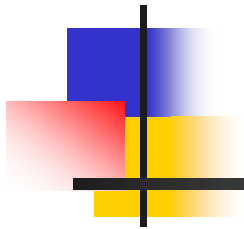


# Call Management Policy Specification for Asterisk PBX



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# Requirements

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- User Policy specification for call handling
  - When busy, customer calls forwarded to team members  
colleagues hear my schedule  
friends -> voicemail
  - During 9-5, when I am out of office  
incoming calls -> mobile, cross-town-office
- Administrator Policies for authorisation and call management
  - Calls to mobiles, receive message 5 minute duration  
after 5 min. terminate
  - Research & sales dept. staff permitted to dial international  
receive message 10 min duration
  - Calls to cross-town-office use SIP over datalink
  - Switch service provider if failure rate exceeds threshold



# Asterisk PBX

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- Asterisk is public domain VoIP PBX software for standard PCs
  - Not easy to manage, configure or maintain
- Sophisticated call management features via configuration files
  - Forwarding, monitoring, recording, block, voicemail, ring types, queues, hunt groups, query variables, access database
  - Example for calls to ext. 123
    - exten => 123,1,Answer()
    - exten => 123,2,Playback(myMessage)
    - exten => 123,3,Voicemail(123)
    - exten => 123,4,Hangup()



# Example Asterisk Administrator's Call Management 'Policy'

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```
[Globals]
SipOUT = SipFirst
FailedCalls = 0
[SipOutgoingCallsCheck]
exten => _X,1,Dial(${EXTEN}@${SipOUT})
;;; After the call check the result in the
;;; DIALSTATUS variable. If it is a failed call
;;; go-to step 101 otherwise exit
exten => _X, 2, GotoIf ($[${DIALSTATUS} = CONGESTION ]? 101:200)
;;; FAILED CALL
exten => _X,101,SetVar(FailedCalls = ${FailedCalls} +1)
;;; If failed calls are more than 10, switch providers
exten => _X,102, GotoIf($[${FailedCalls} = 10 ]? 103:200)
exten => _X,103, SetVar(SipOUT = SipSecond)
exten => _X,104, SetVar(FailedCalls = 0)
exten => _X, 105, Hangup()
;;; OK EXIT
exten => _X, 200, Hangup(
```



# Conflict Handling

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- Conflicts due to granularity of number specification
- P1 All calls from Greece (0030....)  
Forward to mobile,  
change caller ID to 101 to indicate from Greece,  
record.
- P2 Call from 003021080777777 (from Brother)  
Forward to mobile, + home
- Conflict detected and user informed
- Default resolution is more specific policy takes precedence so P2 over-rides P1

# Example End User Policy Specification

**NEW POLICY FOR 100 (office)**

NAME : OFFICE\_HOURS

DESCRIPTION: During office hours if I am away forward to my mobile

DIRECTION: INCOMMING

MATCHING :

- CALLER NUMBERS: STARTING WITH 6944
- Time: TIMES BEFORE 17 : 00, DAYS WeekDays
- when my phone: is NOT ANSWERING

Conflicting Policy Name	Number conflict is that	Will be overridden ?
TEST1	number is more specific (ALL = )	NO
FORWARD	number is more generic (STARTING WITH = 6944)	YES

add actions

**HELP:**  
Dial up to 3 numbers simultaneously. The first number to answer will be bridged

ACTION	ARGUMENT	PRIORITY		
SET CALLER IDENTIFICATION	100	1	delete	add
CALL LIMIT (max seconds)	180	2	delete	add
RECORD CALL		3	delete	add
DIAL	69757676767   210807777777	4	delete	add

submit

Ολοκληρώθηκε

- Event (incoming or outgoing call) – condition – action rule

# Admin Policy Specification

New ADMIN Policy - Mozilla Firefox

Αρχείο Επεξεργασία Προβολή Μετάβαση Σελιδοδείκτες Εργασίες Βοήθεια

http://192.168.1.100:8080/ACME/admin/admin\_policy/newPolicy.jsp Μετάβαση

## NEW POLICY FOR ADMIN

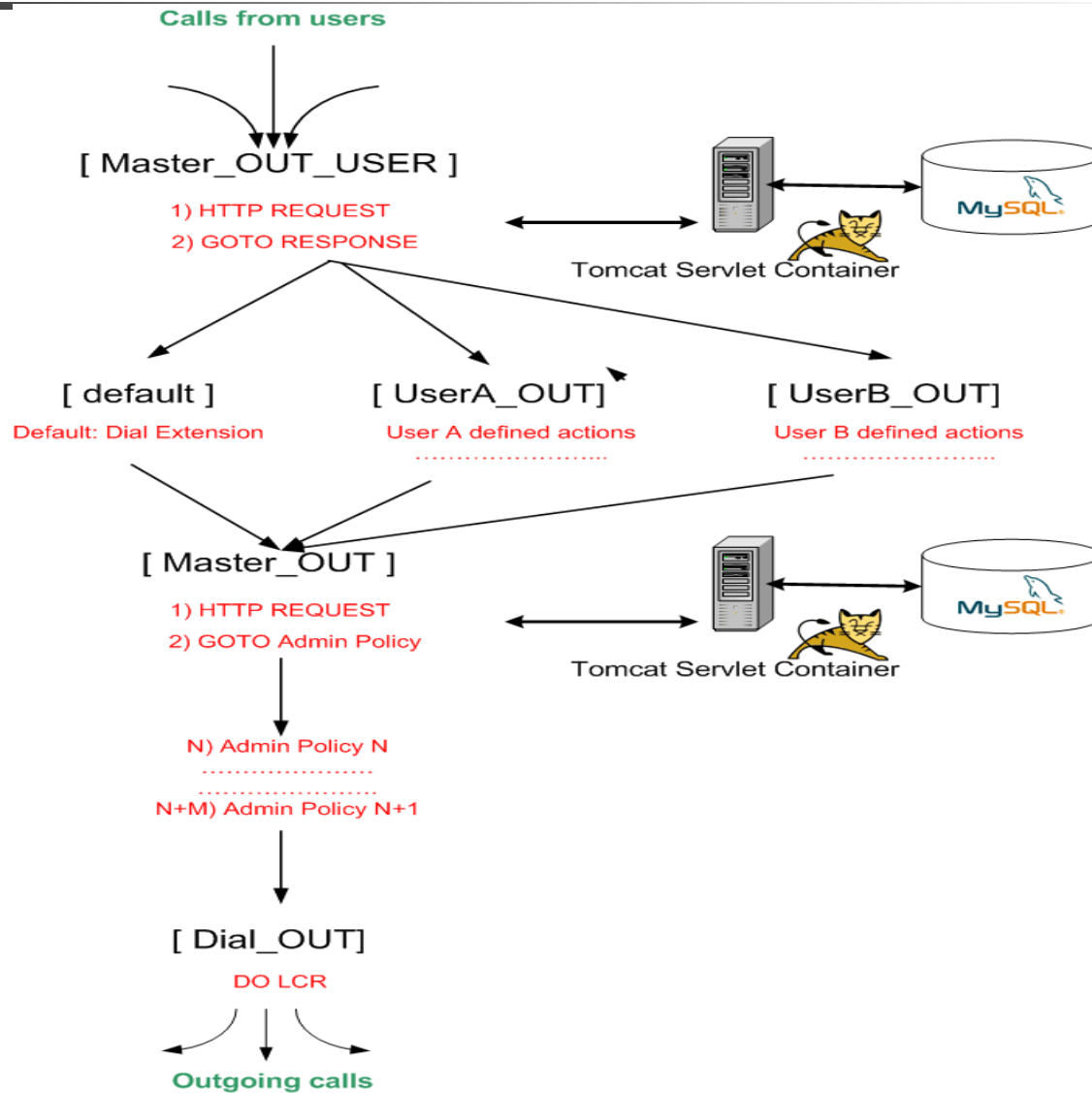
<b>NAME :</b>	DEFAULT_LIMIT_MOBILES	
<b>DESCRIPTION:</b>	The default users group may not place mobile calls of more than 5 minutes	
<b>DIRECTION:</b>	OUTGOING	
<b>MATCHING :</b>	<b>GROUP / CALLER</b>	<b>DESTINATION</b>
	GROUP: default USER: ALL USERS	TYPE: Mobile NUMBER: ALL NUMBERS

ACTION	ARGUMENT	PRIORITY	
PLAYBACK	FILE: call_is_limited <i>Choose one of your uploaded files:</i> test.wav OR upload	1	delete
CALL LIMIT (max minutes)	300	2	add

submit

Ολοκληρώθηκε

# Outgoing Call Handling







# Outgoing Call Overheads

<b>LATENCY</b>	<b>Ave. time in ms</b>
User DB Latency	5.776
User Policy Latency	0.238
<b>Overall User Latency</b>	<b>6.01</b>
Admin DB Latency	14.124
Admin Policy Latency	0.407
<b>Overall Admin Latency</b>	<b>14.531</b>
<b>Overall Outgoing latency</b>	<b>20.546</b>



# Conclusions

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- 6 month Masters student project
- Able to cater for specification of most policies
- Evaluated by users and administrators in Telecomms Service Provider (InAccess) in Athens
- Application specific constrained policy specification is essential for non-technical end-users
- Useful for Administrators
- Reasonable performance with no attempt to optimise