



Unified Communications



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Osnova

- Historie
 - Požadavky na funkčnost
 - Protokoly
- Unified... Co?
- On size fits all?
 - Consumer
 - SMB
 - Enterprise
 - Service provider

Historie

- Data sent to the quest...
- Data meets Voice...
- Data falls in love with Voice
- ...and they lived happily ever after

Evolution of Unified Communications



*long-distance calling,
ca. 1930*



“does it do
call transfer?”

*catching up
with the digital PBX*

“how can I make it
stop ringing?”

*going beyond
the traditional phone*

1996-2000

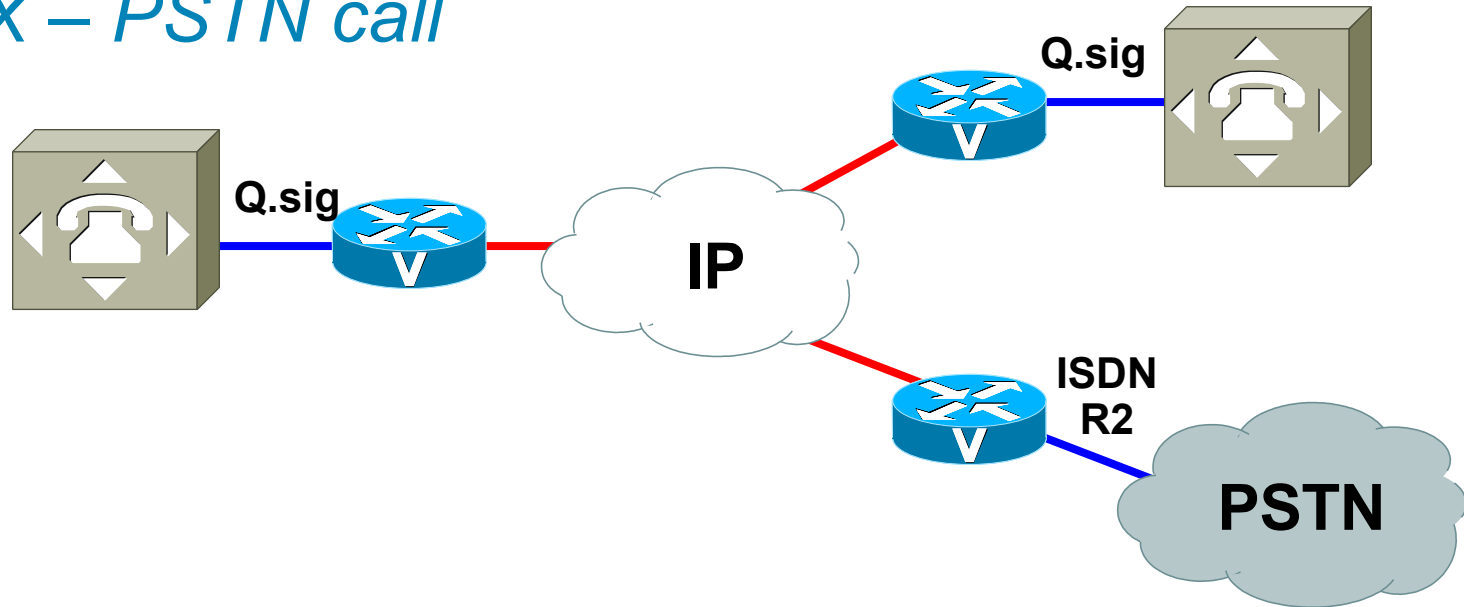
2000-2003

2004-

VoIP

PBX – PBX call

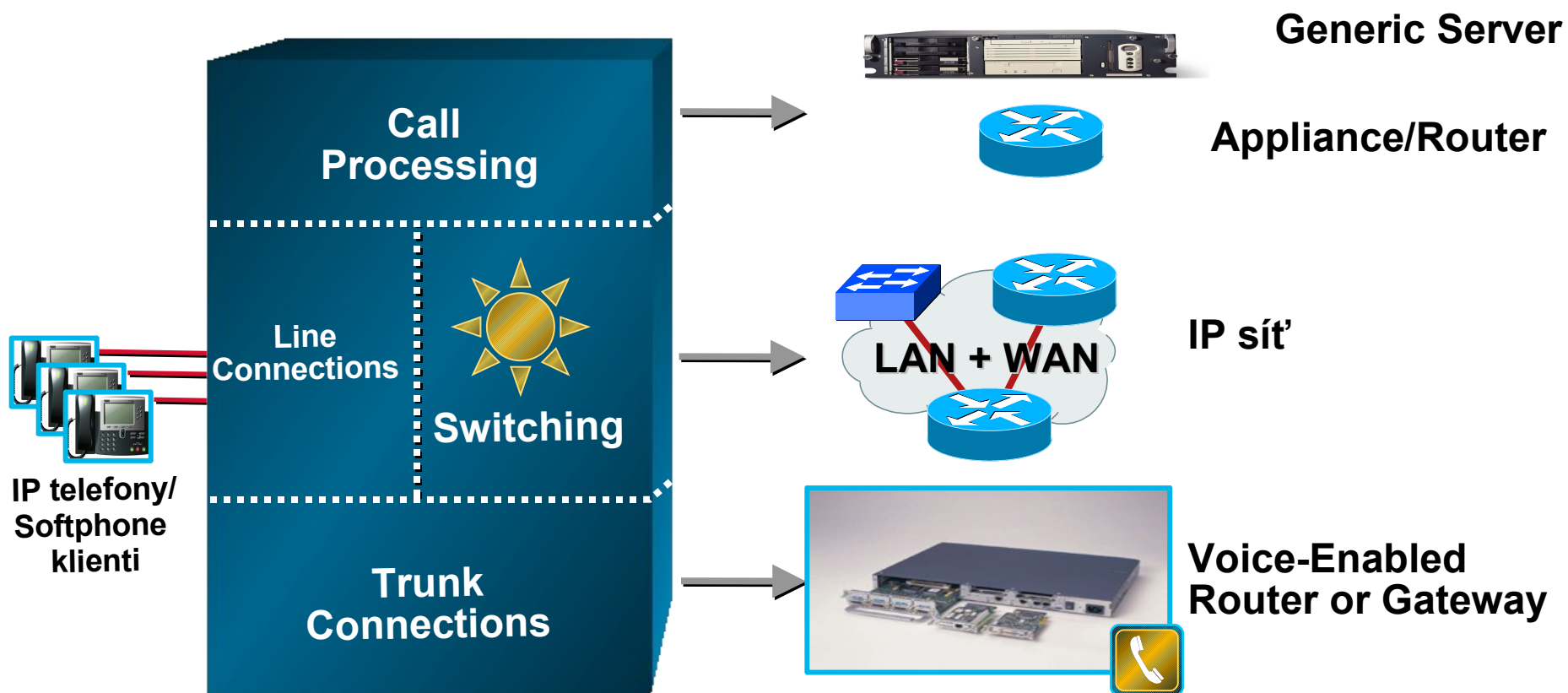
PBX – PSTN call



- Toll bypass – basic call
- Transport PBX-specific information (Q.sig)
- PSTN interoperability (ISDN, R2,...)

IP PBX

Srovnání architektury tradiční ústředny a IP PBX

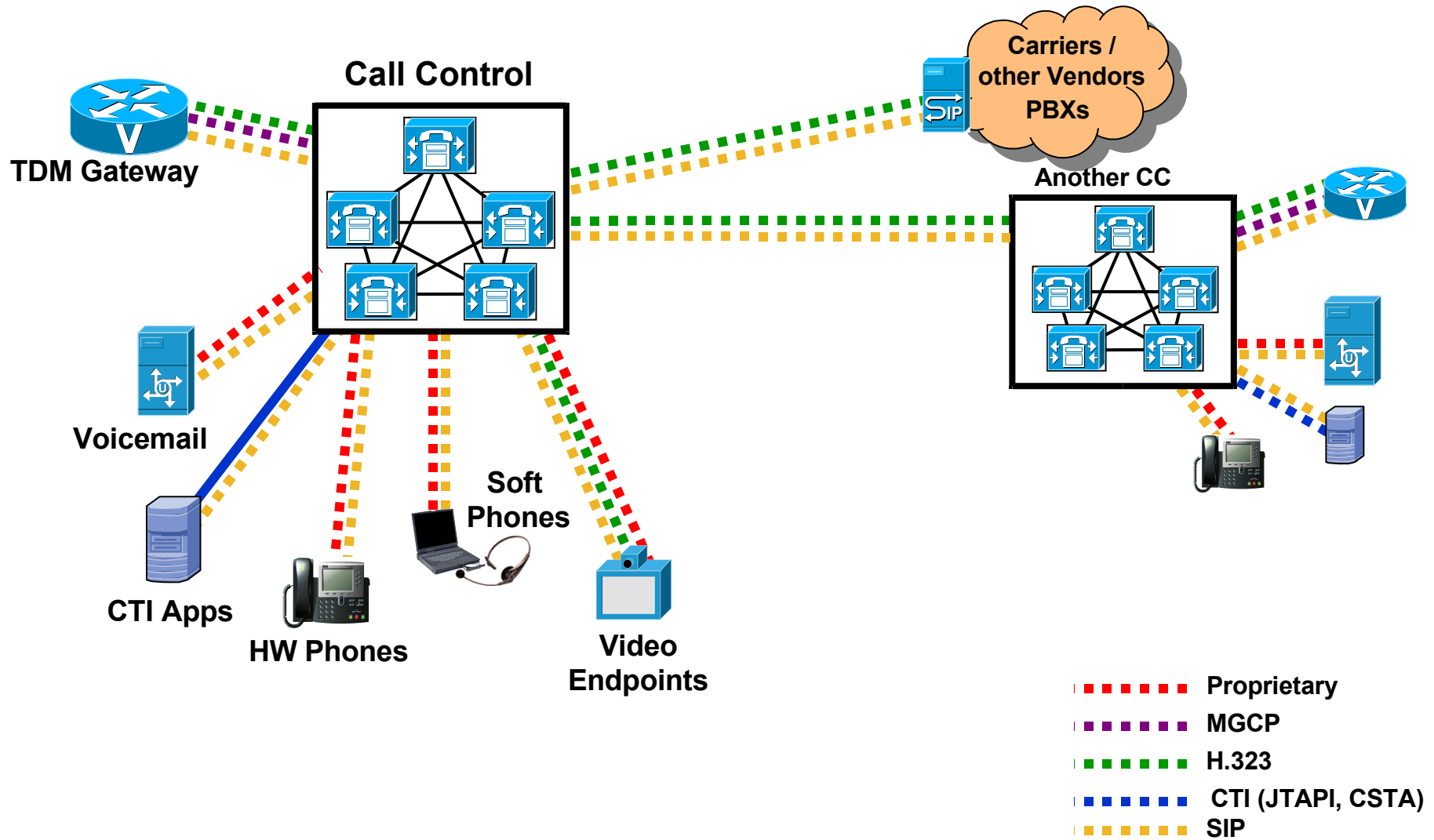


Úloha protokolů

- Call setup/tear down
- Media Transport
- Supplementary services
- 3rd party call control
- Instant messaging

Signaling Protocols

Standards & Proprietary, where?



Protokoly

- Signalizace telefon – call control server, call control – call control
 - SIP, H.323, MGCP, proprietary (SCCP, AIX, Skype, výrobcem zavedená rozšíření SIP/H.323)
- CTI (Computer Telephony Integration) – JTAPI, CSTA, SIP
- Kdy proprietární?
 - Homogenní systém, uvnitř není důvod pro používání standardů
 - Standardizace je pomalejší než technologie
 - Standardizace nemusí pokrývat vedlejší důležité funkce (dohled, provisioning)
- Kdy standardní?
 - Integrace se 3rd party produkty, systémy (CTI, aplikace)
 - Propojení s cizími systémy (VoIP trunk)

Gateways

VoIP Signaling Protocols Choice

H.323

**ITU Standard
“Peer-to-Peer” Signaling Protocol**

SIP

**IETF Standard
“Peer-to-Peer” Signaling Protocol**

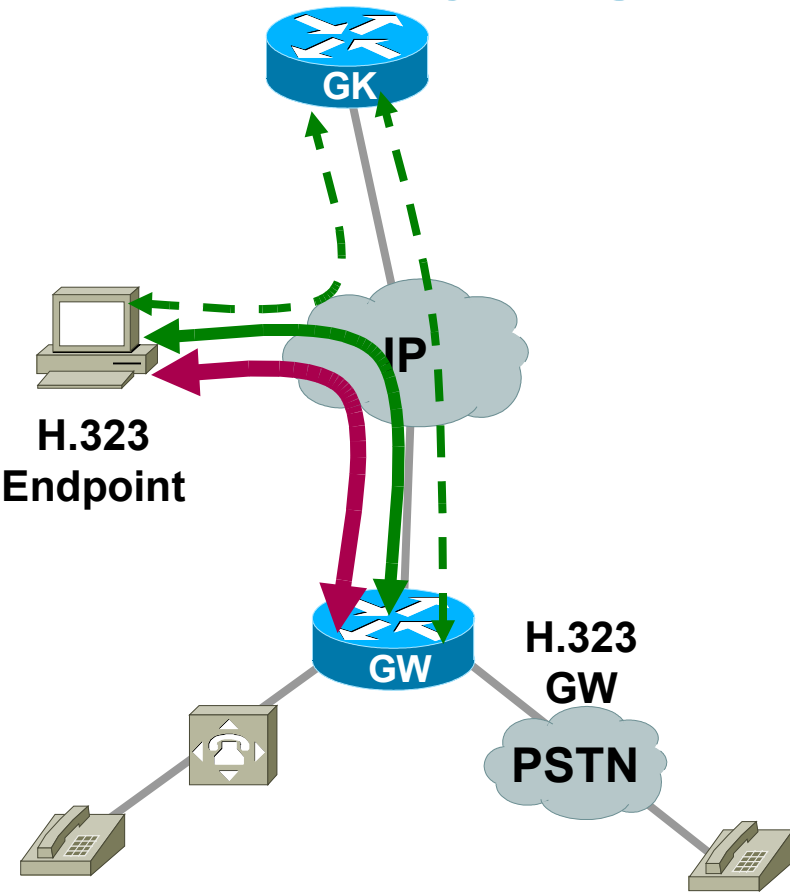
MGCP

**IETF Standard
“Client-Server” Signaling Protocol**

SCCP

**Client-Server Signaling Protocol
Used by some FXS voice gateways in
CallManager networks**

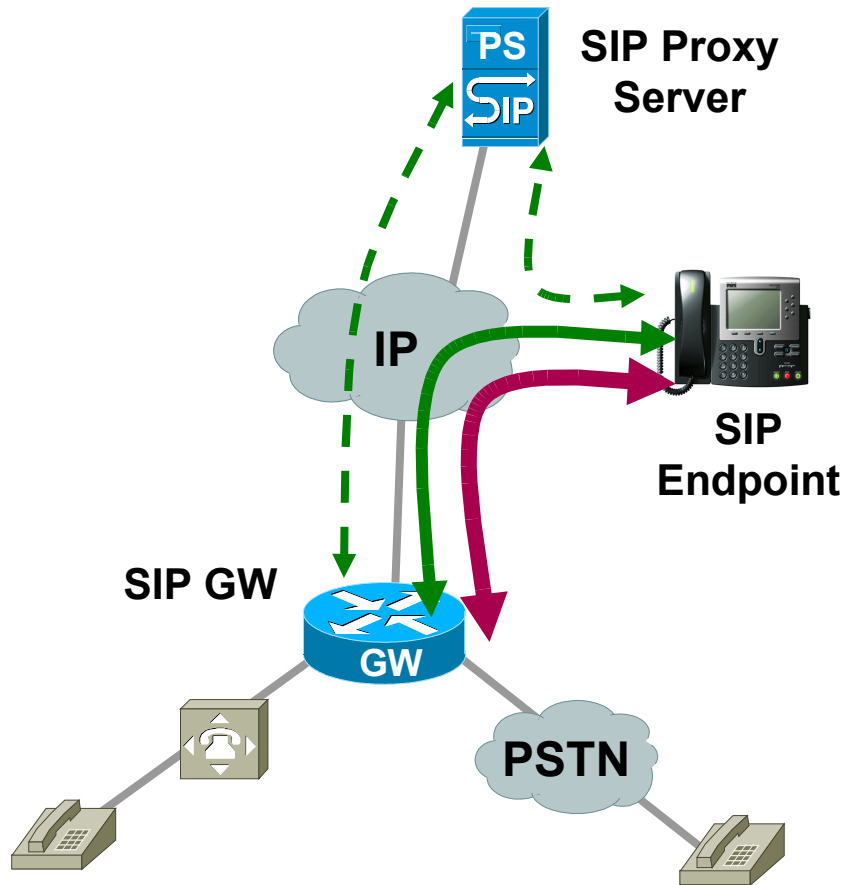
Gateway Signaling Protocols: H.323



- All signaling messages and dialed digits are interpreted by the protocol stack on the Endpoint/Gateway
 - Gateway/Endpoint is an “intelligent” device
- Peer-to-peer call setup (optional use of gatekeeper)
 - Alternate Gatekeeper/Alternate Endpoint mechanisms for choosing an alternate route if GK/Endpoint IP Address is out of reach
- TDM signaling types supported is a function of the GW protocol stack
- Resilient over IP connectivity failures
- Scalable – distributed CPU power
- Distributed configuration

- ← - - - → Optional signaling to locate IP address of peer
- ← - - - → Call setup signaling
- ← - - - → Media

Gateway Signaling Protocols: SIP



- All signaling messages and dialed digits are interpreted by the protocol stack on the Endpoint/Gateway

Gateway/Endpoint is an “intelligent” device

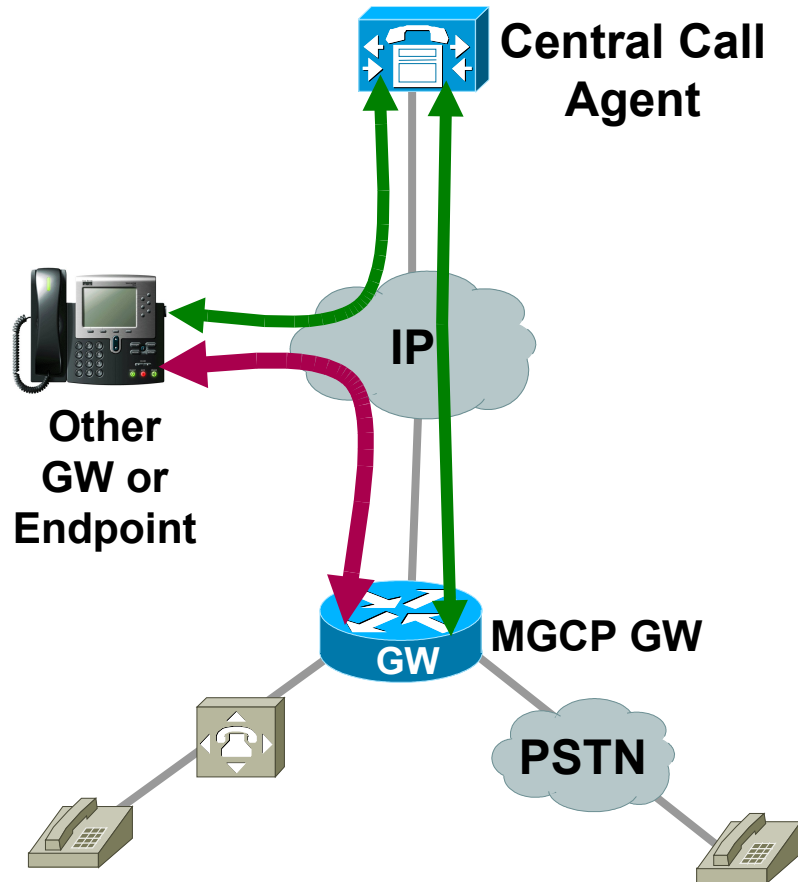
- Peer-to-peer call setup (optional use of SIP Proxy Server/Redirect Server)
- TDM signaling types supported is a function of the GW protocol stack
- Resilient over IP connectivity failures
- Scalable – distributed CPU power
- Distributed configuration

← - - → Optional signaling to locate IP address of peer

← → Call setup signaling

← → Media

Gateway signaling protocols: MGCP



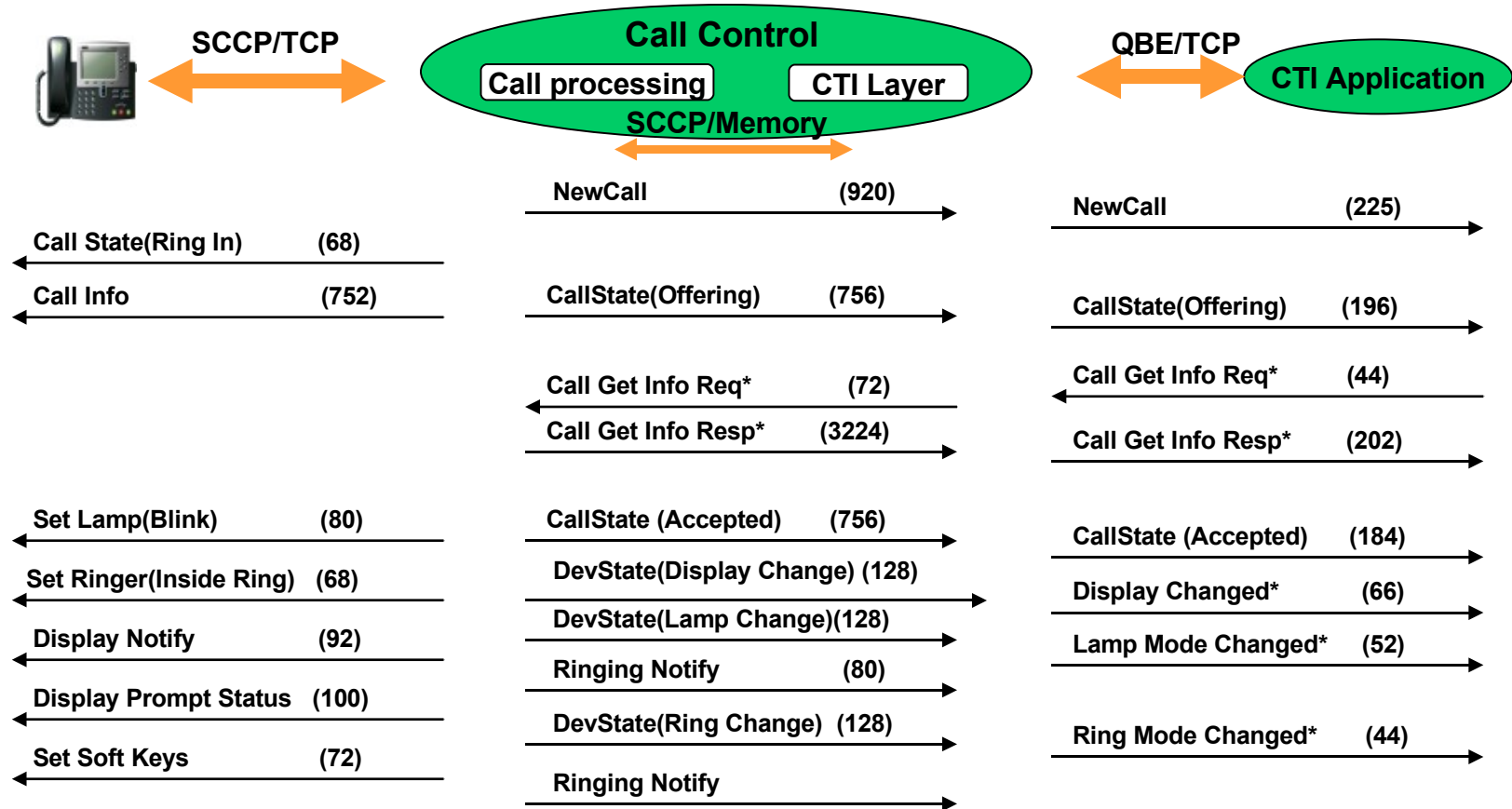
- All signaling messages are “back-hauled” to the Call Agent
 - Gateway/Endpoint is a “dumb” device
- Call Agent arbitrates all call setup
 - If Call Agent is out of reach, the Endpoint/GW cannot function
- TDM signaling types supported is a function of the GW and Call Agent
- Dependent on IP network connectivity
 - Requires failover strategies
- Scalable – central Call Agent is a contention point
- Centralized configuration

↔ Call setup signaling

↔ Media

JTAPI

Basic Inbound Call Message Traffic



Unified... Co?



Proč Unified?

- Společná infrastruktura
- Společná správa?

Společná správa

Integrovaná diagnostika sítě, IP telefonů a aplikací (kde je problém?)

Replikace uživatelských aktivit

- Hovor
- Registrace telefonů
- Oznamovací tón
- Message Waiting Indicator
- Konference

Korelace informací

Od uživatelů (stížnosti)

Ze sítě (LAN, WAN)

CDR

Koncové a měřící body

Generování testovacího provozu

- QoS - Ztráty/Zpoždění/Jitter

End - End testing (signaling + data path)

Node - Node testing (IP SLA)

PSTN

WAN

Register
Dial-tone
Redial
Hold
Park
Transfer
Confirn

Summary
Test Name: batch-test1
Status: Scheduled
Start Time: Fri 22-Sep-2006 10:10:00 GMT+05:30
End Time: Fri 22-Sep-2006 10:13:57 GMT+05:30

Results for batch test : batch-test1

Action Name	Extension	Negative Test	Test Status	Test Start Time	Test End Time
IntraClusterCall	71713000	No	Failed	Fri 22-Sep-2006 10:10:13 GMT+05:30	Fri 22-Sep-2006 10:11:22
Call Park test	71713000	No	Failed	Fri 22-Sep-2006 10:11:22 GMT+05:30	Fri 22-Sep-2006 10:11:54
Call Hold test	71713000	No	Failed	Fri 22-Sep-2006 10:11:54 GMT+05:30	Fri 22-Sep-2006 10:12:26
Call Forward test	71713000	No	Passed	Fri 22-Sep-2006 10:12:26 GMT+05:30	Fri 22-Sep-2006 10:12:34
Conference test	71713000	No	Failed	Fri 22-Sep-2006 10:12:38 GMT+05:30	Fri 22-Sep-2006 10:12:56

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Phone Test Results for pt2

Action Name	Extension	Negative Test	Test Status	Test Start Time
CallToPSTN	71713002	No	Passed	Fri 22-Sep-2006 10:12:56 GMT+05:30

Back to Top

Phone Test Results for pt3

Action Name	Extension	Negative Test	Test Status	Test Start Time
Call to PSTN Negative	71716000	Yes	Passed	Fri 22-Sep-2006 10:13:00 GMT+05:30

Proč Unified?

- Společná infrastruktura
- Společná správa?
- User Experience

Telefon & počítač – kontakty, ovládání, komunikace podle potřeby/nálady

Jeden uživatel = více zařízení – HW telefon, SW telefon, mobil, počítač, PDA – uživatel je mobilní, funkce se musí přizpůsobit zařízení, na kterém jsou provozovány (displej, ovládací prvky,...)

Příklady

- Click-to-dial – web-based directory, výběr čísla na web stránce
- Identifikace volajícího
- Single number reach – dostupnost na jednom tel. čísle
- Sdílení kontaktů, call log
- Web 2.0
- Presence
- Instant Messaging

Click-to-dial – web directory

| [Advanced Search](#) | [Edit My Profile](#)
 (Name, User ID or Phone)

výsledek hledání v interním telefonním seznamu

Only the first 100 results were shown of the total matches. Please refine your query to reach 100 limit. Learn more about [how to use search](#) in the online help.

Search Results for "john"

[Show Photos](#)

Name	User ID	Phone
Alexander, John	johnalex	+1 972 813 5101 (Work)
Wheeler, John	johnwh	+1 408 526 414
Adams, John	jadams	+1 408 526 5419
Andolina, John	jandolin	+1 518 427 523

| [Advanced Search](#) | [Edit My Profile](#)
 (Name, User ID or Phone)

zvoleném kontaktu je možné (prokliknutím odkazu na stránce):

- poslat e-mail
- zavolat
- poslat SMS

John Adams, IT Engineer

[Profile Information](#) | [Reporting Structure](#)



[Download vCard](#)

Contact Information

User ID [jadams](#)
 Voice Mail 526 5419

Phone Numbers

Work **+1 408 526 5419** (Preferred)
 Mobile
 Other
 Fax
 Pager
 Epage [Epage jadams](#)

Address

Mail Stop SJC05/3
 325 East Tasman
 San Jose , CALIF
 United States

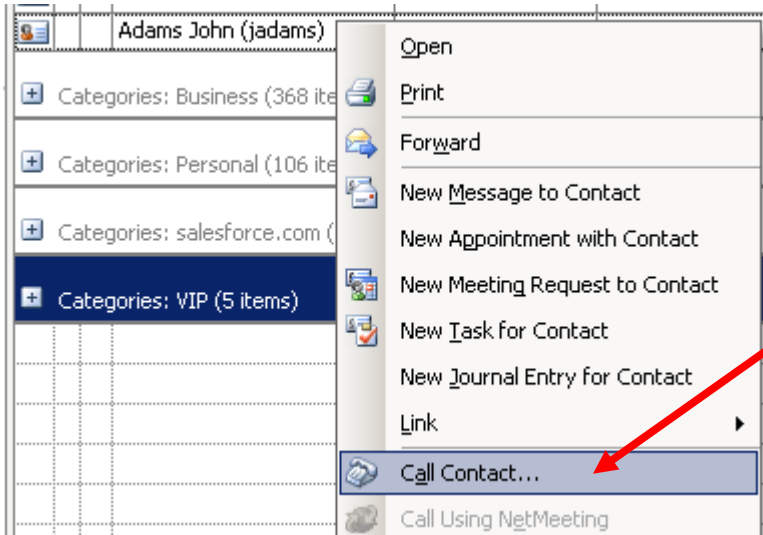
Building
 Floor
 Cube

Organization Information

Job Title IT Engineer
 Group HRIT - Global Technology Servi
 Direct Reports None
 Program Reports None

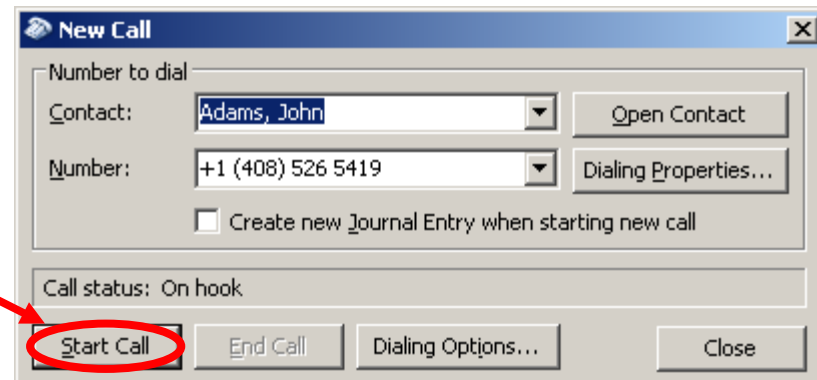
Type
 Work Type
 Cisco ID Number
 Department ID

Click-to-dial – thick client



po vyhledání kontaktu je v Outlooku v kontextovém menu k dispozici “Call Contact...”

pak stačí stisknout “Start Call” a uživatelův IP telefon číslo vytočí



Adresář na telefonu – stejná data

05:21 04/12/06 221435030

Cisco Employee Directory

Last Name: adams

First Name: john_

Userid:

Building:

City:

Enter a name

Submit << Exit

1. uživatel vyplní vyhledávací formulář

2. stiskne tlačítko "Submit"

3. vybere kontakt ze seznamu

05 22 04/12/06 221435030

2 matches

1 Adams, John (jadams)
IT Engineer
85265419

2 Adams, John (johnada)
Consultant-Audio Visua
85274619

Page 1 of 1

Exit Dial Details

4. nechá číslo vytočit

Tel. číslo na www stránce

The screenshot shows a website interface with a navigation bar at the top. The navigation bar has a dark blue background with white text for the main menu items: Hlavní stránka, TV a video, Hudba, Zprávy, Hry, Do mobilu, and Praktické. Below this is a secondary navigation bar with a lighter blue background and white text for sub-menu items: Telefonní seznam, Doprava, Mapy, Práce, Programy TV, kin a divadel, Dovolená, and Inzeráty. On the left side, there is a vertical sidebar with a light blue background containing several menu items, some of which are partially visible: odkazy, a, ěrová čísla, lužba, latých stránek, y, s. The main content area is titled 'DETAIL OSOBY' and features a profile for 'Novák Josef'. The profile includes an address: 'Šmilovského 16 / 2198, Praha 2 (Vinohrady)'. Below the address, there is a link to 'Zobrazit na mapě'. The phone number '224 252 452' is displayed in a blue box, indicating it is the focus of the slide. At the bottom of the profile, there is a link to 'Uložit jako vizitku do Outlooku'.

HLAVNÍ STRÁNKA TV A VIDEO HUDBA ZPRÁVY HRY DO MOBILU PRAKTICKÉ

TELEFONNÍ SEZNAM DOPRAVA MAPY PRÁCE PROGRAMY TV, KIN A DIVADEL DOVOLENÁ INZERÁTY

odkazy
a
ěrová čísla
lužba
latých stránek
y
s

DETAIL OSOBY

 **Novák Josef**

 Šmilovského 16 / 2198, Praha 2 (Vinohrady)

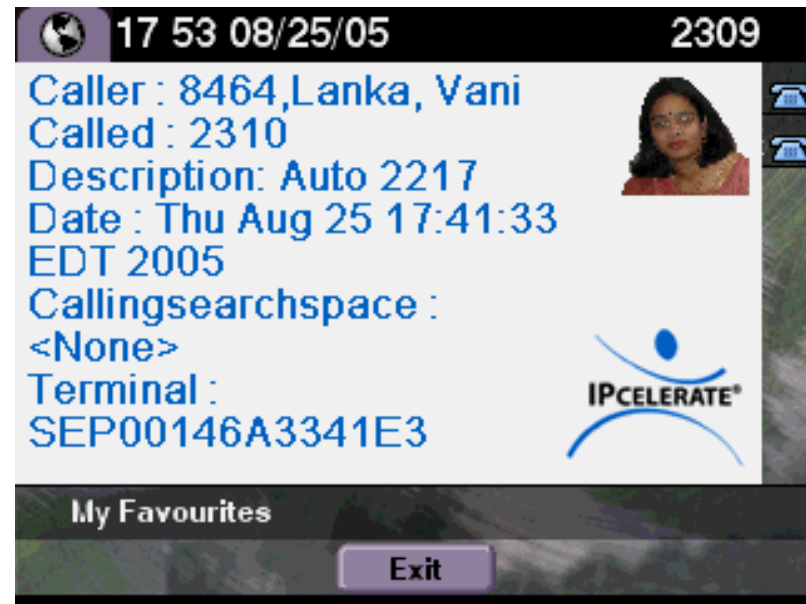
 [Zobrazit na mapě](#)

224 252 452

 [Uložit jako vizitku do Outlooku](#)

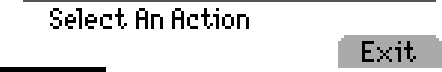
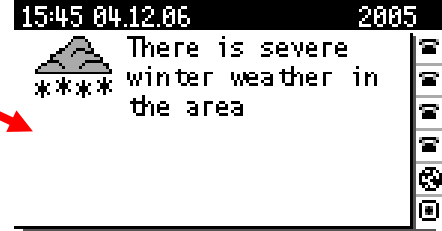
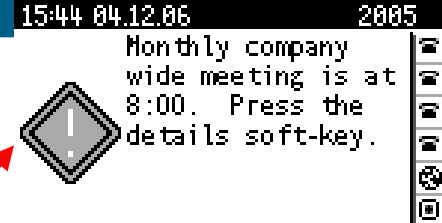
Identifikace volajícího

- S příchozím hovorem se na displeji objeví informace o volajícím

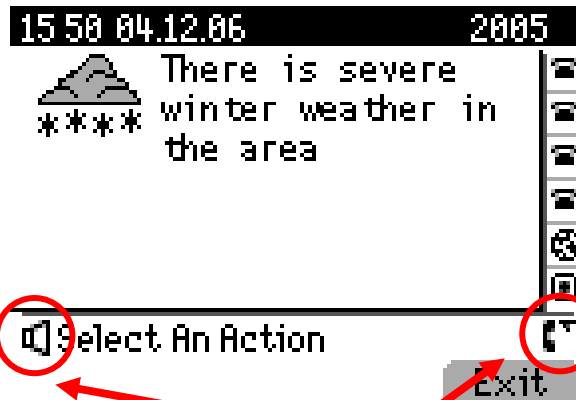
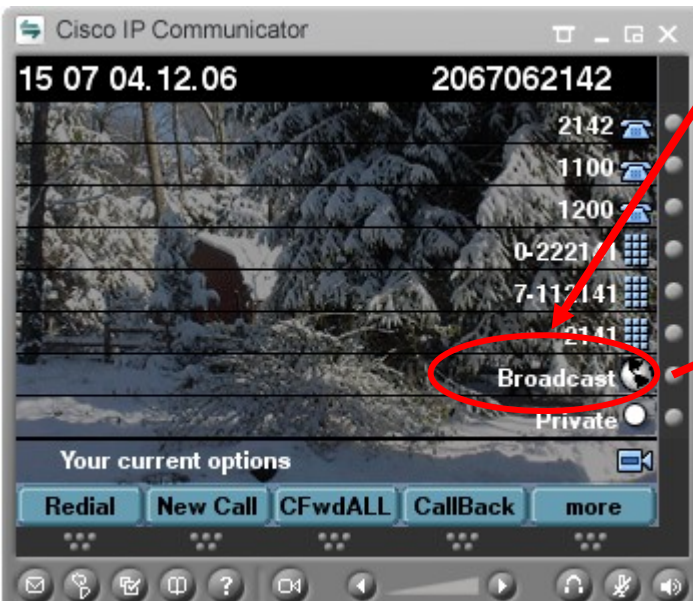


Data na IP telefonu

Description	Display Short Text	Type	Action
(Example Ad-Hoc Broadcast)	This is an ad-hoc broadcast.	Audio Ad-Hoc	Send Edit Delete
Example Berbee Broadcast	This is a broadcast from Berbee's Broadcast System!	Text and Audio	Send Edit Delete
Example Blip	This is a broadcast of an industrial sounding blip	Text and Audio	Send Edit Delete
Example Humoctopus Alert	There is a Humoctopus in the building!	Text and Audio	Send Edit Delete
Example Live Audio Broadcast		Live Audio Only	Send Edit Delete
Example Monthly Meeting	Monthly company wide meeting is at 8:00. Press the details soft-key.	Text Only	Send Edit Delete
Example Report mail server down	Email is down	Text Only	Send Edit Delete
Example Ring tone - Bell 1		Audio Only	Send Edit Delete
Example Ring tone - Bell 2		Audio Only	Send Edit Delete
Example Ring tone - Bell 3		Audio Only	Send Edit Delete
Example Ring tone - Clock chime		Audio Only	Send Edit Delete
Example Ring tone - Ding dong		Audio Only	Send Edit Delete
Example Ring tone - Tone 1		Audio Only	Send Edit Delete
Example Ring tone - Tone 2		Audio Only	Send Edit Delete
Example Severe Weather	Severe weather is in the area	Text Only	Send Edit Delete
Example Tornado	There is a tornado in the area.	Text Only	Send Edit Delete
Example Winter Weather	There is severe winter weather in the area	Text Only	Send Edit Delete
Push to Talk	Message	Push to Talk	Send Edit Delete

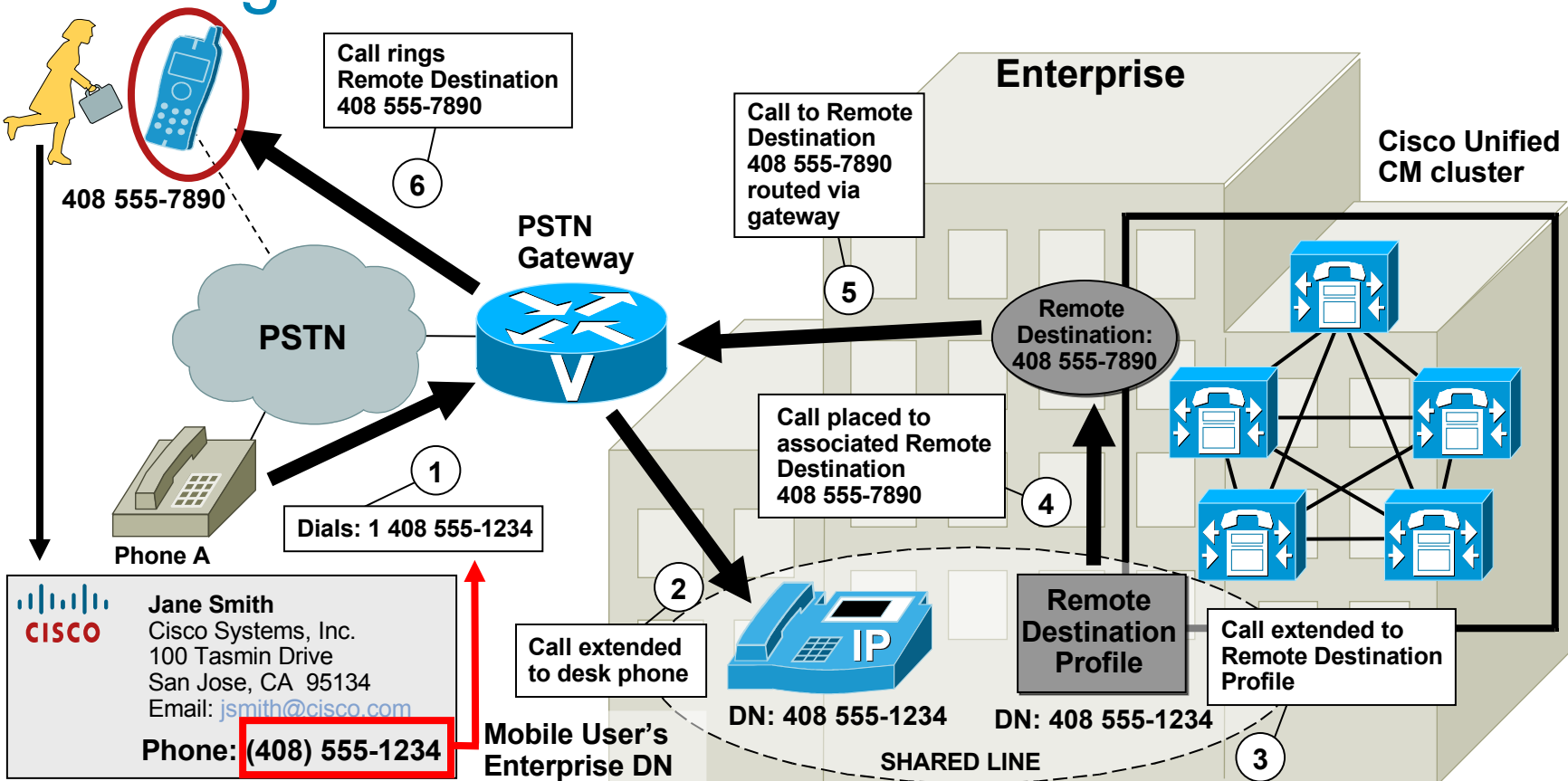


Telefon lze nakonfigurovat pro vysílání na skupinu telefonů (Broadcast)



Na přijímajících telefonech se automaticky aktivuje reproduktor

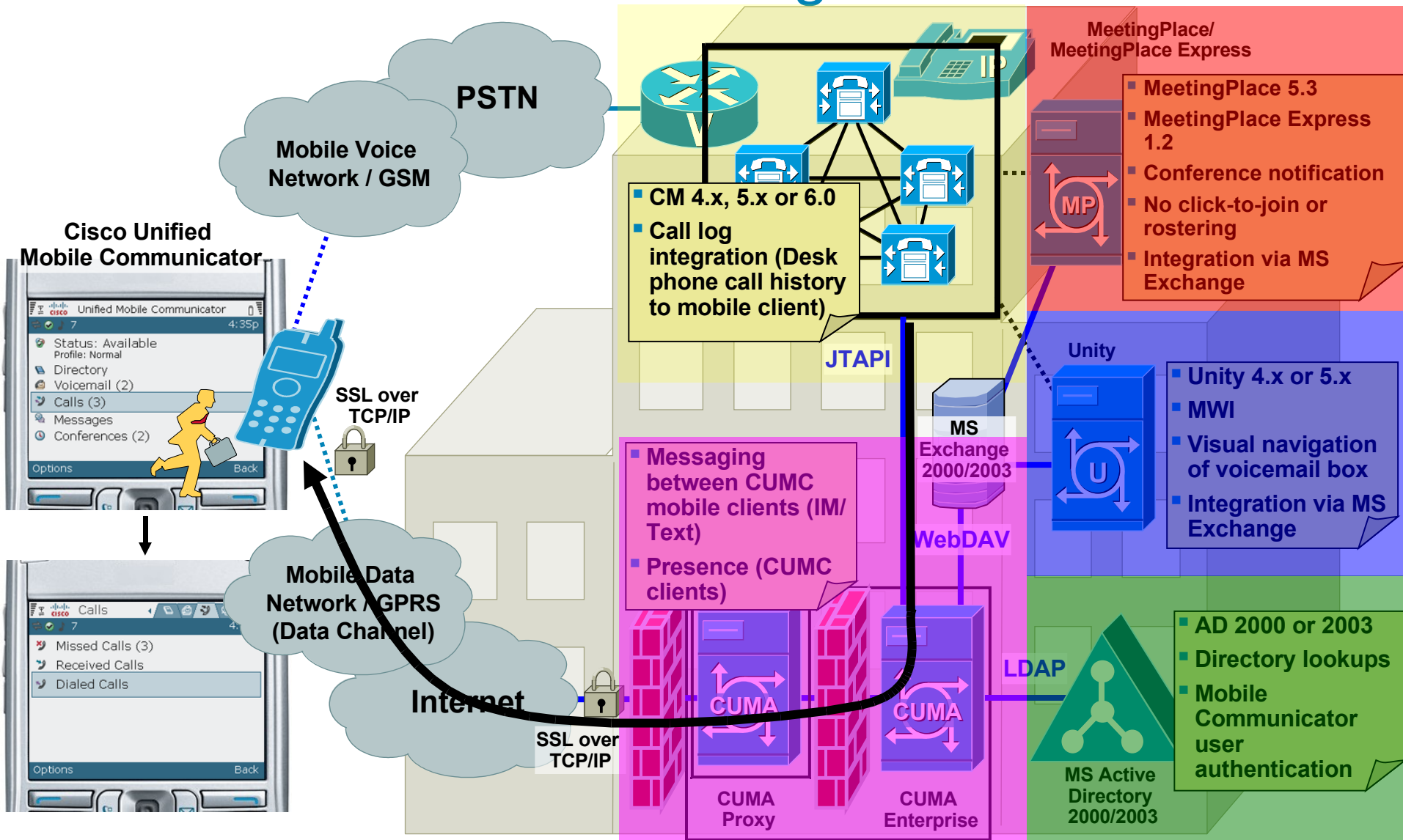
Single number reach



Call to mobile user's Enterprise directory number rings at desk phone and Remote Destination phone.

- Call can be answered at either phone
- Once answered all other call legs are cleared
- Access Lists used to block calls from certain numbers

Sdílení kontaktů – call log



Web 2.0 technologie

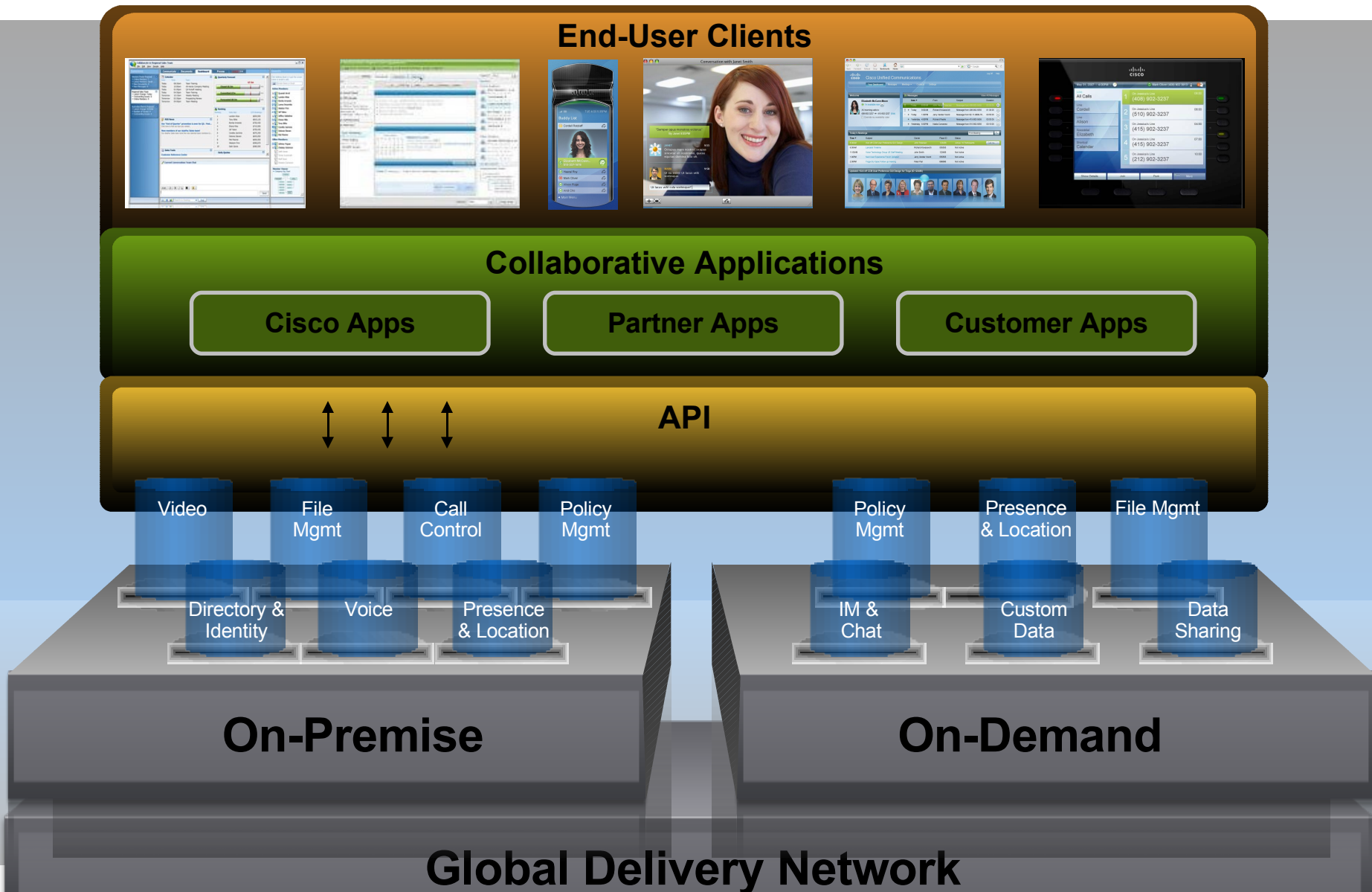
- Místo desktopu “webtop”
- Integrace hostovaných řešení s aplikacemi, call control atd. u uživatelů

The screenshot displays a webtop interface for 'Project Neo / Dashboard'. The interface is divided into several sections:

- Project Neo Dashboard:** A sidebar menu with options: Dashboard (selected), Contacts, Calendar, Meetings, Documents, and Conversations.
- Team Calendar:** A calendar view for September 25, 2007, showing a grid of dates from 26 to 30. The 25th is highlighted.
- Contacts:** A list of contacts including Susan Adams (Working), Regina Bozman (Do not disturb), Michael Butcher (In the office), and Sophia Clark.
- Conversation Steven Jones and Kim Lin:** A central chat window showing messages from Kim (10:26 PM), Steven (10:29 PM), and Elizabeth (10:30 PM). A notification states 'Elizabeth has Joined the Conversation 10:30AM'. The conversation title is 'Neo System Architecture (ID 123456)'.
- To Dos:** A list of tasks with due dates and assignees: '9/25 Update...' (Due), 'Complete Code' (toisen), 'Review Contract' (ebarker), 'Update Spec Doc...' (cthomp), 'te all P1s 11/07' (mlenz), 'Review Meeting Notes' (mburns), 'Back-end Integration' (tlai), and 'Complete Navigation...' (sgardner).
- Documents:** A section titled 'Documents' with 'Last Updated: 10:32PM', showing several document thumbnails.

The interface includes a search bar at the top right and a status bar at the bottom with 'Done', 'Internet | Protected Mode: On', and '100%'.

Webtop Architektura



Presence Should Be Automatically Derived Whenever Possible

Because most people don't manually set their presence status, it should be automatically derived from sensors in the system whenever possible.



One Size Fits All?



Consumer

- Cena: Free, free, free
- Infrastruktura: nezávislost na konektivitě, NAT...
- Funkce: Jednoduché ovládání = minimální sada funkcí
- Podpora standardů: důležitá je kritická masa uživatelů služby (Skype) nebo cena klienta (SIP)

SMB

- Cena: levně
- Infrastruktura: ideálně s nějakou garancí služby
- Funkce: záleží na uživatelích – od jednoduché sady po maximální
- Podpora standardů: tam, kde se propojuje do cizího prostředí (trunk - SIP, H.323)

Enterprise

- Cena: „zdůvodnitelná“
- Infrastruktura: spolehlivost a dostupnost, QoS
- Funkce: integrace s procesy, daty, aplikačním prostředím
- Podpora standardů: propojení do cizího prostředí – trunk (SIP, H.323), aplikace/data (web, SOAP, CTI, LDAP,...)

Service Provider

- Cena: „abych tu službu dokázal prodat“
- Infrastruktura: záleží na zákaznících a kategorii služby
- Funkce: více variant s jednotnou sadou bez ohledu na zákazníka
- Podpora standardů: SIP

Závěr

- Unified... Co?

Infrastruktura? Ano, ale s vyšší dostupností a QoS

Uživatelské prostředí? Integrace nejen dat, hlasu a videa, ale i IM, více zařízení pro jednoho uživatele, aplikací, Web 2.0

- Standardy... Tu jsou, ale...

Co správa a provisioning? Client-server ?

- Univerzální řešení... Pro koho?

