

CERNphone update



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Agenda

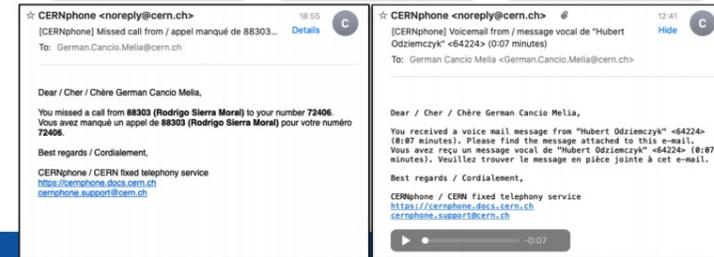
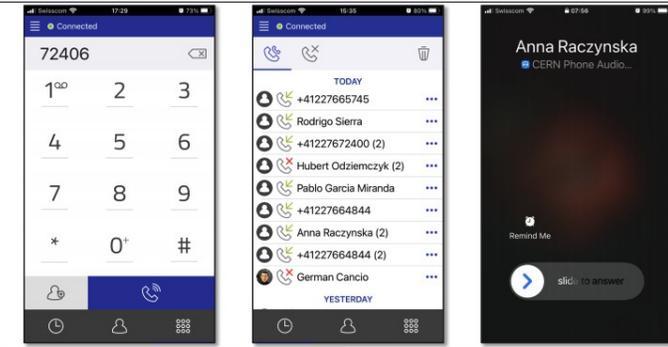
- CERNphone backend and mobile client status
- CERNphone desktop
- Physical phones
- Advanced use cases
- Migration

Backend + mobile client

- **CERNphone infrastructure + mobile clients** (cf HEPiX Fall 2020 [presentation](#)) **are fully available to the CERN community**
 - Used by employees, users and contractors in the office at CERN or collaborating institutes, on the field and at home
 - All core features implemented (Wifi+mobile data, network handover, caller ID, call forwarding, voicemail, HD audio, web-based User Portal, etc)
 - Android & iOS clients available via App Stores
- ~ 380 numbers already created/migrated:
 - “personal” numbers, used on CERN and private smartphones
 - “shared” service numbers for rotas/intervention (used by experiments and control teams)

Features

- Available for Android + iOS
 - Up to 3 devices per number
- Wifi+mobile network support
 - World-wide reachability on CERN fixed number
- In-call network handover support
 - Wifi/LTE network changes
- HD audio support (Opus)
- Call forwarding (immediate, delayed), simultaneous ringing
- Call transfer, parallel calls, call merging
- Caller ID presentation
- Missed call notifications + voice2email



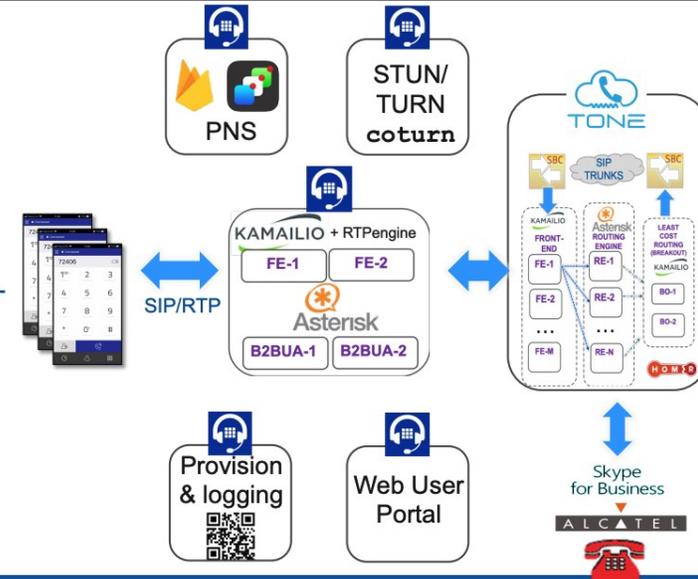
1/10/2020

CERNphone / HEPiX Fall 2020

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Architecture

- Kamailio/Asterisk cluster (authentication, media relay, mobile gateway, VoIP services)
- SIP clients (mobiles, desktops)
- Provisioning server (QR-code based)
- Web User Portal (call forwarding + voicemail settings)
- Push Notification Server (Firebase+APNS)
- STUN/TURN (NAT traversal)
- CERN's TONE back-end (routing, trunking, call rights, legacy PABX integration, CERN services)

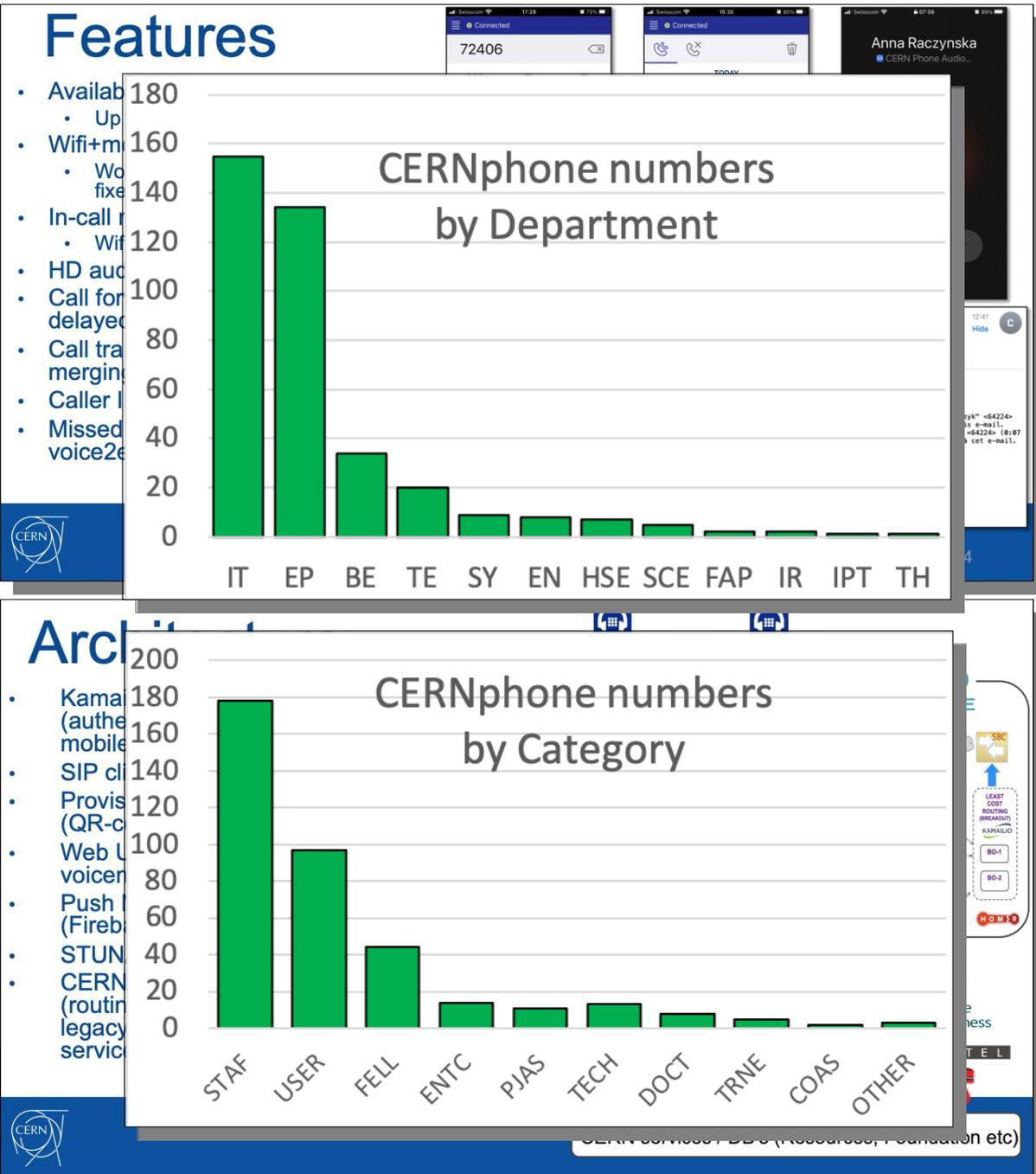


CERN services / DB's (Resources, Foundation etc)



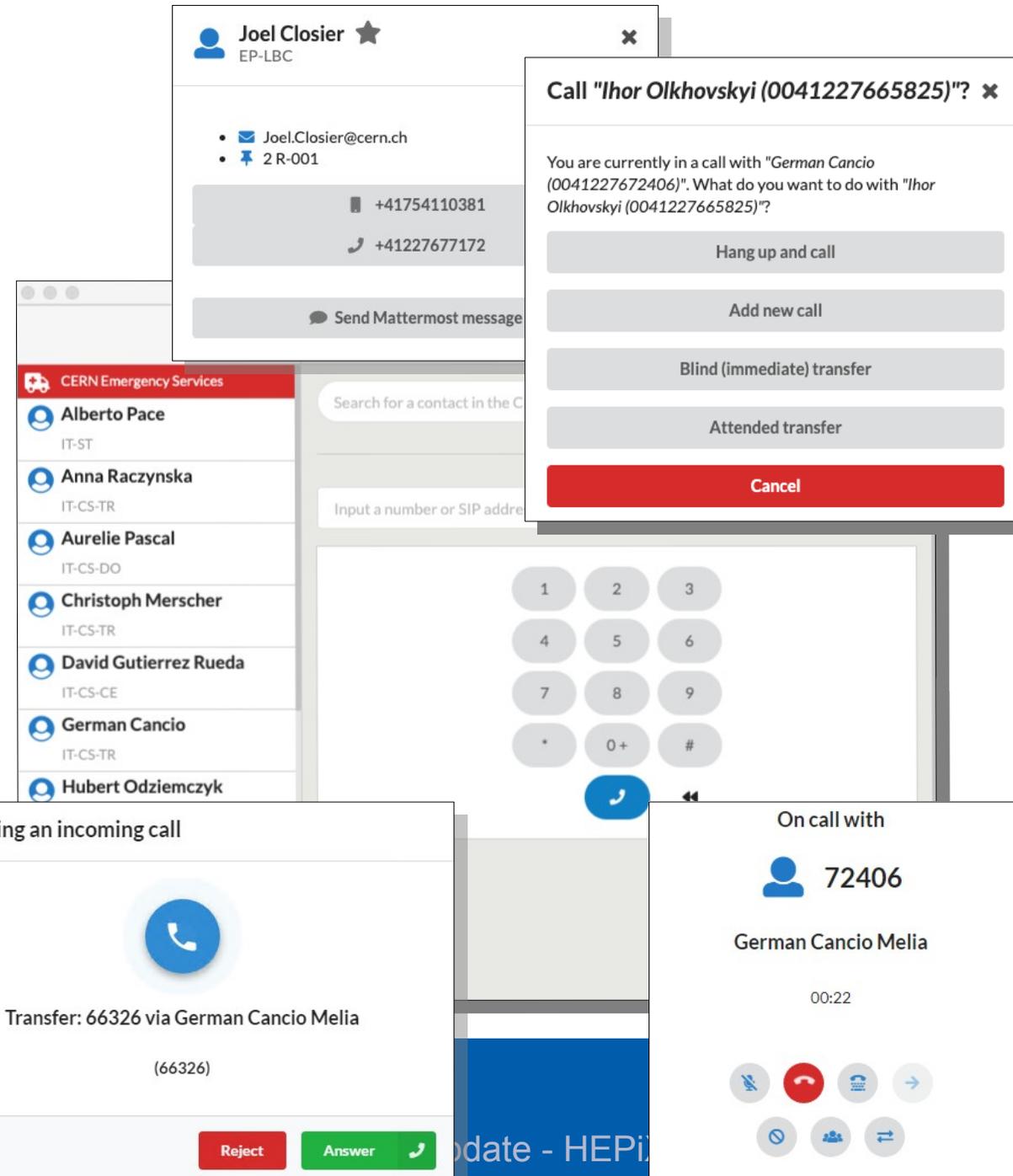
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CERNphone desktop (I)

- Evolution of the DIAL client (see HEPiX [Fall 2019](#))
 - Windows, Mac, Linux (SLC, Ubuntu)
 - Electron / React based
 - SIP-WSS/WebRTC/DTLS-SRTP via sip.js
- Fallback for those not able to use CERNphone mobile or requiring extra functionality
- Usable in parallel to CERNphone mobile
- Enhanced features (CERN phone book, Mattermost integration, parallel and merged calls, transfers, etc)
- Internal pilot started in IT-CS (and other volunteers)
- Public pilot in April, release in May



CERNphone desktop (II)

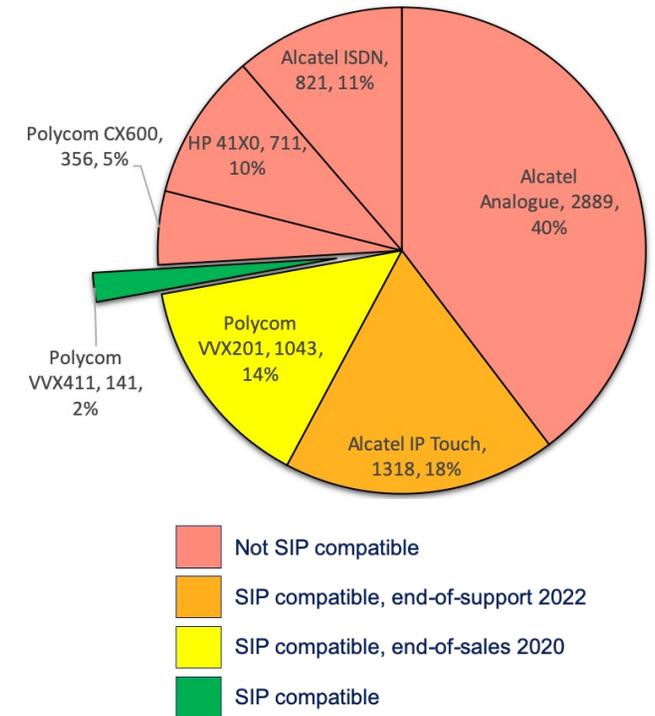
- Reworked application:
 - NAT traversal, network resilience (stale and lost SIP connections, laptop wakeup, connection retrials)
 - Concurrent calls and call merging, Asterisk-based attended/blind transfers
 - Support click-to-dial via URI handling (`tel:+412276XXXXX`, `callto:...`, `cernphone:...`)
 - Pop-up notifications for incoming and missed calls
 - Others: improved in-app update and sound device selection, reviewed GUI layout
- Ongoing back-end migration to CERNphone production hardware
 - Uniform Kamailio SIP proxy cluster for all WebRTC and SIP clients
 - Review dependencies on Openshift hosted REST backend (contacts, user settings)
- Next steps:
 - Migration to new CERN SSO for initial login and REST backend access
 - Migration to standard RFC 8760 SIP authentication instead of using custom CERN SSO-based tokens
 - Upgrade Electron / React / Node.js versions and dependencies
 - Enhancements for advanced users, e.g. call delegation, custom loudspeaker/headphone buttons, etc.



Physical phones... and their demise

- IP phones only for exceptional cases (receptions, control rooms, etc)
 - not for personal or shared offices
 - high hardware and infrastructure costs (cabling, switches)
 - IP phones are not future-proof (security exploits, device obsolescence):
Most CERN IP phones not SIP compatible or at end of sales / support!
- CERNphone apps will replace most of CERN's >7K physical phones!
- Limited integration will be offered for some Polycom VVX models:
 - Conversion of Lync/SfB to SIP
 - TLS/SRTP via production CERNphone servers
 - CERN LDAP phone book lookup
- Next steps:
 - Set up TFTP/HTTPS provisioning server for Polycom UC firmware + cfg profiles
 - Integration with CERN DHCP, network/inventory DB's and phone resources DB for automated profile generation - including random SIP/web credential generation

Physical phones at CERN
(excluding special devices)



Advanced use cases (I)

- **Team call groups:** distributing calls to a given number
 - for support teams, piquets, manager/assistants and for replacing “shared office” phones
 - calls broadcasted according to strategies – parallel, sequential, random
 - members can be paused or pause themselves (e.g. shift start/end)
- **Delegates:** enable team members to place calls on behalf of a team number (WIP)
- **Attended call transfers:** check availability of called party prior to transfer
- **e-groups support:** delegated configuration management

Settings for phone number 88406 [Back to the list](#)

In this page you can configure call settings such as call forwarding or simultaneous ringing.

Team number settings

Team number (the call forwarding needs to be disabled)

Ringing type

Note: changing from one ringing type to another may take up to 5 minutes to become effective

Parallel

Sequential

Random

List of members subscribed to this team number

Member number	Paused	Delegate	Add/Remove
160030	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
88406	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
66326	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
66082	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
72406	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Add"/>

Advanced use cases (II)

- Team groups: using Asterisk Queue module and SQL/ODBC custom tables
 - Dial plan logic developed for honoring do-not-disturb and pause settings, call loops and intra-team calls/transfers
 - Call group members see “Team: *Caller via Team*” (with CERN address book resolution)
 - Call delegation by using call prefixes and setting Caller ID (after validation)
 - Found Asterisk bugs/features requiring workarounds: Ordering of sequential (“linear”) queue members when using ODBC; avoidance of Asterisk restart on ring type change
- Call transfers implemented server-side within Asterisk, avoiding complex client SIP NOTIFY/REFER implementations and potential PBX cross-talks.
 - Desktop client issues DTMF star codes when clicking on transfer buttons
 - Called party sees “Transfer: *Caller via Transferor*” (blind transfers only)
 - Validation of transferor rights (to avoid call hijacking) via ODBC lookups
- Many enhancements in the pipeline:
 - Complete call delegation UI on desktop client
 - Development of configurable call hours and call redirections
 - More flexible timeout configurations
 - “Busy-on-busy”
 - etc...

Migration to CERNphone

- CERNphone is now default for creating new or migrating existing numbers – and will become only choice once desktop client released
- Skype for Business numbers will be migrated to CERNphone by March 2022
- Decommissioning of Alcatel legacy phones will follow during 2022/2023
- Information campaigns are being prepared, trainings will be scheduled
- A new resources portal plug-in and a wizard will be developed for assisting users in the migration process



Summary

- CERNphone is now CERN's default (and growing) softphone-based telephony solution
- Desktop client progressing and nearing first public release
- Functionality developed for covering more advanced use cases
- Upcoming migration campaign starting in the second half of this year will be the beginning of the end of legacy telephony at CERN