A Tele-Visit System for ACTIVAGE Project

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ADTC and edaWorkshop19

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ISTITUTO DI SCIENZA E TECNOLOGIE DELL'INFORMAZIONE "A. FAEDO"

Signals & Images Laboratory

2014 – SILAB (ISTI-CNR)

- Computer vision
- Signal Analysis
- Smart vision systems
- Multimedia data understanding

Si Do ReE Mi

Sistema Domiciliare di Rieducazione Espressiva del Movimento e dell'Interazione

Lucca

SEMI

Sistema Espressivo Multicanale Interattivo

From 2018

ACTIVAGE PROJECT

***ACT**ivating **I**nno**V**ative IoT smart living environments for **AGE**ing well*

(H2020-IOT-2016-2017, Topic IoT-01-2016, Action IA, n. 732679)

ACTIVAGE project

- *European Multi Centric Large Scale Pilot on Smart Living Environments;*
- *First European IoT (Internet of Things) ecosystem;*
- *Nine Deployment Sites (DS) in seven different European nations;*

The Italian DS (DS-RER)

- Emilia Romagna (Parma region)
- Solutions for a better quality of life for the elderly
- Post stroke

Local Health Authority Parma
CUP 2000
Aurora Domus

IBM
Wind / Tre
CNR

SILAB involvement in ACTIVAGE

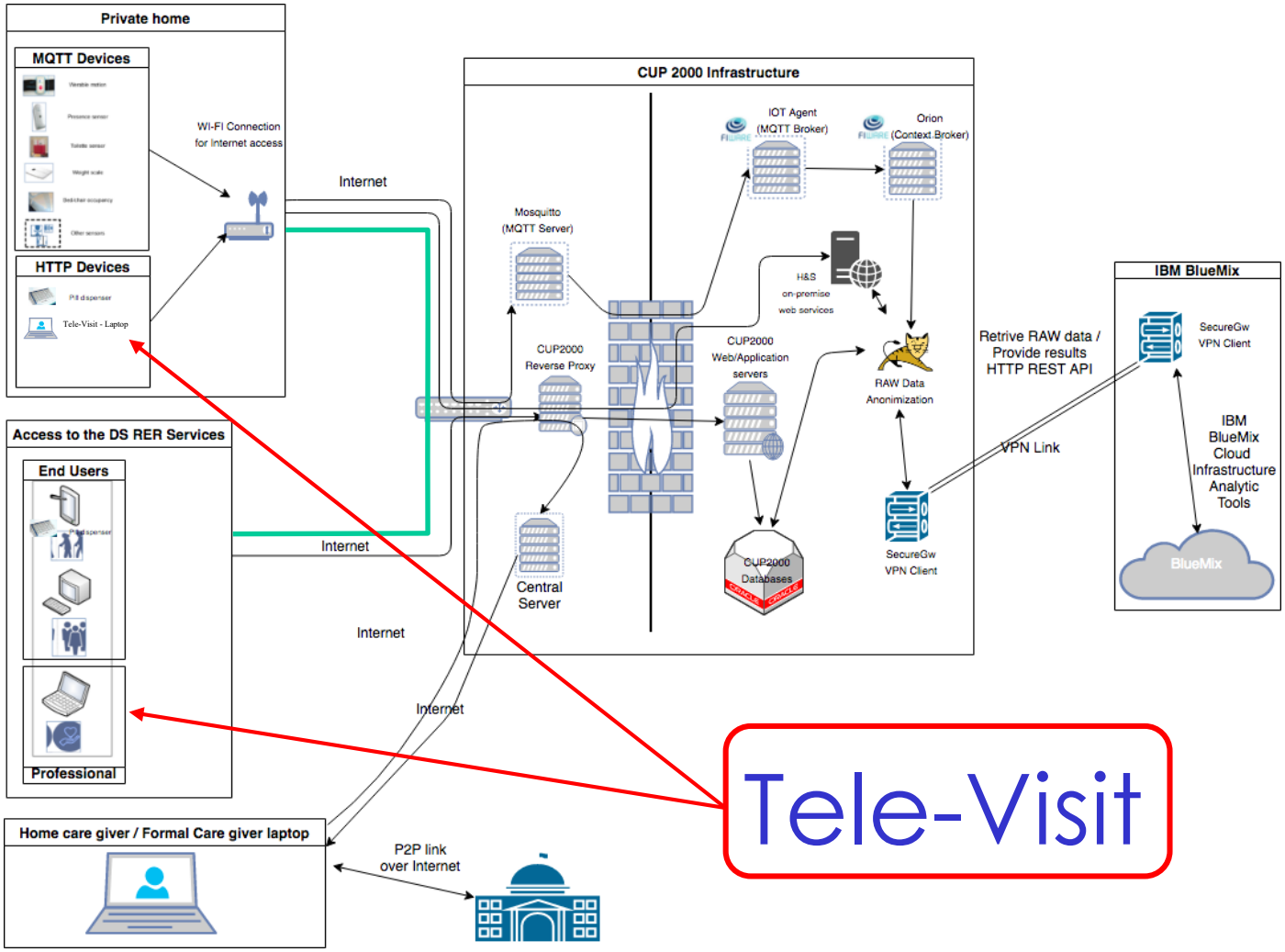
WP3

Activage Secure Interoperability Layer: definition and development of services aimed at creating an interoperability layer between the various instances of the ACTIVAGE project

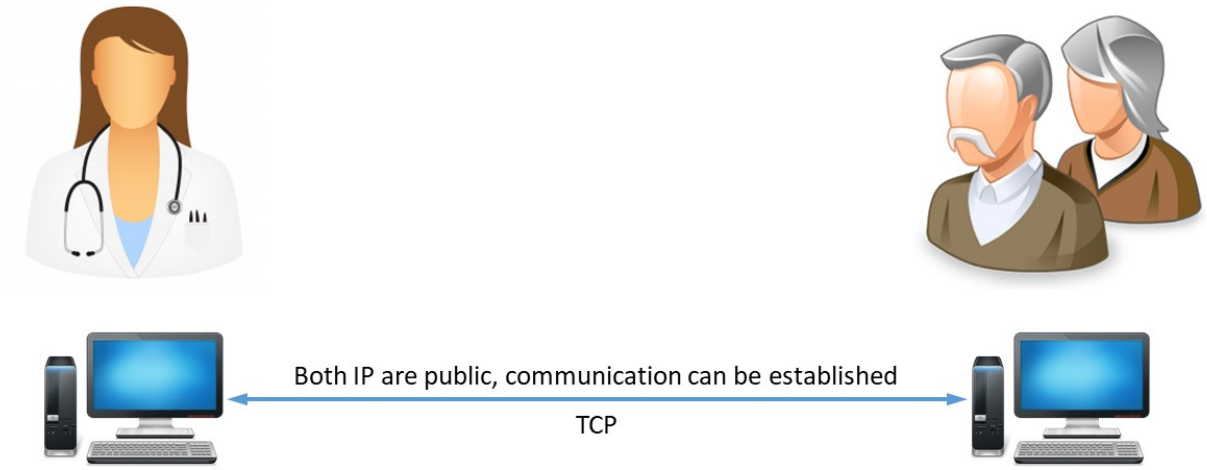
WP9

Implementation of a Tele-Visit software on Windows platform for remote patient visits by specialists

DS-RER Architecture

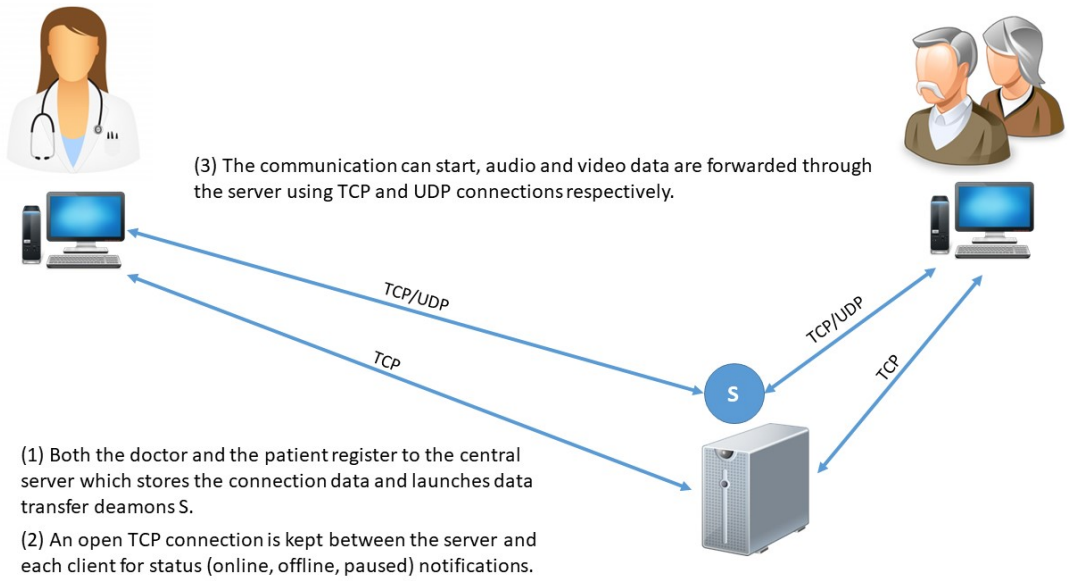


The Tele-Visit system (1)



- First prototype made for the SIDOREMI project
- Public IPs
- Audio and video transmission over TCP

The Tele-Visit system (2)

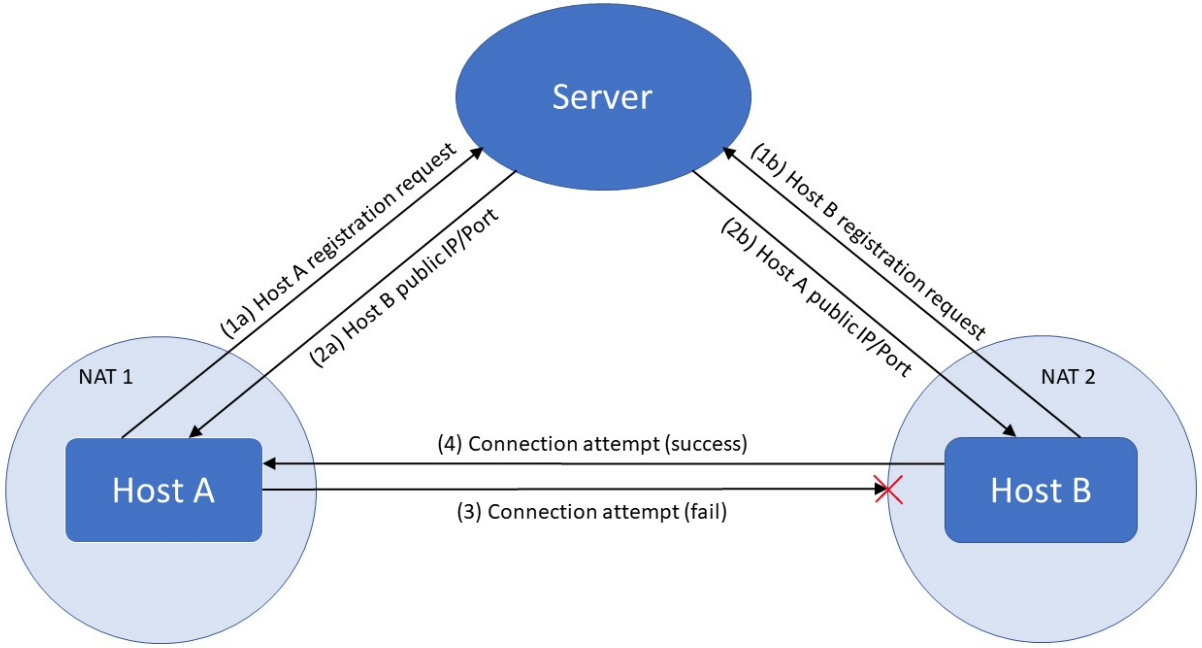


- Central server introduction
- Hybrid use of UDP/TCP channels
- Private host addresses

Main development steps

- Introduction of a central server responsible for registering hosts, all changes in status and correct routing of traffic
- Testing of UDP Hole Punching techniques for point-to-point data transmission
- Implementation of the correct audio/video routing between hosts and real-time management of the status of services
- Study of network packet sizing, use of buffering techniques, packet fragmentation and checksum

UDP Hole Punching



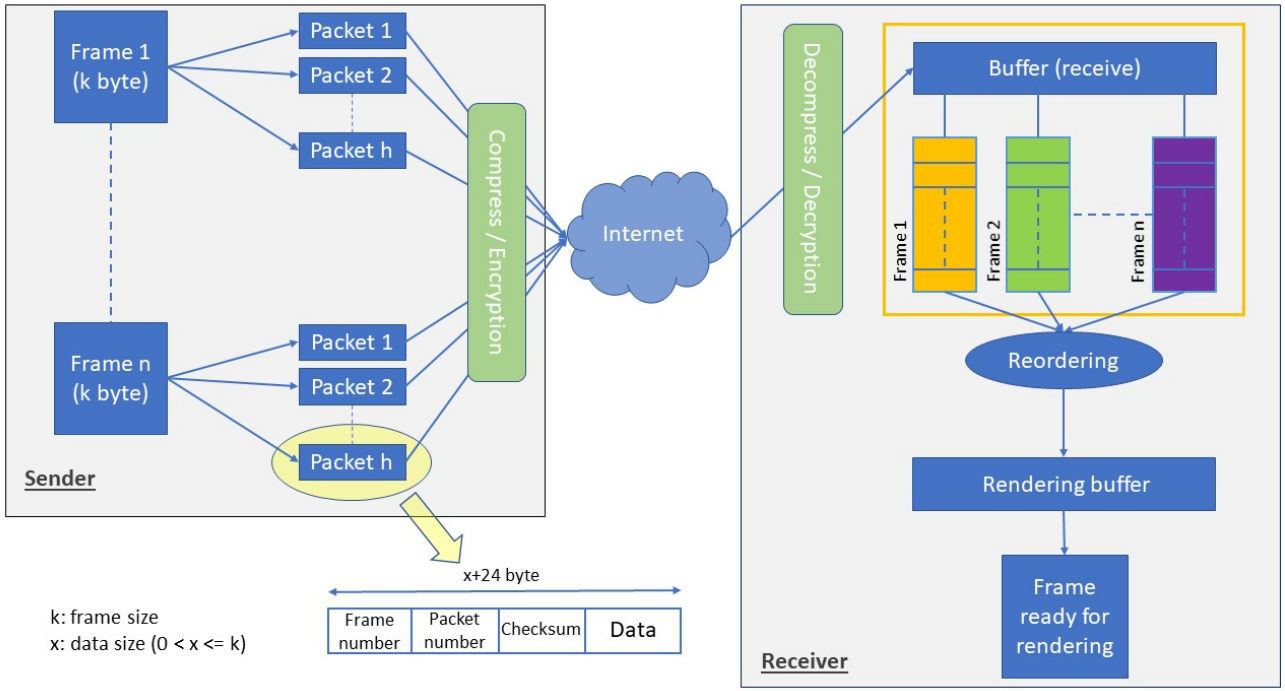
- Technique that allows two «NATted» hosts to establish bidirectional connections
- A third host with public address is needed
- Does not work with symmetric NATs

Central Server

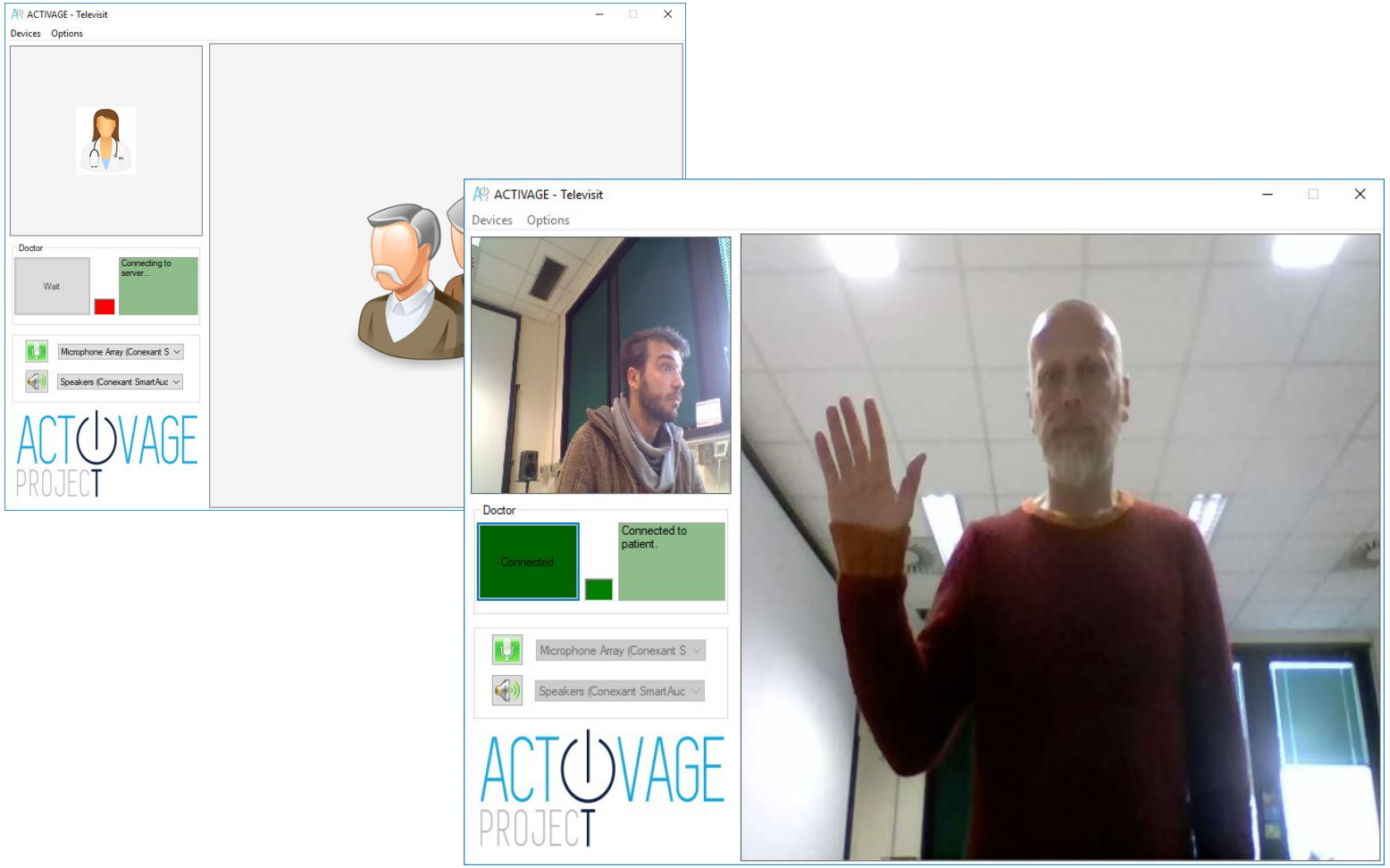
- Public IP
- Step 1: address database and UDP Hole Punching experimentation
- Step 2: connected users status mangement
- Step 3: audio and video traffic management

Optimization of UDP video transmission

- Maximum IP packet size -> 65535 byte
- Header IP (20 byte) + header UDP (8 byte) -> 65507 byte
- MTU (Maximum Transmission Unit) -> 576 byte
- Frame number + Packet number + Checksum -> 24 byte
- Maximum data packet size -> 524 byte



The GUI


ACTIVAGE - Televisit
Devices
Options
Doctor
Wait
Connecting to server...
Microphone Array (Conexant S
Speakers (Conexant SmartAuc
ACTIVAGE PROJECT
ACTIVAGE - Televisit
Devices
Options
Doctor
Connected
Connected to patient.
Microphone Array (Conexant S
Speakers (Conexant SmartAuc
ACTIVAGE PROJECT

Considerations and future development

- Why don't you use Skype???

- The prototype is currently being approved by the ethic committee awating experimentation

- Experimenting an algorithm with end to end encryption to guarantee security in communications

Thank you all for your attention!

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