

Kamailio and Kazoo Platform

Presented By: Luis Azedo

About Myself

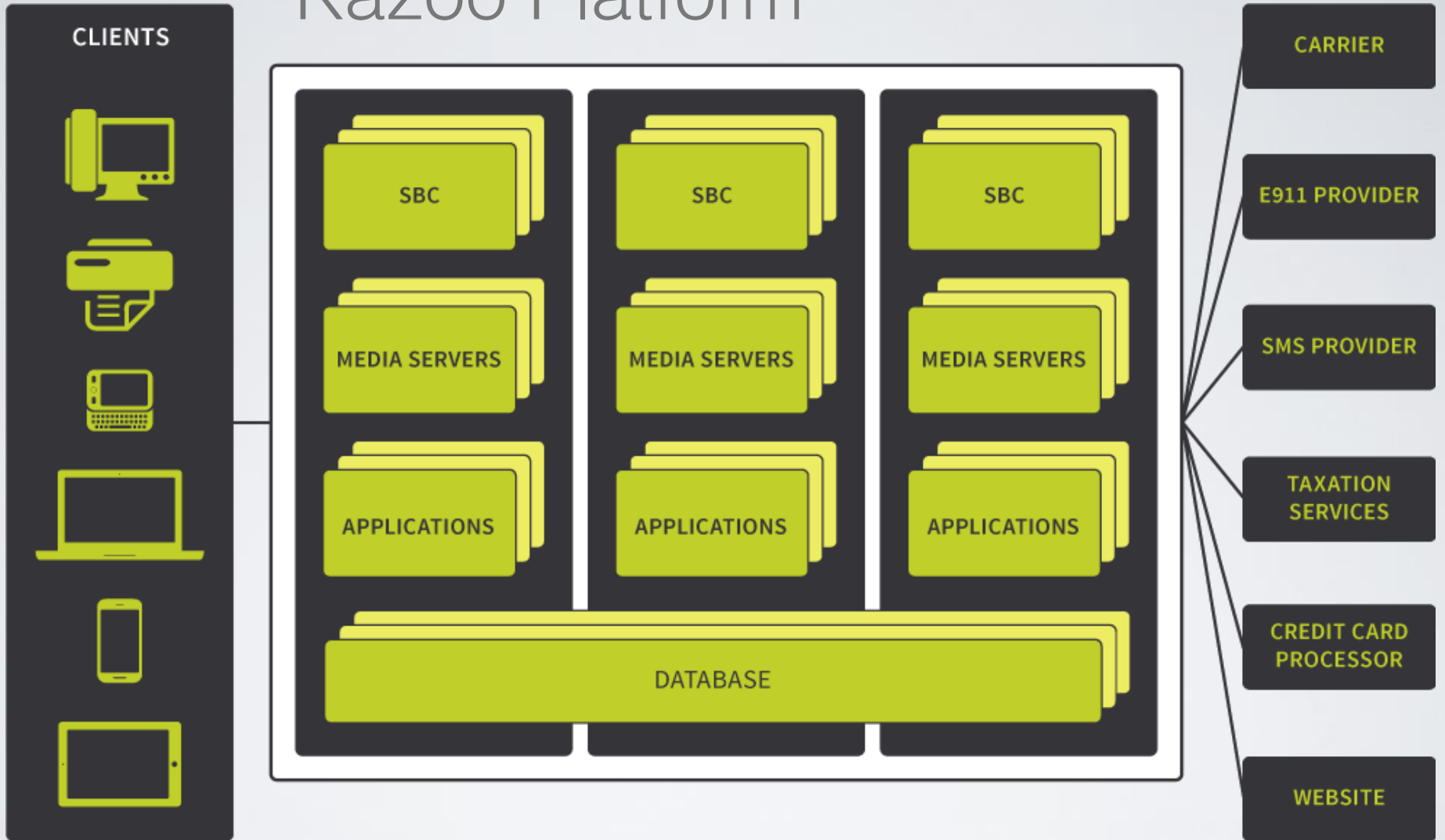
Luis Azedo

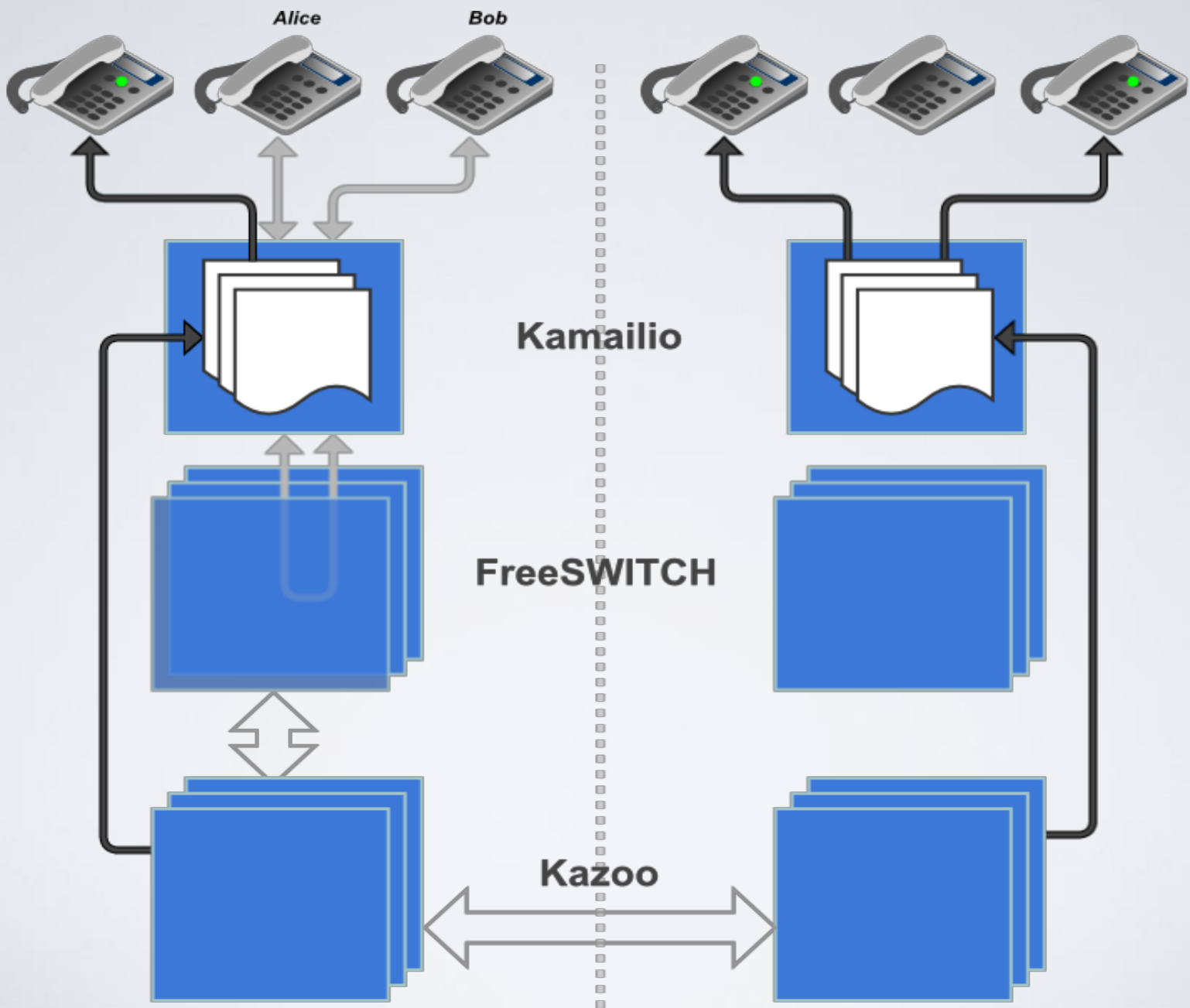
Been around since the Sinclair Z80

Joined 2600hz in early 2014 as a Distributed Software Engineer leading the efforts on Kamailio integration and functionality with Kazoo.



Kazoo Platform





How do we handle AMQP

Round-Robin with shared queues

- . Registrar Query

Req/Win (when round-robin is not enough)

- . Call processing

Private Queues (Fanout)

- . Registrar Store

Some Apps from Kazoo

Callflow

Ecallmgr

Konami

Webhooks

Crossbar

Doodle

Frontier

Blackhole

cccp

Pivot

Users Settings

Extensions

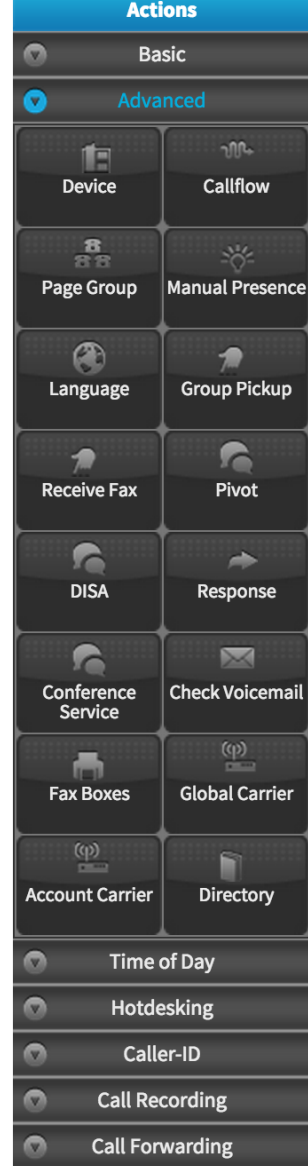
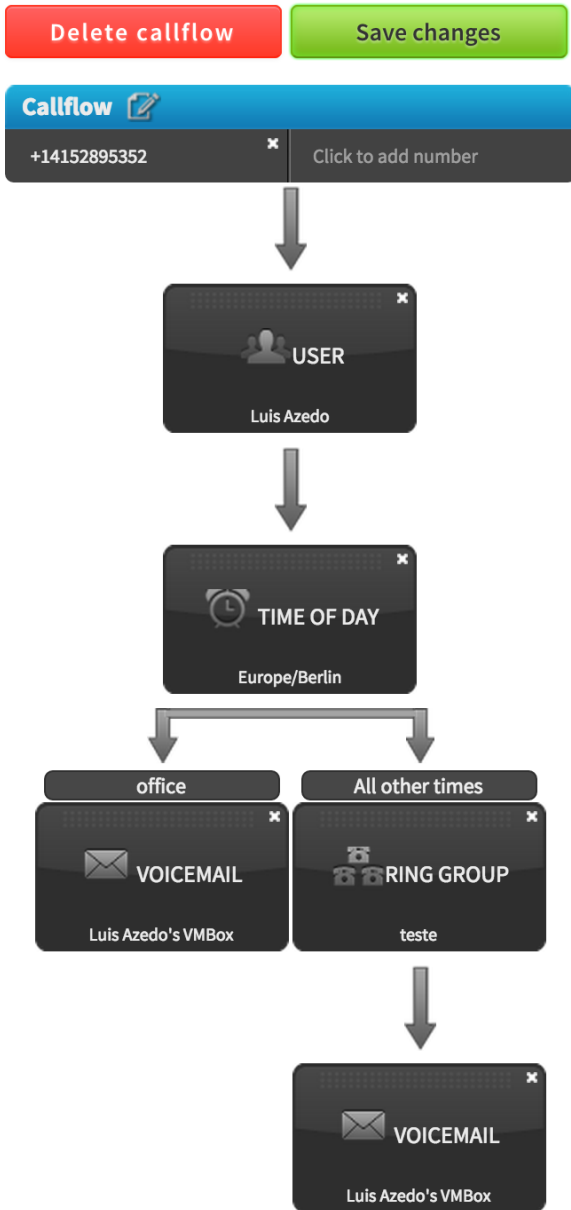
Phone Numbers

Devices

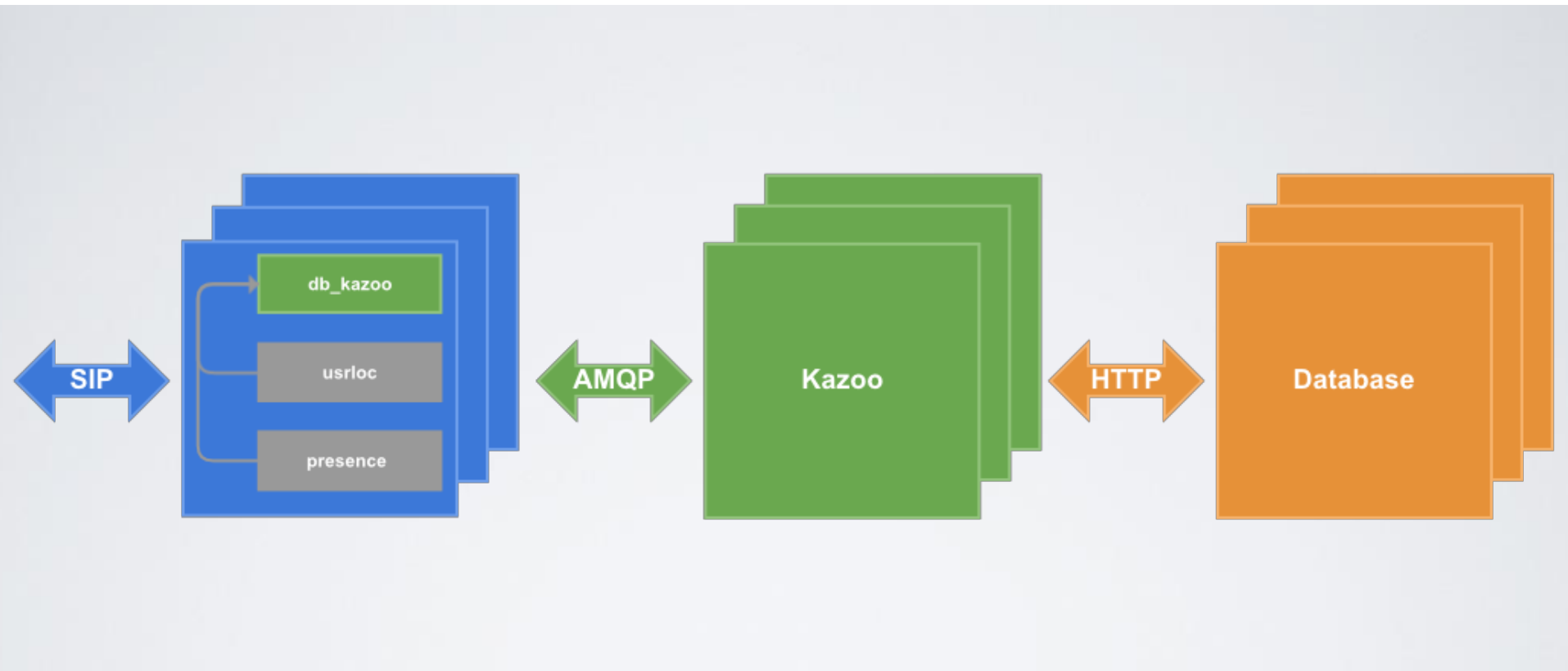
User Features

Users Settings	Extensions	Phone Numbers	Devices	User Features
Luis Azedo	1000	None		
Caller-ID Number	Call Forwarding	Hot-Desking		
Voicemails	Faxbox	Conference Bridge		
Find me, Follow me	Music-On-Hold	Inbound Call Recording		
Paula Costa	1001	None		

You have modified this Callflow, don't forget to save it!



db_kazoo





```

int dbk_credentials_query(const db1_con_t* _h, ..., db1_res_t** _r) {
    amqp_mb.len = sprintf(messagebody, "{\"Method\":\"REGISTER\", \"
        \"Auth-Realm\":\"%.s\", \"
        \"Auth-User\":\"%.s\", \"
        \"From\":\"%.s@%.s\", \"
        \"To\":\"%.s@%.s\", \"
        \"Server-ID\":\"%s\", \"
        \"Node\":\"kamilio@%.s\", \"
        \"Msg-ID\":\"%.s\", \"
        \"App-Version\":\"%s\", \"
        \"App-Name\":\"%s\", \"
        \"Event-Name\":\"authn_req\", \"
        \"Event-Category\":\"directory\"}\",
        _v[1].val.str_val.len, _v[1].val.str_val.s,
        _v[0].val.str_val.len, _v[0].val.str_val.s,
        _v[0].val.str_val.len, _v[0].val.str_val.s,
        _v[1].val.str_val.len, _v[1].val.str_val.s,
        _v[0].val.str_val.len, _v[0].val.str_val.s,
        _v[1].val.str_val.len, _v[1].val.str_val.s,
        serverid,
        dbk_node_hostname.len, dbk_node_hostname.s,
        unique_string.len, unique_string.s,
        VERSION, NAME);
    amqp_mb.bytes = messagebody;

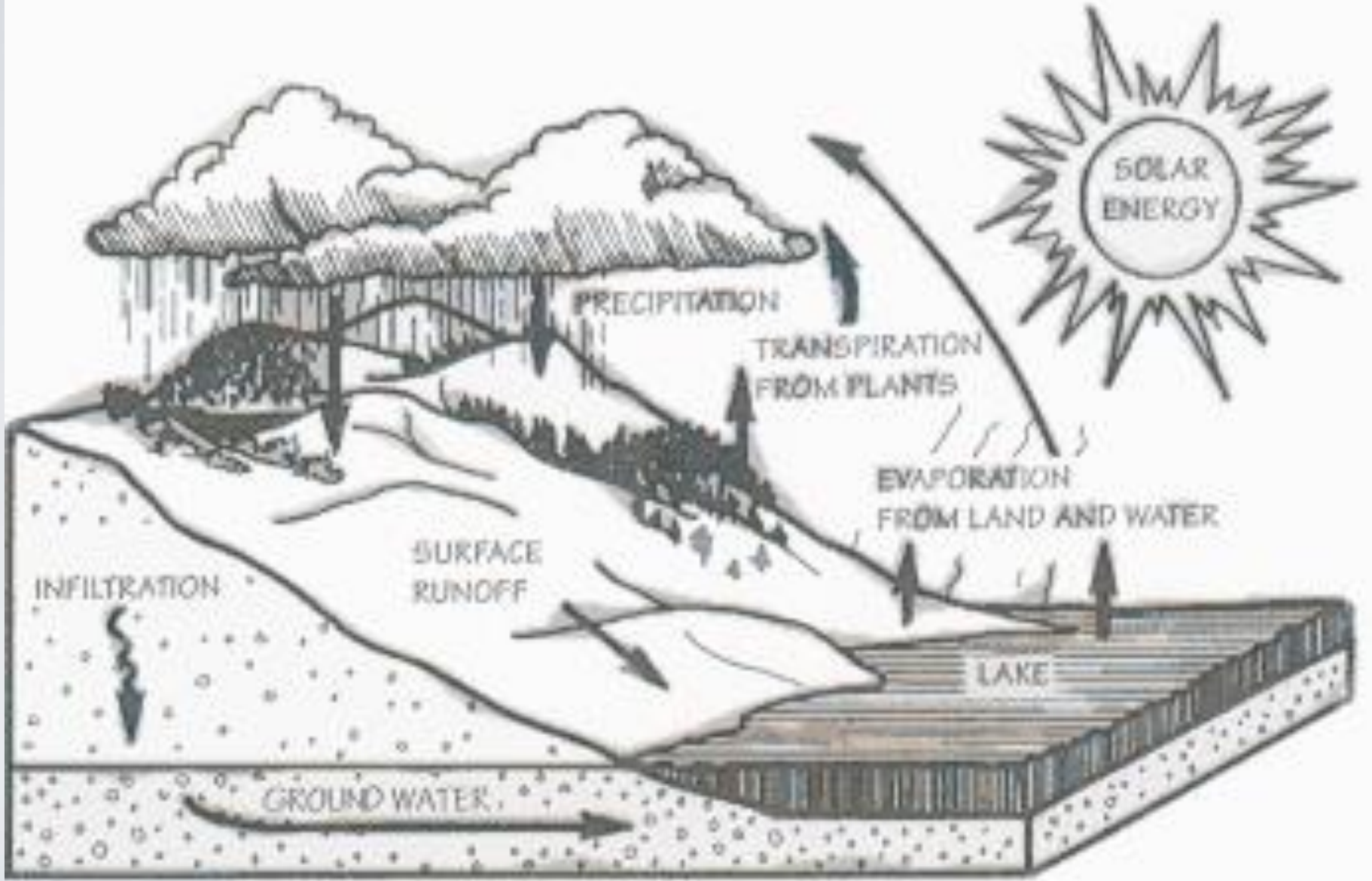
    if (!amqp_basic_publish(rmq->conn, rmq->channel, ..., amqp_mb)) {
        goto error;
    }
}

```

From db_kazoo to kazoo

Why ?

- Specific Tables
 - Closed AMQP Payload
 - Hard to maintain
 - Only at DB level
-
- The result is General Purpose AMQP connector



Kazoo module

. SUBSCRIBE / CONSUME

. PUBLISH

. CALL (publish + consume correlated message)

Expose the functions to the configuration script to allow greater flexibility.

Kazoo

- PARAMETERS

```
##### Kazoo Integration module #####  
loadmodule "kazoo.so"  
modparam("kazoo", "node_hostname", "MY_HOSTNAME")  
modparam("kazoo", "amqp_connection", "MY_AMQP_URL")  
  
#ifndef MY_AMQP_URL_SECONDARY  
modparam("kazoo", "amqp_connection", "MY_AMQP_URL_SECONDARY")  
#endif  
  
modparam("kazoo", "amqp_max_channels", MY_AMQP_MAX_CHANNELS)  
modparam("kazoo", "amqp_query_timeout_avp", "$avp(kz_timeout)");
```

Kazoo

- SUBSCRIBE

```
event_route[kazoo:mod-init]
{
  ...
  $var(Payload) = '{ "exchange" : "nodes", "type" : "fanout"}';
  kazoo_subscribe("$var(payload)");
  ...
  $var(Payload) = "{ 'exchange' : 'callmgr' , 'type' : 'topic', 'queue' : 'MSG-FLUSH-
MY_HOSTNAME', 'routing' : 'registration.flush.*' }";
  kazoo_subscribe("$var(Payload)");
  ...
}
```


Kazoo

- CONSUME

```
## kazoo event route , {"directory", "reg_flush") => reg-flush by kamailio limitations
## when a Event-Category or Event-Name has a underscore (_) we need to declare it with a dash (-)
## $kzE contains the event Payload
```

```
event_route[kazoo:consumer-event-directory-reg-flush]
{
    $var(user) = ${kzE{kz.json,Username}} + "@" + ${kzE{kz.json,Realm}};
    if ($sht(auth_cache=>$var(user)) != $null) {
        xlog("L_INFO", "log|removing SIP credentials cache for $var(user)");
        $sht(auth_cache=>$var(user)) = $null;
    }
}
```

- CONSUME

```
event_route[kazoo:consumer-event-nodes-advertise]
{
    if( $(kzE{kz.json,Media-Servers}) != "" ) {
        xlog("L_INFO", "received nodes advertise for media servers : $(kzE{kz.json,Media-Servers})");
        $var(ix) = 0;
        while( $(kzE{kz.json,Media-Servers[$var(ix)]}) != "" ) {
            $var(fs) = $(kzE{kz.json,Media-Servers[$var(ix)]}{re.subst,$var(reg)});
            xlog("L_INFO", "received node $var(ix) - $(kzE{kz.json,Media-Servers[$var(ix)]}) => $var(fs)");
            ## collect media servers and compare to dispatcher list
            $var(ix) = $var(ix) + 1;
        }
        ## check dispatcher and reload if needed
    }
}
```

Kazoo

- PUBLISH

```
##### Nodes role - pushes info to kazoo #####
```

```
modparam("timer", "declare_timer", "NODES_TIMER=NODES_TIMER_ROUTE,  
5000,slow,enable");
```

```
##### NODES Logic #####
```

```
route[NODES_TIMER_ROUTE]
```

```
{
```

```
    $var(Payload) = '{"Event-Category" : "nodes", "Event-Name" : "advertise", "Expires" :  
5000, "Used-Memory" : $(stat(real_used_size){s.int}), "Registrations" : $  
(stat(registered_users){s.int}), "WhatsApps" : {"kamailio" : {"Startup" : $Tb }} }';
```

```
    kazoo_publish("nodes", "", $var(Payload));
```

```
}
```

Kazoo

- PUBLISH

```
##### Presence Logic #####
route[HANDLE_SUBSCRIBE]
{
....
$var(amqp_payload_request) = '{"Event-Category" : "presence", "Event-Name" :
"subscription", "Event-Package" : "$hdr(event)", "Expires" : "$var(Expires)", "Queue" :
"BLF-MY_HOSTNAME", "Server-ID" : "BLF-MY_HOSTNAME", "Contact" : "$
(ct{s.escape.common})", "Call-ID" : "$ci", "From" : "$fu", "User" : "$tu", "User-Agent" : "$
(ua{s.escape.common})" }';

    kazoo_publish("dialoginfo_subs", "dialoginfo_subs", $var(amqp_payload_request));
```

Kazoo

- CALL

How does it Work ?

Kazoo module injects Server-ID in every publish with a queue from where it gets the response.

Your app should read Server-ID from the request payload and send the response payload to the Server-ID queue.

Kazoo

- CALL

```
if ($sht(auth_cache=>$Au) != $null && registered("location", "$rz:$Au", 6) == 1) {
    xlog("L_INFO", "$ci|log|authenticating $fu via cached SIP creds");
    $var(password) = $sht(auth_cache=>$Au);
} else {
    $var(amqp_payload_request) = '{"Event-Category' : 'directory' , 'Event-Name' : 'authn_req', 'Method' : $fu + "", 'From' : "" + $fu + "", 'To' : "" + $tu + "" }";
    $var(amqp_routing_key) = "authn.req." + $(fd{kz.encode});
    sl_send_reply("100", "Attempting Kazoo query");
    if(kazoo_query("callmgr", $var(amqp_routing_key), $var(amqp_payload_request))) {
        $var(password) = $(kzR{kz.json,Auth-Password});
        $xavp(ulattrs=>custom_channel_vars) = $(kzR{kz.json,Custom-Channel-Vars});
        xlog("L_INFO", "$ci|log|authenticating $Au via Kazoo query response");
    } else {
        xlog("L_INFO", "$ci|log|failed to query Kazoo for authentication credentials for $Au $si:$sp");
    }
}
```

Kazoo

- CALL

```
if($hdr(Replaces)!= $null) {
    $var(replaced_call_id) = $(hdr(Replaces){s.select,0,,});
}

if($var(replaced_call_id) != "none") {
    xlog("L_INFO", "$ci|log|replaces call-id $var(replaced_call_id)");
    $var(amqp_payload_request) = '{"Event-Category" : "call_event" , "Event-Name" : "channel_status_req", "Call-ID" :
    $var(amqp_routing_key) = "call.status_req." + $(var(replaced_call_id){kz.encode});
    sl_send_reply("100", "Attempting Kazoo query");
    if(kazoo_query("callevt", $var(amqp_routing_key), $var(amqp_payload_request))) {
        $du = $(kzR{kz.json,Switch-URL});
        if($du != $null) {
            xlog("L_INFO", "$ci|log|call-id $var(replaced_call_id) found redirecting call to $du, courtesy of kazoo");
            route(EXTERNAL_TO_INTERNAL_RELAY);
            exit();
        }
    }
}
```

Payback time

Other stuff we contributed to

- Dbtext
- Presence
- Usrloc
- Registrar
- Dispatcher

What's Next ?




- Dynamic subscribe
- Deprecate pua customizations
- Native JSON in kamailio script ?
- AMQP handled at transport level ?






KazooCon 2015 – October 5/6 San Francisco

Thank You!

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