



# シスコシステムズのENUMに関する取り組み

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# シスコ製品におけるENUMの対応



# ENUM ステータス

- **Products**

  - 音声Gateway

    - Cisco IOS ソフトウェア 12.2(11)T以降
    - SIP/H.323共にクエリから参照可能

  - Proxyサーバ

    - Cisco SIP Proxy Server

  - DNSサーバ

    - CNR

- **Activity**

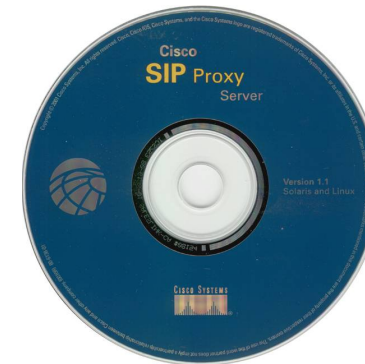
  - Patrik Fältström

  - IETF enum WG chair

  - Sweden/Singapore ENUM Trials

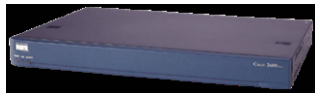
  - Yuki Iwagishi

  - Japan ENUM Trials

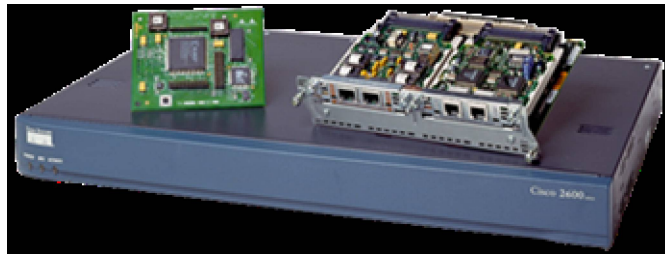


# マルチサービスモジュラールータ

**Multi-Protocol  
Routing, Access  
Control, QoS**



**IOS Firewall/  
Encryption**



**VoFR, VoIP  
and VoATM**

**IP Telephony**

- CallManager Express
- Cisco SRST

**Advanced  
Security**

**Low Density  
Switching**

**Control  
Delivery**

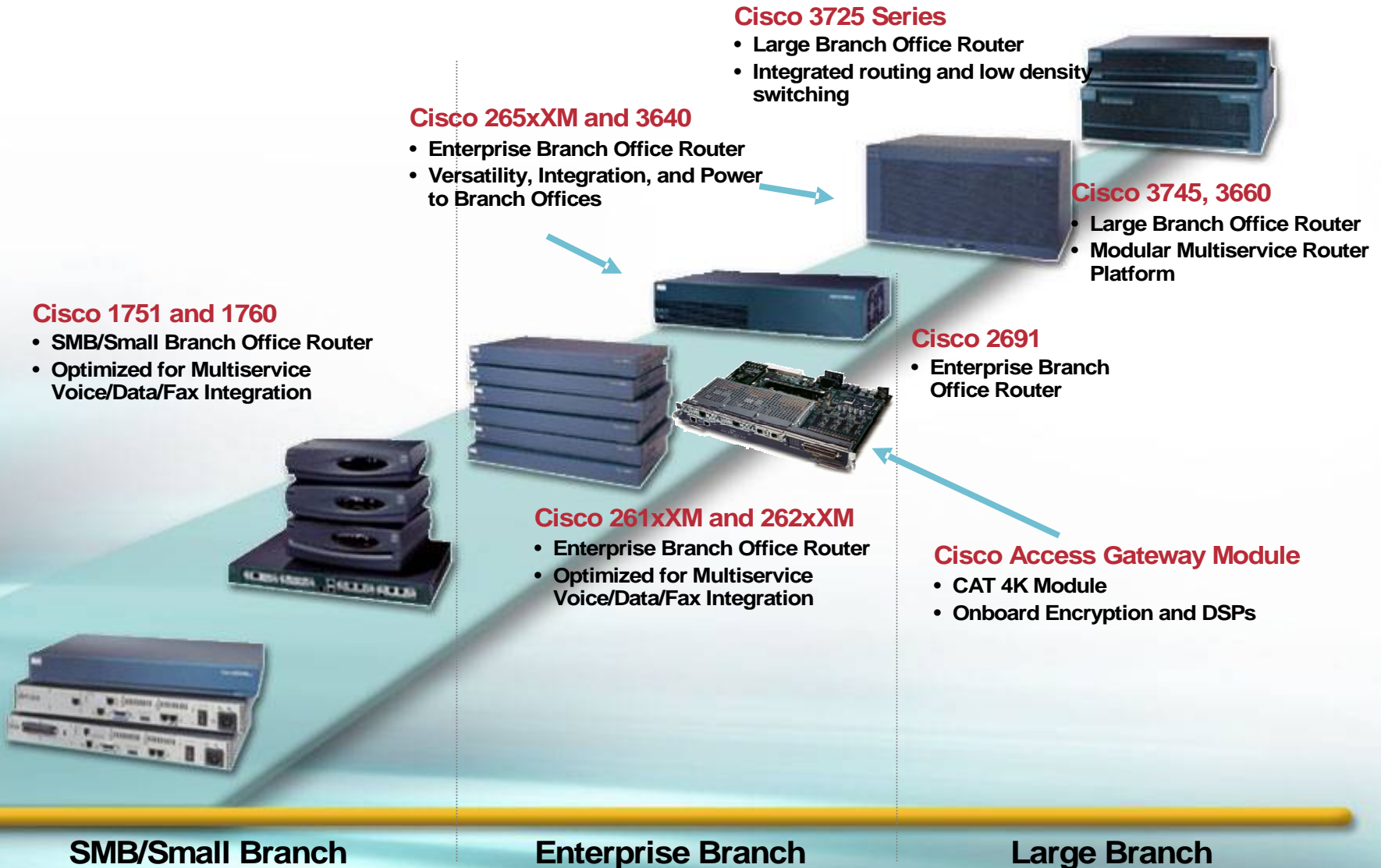
**Voice Applications**



# マルチサービスモジュラールータ

Cisco.com

PERFORMANCE & SERVICES



# ダイヤルピアについて



# 音声ゲートウェイに求められるもの

Cisco.com

- **電話番号を物理ポートにマップする設定**
- **電話番号をネットワークアドレスにマップする設定**
- **ディジット(番号)の操作 追加/置換/削減**
- **番号の拡張**

# Cisco IOSの実装例 - ダイヤルピア

Cisco.com

- ローカルダイヤルピア

公衆電話交換網、PBX、または電話に接続

インターフェイスで言うとFXS/FXO/ISDN BRI,PRIなど

- ネットワーク ダイヤルピア

- 音声ゲートウェイ (H.323/SIP/MGCP)

- Cisco CallManager

- SIPサーバ

- SIP UA

- H.323 Gatekeeper

- H.323 Terminal/SIP UA

- ENUM

[http://www.cisco.com/japanese/warp/public/3/jp/service/tac/788/voip/dialpeer\\_call\\_leg-j.html](http://www.cisco.com/japanese/warp/public/3/jp/service/tac/788/voip/dialpeer_call_leg-j.html)

# ネットワーク ダイアルピア

Cisco.com

- **Voice over IP (VoIP)**
  - 宛先 VoIP デバイスの IP アドレス、Domain Name System (DNS) 名にマップ
  - H.323、SIP、MGCP
  - Codec の指定
- **Voice over ATM (VoATM)**
- **Voice over Frame Relay (VoFR)**
- **Multimedia Mail over IP (MMoIP)**

# Simple Configuration Example

Cisco.com

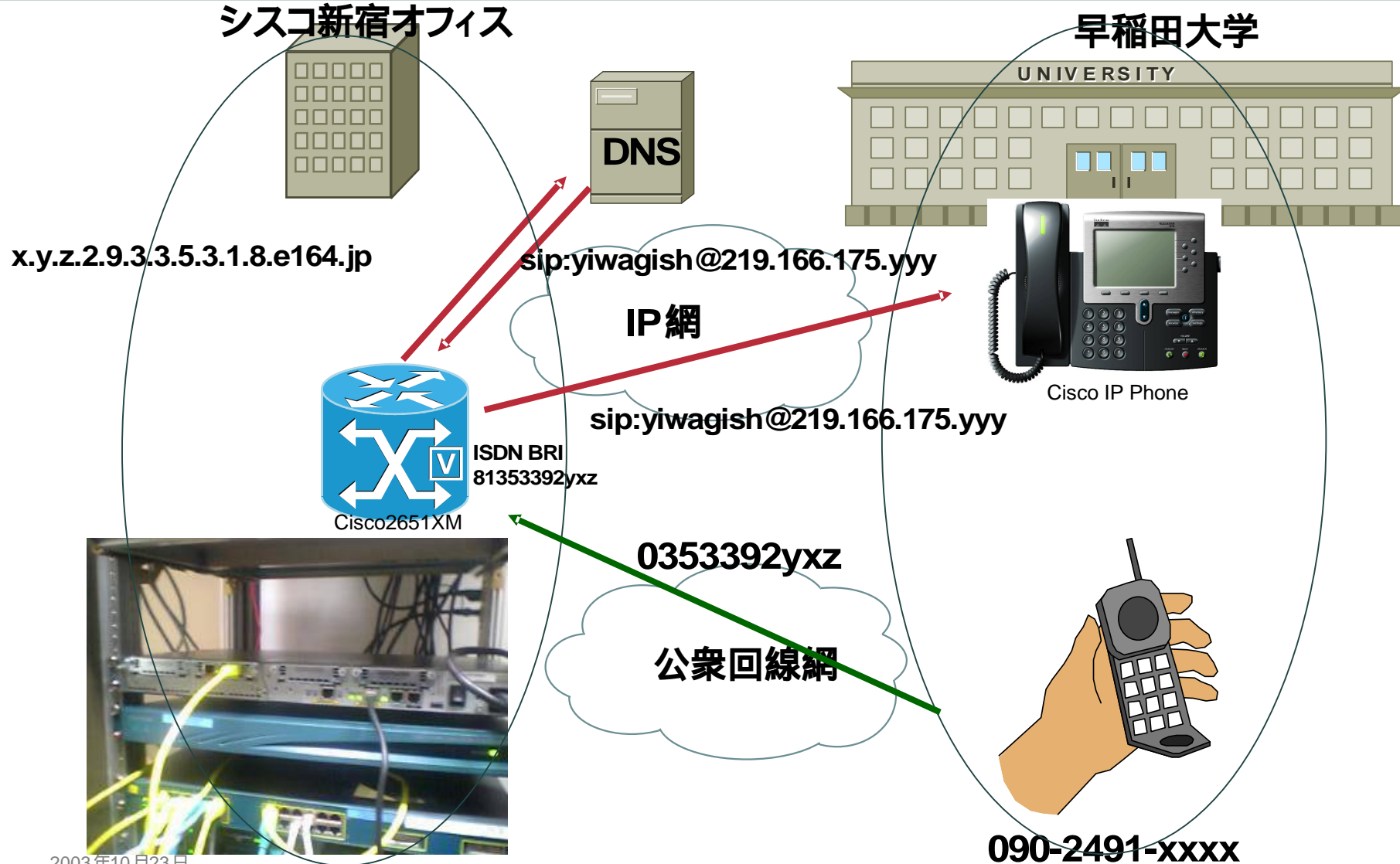
```
ip name-server 219.166.175.w
!  
isdn switch-type ntt  
  
voice enum-match-table 1  
rule 1 1 /^¥(. *¥)/ /¥1/ e164.jp  
  
interface FastEthernet0/0  
ip address 219.166.175.xxx 255.255.255.248  
  
interface BRI1/0  
no ip address  
isdn switch-type ntt  
isdn incoming-voice voice  
isdn calling-number 53392zyx
```

```
ip route 0.0.0.0 0.0.0.0 219.166.175.zzz  
!  
dial-peer voice 10 voip  
destination-pattern 8135339....  
session protocol sipv2  
session target enum:1  
codec g711ulaw  
  
voice-port 1/0/0  
connection plar 81353392zyx  
sip-ua
```

# ENUM デモ



# ENUM デモ



# ENUMデモ

- Cisco 2651XM
  - NM-2V
  - VIC-2BRI-S/T-TE
  - IOS 12.3(3) IP Plus
- Cisco IP Phone 7960G
  - SIPソフトウェア



# debug isdn q931

ISDN BR1/0 Q931: RX <- SETUP pd = 8 callref = 0x4E

Bearer Capability i = 0x8090A2

Standard = CCITT

Transfer Capability = Speech

Transfer Mode = Circuit

Transfer Rate = 64 kbit/s

Channel ID i = 0x89

\*\*\* Called Party Number i = 0x80, '53392zyx'

Calling Party Number i = 0x0081, '0902491xxxx'

Plan:Unknown, Type:Unknown

High Layer Compat i = 0x9181

\*\*\*ダイヤルイン契約がない場合、Called Party Numberをもらえない。  
二段階ルーティングもしくはConnection planを設定する必要あり。  
Translation Ruleを使って813を追加する必要あり。(今回は省略)

# debug voip enum detail

Cisco.com

```
enum_resolve_domain: match_num 81353392ZYX table_indx 1
enum_resolve_domain: rule 1 result string 81353392ZYX
generate_enum_search_string : search string X.Y.Z.2.9.3.3.5.3.1.8.e164.jp
enum_dns_query: name = X.Y.Z.2.9.3.3.5.3.1.8.e164.jp type = 35, ns_server = 0
order 100 pref 10 service sip+E2U flag u
regexp /^(.*)$/sip:yiwagish@219.166.175.yyy/ replacement
num_elem = 1
NAPTR Record : order 100 pref 10 service sip+E2U
    flags u regexp /^(.*)$/sip:yiwagish@219.166.175.yyy/
    replacement
decode_naptr_record : re_string ^(.*)$
decode_naptr_record : re_substitution_string sip:yiwagish@219.166.175.yyy
decode_naptr_record : re_flags_string
U_FLAG case, stopping query
new_e164_user sip:yiwagish@219.166.175.yyy
contact_list :
    sip:yiwagish@219.166.175.yyy
enum_resolve_domain: contact_list 827981D8
```

# debug ccsip messages

Cisco.com

**INVITE sip:yiwagish@219.166.175.yyy SIP/2.0**  
**Via: SIP/2.0/UDP 219.166.175.xxx:5060**  
**From: <sip:0902491xxxx@219.166.175.xxx>;tag=1E31D422-1D4F**  
**To: sip:yiwagish@219.166.175.yyy**  
**Date: Sat, 06 Mar 2003 20:43:02 GMT**  
**Call-ID: 23496CF-198A11CC-807C8139-908FFD86@219.166.175.217**  
**Supported: timer,100rel**  
**Min-SE: 1800**  
**Cisco-Guid: 36920806-428478924-2155446585-2425355654**  
**User-Agent: Cisco-SIPGateway/IOS-12.x**  
**Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, COMET, REFER, SUBSCRIBE, NOTIFY, INFO**  
**CSeq: 101 INVITE**  
**Max-Forwards: 6**  
**Remote-Party-ID: <sip:0902491xxxx@219.166.175.xxx>;party=calling;screen=yes;privacy=off**  
**Timestamp: 731450582**  
**Contact: <sip:0902491xxxx@219.166.175.xxx:5060>**  
**Expires: 180**  
**Allow-Events: telephone-event**  
**Content-Type: application/sdp**  
**Content-Length: 224**

**ENUM Trial Japan 実証実験を通じてENUMの展開に必要な機能などのフィードバックがあれば今後の参考にしますのでよろしくお願いいたします。**



# 參考資料



- **INTERNET PROTOCOL JOURNAL**

[http://www.cisco.com/en/US/about/ac123/ac147/ac174/ac179/about\\_cisco\\_ipj\\_archive\\_article09186a00800e55d4.html](http://www.cisco.com/en/US/about/ac123/ac147/ac174/ac179/about_cisco_ipj_archive_article09186a00800e55d4.html)

- **VoIP Gateway Trunk and Carrier Based Routing Enhancements**

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1839/products\\_feature\\_guide09186a00800b5dbf.html#1038576](http://www.cisco.com/en/US/products/sw/iosswrel/ps1839/products_feature_guide09186a00800b5dbf.html#1038576)

## 参照URL その2

- シスコシステムズ株式会社

<http://www.cisco.com/jp/>

- シスコIOSソフトウェア

<http://www.cisco.com/japanese/warp/public/3/jp/product/hs/ios/>

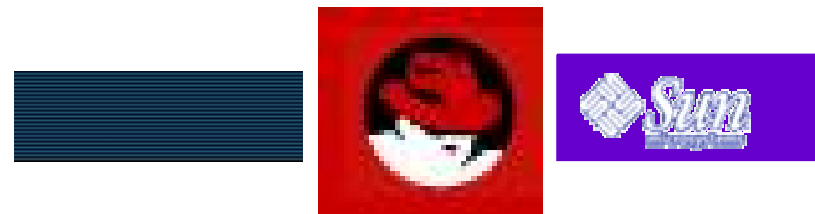
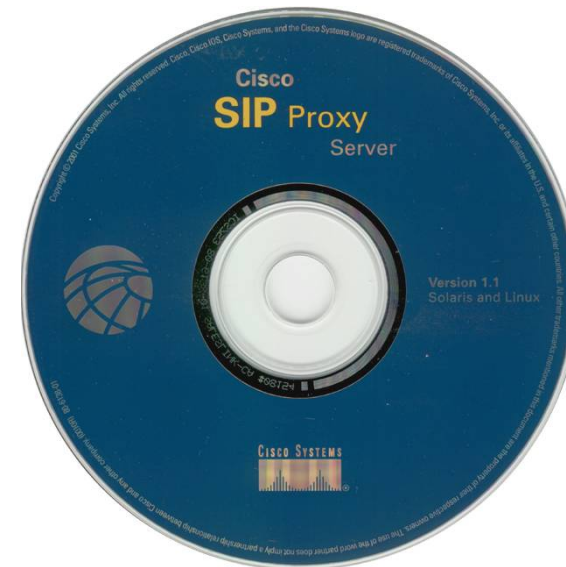
- シスコIPテレフォニー

<http://www.cisco.com/japanese/warp/public/3/jp/product/hs/iptel/>

# (参考)What is the Cisco SIP Proxy Server?

Cisco.com

- Provides call processing functionality via Proxy or Redirect server
- Manages end point registrations via Registrar server
- Routes on-net calls between subscribers and off-net calls to PSTN
- Maintains a MySQL database to store subscriber and configuration data
- RFC 2543/3261 compliant
- Supports UDP, TCP, DNS, ENUM, HTTP Digest, IPSec, NTP, RADIUS
- Based on Apache web server
- Provides high availability and awesome performance via redundant servers
- Operates on IBM Linux and Sun Solaris platforms



# (参考) Available Feature Summary

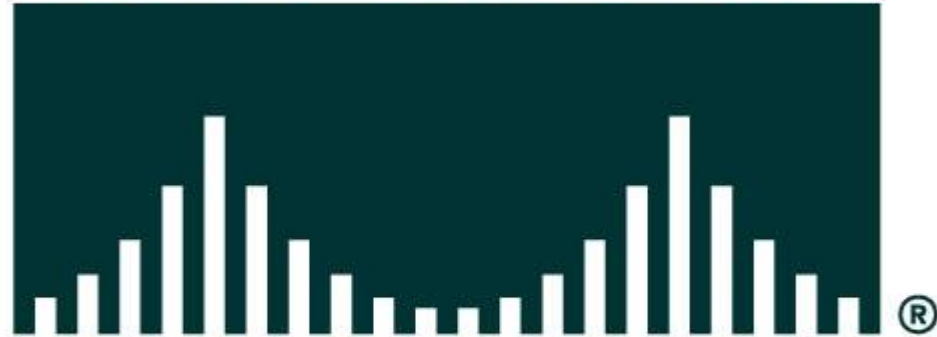
Cisco.com

- **RFC Compliance**
  - **RFC 2543bis**
  - **Subset of RFC 3261**
  - **Subset of RFC 3263**
- **Proxy, Redirect, Registrar Srvr**
- **UDP and TCP Transport**
- **Transport Layer Security (TLS)**
- **IPSec**
- **Access Control Lists**
- **Number Expansion**
- **Domain-Specific Registration**
- **Static & Dynamic Registrations**
- **ENUM Queries**
- **Static Routes**
- **DNS NAPTR, SRV and A Records**
- **LRQ Interface to H.323 Gatekpr**
- **Call Forwarding**
- **MySQL Database**
- **Digest Authentication**
  - **via MySQL or RADIUS**
- **Accounting for All Call Attempts**
  - **via RADIUS**
- **Linux & Solaris OSs**
- **IBM & Sun Server Platforms**
- **Redundant Servers**
- **Database Redundancy**
- **20,000 Registrations**
- **20,000 Static Routes**
- **Provisioning GUI**
- **Configuration File**
- **Command Line Interface Tools**
- **Access, Error & Stats Logging**
- **SNMP Server Status & Control**

# Q and A



# CISCO SYSTEMS



EMPOWERING THE  
INTERNET GENERATION