Kamailio for RTC Stability, Scaling, and Security

CommCon 2020

Kamawhat???

- Kah-mah-illie-oh

- Hawaiian word

- "To communicate"

Kah
Mah
Illie
Oh

KAMAILIO

Who am I?

- Fred Posner

- VoIP Consultant

- Contact via qxork.com

Agenda

- **What is Kamailio?**
- **What *isn't* Kamailio?**
- **Why Kamailio?**
- **Key Features**

- **Deployment Examples**
- **Scaling SIP/RTC**
- **Securing SIP/RTC**
- **APIBAN**

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What is Kamailio?

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What is Kamailio?

rock solid SIP server
excellence in SIP since 2001
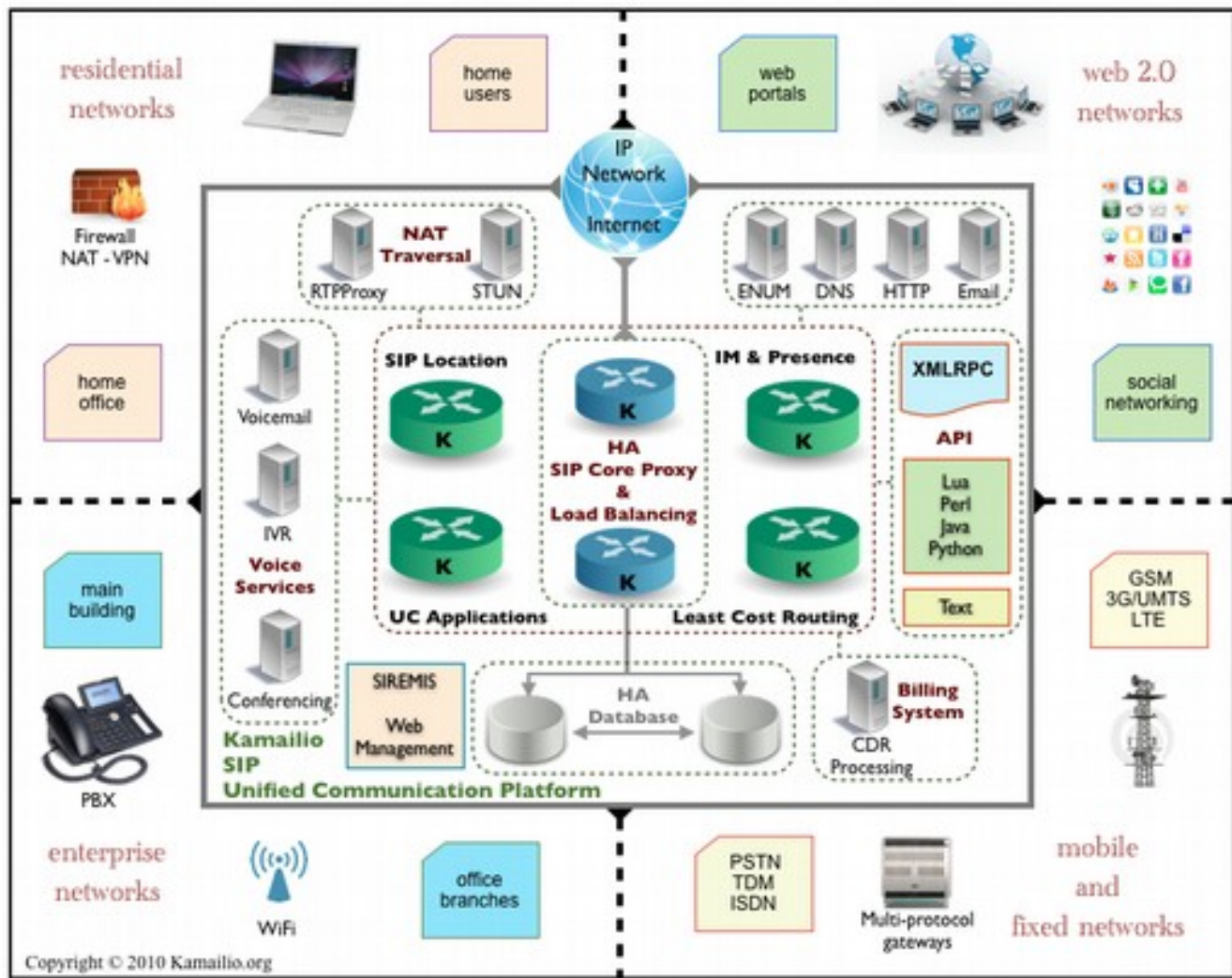
- SIP proxy server
- SIP registrar server
- SIP location server
- SIP application server
- SIP dispatcher server
- SIP websocket server

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What *isn't* Kamailio?

Kamailio cannot be...

- SIP phone

- Media server

- B2BUA

Why Kamailio?

Why Kamailio?

- A topic in of itself…

- Kamailio World 2017
  Why I Love Kamailio

  - https://youtu.be/J204OGgZ51M

- Open Source

- Small Footprint

- Fast

- Modular

- Plays well with others

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Key Features

Key Features

- **Robust and Performant SIP (RFC3261) Server**

  - Registrar

  - Location

  - Proxy

  - SIP Application

  - Redirect

- SIP Routing Capabilities

  - stateless and transactional stateful SIP Proxy processing

  - serial and parallel forking

  - NAT traversal support

  - Load balancer

  - Least cost routing

  - High Availability

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Key Features

- Transport Layers
  - UDP, TCP, TLS and SCTP
  - IPv4 and IPv6
  - Transport layer gatewaying (tls → udp, etc)
  - SCTP multi-homing and multi-streaming
  - WebSocket for WebRTC

- Asynchronous Processing
  - asynchronous TCP handling
  - asynchronous SIP message processing
  - asynchronous inter-process message queues communication system
  - distributed message queue

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Key Features

- **Secure Communication**

  - Digest SIP User authentication

  - ACL

  - TLS for SIP

  - Handling for SRTP

  - Many authentication models

- **IP and DNS**

  - SRV and NAPTR DNS lookups

  - SRV DNS failover

  - DNSsec support

  - ENUM

  - Internal DNS Cache

  - IP level blacklists

  - Topology hiding

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Key Features

- Accounting

  - event based accounting

  - configurable accounting data details

  - multi-leg call accounting

  - storage to database, Radius or Diameter

  - prepaid engine

- And much much more...

  - RPC control interface

  - Rich Communication Services

  - Remote monitoring

  - APIs

  - Multiple Database Backends

  - IMS

  - Scalability

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Kamailio HTABLE

- Hash Table Module

- Stored in shared memory

- Custom cache system

- Replication via DMQ

Since 2010

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KEMI

- https://kamailio.org/docs/
tutorials/devel/kamailio-
kemi-framework/

- Use other scripting
languages to write SIP
routing

- Python

- LUA

- JavaScript

- Ruby

- Squirrel

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Kafka

- Produces and sends messages to a Kafka server

- New in 5.4

Since 2020

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MQTT

- **Bidirectional publish/subscribe communication to a MQTT Broker**

- **New in 5.4**

SECSIPID

- Secure SIP identity specifications - STIR and SHAKEN IETF extensions for SIP (RFC8224, RFC 8588)

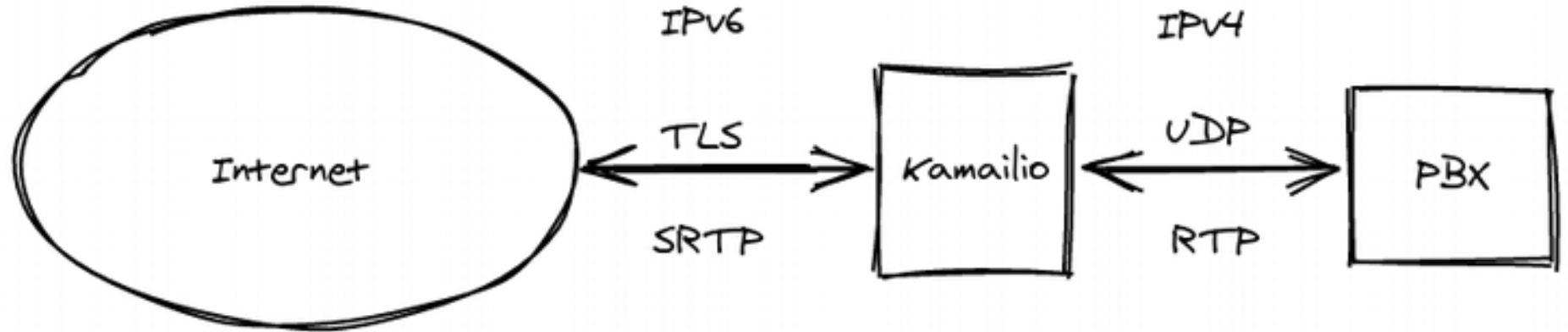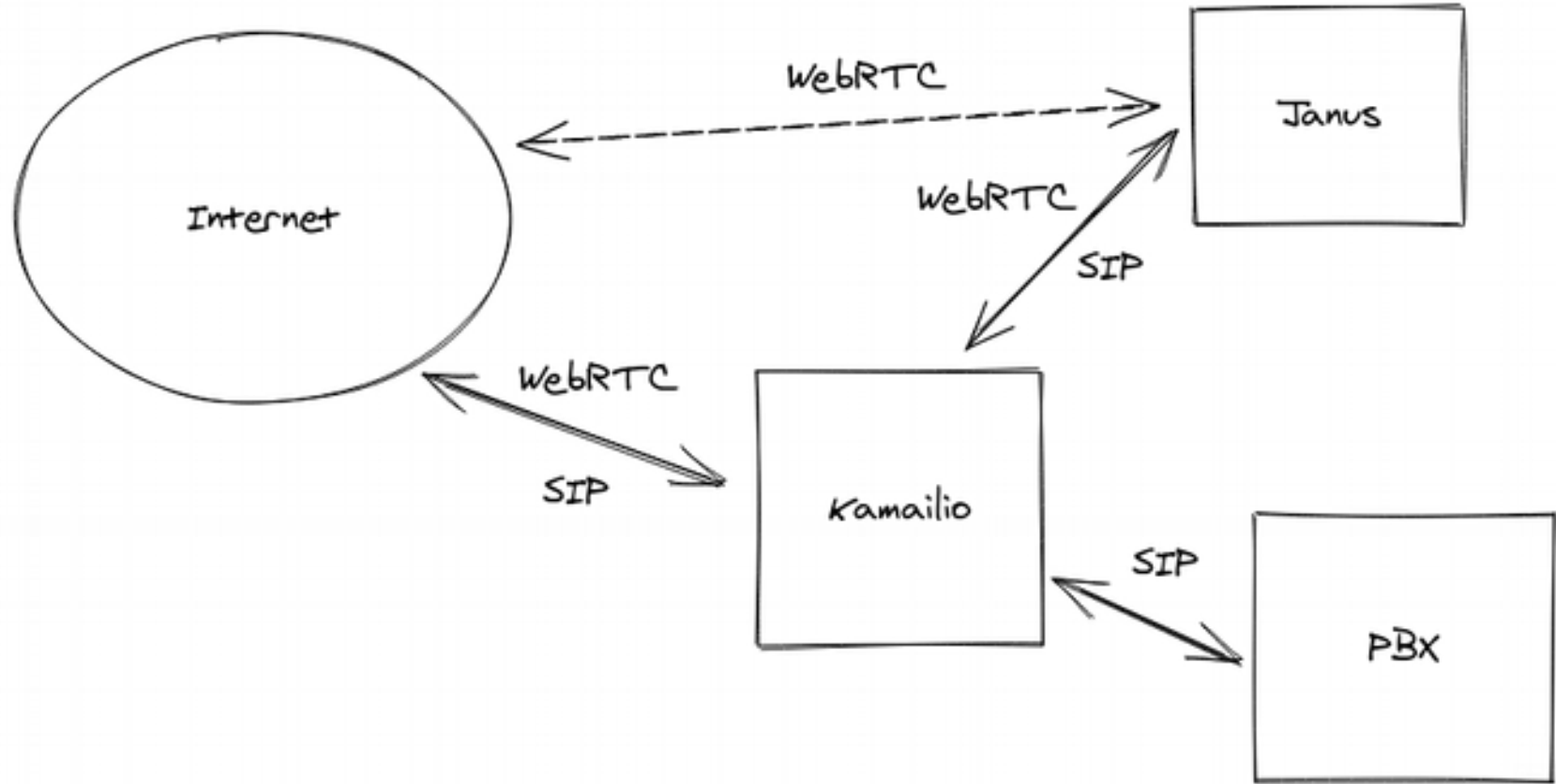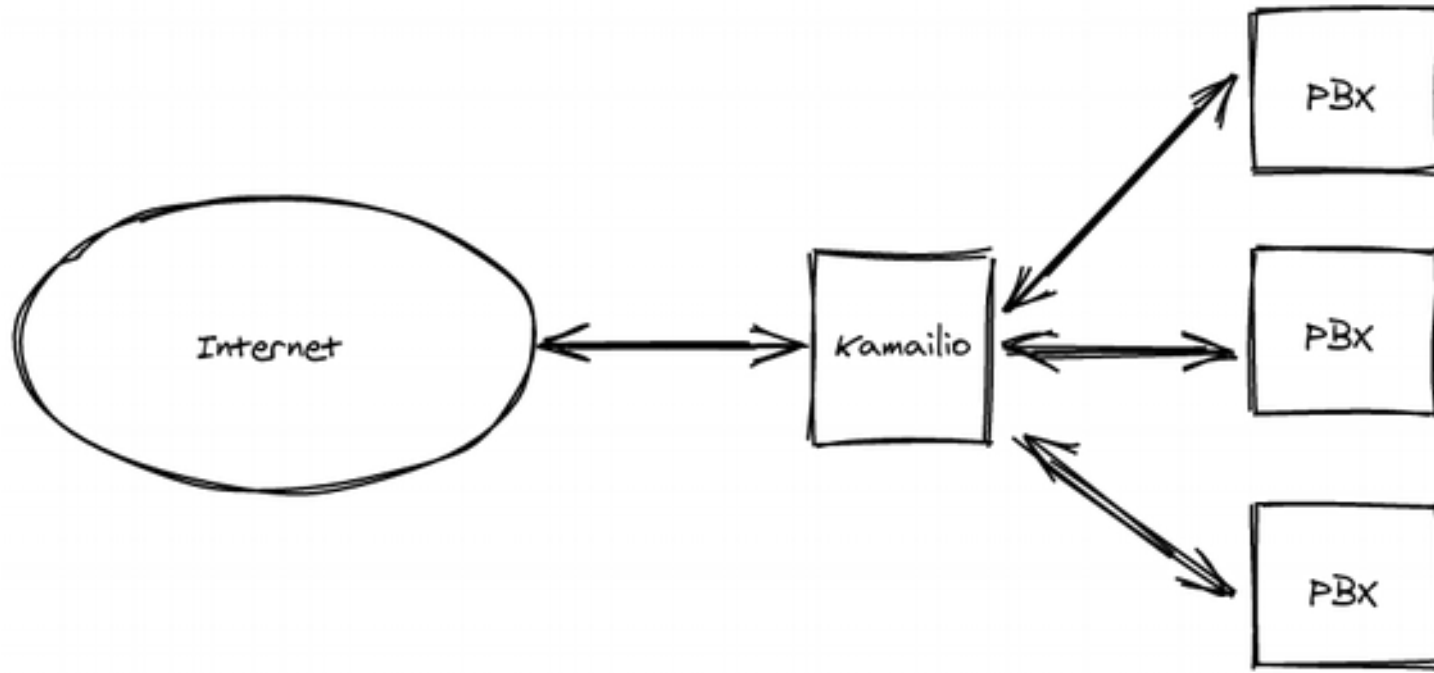- New in 5.4

Deployment Examples
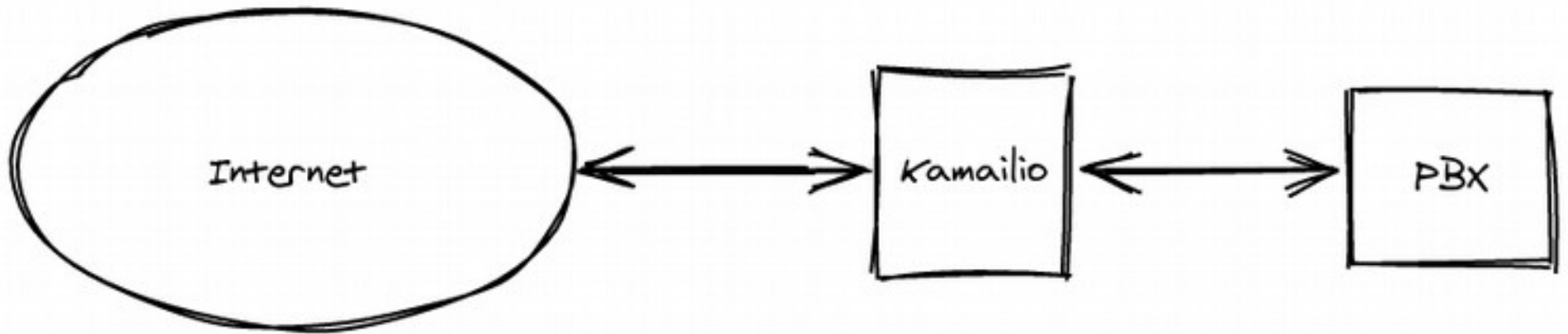
Deployment Examples

Deployment Examples

IPv6

IPv4

Internet ← TLS → Kamailio ← UDP → PBX

SRTP

RTP

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Deployment Examples

Internet ←--WebRTC--→ Janus

Janus ←WebRTC / SIP→ Kamailio

Internet ←WebRTC / SIP→ Kamailio

Kamailio ←SIP→ PBX

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Deployment Examples

Deployment Examples

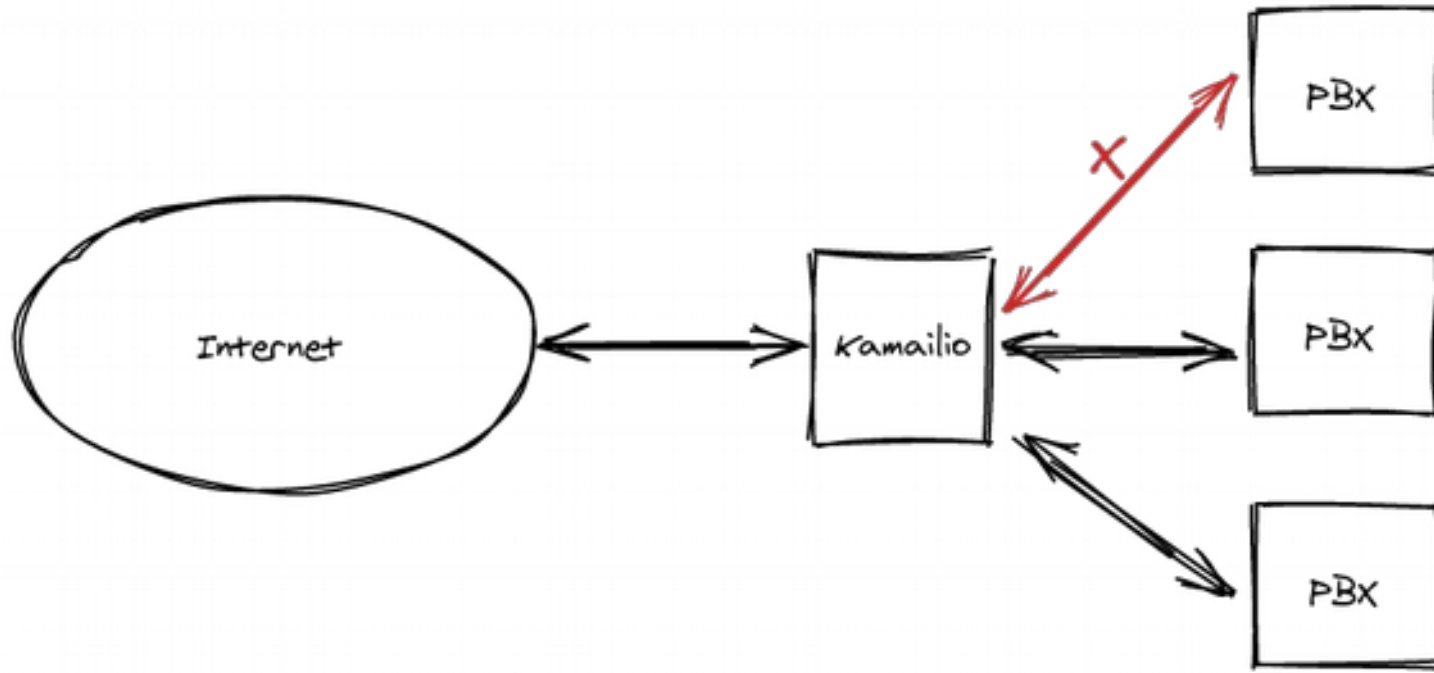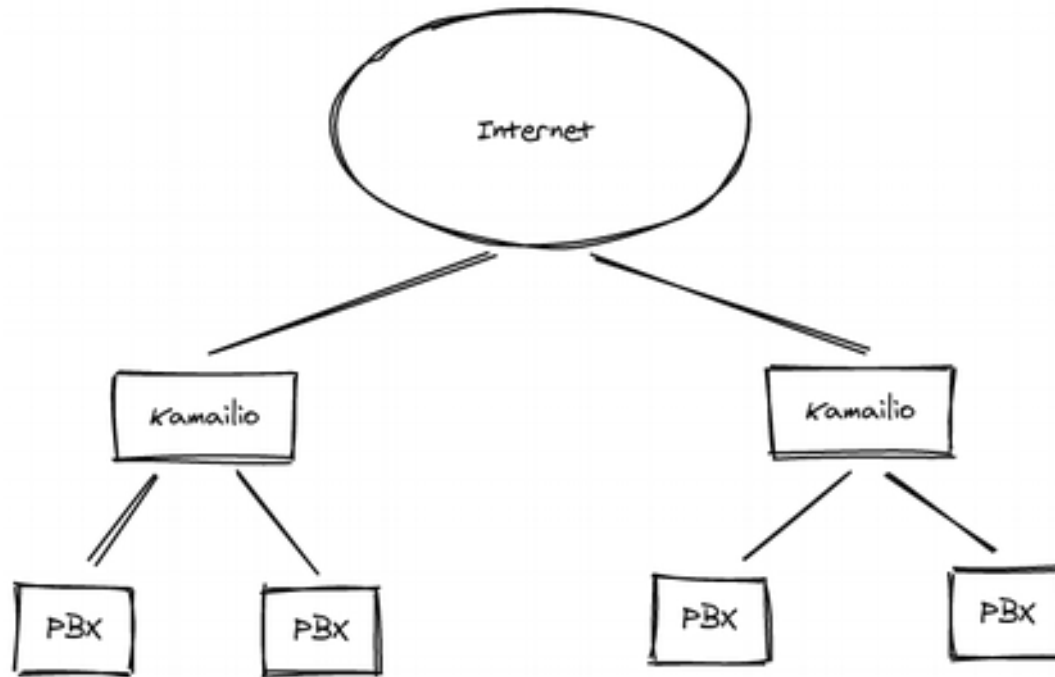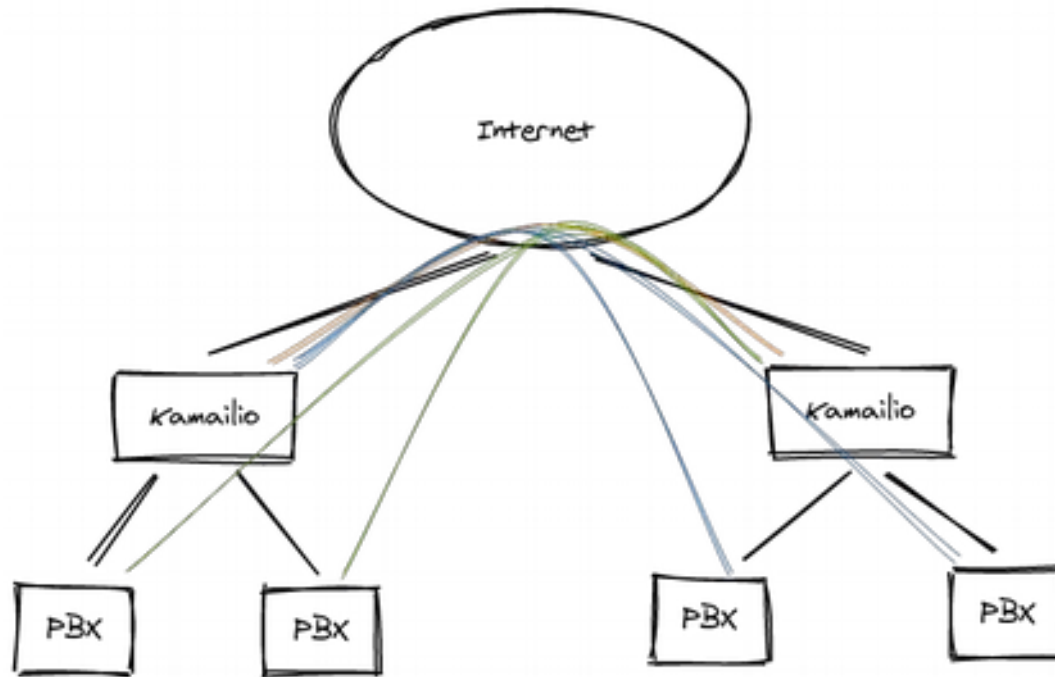# Deployment Examples

Deployment Examples

Scaling

Scaling

- HTABLE module

- DISPATCHER module

- REDIS

- DMQ

- on systems with 4GB memory, Kamailio can serve a population over 300 000 online subscribers

- used as load balancer in stateless mode, Kamailio can handle over 5000 call setups per second

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Security

Security

- PERMISSIONS module

- PIKE module

- SIP inspection

- GEO IP

- Block by User Agent

- Block by CPS

- Block SQL injection

- Block by anything you need =)

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APIBAN

APIBAN

- **https://apiban.org**

- FREE API Key

- Kamailio Integration

- Open Source Go client (asterisk, freeswitch, freepbx, netsapiens, etc)

Thank you!

- Questions?

- Learn more: kamailio.org

- Contact me: qxork.com

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