H.323 Architecture and Design

Course Number
Presentation_ID

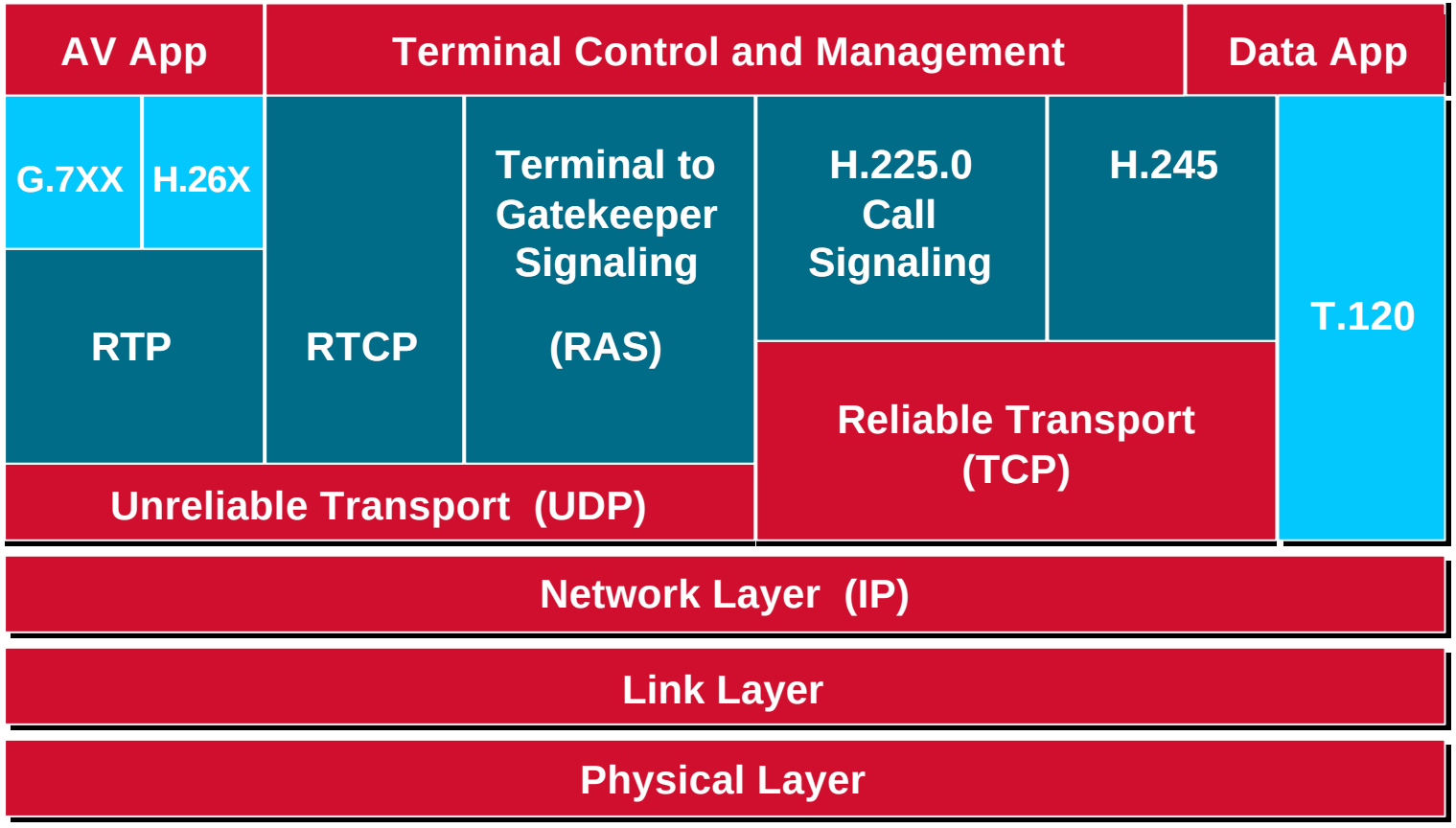
IP Conferencing Protocols

- **H.323**

  ITU standard protocol

  Evolved from H.320 ISDN standard

H.323 Hierarchy



H.323 Sub-Protocols

- **H.225/Q.931 for call signaling**

  TCP-based variant of ISDN call signaling

- **RAS for gatekeeper access**

  UDP-based client-server protocol

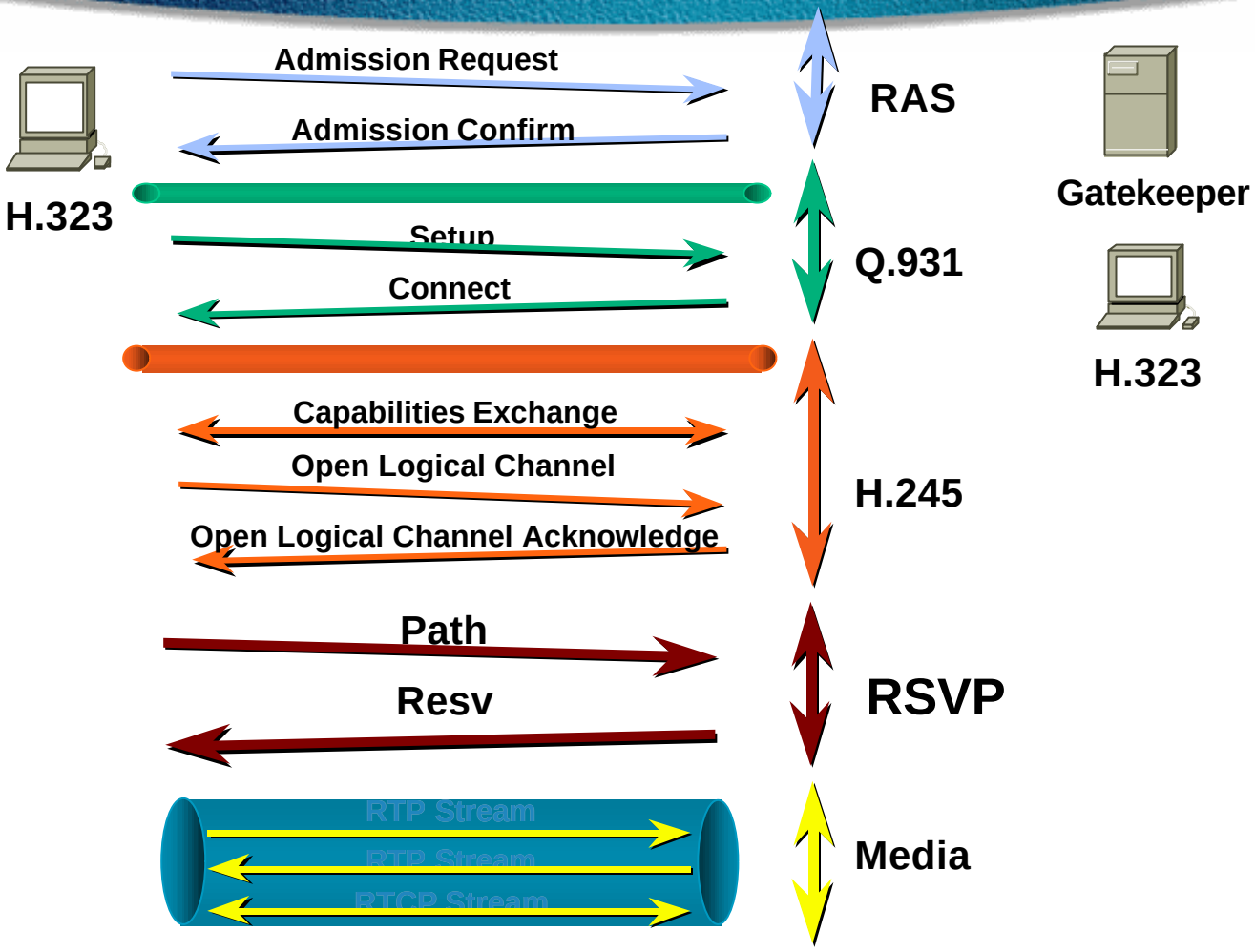
- **H.245 session control protocol**

  TCP-based, capabilities negotiation, conference control

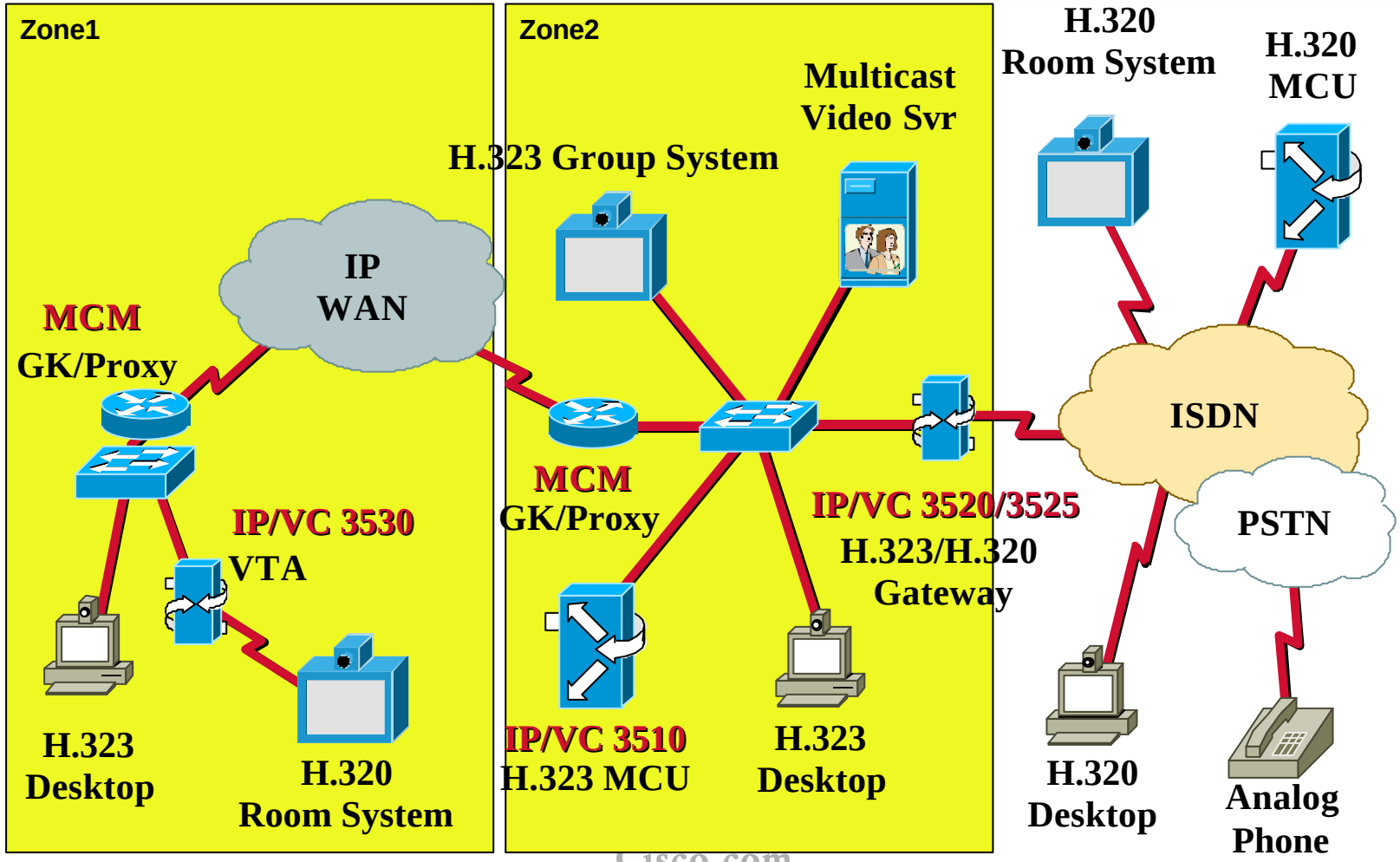
- **RTP**

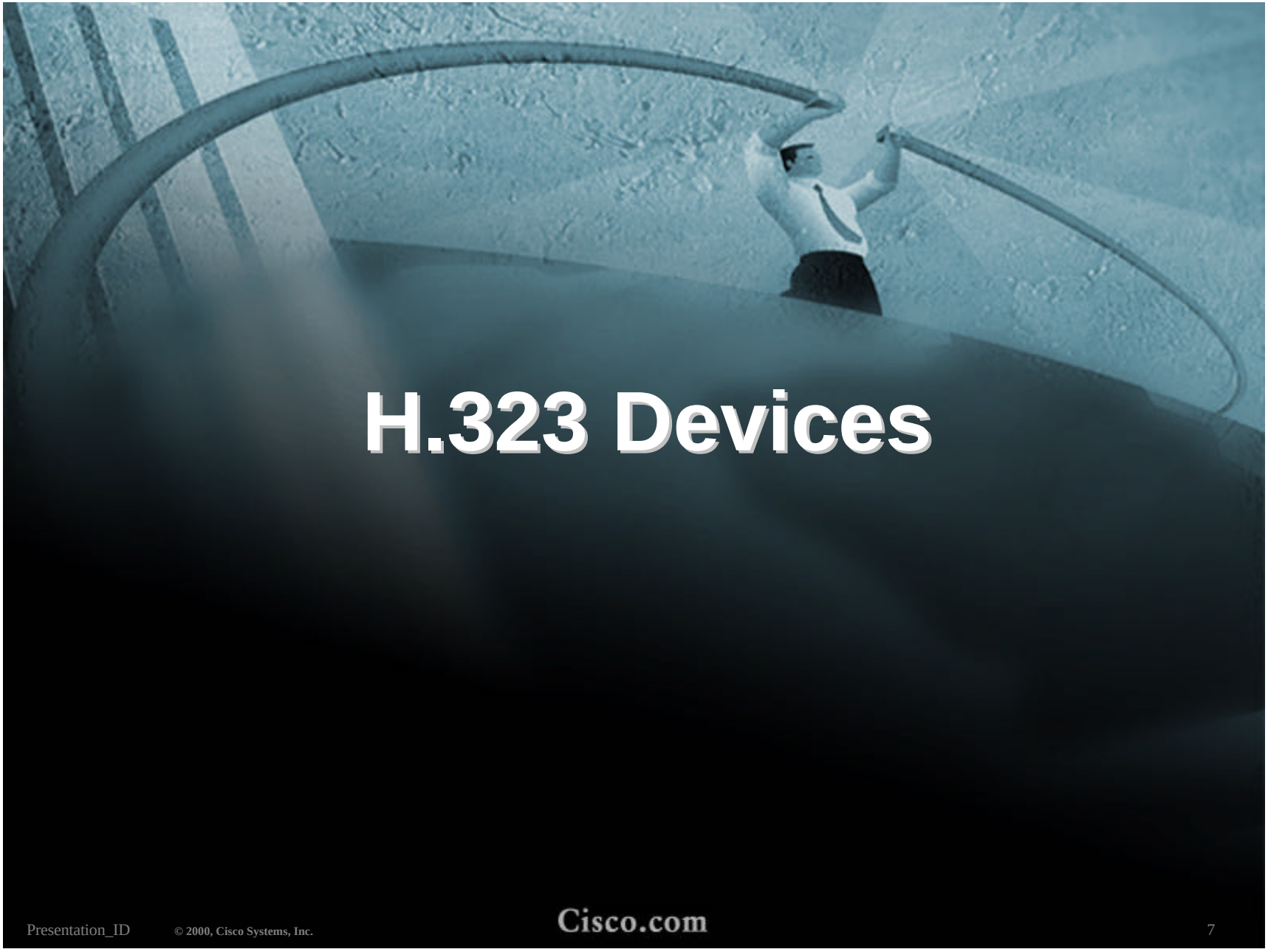
  Codec-independent media transport

H.323 Signaling



H.323 Networks





H.323 Devices

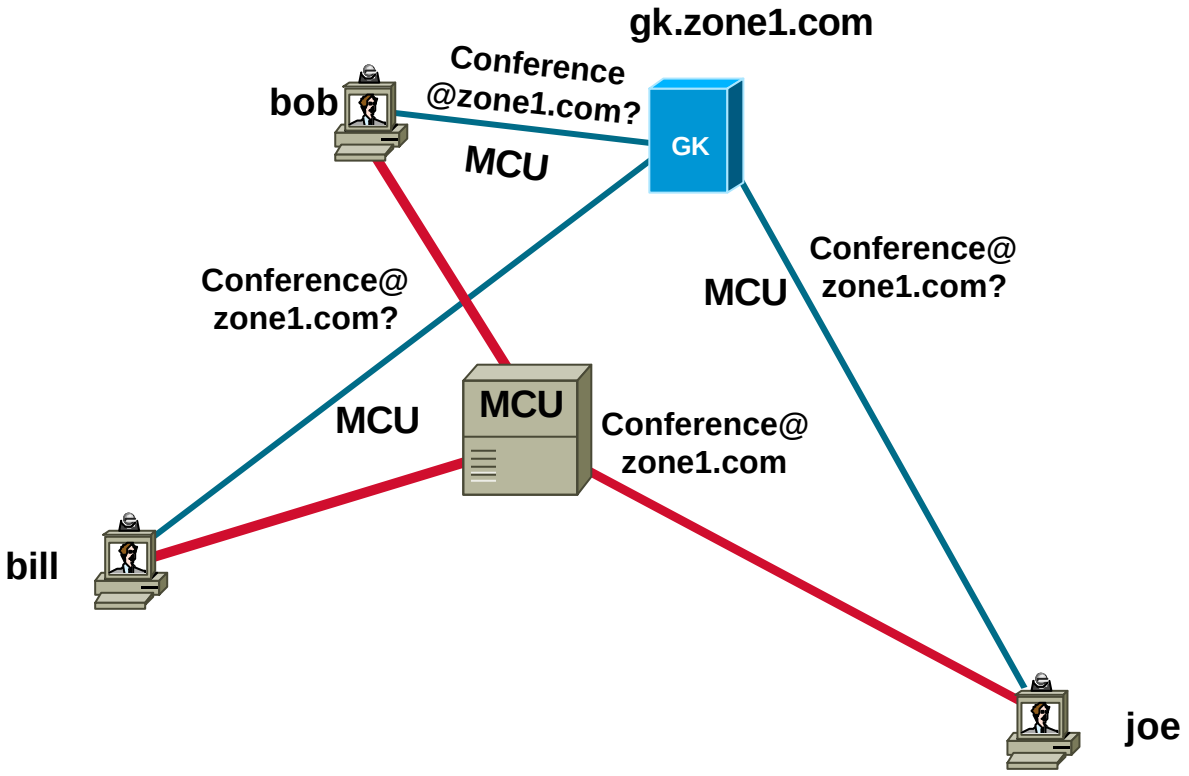
Terminals and MCUs

- Terminals can be full-function PCs or internet appliances
- Video/voice or voice-only
- Enterprise or SOHO through a NAS.
- Some terminals can manage small conferences
- Large conferences handled through a multipoint control unit (MCU).

H.323 MCU's

- MCU mixes many point to point calls
- Star call topology
- MC does signaling negotiation
- MP does media stream mixing
- Conferences look like endpoint aliases

H.323 MCU intrazone call



Gateways

- Required for interoperability between video/audio standards (H.323, H.320, H.324, POTs)
- Conversion of protocols between standards
- Audio/video format conversion (transcoding) where necessary

H.320/323 Addressing

- **Direct Inward Dial (DID)**

  Gateway acts as "PBX" attached to Multiple Subscriber Network (MSN)

  DID numbers mapped to E.164 aliases

- **Signaling for ISDN subaddressing**
- **TCS-4 signaling supports alphanumeric H.323 aliases (H.320 BAS codes)**
- **IVR-style DTMF address prompting**
- **Operator- or user-assisted address prompting**

Gatekeepers

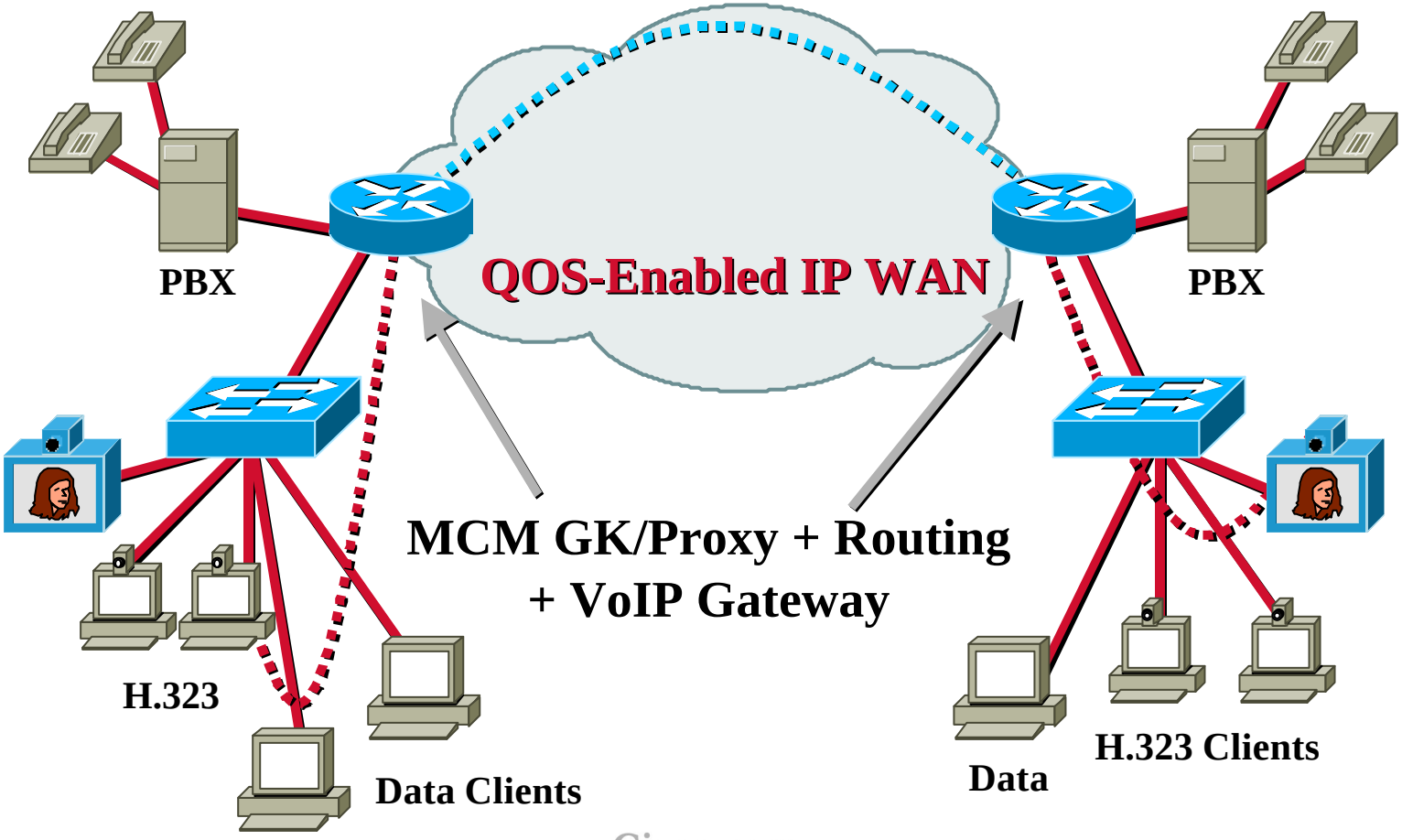
- Policy component for H.323 terminals, proxies, and gateways
- Logically separate from the H.323 endpoints

- H.323 ITU Specification
  - Gatekeeper mandatory services are:
    - Address translation
    - Admissions control
    - Zone management
  - Gatekeeper optional services are:
    - Call control signaling
    - Call authorization
    - Bandwidth management and reservation

Proxies

- **“H.323-to-H.323 gateway”**
- **Fast packet switching for video/audio**
- **Provides enterprise isolation and security**
- **Separates enterprise QoS from backbone QoS**
- **Applies H.323-specific routing policies**
- **A gateway between Cisco-unaware devices and Cisco conferencing infrastructure components.**

Multimedia Conference Manager



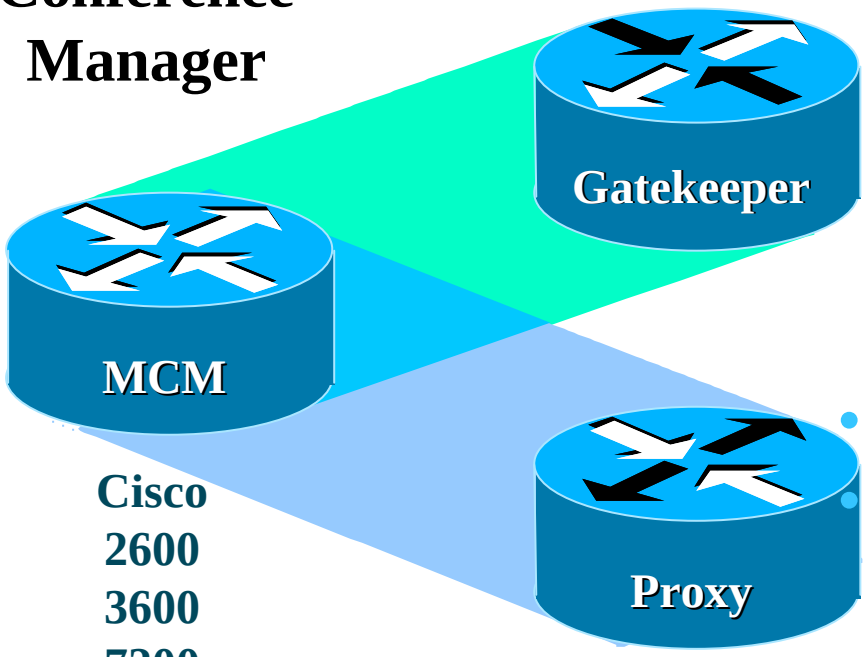
QoS Requirements for H.323

Bandwidth - Delay - Jitter -Packet loss

- Bandwidth must be maintained for streaming audio/video
- One-way audio delay <200-400 msec for interactive use
- Audio/video bandwidth requirements fairly uniform
- Audio must be played even with or after video, never before
- Packet loss requirements vary

Cisco IOS® Router MCM

Multimedia Conference Manager



Cisco
2600
3600
7200
MC3810

MCM Gatekeeper

- Address resolution
- User authorization
- Zone bandwidth management
- Accounting

MCM Proxy

- QoS
- Security

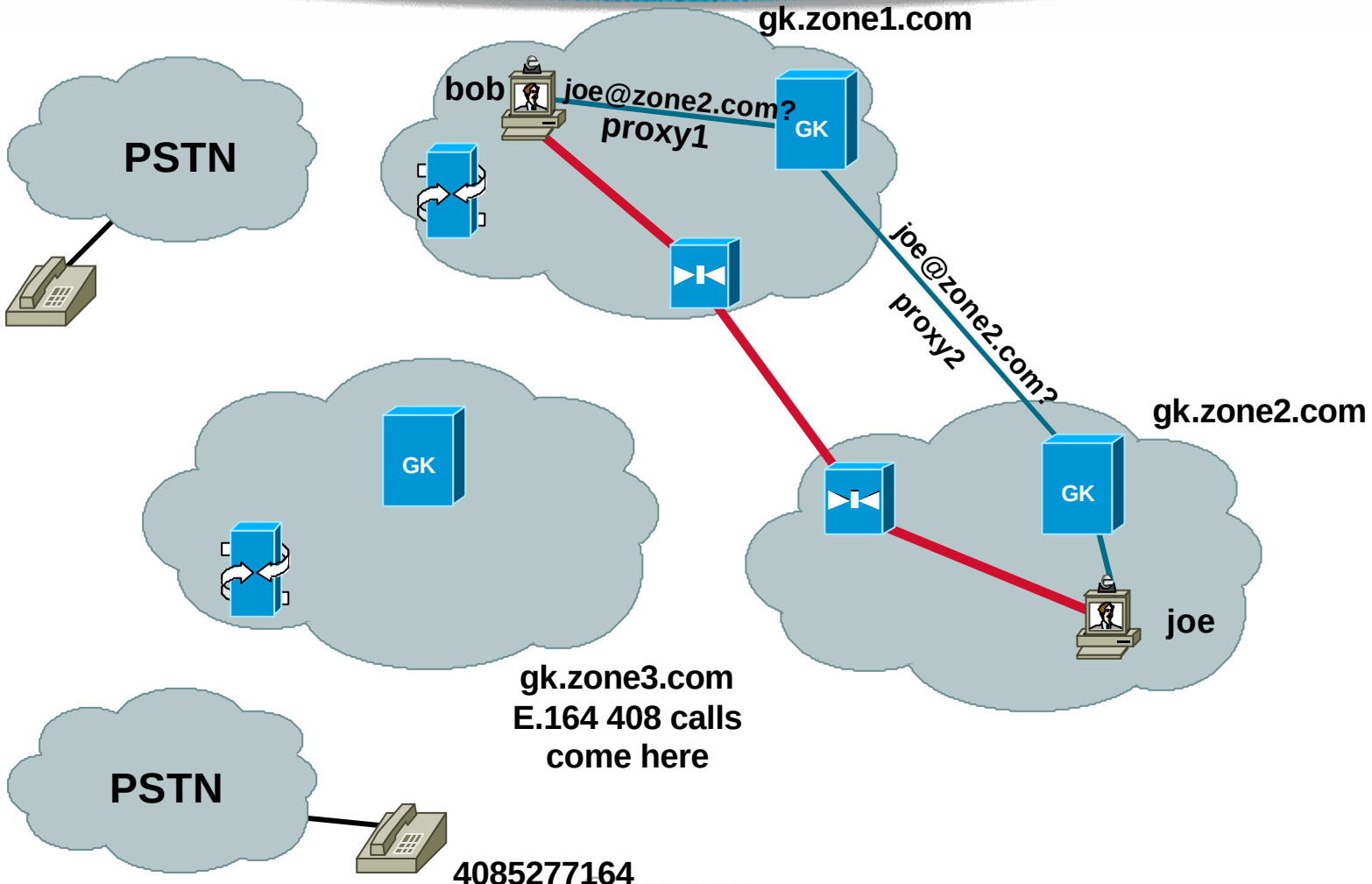
Gatekeeper Zone Design

- One gatekeeper per zone
- Gatekeeper zones are logical in nature
- Network topology, administrative scope both factors in zone design
- Availability of resources like gateways and proxies may affect partitioning of zones
- Consider how H.323 zones and DNS domains interact

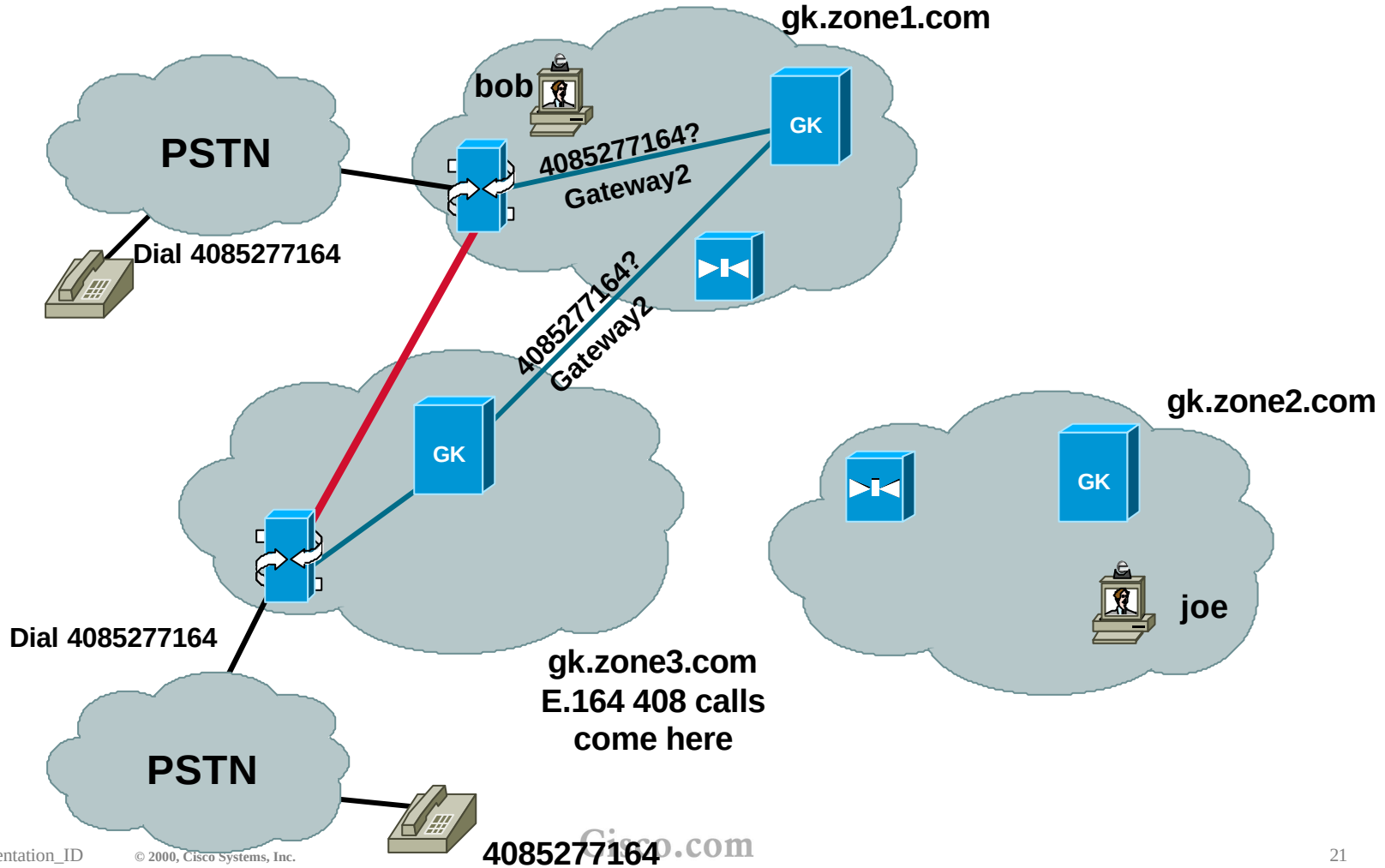
H.323 Naming

- Names are dynamic, not bound to a specific terminal, so they can follow a user
- E.164 names for gateway support between H.323 and PSTN-based standards
- H.323 IDs, URLs, and Email names are all text strings. For user-friendly access between H.323 terminals

Finding Names in Other Zones



Finding Names in Other Zones
(Voice release)

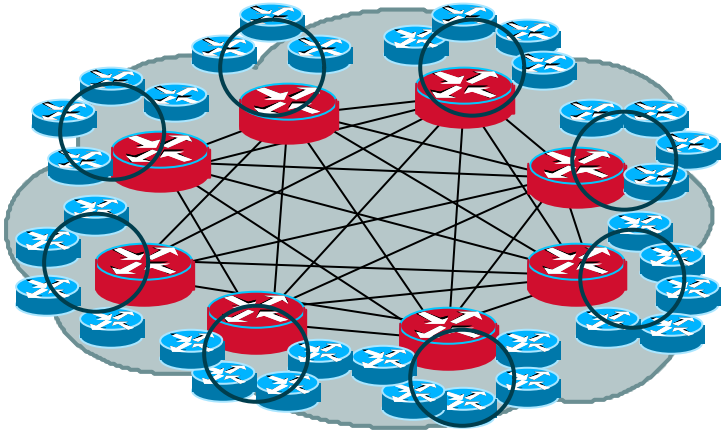


H.323 Name Space Design

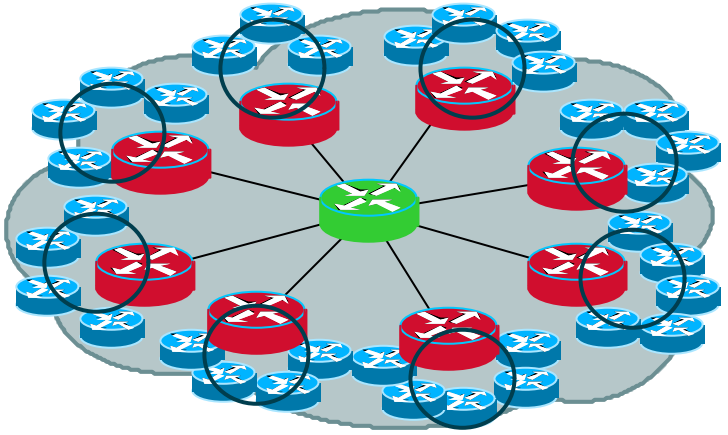
- **Terminals should be assigned E.164 addresses for inbound gateway support.**
- **Consistent naming enhances inter-zone usability.**
- **Consider using a user's Email name for H.323-IDs, Email-IDs, or URLs.**

Directory Gatekeeper - Network Scaling

Medium Network - Multiple Gatekeepers



Medium-Large Network - Multiple Gatekeepers and a Directory Gatekeeper

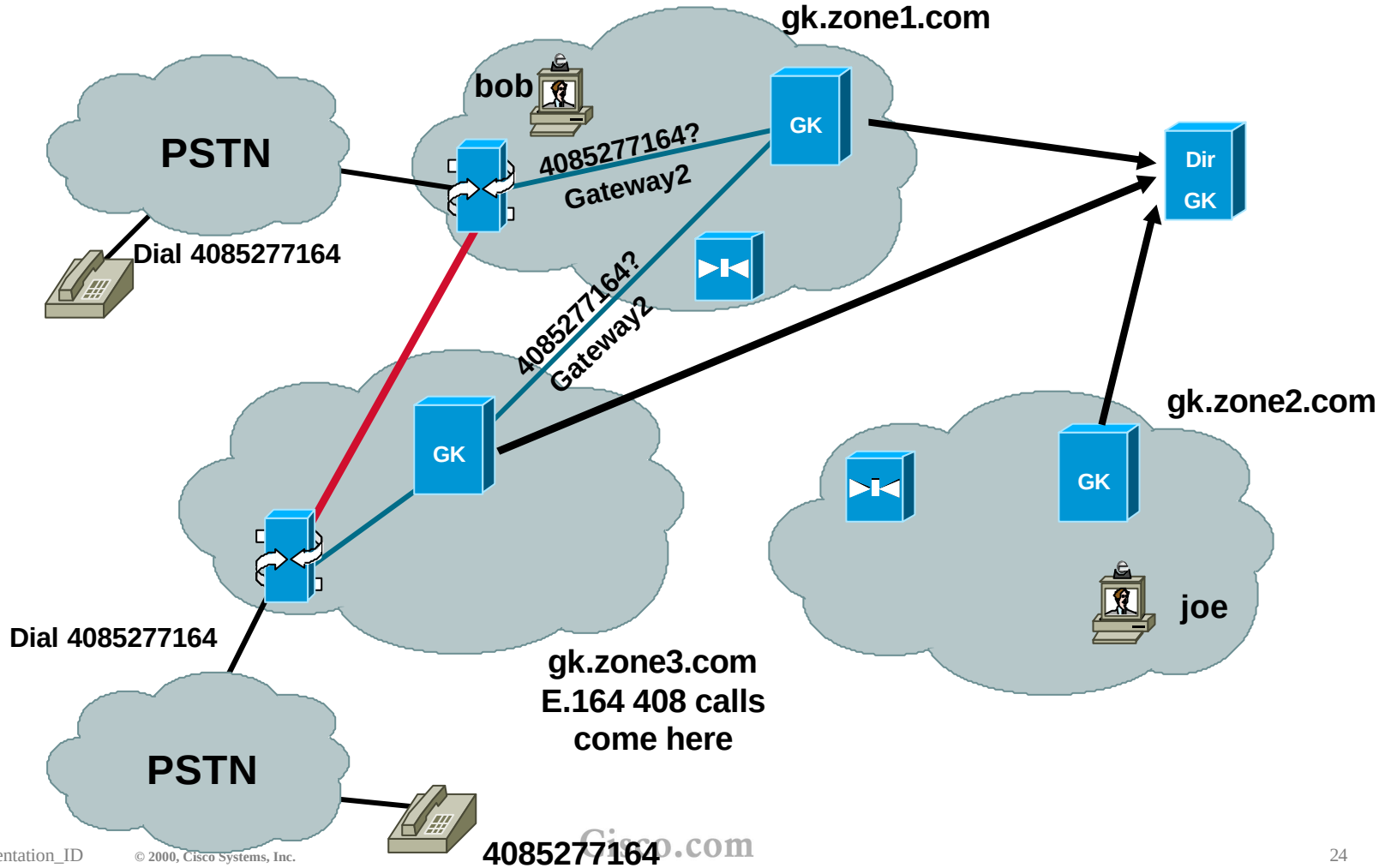


Gateway

Gatekeeper

Directory Gatekeeper

Finding Names in Other Zones



Directory GK

- Directory-Gatekeeper = Super Gatekeeper = LRQ-forwarding
- GKs point to Directory-GK; no full mesh needed between GKs
- Limit of 5 hops for an LRQ:
  - Allows up to a 4-tier GK hierarchy
  - Dedicated vs. Shared Dir-GK is a network design decision
  - Local zones and “LRQ forwarding zones” can be mixed
- Dir-GK does not maintain states about the forwarded-LRQ calls

H.323 Deployment Needs

- **Bandwidth and manageable QoS**
- **Administration and network management**
- **Scalability**
- **Interoperability with other videoconferencing standards**
- **Safety and security**

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