Hosted PBX Christian Stredicke

The Future of VoIP, 14 Oct 2005, Den Haag









Why are so many people talking about hosted XXX?

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- No hardware required
- No hassle with software updates
- No hassle with backup
- Usually no investment costs





While http is clearly the choice for hosted web services, this is not so clear for telephony services

H323

- The first (?) serious protocol for signaling VoIP
- ASN.1 limited the friendship to this protocol
- H.225, H.245 rose questions if H.323 was maybe a little bit too complicated
- H.450 was and is mind-boggling
- Still used, especially between operators

MGCP

- Goal: replace the cable with a stupid protocol
- Keep the endpoints cheap and stupid
- ASN.1 also in the game, but not mandatory for the endpoints
- Pretty open, but community looked quite "static"
- MEGACO, etc
- Still not 100 % dead

SIP

- Hey, lets copy HTTP!
- Very simple in the beginning (1996?)
- "Made in Berlin"!
- Became quite difficult over time
- Big players say that's it

Yahooo!!!

- Try the latest yahoo messenger
- All the promises of SIP work there in reality!
- Proprietary
- Unlikely support from the "rest" of the industry

ISDN via Ethernet

- Why invent another protocol?
- ISDN does the telephony part pretty well
- Tunnel the ISDN stuff trough IP
- Most "IP" PBX vendors did it that way and still do it
- And what about presence, IM and other cool stuff?
- Keep the "good old" business rules...
- Americans never understood it, anyway



- Here we go again
- Solves NAT!!!
- More details unknown
- Proprietary power 3
 - IAX • Are you kidding...





SIP went through a long ripe process already



- Probably more standards than H323
- AVT still pretty active
- Core SIP seems to stabilize
- Biggest change was in 2002

Source: Nils Ohlmeier, www.rfc3261.net





Some optimistic assumptions in SIP are creating a lot of problems

NAT and UDP Assumptions

- Everybody can talk to everybody
- Firewalls are not existing
- UDP fragmentation does not exist and packets can become huge

Proxy Assumptions

- Forking Proxy add value
 - Messy handling of 2xx and other return codes
- Record-Routing with strict and loose routing is easy to implement
 - Why are most implementations buggy then?
- The contact is the address of the user agent vs. the route is the real address
 - How do you indicate the transfer destination then?
 - Try to fix that by GRUU





An example of how the IETF call flows make life very hard and how it can be solved the PBX way



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The SIP PBX has no other choice than using B2BUA architecture

• Solves the NAT/UDP problem

- NAT is more or less under control for the basic call
- Short routing paths keep packets small (UDP fragmentation)
- Transfer and other features become trivial
- Features do not depend on the other side of the call
- Problem: Media Relay
 - Can be avoided by re-negotiation of the SDP
 - However renegotiation takes time and causes additional interoperability problems
- The most simple (=working) solution is media relay with transcoding





The no-trouble hosted PBX must relay its media



- No customer premises equipment necessary
- Features like recording make the necessity for relay obvious
- Double Bandwidth
 - Like incoming call and outgoing call

• Double roundtrip time

- Like a call to a foreign domain
- Makes sense when the probability for internal calls is low





Customer premises PBX solves all problems, but means extra equipment



- Media relay only inside the local network
- Media leaves the organization only trough a trunk
- The price tag is the customer premises equipment necessity
 - Backup, failure prevention
 - However remote management is possible







You must think about security if you are thinking about enterprise communications



- Permanent TLS connections solve a couple of problems
 - No NAT problems
 - Security between phone and PBX is guaranteed
 - Key exchange for SRTP can be done in plain text
- PBX must guarantee that security policy is kept
 - What about trunks to PSTN?
 - No "End-to-End" security

• UA must support TLS

- This limits the choice for hard phones to snom
- Limit on number of TCP connections!







Examples for PBX that could be used for hosted PBX services

• Asterisk

- Pragmatic implementation of the B2BUA approach with media relay
- Poor SIP implementation, no TCP/TLS

BroadSoft

- "Carrier-Grade" B2BUA that avoids media relay
- Good SIP Implementations

• Kapsch

- "Carrier-Grade", uses SBC for media path optimization
- Not offered as product as such, comes with the service

pbxnsip

- PBX that can be used in CPE and hosted environment
- Good SIP implementation, supports TCP/TLS and SRTP

• Sylantro

- "Carrier-Grade" with advanced PBX and Centrex functionality
- Extensive Star code features, no TLS and SRTP.







The Bottom Line

- Hosted PBX is possible today
- Call flows must be kept simple
- •Tradeoff between delay for hosted PBX and equipment cost for CPE PBX

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