

# Connecting Remote Sites/Teleworkers

**Tim Saunders**

**ADTRAN**

**Vice President, Product Management  
Enterprise Networks Division**

# Perspective

- Our Own Experience Using VoIP For Connecting Branches, Telecommuters
- What ADTRAN Is Seeing and Hearing Regarding VoIP As A VoIP Solutions Provider

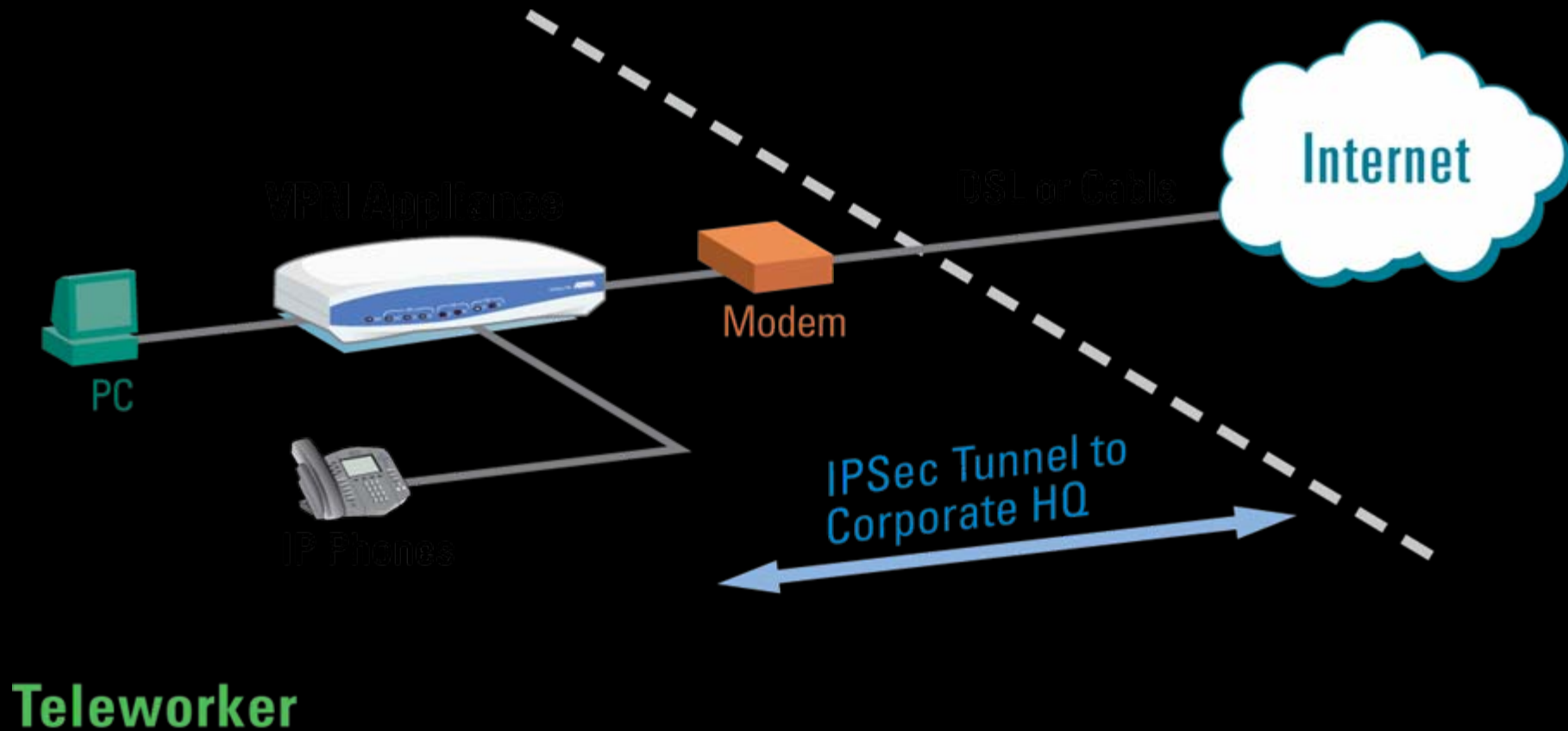
# Why Does ADTRAN Use Voice Over IP?

- Remote Locations
  - Most Economical Approach
  - Extension of Corporate Voice Network
  - Useful Features: Find Me, Voice Mail/Email Integration
- Teleworkers
  - Extension of Corporate Voice Network

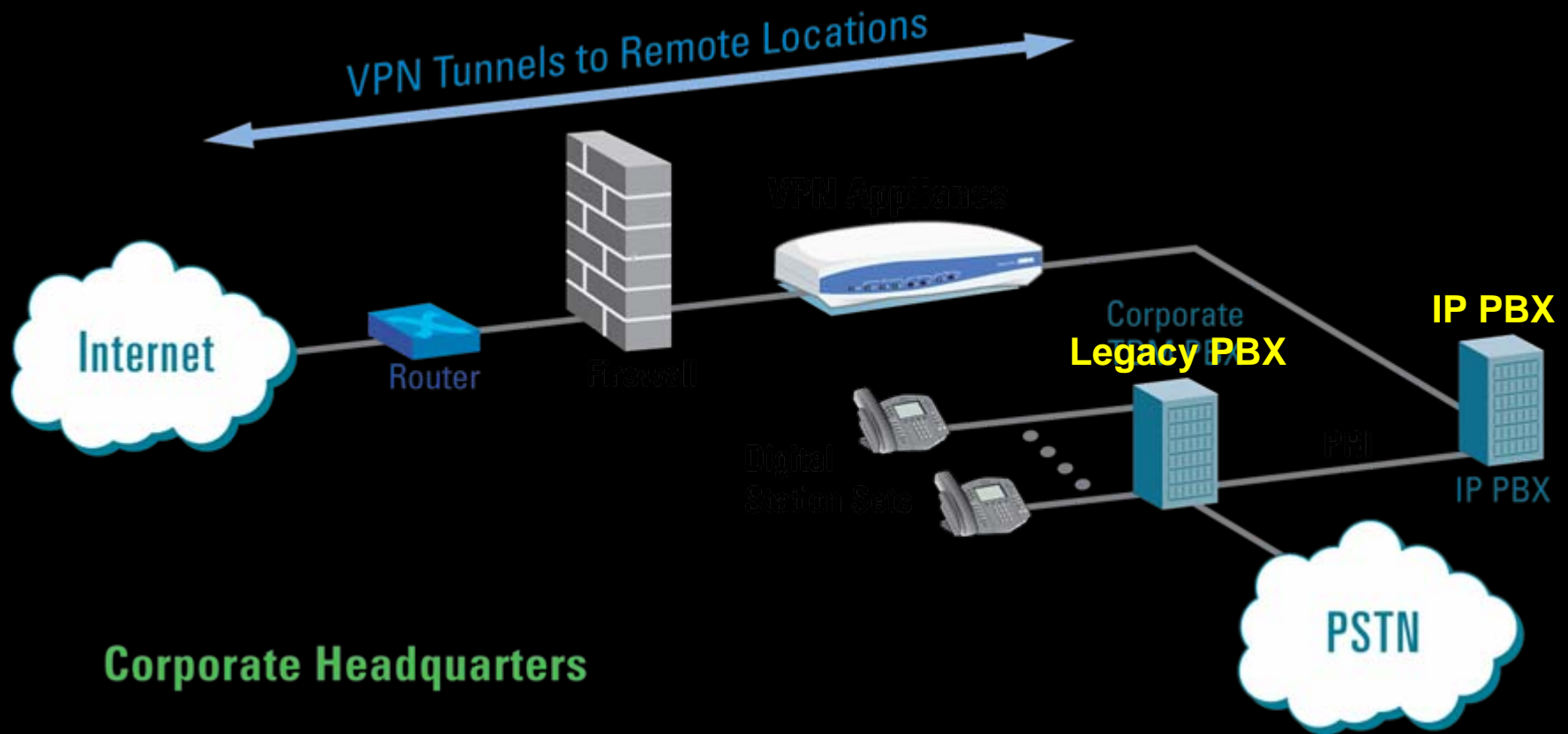
# When Doesn't ADTRAN Use VoIP?

- New Corporate Employees
  - Capacity on Legacy TDM PBX
  - Phones Are Relatively Cheap

# Typical Teleworker VoIP Set-Up



# Headquarters Set-Up



# Effects on WAN Architectures - Teleworkers

- Little Effect
  - Teleworkers Typically Already Had Broadband for Internet
  - Some Tried Higher Upspeed Link - Didn't Yield Expected Results
  - Acceptable Voice Quality, But Can Tell You're Calling over Internet
  - Most Said They Would Not Initiate Important Calls Over Internet

# Effects on WAN Architectures – Remote Branches

- Same Service, Increased Bandwidth
- 768K to Full T1 for 35 Person Engineering Office
- Bandwidth Increase Depends on Codec
  - G.729 is acceptable, bandwidth friendly
  - VAD Helps Too
- VoIP Service Offerings Looked At, Not Selected
  - Insufficient Office-to-Office Traffic To Justify

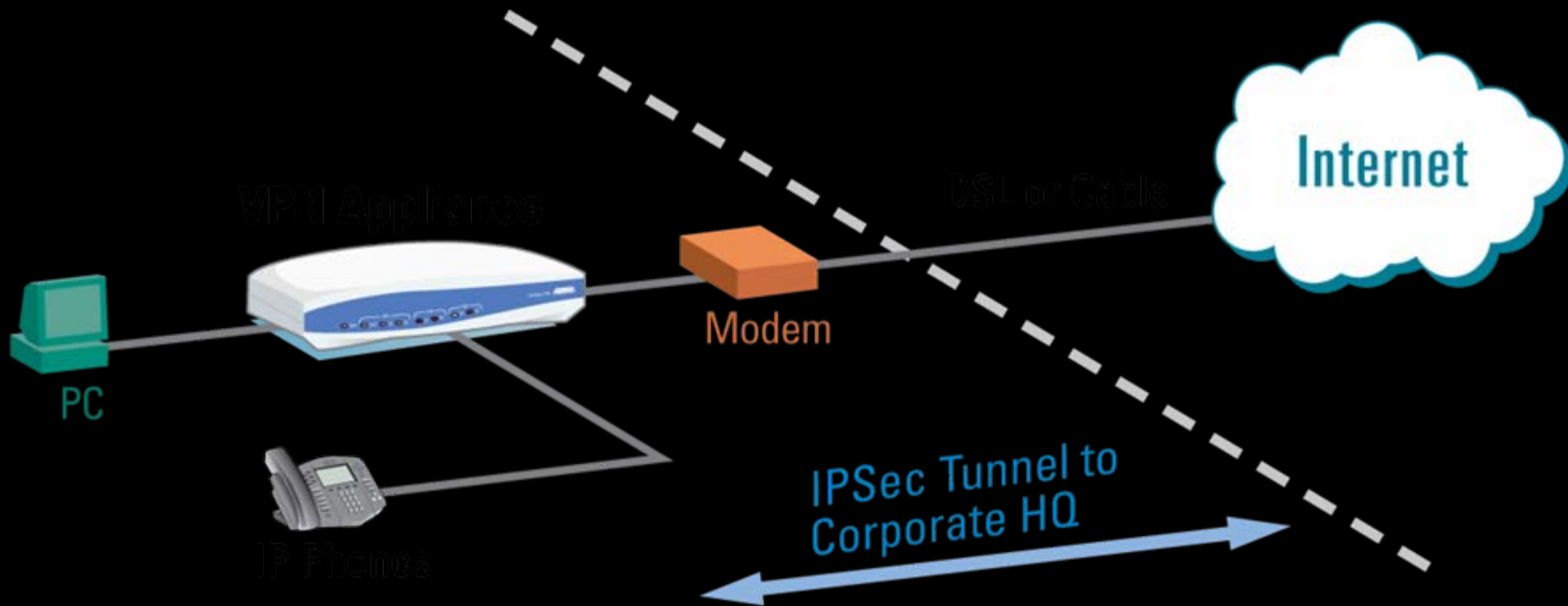
# Telecommuting Challenges

- Internet Link Performance
  - Sometimes Degrades At Certain Times of Day
  - Sometimes Degrades At Certain Times of Year
- Home Office is Messy
  - Lots Of Cables
- Overall Though, Not Too Challenging

# The Security Challenge

- Require NAT, Good Firewall Protection
- VoIP Calls Use Any Port, Need to Know Destination IP Address
- IPSec VPN Tunnel Preferred If Feasible
- Alternatives – SIP ALG, Back-to-Back User Agent, Transparent SIP Proxy
  - Interoperability Issues
  - Not Trivial To Get Right For All Calling Scenarios

# Typical Teleworker VoIP Set-Up



**Teleworker**

# Which WAN Technologies To Deploy

- Telecommuters
  - ADSL, Cable
- Remote Branches
  - Business Class ADSL
  - Point-to-Point Circuit
  - Private IP
- SMB
  - Business Class DSL, Cable: Hosted PBX Overlay
  - SIP Trunking/Integrated Access

# Service Provider Focus

- SIP Trunking
  - VoIP/SIP Over WAN
  - Analog to User – KSU, PBX, Telephones, Fax, etc.
    - FXS, PRI, T1
  - IAD or MSAG At Customer Premises
  - Includes Internet Access and Telephony Service
  - CLECs Do This in a Big Way
  - National Providers As Well
  - Good SMB Solution
  - Doesn't Address Corporate Voice Network Extension Objective

# Service Provider Focus

- Hosted PBX/IP Centrex
  - No PBX at Customer Premises
  - VoIP/SIP Over WAN
  - IP Phones, Analog Phones/Fax (Where Necessary)
  - Extensive CPE Requirements
    - Hardware, Configuration
  - Meets Corporate Voice Network Extension Objective
  - Just Now Seems To Be Getting Traction

# CPE Upgrades Required

- Possibly Higher Performing Router
- Good Quality of Service Implementation in Router
  - Priority Queuing
- IPSec VPN
  - Eliminates Requirement for SIP ALG or B2BUA
- Power Over Ethernet in Switches
  - Branch Office More Than Teleworker
- Ordering of Router and ATA Can Be Important

# Summary

- VoIP Is Preferred At Branches, Telecommuters
- Enabling Quality of Service Required
- Router Performance to Match WAN Link
- Use IPSec VPN If Feasible for Secure Internet Voice