Performance Management: Key to IP Telephony Success

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VoIP Network Management… An Afterthought?

- VoIP is sensitive to network performance -- and end users are sensitive to VoIP performance
- Problems are often transient
- Problems can result from the interaction of network components
- Problems are compounded by:
  - large numbers of widely distributed endpoints
  - remote teleworkers
  - distributed call centers..

IP Telephony needs a well-defined Performance Management Architecture

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Today's Presentation:

- VoIP Performance Issues and Problems
- Enterprise IP Deployment Scenarios
  - Today
  - Future
- What are the problems we need to address?
- Emerging VoIP Management Framework
- Steps to successful deployment

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VoIP Performance Issues and Problems

- Well Known Problems
  - Packet Loss -- Leads to quality degradation
  - Jitter -- Leads to packet loss (discards)
  - Delay -- Causes conversational difficulty

VoIP Performance Issues and Problems

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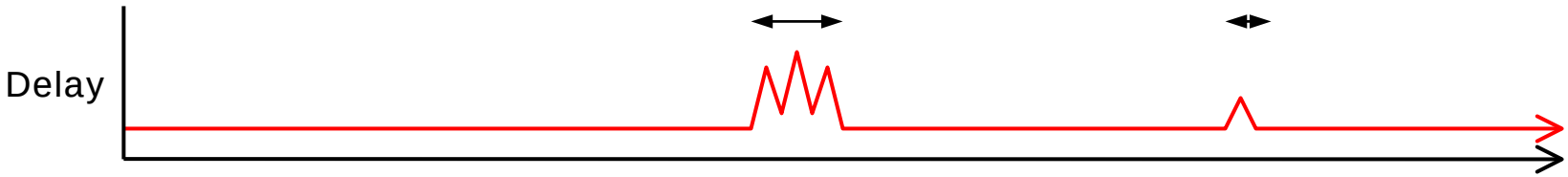
- Lesser Known Problems
  - Packet loss and jitter are transient and can be hard to detect and diagnose
  - Echo becomes more obvious due to the delay of VoIP systems
  - Clipping, echo and gaps in speech can be caused by incorrect configuration of gateways and phones
  - Excessive delay or quality degradation can result from incorrect configuration of jitter buffers

Transient IP Problems?



Average loss or jitter per call –- Grossly inadequate

RTCP reports every 6-8 seconds –- Barely adequate

New RTCP XR -- Detect and measure the actual events

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VoIP Management Requires a Different Approach

- Traditional telecom problems don't tend to move around and "stayed fixed…"

  …but, IP problems are often transient and may not occur repeatably

- Network monitoring/ management systems need to capture diagnostic info in real time…

  …this requires a move from the "old" paradigm that separated "Management" and "Test"

IP Telephony needs
Integrated Fault/ Performance Management

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VoIP Management Requires a Different Approach

- Voice packets don't always travel through the same central point, and may change route during a call -- network probes won't necessarily see every call/ packet
- Problems may occur at any point up to the user's IP phone/ desktop
- Remote IP endpoint may be in a different management domain

Need capable, informative Embedded Monitoring Functionality in IP endpoints

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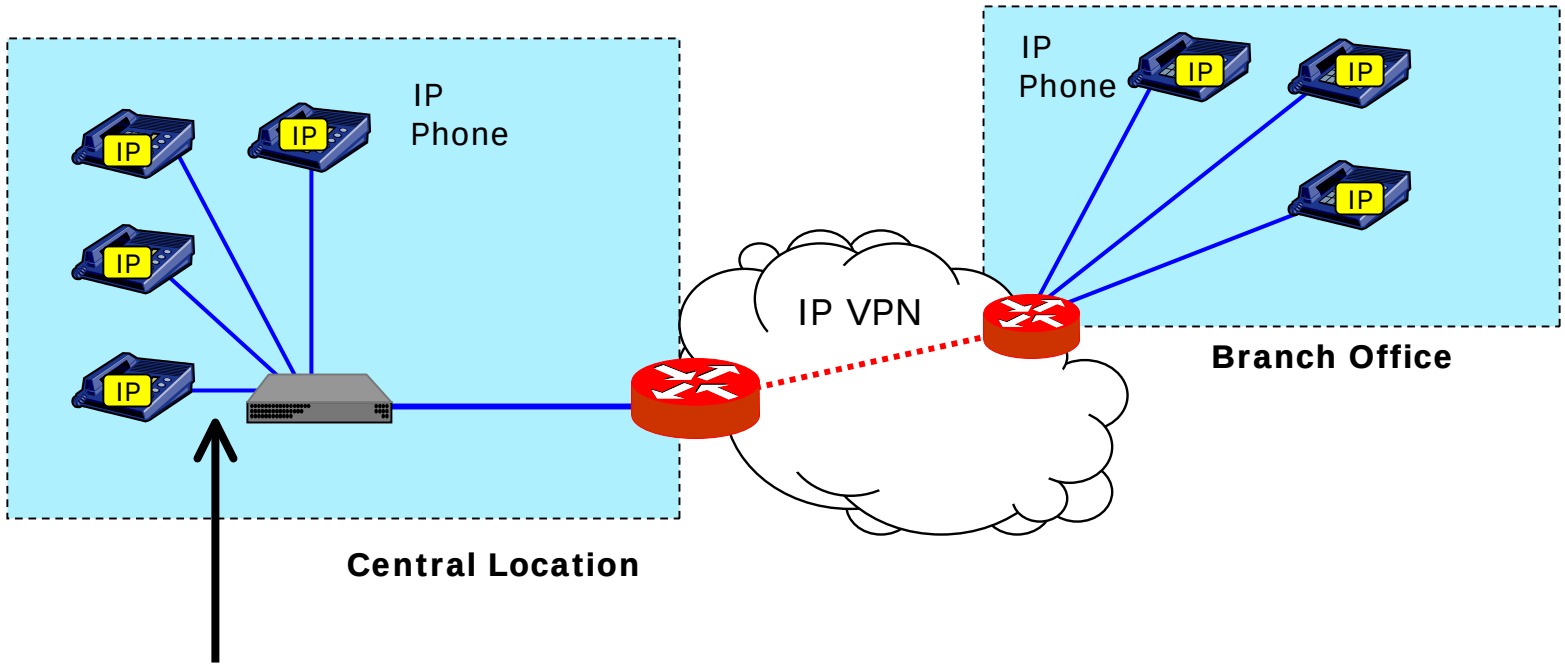
2004... Enterprise IP Telephony Scenario



Switched 100BaseT,
VLAN, GigE, etc.

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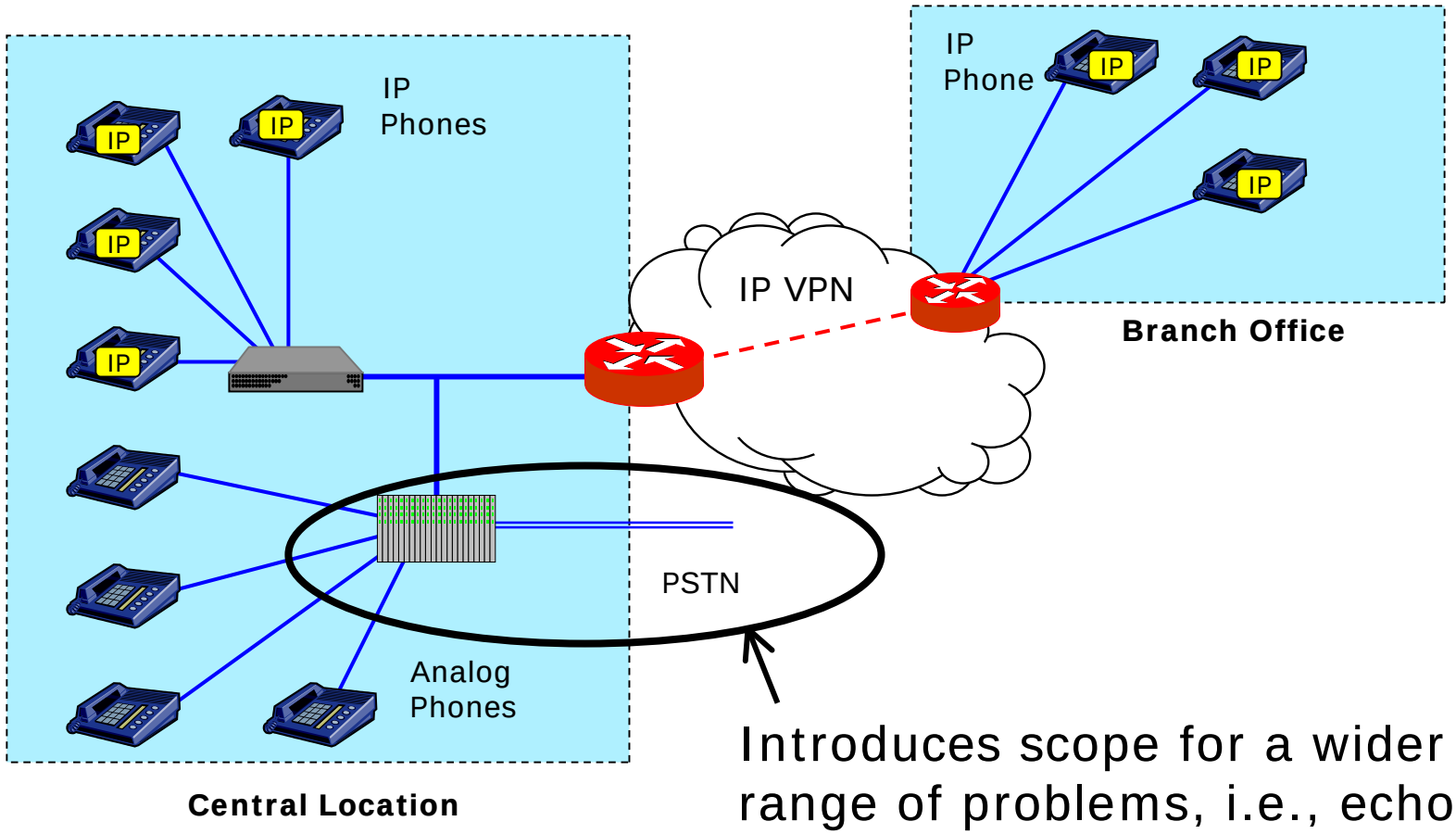
2004... Hybrid IP PBX/ PSTN Gateway Scenario



Introduces scope for a wider range of problems, i.e., echo, signal level

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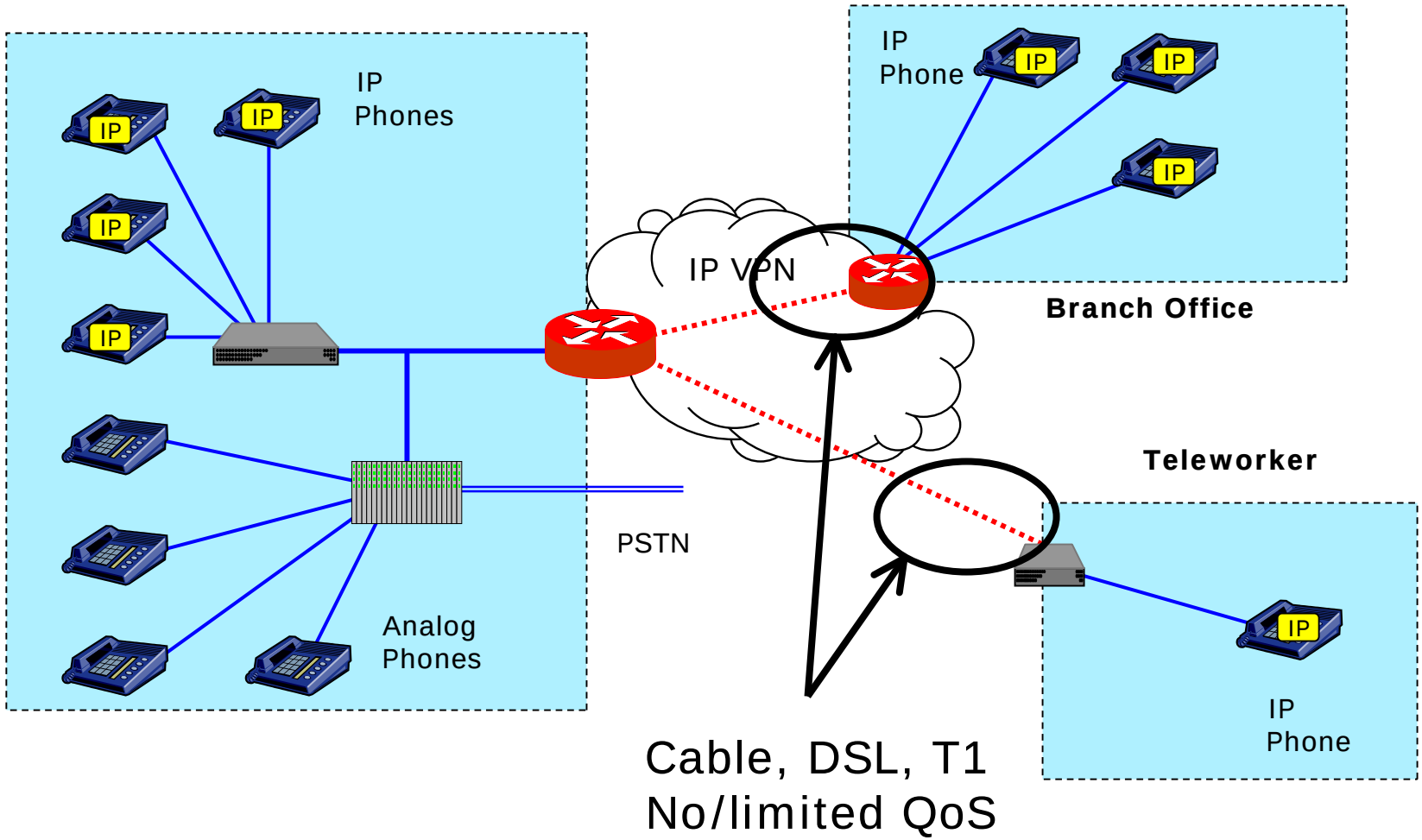
2004... Teleworkers and Distributed Call Centers?



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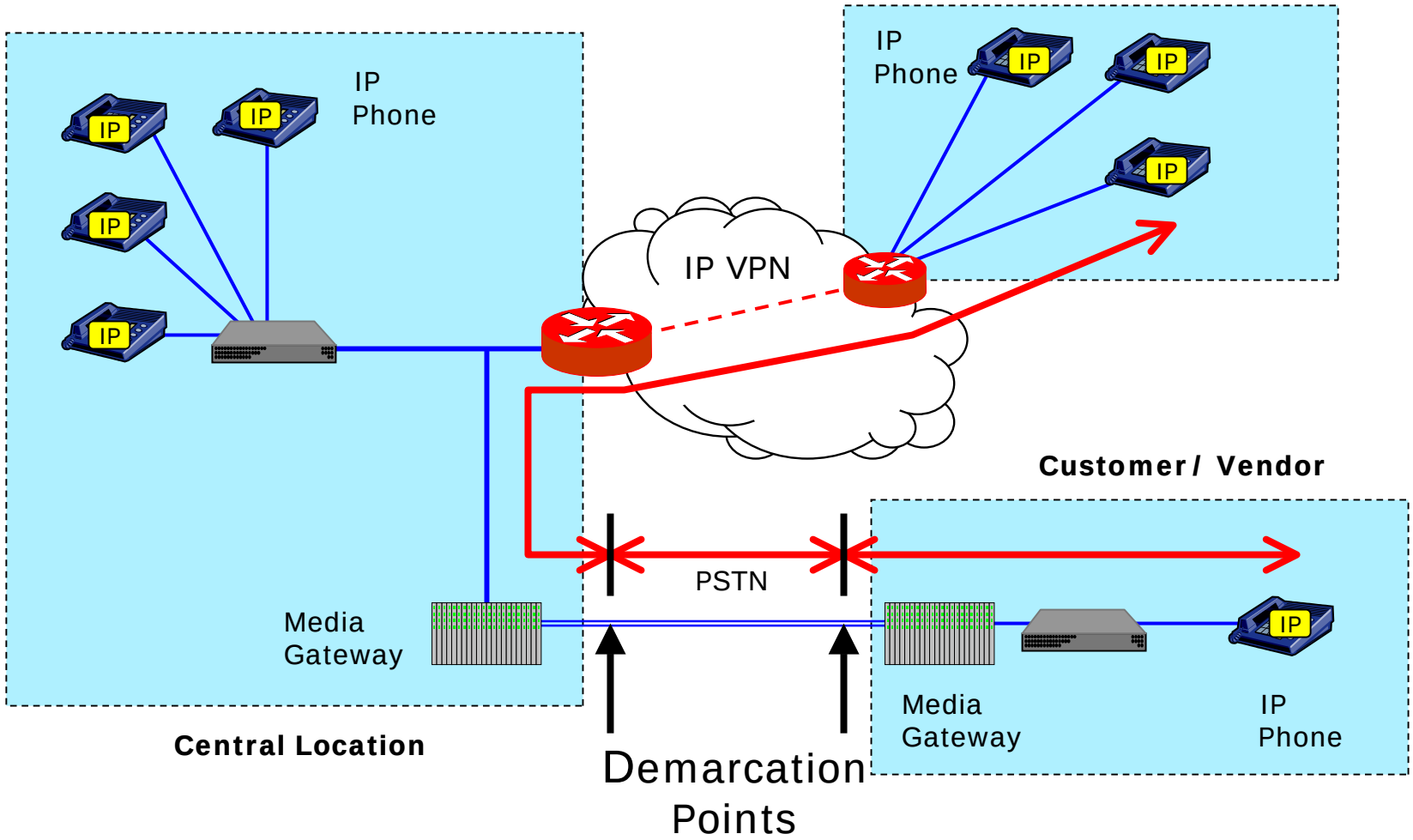
2004… Inter-Enterprise “IP Telephony”



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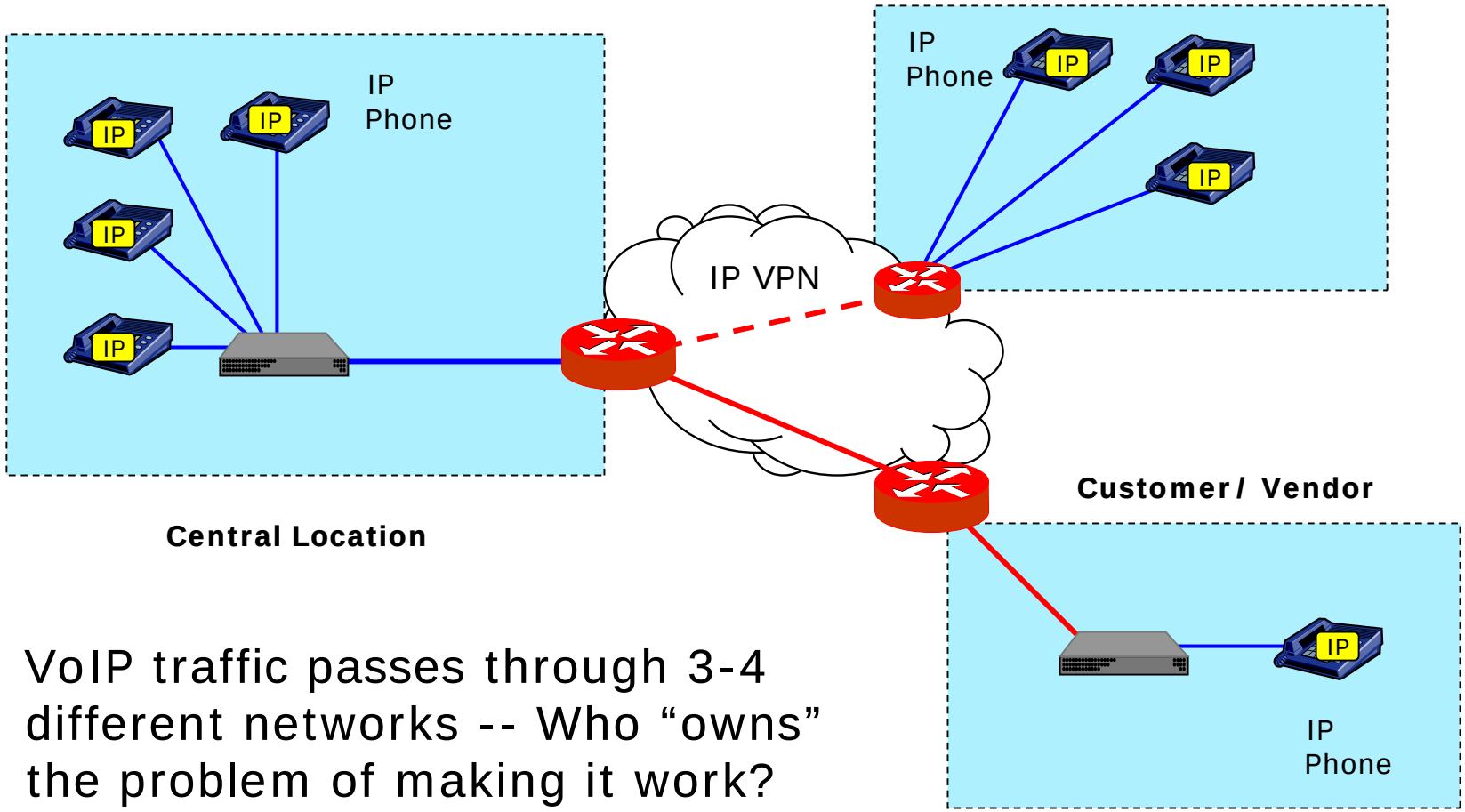

VoIP traffic passes through 3-4 different networks -- Who “owns” the problem of making it work?

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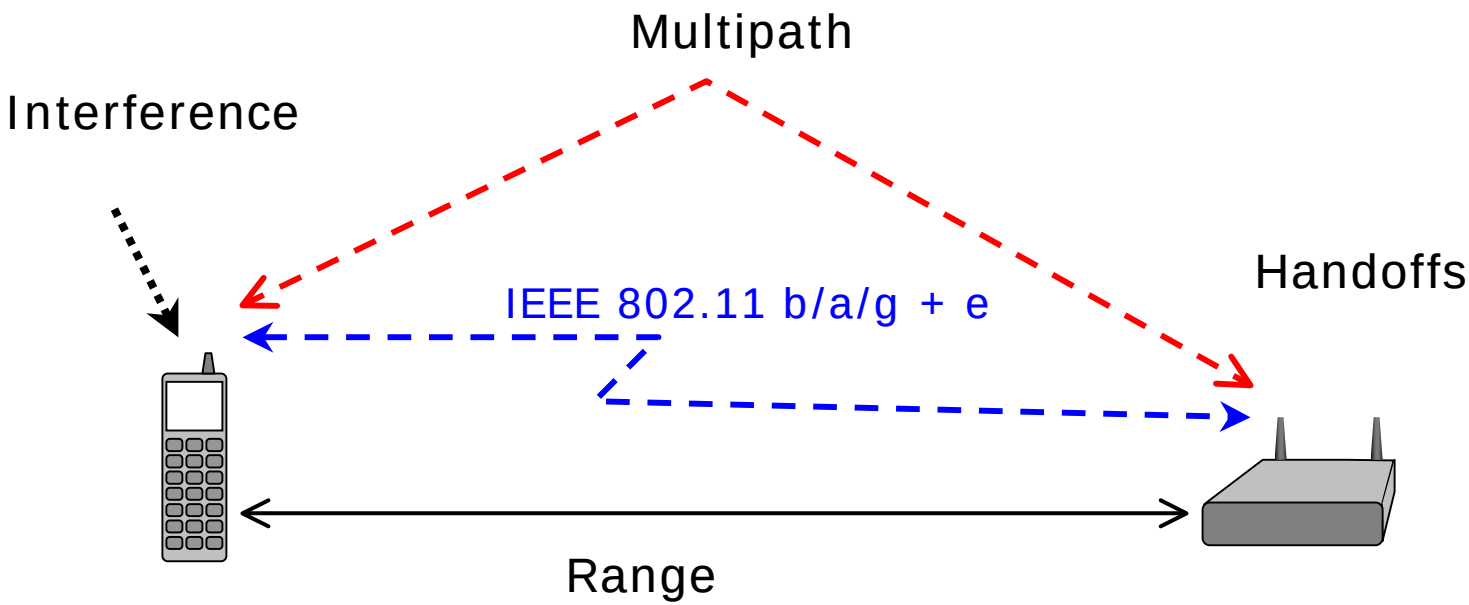
2005… VoIP over WiFi



Industry focus on quality; however, still somewhat uncertain what level of quality to expect…

… but, WiFi's a "hot" technology, expect widespread deployment

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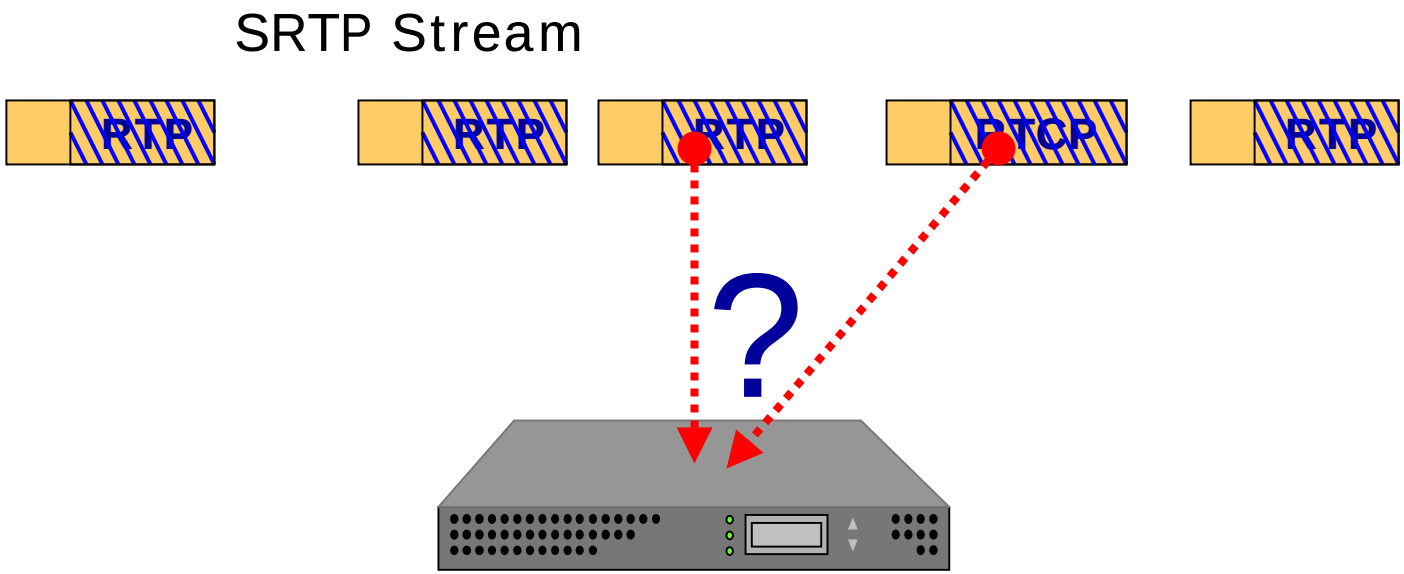
2005… SRTP – More Secure, Less Manageable?



Probes, analyzers and voice quality testers can't decode encrypted payloads

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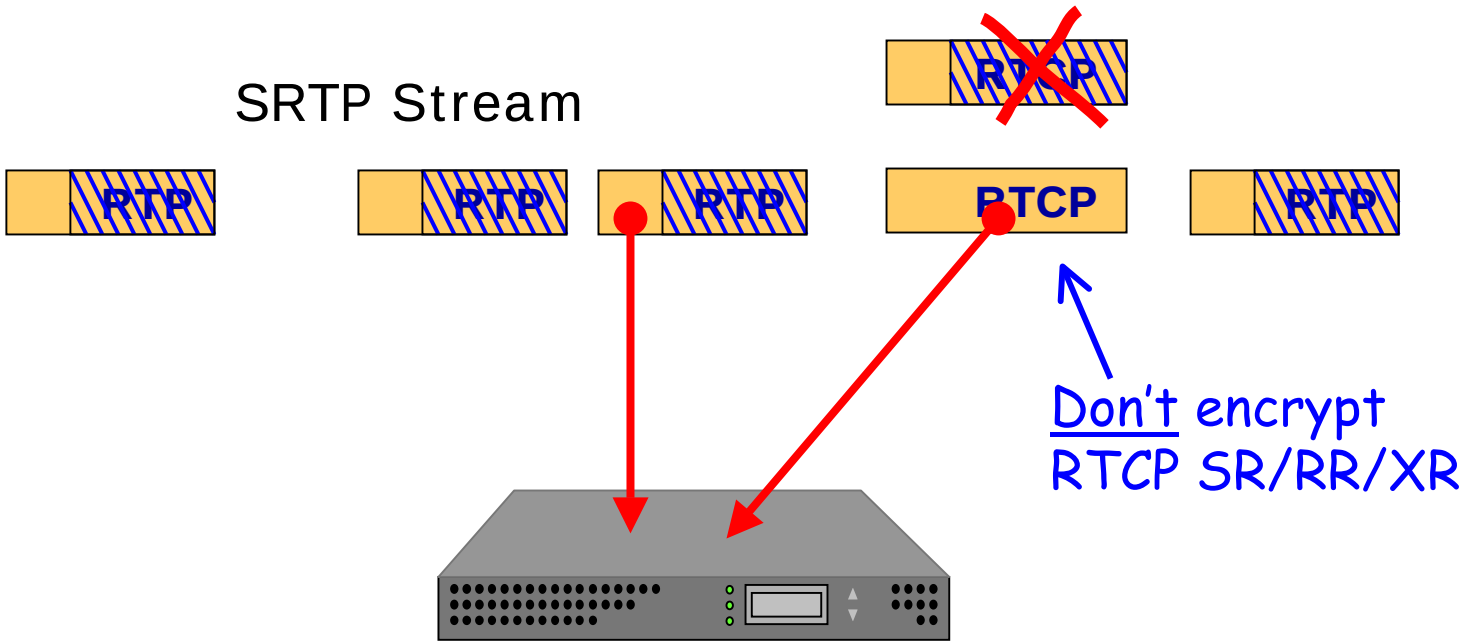
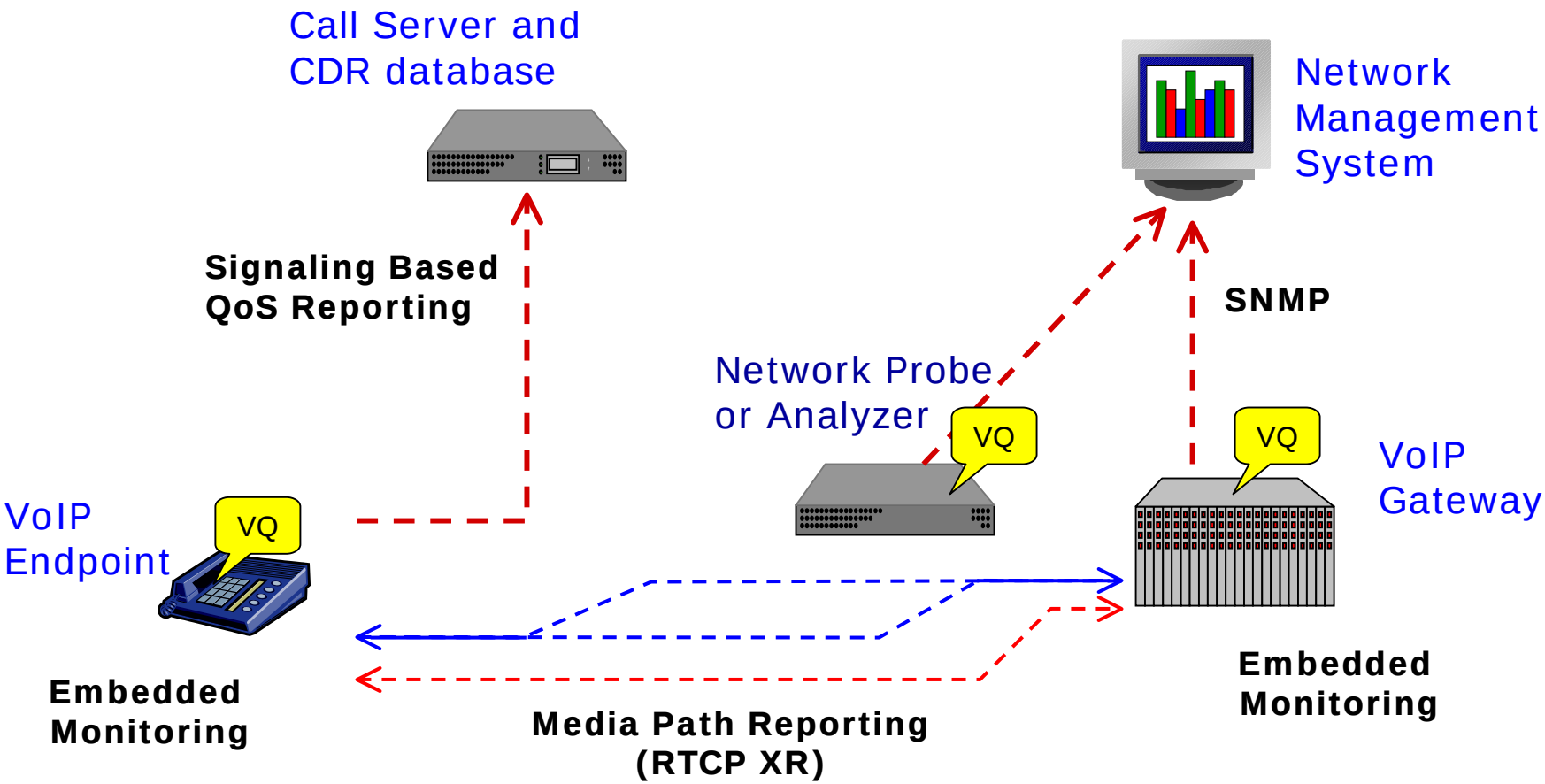


Probes, analyzers and voice quality testers can decode RTP headers and can make use of RTCP SR/RR/XR metrics

Where does this leave us?

- QoS controls, VLANs, prioritization can help
- Problems can still occur due to
  - Access links to teleworkers, branch offices
  - Core IP network issues and problems
  - VoWiFi is an unknown quantity
  - Interaction of VoIP with “analog” networks
- Secure protocols make problem detection/ resolution difficult
- How to solve problems that span multiple networks?
- How to solve system level problems?

VoIP Performance Management Framework #1



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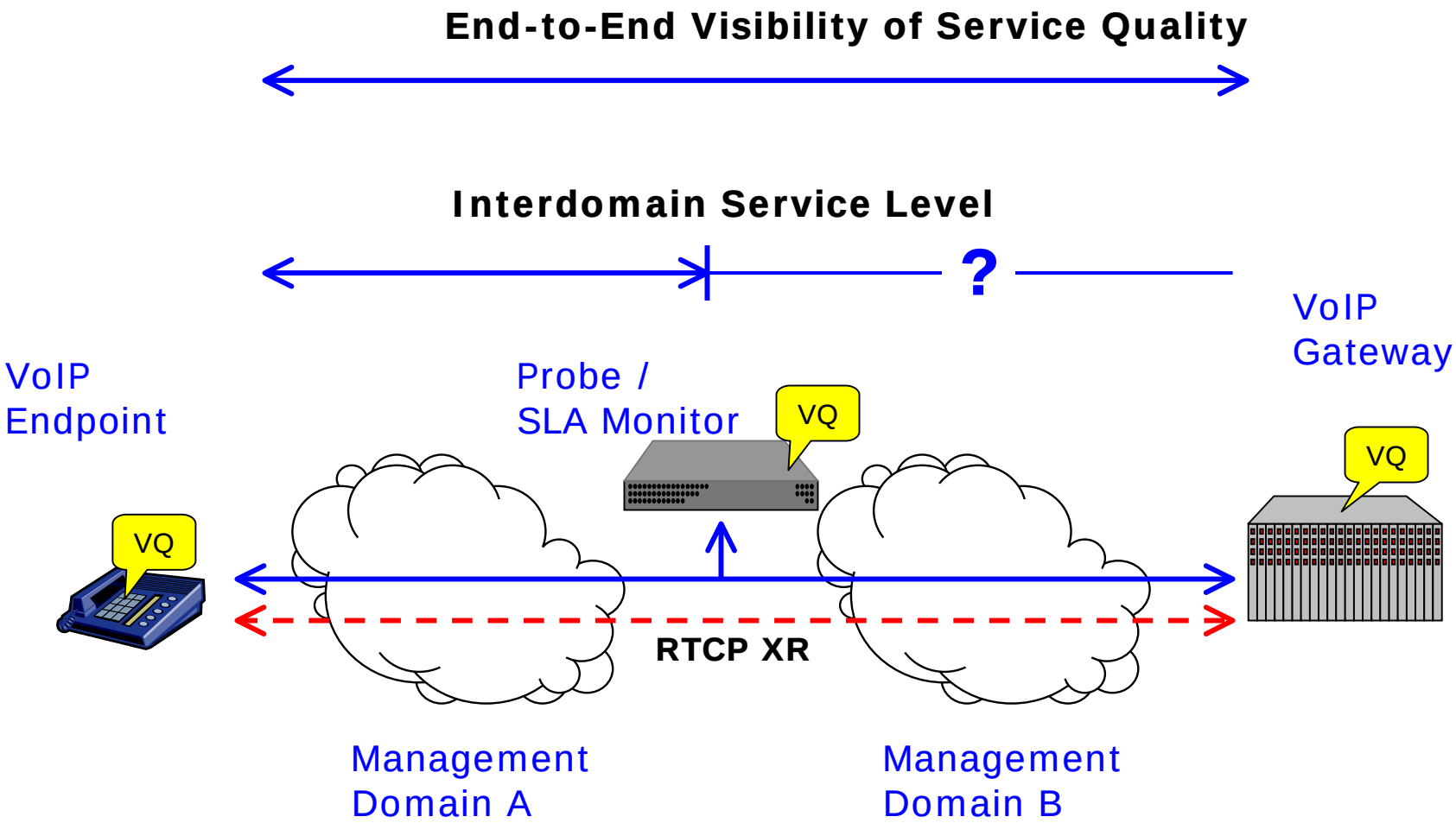
VoIP Performance Management Framework #2



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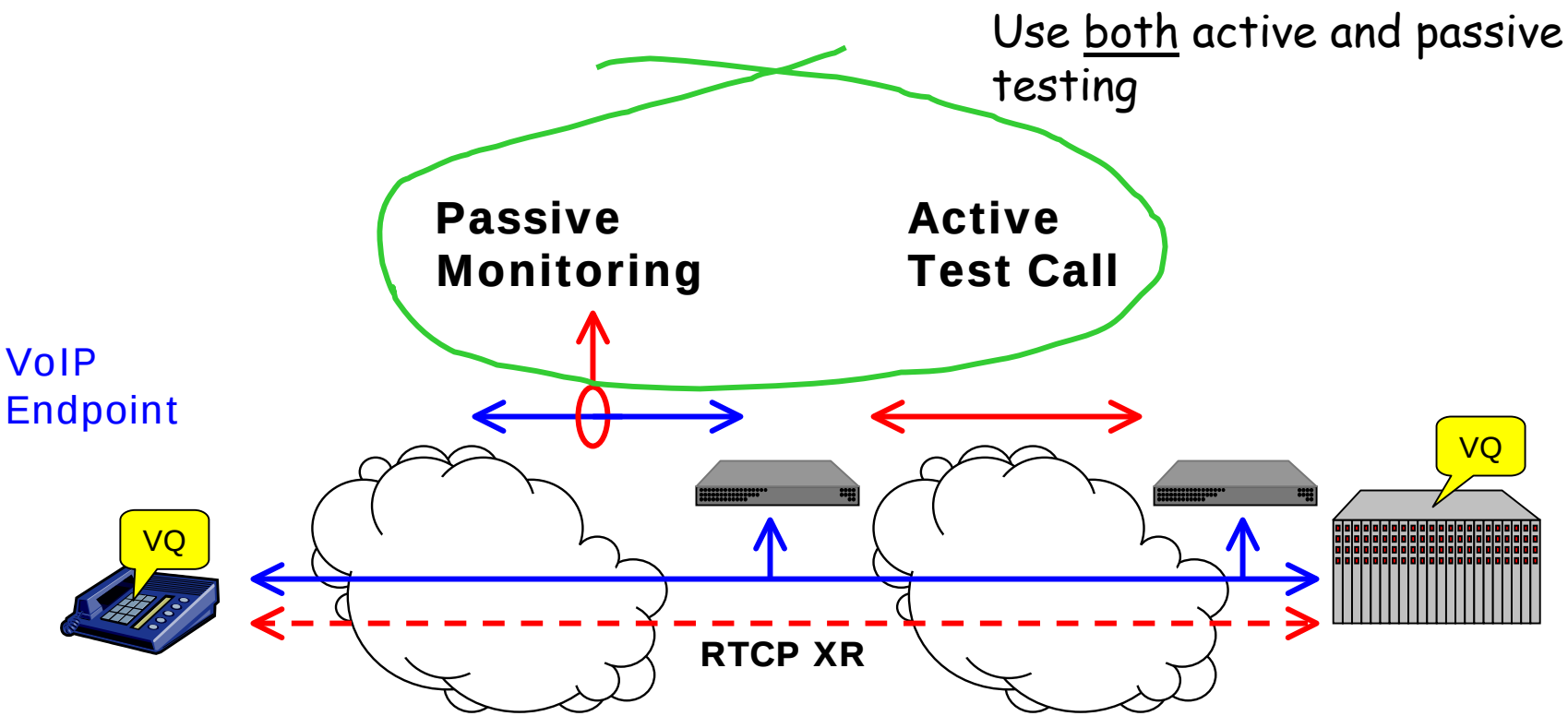
VoIP Performance Management Framework #3



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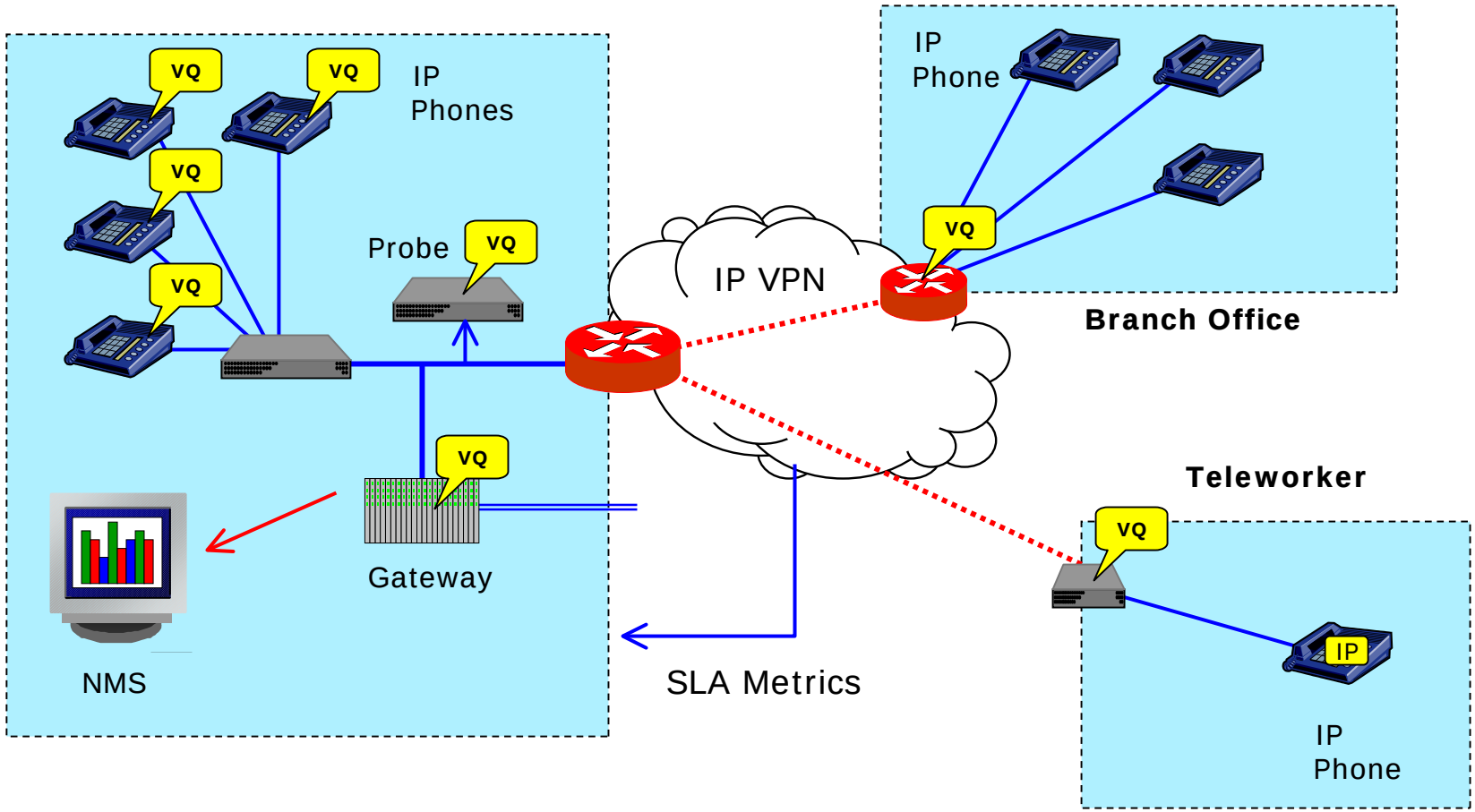
Enterprise Application using New Framework



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Critical Steps For VoIP Management Success

1. Pre-deployment testing

2. Apply the new performance management architecture
   -- Insist on RTCP XR

3. Be sensible in balancing security vs. manageability --
   Don't encrypt RTCP XR

4. Use a common performance monitoring/ analysis technology in endpoints, probes, analyzers, routers, etc.

5. Use management tools that understand system level VoIP problems

6. Use passive monitoring to capture problems affecting live calls and active testing for troubleshooting/ pre-deployment testing

7. Establish cooperative SLA agreements with service providers.

Summary

- VoIP works reliably if your network does
- Switched 100 Base T, VLANs and diffserv work well -- But don't neglect small offices, teleworkers, etc.
- Consider future direct IP-to-IP connections to customers and vendors as a more complex multi-network problem
- There is a performance management framework designed for VoIP – Use it.