Session Border Controller and IP Multimedia Standards

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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
Introduction – Standards and Organizations

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

• Key organizations
  – IETF
  – ITU-T
  – 3GPP
  – ETSI
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
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
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
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.
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
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
Results

• Functions were identified
  – SBCs perform a lot of functions!
  – 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
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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