Session Border Controller and IP Multimedia Standards

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December 1, 2005

Contents

- Introduction

- Motivation

- Research problem

- Research method

- Results

- Conclusion

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Introduction – IP Multimedia

- Based on Internet Protocol

- Related to interactive and conversational communication

- Different communication modes simultaneously

- Time dependence

- Real-time

- Quality of service

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Introduction – Standards and Organizations

- Key standards
  - SIP (focus)
  - H.323
  - MGCP
  - MEGACO / H.248
  - RTP

- Key organizations
  - IETF
  - ITU-T
  - 3GPP
  - ETSI

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Introduction – Session Border Controller

- A session border controller (SBC) is a multi function network element

- Building block of real-time IP multimedia service platforms

- Relatively new concept

- There is no universally accepted definition for SBC

- Carriers and service providers are the typical users of SBCs

- Enterprises use SBCs to manage IP multimedia traffic between internal network and the Internet

- Help to manage services across the boundaries of administrative and technological domains

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Introduction – What Problems Does a SBC address?

Administrative borders

- Borders between two different network operators

- Between a network operator and a service provider

- Between service provider and enterprise, or service provider and residential

- Technology borders

  - Different addressing such as public and private IP addresses

  - Networks that use different versions of the IP protocol (IPv4 / IPv6)

  - Services using different signalling protocols such as SIP and H.323

  - Services using different variants of the same IP multimedia standards such as IETF SIP and 3GPP SIP

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Introduction –IETF SIPPING View on SBC

- Perimeter Defence
    - Access control
    - Topology hiding
    - DoS detection & prevention
- Functionality Not Available in Endpoints
    - NAT traversal
    - Protocol interworking
    - Protocol repair
- Network management
    - Traffic monitoring
    - Traffic shaping
    - QoS

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Introduction – SBC Industry Approach

- **Session**: Any real-time, interactive voice video or multimedia communication using layer 5 IP signalling protocols such as SIP, H.323 MGCP or Megaco/H.248

- **Border**: Any IP-IP network border between two service providers or between a service provider and its end user customer/subscriber.

- **Control**: Functions spanning security, service assurance and law enforcement requirements.

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Motivation – Why the Thesis Was Made?

- Interest in peering or federating applications
  - IP multimedia network interconnection issues (commercial, security, legal & regulatory, etc.)
  - Technical inter-op issues
  - Service reach
  - Internet & PLMN/PSTN convergence

- Controversy and different approaches
  - Intelligent endpoints, dumb network
  - Dumb endpoints, intelligent network

- Lack of widely accepted solution

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Research Problem and Method

- The main goal was to find out
  - What functions are performed by SBCs?
  - Why those functions are performed?
  - What SBC functionality is standards conforming and what is non-standard?
- Secondary goal
  - How SBC functionality is viewed by different standards organizations?
- Method
  - Literature study of SBC functionality and IP multimedia standards
  - Minor practical analysis in a test setup
  - Comparison of findings with standards
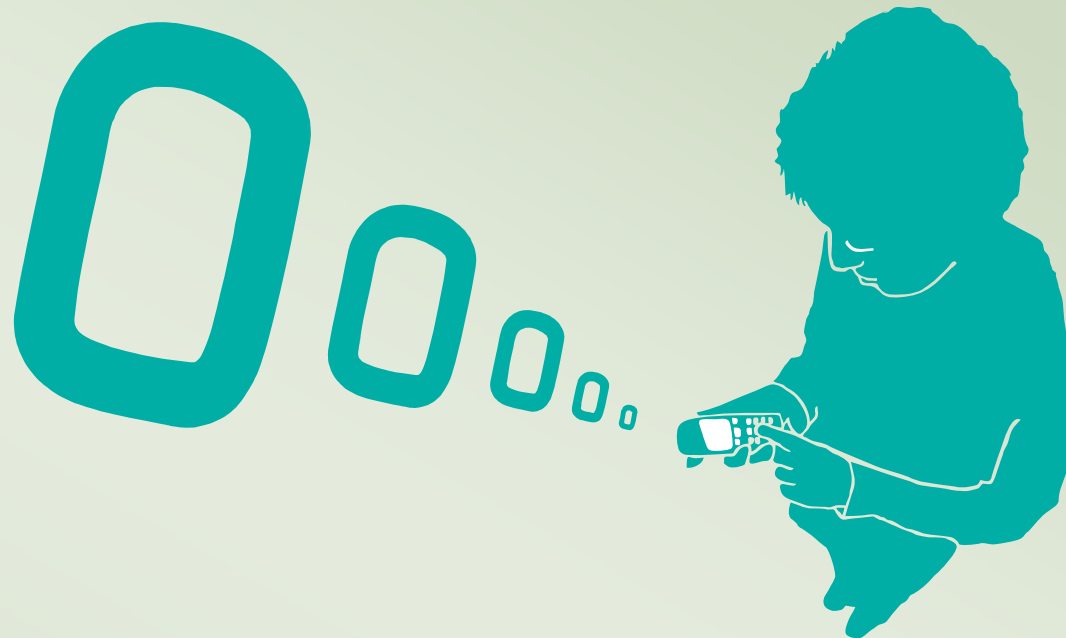
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Results

- Functions were identified
  - SBCs perform a lot of functions!
    - NAT & FW traversal, Traffic monitoring, Traffic shaping, QoS marking, Signalling Protocol repair and variant interoperation, Signalling IWF, IPv4/IPv6 Interworking, Transport protocol interworking, DoS and Overload prevention, Call Admission Control, Legal Intercept, Emergency services, Media encryption, Media transcoding…
  - Service reach
  - QoS
  - Interworking
  - Security
  - Management
  - Billing
  - Legal & regulatory

Results

- Comparison was performed
  - Some of the functionality is standard, some is not…
  - …or actually the **same** functions are considered standard by some and non-standard by other standards bodies!
  - 3GPP IMS and ETSI TISPAN NGN specify many functions similar to SBC functions
  - The way many of the SBC functions are performed are considered "SIP unfriendly" by the IETF
    - SBC acting in the role of a SIP proxy, but violates RFC 3261
    - B2BUA
  - Differences between 3GPP/ETSI TISPAN and IETF approaches

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Conclusion

- SBCs are used in operator, service provider and enterprise networks

- Centred on security, service assurance and quality, interoperation, legal requirements.

- SBC functionality has evolved to address the practical real world issues, that hinder the wide spread use of IP multimedia

- SIP B2BUA

- IETF

- 3GPP & TISPAN NGN

- Convergence

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The Nordic and Baltic telecommunications leader

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December 1, 2005