

GnuGk – The GNU Gatekeeper

Open Source
Telephony Summit

Michal Zygmuntowicz

What we will be talking about

- role of a gatekeeper in VoIP network
- what is GNU Gatekeeper
- deployment scenarios
- performance
- configuration
- the future

How did it all start?

- the project was founded by Jan Willamowius in 1999
- version 1.0 released in 2001
 - usable for small production setups
- version 2.0 released in 2002
 - it is being used in many larger installations
 - stable development state
- Version 2.2 to be released in 2004
 - architectural redesign, new features

GnuGk Community

- active mailing lists:
 - ~750 members on the users mailing list
 - ~300 members on the developer mailing list
- ~5000 downloads per month
- ~20000 visits at **gnugk.org** per month

What is a H.323 gatekeeper (1)

- H.323 gatekeeper should provide in a typical VoIP network the following services:
 - user location (address translation)
 - access control (registration authentication, call admission)
 - bandwidth control
 - zone management

What is a H.323 gatekeeper (2)

- H.323 gatekeeper may provide the following additional services:
 - call signalling control
 - call authorization and accounting
 - call routing decisions
 - directory services

What a H.323 gatekeeper is not

- the gatekeeper is not:
 - a H.323 proxy
 - a H.323 gateway
- although these H.323 entities may be collocated with the gatekeeper
- **GnuGk** can act as a H.323 proxy

Feature Overview (1)

- GPL licence,
- support for Unix (Linux, Solaris, BSD), Mac OS X and Windows platforms
- can be run as a Windows service
- H.323 protocol handling through OpenH323 library
- three operational modes:
 - direct signalling
 - gatekeeper routed signalling
 - full proxy (signalling + RTP media)

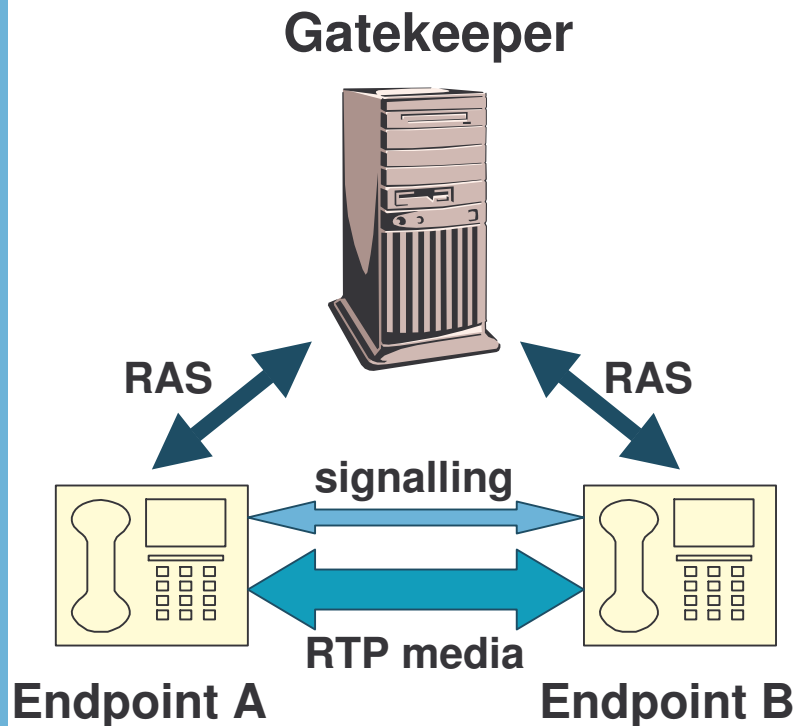
Feature Overview (2)

- NAT traversal - both outgoing and incoming calls
- authorization and accounting with various backend systems (plain text file, SQL, LDAP, RADIUS)
- telnet monitor and admin interface
- gatekeeper clustering and failover support:
 - child-parent gatekeepers
 - neighbor gatekeepers (interzone communication)
 - alternate gatekeepers

Feature Overview (3)

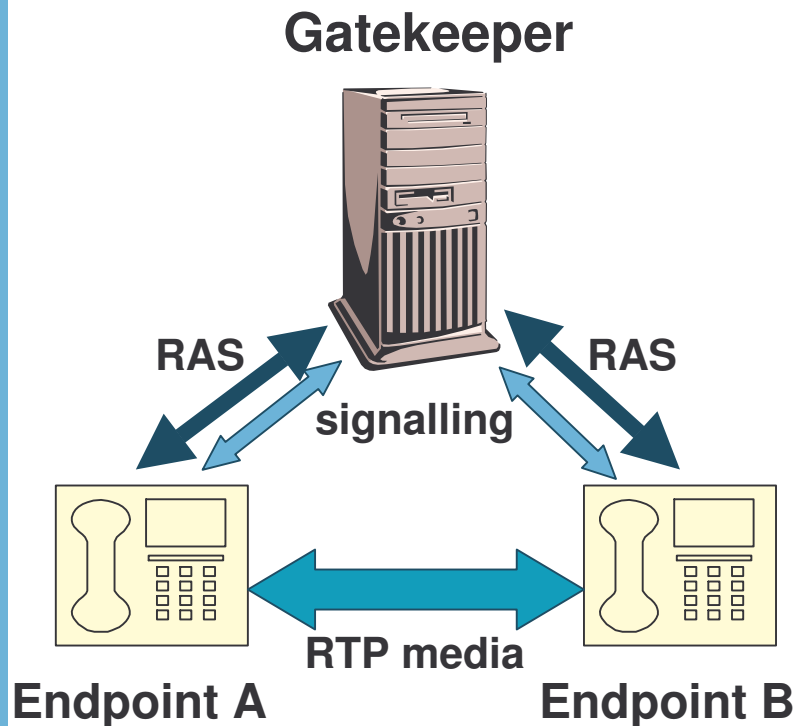
- support for various versions of H.323 protocol (V1 endpoints, some V4 features)
- H.235 security (authentication)
- CTI functions:
 - inbound call routing (virtual queues),
 - call transfer
- E.164 number rewriting (call routing)
- configuration changeable at runtime
- Graphical User Interface in Java for monitoring

Direct Signalling Mode



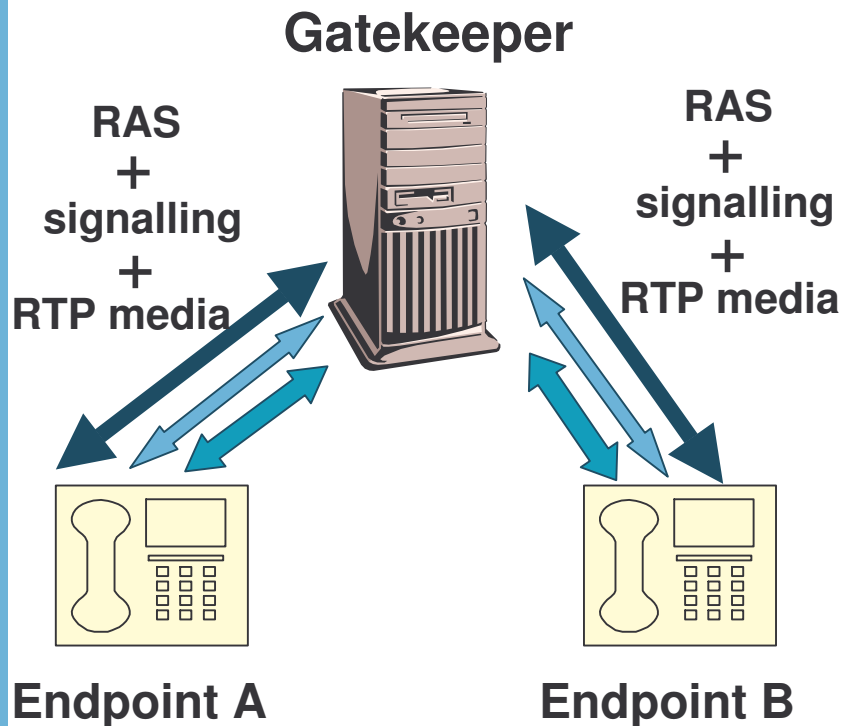
- only RAS channel between endpoints and the gatekeeper
- signalling directly between endpoints
- very good scalability
- lack of precise call control

Gatekeeper Routed Signalling



- signalling channel is routed through the gatekeeper
- precise call control (authorization, accounting)
- additional services like call transfer
- good balance between performance and flexibility

Full Proxy Mode

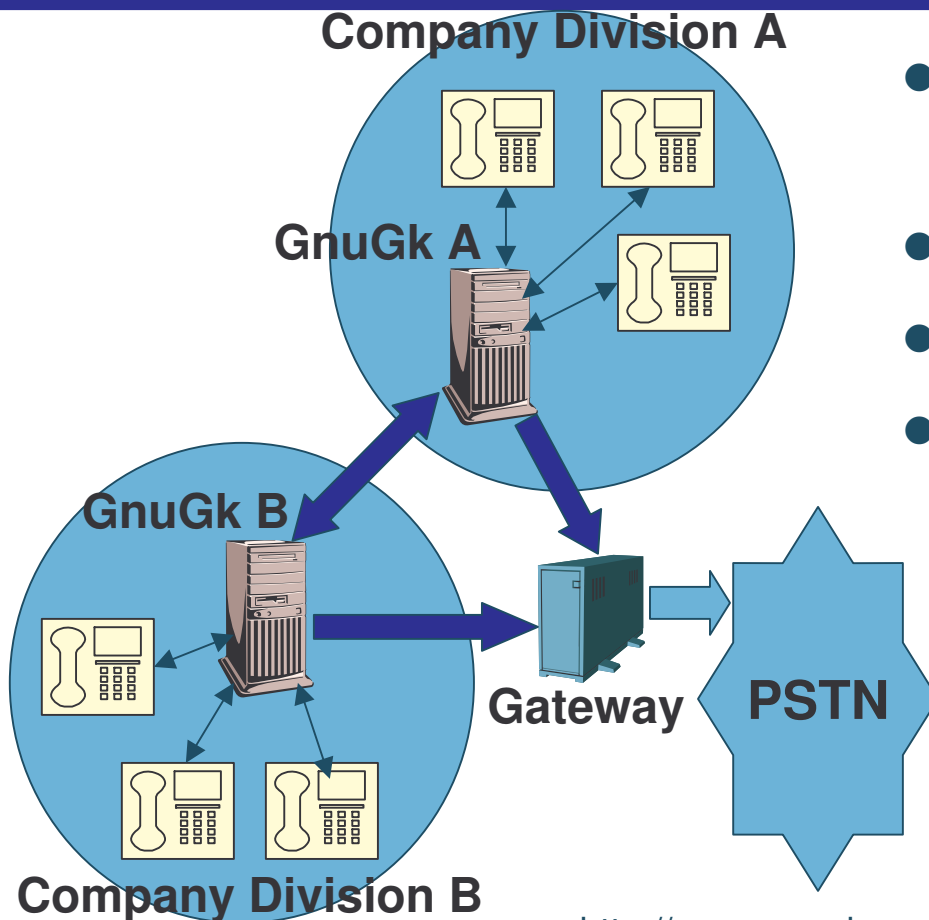


- all data (RTP audio, RTP video, T.120 data) is routed through the gatekeeper
- no direct communication between endpoints
- high CPU/bandwidth consumption
- designed to allow firewall/NAT traversal

GnuGk Deployment Scenarios

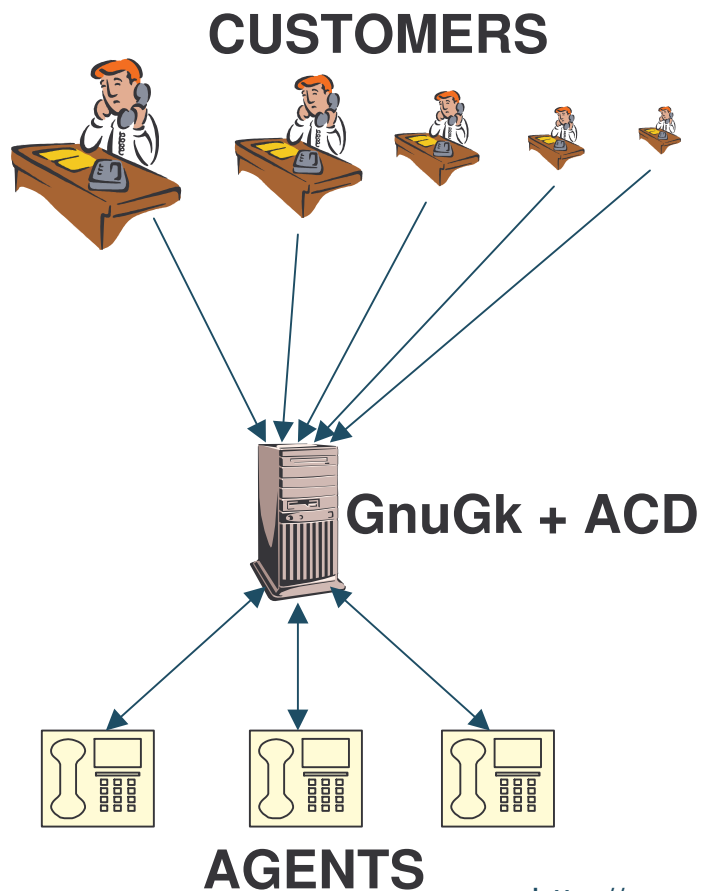
- PBX replacement
- prepaid VoIP telephony
- call center
- call termination
- and much more...

PBX Replacement



- internal calls within the company
- inter-division calls
- numbering plans
- cheap PSTN calls

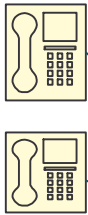
Call Center



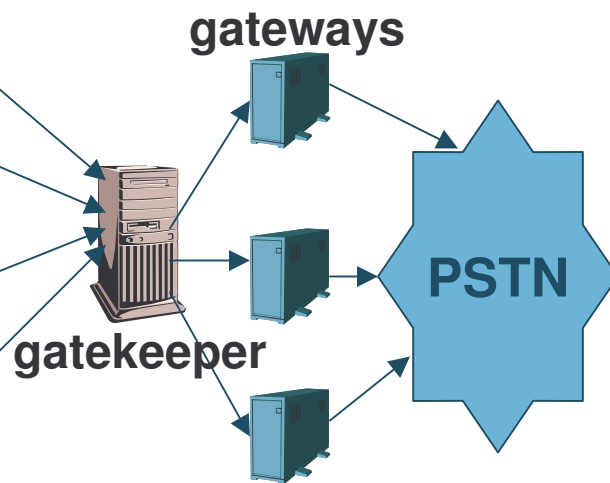
- ACD (Automatic Call Distribution) application
- calls to a single number or name are distributed to registered agents
- various call distribution policies:
 - longest idle
 - first idle
 - round robin

Prepaid Calling

IP phones

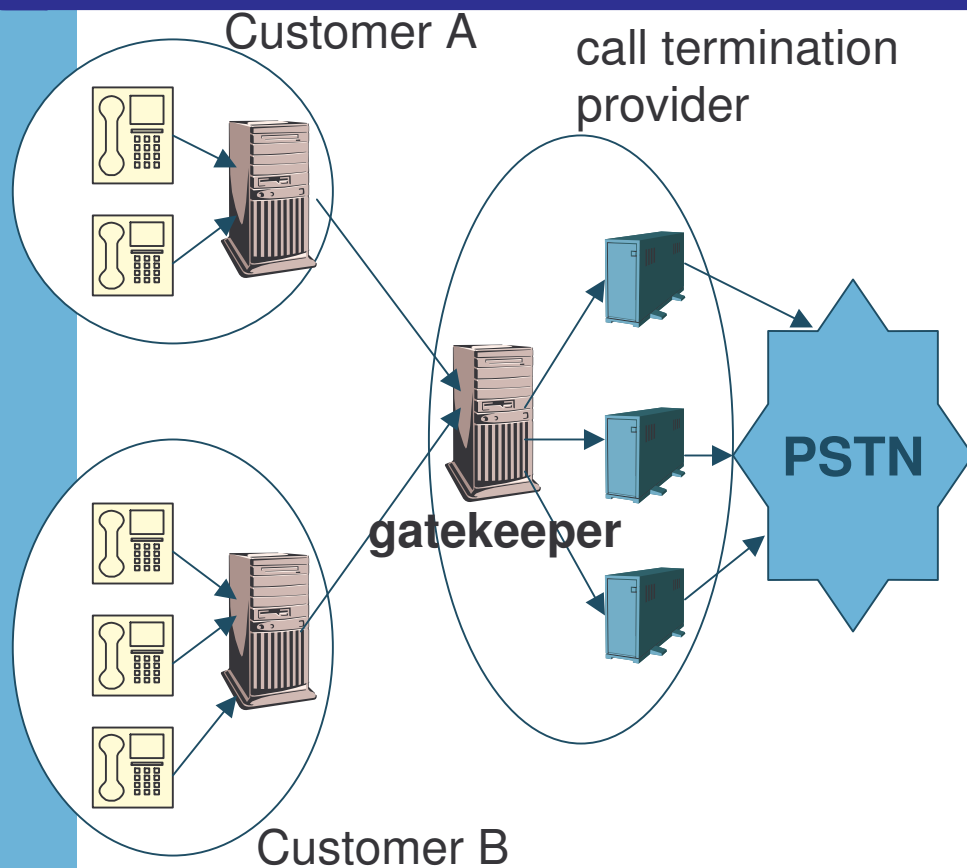


software
phones



- call authorization and accounting
- enforcing limit on call duration
- easy integration with RADIUS and existing billing systems
- can be easily built from open source components only:
 - GnuGk + RADIUS server + SQL database

Call Termination Services



- call authorization and accounting (gatekeeper routed signalling mode)
- call routing decisions:
 - route the call to a specific gateways
 - route the call other call termination providers

GnuGk Configuration (1)

- all configuration settings are read from a text file:
 - `## Everyone is allowed to connect to the status port.`

```
[Gatekeeper::Main]
Fourtytwo=42
Name=GnuGK
```

```
[RoutedMode]
GKRouted=1
```

```
[GkStatus::Auth]
rule=allow
```

- changes can be applied without restarting the gatekeeper (at runtime)

GnuGk Configuration (2)

- the configuration is divided into sections:
 - global parameters
 - gatekeeper mode (direct signalling, routed signalling, full proxy)
 - neighbor/parent gatekeepers
 - routing (E.164 rewrite, gateway prefixes)
 - authentication modules
 - accounting modules
 - virtual queues

GnuGk Telnet Interface (1)

- easy remote administration:
 - configuration changes/reloads
 - list of endpoints registered at the gatekeeper
 - list of active calls
 - manual call disconnect and endpoint unregistration
 - gatekeeper statistics (total calls/endpoints)
 - access username/password based authentication
- live CDR output
- interface to an external application that makes routing decisions

GnuGk Telnet Interface (2)

```
• AllRegistrations
RCF|127.0.0.1:1720|gkuser:h323_ID|terminal|8602_endp
Sun, 18 Jan 2004 12:22:40 +0100 (permanent) C(0/2/2) <1>
Number of Endpoints: 1
;

ACF|127.0.0.1:1720|8602_endp|16253|0048501342719:dialedDigits|
gkuser:h323_ID|false;
CDR|3|5c 6e 1d d9 27 ef 18 10 89 4c 00 d0 b7 25 7d fe|14|
Sun, 18 Jan 2004 12:24:24 +0100|
Sun, 18 Jan 2004 12:24:38 +0100|127.0.0.1:1720|
8602_endp|193.91.11.2:1720|oz_1000_endp|
0048501342719:dialedDigits|gkuser:h323_ID|GnuGk;
DCF|127.0.0.1|8602_endp|16253|normalDrop;

-- Endpoint Statistics -
Total Endpoints: 1 Terminals: 1 Gateways: 0 NATed: 0
Cached Endpoints: 1 Terminals: 1 Gateways: 0
-- Call Statistics -
Current Calls: 0 Active: 0 From Neighbor: 0 From Parent: 0
Total Calls: 3 Successful: 3 From Neighbor: 0 From Parent: 0
Startup: Sun, 18 Jan 2004 12:21:22 +0100 Running: 0 days 00:03:18
;
```

GnuGk Performance

- depends strongly on the gatekeeper mode selected (direct, routed signalling, full proxy)
- few performance statistics/tests
- direct and routed modes are able to process a few hundreds of simultaneous calls and thousands of calls per hour on a typical high-end PC machine
- full proxy mode is designed for small call volumes - less than 100 simultaneous calls
- for large volume of calls the Unix version of GnuGk is recommended

GnuGk Future (1)

- two branches:
 - 2.0:
 - stable, well tested product
 - only bugfixes and some minor new features
 - 2.2:
 - current development version
 - the first release planned for 2004
 - backward compatible
 - redesigned to give much better performance and call routing control

GnuGk Future (2)

- flexible call routing:
 - failover support (multiple destination routes)
 - smart route selection (LCR – Least Cost Routing)
 - multistage E.164 number rewriting
- more advanced gatekeeper clustering
- stability of GnuGk 2.2
- generating large volume of outgoing calls with the ACD application for call centers
- development of external applications on top of GnuGk

Visit <http://www.gnugk.org>

Thank you...