digium
The Asterisk Company

Asterisk 12 and PJSIP

Asterisk and PJSIP

Asterisk's PJSIP channel driver: a SIP architecture for the future

The future is now!

Asterisk and SIP: A History

- Why write a new SIP stack?
- RFC 3261 – SIP: Session Initiation Protocol
  - June 2002
- chan_sip:
  - r472 | markster | 2002-06-28 15:34:46 -0500 (Fri, 28 Jun 2002) | 2 lines
    Version 0.1.12 from FTP
- That's 12 years ago!

No Facebook, Twitter, or even MySpace

- Social network: friendster
  - This is now a gaming site?

http://mediafactory.org.au

http://www.friendster.com/

Linux landscape was changing

- RedHat releases first version of RHEL
  - May 6 2002: RHEL 2.1 AS (Pensacola)

https://fedoraproject.org/wiki/History_of_Red_Hat_Linux

http://redhat.com

We still cared about Blackberry

- Blackberry 5810 (March 4, 2002)

http://www.techhive.com/article/172837/the_mobile_phone_a_history_in_pictures.html

Asterisk was very new

- Two asterisk-users mailing list emails still exist
- One is unsubscribe

January 2002 Archives by thread

- **Messages sorted by:** [subject] [author] [date]
- More info on this list...

Starting: *Wed Jan 16 01:02:31 MST 2002*
Ending: *Wed Jan 16 01:02:31 MST 2002*
Messages: 1

- [Asterisk-Users] unsubscribe *jave*

Last message date: *Wed Jan 16 01:02:31 MST 2002*
Archived on: *Tue Sep 5 15:25:22 MST 2006*

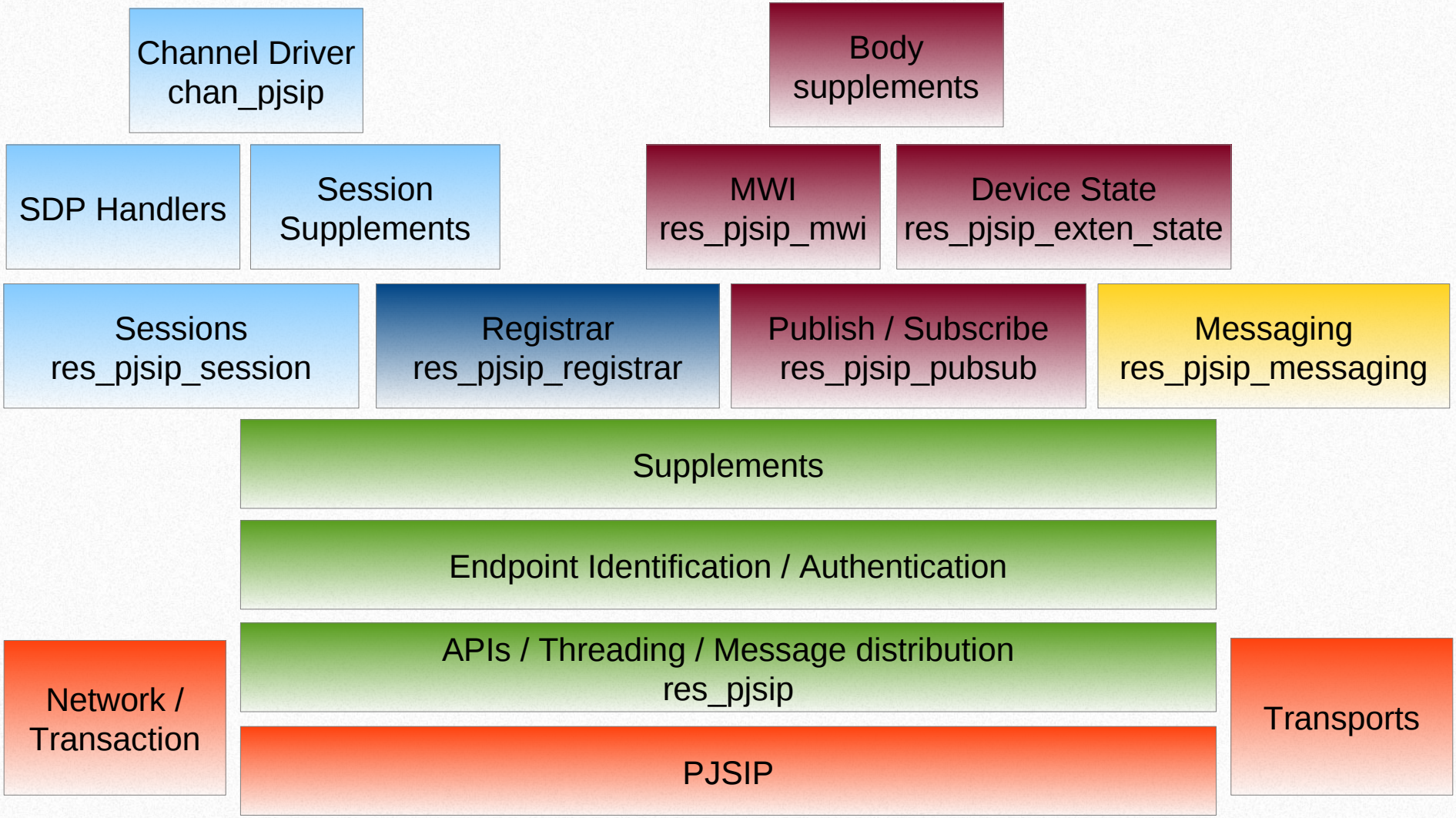
- **Messages sorted by:** [subject] [author] [date]
- More info on this list...

This archive was generated by Pipermail 0.09 (Mailman edition).

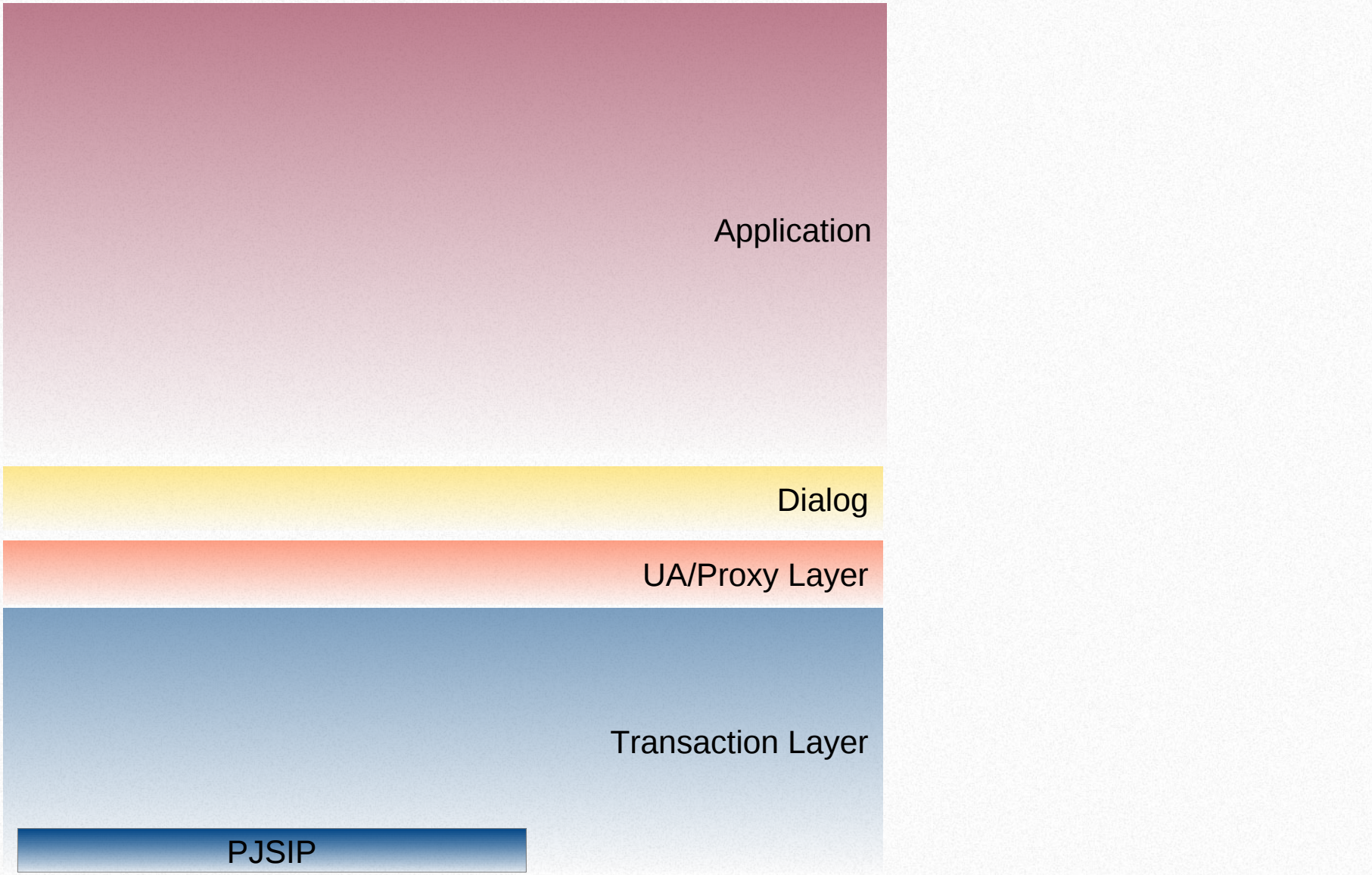
chan_sip: a long and venerable life

- Architecture was never designed for its current size
  - 0.1.12 – 1950 lines
  - Trunk – 34570 lines
- Current structure limits change
  - No stack
  - Large monolithic architecture
- Venerable, yet time to retire

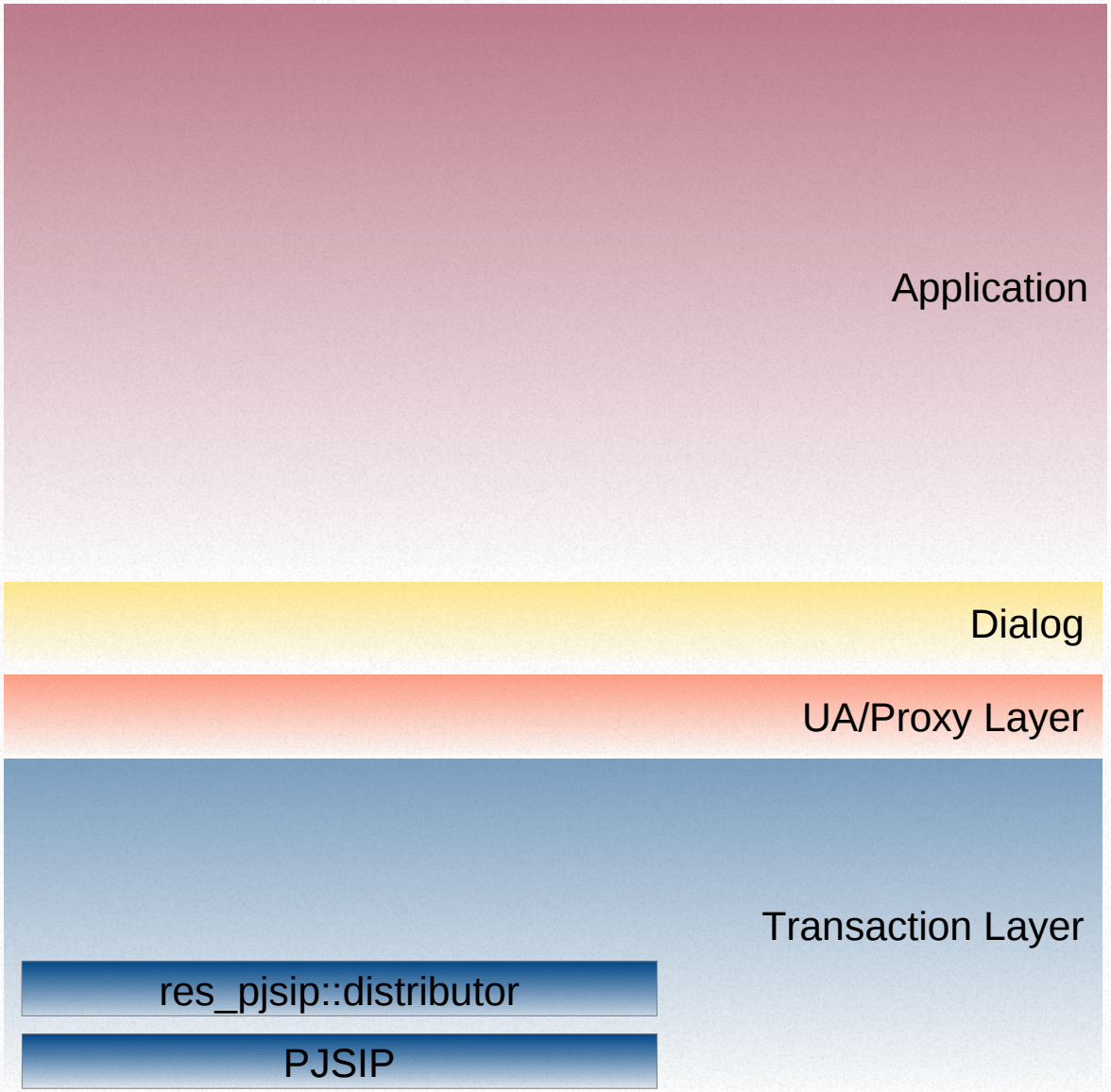
Asterisk 12 SIP Stack



Example: Inbound INVITE request

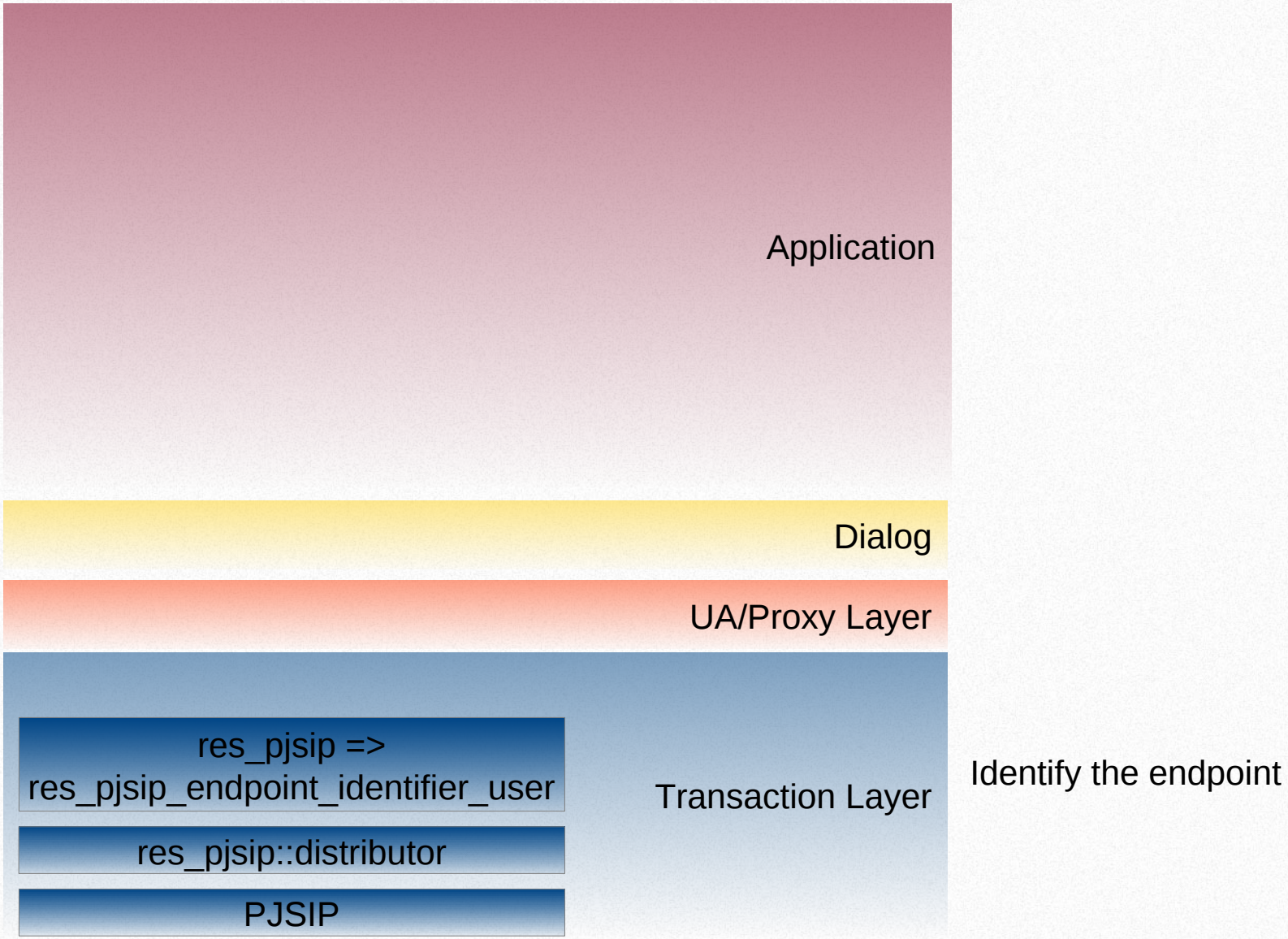


Example: Inbound INVITE request



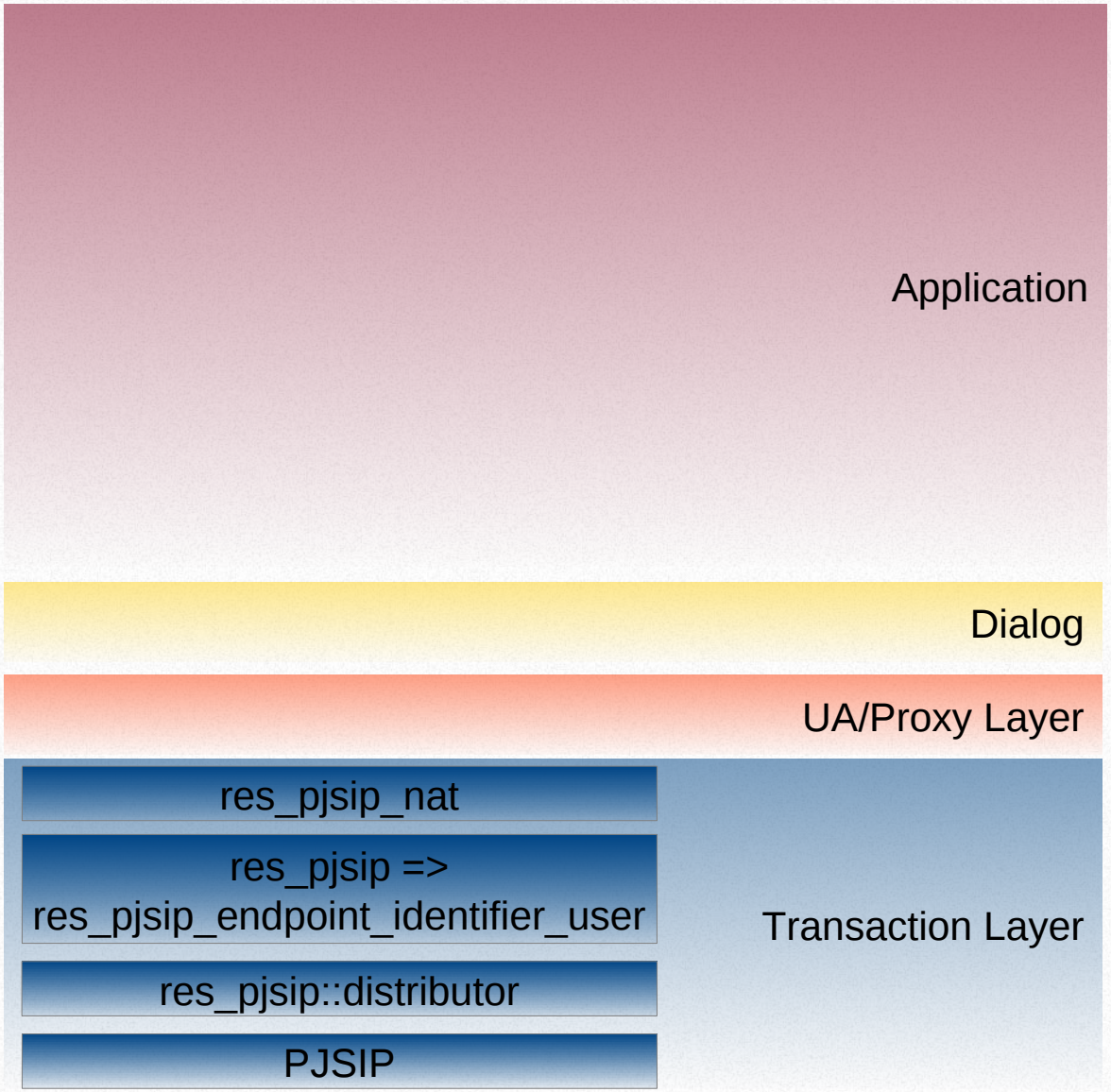
Put the request in a threadpool for processing

Example: Inbound INVITE request



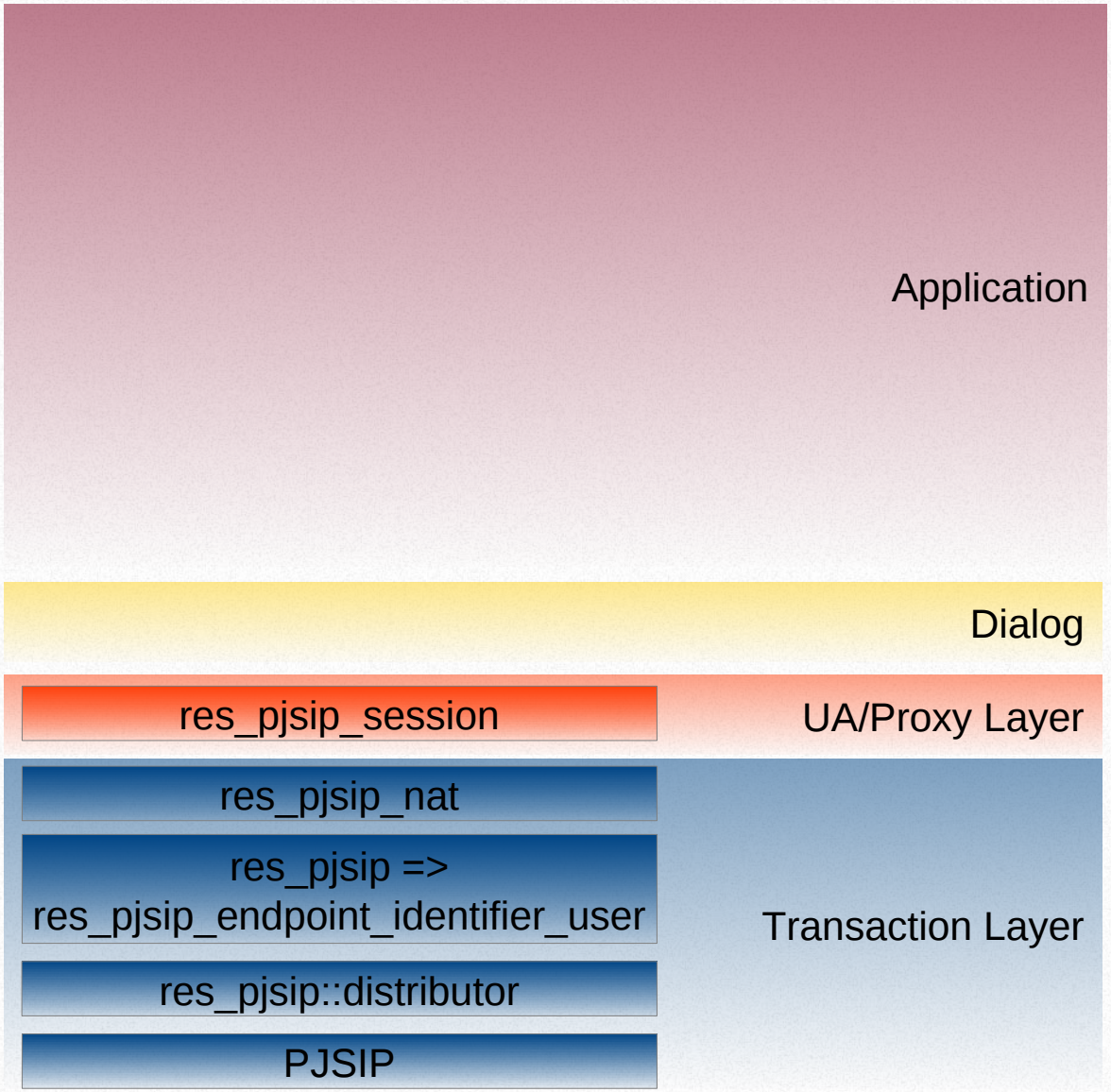
Identify the endpoint

Example: Inbound INVITE request



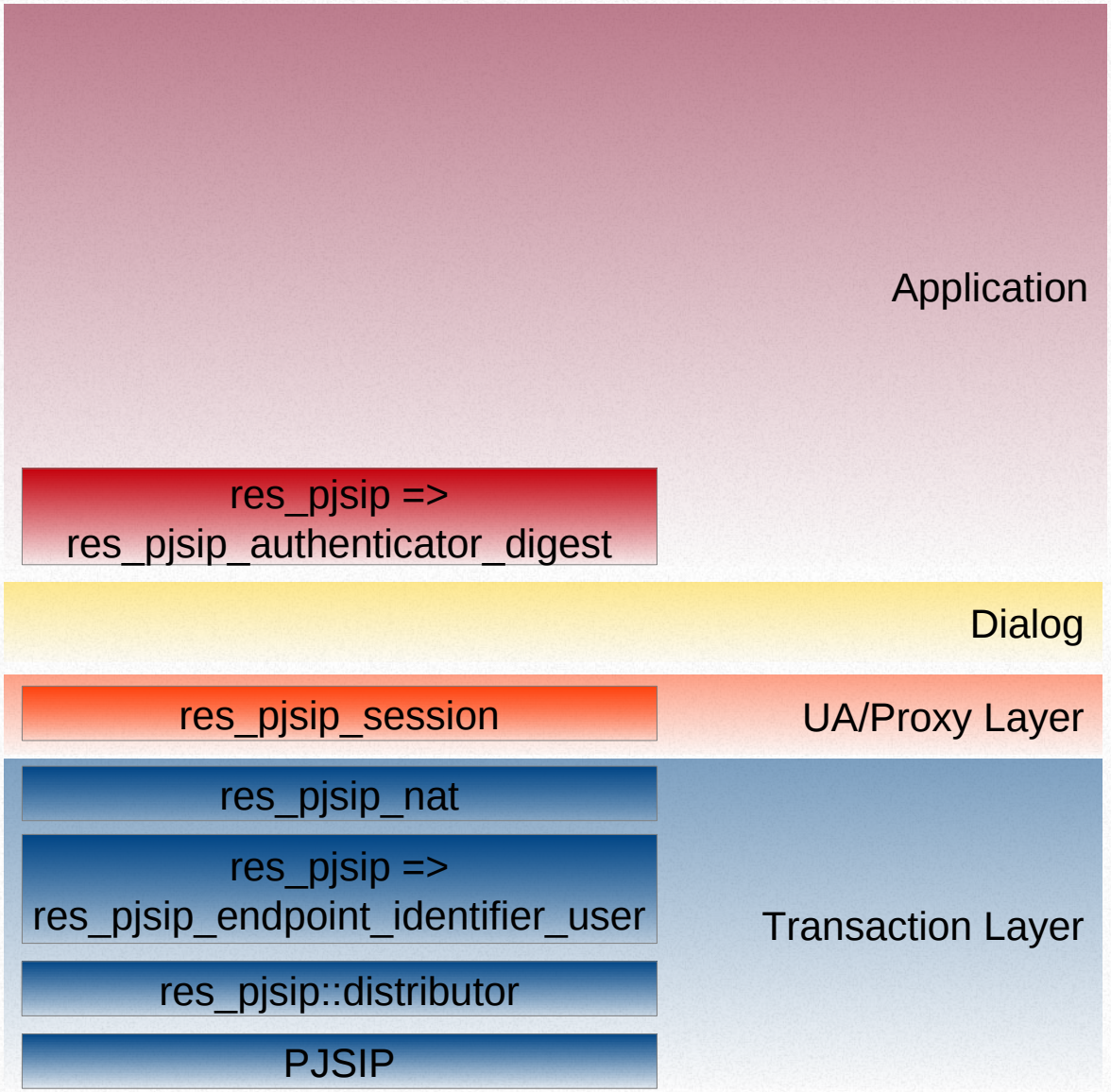
See if we need to change anything due to NAT settings

Example: Inbound INVITE request



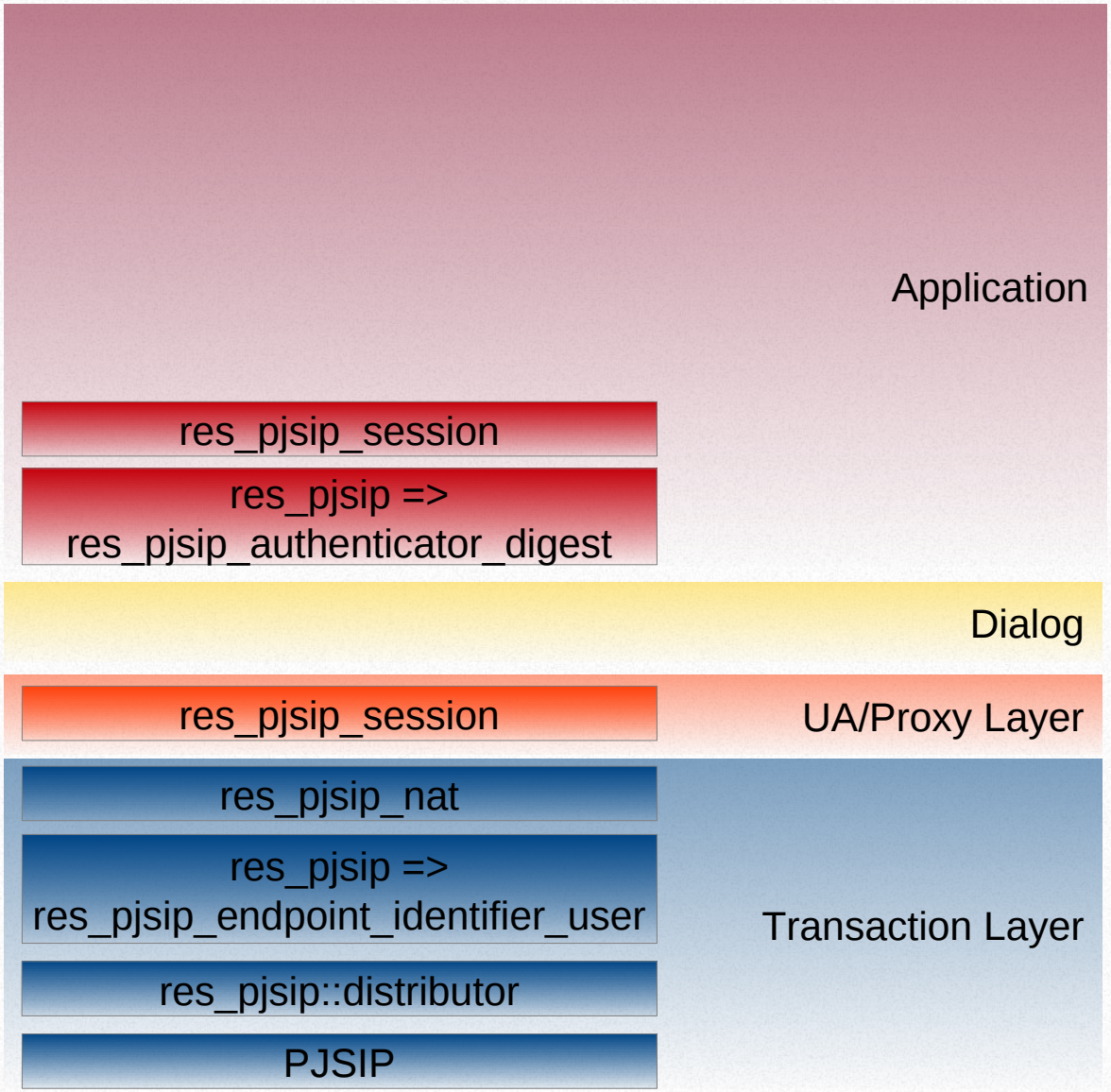
If this is a re-INVITE, update media state
(it's not, move on)

Example: Inbound INVITE request



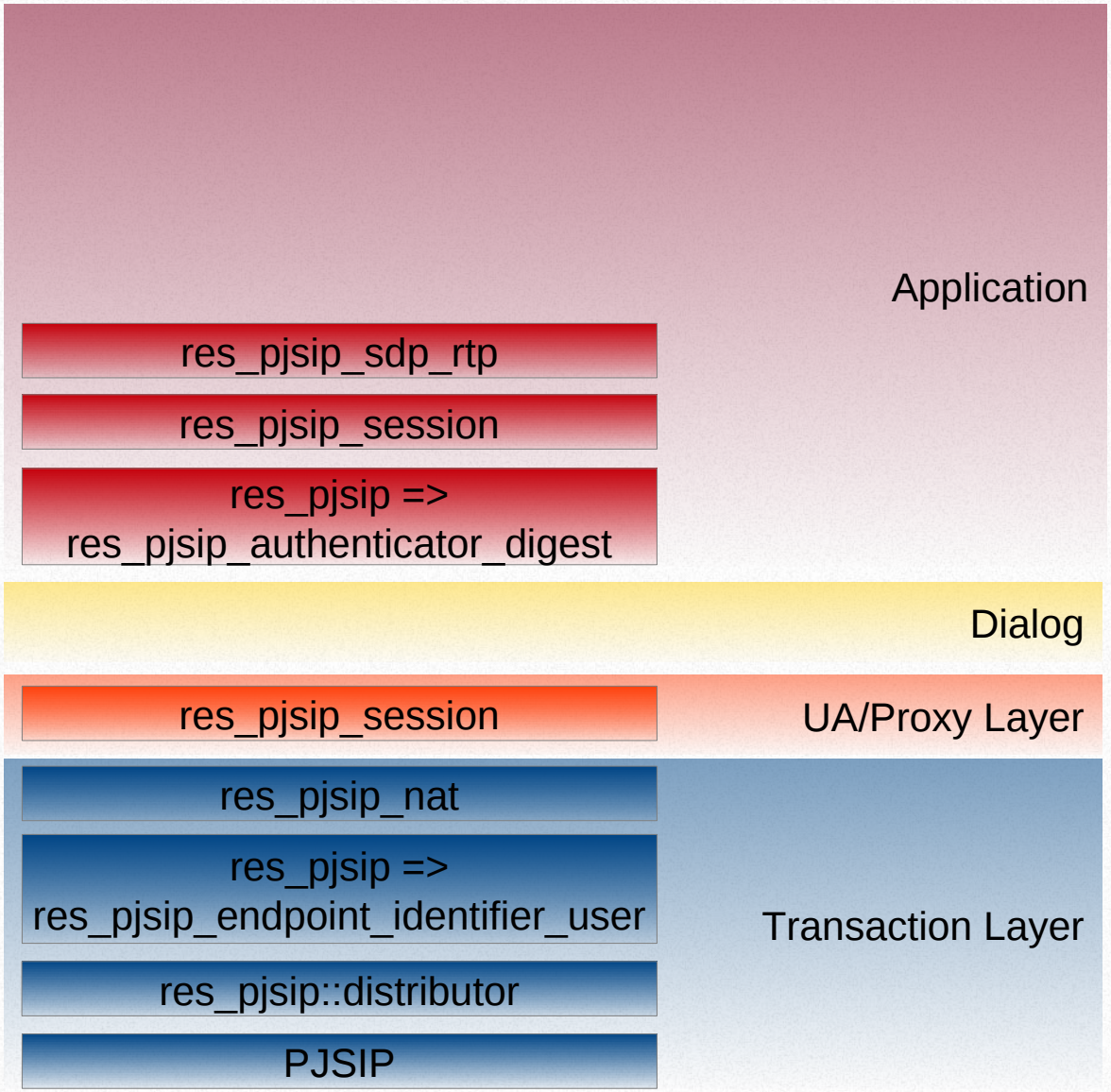
Authenticate the request

Example: Inbound INVITE request



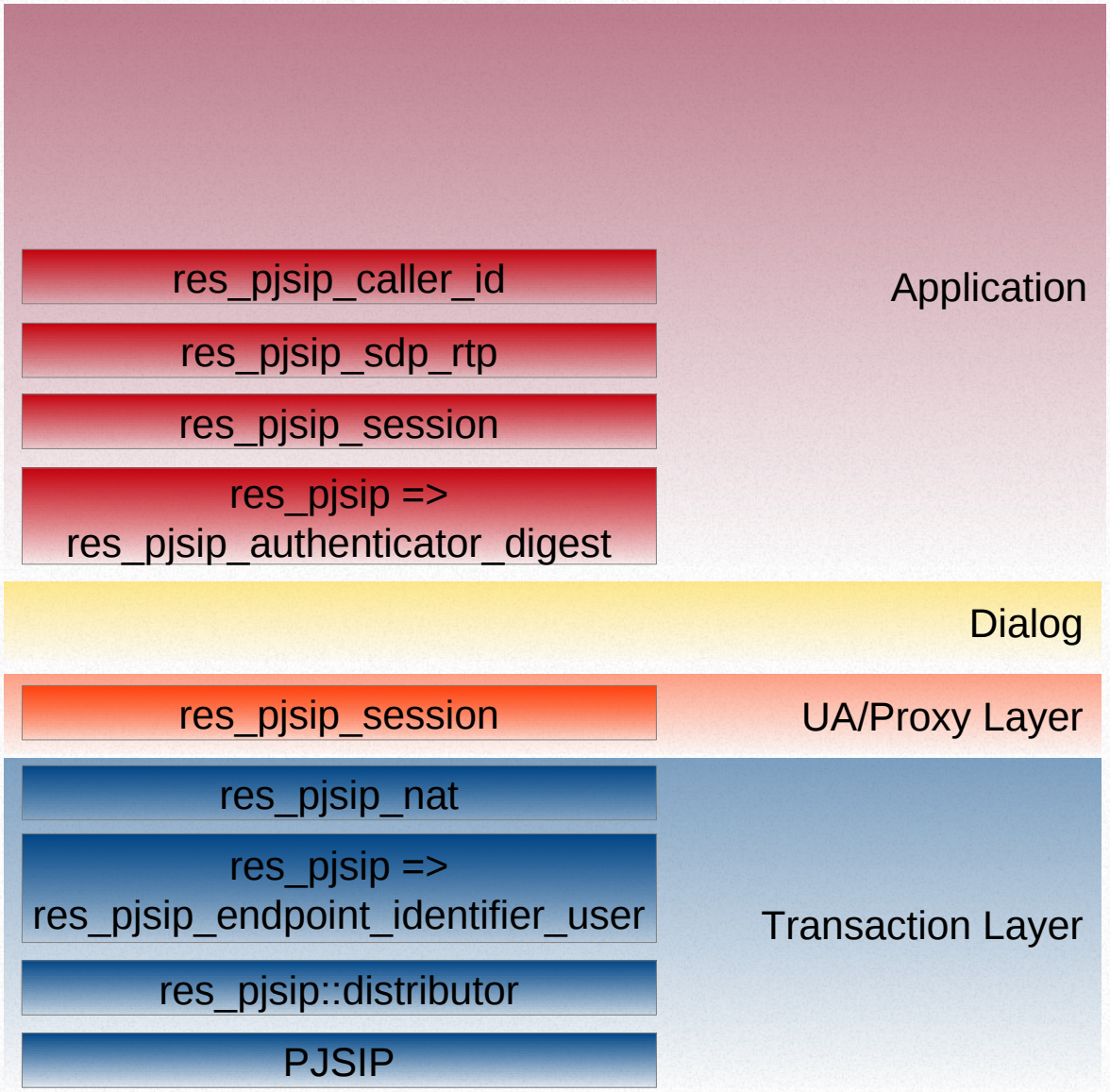
Make a new session

Example: Inbound INVITE request



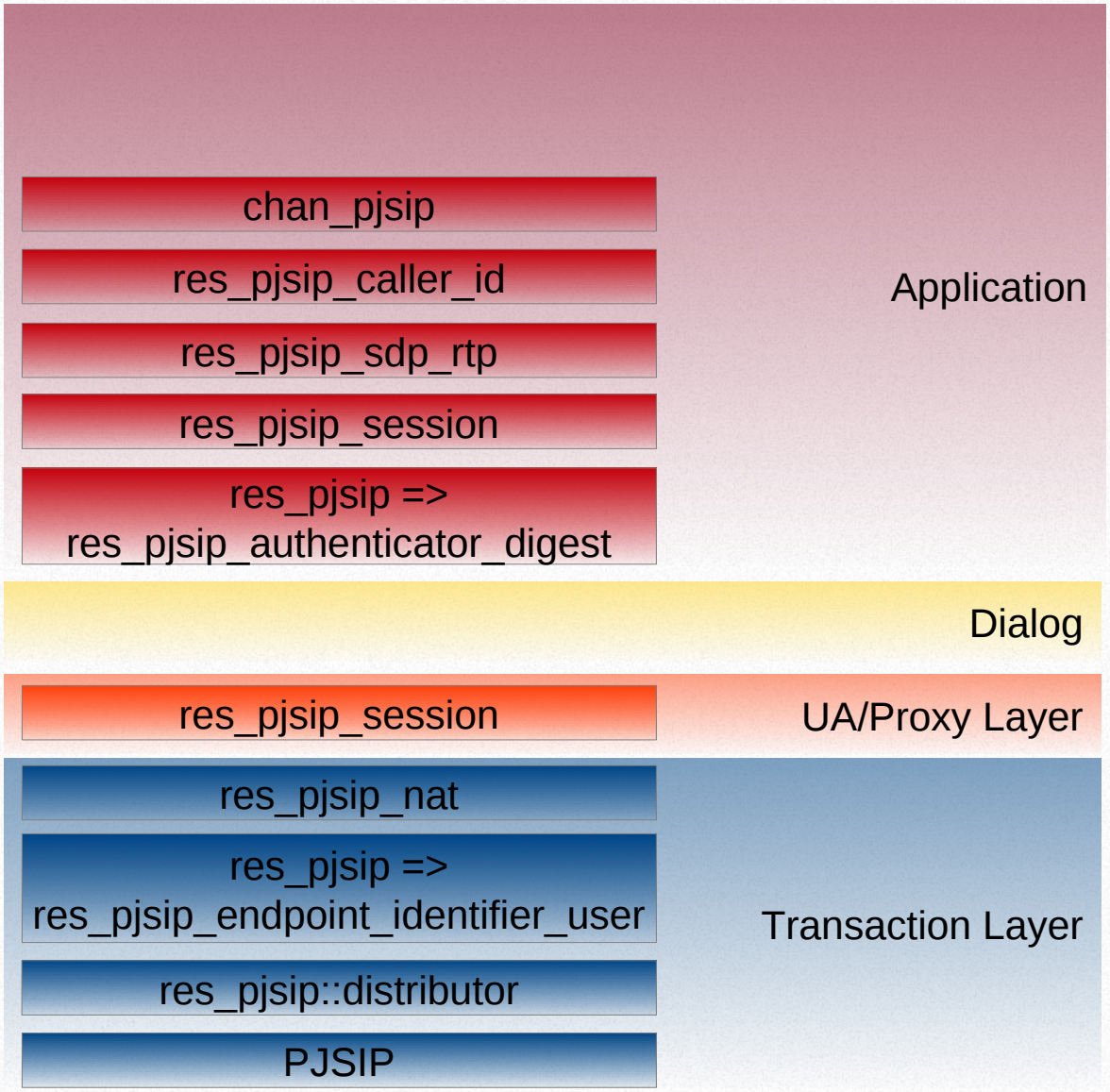
Process the offer
(if we have one)

Example: Inbound INVITE request



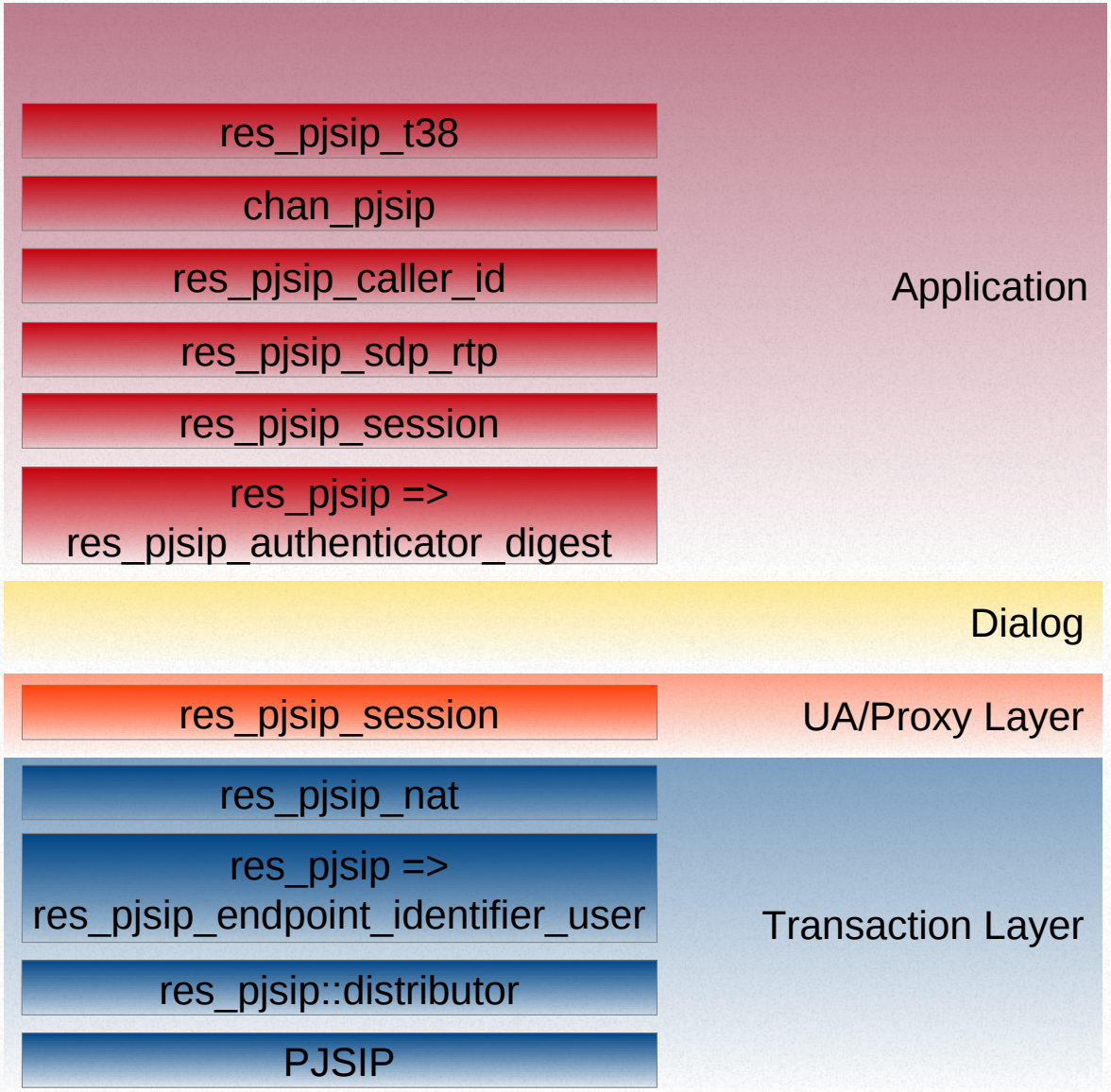
Extract caller ID and store it

Example: Inbound INVITE request



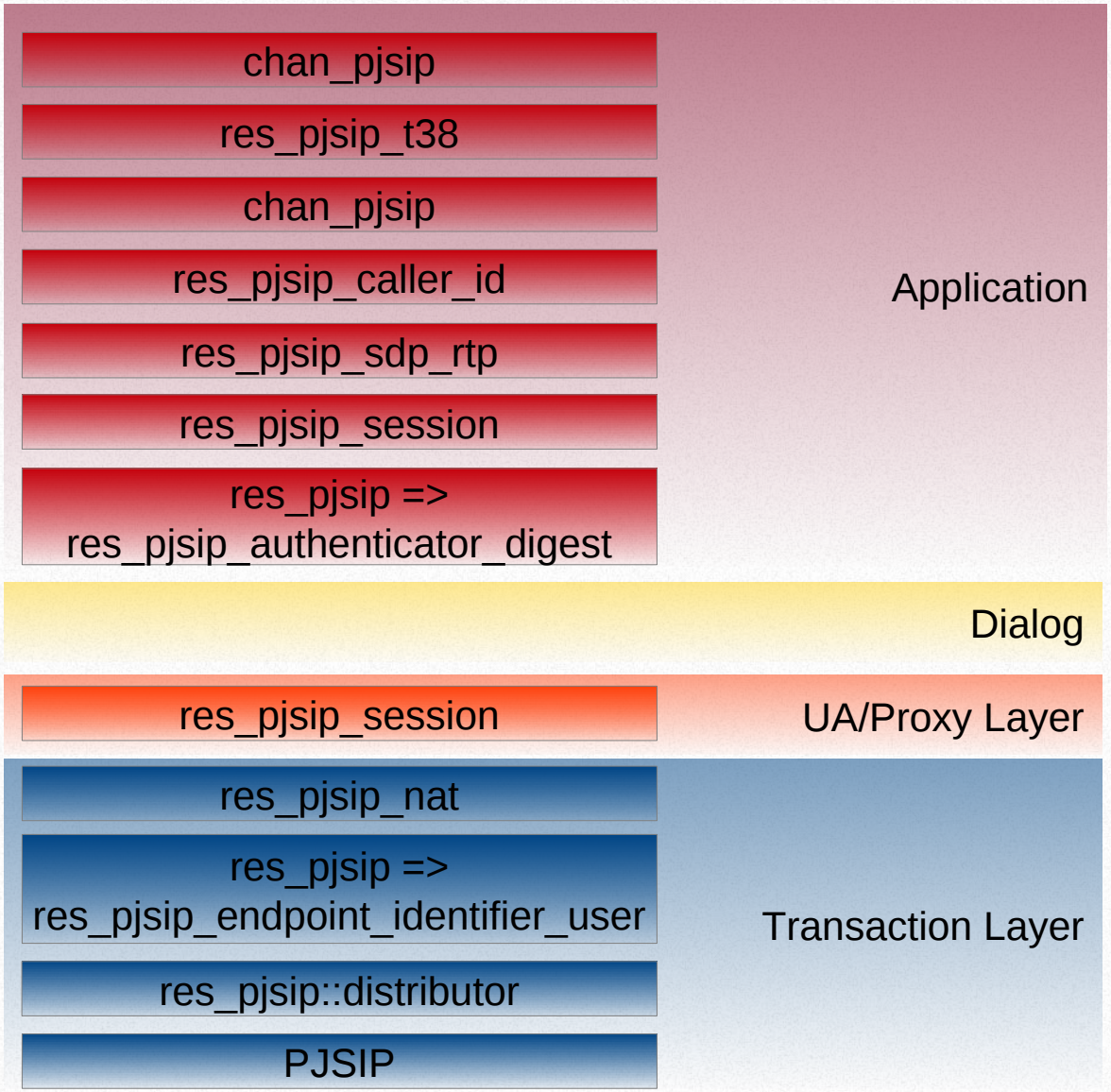
Make the ast_channel object

Example: Inbound INVITE request



See if we need to do anything with T.38 fax state (nope!)

Example: Inbound INVITE request

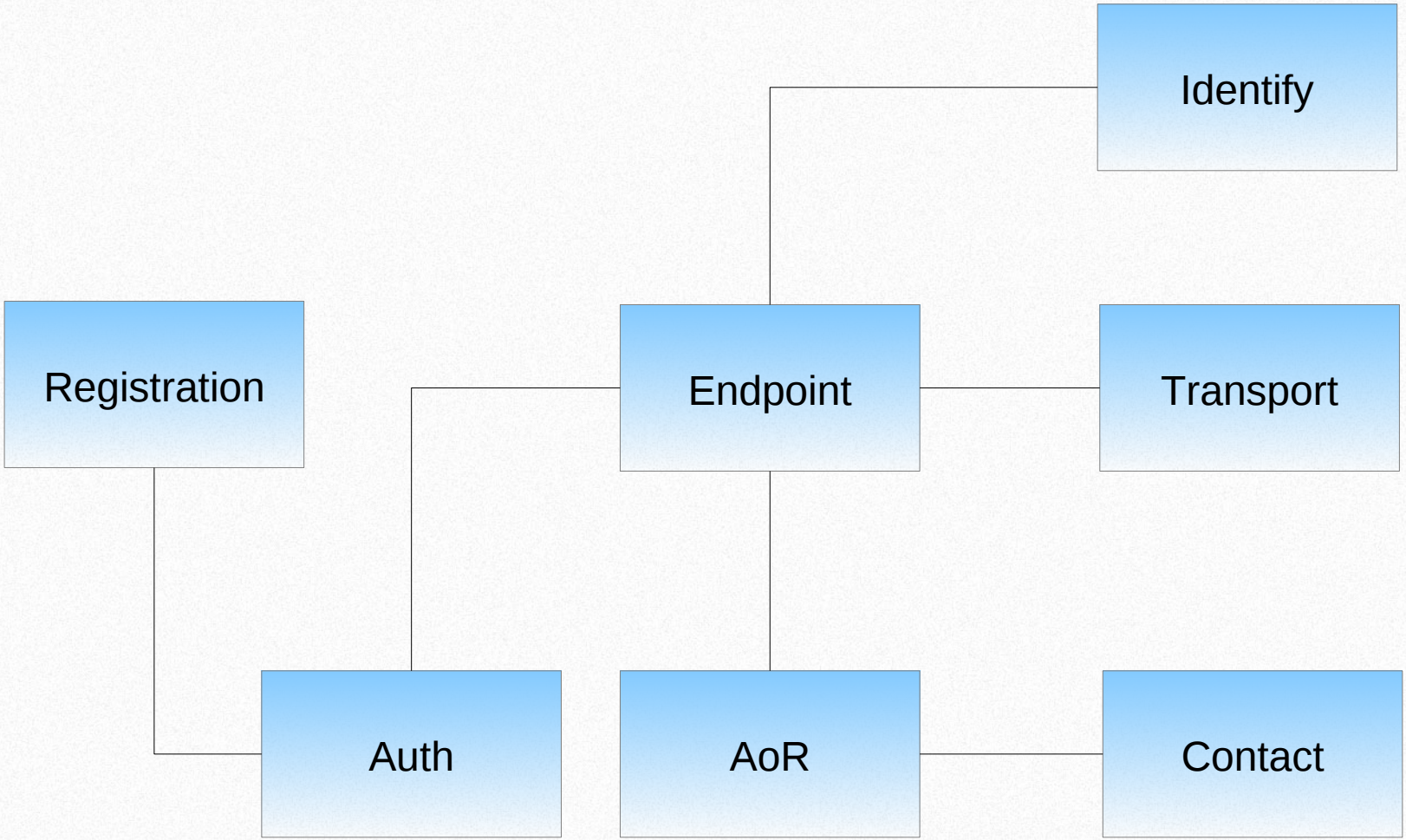


Start the PBX!

Configuration

- Sorcery: Data Abstraction Layer
  - ORM (for some values of O and R)
  - Supports CRUD operations
  - Well defined lifetime, thread-safe, reload-safe
  - Prune realtime peers/reloads
- Smaller objects
  - Takes advantage of templating/databases
  - Can change storage location of each object
    - Example: Configuration data in database; contacts in AstDB
  - Simple mapping to in-memory representation
    - Defer higher level concepts to systems on top of Asterisk

Configuration Relationships



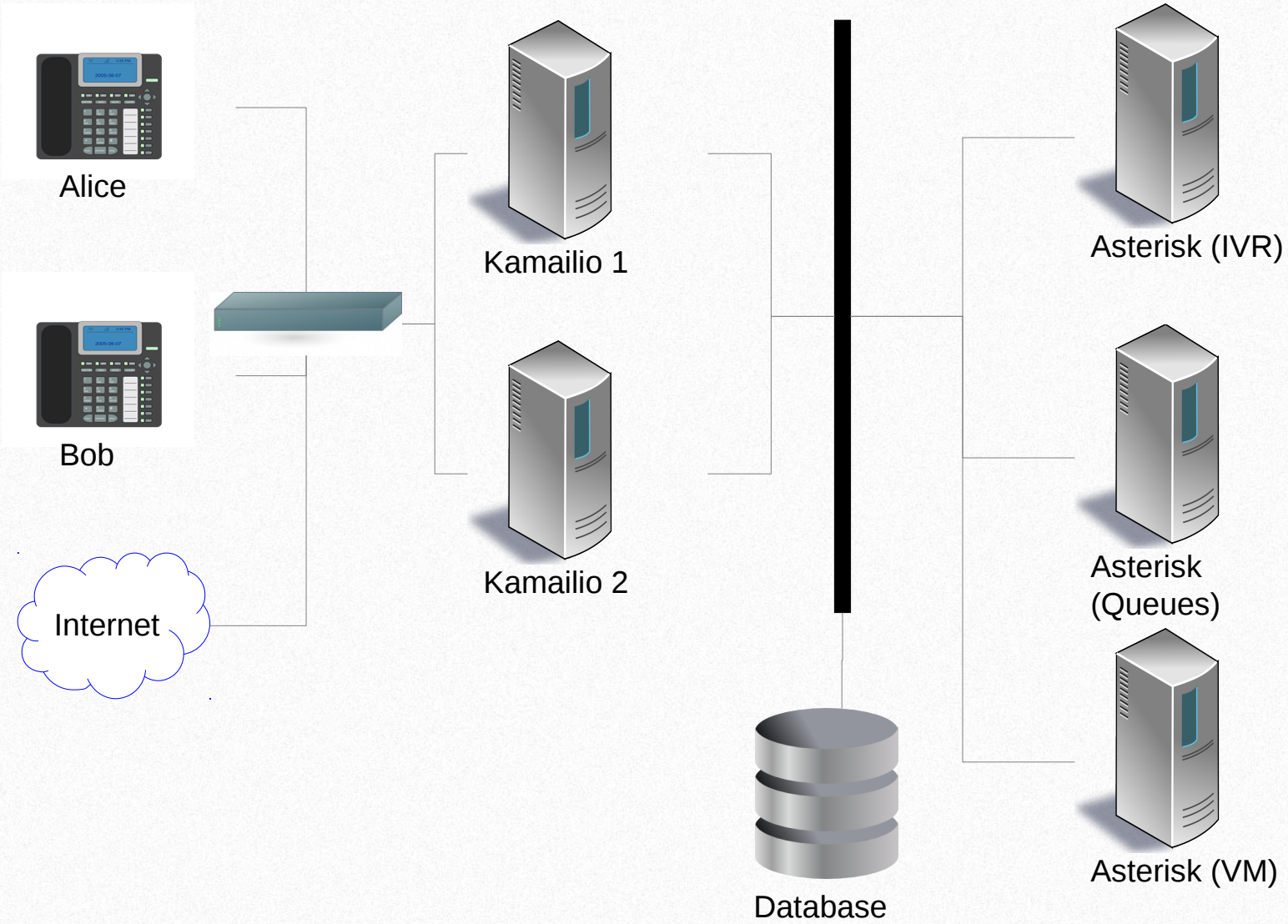
Configuration Example

```
[alice]
type=endpoint
context=internal
allow=!all,g722,alaw
auth=alice_auth
aors=alice_aors

[alice_auth]
type=auth
auth_type=userpass
username=alice
password=as8918hd!@8hs19a1m

[alice_aors]
type=aor
max_contacts=10
```

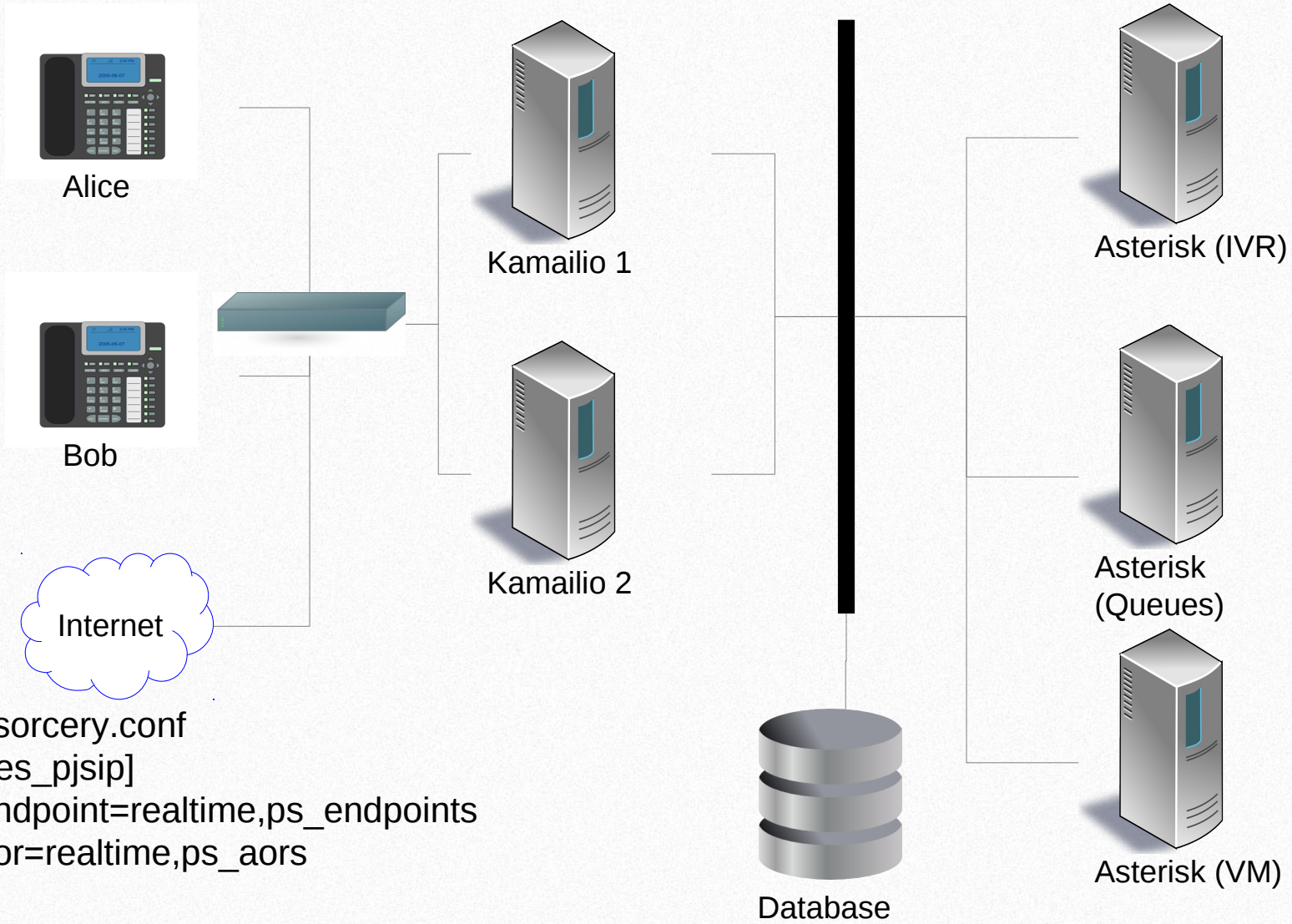
Asterisk and Kamailio

http://www.markthalle-in-hannover.de/p_73_bistro
http://shop.brewforia.com/browse-by/style/german-pilsner

Asterisk 12 and Kamailio

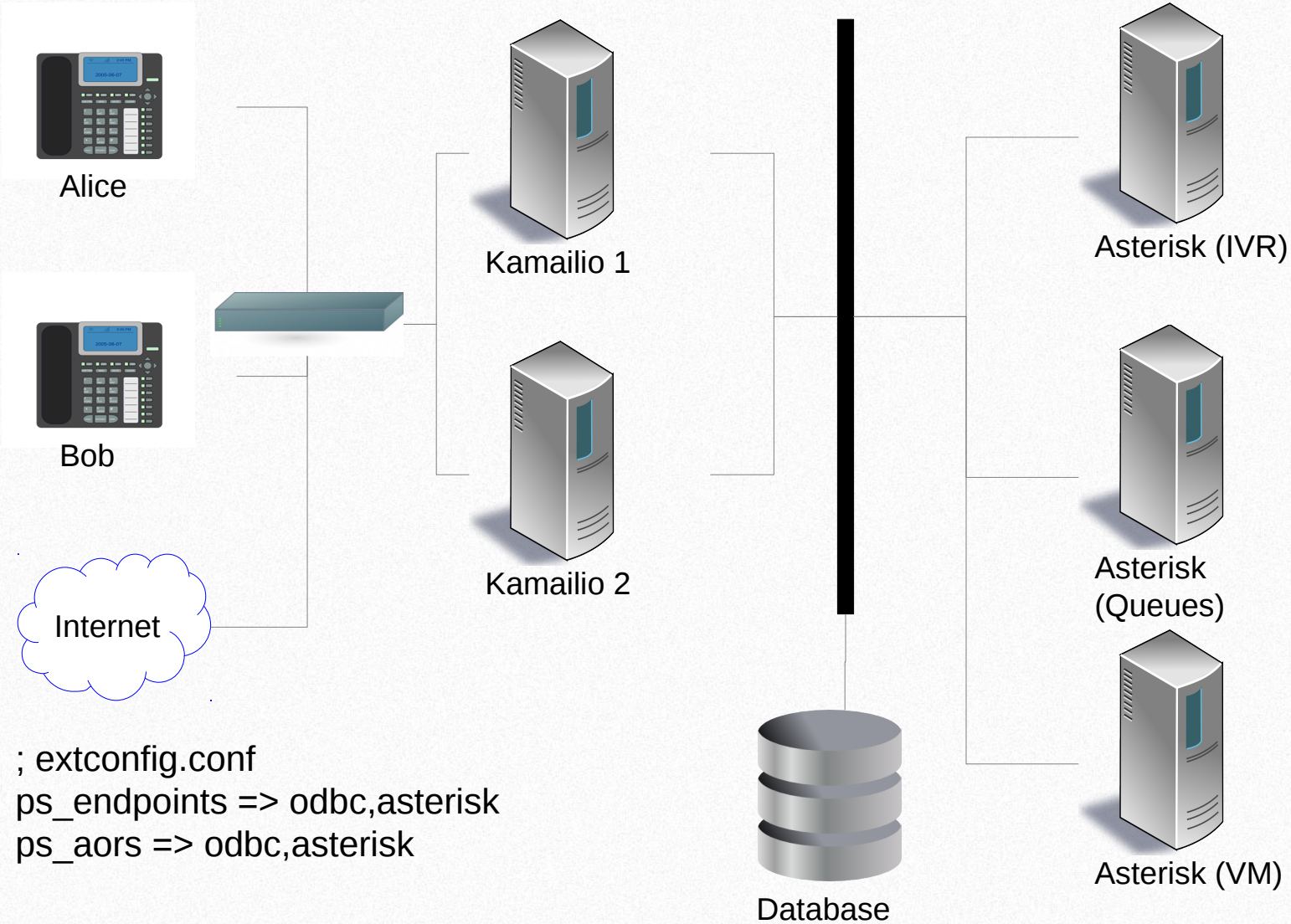


Asterisk 12 and Kamailio



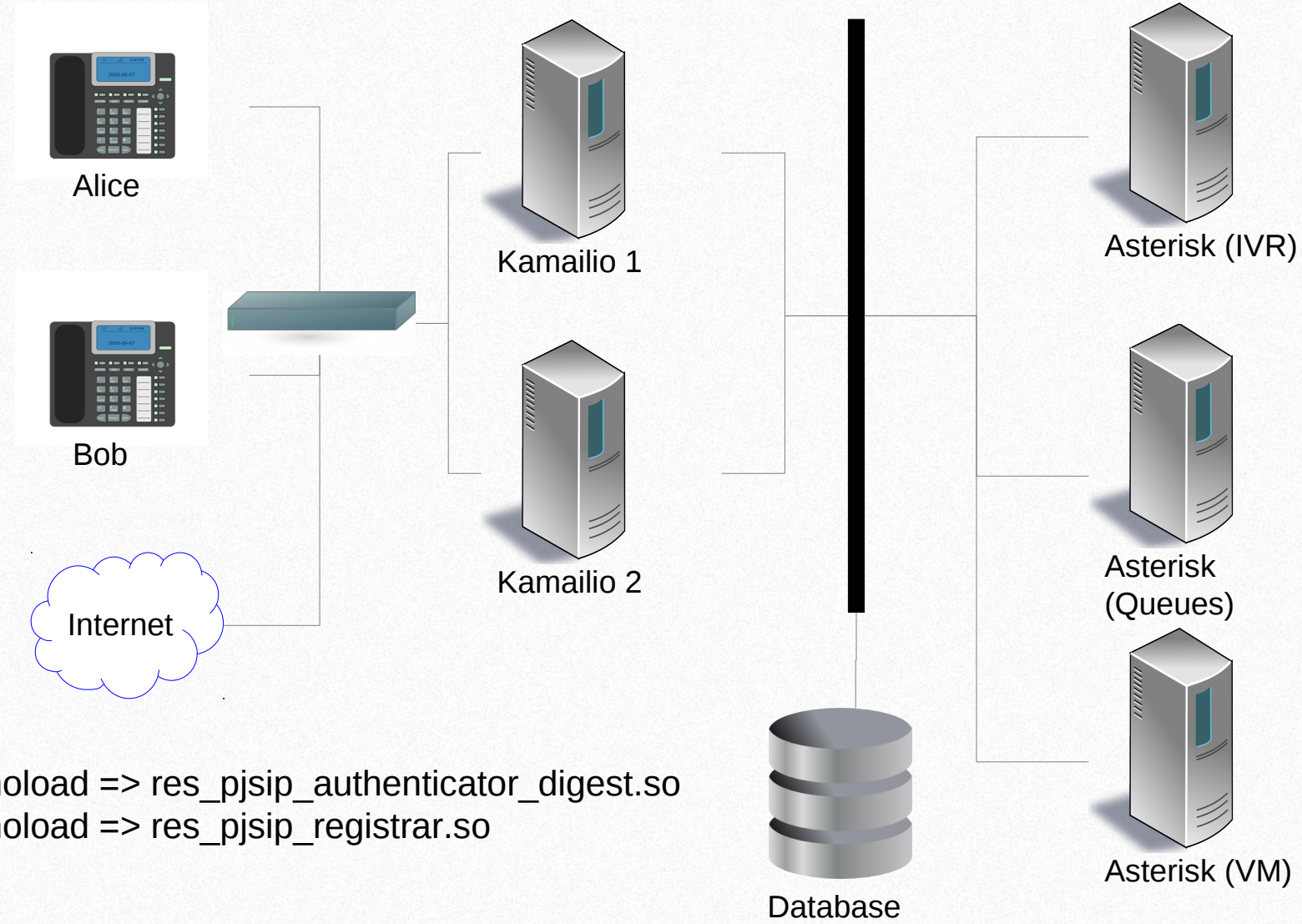

```
; sorcery.conf
[res_pjsip]
endpoint=realtime,ps_endpoints
aor=realtime,ps_aors
```

Asterisk 12 and Kamailio




```
; extconfig.conf
ps_endpoints => odbc,asterisk
ps_aors => odbc,asterisk
```

Asterisk 12 and Kamailio

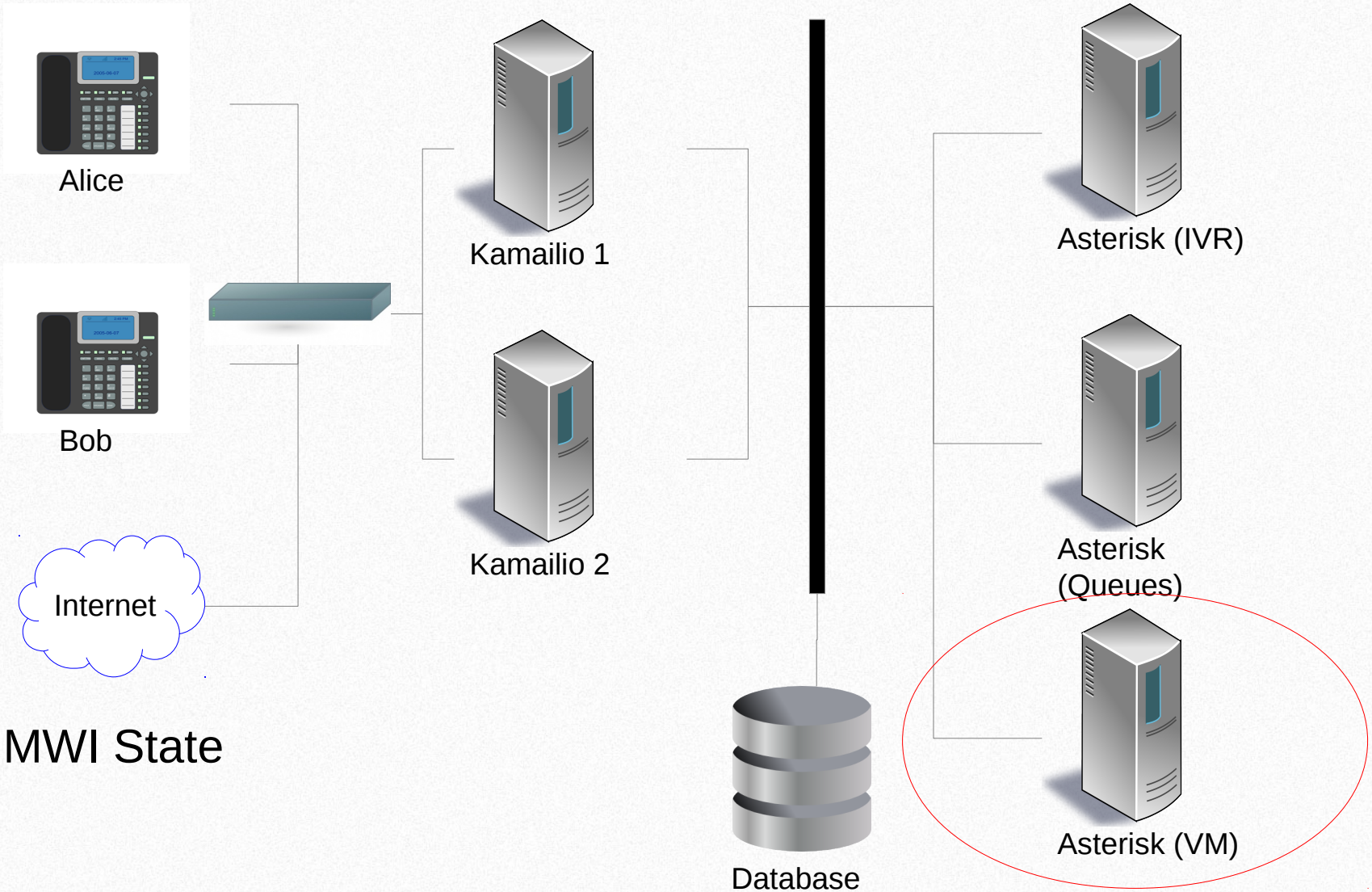


noload => res_pjsip_authenticator_digest.so
noload => res_pjsip_registrar.so

What's Next?

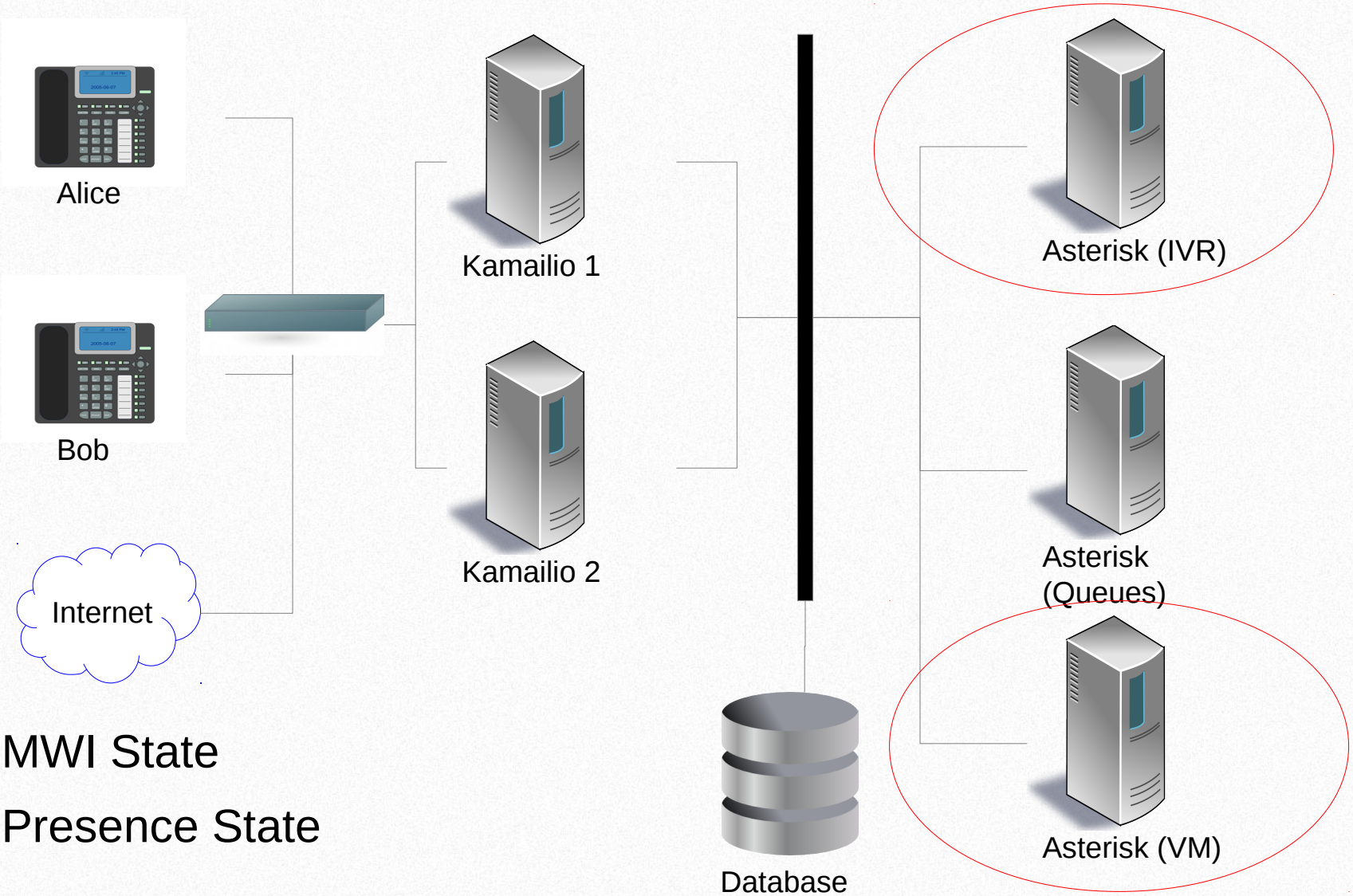
- Distributing Presence

Asterisk 12 and Kamailio: Next Steps



MWI State

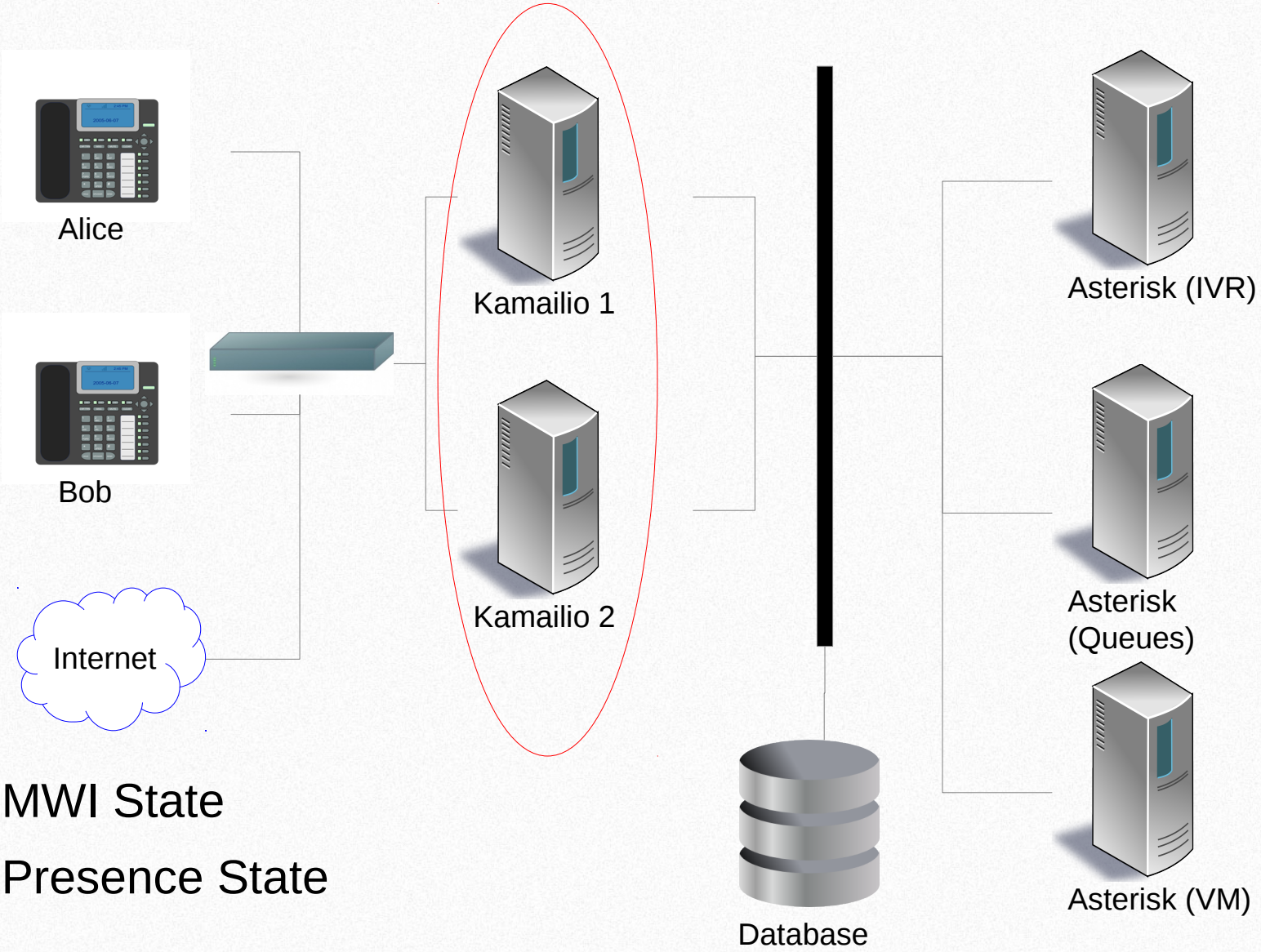
Asterisk 12 and Kamailio: Next Steps



MWI State

Presence State

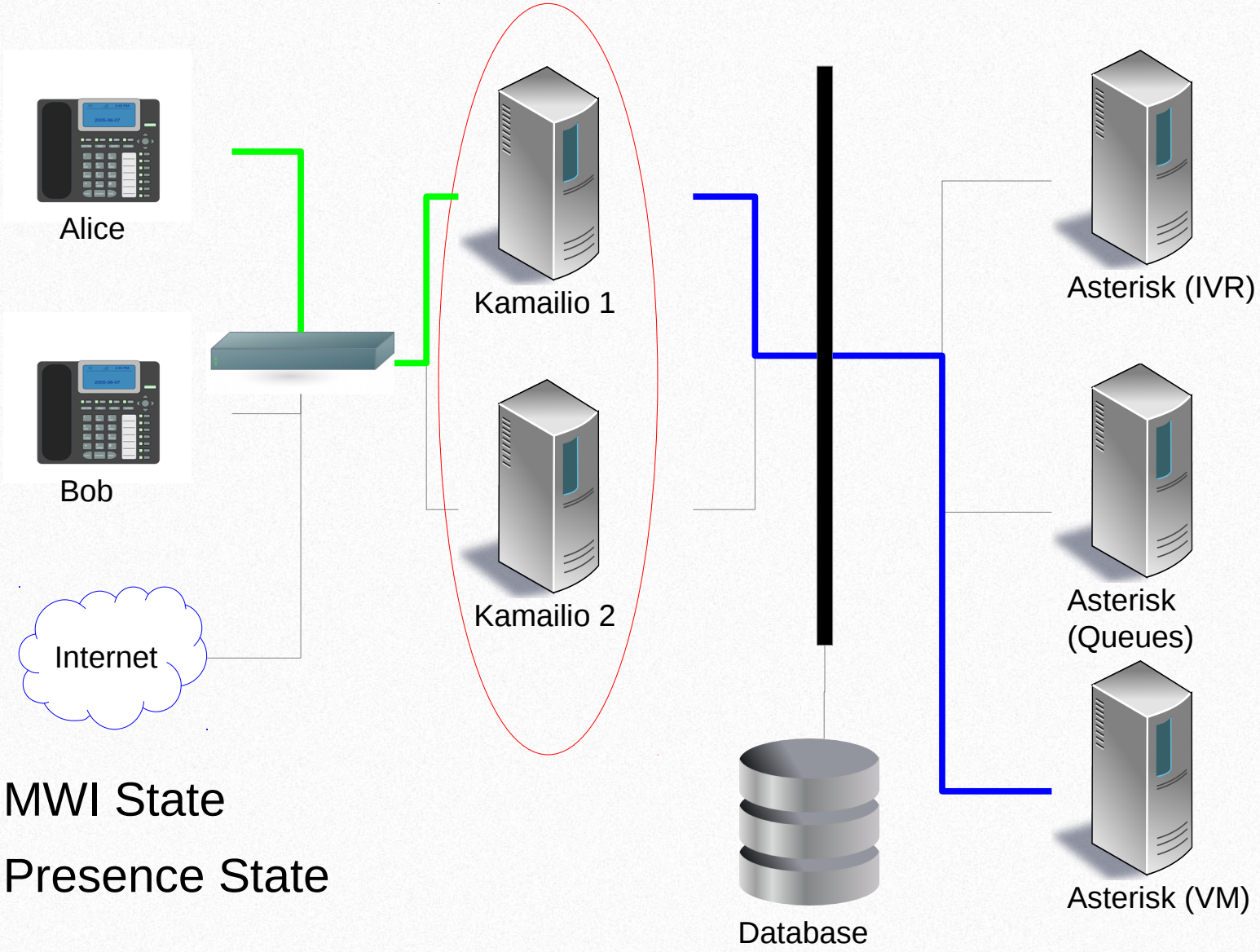
Asterisk 12 and Kamailio: Next Steps



MWI State

Presence State

Asterisk 12 and Kamailio: Next Steps



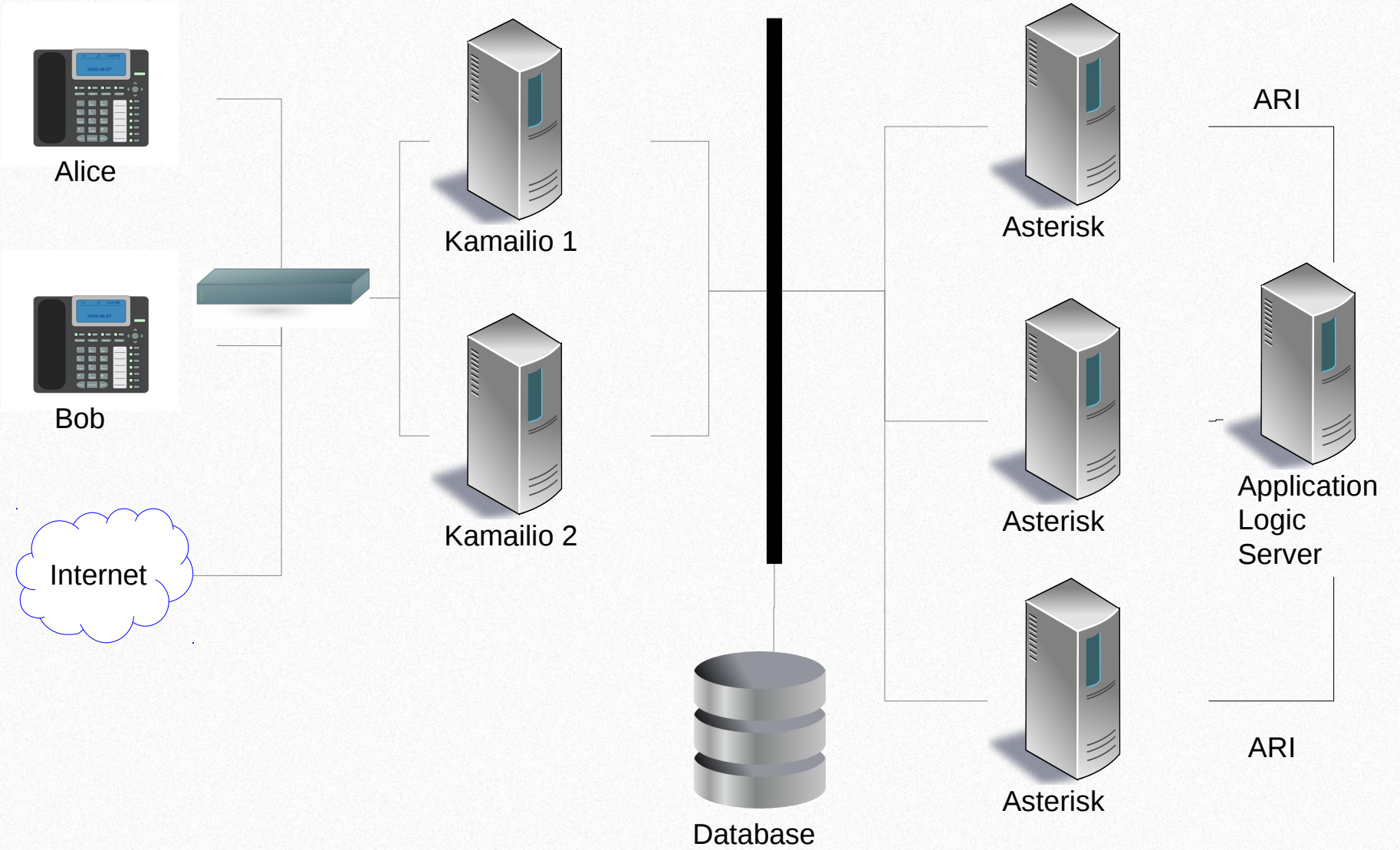
MWI State

Presence State

What's Next?

- What happens if we need more of some resource?
  - Not always easy to change purpose of an Asterisk server
  - Major constraining point: dialplan
- Alternative: ARI
  - Treat Asterisk as an application engine
  - Push all dialplan logic out of the Asterisk instances

Asterisk 12 and Kamailio: Next Steps



Asterisk: Things on the horizon

- Testing
  - 390 Unit Tests
  - 433 Functional Tests
  - 2.1x more tests than Asterisk 11
  - Lots more to go
- PJSIP: Enhance and Extend
- Publish/Subscribe
  - Highly desired
  - RLS
- ARI: enable application logic outside of Asterisk

Questions