# Cisco IP Telephony For Defence
# A Business Focus

**GDSG APAC TEAM**
**Peter Holliday & Andre Obradovic**

# Key Themes



- **Developments in Commercial Technology has changed the way we fight the war**
- **Benefits to Defence of a converged IPTEL System**
- **Why Customers Chose Cisco for IPTEL**
- **Tactical Deployed Customer Examples**
- **Strategic HQ & Campus Customer Examples**
- **Technical Discussion Reasons for Migration**

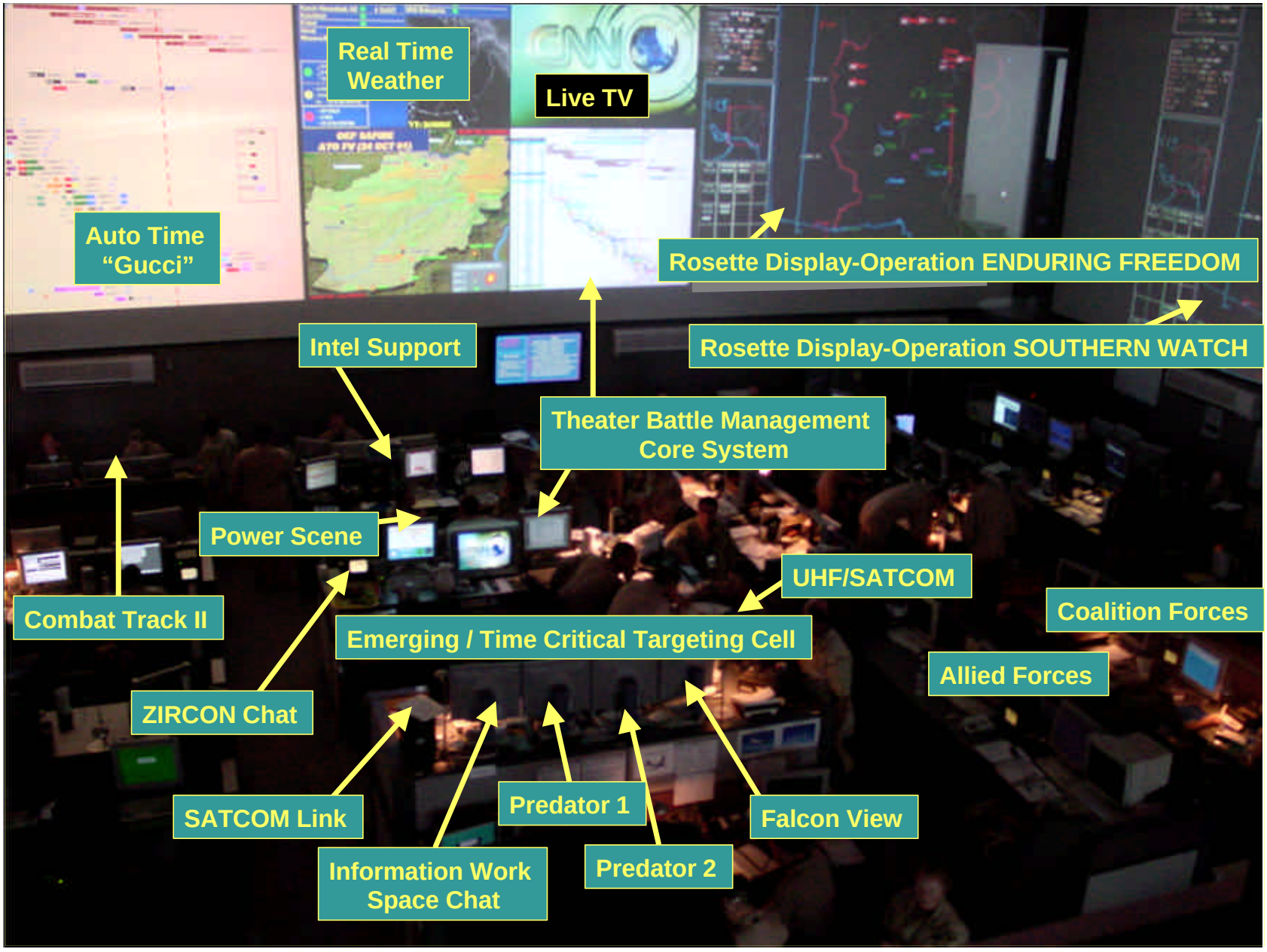
# Example of Exponential Change in Technology



**World War II**
1,500 B-17s
One target – 9000 bomb
250 lbs
3,300 ft accuracy

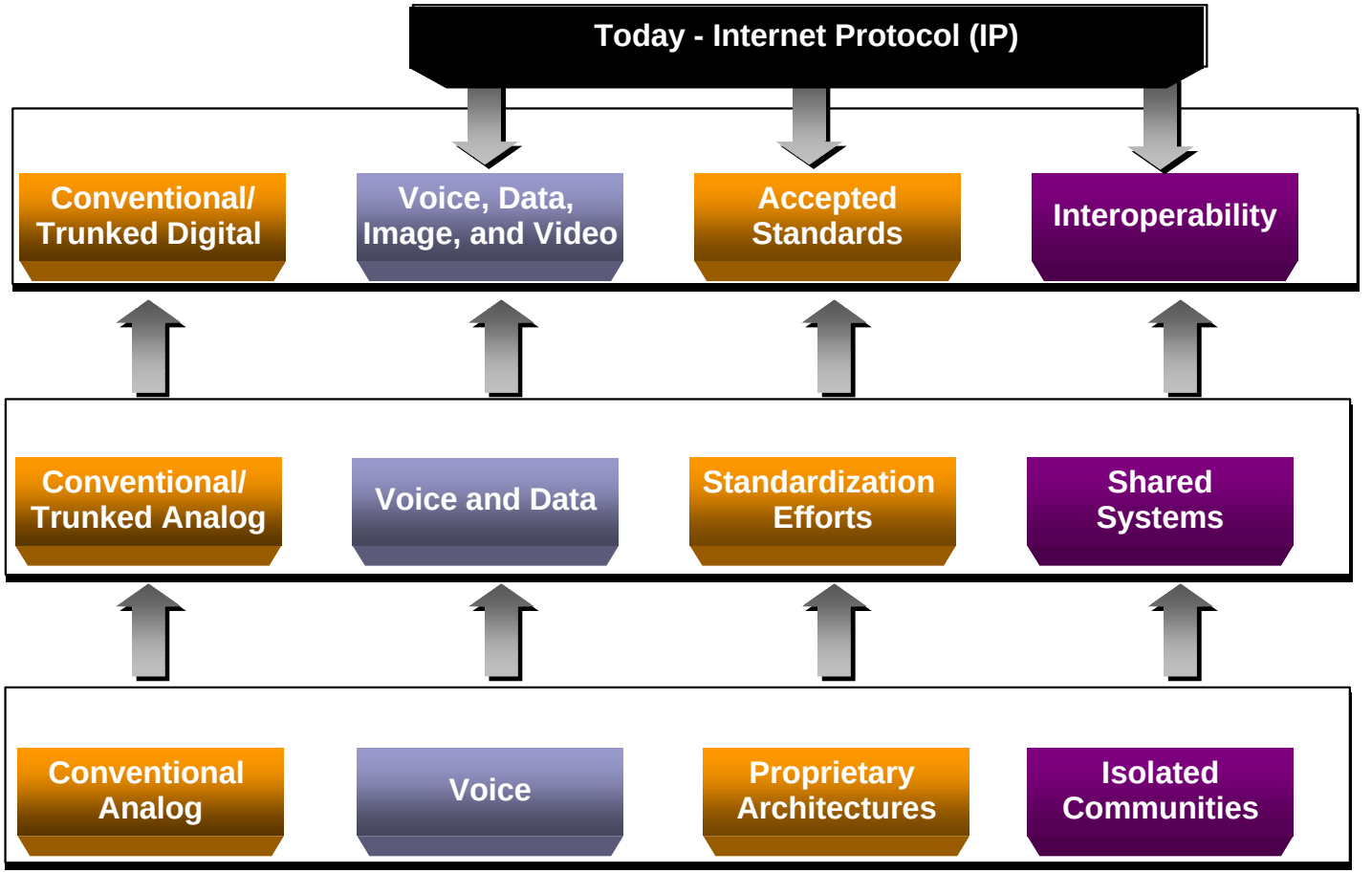
**Vietnam**
30 F-4s
One target – 176 bombs
500 lbs
400 ft accuracy

**Desert Storm**
1 F-117 (clear night)
2 targets – 2 bombs
1000 lbs
10 ft accuracy


Real Time Weather
Live TV
Auto Time "Gucci"
Rosette Display-Operation ENDURING FREEDOM
Intel Support
Rosette Display-Operation SOUTHERN WATCH
Theater Battle Management Core System
Power Scene
UHF/SATCOM
Combat Track II
Coalition Forces
Emerging / Time Critical Targeting Cell
Allied Forces
ZIRCON Chat
SATCOM Link
Predator 1
Falcon View
Information Work Space Chat
Predator 2

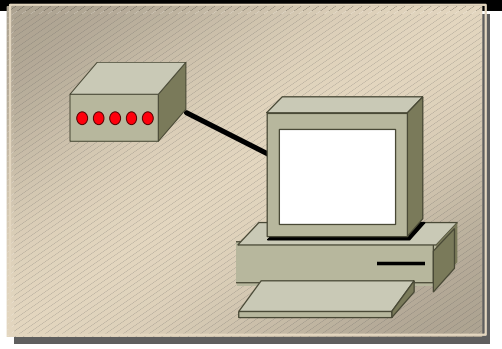
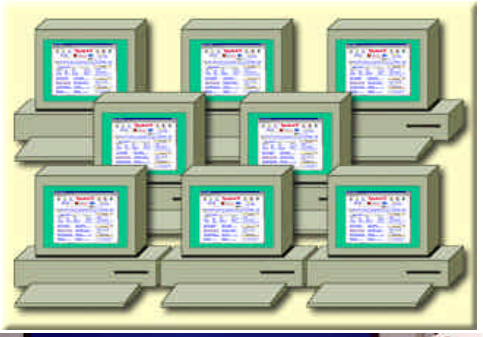
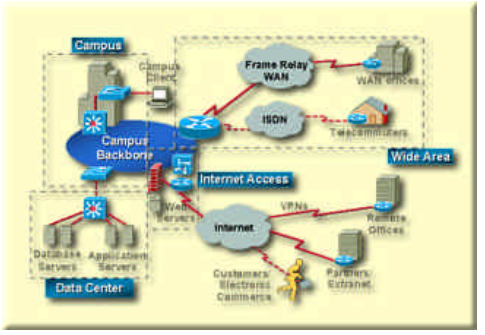
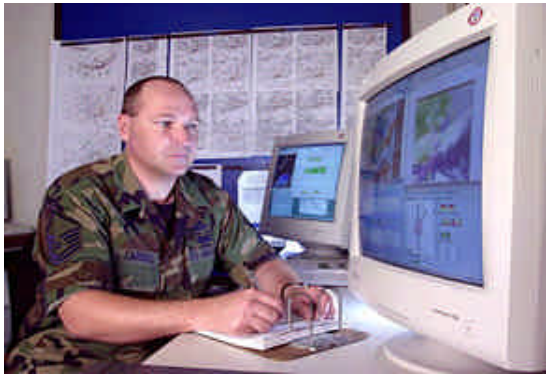
# Changing Environment in information Systems

Cisco.com



# Ubiquitous Access within Military information and Combat Systems

Cisco.com

| Human Factors Interfaces | Speed and Bandwidth | Personalization / Customization |
|---|---|---|
|  |  |  |
|  |  |  |
| From Text – To Graphics & Interactive Multimedia | From Terminal servers – To high bandwidth - Mobile Wireless | From General – to Personalized – Mission Specific – C2 |

# Key Themes

Cisco.com

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# Multimedia Applications & Convergence



- Personal telephony services
  - Follow Me Call systems
  - Email/URL Phone books
- Unified messaging
  - Email/Fax/Voice
- Collaborative data sharing
  - Interactive Web pages
- Video streaming and conferencing
  - E-Learning
- Virtual call “contact”/command centers
- E-Learning  for remote training

# Why the movement to Voice over IP



***In Defense the Warfighter is driving demand for IP Telephony. Implementation started in garrison renovation projects and moved to the battlefield***

- Flexibility, Centralized Call Processing – roaming and remote access – and/or Decentralized
- Quantifiable ROI – money, rapid deployment, versatility (ubiquitous access)
- Depth and breadth of solution set
- Experience with IP and Internet applications
- Survivability and availability
- Co-Existence, ease of deployment – no “forklift” required
- Open, end-to-end, integrated solution

# Benefits of Convergence



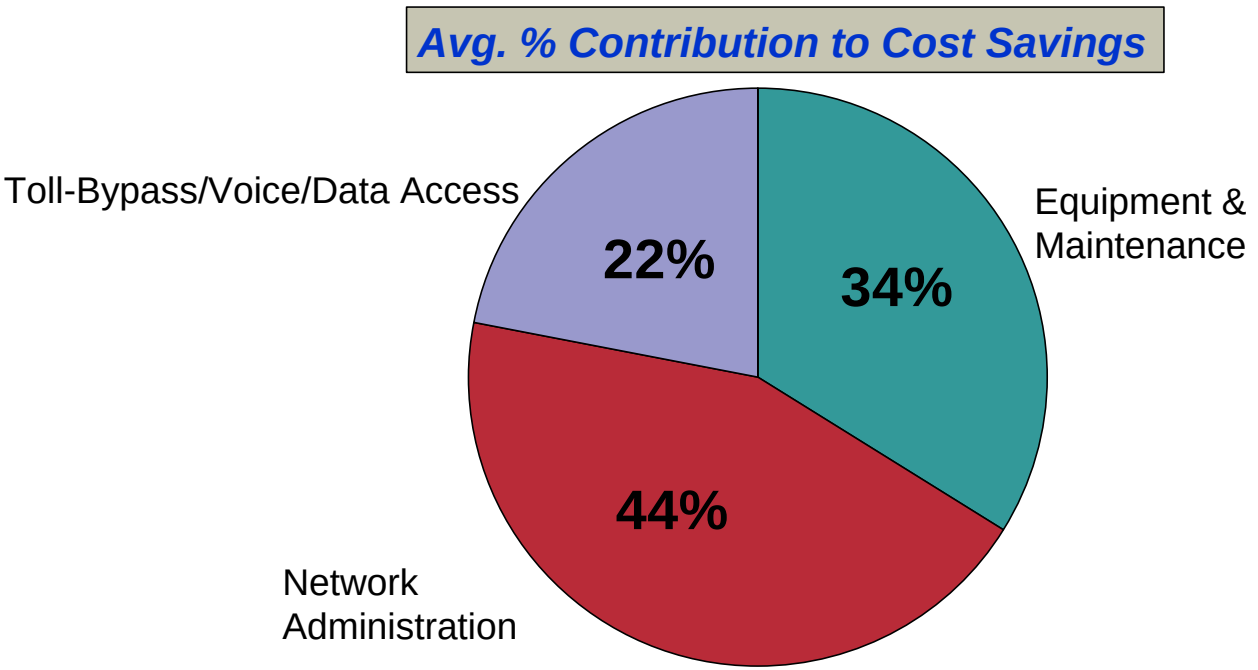
- Design efficiency
  - ✓One infrastructure to know, buy and maintain
  - ✓Cost savings - Capital, personnel, training
  - ✓Leveraged investment for expansions and upgrades
- Greater operational agility for new technologies and applications
- Extension of data security technology to voice and video
- Scalability, beyond the PBX cabinet

***Cisco Convergence delivers greater economic and operational advantages***

# ROI Findings in CallManager Installations

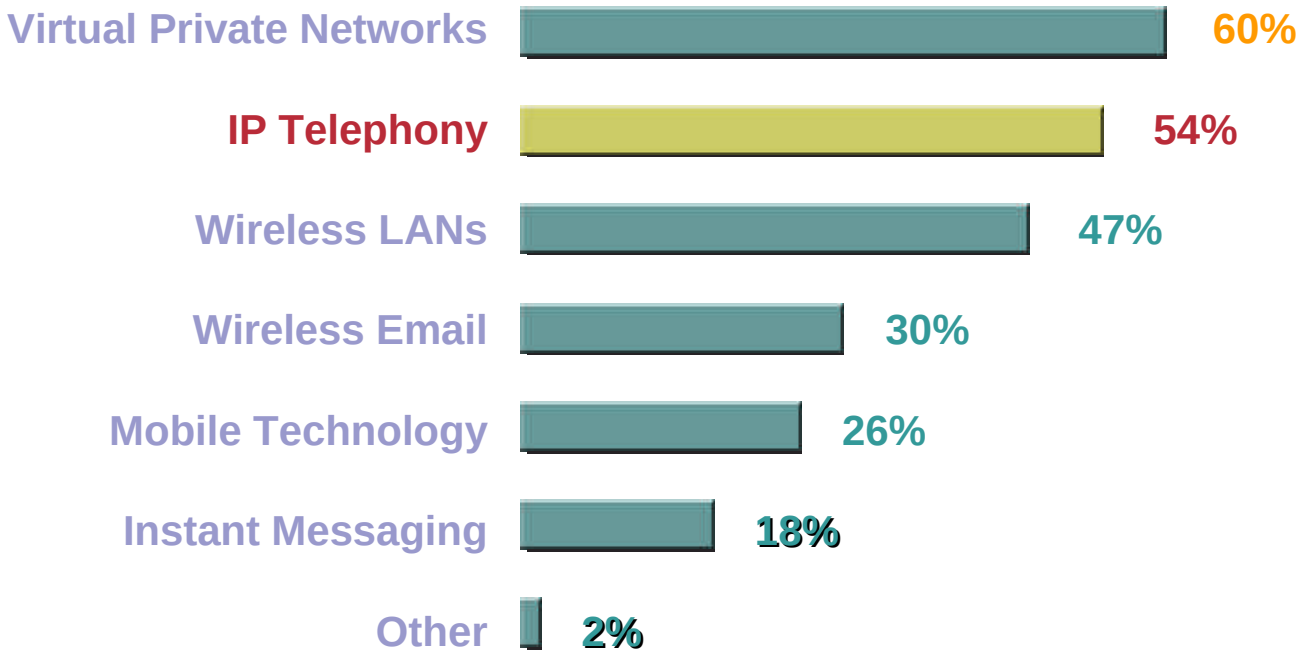


- 2100+ Customer Profiles to date
- Positive ROI 78% of the time
- Average payback of  16-18 months
- Average annual savings per user of $334



# Which Technologies Will Drive Productivity?






**IP Telephony Ranked Second on List of Technologies Associated with Improved Productivity**

Source: Sage Research, January 2003

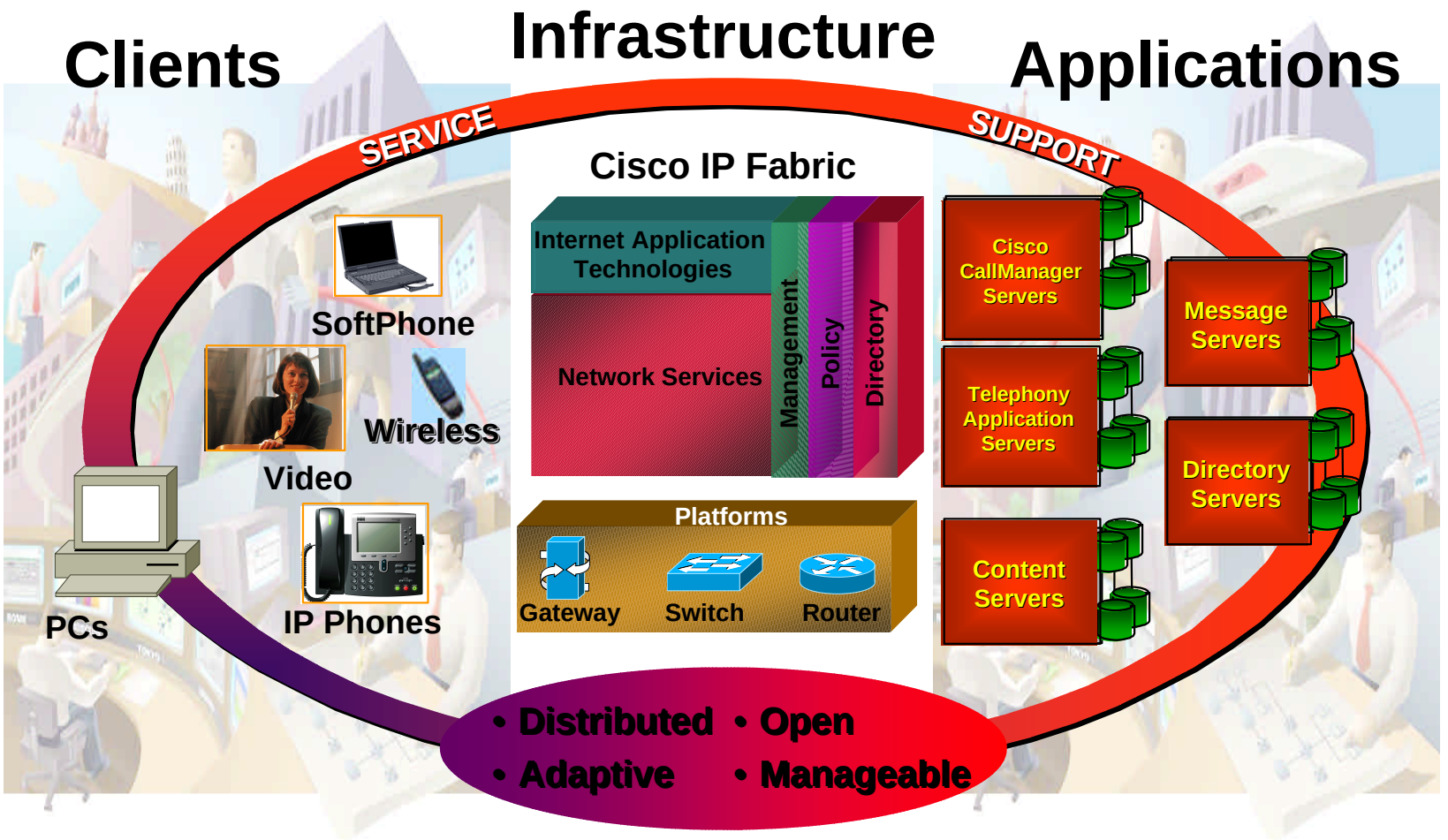
# Terminology



- **AVVID - Architecture for Voice, Video and Integrated Data – Supports the delivery of a variety of networking and e-business solutions, all running on a common network infrastructure.**
- **Convergence - Enterprise initiative for integrated data, voice, and video over a common transport. The integration of telephony services into a data network.**
- **VoIP – Using Internet Protocol over packet data networks for the transmission of voice traffic (WAN)**
- **IP Telephony - Science of converting sound to electrical signals and transmitting it between widely removed points. (CAMPUS)**

# Cisco AVVID - An End-to-End Architecture

Cisco.com



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- Tactical Deployed Customer Examples
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# Why Customers Select Cisco

Cisco.com

- World Leader in Networking with IP and Internet applications
- First to Market and most experienced with VOIP/IPTEL
- Understand Migration issues
- Open, end-to-end, integrated solution
- Ecosystem partners – Low Risk
- Cisco is a Low Risk Business Decision
- Financial Strength (no debt)
- Funds Spent on R & D $3.2BN #1 Networking Company on IEEE Orgs for R & D Investment

# Cisco Defense Initiatives - JITC


- **Working directly with DISA and Joint Staff on DoD specific functionality and requirements for IPTEL (MLPP)**
- **Developing required military unique features and functionality as outlined in the latest GSCR – Phased Approach**
- **Lead field engineering commitment for successful completion of testing requirements at JITC**
- **Partnering and testing customer solutions where required to allow DoD customers to move forward with approved Command and Control solutions**

# Cisco Engineering Focus with JITC


- **PBX2 Certification – Non Command and Control**
- **PBX1 Certification – Command and Control (MLPP and Secure Voice)**
- **Defense Red Switch Initiatives, Tactical Voice Requirements, and STIGs (IA)**
- **WAN Assured Services and Voice Information Assurance (IA)**

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# Cisco Defence Customers - Tactial
# IP Telephony Installations Worldwide









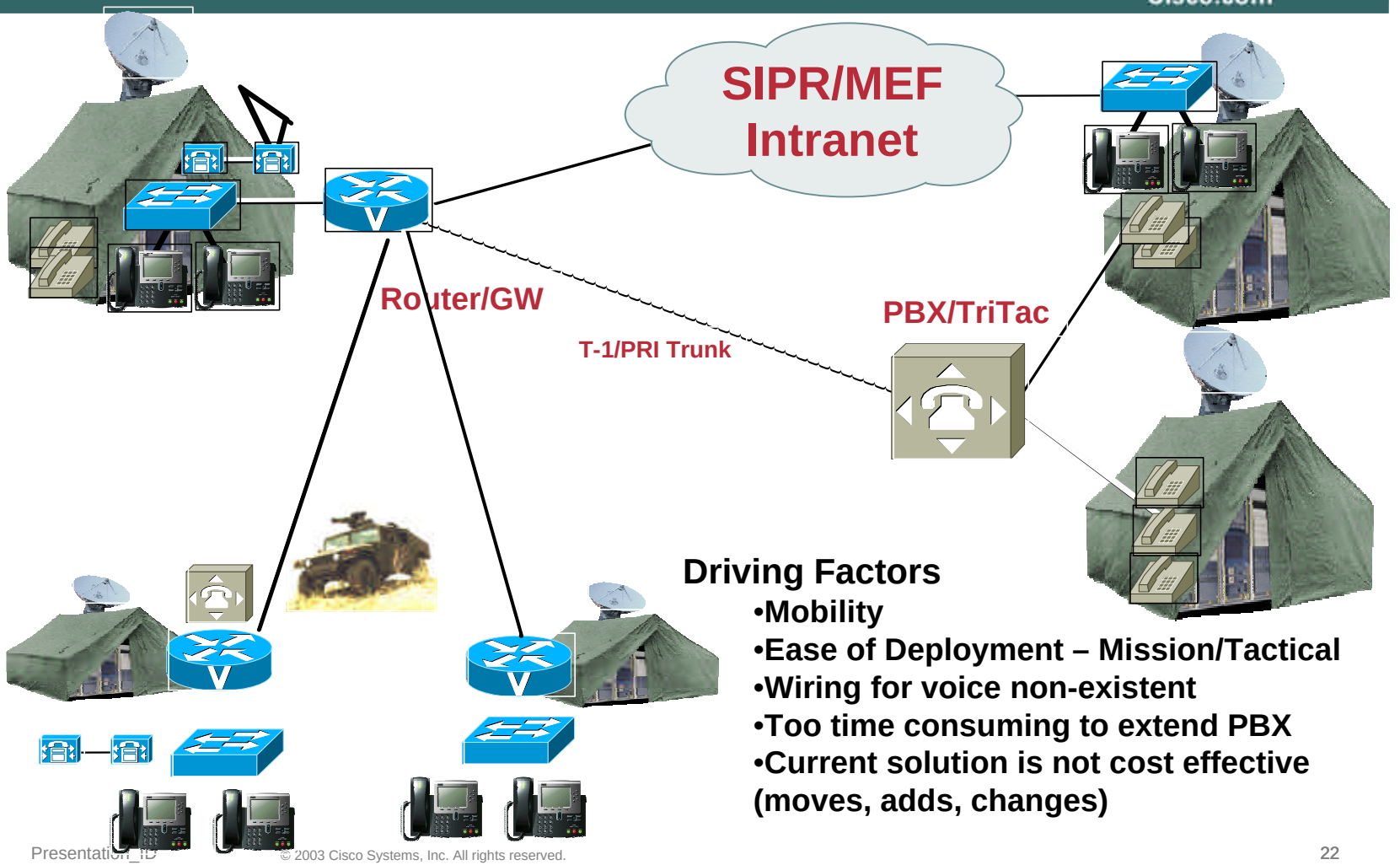

# Reasons we choose IPTEL



- Speed of Deployment into Area of Operations
- Reduction of Training of Signals Troops
- Redundancy - De-centralized Call Management
- PABX in a Router (Cisco Call Manager Express CCME)
- Reduced deployment of Crypto Equipment
- XML Applications to the Phone Interface
- Land Mobile Radio - Application
- More flexible use of bandwidth – converged Bandwidth
- Staff Mobility from Command Post to Command Post

# Deployment Ease – Co-Existence






**Driving Factors**

- **Mobility**
- **Ease of Deployment – Mission/Tactical**
- **Wiring for voice non-existent**
- **Too time consuming to extend PBX**
- **Current solution is not cost effective (moves, adds, changes)**

# Tactical Deployed Customer Examples 1



- **First to deploy VoIP in the Battlefield**
- **Kabul**
- **IRAQ**

# Tactical Deployed Customer Examples 2



- **CENTCOM Deployable**
- **RAAF Australia**
- **Singapore**
- **Norway TITAN**

# Operation Iraqi Freedom (OIF)

- Supplemented Tactical Communications with "Data Packages" at Central Command
- (CENTCOM) Level
  - Cisco Switches, Routers, and Call Managers
  - Extensive Use of IP Telephony

- US Army 3rd Infantry Division
  - Integrated Switches, Routers, & Call Managers w/ Tactical MSE Assemblages
  - Extensive Use IP Telephony / VoIP During Mobile Combat Operations

- US Army 4th Infantry Division
  - Fully IP Enabled – Employs VoIP in Command Posts / Tactical Operations Centers
  - Ethernet and ATM Switches, Routers, & Call managers

Consists of: S-250, HMMWV, 2.4M VSAT Antenna
Serves 1-48 users
Provides:
Secure Data (SIPRNet)
Non-Secure (NIPRNet)
AMC I & AMC II both use VoIP* Switches
Bulk and Circuit Encryption
VTC (non-secure)

Consists of: 15 Transit cases
Easy Setup and Tear Down
Serves 1-48 users
Provides:
Secure Data (SIPRNet)
Non-Secure (NIPRNet)
VoIP Switch
Bulk and Circuit Encryption
VTC (non-secure)

Consists of: 10 Transit cases
Easy Setup and Tear Down
Serves 1-15 users
Provides:
Secure Data (SIPRNet)
VTC (non-secure)
ıre (NIPRNet)
itch

* VoIP = Voice over Internet Protocol

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# Cisco Defence Customers – Campus & HQ IP Telephony Installations Worldwide

co.com














# Reasons we choose IPTEL



- Cost Savings compared to TCO of Traditional PBX
- Redundancy - De-centralized Call Management
- Able to use Cisco IPCC for redundant Emergency C2
- Small Sites Cisco Call Manager Express – Cost reductions compared to PBX – Key Systems
- Secure voice on your Classified Bounded Network
- Staff Mobility from Office to Office HQ to HQ
- New Applications to the Phone Screen
- Land Mobile Radio Application to Phone
- Less Cable and infrastructure required (use In line power)

# Existing users of Cisco IPTEL



**CENTCOM**
- QATAR Initial Commander
- Cisco IPTEL
- For Secure Voice on SIPERNET

**US Army**
- Battlefield simulation
- Video over IP

**US Navy NAVSEA HQ**
- Cisco IPTEL Complete Site

**JWID**
- Joint Warfare Combined network
- Cisco IPTEL for Secure Voice
- Multination Network

**Fort Hood, Texas**
- Tactical Exercise
- VOIP used between HQ's

**NMCI**
- 450 K Seats outsource
- Now considering
- Cisco IPTEL

# NAVSEA US Navy Command


- **The NAVSEA IPTEL solution also features integrated voice mail, call center functionality and other state-of-the-art telephony capabilities. Eight media conversion servers, servers equipped with specialized gateway software, enable the voice over IP telephony infrastructure to interface with the traditional public telephone network to send and receive calls.**
- **Based on this success, Bourdon said: "We are seeing a decline in the validity of classic telephony. [Our CIO] Ed Shelton has said that he would rather have IP than a standard PBX-based system, even if some of the features are still cooking."**

  **The success of the solution has prompted discussions of adding videoconferencing and video over IP to the mix in the near future. "The solution would allow us to create an IPTV system that could store and deliver 'all hands' meetings — talks given by the admiral and aimed at the entire command — on everyone's desktop," he said.**

# SECURE VOICE OVER IP - JWID

Call Manager

AUSTRALIA

IP Telephone

CallManager

UNITED STATES

IP Telephone

CWAN Backbone

CallManager

CANADA

IP Telephone

SPAIN

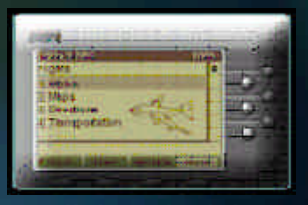
UNITED KINGDOM

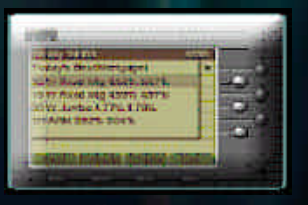
IP Telephone

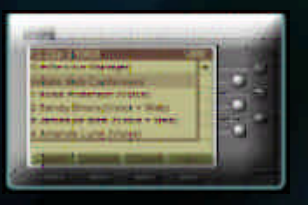
# Many “Killer Apps” for IP Communications

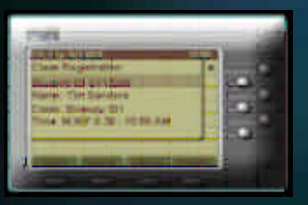
Cisco.com

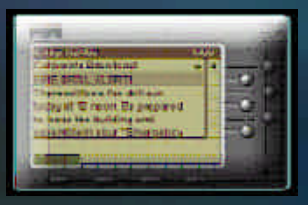

HQ Intercom

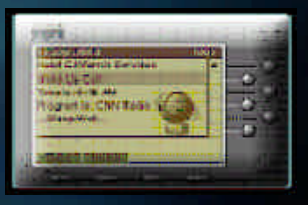

Flight Schedule


Radio Interface

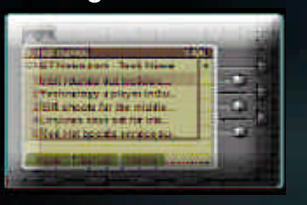

Org Chart Info


Duty Roster

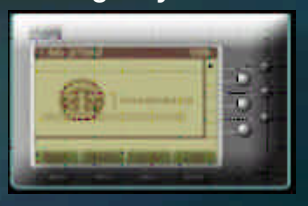

Emergency Bulletin

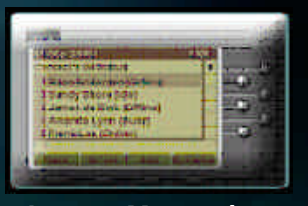

Calender

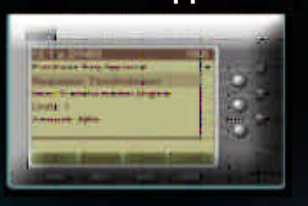

Gun Fire Support

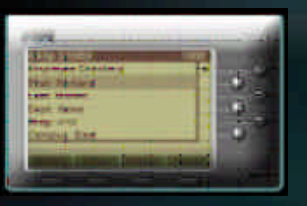

Comds’ Notes

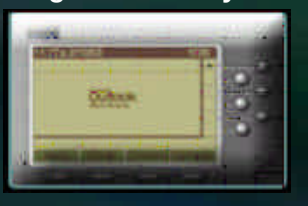

Signals Delivery

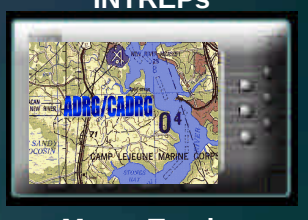

INTREPs


Instant Messaging

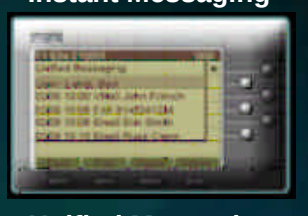

Supply Purchase

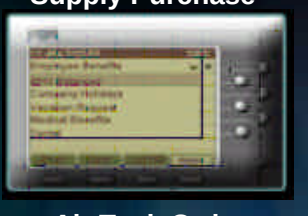

Conference Manager

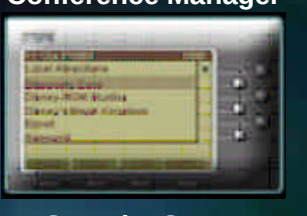

Outlook Integration

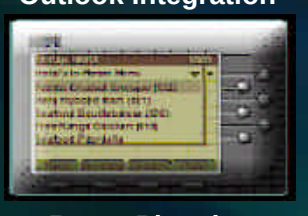


Maps, Tracks, Overlays


Unified Messaging


Air Task Order


Security Status


Room Planning

# XML Applications Made Easy



## InformaCast

- Broadcast  text and/or live or prerecorded audio to 7940/60/70s
- Loop messages for predetermined time
- Override voice streams in emergencies
- Schedule non-emergency messages
- Group phones by zones or groups of zones
- Provide password authentication
- Uses multicast to lighten network load
- Scales to thousands of phones

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# Typical Military Networks

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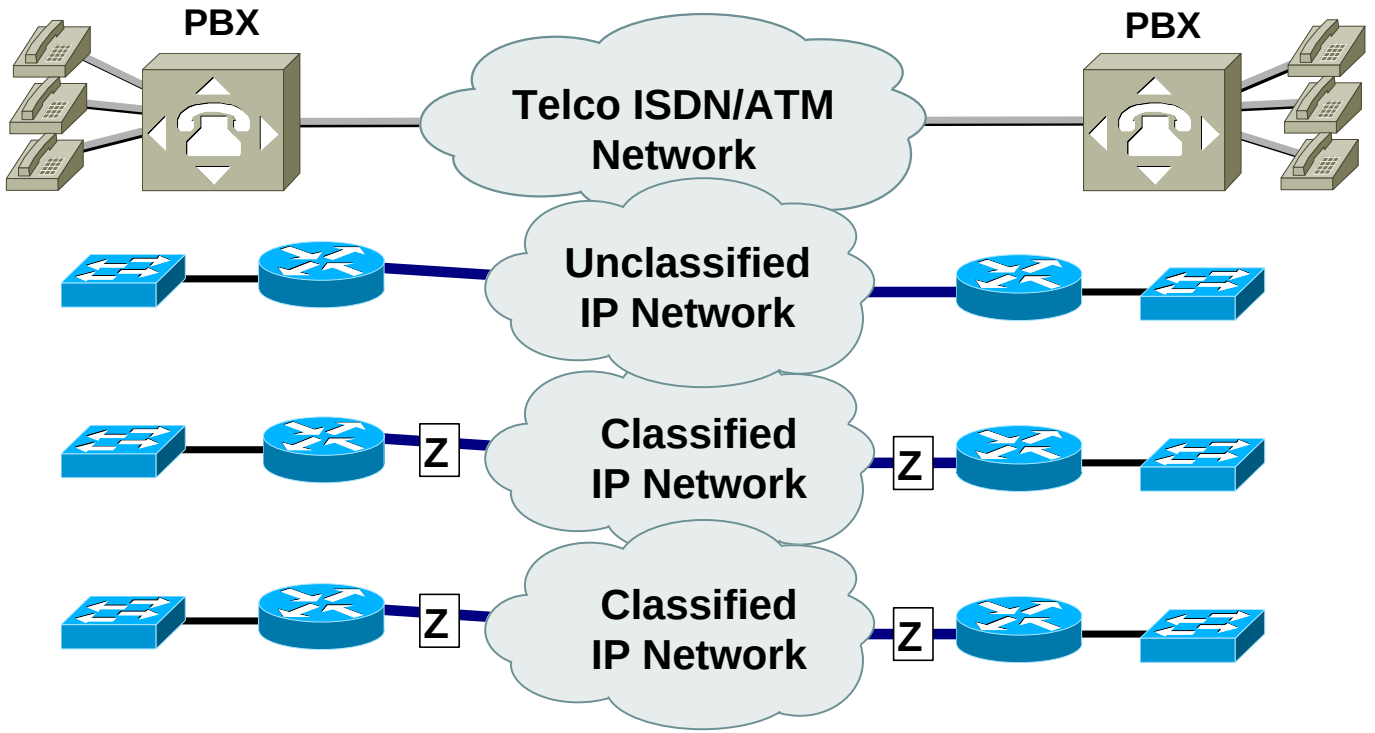



- **Separate Voice and Data Networks for each security enclave**
- **Bandwidth is paid for even if not used**
- **Telco's love this model!**

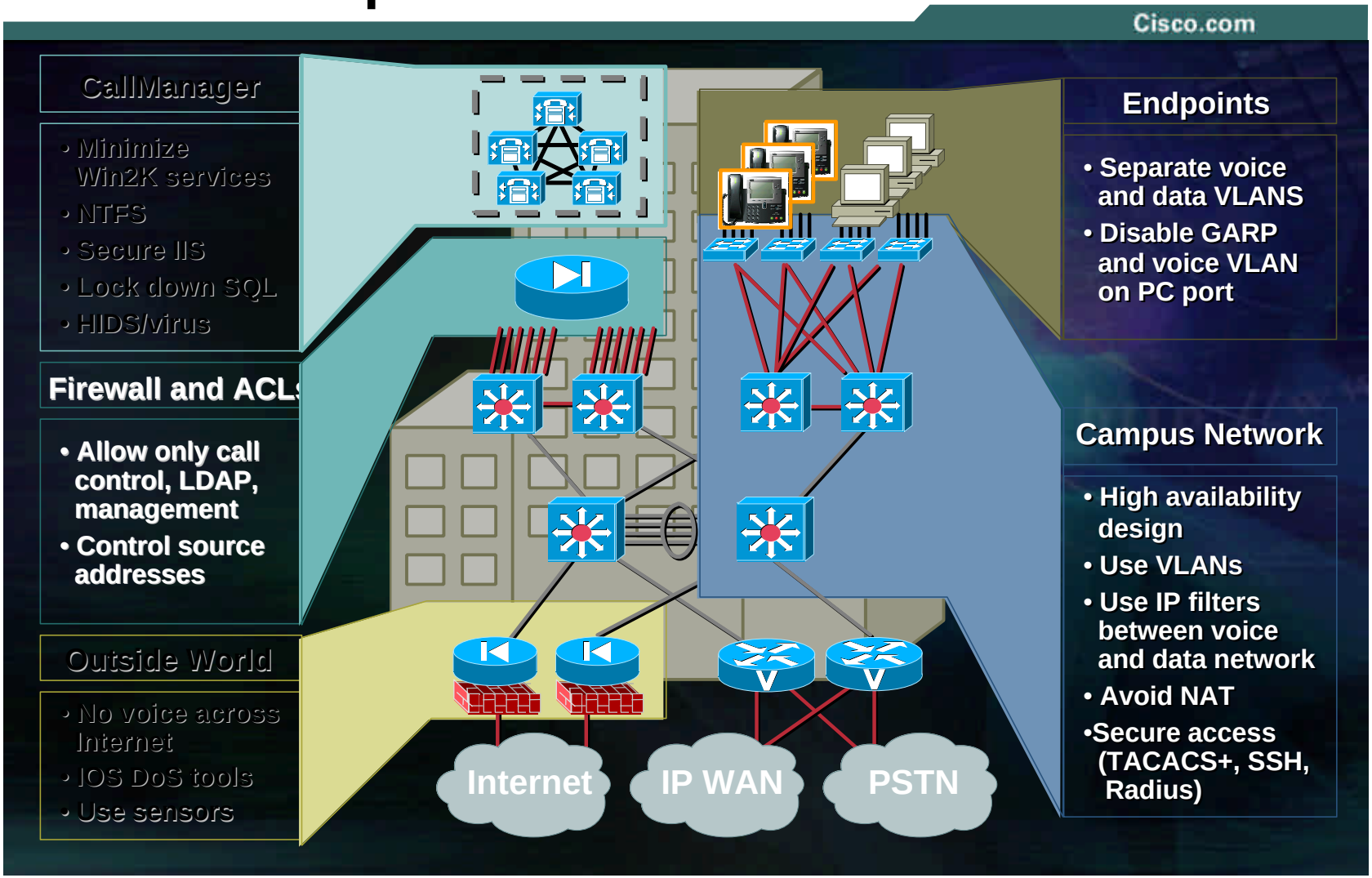

# Unclassified Networks

# Unclassified Networks



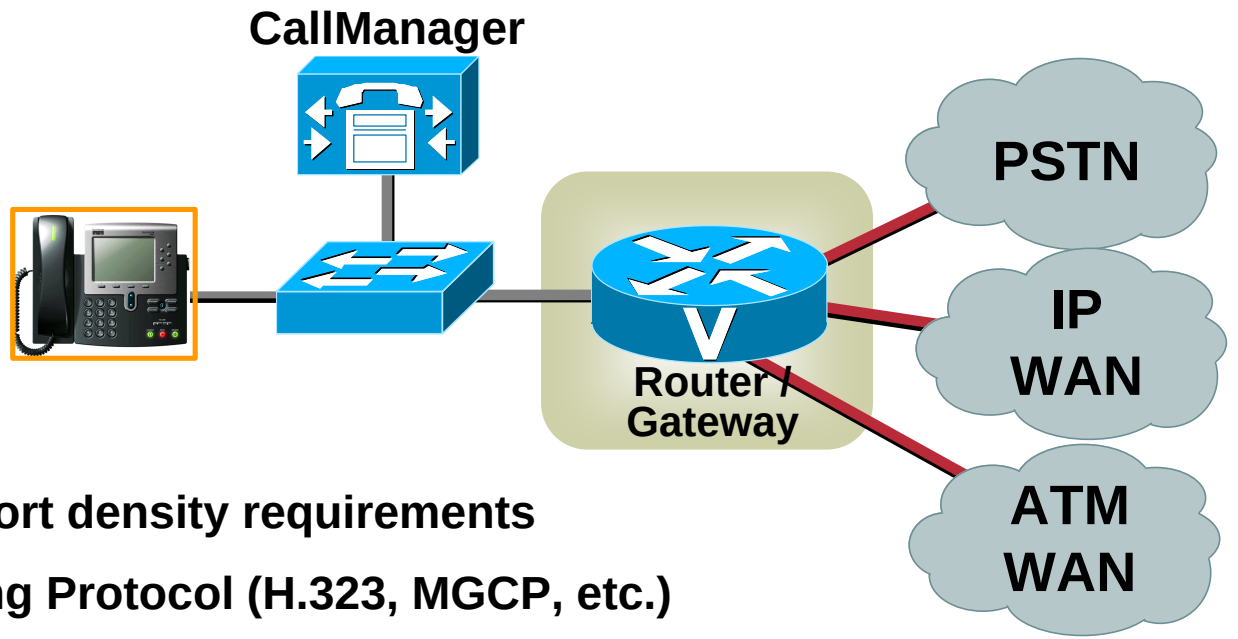
- PSTN and Internet data connectivity
- IP Telephony can use gateways to connect to any standard commercial interface
- IP to ATM gateways to isolate VoIP in the LAN, but VoATM in the WAN if desired
- SAFE architecture for IP Networks to protect Voice/Data infrastructure from attack
- QoS policy to ensure integrity of voice traffic

# SAFE Blueprint for IP Communications



# Gateways
## Gateway Selection Criteria

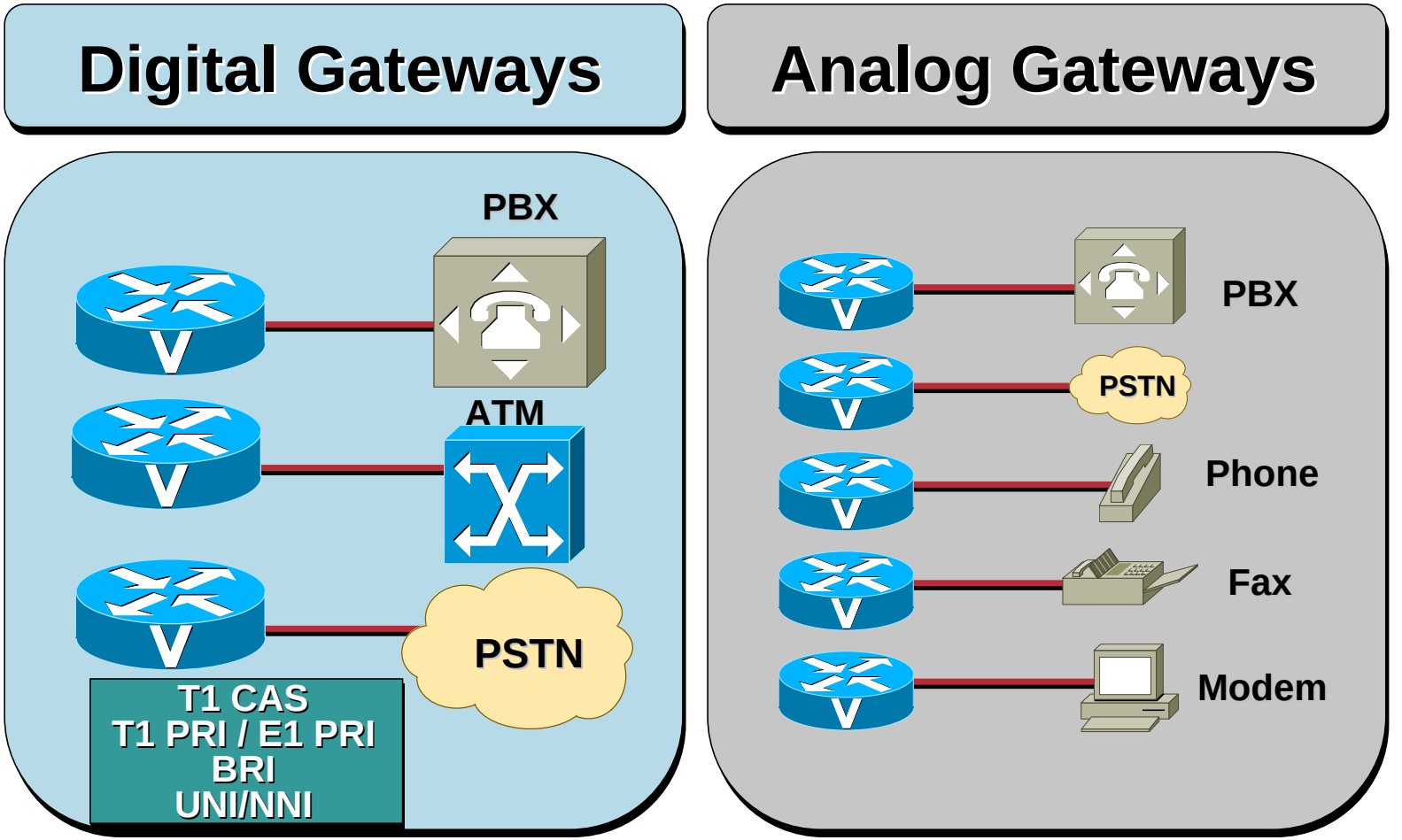





- Voice Port density requirements
- Signaling Protocol (H.323, MGCP, etc.)
- Support for required PSTN signaling types
- Support for required WAN interfaces and QoS
- ATM AAL2 VoATM across the WAN
- ATM AAL5 VoIP across the WAN

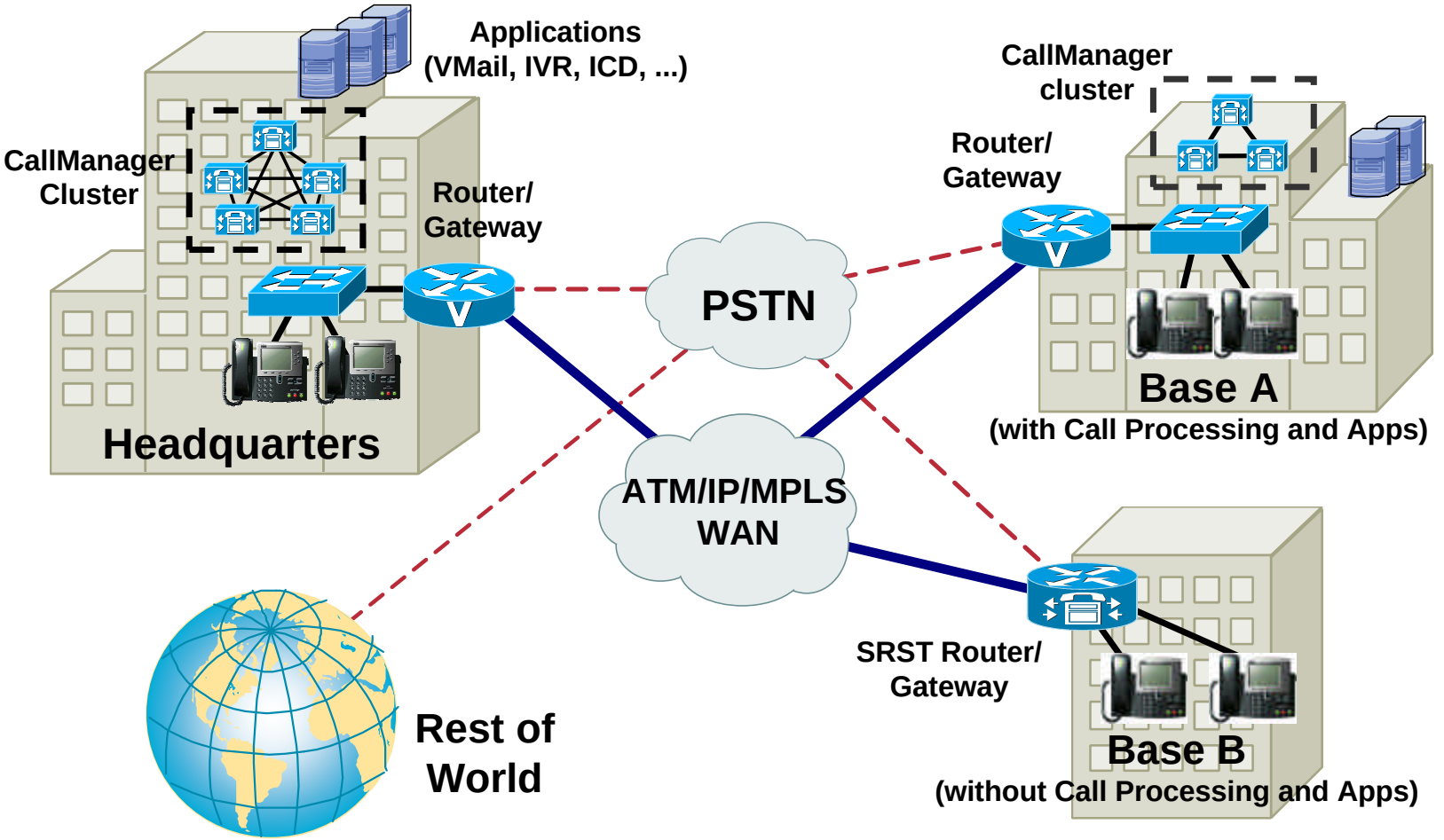
# Gateways
## Digital vs. Analog





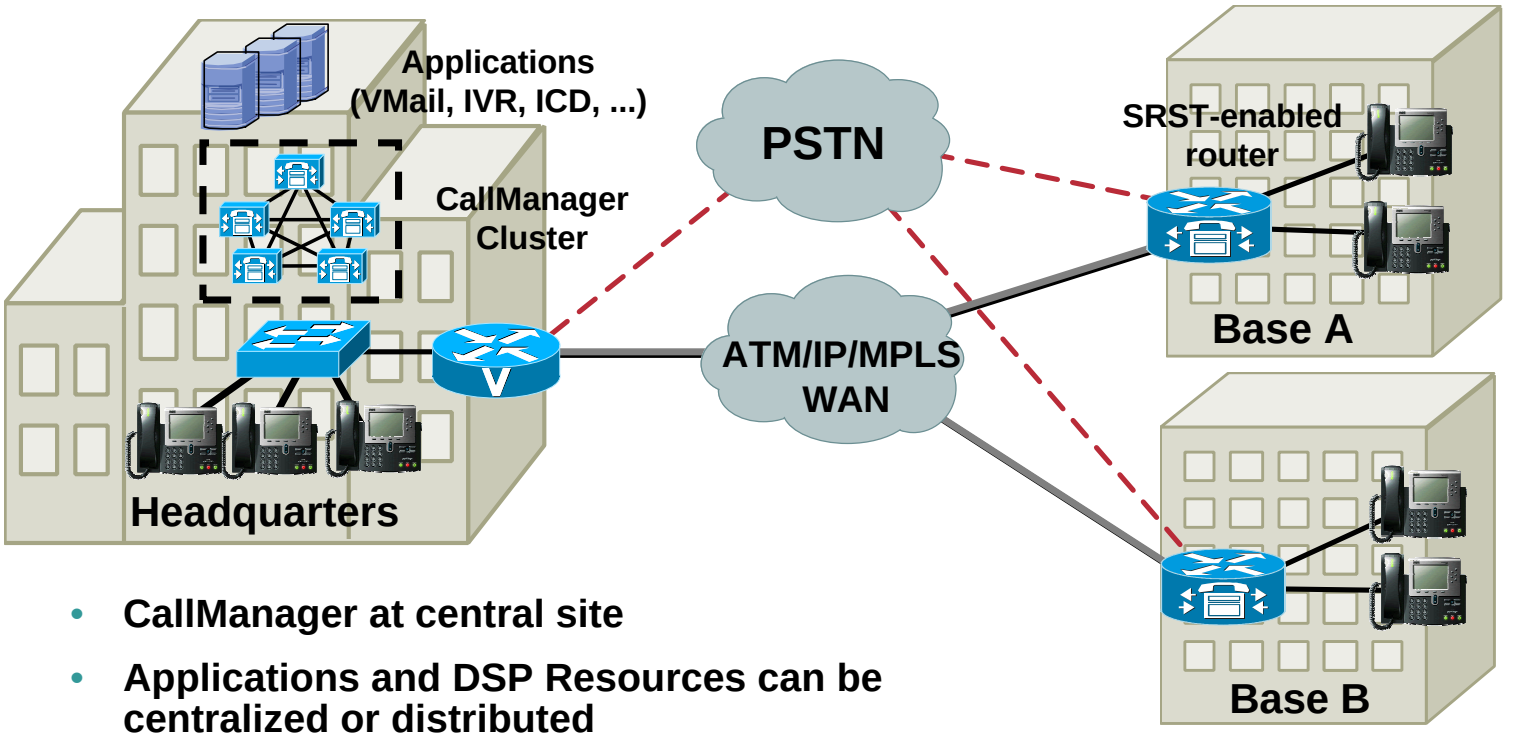
# Unclassified Site to Site Connections





# Deployments Models
## Centralized Call Processing

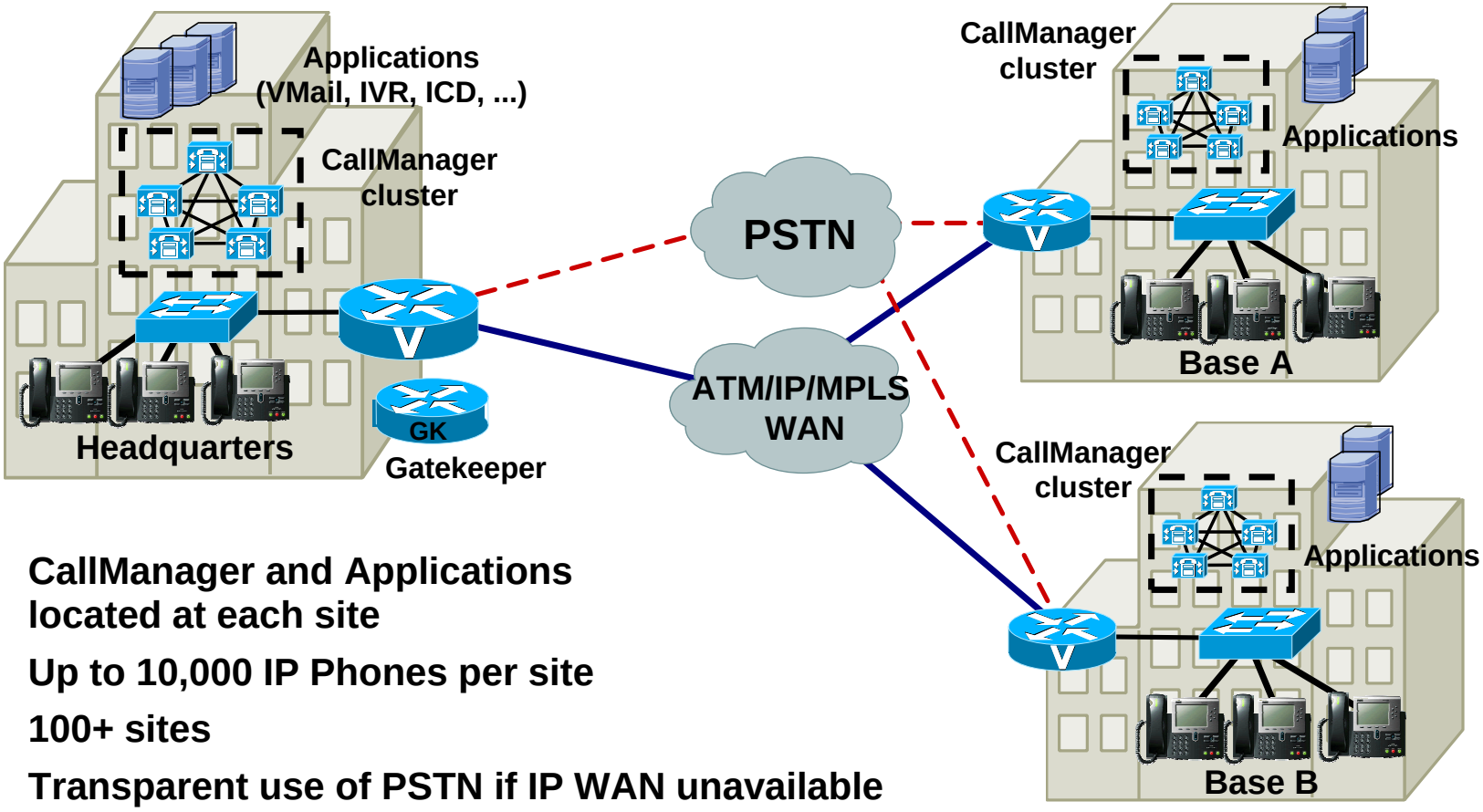





- CallManager at central site
- Applications and DSP Resources can be centralized or distributed
- Supports up to 10,000 IP Phones per cluster
- Call Admission Control (limit number of calls per site)
- Survivable Remote Site Telephony for remote branches

# Deployments Models
## Distributed Call Processing

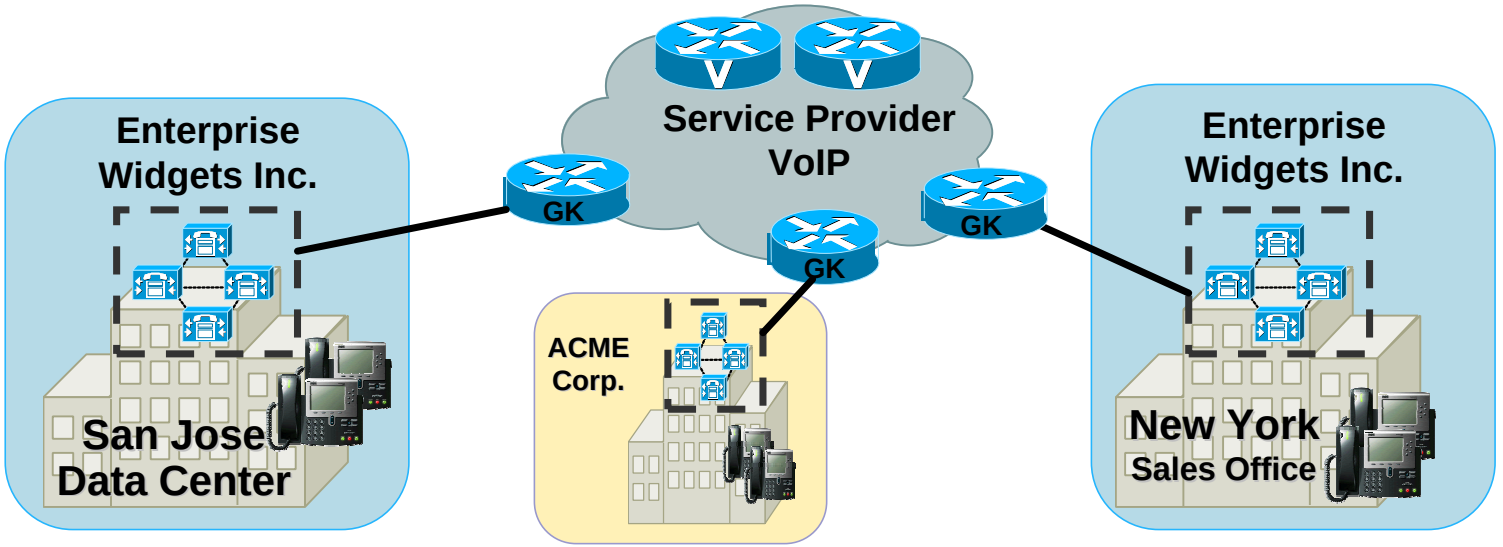





- CallManager and Applications located at each site
- Up to 10,000 IP Phones per site
- 100+ sites
- Transparent use of PSTN if IP WAN unavailable

# Gateways
## Outsourcing Options (VoIP Long Distance)





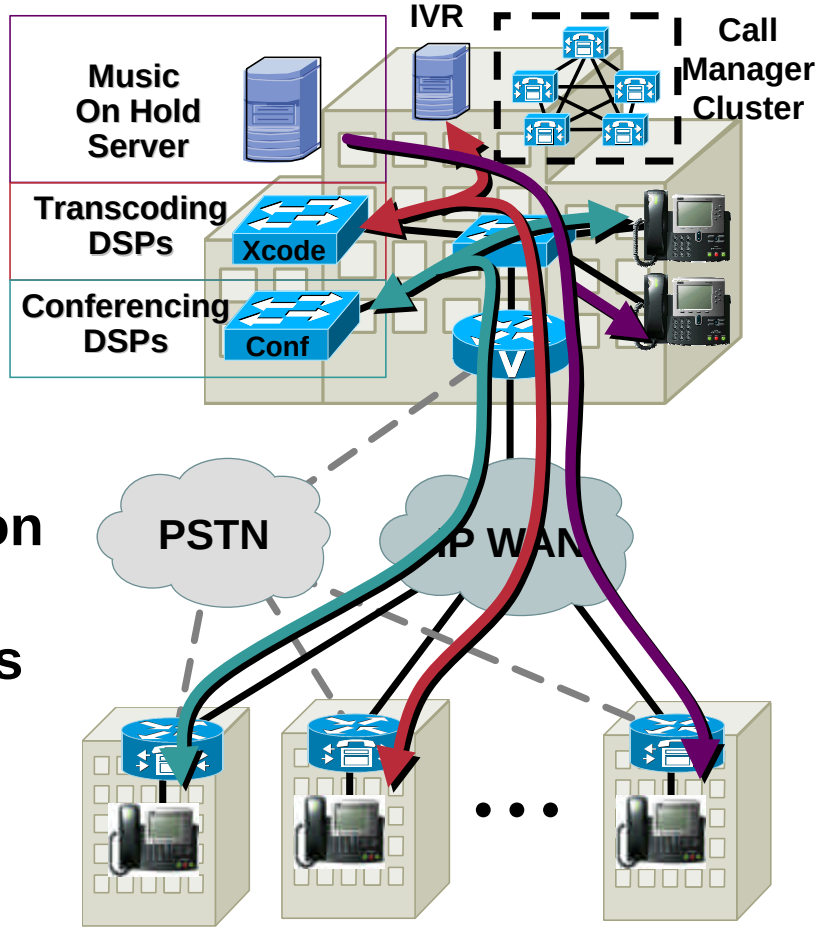

Outsource the PSTN Gateways

1. Outsource the PSTN Gateways
2. Outsource the Inter-site Voice (VVPN)
3. Inter-enterprise Voice (maybe CM to CM)

# Media Resources
## Conferencing, Transcoding, Music On Hold



- **Conferencing**
  - DSPs needed for multi-party conferences
- **Transcoding**
  - Multiple CODEC support (e.g., G.711 to G.729)
  - Automatic CODEC selection
  - DSPs needed in presence of single-CODEC endpoints
- **Music On Hold**
  - Centralized server sends streams across the WAN




# Classified Networks

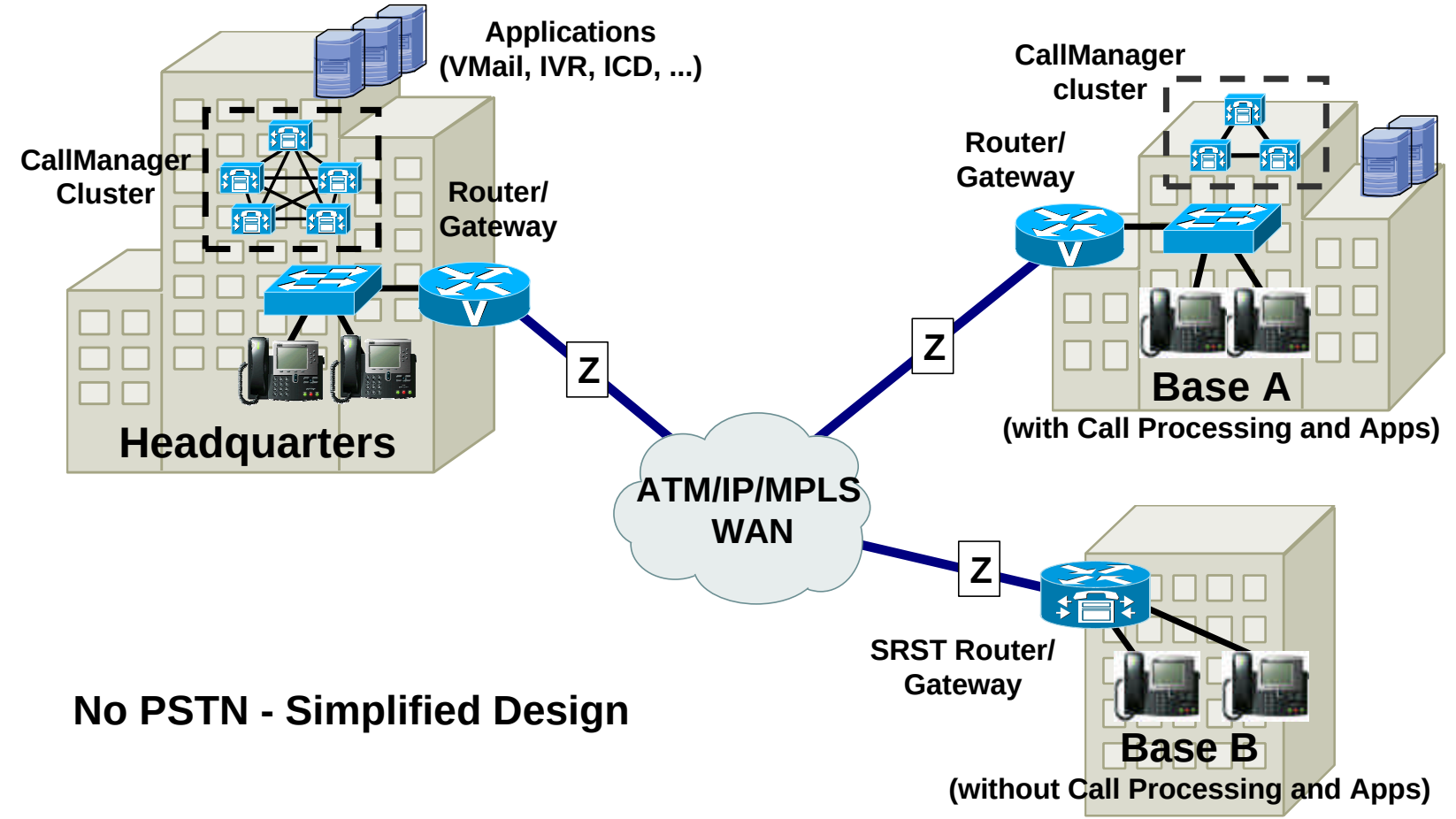
# Classified Networks



- Closed network – typically IP only, no public PSTN connectivity
- Gateways can connect to legacy classified voice network – Digital or Analogue
- Still requires SAFE architecture for protection from internal attack
- QoS policy to ensure integrity of voice traffic

# Classified Site to Site Connections



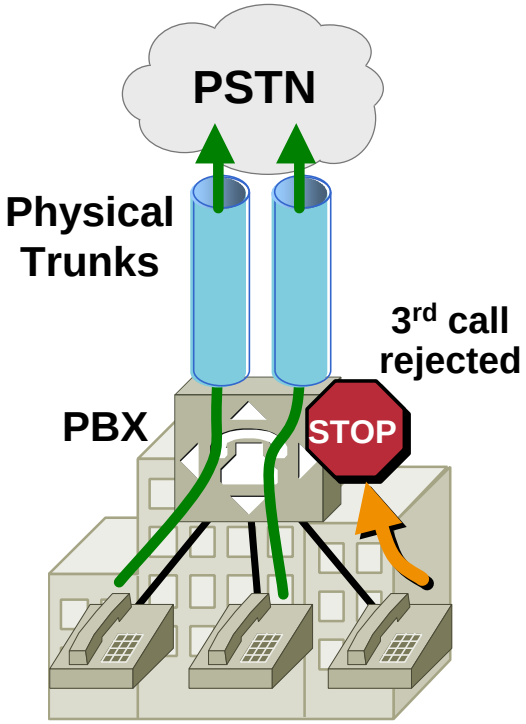



**No PSTN - Simplified Design**

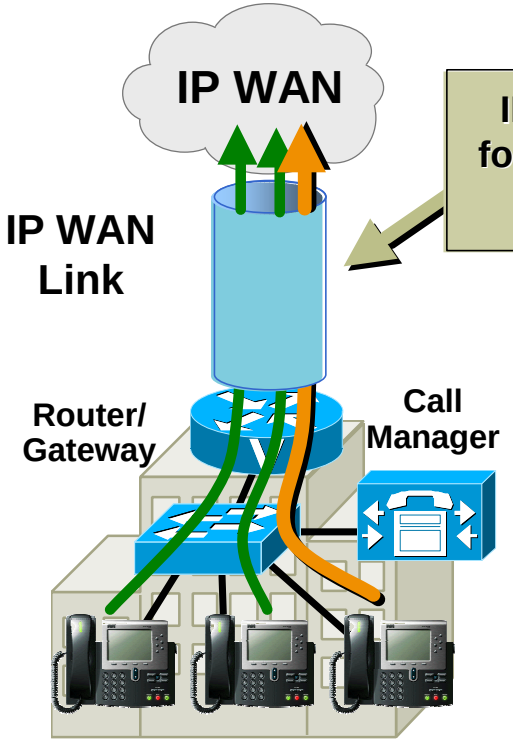
# Call Admission Control
## Why Is It Needed?



### Circuit-Switched Networks




### Packet-Switched Networks




IP WAN link provisioned for 2 VoIP calls (equivalent to 2 “virtual” trunks)

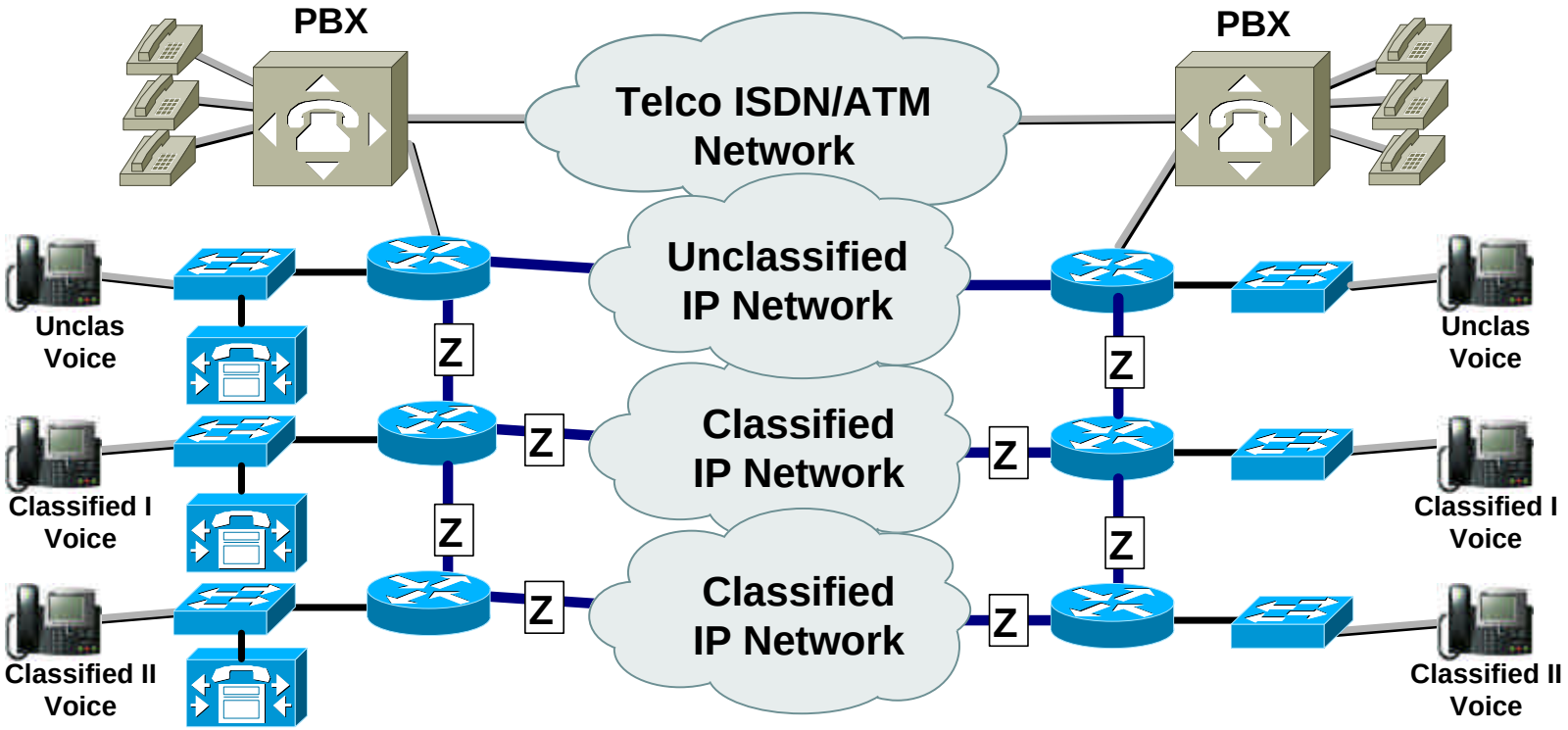
No physical limitation on IP links

If 3rd call accepted, voice quality of all calls degrades

Call Adm. Control limits # of VoIP calls on each WAN link

# Converged Thinking






- Single Backbone for Voice, Video and Data
- Multi Level Secure Voice, Video and Data
- Single Manageable QoS Policy for the entire network