SIP CALL FLOW

BASIC SIP CALL SCENARIO

1. The UE sends a request or "INVITE" to setup session with Proxy-CSCF

2. The Proxy-CSCF forwards this request to the Serving-CSCF.

3. The request is routed to the application servers found in the subscribers profile for service handling.

4. After originating services have been applied the Serviing-CSCF queries DNS (ENUM) for the address of the Interrogating-CSCF of the called UE and fowards the request to that Interrogating-CSCF.

5. The I-CSCF then gets the address of the responsible S-CSCF from the HSS, and forwards the request to it.

6. The request is given to the application server that is in the subscribers HSS.

7. All terminating services are applied from the application server, the call is forwarded to the end users P-CSCF.

8. Request forwarded to terminating UE, and a voice path is established.

SIP Requests

REGISTER If user device is not registered, then this will be the first request sent. The caller's contact URI (sip:bob@google.com) will be bound to an Address of Record in the Proxy-CSCF

INVITE If user device is already registered, then this will be the first request sent. Indicates a client is being invited to participate in a call session. Sent to the Proxy-CSCF, which forwards the request to the local S-CSCF, which in turn sends it to the 5420 Converged Telephony Server. It checks it's subscriber database for the called party and eventually passes the INVITE to the terminating S-CSCF

ACK An acknowledgement packet to confirm prior message was received.

BYE Terminates a call and can be sent by either the caller or the callee.

OPTIONS Queries the capabilities of connecting servers.

SIP Requests (cont)

SUBSCRIBE Indicates that a user wishes to hear about changes in an application service. Examples of such services include automatic callback services (based on device state events), buddy lists (based on user presence events), message waiting indications (based on mailbox state change events). Ex:"sip:steve@ALU.com" would be an appropriate URI to subscribe to for my presence state; it would also be an appropriate URI to subscribe to the state of my voice mailbox. To distinguish which, subscribers MUST include exactly one "Event" header in SUBSCRIBE requests.

NOTIFY The updates given to the subscribed user device of any changes or events that happened to the service that they are subscribed to.

The Session Initiation Protocol

SIP Ferries the signaling portion of the call setup and teardown

RTP Ferries the data/voice portion of the user call session

MEGACO is used with SIP to controlling gateway functions to the PSTN

SIP Return Codes

1xx- Provisioning...

2xx- Action was successful

3xx- Redirect to another server

4xx- Client error, bad syntax of request

5xx- Server error, couldn't fulfill request

6xx- Global Failure

*The IMS architecture is built around using SIP.

*SIP supports name mapping and redirection, this allows users to be found and reached from different varying locations.

*SIP uses a syntax very similar to HTTP.

*SIP is not as robust as it's rival protocol H.323

*SIP often is implemented with SDP to fill in gaps.

Examples of SIP Services

Basic Unassisted SIP Services:

Many services listed here, make use of the SUBSCRIBE/NOTIFY requests.

*Call Holding

*Auto-Redial

*Find-Me

More advanced features are assisted by an application server. The 5420 Converged Telephony Server is one such application server.

*Call Holding w/ Music

*Three Way Call

*Six-Way Call

*Call history

*Voicemail

*VPN Dialing

*Authorization for conference calls

*"Visitor Desk"

*RingBack Tones

*Caller Name/ID

*Call barring

*Presence Status

Common IMS Acronyms / Terms

UE User-Endpoint (the device used to place the call)

P-CSCF Proxy Call Session Control Function First point of contact in IMS call flow. May provide TLS or IPSec security.

S-CSCF Serving Call Session Control Function It is a SIP server, but performs session control too. It provides routing services, typically using Electronic Numbering (ENUM). Also it handles SIP registrations, which allows it to bind the user's location and the SIP address

I-CSCF Interrogating Call Session Control Function It queries the HSS to retrieve the address of the proper S-CSCF and assign it to a user performing SIP registration.Also forwards SIP request or response to the S-CSCF.

Common IMS Acronyms / Terms (cont)

HSS Home Subscriber Server is a master database. It contains the subscription information like subscriber profiles, performs authentication and authorization of the user, and provides information about the subscriber's location and IP information.

URI Uniform Resource Identifier. A string of characters used to identify a caller and the resource. It can be digits, such as tel:+1-555-123-4567 or alphanumeric, such as sip:john.doe@example.com

Home Network The subscribers native, original provider's network

Visited Network The network that the subscriber is using while away from the home network.

B2BUA A back-to-back user agent could be a physical server or software that receives SIP requests. It can then send back the proper responses. It then acts as a user agent device and generates requests to be sent to the real remote user agent device. Different than a proxy cscf in that the B2BUA maintains the complete call state and participates in all call requests. Provides accurate call accounting, pre-paid rating and billing, failover call routing

AoR An address-of-record, represents an identity of the user, generally a long-term identity, and it does not have a dependency on any device. Users can move between devices or even be associated with multiple devices at on time while retaining the same address-of-record. A simple URI, generally of the form sip:steve@example.com, is used for an address-of-record.