digium
The Asterisk Company

# Asterisk as a Media Application Server

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Goal:

*Can we make Asterisk a generic media application server?*

# Scalability

# Traditional Deployments

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- Asterisk front-ended with Kamailio
  - Kamailio acts as Registrar, provides Location
  - Asterisk provides media services
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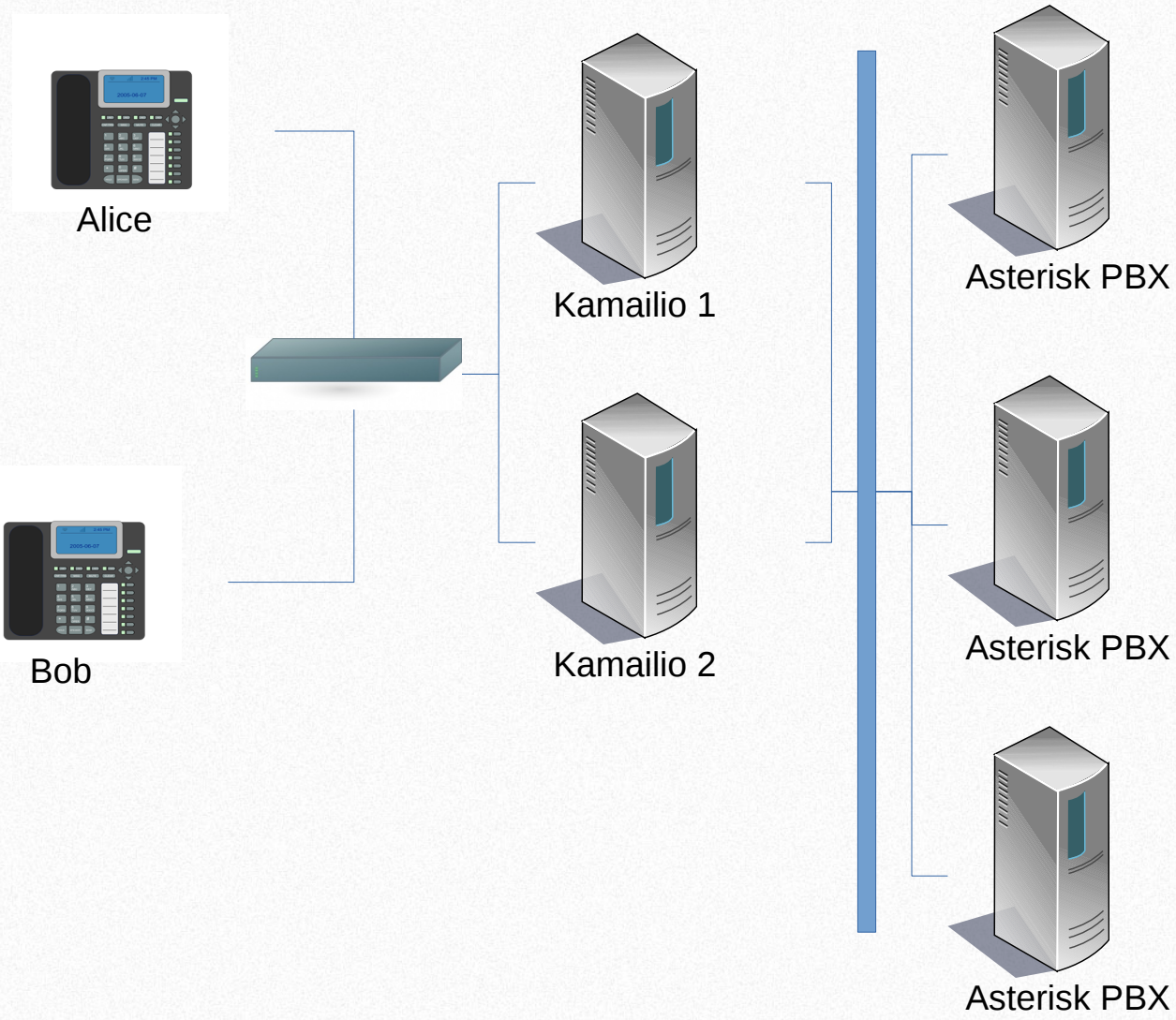
# Traditional Deployment: Option 1



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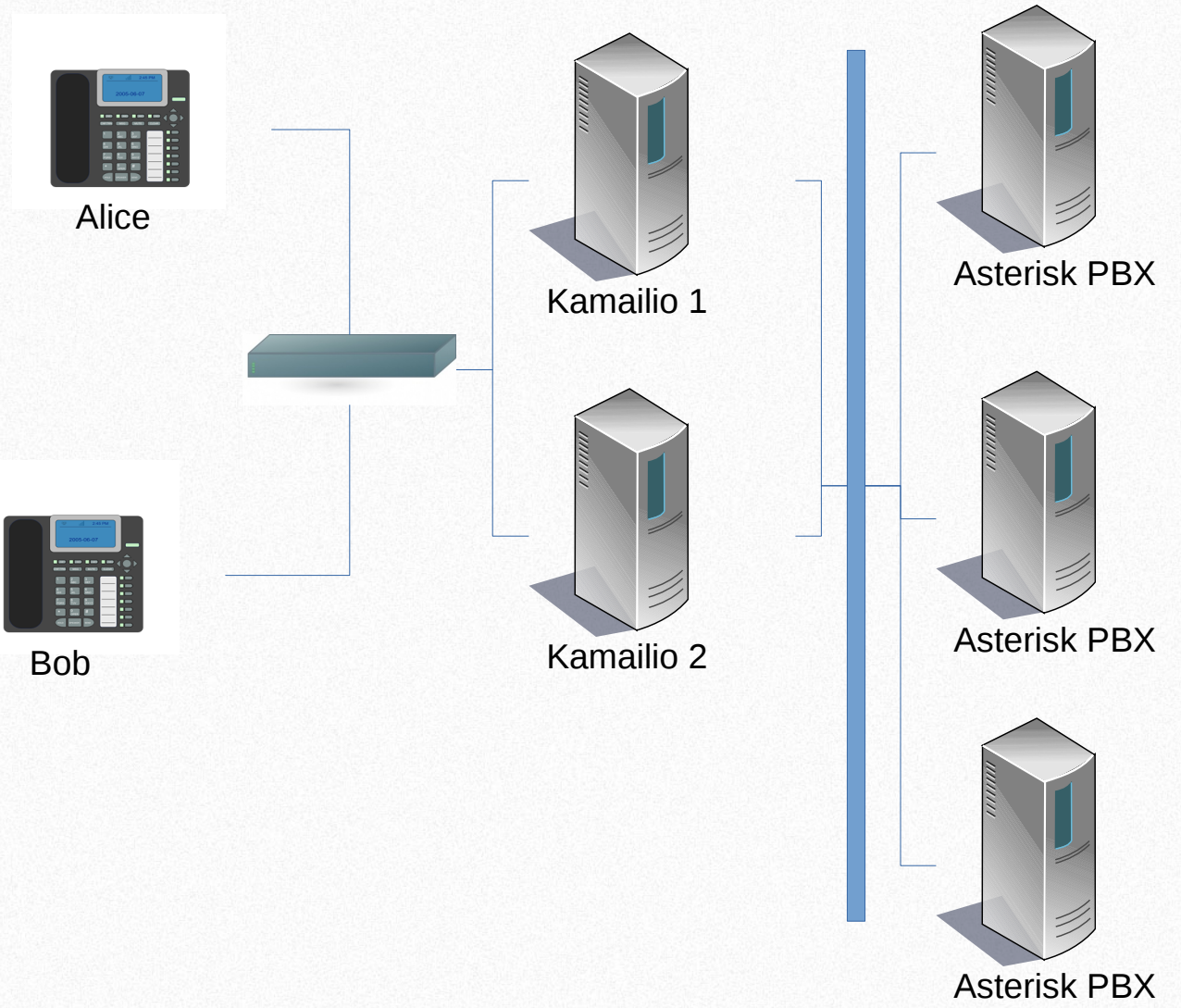


- Kamailio acts as Registrar
- Round Robin routing
- Multi-tenant
- Asterisk systems share configuration

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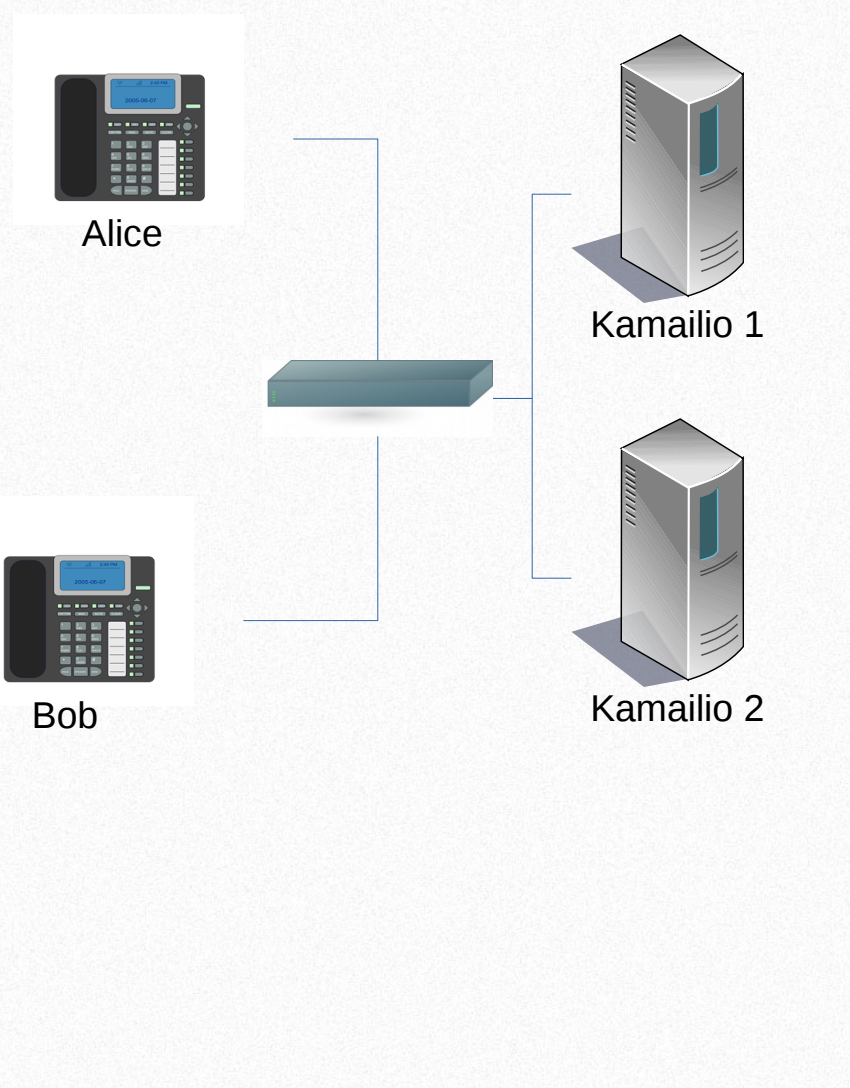


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# Problems with Option 1

- Sharing Configuration
  - Not easily scaled
  - All systems must know all information
  - Requires careful dialplan construction (func_odbc)

```
[customer_one]

exten => 1000,1,NoOp()
 same => n,ConfBridge(1000,c_one_profile)
 same => n,Hangup()

[customer_two]

exten => 1000,1,NoOp()
 same => n,ConfBridge(1000,c_two_profile)
 same => n,Hangup()
```

```
[customer]

exten => 1000,1,NoOp()
 same => n,ConfBridge(1000,${ODBC_CONF_PROF(${CALLERID(num)})})
 same => n,Hangup()
```

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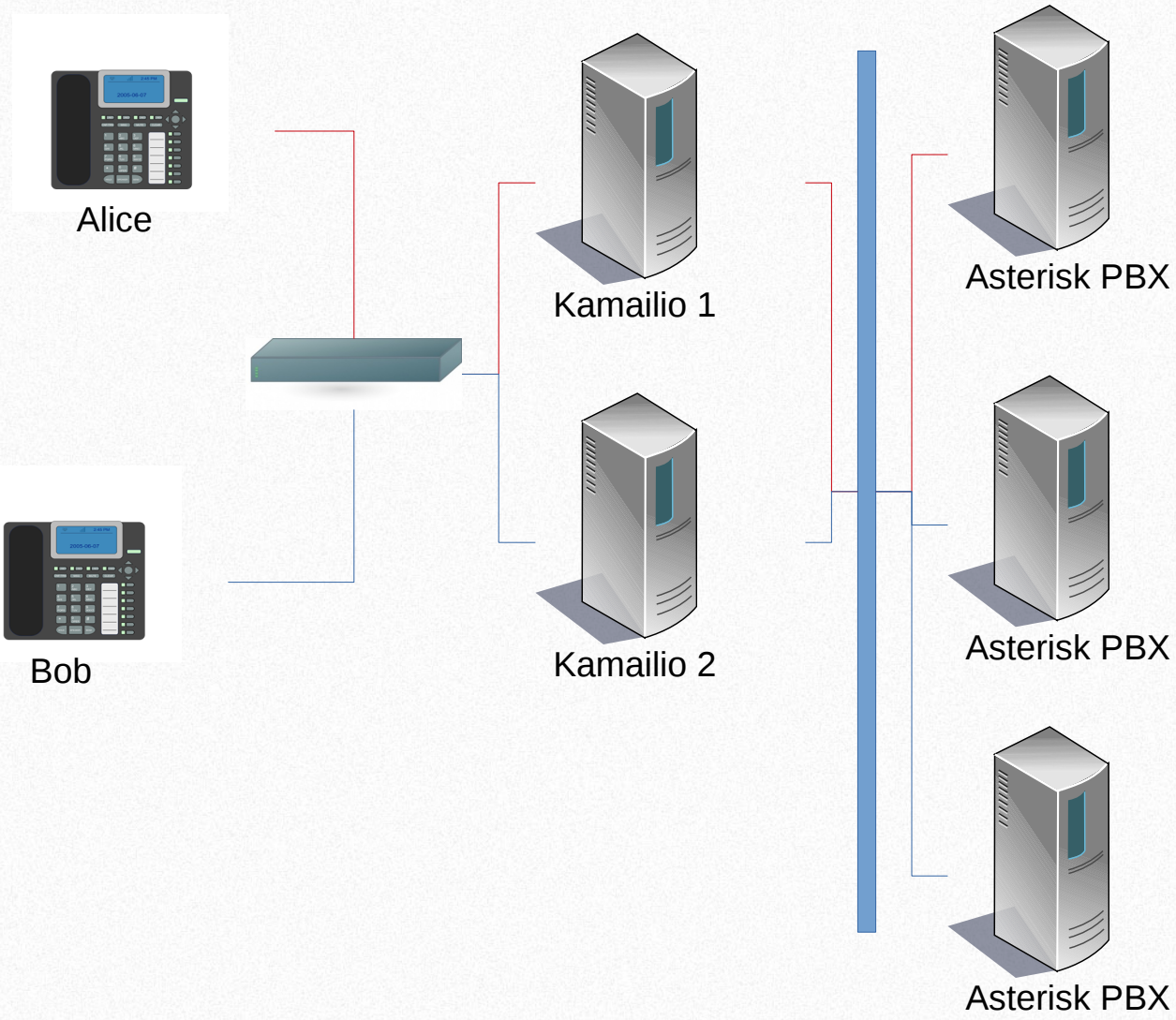


Alice Calls 1000 (Conference)

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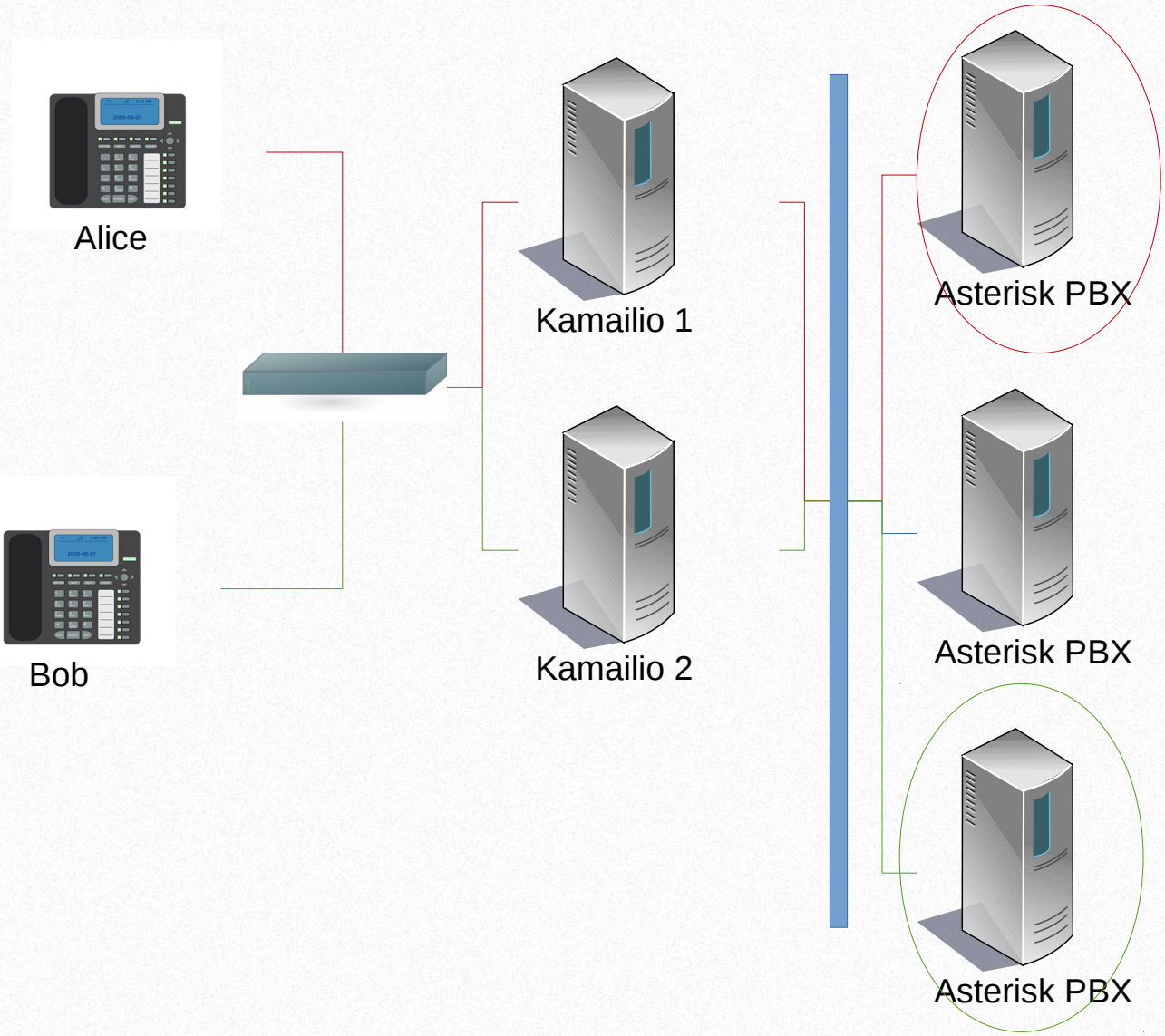


Bob Calls 1000 (Conference)

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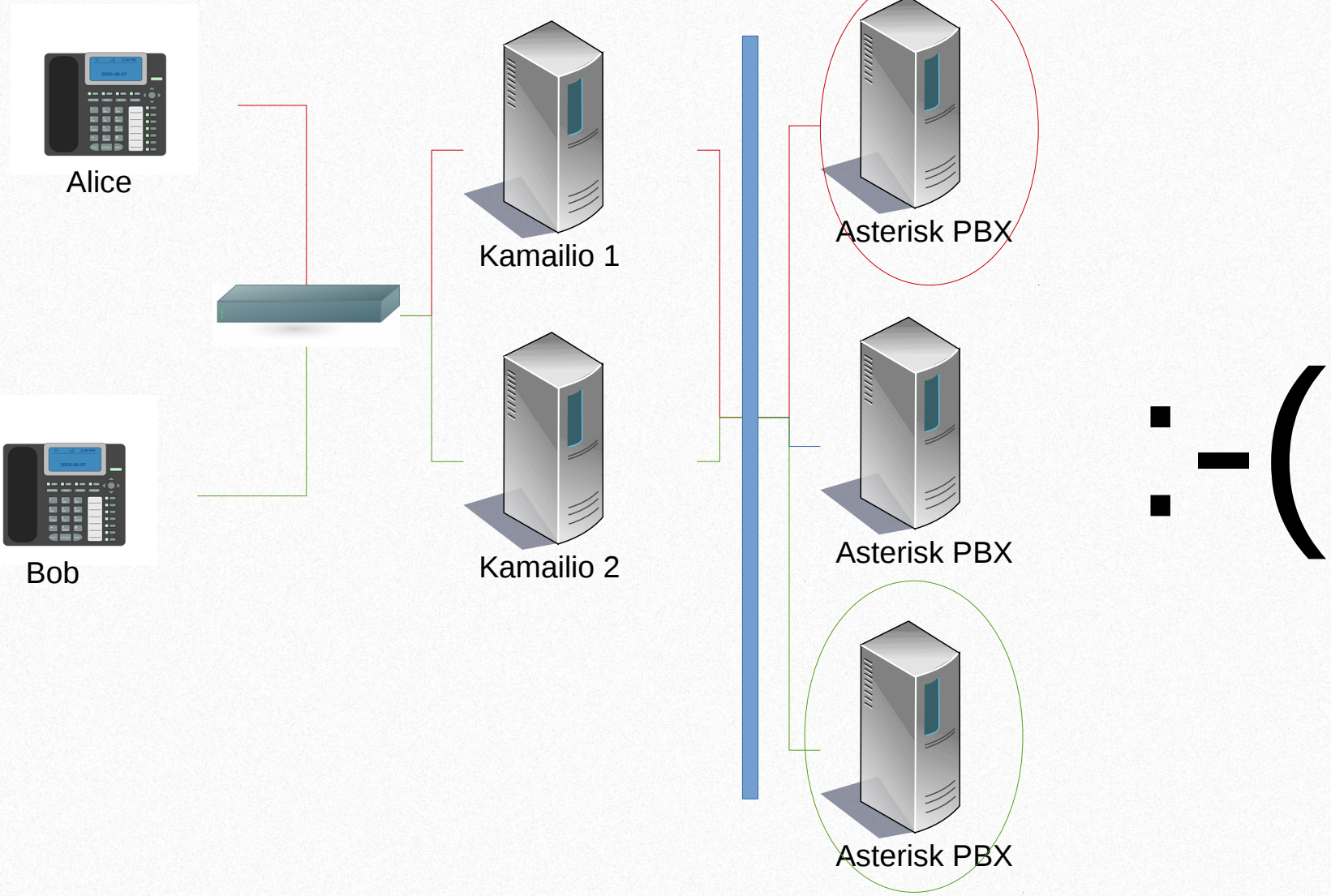

# Problems with Option 1

- Sharing Configuration
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- func_odbc: Still doesn't scale well!
  - Can defer customer logic to external system
  - Cannot easily defer routing/application logic

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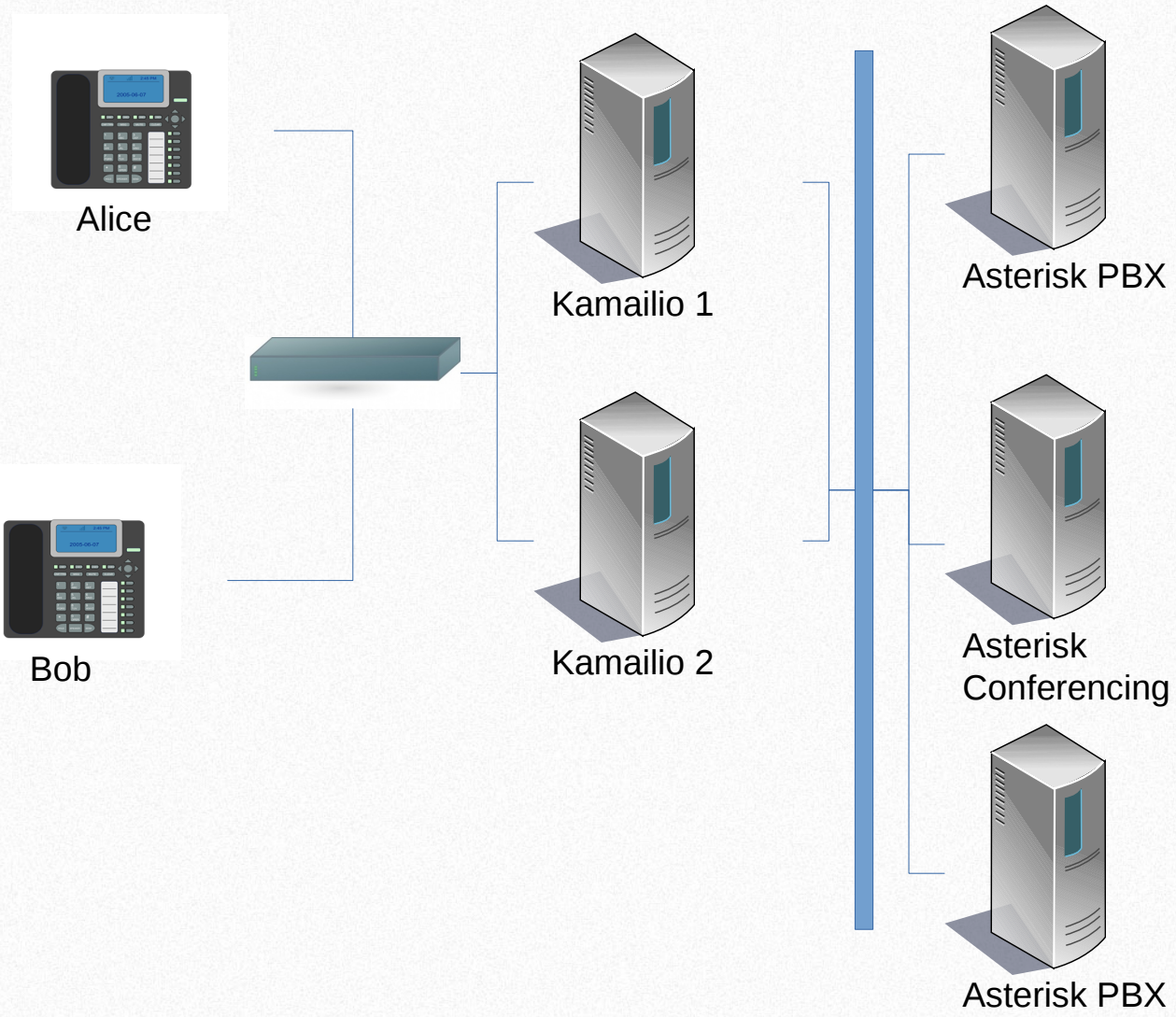
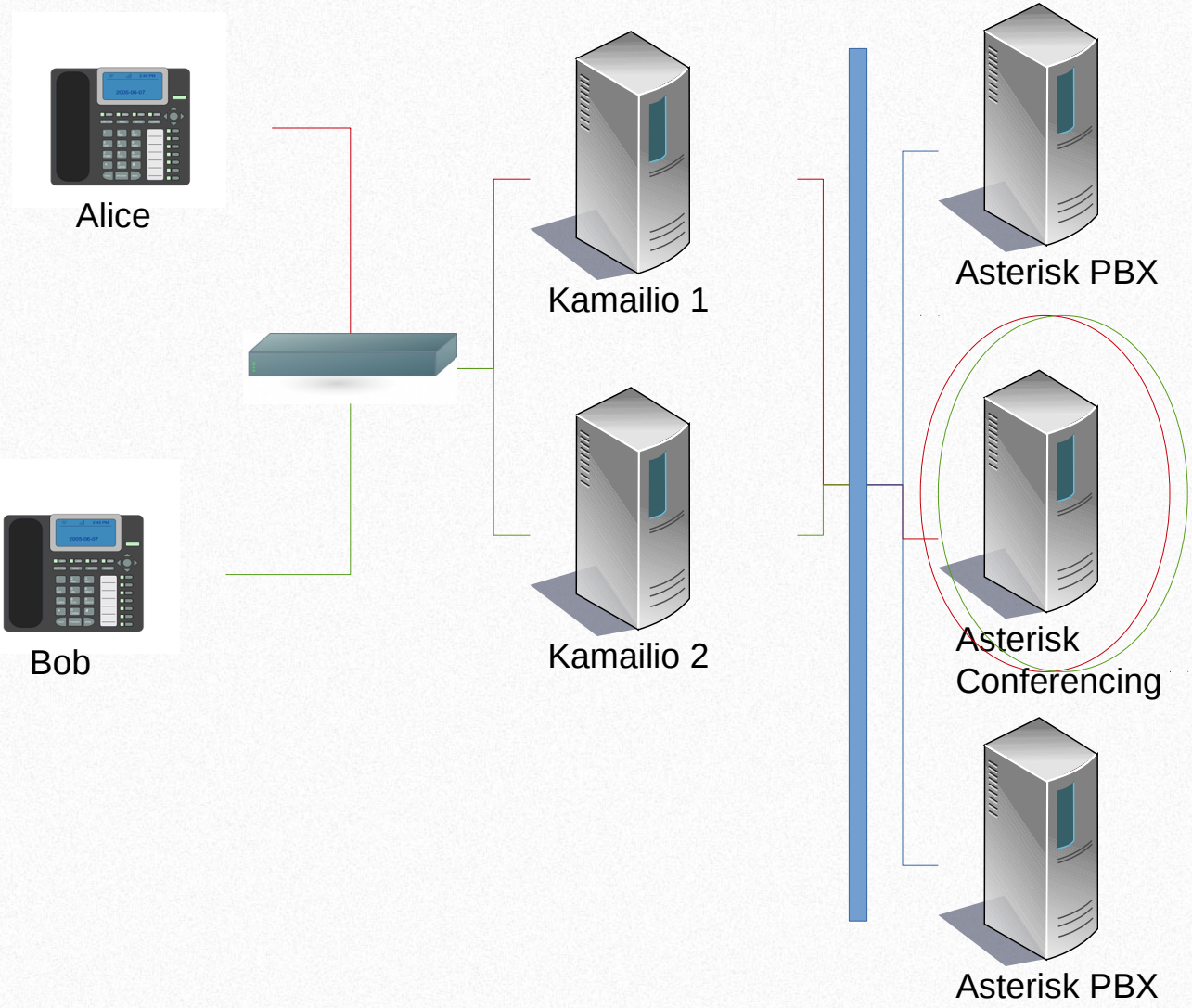
- ~~Option 1: Each Asterisk server the same~~
- Option 2: Special purpose Asterisk servers

# Traditional Deployment: Option 2

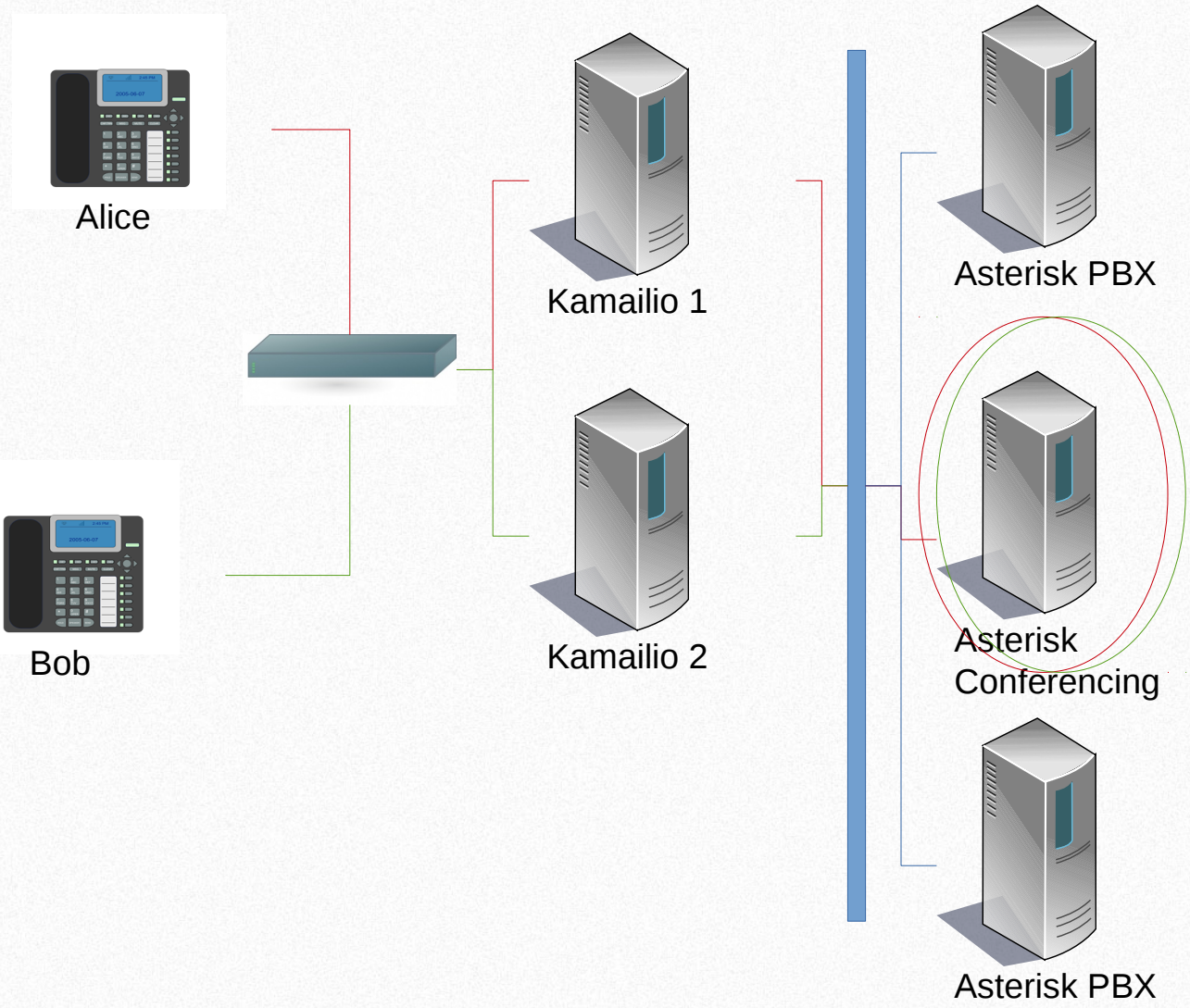



- Kamailio acts as Registrar
- Route based on functional purpose (with round robin amongst those)
- Multi-tenant
- Asterisk systems share configuration

# Traditional Deployment: Option 2

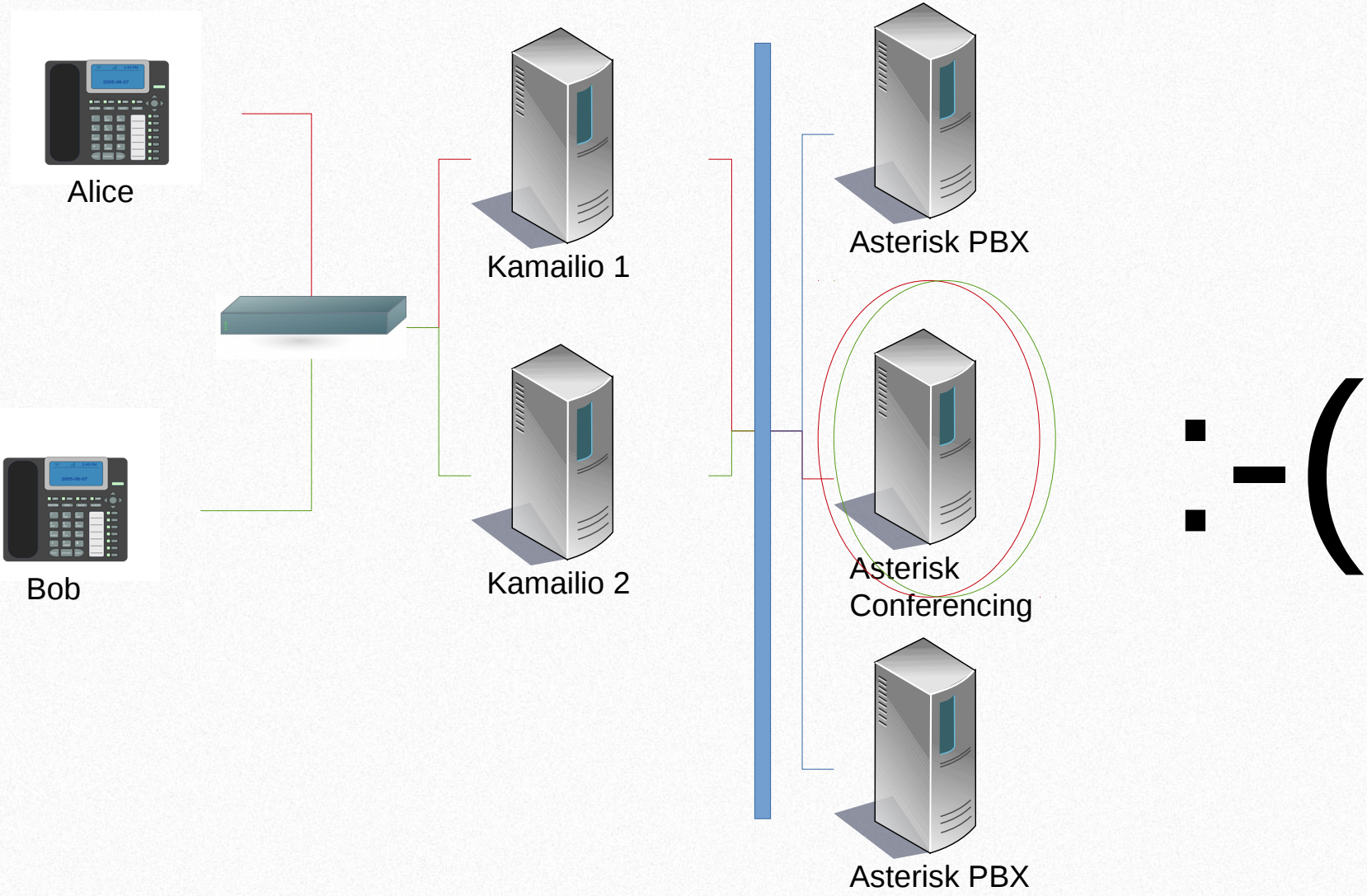


# Traditional Deployment: Option 2




But what if I need another Conferencing Server?

# Traditional Deployment: Option 2



# Traditional Deployments

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- ~~Option 1: Each Asterisk server the same~~
- ~~Option 2: Special purpose Asterisk servers~~

# Problems with Option 1 and Option 2

- Sharing Configuration
  - Not easily scaled
  - All systems must know all information
  - Requires careful dialplan construction (func_odbc)
- func_odbc: Still doesn't scale well!
  - Can defer customer logic to external system
  - Cannot easily defer application logic
- Functional systems only partially mitigate the problem
  - Application logic still affects routing decisions
  - Impacts how easy we can scale

# Problems with Tradition

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- Optimal routing should not require application logic: Not Kamailio's job
- Application Logic impacts routing
- Ideal situation
  - Every instance of Asterisk is generic
  - Kamailio just routes based on performance

# Goal:

*Can we make Asterisk a generic media application server?*

*Remove the application logic from Asterisk*

# *ARI: An API for building custom communications applications*

# ARI: A Super Quick Overview

- A REST(ful) API
  - Exposes the raw Asterisk primitives as resources

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```
POST /channels/12345/answer
DELETE /bridges/awesome_bridge
PUT /deviceStates/my_dev/state=BUSY
```

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- A REST(ful) API
  - Exposes the raw Asterisk primitives as resources

```
POST /channels/12345/answer
DELETE /bridges/awesome_bridge
PUT /deviceStates/my_dev/state=BUSY
```

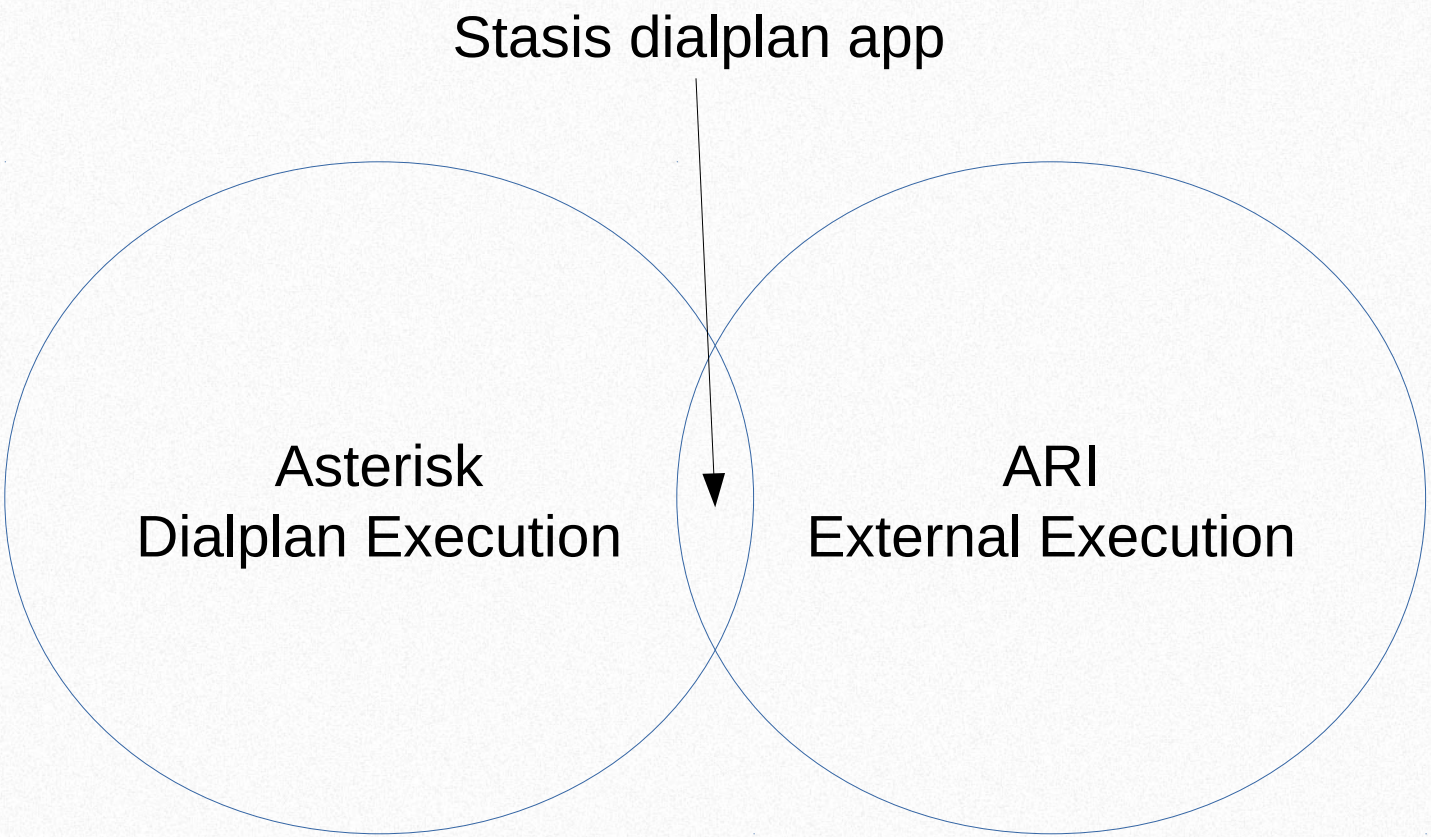
- JSON Events over WS

```
{ event: 'ChannelHangup',
  channel: { 'id': '12345',
             'name':  'PJSIP/alice'
```

- A tiny bit of dialplan

```
exten => _XXXX,1,Stasis(your-app)
```

# ARI: A Super Quick Overview



# Single Slide Conference Bridge

```
import ari

client = ari.connect('http://localhost:8088',
    'ari_user', 's3cr3t')

conf_bridge = client.bridges.create(
    type='mixing,dtmf_events',
    bridgeId='awesome_conf')

def stasis_start_cb(channels, ev):
    channel = channels.get('channel')
    channel.answer()

    conf_bridge.play(media='sound:beep')
    conf_bridge.addChannel(channel=channel.id)

client.on_channel_event('StasisStart',
    stasis_start_cb)

client.run(apps='awesome_conference')
```

# *ARI: An API for building custom communications applications*

*(THAT'S THE DIALPLAN)*

# Nontraditional Deployment

# Step 1: Remove the Dialplan*

* Conspiracy Theorists Rejoice

# Getting a little extreme

```
[default]

exten => _X.,1,NoOp()
 same => n,Stasis(EVERYTHING)
 same => n,Hangup()
```

# Step 2: Use a Message Bus Approach

# Getting a little extreme

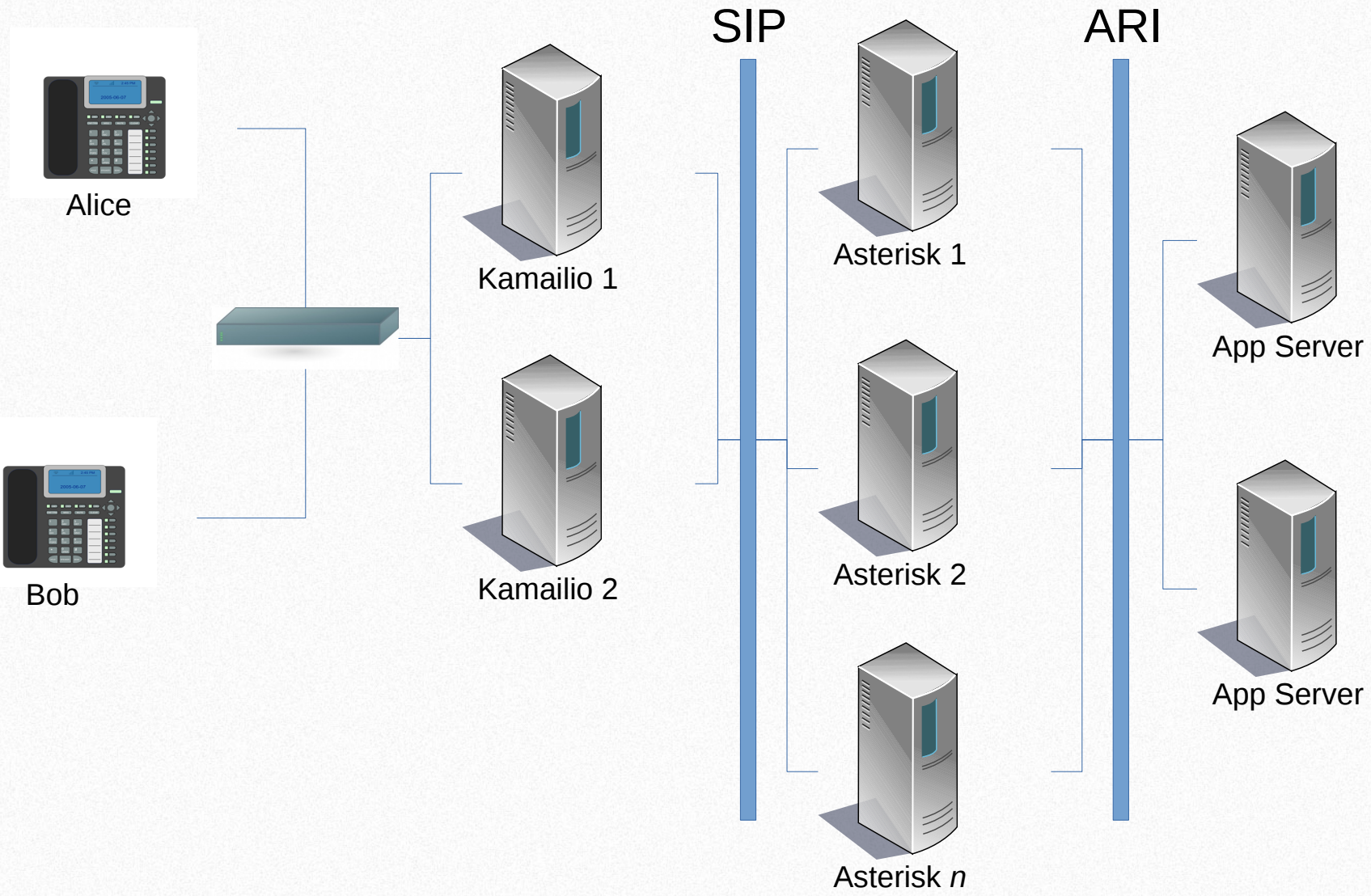
```
def get_app_by_exten(exten):
    """This is terrible, but demos the concept"""

    if exten == '1000':
        return exec_conference
    else:
        return default_app_exec

def stasis_start_cb(channel, ev):
    exten = ev.get('exten')
    app = get_app_by_exten(exten)
    app(channel)

client.on_channel_event('StasisStart',
                        stasis_start_cb)
```

# Getting a bit more extreme



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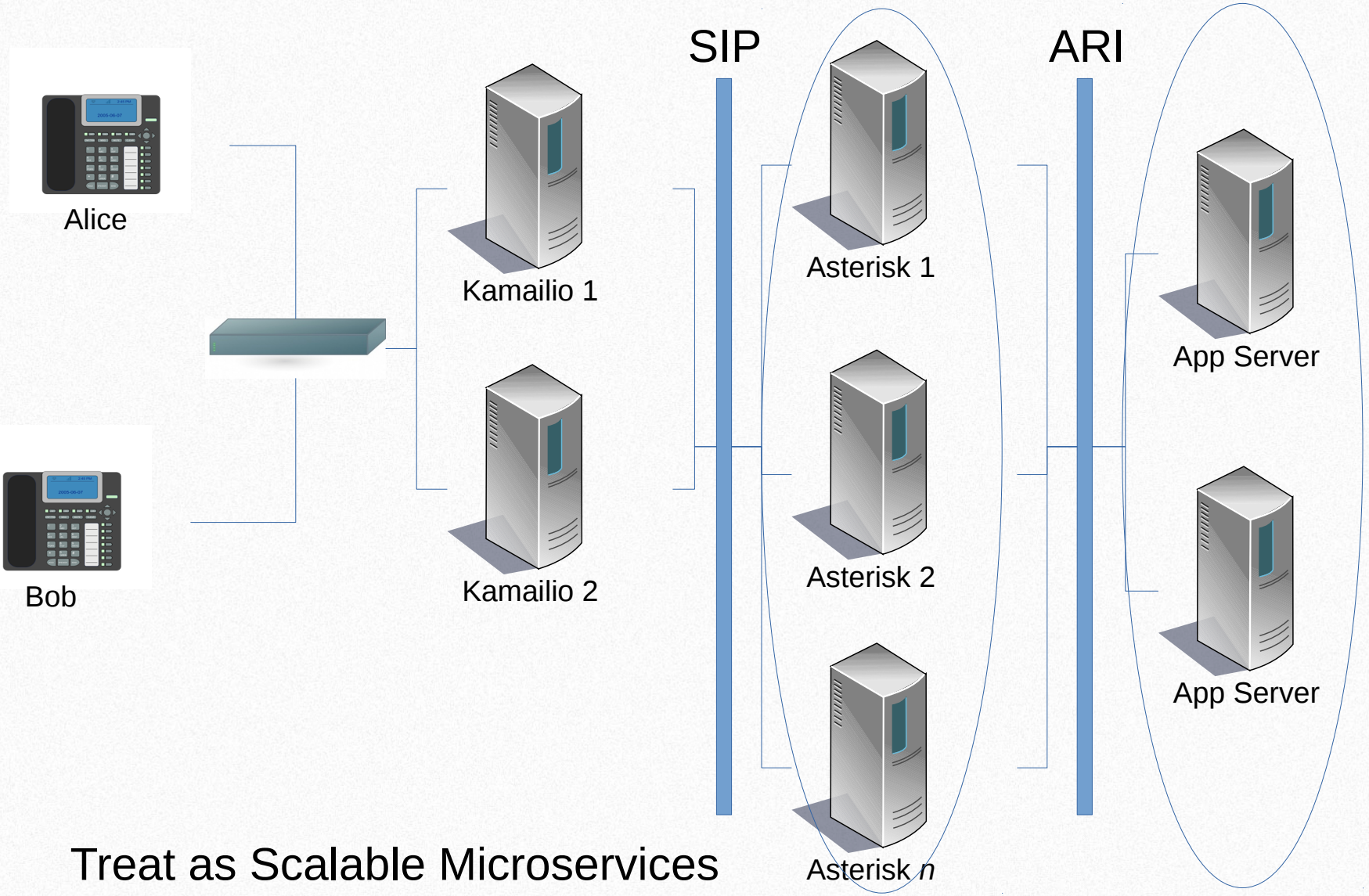


Treat as Scalable Microservices

# A philosophical taxonomy

- Keep things as simple as possible, but no simpler
- Kamailio: manage SIP
- Asterisk: manage media
- Application logic: your choice

# Questions

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