

REDUNDANCY AND RELIABILITY



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Reliability through High Availability

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- High availability and resilience mechanisms are addressed in three basic areas:
 - Customer premise
 - IP network
 - SP VoIP infrastructure resources
- SP can incrementally enhance each area to its needs or the needs of the subscriber

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Reliability through High Availability: At the CPE

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- LAN

Redundant switch links with enhanced STP convergence speed (RSTP)

In-line power from switch to phones allows for centralized power backup

- VoIP Components

CCM: Server Clustering, SQL database replication from publisher to subscriber, Survivable Remote Site Telephony (SRST)

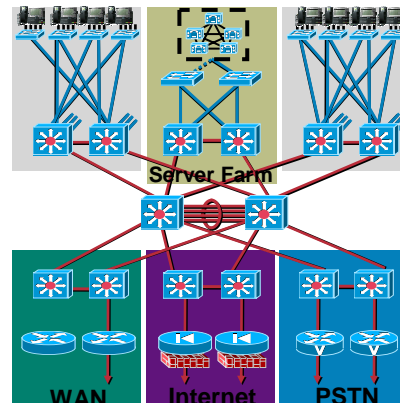
CME/GW: HSRP

SIP IP Phone: SIP SRST

- Call routing / admission

CCM: Alternate Auto Routing, PSTN fallback, Alternate GK, Alternate EP, Inter-Cluster and Intra-Cluster CAC

CME /GW: Rotary dial-peers, PSTN fallback, Alternate GK, Alternate EP, BRQ CAC



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Reliability through High Availability: In the IP Network

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- Layer 2

STP, inline Power

- IP Networks:

HSRP core routers

Redundant links

IP routing robustness and convergence

- MPLS Networks:

Leverage existing layer three IP routing protocol convergence

MPLS Fast Re-Route which gives the ability to patch traffic onto a backup tunnel in case of a link or node failure with a failover time of 50 ms or lower

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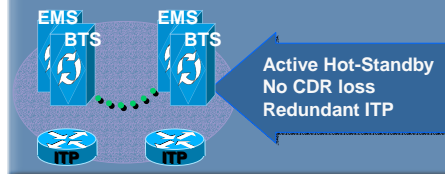
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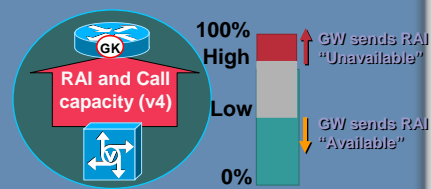
Reliability through High Availability: VoIP Infrastructure

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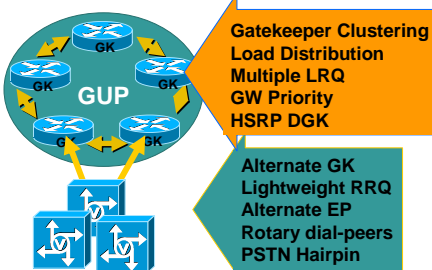
BTS10200 Redundancy



Resource Availability



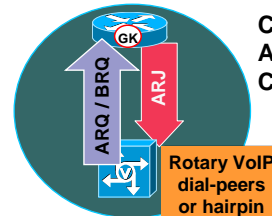
G with GK Fault Tolerance



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Call Admission Control



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CASE STUDY 1



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U.S. BVS CME Opportunity

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- A large enterprise that considers themselves an SP
- First phase: 10K site current moving to 15K in a year. 20K sites by 2010
- BTS10200 as router server: two separate systems for geographic redundancy
- Four HQ with CCM
- 10K remote sites with CME (1760)
- Centralized Unity VM: BTS relay the voice signaling and a separate centralized CME functioning as MWI Proxy

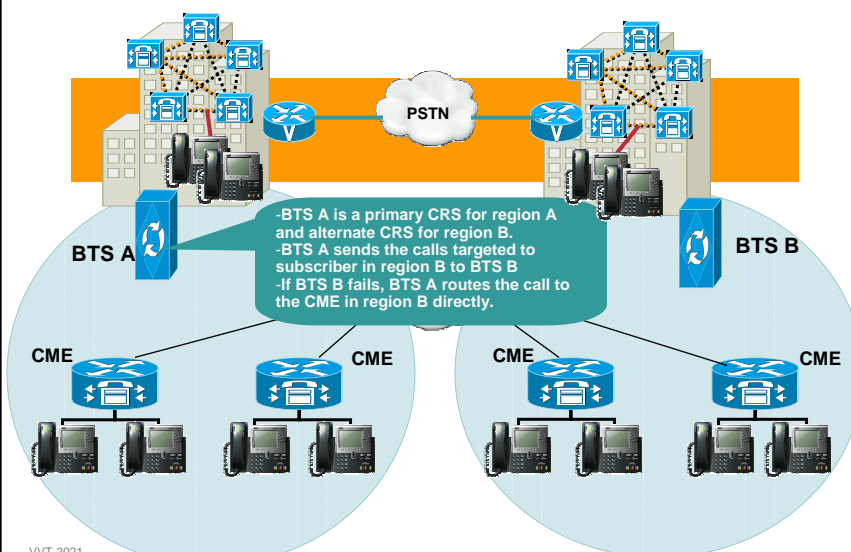
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Simplified Architecture

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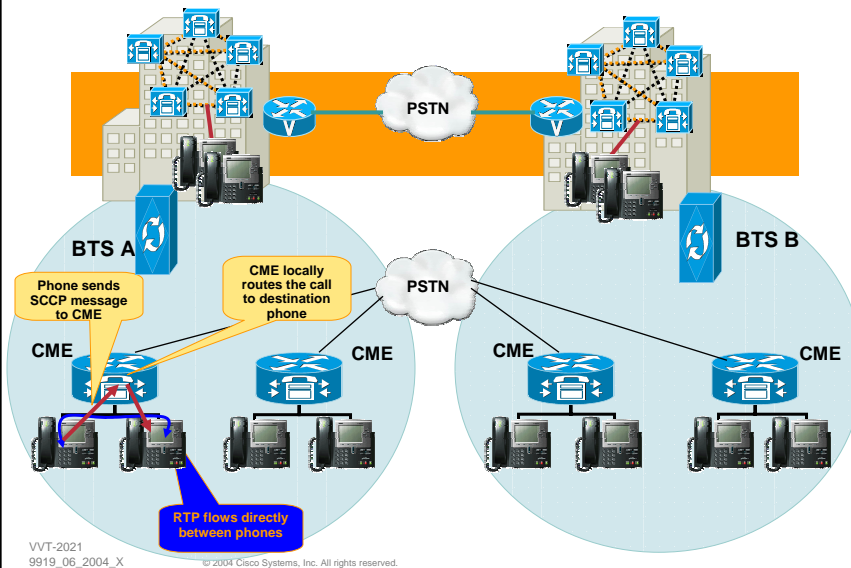
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Local Intra-Site Call

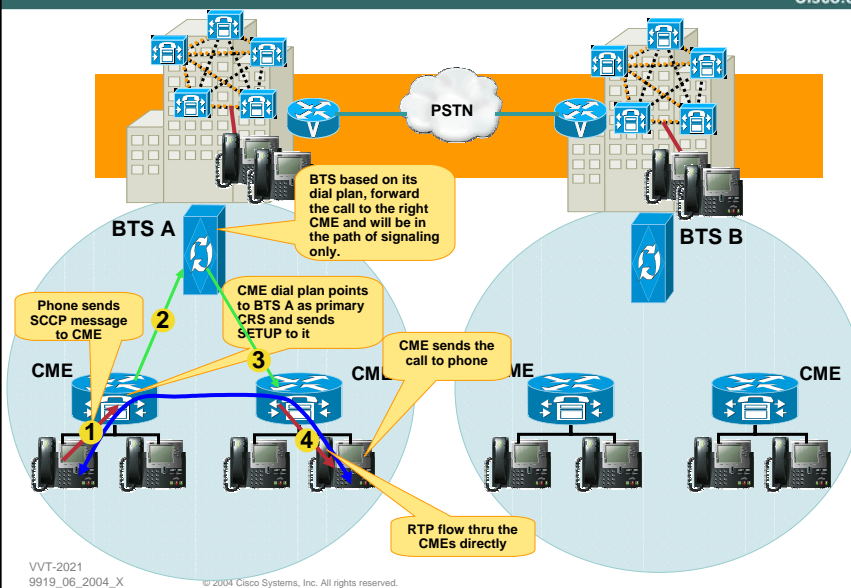
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Intra-Region Calls

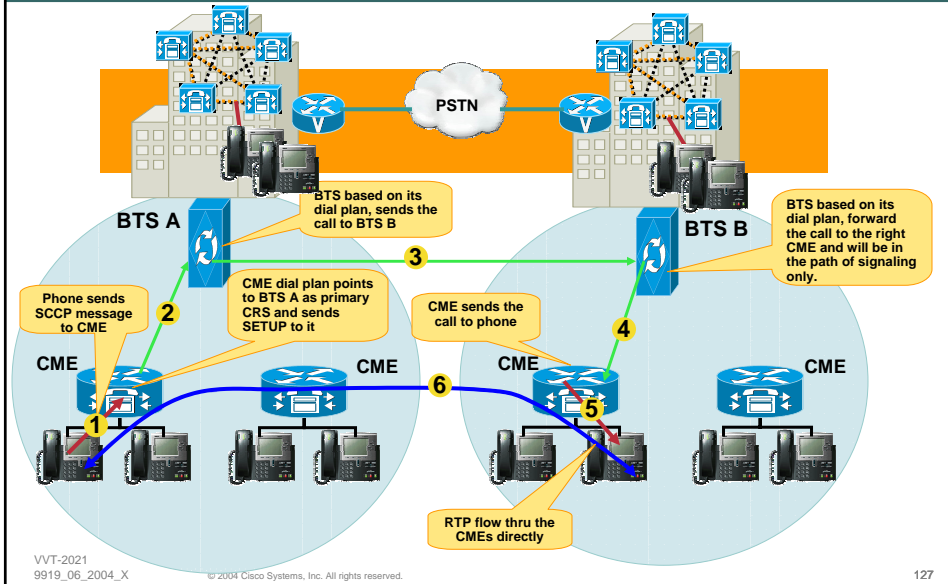
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Inter-Region Calls

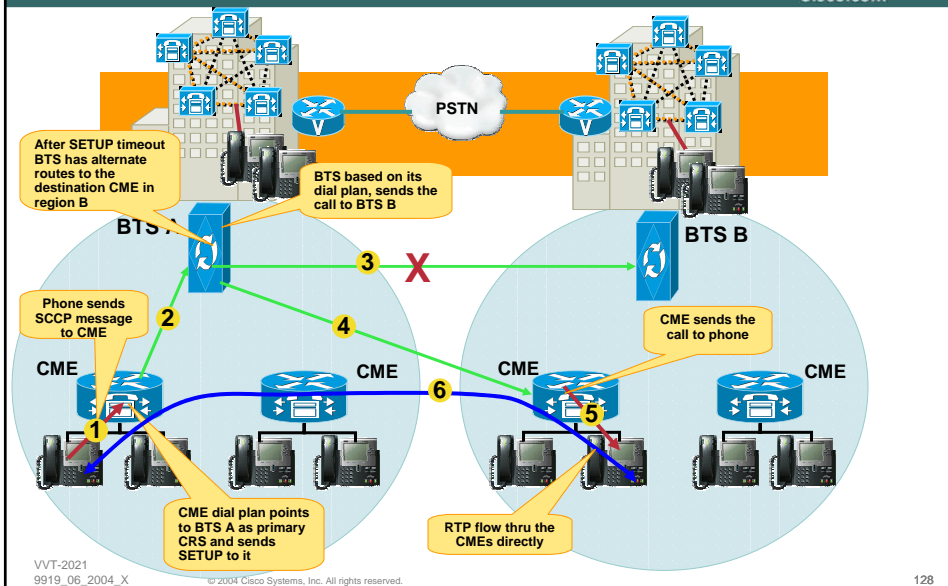
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Inter-Region Calls: BTS B Fails

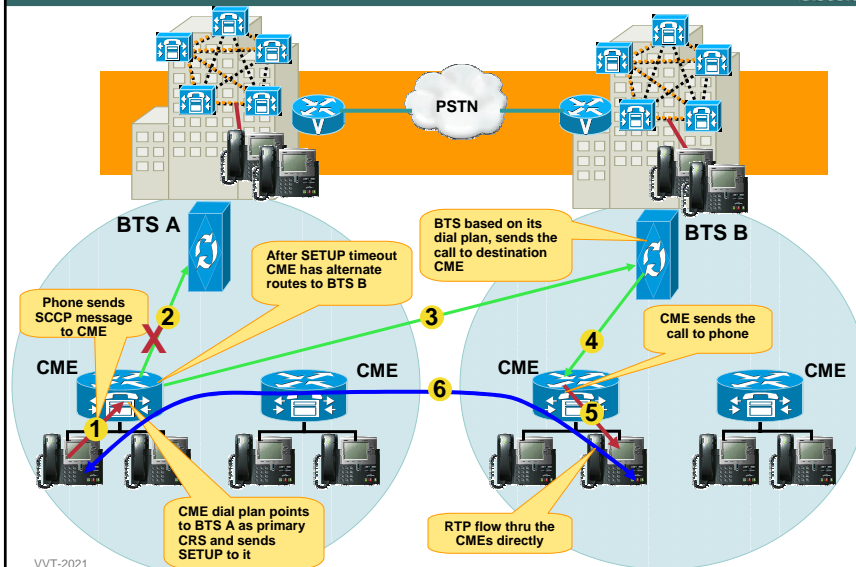
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Inter-Region Calls: BTS A Fails

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SUMMARY



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Business Voice Solution Summary

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- **Highly modular architecture enables pay as you grow and expand as capacity increases**
- **Arsenal of enhanced features, products, and end-to-end system design to address concerns Cisco has experience building the world's largest carrier class VoIP networks in regions around the globe**
- **Address most enterprise concerns with education**
 - 1) Can address small customers (CCME) to large enterprises (CCM)
 - 2) Can accommodate migration with combination of ITS and GWs front-ending PBXs
 - 3) Can accommodate multi-protocol environments
 - 4) Modular architecture can allow service nodes for new offerings
 - 5) Supports variety of deployment models simultaneously
 - 6) Ability to partner with other carriers for increased global coverage for PSTN termination

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THANK YOU



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Reference URLs

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- **Business Case for Cisco Business Voice Solution**
<http://www.cisco.com/warp/public/cc/so/neso/voso/spbvs/wp.htm>
- **Cisco Business Voice Solution**
<http://www.cisco.com/warp/public/cc/so/neso/voso/cbvs2/ov.htm>
- **Cisco IP Telephony Design, Products and Solutions**
http://www.cisco.com/warp/public/779/largeent/avvid/datacom/best_practices.html

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REFERENCES



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Other Networkers Sessions of Interest

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- **VVT-2000 Choosing the Correct Voice/Video Signaling Strategy: H.323**
- **VVT-2001 Choosing the Correct Voice/Video Signaling Strategy: MGCP/SIP**
- **Cisco Booth World of Solutions, Service Provider Cluster: Business Voice Managed Services Demo**

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QUESTIONS



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Complete Your Online Session Evaluation!

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- WHAT:** Complete an online session evaluation and your name will be entered into a daily drawing
- WHY:** Win fabulous prizes! Give us your feedback!
- WHERE:** Go to the Internet stations located throughout the Convention Center
- HOW:** Winners will be posted on the onsite Networkers Website; four winners per day

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CASE STUDY 2



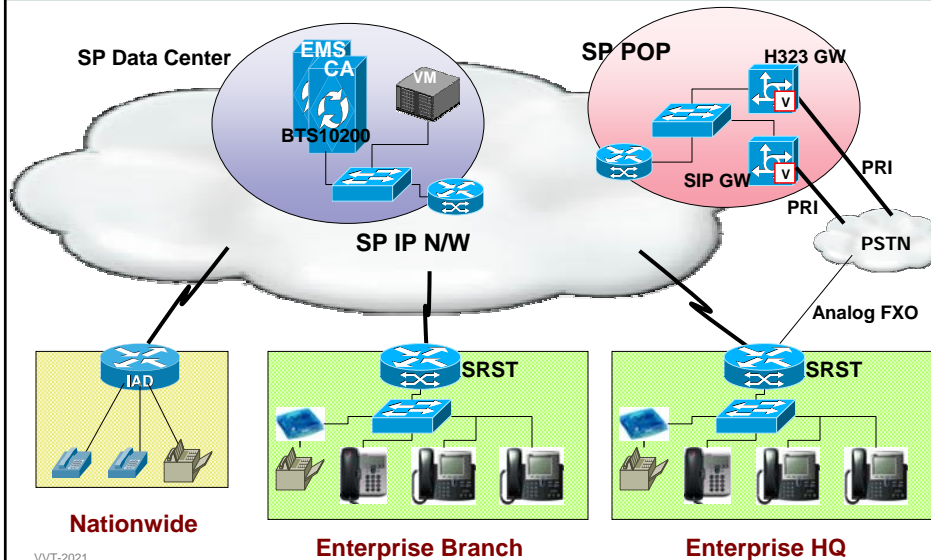
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BTS 10200 / SIP Phone Support and Any-to-Any Interconnect Topology

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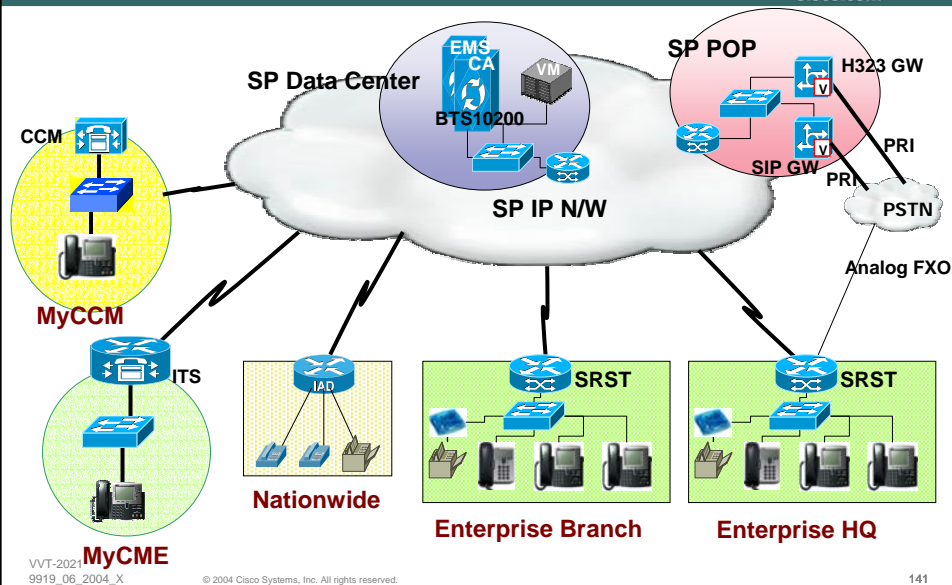


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Integration of CCM and CME



Dial Plan (1)

- Cisco.com
- 5 digit extension dialing is provisioned for intra-enterprise calling (between all sites).
 - Between enterprises and out to PSTN: 9+10 digits E.164. Provisioned for certain NPA-NXX, 800, 866, 877, 888, 1010321, 1010220, 911, 411.
 - **Enterprise HQ:**
 - 7960_1: E.164 no. =4083251400 (3 lines as Operator), 4083251401
 - 7960_1: E.164 no. =4083251404, 4083251405
 - 7905: E.164 no.=4083251402
 - ATA186: E.164 no.=4083251403

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Dial Plan (2)

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- **Enterprise Branch:**

7960_1: E.164 no. =4085451350, 4085451351

7960_1: E.164 no. =4085451354 (two lines), 4085451355

7905: E.164 no.=4085451352

ATA186: E.164 no.=4085451353

- **Nationwide:**

IAD2421: E.164 no.=4082321300, 4082321301, 4082321303

- **MyCCM:** E.164 no.=4083271420

- **MyCME:** E.164 no.=4083281430

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Call Signaling Flows

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- SIP between all SIP phones
- SIP to VM
- SIP <-> MGCP between MGCP endpoints (IAD and ATAs)
- SIP <-> H323 from SIP phones to PSTN GW and to CME
- SIP <-> CCM H323 from SIP phones to CCM Skinny phones
- SIP <-> SIP from PSTN GW to SIP phones
- MGCP <-> H323 from MGCP endpoint to PSTN GW

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BTS 10200 SPA Features

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- Add/Remove subscriber to an enterprise
- Display features enabled for a subscriber
- Change call forwarding options for a subscriber
- Change class of service restrictions for a subscriber
- Add and remove members from multi-line hunt group
- Display members of an enterprise (office administrator function)
- Enable/disable three way calling, call hold/transfer, call waiting, caller ID/name delivery, voice mail, call forwarding for a subscriber

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SIP phones Features

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- Basic calls: intra-group, intra-enterprise, inter-enterprise, and to/from PSTN (DID/DOD).
- Calling name and number.
- CFW between enterprises, between groups, within group, and out to PSTN.
- call waiting and cancel call waiting. Caller ID/name should be displayed
- call hold.
- call transfer between enterprises, within group, between groups and out to PSTN.
- 3 Way Calling.
- Call logs: missed, received, placed, etc.
- Redial Softkey
- 911, 411.
- Operator assistance, 0 dialing.
- Change display on the phone (picture, logo, etc.). Hehee I put my name as logo ☺
- VM support with MWI.
- Dial Around Service (1010xxx) calls (only 321, 220 provisioned in this setup)
- Toll Free Calling: 800, 866, 877, 888
- DND

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