

VoIP interconnection

between Internet, Cable, Mobile and Fixed Worlds

TNO | Knowledge for business



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Four worlds on their own that hardly interconnect



Illustration: Ingrid Joustra, © Automatisering Gids, 7 October 2005

- All use SIP, but differently
- Internet world
- Mobile world
- Cable world
- Fixed world
- At most, only basic voice service will interoperate between those worlds



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 - Different services
 - Different business models
 - Different naming
 - Different security



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- Mission: “to enable scientific knowledge to strengthen the capacity of businesses and government to innovate”



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Four worlds on their own ...: 1) Internet world



- Peering American VoIP providers
 - VoIP peering, free VoIP-to-VoIP calls
 - Parallel number plan with own operator codes (393=FWD, ...)
 - No direct interconnection with PSTN
 - Only basic voice calls
 - Vonage dropped out ...
- Main IM+presence+VoIP+video providers have closed model
 - Skype, AIM, Yahoo+MSN, Googletalk
 - Yahoo-MSN¹ in the future based on SIP/Simple, still closed

1: au.news.yahoo.com/051014/20/wct3.html

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Four worlds on their own ...: 2) Mobile world



- 3GPP – IMS: TS24.229 + many others
 - SIP for session control of multimedia on top of packet-switched domain
 - Push-to-talk, IM, presence, MMS, video, but no VoIP
 - Bandwidth reservations and call admission control
 - Large set of public and private identities (SIP URI)
 - Topology shielding function (“I-CSCF”)
 - Focus is roaming of IMS services

1: www.3gpp.org

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Four worlds on their own ...: 2) Mobile world



- GSMA
 - GRX: shielded IP interconnection network (unreachable public IP addresses), shielded domain .gprs
 - IPX: shielded SIP-based IMS interconnection
- Mobile operators
 - Trials with IMS interconnection and IMS roaming
 - Slow uptake of VoIP due to limited radio access bandwidth

1: www.gsmworld.com

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Four worlds on their own ...: 3) Cable world



- Cablelabs – Packetcable: PKT-SP-CMSS1.5-I02-050812 + other
 - SIP between call servers
 - Inter cable-domain user services
 - Call transfer (“R”)
 - Authentication of calling line identity
 - Calling line presentation restriction
 - Cable operator specials
 - Billing functions: account no, correlation-ID, IP address of record keeping system
 - Control resource reservation (against speech-clipping)
 - Busy line verification
 - Emergency interrupt of standing call
 - Call tracing for malicious calls

1: www.cablelabs.com, consortium of American cable operators
2: www.packetcable.com

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Four worlds on their own ...: 3) Cable world



- ITU-T SG 9 – IP Cablecom: J.178 + other
 - Based on Cablelabs specs
 - SIP signalling between call management servers
- ETSI – “IP Cablecom”: TS101909 part 6
 - IP multimedia time critical services
- Main focus of cable operators: emulating PSTN services
 - No IM, presence, video, ...
 - No interconnection outside cable operators world
 - Assumes Docsis/Eurodocsis-based IP transport
- Clusters of cable operators
 - America: Cable Labs
 - Netherlands¹: “Dutch cable companies to set up SIP exchange”

1: <http://www.telecompaper.com/news/article.aspx?id=99788&nr=310&type=>

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Four worlds on their own ...: 4) Fixed world



- ITU-T SG 11: Q.1912.5
 - SIP profiles for VoIP interconnection
 - Profile A: “IMS SIP profile”
 - Profile B: “Basic VoIP”, profile A without mandatory resource reservation (speech clipping)
 - Profile C: SIP transfer of PSTN (ISUP) signalling
 - PSTN emulation using VoIP and SIP
- ETSI – TISPAN: many meeting reports ...
 - IMS Fixed, IMS for fixed-mobile convergence
 - Assumes DSL-based IP transport

1: www.itu.int/ITU-T/studygroups/com11/index.asp

2: portal.etsi.org/tispan/

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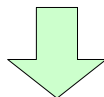
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... that hardly interconnect: 1) Services



- Fixed operators
 - Focus is interworking PSTN with VoIP
 - Focus is PSTN emulation with all its supplementary services
- Cable operators
 - Focus is inter cable-operator domains
 - Focus is PSTN emulation with many cable operator specials
- VoIP providers from internet world
 - Either cheap VoIP calls without any extra's
 - Or rich services with presence, IM, video, application sharing
 - In both cases cumbersome interconnection with PSTN
- Mobile operators
 - Multimedia, push-to-talk, MMS, EMS, IMS, IM, presence
 - No VoIP

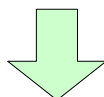


- Major differences in types of services offered

... that hardly interconnect: 2) Business models



- Cable-, fixed- and mobile operators
 - Terminating fees
 - Time-based billing
- Mobile operators
 - Billing per service: SMS, MMS, data
- VoIP providers from internet world
 - Peering
 - Flat fee

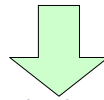


- Major differences in business models used

... that hardly interconnect: 3) Naming



- Cable- and fixed operators
 - Phone numbers (usually geographic numbers, sometimes disguised as sip: or tel: URI)
- Mobile operators
 - Phone numbers (usually mobile numbers)
 - SIP URI's for IMS services
- VoIP providers from internet world
 - Proprietary naming and numbering schemes
 - "Peering numbers" for calls to other VoIP providers
 - Buddy identification based on e-mail address
 - Absent or cumbersome connection with PSTN (2-stage dialing, ...)



- Major differences in naming and numbering schemes used

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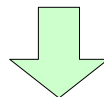
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... that hardly interconnect: 4) Security



- Cable-, fixed- and mobile operators
 - Authentication of calling line identity
 - Network connection
 - SIM cards (mobile)
 - Billing relationship
 - Trust relationships
 - Privacy settings ("CLIR") respected by operators
 - Shielding of SIP route using encryption (mobile: "I-CSCF")
- VoIP providers from internet world
 - Default no authentication of the "From:" header
 - Default no privacy possibilities



- Major differences in handling security and privacy

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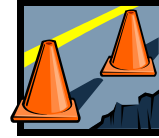
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At most, only basic voice service will interoperate



- Many things will go wrong with VoIP between different worlds
 - Speech clipping
 - No or unreliable calling-line identification
 - Failing calls due to differences in service
 - (C.f. calling a fax machine)
 - Failing calls due to interactions with topology-hiding functions
 - Undialable text-based “numbers” (SIP-URI)
 - Undialable proprietary numbering schemes
 - Unreachable “islands” due to business model disagreements
- Common denominator: the basic voice call
 - And even that may not always work

Thank you !

