

SIP What it is, what it is not



S Session
I Initiation
P Protocol

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Telco vs Internet Ideas of Service

Absolute Reliability
Absolute Dependability
End-to-end Guarantee

What “Five-Nines” Really Means

Circuit Switched vs Packet Switched

“This is your father's copper twisted pair. An elegant medium, for a more civilized age.”

OSI Networking Model

Layer 9	Politics	Consists of technically ignorant morons who negatively impact network development
Layer 8	Money	Provides network corruption by inspiring increased interference from upper layers
Layer 7	Application	Consists of application programs that use the network
Layer 6	Presentation	Standardizes data presentation to the applications
Layer 5	Session	Manages sessions between applications
Layer 4	Transport	Provides end-to-end error detection and correction
Layer 3	Network	Manages connections across the network for the upper layers
Layer 2	Data Link	Provides reliable data delivery across the physical network
Layer 1	Physical	Defines the physical characteristics of the network media

Figure 42.1 - The 9 Layer OSI Network Model
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Actual OSI Networking Model

Data Units

Layers

data	application Network Process to Application
data	presentation Data Representation & Encryption
data	session Interhost Communication
segments	transport End-to-End Connections and Reliability
packets	network Path Determination & Logical Addressing (IP)
frames	data link Physical Addressing (MAC & LLC)
bits	physical Media, Signal and Binary Transmission

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HUB

Actual OSI Networking Model

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	data	session Interhost Communication
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	packets	network Path Determination & Logical Addressing (IP)
SWITCH	frames	data link Physical Addressing (MAC & LLC)
HUB	bits	physical Media, Signal and Binary Transmission

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	Data Units	Layers
	data	application Network Process to Application
	data	presentation Data Representation & Encryption
	data	session Interhost Communication
	segments	transport End-to-End Connections and Reliability
ROUTER	packets	network Path Determination & Logical Addressing (IP)
SWITCH	frames	data link Physical Addressing (MAC & LLC)
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Actual OSI Networking Model

	Data Units	Layers
	data	application Network Process to Application
	data	presentation Data Representation & Encryption
	data	session Interhost Communication
GATEWAY	segments	transport End-to-End Connections and Reliability
ROUTER	packets	network Path Determination & Logical Addressing (IP)
SWITCH	frames	data link Physical Addressing (MAC & LLC)
HUB	bits	physical Media, Signal and Binary Transmission

Actual OSI Networking Model

SIP

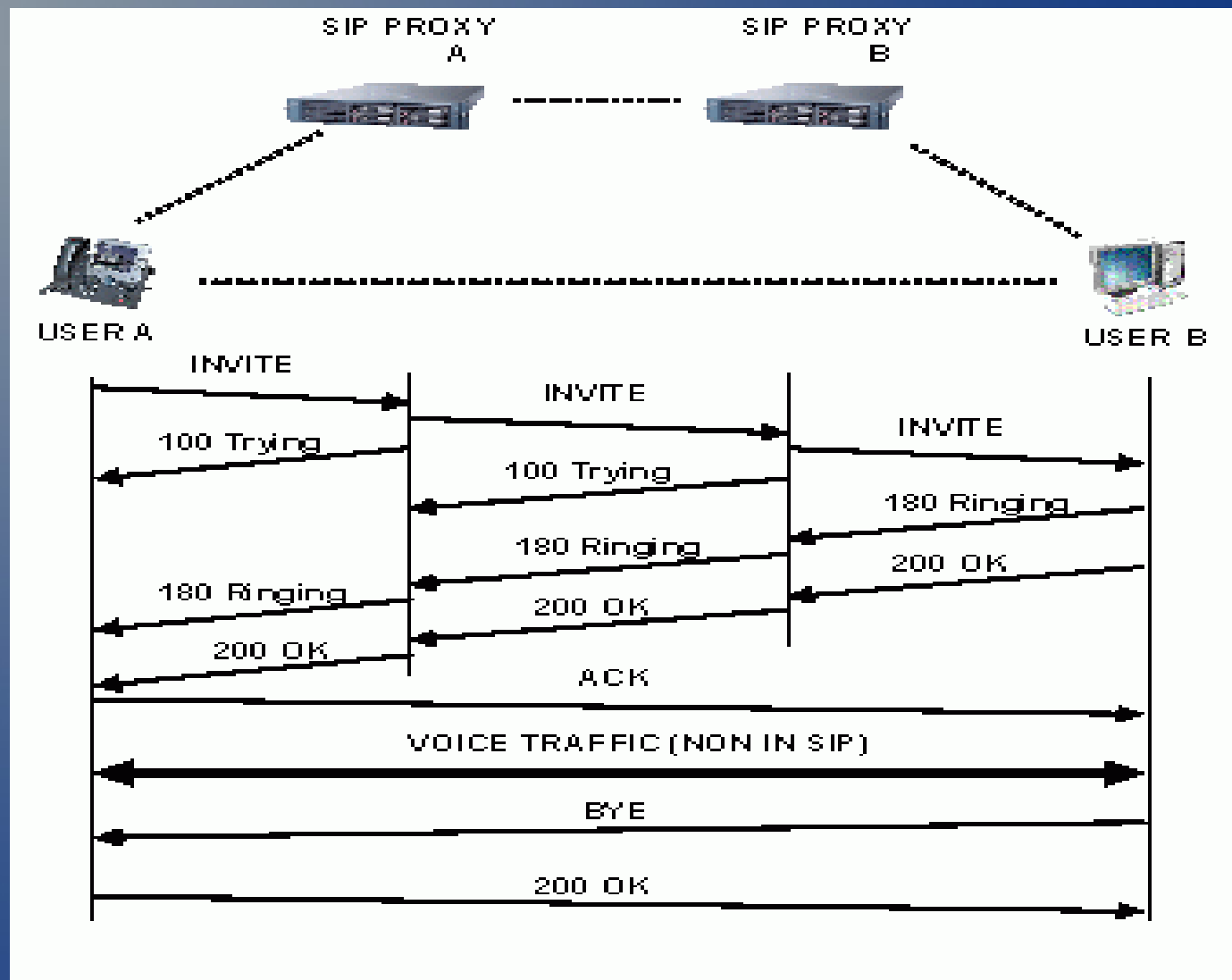


Data Units

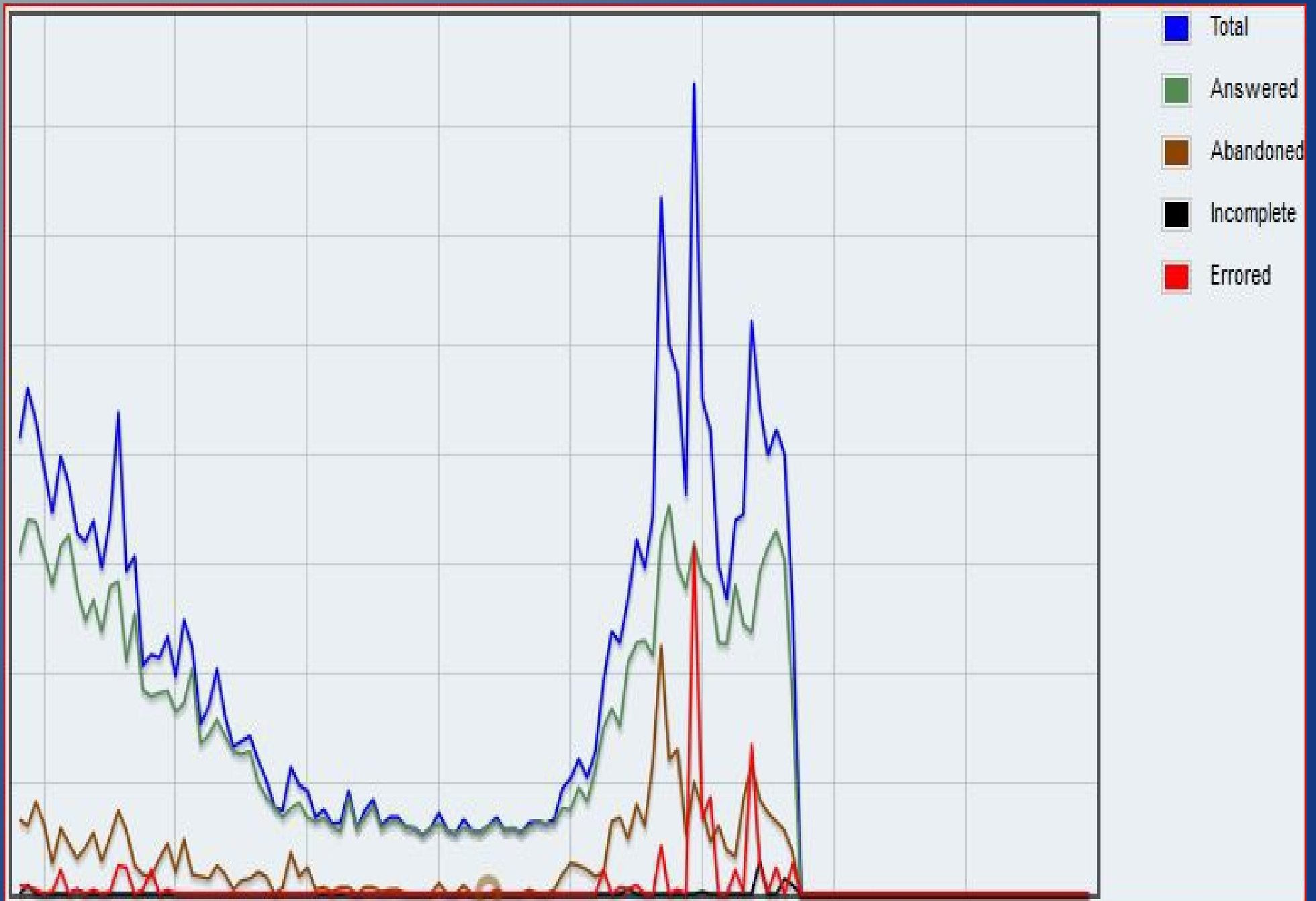
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Basic SIP Session Structure



Very, very busy



SIP Response Codes

RFC 3261

100 Trying

180 Ringing

181 Call is Being Forwarded

200 OK

301 Moved Permanently

302 Moved Temporarily

403 Forbidden

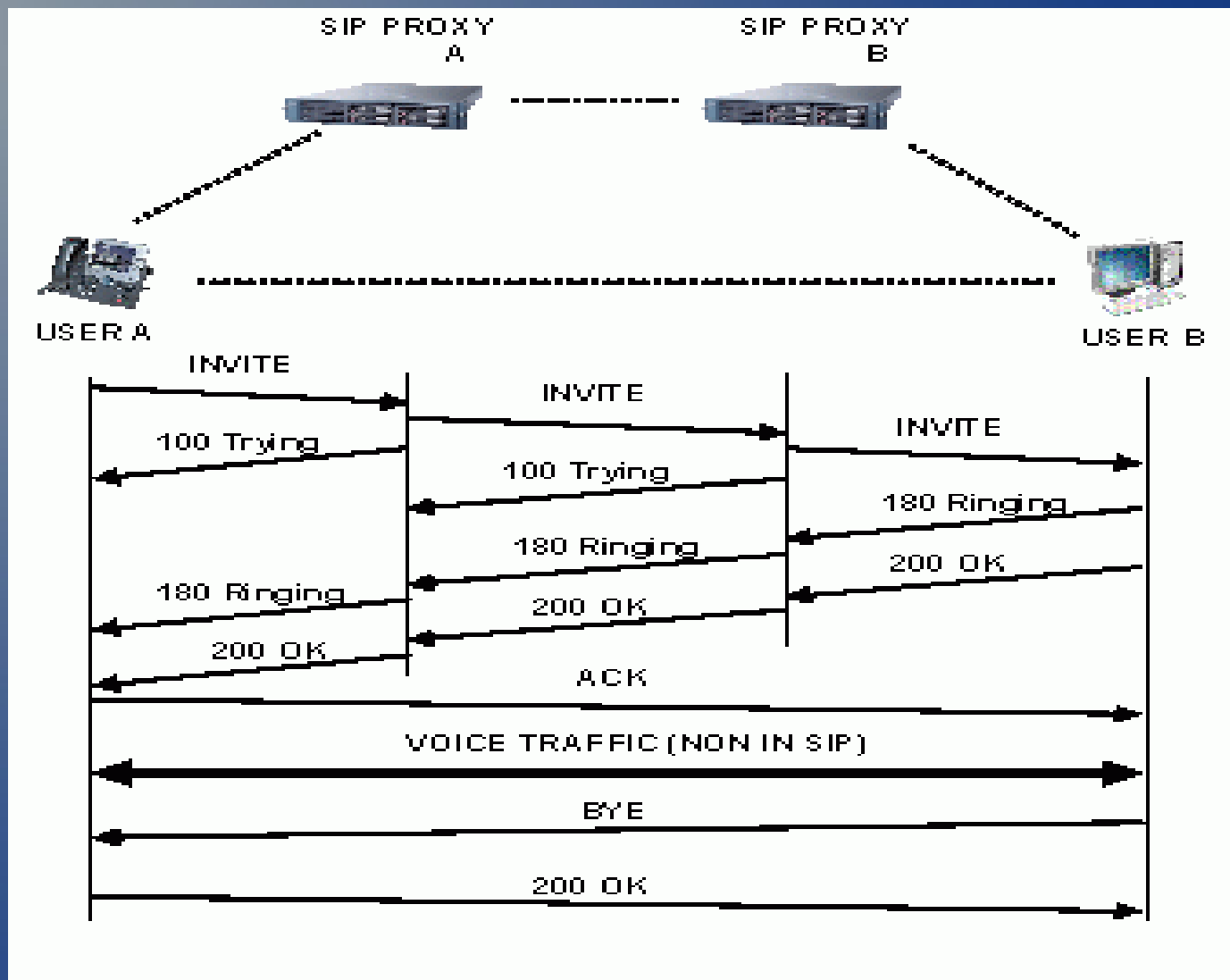
404 Not Found

SIP Switching

Call Forwarding
Simultaneous Ringing
Sequential Ringing
 Hunt Groups

All “Where Calls Go Next”

Where SIP Ends

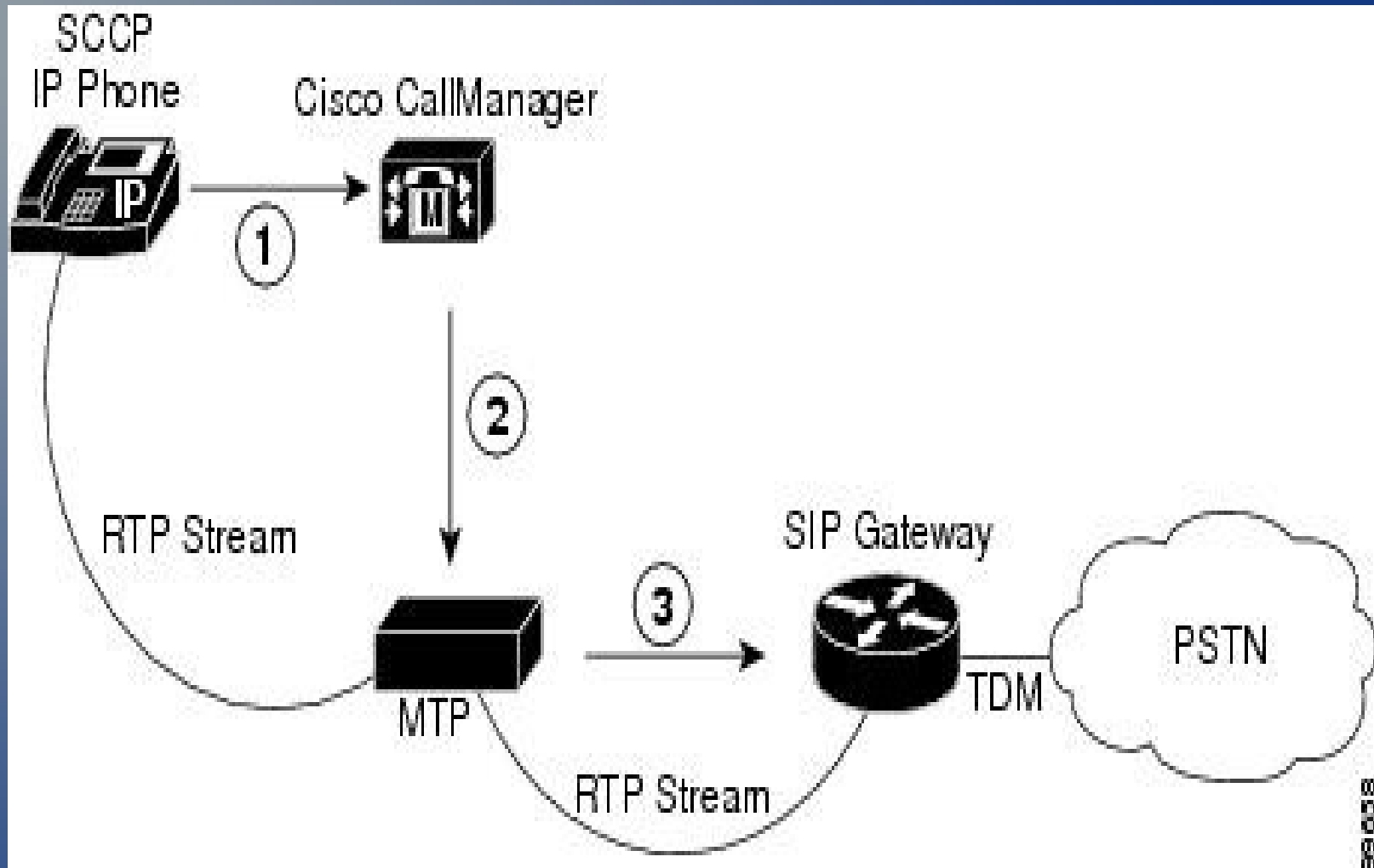


RTP

Real
Time
Protocol

Style: RTP, ZRTP, SRTP,
Codec: G711, G722, SILK, etc.

NAT Traversal, Security isolation, etc.



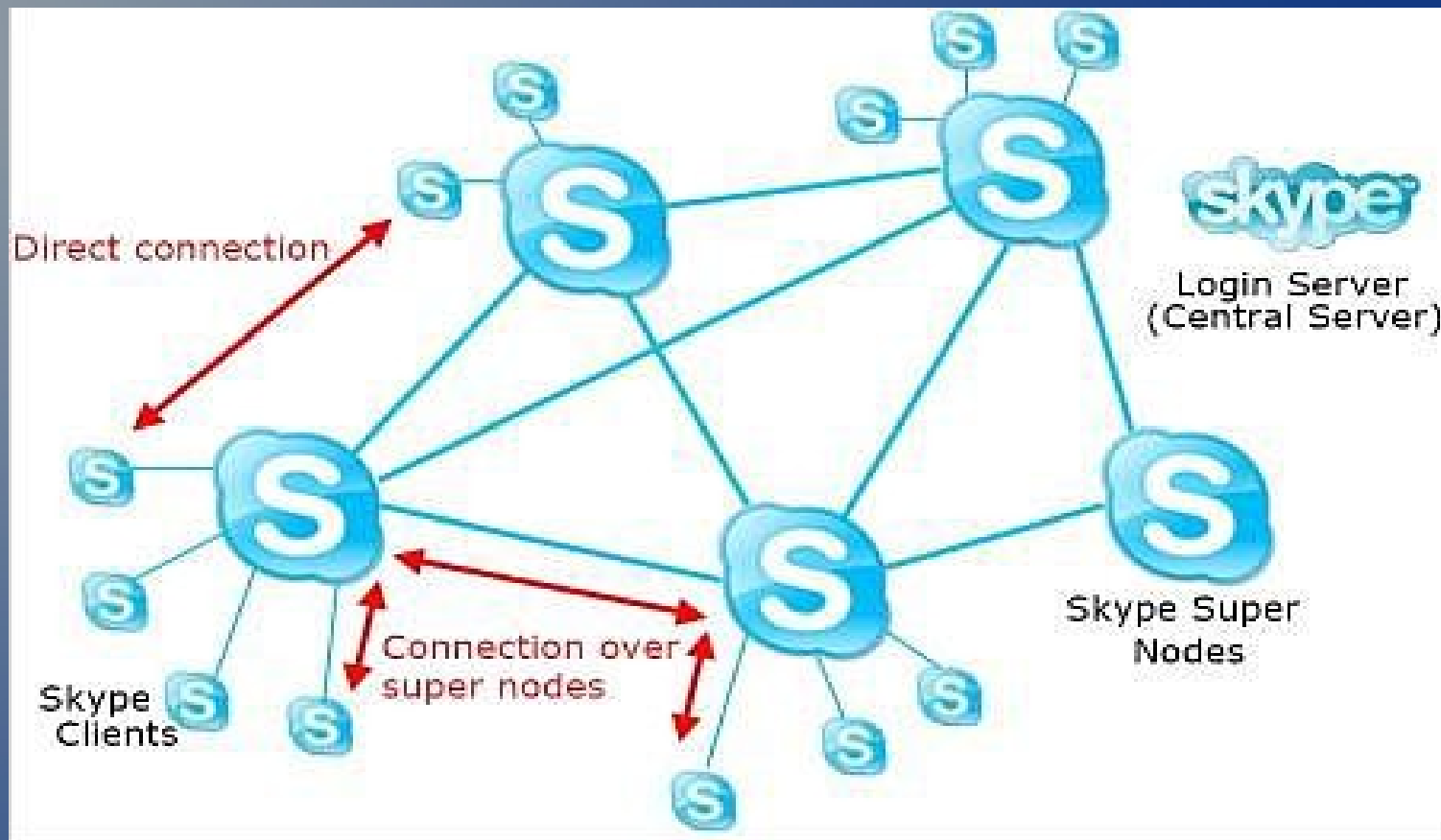
STUN server
MEDIA server

RTP Proxy

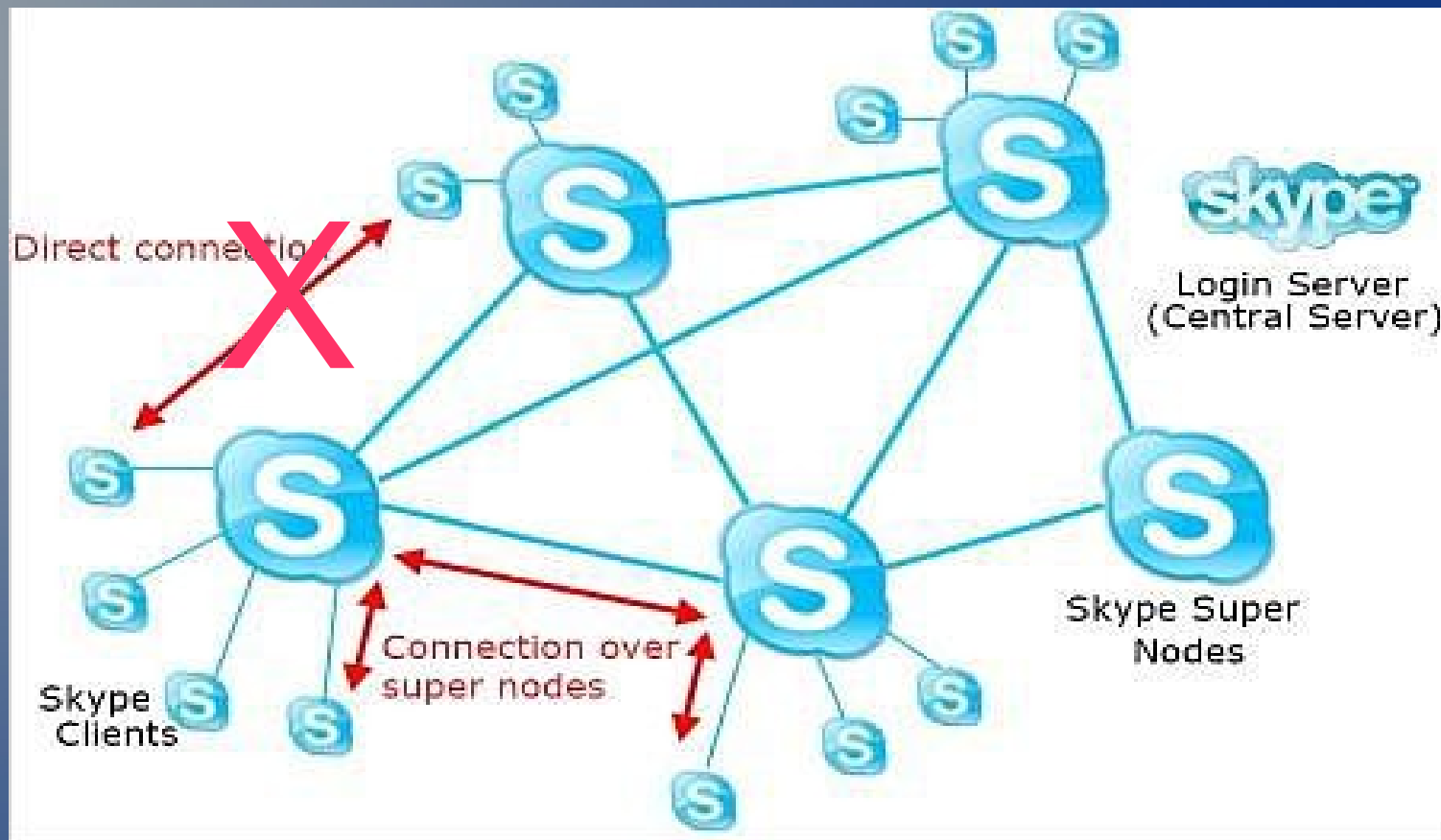
“SBC” Session Border Controller

Media Servers

Music On Hold
Conferences
Three-way Calling
Call Parking
Voicemail
Lawful Intercept
Supervisor Call Monitoring
Call Recording
DTMF digit collection/conversion
Announcements, Prompts, etc.



Looks innocent enough, don't it?
Before Microsoft



Not so innocent in practice
After Microsoft

Routing Between SIP Service Providers

SIP-Code	SIP Proxy	Provider name
*011	sipbroker.com	SIPBroker Alias Server
*013	sipbroker.com	SIPBroker ENUM Server
*018	gtalk2voip.com	GTalk2VoIP
*210	proxy.freecall.net.au	Freecall
*220	sip.oiptel.com	sip.oiptel.com
*227	musimi.dk	Musimi
*233	sip.pacificvoice.net.au	sip.pacificvoice.net.au
*234	sip.pennytel.com	PennyTel
*235	sip.netrex.nl	sip.netrex.nl
*237	as.bw.iprimus.net	as.bw.iprimus.net
*239	voip.macronet.ro	voip.macronet.ro
*241	pbx.ewingit.com.au	Ewing IT - PBX
*250	sip.voipbg.com	sip.voipbg.com

SIP in DNS

- ns.bigu.edu. 43200 IN A 10.0.0.20
- sipserver1.bigu.edu. 43200 IN A 10.0.0.21
- sipserver2.bigu.edu. 43200 IN A 10.0.0.22
- ;
- _sip._udp.bigu.edu. 43200 IN SRV 0 0 5060 sipserver1.bigu.edu.
- _sip._udp.bigu.edu. 43200 IN SRV 1 0 5060 sipserver2.bigu.edu.
- _sip._tcp.bigu.edu. 43200 IN SRV 0 4 5060 sipserver1.bigu.edu.
- _sip._tcp.bigu.edu. 43200 IN SRV 0 2 5060 sipserver2.bigu.edu.
- _sips._tcp.bigu.edu. 43200 IN SRV 0 0 5060 sipserver1.bigu.edu.
- _sips._tcp.bigu.edu. 43200 IN SRV 0 0 5060 sipserver2.bigu.edu.

DNS based SIP call

Howland@Ekiga.net Registered

Jim@example.net Entered

DNS lookup by Ekiga.net for sip @ example.net

SIP call placed from Howland@Ekiga.net to Jim@example.net without any numbers at all.

SIP handles what happens if Jim isn't registered with example.net just fine.

What Is SIP?

Session Initiation

How to get from Here to There
What to do once you get There
One Step at a Time

What SIP Is Not?

Panacea, Perfection,
The Transport Protocol Itself

**There is no elevator
to success.
You have to take
the stairs..**

