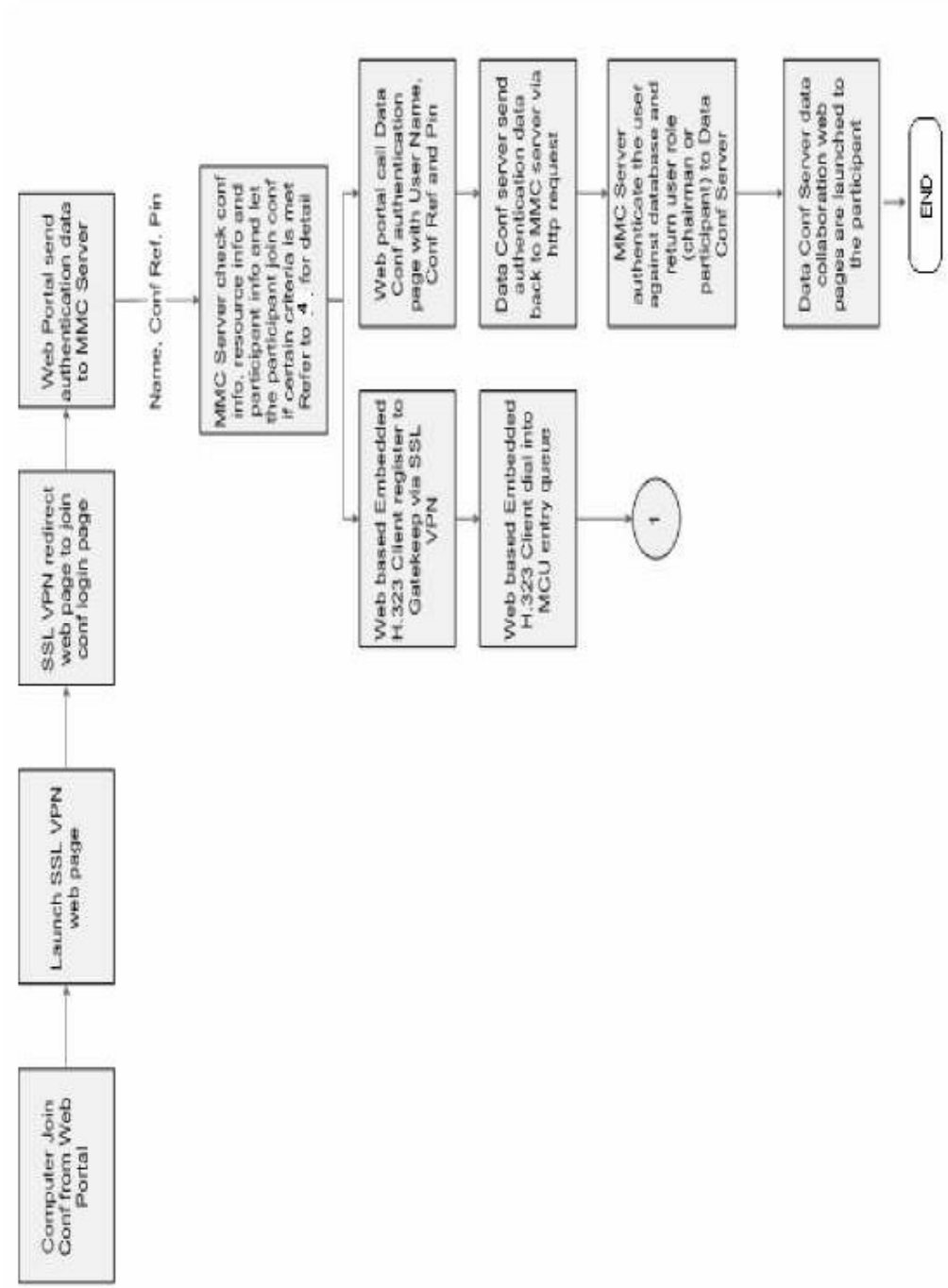

Computer Join Conf from Web Portal
Launch SSL VPN web page
SSL VPN redirect web page to join conf login page
Web Portal send authentication data to MMC Server
Name, Conf Ref, Pin
MMC Server check conf info, resource info and participant info and let the participant join conf if certain criteria is met Refer to '4' for detail
Web based Embedded H.323 Client register to Gatekeep via SSL VPN
Web based Embedded H.323 Client dial into MCU entry queue
1
Web portal call Data Conf authentication page with User Name, Conf Ref and Pin
Data Conf server send authentication data back to MMC server via http request
MMC Server authenticate the user against database and return user role (chairman or participant) to Data Conf Server
Data Conf Server data collaboration web pages are launched to the participant
END

Fig 23

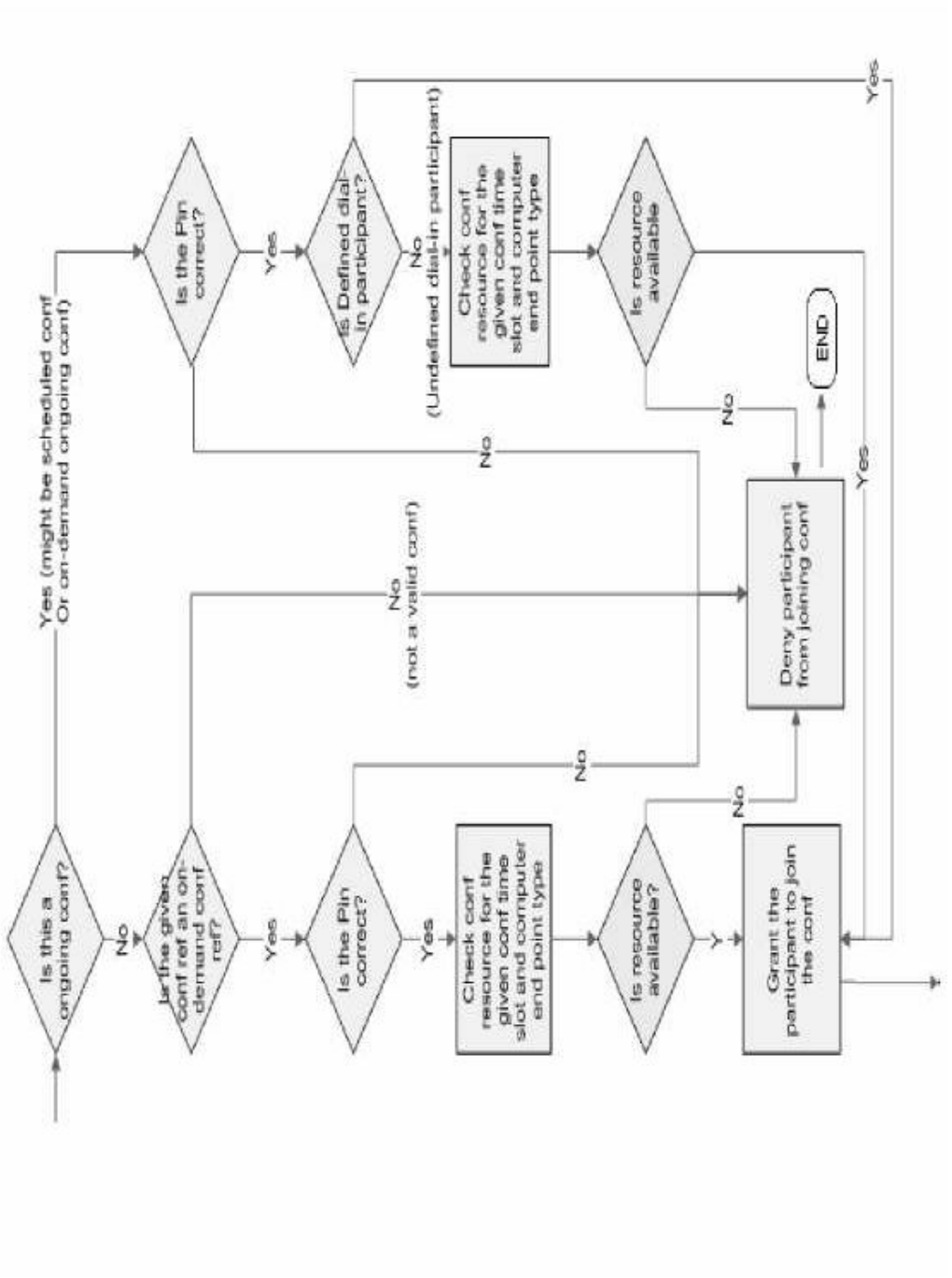

Is this a ongoing conf?
Yes (might be scheduled conf Or on-demand ongoing conf)
No
Is the given conf ref an on-demand conf ref?
Yes
No (not a valid conf)
Is the Pin correct?
Yes
No
Is the Pin correct?
Yes
No
Is Defined dial-in participant?
No (Undefined dial-in participant)
Check conf resource for the given conf time slot and computer end point type
Check conf resource for the given conf time slot and computer end point type
Is resource available?
Y
Is resource available
No
Yes
Deny participant from joining conf
END
Grant the participant to join the conf
Yes

Fig 24


Chairman create a Defined Dial-out participant during reservation
MMC create a dial-out participant in MCU for the reserved conf
MCU auto dial out to the participant when conf is started

Fig 25

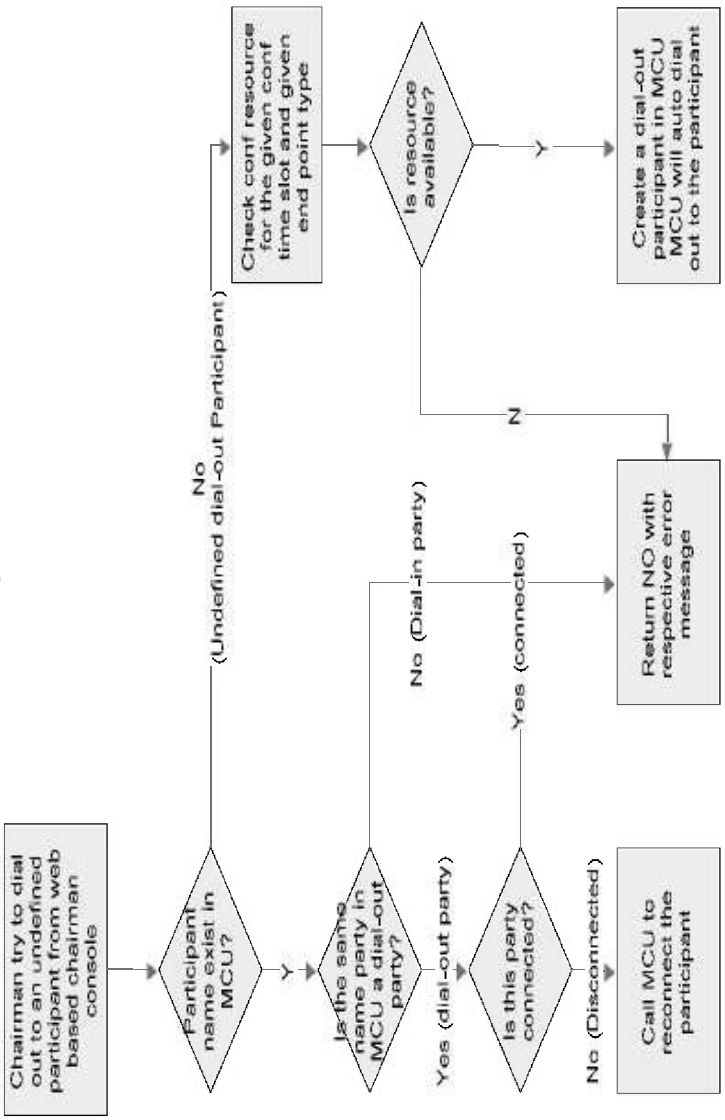

Chairman try to dial out to an undefined participant from web based chairman console
Participant name exist in MCU?
Y
No (Undefined dial-out Participant)
Check conf resource for the given conf time slot and given end point type
Is resource available?
Y
Create a dial-out participant in MCU MCU will auto dial out to the participant
N
Is the same name party in MCU a dial-out party?
No (Dial-in party)
Yes (dial-out party)
Is this party connected?
Yes (connected)
No (Disconnected)
Return NO with respective error message
Call MCU to reconnect the participant

Fig 26

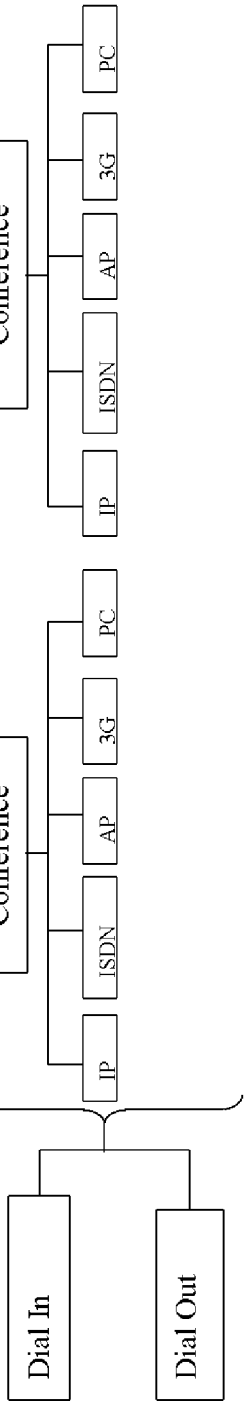

Dial In
Dial Out
IP
ISDN
AP
3G
PC
Scheduled Conference
IP
ISDN
AP
3G
PC
On-demand Conference

Fig 27

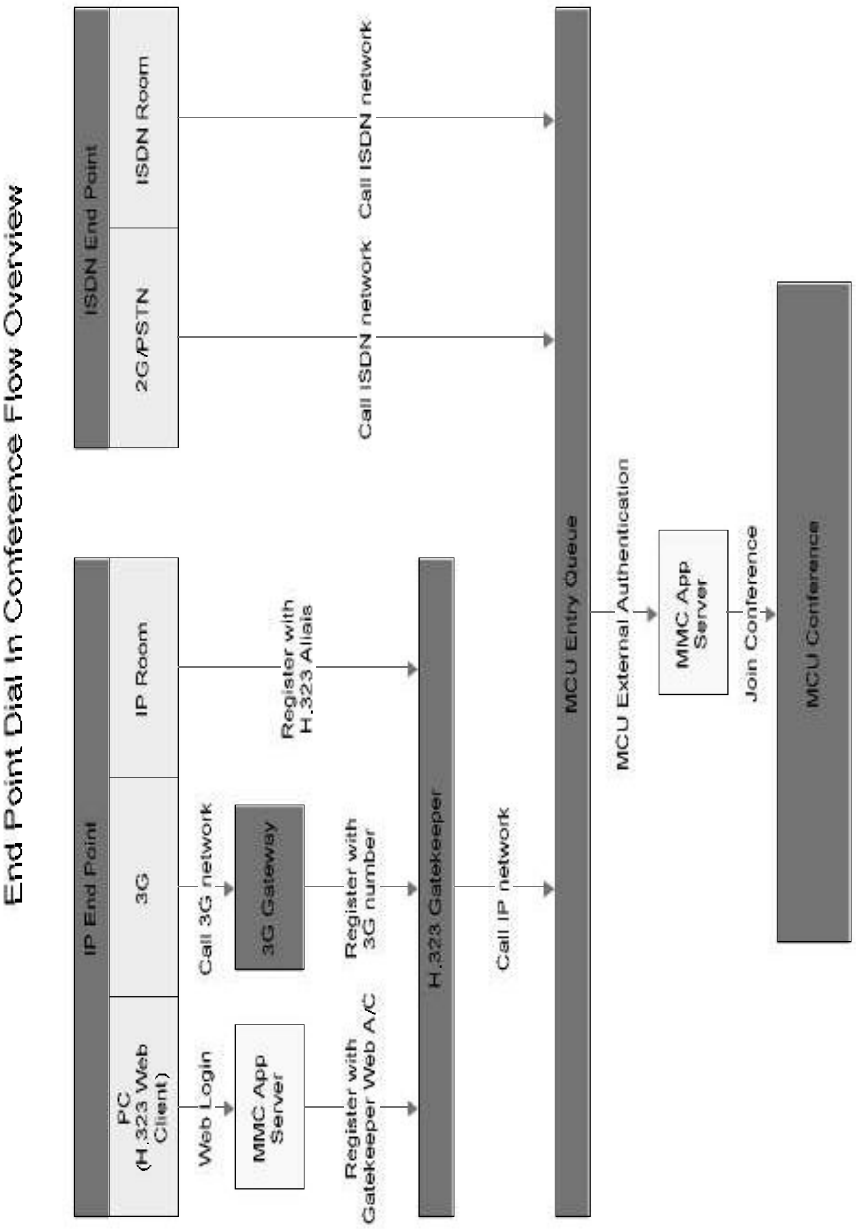

End Point Dial In Conference Flow Overview
IP End Point
PC (H.323 Web Client)
3G
IP Room
ISDN End Point
2G/PSTN
ISDN Room
Web Login
Call 3G network
Call ISDN network
Call ISDN network
MMC App Server
3G Gateway
Register with H.323 Alias
Register with Gatekeeper Web A/C
Register with 3G number
H.323 Gatekeeper
Call IP network
MCU Entry Queue
MCU External Authentication
MMC App Server
Join Conference
MCU Conference

Fig 28

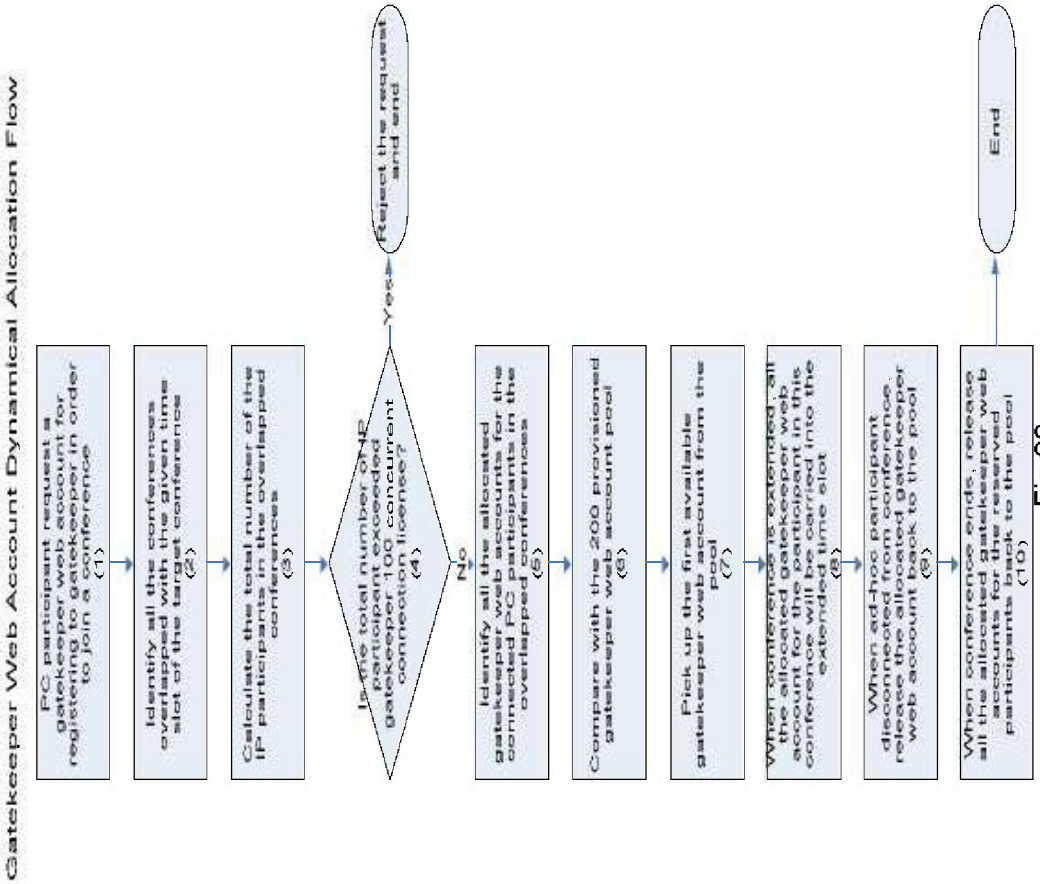

Gatekeeper Web Account Dynamical Allocation Flow
PC participant request a gatekeeper web account for registering to gatekeeper in order to join a conference (1)
Identify all the conferences overlapped with the given time slot of the target conference (2)
Calculate the total number of the IP participants in the overlapped conferences (3)
Is the total number of IP participants exceeded gatekeeper 100 concurrent connection license? (4)
Yes
Reject the request and end
No
Identify all the allocated gatekeeper web accounts for the connected PC participants in the overlapped conferences (6)
Compare with the 200 provisioned gatekeeper web account pool (6)
Pick up the first available gatekeeper web account from the pool (7)
When conference is extended, all the allocated gatekeeper web account for the participant in this conference will be carried into the extended time slot (8)
When ad-hoc participant disconnected from conference, release the allocated gatekeeper web account back to the pool (9)
When conference ends, release all the allocated gatekeeper web accounts for the reserved participants back to the pool (10)
End

Fig 29

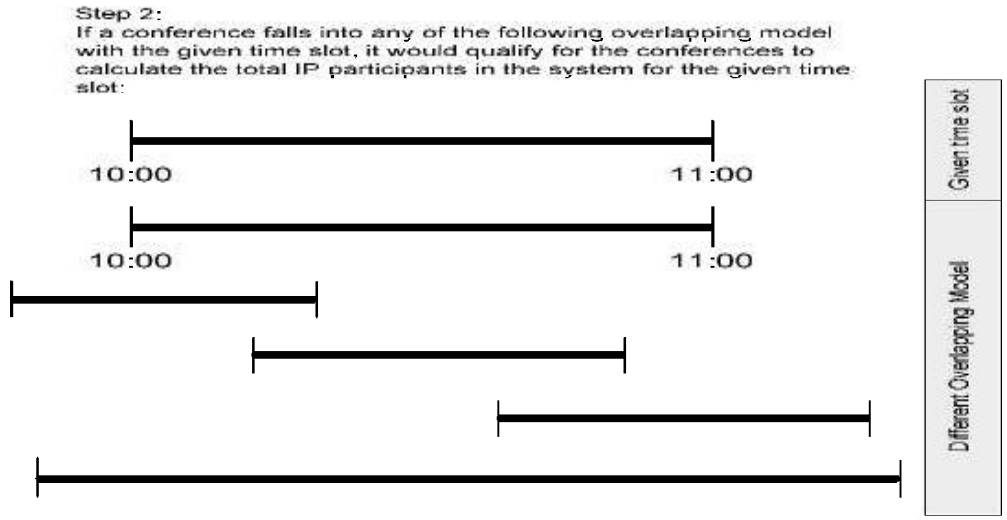

Step 2:
If a conference falls into any of the following overlapping model with the given time slot, it would qualify for the conferences to calculate the total IP participants in the system for the given time slot:
10:00
11:00
10:00
11:00
Given time slot
Different Overlapping Model

Fig 30

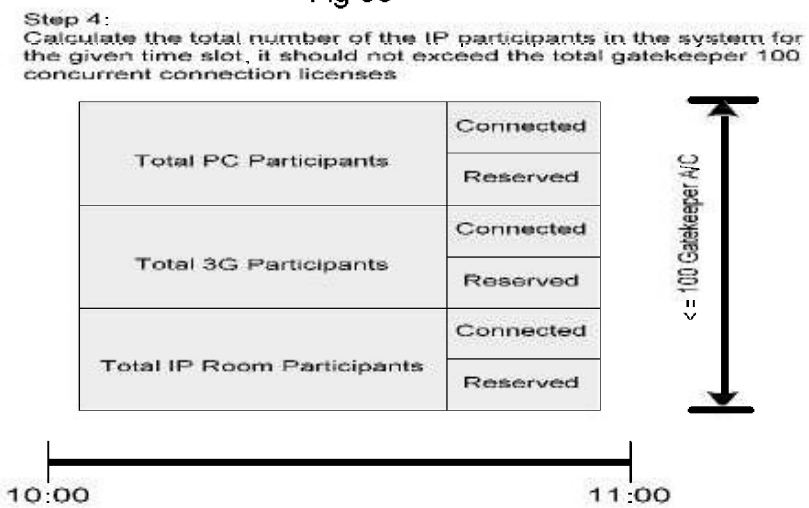

Step 4:
Calculate the total number of the IP participants in the system for the given time slot, it should not exceed the total gatekeeper 100 concurrent connection licenses
Total PC Participants
Connected
Reserved
Total 3G Participants
Connected
Reserved
Total IP Room Participants
Connected
Reserved
=< 100 Gatekeeper A/C
10:00
11:00

Fig 31

Step 5, 6, 7:
Dynamically pick up an available gatekeeper web account from the pool and assign it to the requesting PC participant for registering to gatekeeper

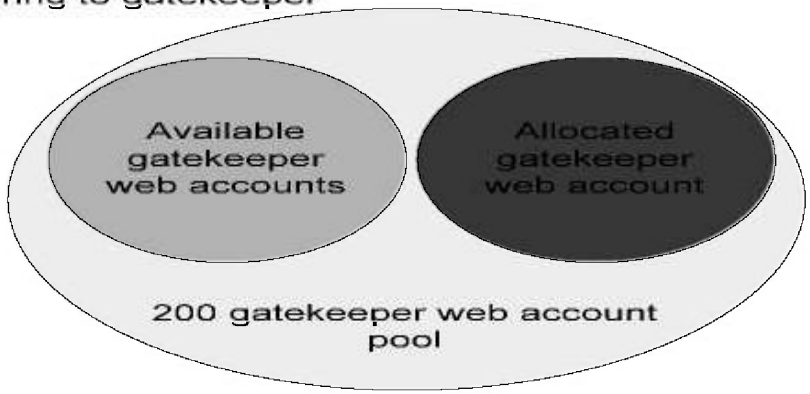


Fig 32