



SIP MOBILITY


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Personal Introduction

- ◆ I am a National Technological University student and a Master Degree Of Science Special Majors candidate
- ◆ I take my degree courses through Southern Methodist University
- ◆ I am currently enrolled in TC 725-N and this is my second semester at SMU
- ◆ I work for 360Networks as a Network Analyst in Toronto, Ontario, Canada 

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SIP Functionality Overview


- ◆ SIP is an application-layer control, signaling protocol
- ◆ It establishes, modifies, and terminates multimedia sessions
- ◆ SIP can invite new members to an existing session or it can create brand new sessions 

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SIP Functionality (continued)


- ◆ SIP is independent of the type of multimedia session handled and the mechanism used to describe the session
- ◆ It is equally useful for videoconferences, audio calls, shared whiteboards, and gaming sessions 

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SIP Functionality (continued)


- ◆ SIP invitations are used to create sessions
- ◆ SIP sessions carry descriptions that allow participants to agree on a group of compatible media types
- ◆ SIP uses Proxy Servers to help route requests to the User's current location 

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SIP Functionality (continued)

- ◆ The Proxy Servers authenticate and authorize Users for services, implement provider call-routing policies, and provide features to Users
- ◆ SIP provides a Registration function that allows Users to upload their current locations. This information will be used by the Proxy Server 


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SIP Mobility Scenarios

SIP Mobility can be divided into:


- ◆ Personal mobility
 - Refers to the Users ability to redirect calls to any User device
- ◆ Session mobility
 - Allows, for example, changing from a VoIP phone to a SIP capable mobile phone when leaving the office 

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SIP Mobility Scenarios (continued)

- ◆ Roaming mobility
 - Refers to a situation where a User is not in a home network
- ◆ Service mobility
 - Addresses the desire of Users to keep their personal services like buddy lists, calendars, personal address book, etc. 


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SIP Mobility Scenarios (continued)

Some of these mobility scenarios can be divided into:

- ◆ Pre-Call mobility when mobility happens prior to the session being established and
- ◆ Mid-Call mobility where the session has already been established and the User has to be able to maintain the session when moving from one visited network to another 

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Mobility Management:

SIP and the Third Generation Partnership Project (3GPP)




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Mobile Systems Review

- ◆ The third generation of mobile systems is the technology that merges the Internet and the cellular worlds
- ◆ The Second-generation(2G) mobile phones deliver only voice and short message services between Users 

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3GPP


- ◆ The Third Generation Partnership Project develops technical specifications for 3G mobile systems based on evolving GSM networks
- ◆ The organizational partners of 3GPP are
 - ARIB; CWTS; ETSI; Committee T1; TTA, and the TTC 

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3GPP (continued)

- ◆ The specifications detailed by 3GPP are used in the 3G systems such as UMTS
- ◆ 3GPP2 develops technical specifications for 3G systems based on ANSI/TIA/EIA-41 networks
- ◆ Both projects, 3GPP and 3GPP2, are part of the ITU through the IMT-2000 process 


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3G Network Domains

The 3G network, as defined by 3GPP, is divided into three different domains:


- ◆ The circuit-switched domain
 - Employs circuit-switching technology to provide voice and multimedia over circuits. This domain is similar to 2G systems where all services are provided through circuit switching 

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3G Network Domains (continued)

- ◆ The packet-switched domain
 - Provides IP connectivity to the terminal. A terminal obtains access to the Internet through this domain.
 - Users can surf the Web, send and receive e-mails, and do most of what can be done in the Internet 

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3G Network Domains (continued)

- ◆ The IP multimedia domain
 - Known as the IP multimedia subsystem
 - The multimedia domain provides IP-based multimedia services to Users using the SIP protocol as the principal signaling protocol




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SIP in the Multimedia Architecture

SIP is used as the principal signaling protocol within the IP multimedia domain


- ◆ All 3G terminals contain a SIP User Agent (UA)
- ◆ IP multimedia network nodes consist of SIP Proxies
 - These are not actually called SIP Proxies, they are referred to as Call/Session Control Functions – CSCFs 

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3GPP: Types of CSCFs


- ◆ The 3GPP architecture defines three types of CSCF, each with a different role:
 - The Proxy CSCF (P-CSCF)
 - The Serving CSCF (S-CSCF)
 - The Interrogating CSCF (I-CSCF) 

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The Roles of the CSCFs


- ◆ The P-CSCF
 - Is the point of contact between the network and the terminal
 - Outgoing and incoming SIP messages go through the P-CSCF
 - Acts as an outbound SIP Proxy because all SIP requests are sent to it irrespective of their final destination 

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The Roles of the CSCFs (continued)


- ◆ The S-CSCF
 - Provides services to the User
 - When a terminal goes through the SIP Register method it becomes associated with an S-CSCF which provides the terminal with services that the User has subscribed to
 - Outgoing and incoming sessions go through the S-CSCF associated with the terminal so that a S-CSCF can provide services on both types of sessions 

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The Roles of the CSCFs (continued)


- ◆ The I-CSCF
 - Finds the proper S-CSCF for a particular User
 - Receives a request then it routes it to the S-CSCF that has to handle the session
 - Is the point of contact within a provider's network for incoming sessions
 - It receives requests for a User within its domain and routes them to the proper S-CSCF 

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The Roles of the CSCFs (continued)


- ◆ The I-CSCF (continued)
 - Receives outgoing sessions requests from the User and routes them to the associated S-CSCF
- The IP multimedia domain of a provider's network contains many CSCFs of each of these three types 

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The Home Subscriber Server


- ◆ The Home Subscriber Server is an important node in the IP Multimedia domain
- ◆ The HSS is **not** a SIP node
- ◆ The HSS contains the S-CSCF associated with an individual User and the User's profile
 - It knows where the User is reachable and which services the User subscribes to
 - The CSCFs consult the HSS when they need that type of information 

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Registration in a 3G Network


- ◆ The purpose of a registration is to assign an S-CSCF to the User
 - The S-CSCF will provide services to the User
- ◆ The SIP Register method is sent from the User's terminal to the P-CSCF
 - The P-CSCF is the point of contact between the terminal and the network
 - The P-CSCF send the Register method to the I-CSCF 

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Registration in a 3G Network (continued)


- ◆ The I-CSCF chooses a S-CSCF for the User
- ◆ To do that, the I-CSCF consults the HSS
 - The protocol used between the I-CSCF and the HSS is *not* SIP
 - The HSS is some sort of a location server: it interacts with SIP entities but does not speak SIP 

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Registration in a 3G Network (continued)

- ◆ The response from the HSS contains information so that the I-CSCF can select a specific S-CSCF for the User
- ◆ The Register method gets forwarded to the chosen S-CSCF
 - The S-CSCF receives the Register request then downloads the User's profile from the HSS
 - The HSS tells the S-CSCF which services the User requires
 - The S-CSCF answers the Register method with a 200 OK SIP response code 

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Registration in a 3G Network from a Visited Domain

- ◆ The Registration process becomes more complex when the User is not in the home network
- ◆ When a User is roaming, two domains come into play
 - The home domain
 - This is the IP multimedia domain of the User's service provider
 - The Visited domain
 - This is the IP multimedia domain of the network that the User is currently using

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Registration in a 3G Network from a Visited Domain (cntd)


- ◆ A User establishes a session and the User's SIP messages go through a group of CSCFs in the visited and the home domains
- ◆ The P-CSCF of the visited domain receives the Register method
 - It detects that the User is not at the home domain
 - The P-CSCF forwards the Register method to the User's home domain
 - From this point on, the process follows the same steps as in a regular registration from the home domain

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Registration in a 3G Network from a Visited Domain (cntd)

- ◆ After the Registration, the HSS knows which S-CSCF has been associated with the User.
 - If an Invite SIP method comes through for that User, the HSS will be able to provide the information to locate the S-CSCF responsible for this User
 - The S-CSCF will then forward the Invite method to the User 

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International Packet Communications Consortium IPCC Market Research

- ◆ The opportunity for the hosted IP voice market is staggering with an expected growth of up to \$6.7 billion by 2007 (IDC, U.S. Hosted IP Voice Forecast and Analysis, 2002- 07).
- ◆ According to an IDC Israel survey, Israeli telecommunications market revenue amounted to \$3.78 billion in 2002, \$2.6 billion of which, amounting to two thirds, came from cellular communications, and \$1.17 billion from fixed-line communications.

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International Packet Communications Consortium IPCC Market Research (cntd)

- ◆ Analysts at Synergy Research Group expect the IP telephony market to increase from approximately \$900 million in 2002 to \$4.3 billion in 2006.
- ◆ According to Allied Business Intelligence, shipments of IP PBX seats are projected to grow from 1.9 million in 2001 to 42 million in 2007. Manufacturers of IP-based systems in 2007 are projected to generate 500% more revenues than manufacturers of legacy equipment in the same year.

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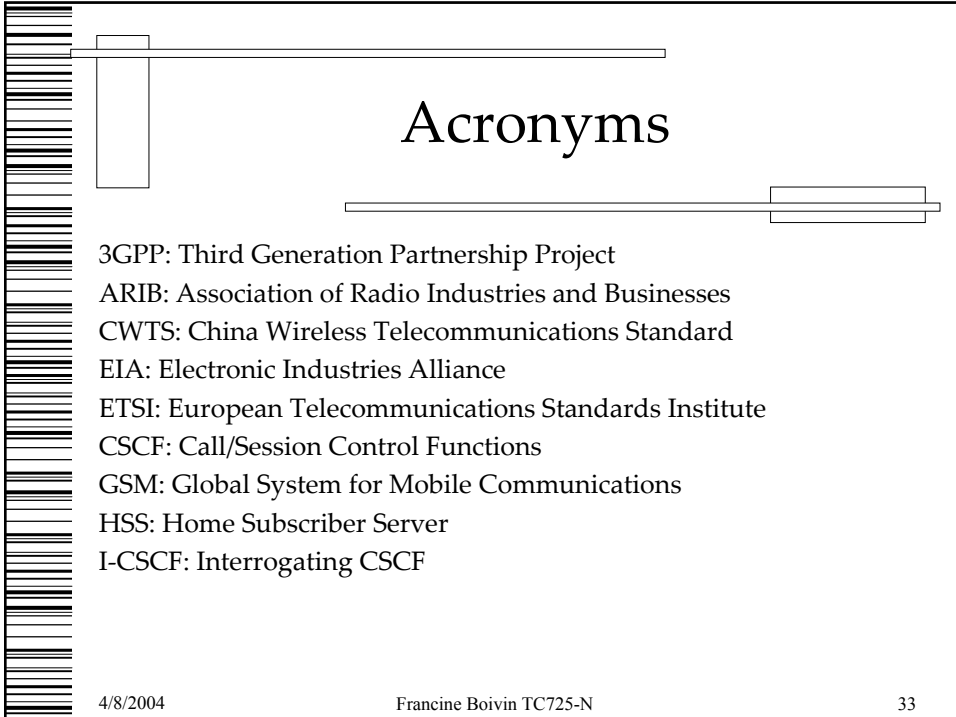
Definitions

- ◆ **Shared Whiteboards**
 - A Multimedia concept that enable you to mark-up a screen using a mouse or stylus input device and have the results show on other screens, often communicating over long distance telephone lines

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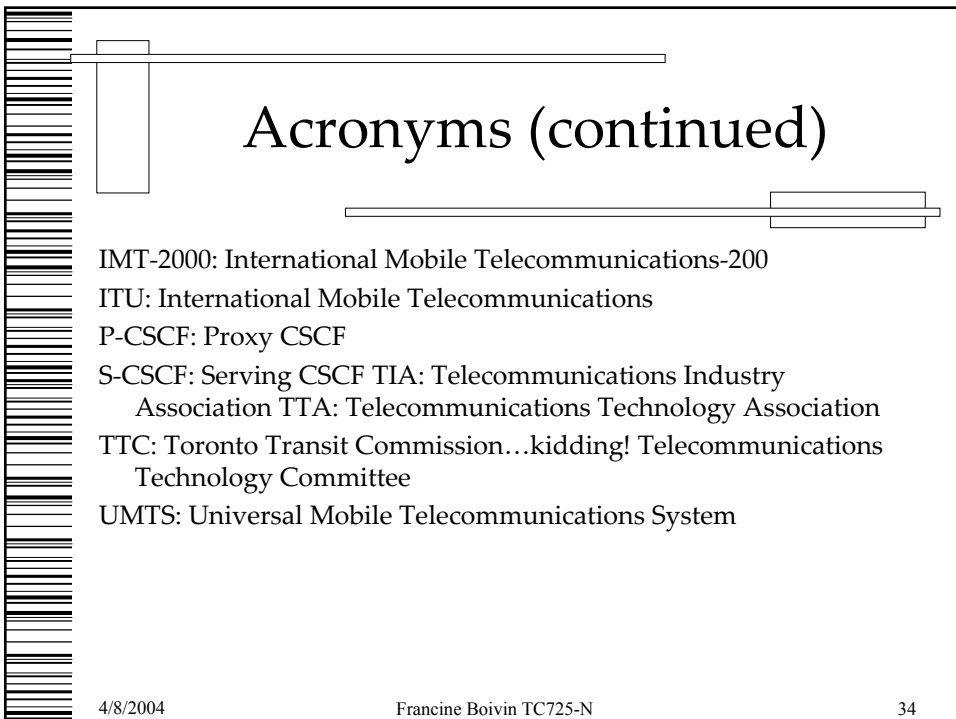
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Acronyms

3GPP: Third Generation Partnership Project
ARIB: Association of Radio Industries and Businesses
CWTS: China Wireless Telecommunications Standard
EIA: Electronic Industries Alliance
ETSI: European Telecommunications Standards Institute
CSCF: Call/Session Control Functions
GSM: Global System for Mobile Communications
HSS: Home Subscriber Server
I-CSCF: Interrogating CSCF

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Acronyms (continued)

IMT-2000: International Mobile Telecommunications-200
ITU: International Mobile Telecommunications
P-CSCF: Proxy CSCF
S-CSCF: Serving CSCF TIA: Telecommunications Industry Association
TTA: Telecommunications Technology Association
TTC: Toronto Transit Commission...kidding! Telecommunications Technology Committee
UMTS: Universal Mobile Telecommunications System

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Thank You !

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