

# Il VoIP parla Wireless



Networking Competence Provider

IL VALORE DELLA CONOSCENZA.

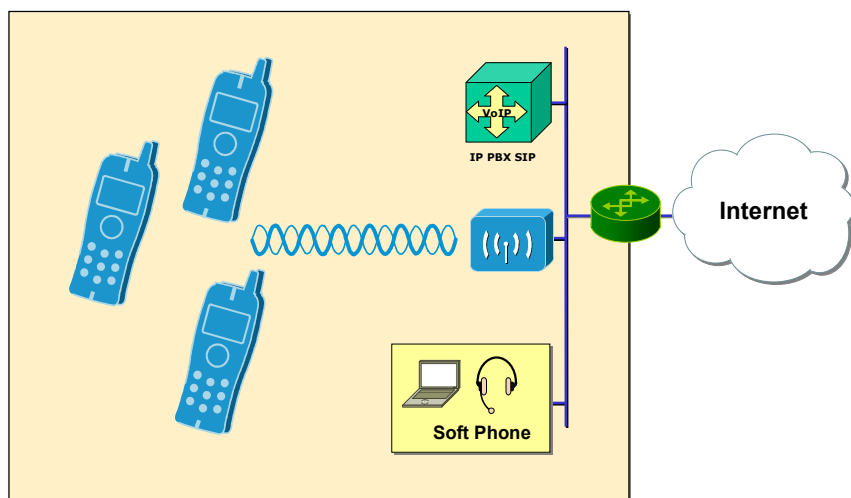
Giuseppe Tetti



Milano **mobile business** 27- 28 marzo

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## Ambiente Demo

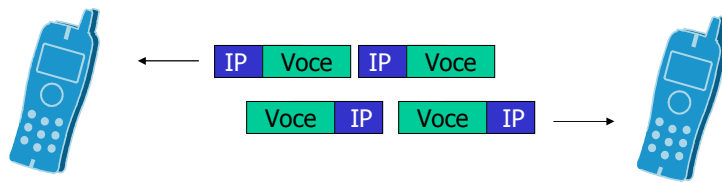


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# Obiettivi

- Realizzare un sistema di comunicazione vocale basato interamente su tecnologie VoIP utilizzando:
  - Trasporto Wireless 802.11g
  - Telefoni Cellulari
  - Softphone
  - Protocollo SIP



# Componenti

- Access Point Zyxel
- Softphone X-lite (free)  
<http://www.xten.com/index.php?menu=download>
- IP PBX Axon (free trial)  
<http://www.nch.com.au/pbx/index.html>
- Collegamento Internet via UMTS Vodafone
- VoIP Provider “Messagenet”  
<http://www.messagenet.it>
- Cellulari Nokia E61  
[http://www.nokia.it/link?cid=EDITORIAL\\_18327](http://www.nokia.it/link?cid=EDITORIAL_18327)



## Fasi di configurazione

- Configurazione Access point
- Configurazione IP PBX SIP
- Configurazione Softphone
- Configurazione Nokia E61

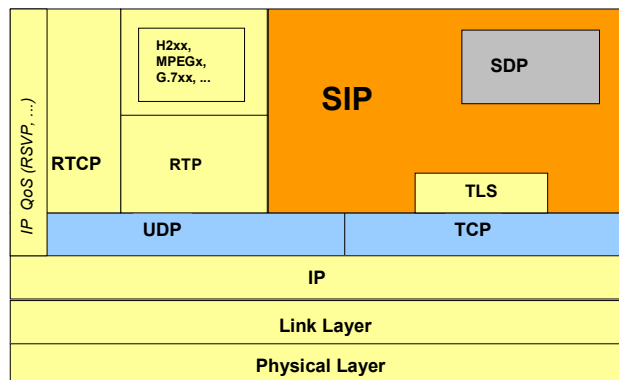
## Introduzione a SIP

- Session Initiation Protocol (SIP)
  - SIP è un protocollo di livello applicativo che può stabilire, modificare e terminare una sessione multimediale.
  - E' indipendente dal livello di trasporto
  - [RFC 3261](#), 3262, 3903, 3311, 3515, 3428, 3265, 2976 e [altri](#).
  - Basato su un modello transazionale request / response simile al protocollo HTTP

## SIP – Componenti e protocolli

- User Agent
  - Risiede in ogni end station SIP: UAC (User Agent Client), UAS (User Agent Server)
- Servers
  - Proxy, Redirect, Registrar, Location.
- URI
  - Formato simile a indirizzi email per identificare utente e dispositivo
    - sip:Alice@atlanta.com
    - sips:proxy-sip.biloxy.com
    - sip:0289678@1.2.3.4
    - sip:1.2.3.4

## Architettura protocollare di SIP



## Messaggi di Richiesta

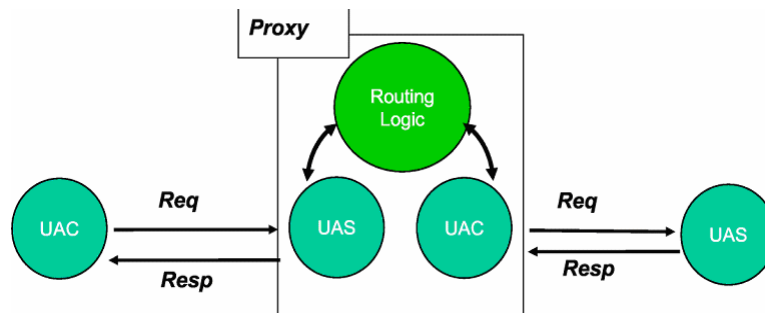
- SIP utilizza **sei tipologie** o metodi di Richiesta (*Request*):
  - INVITE—Indicates a user or service is being invited to participate in a call session.
  - ACK—Confirms that the client has received a final response to an INVITE request.
  - BYE—Terminates a call and can be sent by either the caller or the callee.
  - CANCEL—Cancels any pending searches but does not terminate a call that currently in progress.
  - OPTIONS—Queries the capabilities of servers.
  - REGISTER—Registers the address listed in the To header field with a SIP server. Gateways do not support the REGISTER method.

## Messaggi di Responso

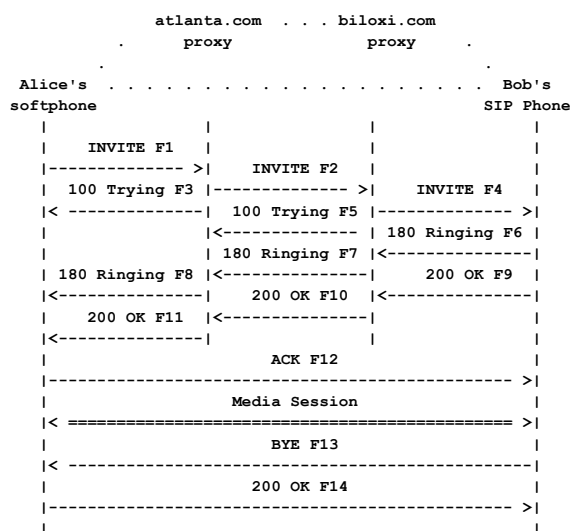
- Nei messaggi di Responso, SIP utilizza le seguenti categorie:
  - 1xx Informational Messages
  - 2xx Successful Responses
  - 3xx Redirection Responses
  - 4xx Request Failure Responses
  - 5xx Server Failure Responses
  - 6xx General Failure Responses

# Il proxy Server SIP

- E' un elemento SIP intermedio che agisce sia come UAC sia come UAS, puo' essere: stateless o statefull (Transaction Statefull o Call Statefull)
- La sua principale funzione è di realizzare il *Call Routing*:
  - Instrada le richieste
  - Fa seguire il percorso contrario alle risposte
- Un proxy altera i messaggi SIP in varie parti (nell' URI, nel Via, ecc.)



# Il trapezio SIP



# Il messaggio INVITE

```
INVITE sip:bob@biloxi.com SIP/2.0
Via: SIP/2.0/UDP
    pc33.atlanta.com;branch=z9hG4bK776asdhds
Max-Forwards: 70
To: Bob <sip:bob@biloxi.com>
From: Alice <sip:alice@atlanta.com>;tag=1928301774
Call-ID: a84b4c76e66710@pc33.atlanta.com
CSeq: 314159 INVITE
Contact: <sip:alice@pc33.atlanta.com>
Content-Type: application/sdp
Content-Length: 142
Segue body SDP
```

Dove inviare Response



Dove inviare Request



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# Il messaggio OK

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP server10.biloxi.com
    ;branch=z9hG4bKnashds8;received=192.0.2.3
Via: SIP/2.0/UDP bigbox3.site3.atlanta.com
    ;branch=z9hG4bK77ef4c2312983.1;received=192.0.2.2
Via: SIP/2.0/UDP pc33.atlanta.com
    ;branch=z9hG4bK776asdhds ;received=192.0.2.1
To: Bob <sip:bob@biloxi.com>;tag=a6c85cf
From: Alice <sip:alice@atlanta.com>;tag=1928301774
    Call-ID: a84b4c76e66710@pc33.atlanta.com
CSeq: 314159 INVITE
Contact: <sip:bob@192.0.2.4>
Content-Type: application/sdp
Content-Length: 131
```

Copinati dal messaggio di INVITE di Alice

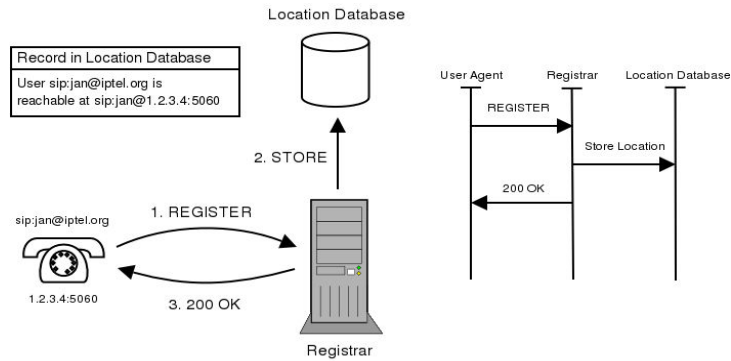
Aggiunto da Bob



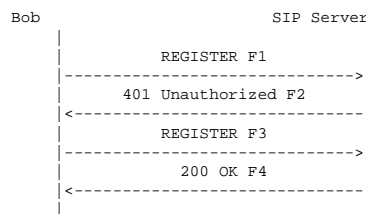
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# Registrazione



# Procedura di Registrazione



- Bob sends a SIP REGISTER request to the SIP server. The request includes the **user's contact list**. This flow shows the use of HTTP Digest for authentication using TLS transport. TLS transport is used due to the lack of integrity protection in HTTP Digest and the danger of registration hijacking without it, as described in RFC 3261 [1].
- The SIP server provides a challenge to Bob.
- Bob enters his valid user ID and password. Bob's SIP client encrypts the user information according to the challenge issued by the SIP server and sends the response to the SIP server.
- The SIP server validates the user's credentials. It registers the user in its contact database and returns a response (200 OK) to Bob's SIP client. The response includes the user's current contact list in Contact headers. The format of the authentication shown is HTTP digest. It is assumed that Bob has not previously registered with this Server. (**estratto RFC 3261**)

# Aggiornamento di una Contact List

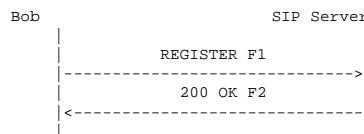


F1 REGISTER Bob -> SIP Server

```
REGISTER sips:ss2.biloxi.example.com SIP/2.0
Via: SIP/2.0/TLS
client.biloxi.example.com:5061;branch=z9hG4bKnashds7
Max-Forwards: 70
From: Bob <sips:bob@biloxi.example.com>;tag=a73kszlfl
To: Bob <sips:bob@biloxi.example.com>
Call-ID: 1j9FpLxk3uxtm8tn@biloxi.example.com
CSeq: 1 REGISTER
Contact: sip:bob@client.biloxi.example.com
Authorization: Digest username="bob", realm="atlanta.example.com",
qop="auth", nonce="lcec4341ae6cbe5a359ea9c8e88df84f", opaque="",
uri="sips:ss2.biloxi.example.com",
response="71ba27c64bd01de719686aa4590d5824"
Content-Length: 0
```



# Aggiornamento di una Contact List

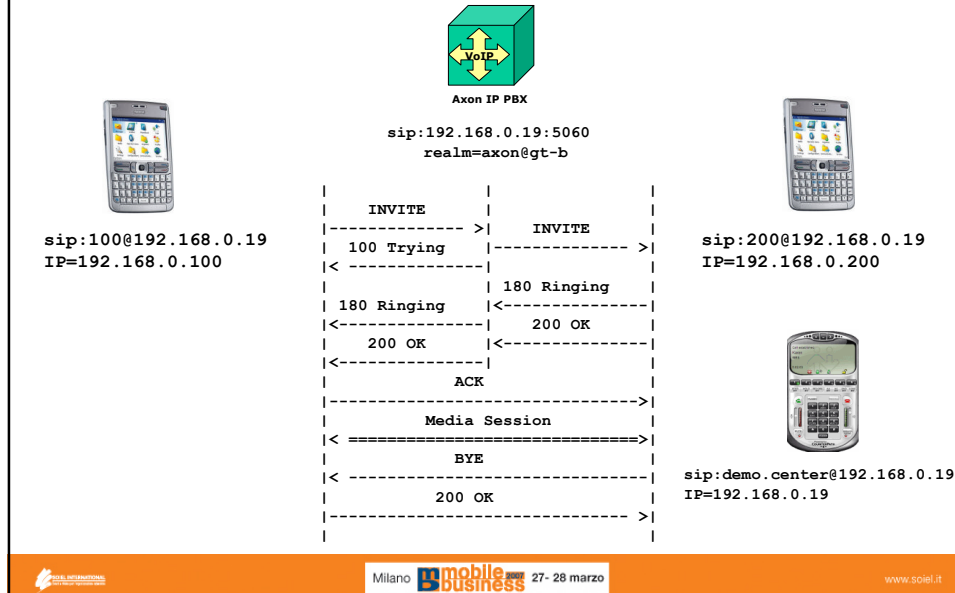


F2 200 OK SIP Server -> Bob

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS
client.biloxi.example.com:5061;branch=z9hG4bKnashds7
;received=192.0.2.201
From: Bob <sips:bob@biloxi.example.com>;tag=a73kszlfl
To: Bob <sips:bob@biloxi.example.com>;tag=34095828jh
Call-ID: 1j9FpLxk3uxtm8tn@biloxi.example.com
CSeq: 1 REGISTER
Contact: <sips:bob@client.biloxi.example.com>;expires=3600
Content-Length: 0
```



## Nostro obiettivo



## Fasi di configurazione

- Configurazione Access point →
- Configurazione IP PBX SIP →
- Configurazione Softphone →
- Configurazione Nokia E61

# Configurazione di Nokia E61

[filmato](#)



Software version  
**3.0633.09.04**

## Configurazione

**Menu=>Strumenti=>Impostazioni=>Connessione**

**-Punti di accesso (rete wireless)**

**-Impostazioni SIP**

**-Impostazioni Telefono Internet**

## Gestione

**Menu=>Connettività**

**-Gestione Connettività**

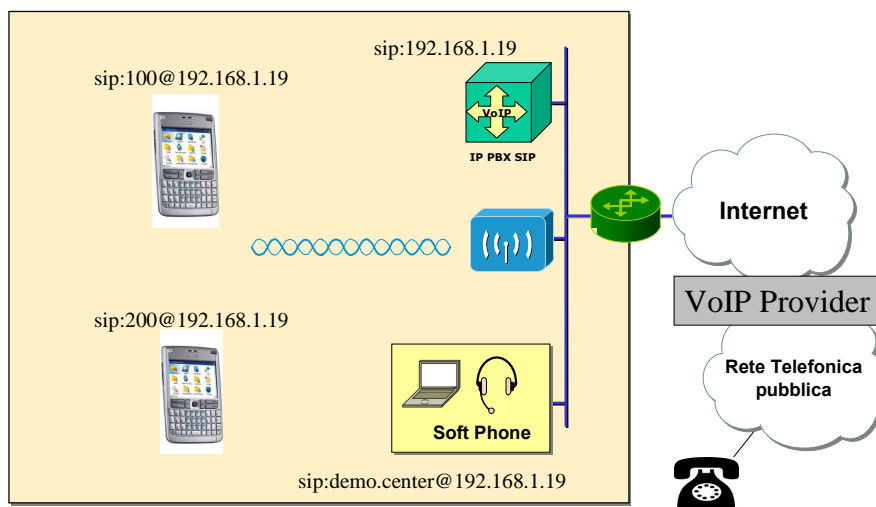
**-Telefono Internet**



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# Ambiente Demo



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Grazie per la cortese attenzione

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