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Bringing SIP to the enterprise

Architecting The SIP Network

Today's Topics

- **Infrastructure**

- **Security**

- **Interoperability**

- **Quality and Reliability**

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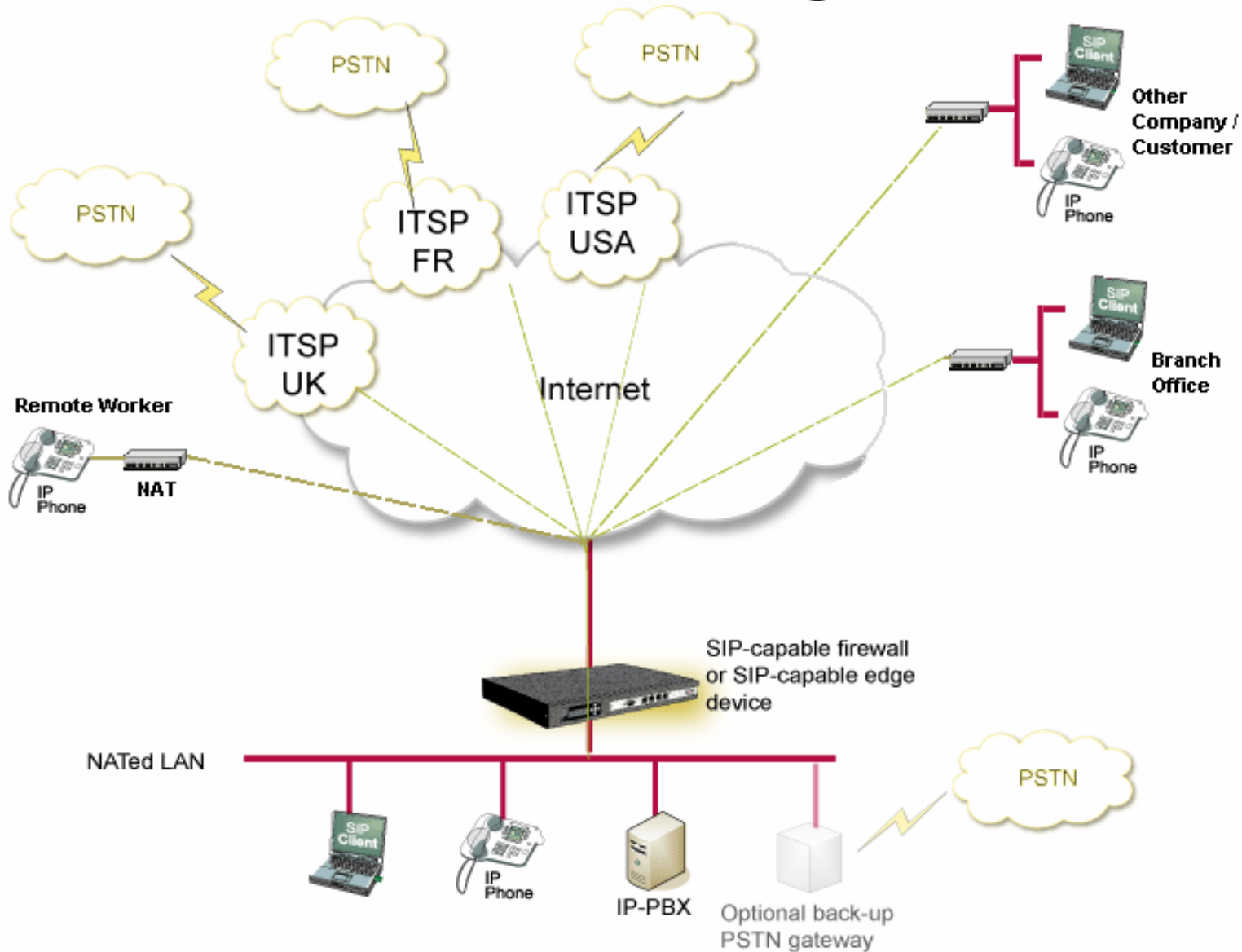
IP-PBX

PSTN Gateway

ITSP

INFRASTRUCTURE

WHAT'S IN YOUR NETWORK?

SIP Trunking

SIP-Aware Firewall

Remote Phones

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Network Diagram

Infrastructure

- **VLANs?**
  - Limiting – No Rich Communication
  - No Soft Clients

- **Single Network!**
  - Realizing Full Converged Communications
  - QoS

- **Bandwidth Requirements**
  - LAN (Data, Voice)
  - WAN (Data, Voice)
  - Codec (G.711, G.729, others)

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Infrastructure

- **Power**
  - UPS
  - PoE

- **Monitoring**

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Infrastructure

IP-PBX Component

- Hybrid IP-PBX
- IP-PBX with SIP front end
- SIP Based IP-PBX

Things to Consider???

- Needed Functionality
- Connect Multi-Vendor Endpoints
- Manageability
- Integration with other IP-based Applications
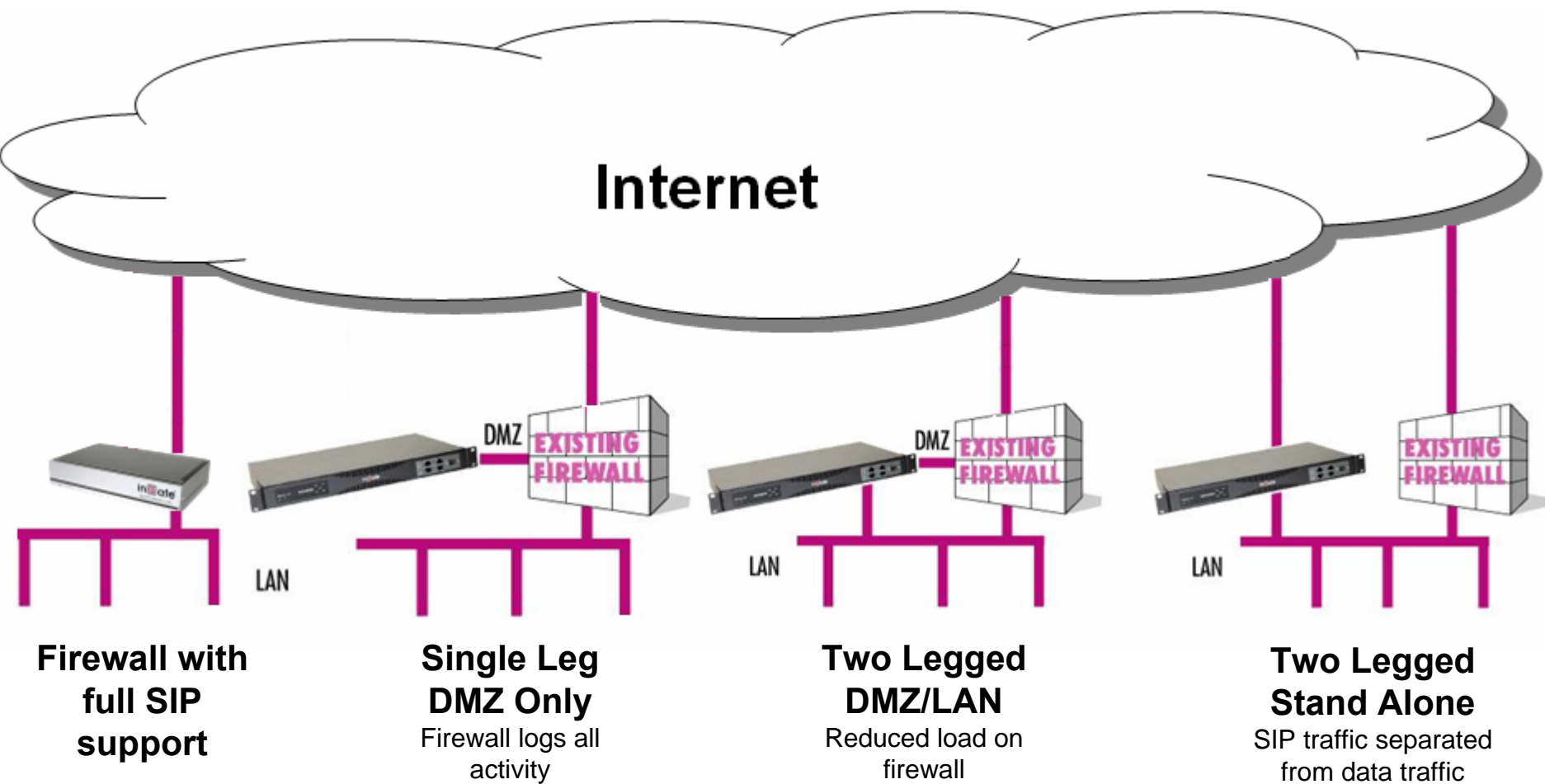- Remote Workers / Branch Offices
- Anonymous VoIP Callers (Other Systems)

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Infrastructure

- **Enterprise Edge Component**
  - FW
  - NAT
  - SIP Aware (SIP Proxy Based)

  What can it do for me???
  - Security
  - Mediation between IP-PBX and ITSP
  - Reliability / Survivability Features
  - Enable Remote Workers
  - Branch Office Interconnect

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Deployment Flexibility

Internet

Firewall with full SIP support

Single Leg DMZ Only
Firewall logs all activity

Two Legged DMZ/LAN
Reduced load on firewall

Two Legged Stand Alone
SIP traffic separated from data traffic

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Infrastructure

- **Service Provider Component (ITSP)**
  - Facilities-based
  - Facilities-less
  - ISP w/ ITSP services

  What can it do for me???
  - PSTN Connectivity
  - Local Breakout

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Security

- **Threats**
  - Brute Force
  - Denial of Service (DoS & DDos)
  - Malformed Message attacks
  - Buffer Overflow Attacks
  - Session Hijacking & Redirection
  - Voice Spam
  - Packet level intrusion
  - Vmail bombing
  - SIP Spam

 ➢ VoIP Security Alliance (VoIP-SA)

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Security

- **Stable Platform**

- **SIP Signaling**
  - SIP Parser
  - Optional Loop Detection
  - Authentication (DIGEST)
  - Encryption (TLS or MTLS)
  - Filtering (ex. Content type, method, To/From Header, black/white listing, etc.)

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Security

- **Controlling Media**
  - Dynamic port control
  - More secure than STUN/TURN/ICE
  - Only accept media from endpoint that receives media (prevents media injection)
  - Media Encryption
    - SRTP

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Edge – Needed Feature Set
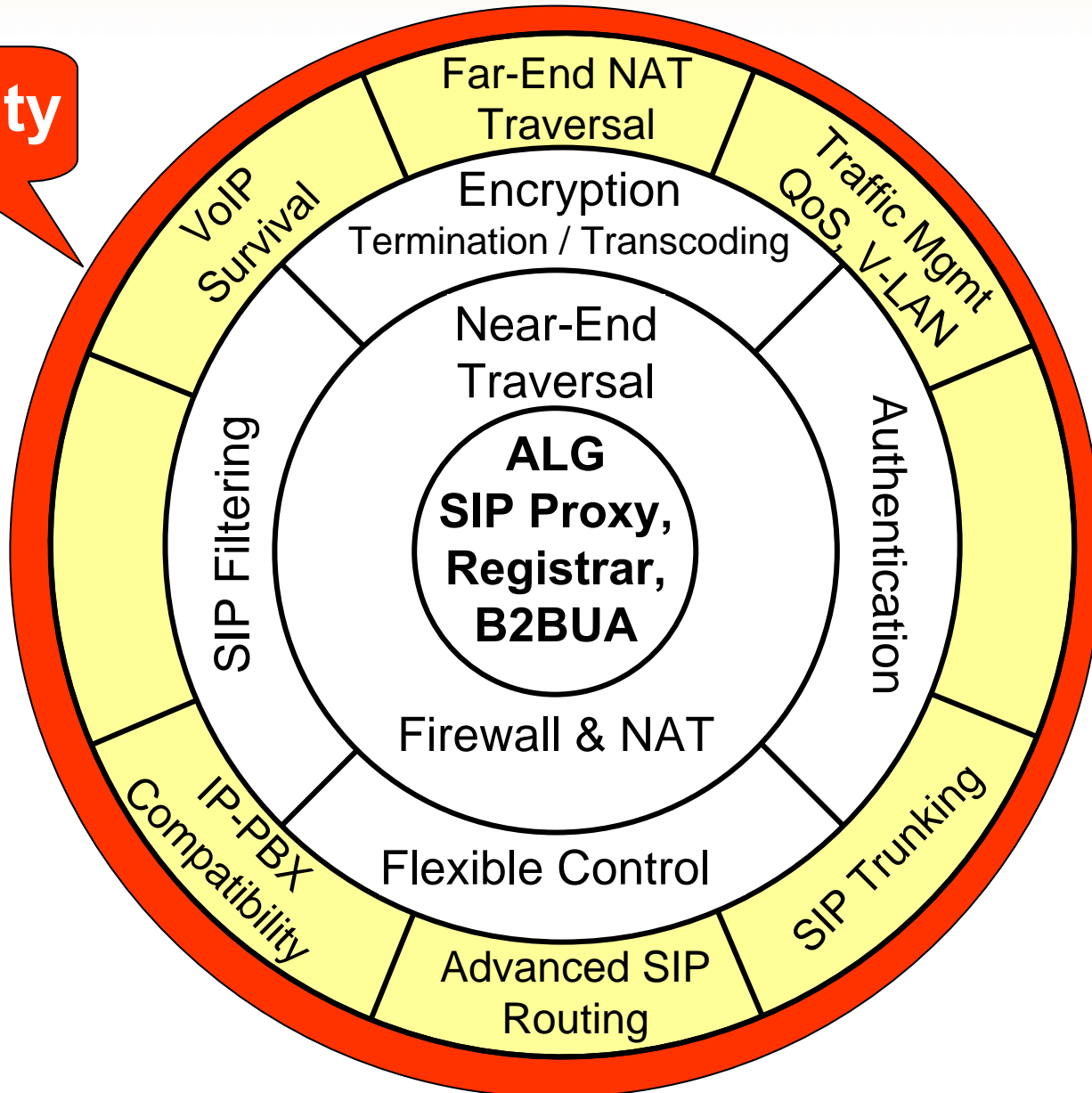
Interoperability

- **SIP Standards**
  - Defined by multiple IETF Standards
  - Different vendors focus on different specs.
  - Testing Important

- **SIPconnect** – Created by SIP Forum as a set of best practices for interfacing PBX with ITSP.

  - DNS
  - Signaling Security
  - FW/NAT Traversal
  - PSTN & SIP Addressing

  - Quality of Service
  - Handling of Media
  - Authentication
  - Accounting

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Interoperability

- **Mediation**
  - IP-PBX to ITSP
    - Varied Authentication Requirements
    - Least Cost Routing
    - Call Transfer
    - Conferencing
  - Remote worker (behind SIP-unaware NAT)
  - ENUM

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Quality & Reliability

- **Prioritization of Voice Traffic**
  - Services (protocol & port)
  - Packet size
  - SIP Traffic
  - IP address and segments

  - Inbound and Outbound
  - Dynamic bandwidth allocation
  - Setting of Type of Service (TOS) and/or Diffserv bits

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Quality & Reliability

- **Call Admission Control**
  - Emergency Calls

- **Other Voice Quality Factors**
  - PCs/Laptops
    - Fragmented disks
    - Poorly managed software installations
    - Sound card not optimized for voice
  - QoS on LAN

- **MPLS**
  - Voice only?

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Quality & Reliability

- **Reliability of SIP Trunks**
  - UPS a must
  - TDM/PSTN gateway capacity as a backup?

- **Failover to Secondary ISP**

- **Failover to Secondary ITSP**

- **Failover to Secondary Edge Equipment**
  - Registrations and calls lost
  - Registrations maintained
  - Registrations and calls maintained

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