GnuGk – The GNU Gatekeeper

Open Source
Telephony Summit

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http://www.gnugk.org
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.32 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

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Direct Signalling Mode

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

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Gatekeeper Routed Signalling

- signalling channel is routed though 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

[RAS signalling + RTP media](#)
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

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Prepaid Calling

- 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)

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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

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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
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Thank you...