# Async API in OpenSIPS

# 11 September 2020

- Peter Lemenkov
- https://github.com/lemenkov(https://github.com/lemenkov)
- https://github.com/lemenkov/opensips-summit-2020 (https://github.com/lemenkov/opensips-

summit-2020)

#### Introduction

- Introduced in OpenSIPS 2.1 (https://www.opensips.org/Documentation/Script-Async-2-1)
- Not widely used
- People unaware
- Not well documented (for developers)
- Has limitations
- I'll talk about ver. 3.1 (https://www.opensips.org/Documentation/Script-Async-3-1)

#### async in c code

```
static pv_elem_t *extra_id_pv = NULL;
static acmd_export_t acmds[] = {
        {"rtpengine_offer", (acmd_function)rtpengine_offer_af, {
                {CMD_PARAM_STR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_VAR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_VAR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_STR | CMD_PARAM_OPT, 0, 0}, {0,0,0}}},
        {"rtpengine_answer", (acmd_function)rtpengine_answer_af, {
                {CMD_PARAM_STR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_VAR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_VAR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_STR | CMD_PARAM_OPT, 0, 0}, {0,0,0}}},
        {"rtpengine_delete", (acmd_function)rtpengine_delete_af, {
                {CMD_PARAM_STR | CMD_PARAM_OPT, 0, 0},
                {CMD_PARAM_VAR | CMD_PARAM_OPT, 0, 0}, {0,0,0}}},
        {0, 0, {{0, 0, 0}}}
```

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## async in c code (cont.)

```
static int rtpe_function_call_async(struct sip_msg *msg, async_ctx *ctx, str *flags_str,
       pv_spec_t *spvar, pv_spec_t *bpvar, str *body, enum rtpe_operation op)
       struct ng_flags_parse ng_flags;
        str oldbody;
       struct rtpe_node *node;
       struct rtpe_set *set;
       int ret, read_fd;
       param->bencbuf = bencbuf;
        param->op = op;
       param->node = node;
       param->cookie = strdup(cookie);
       param->bpvar = bpvar;
        param->spvar = spvar;
       ctx->resume_f = resume_async_send_rtpe_command;
       ctx->resume_param = param;
       async_status = read_fd;
        return 1;
error:
       bencode_buffer_free(bencbuf);
        return -1;
```

### async in c code (cont. next one)

```
enum_async_ret_code_<del>resume_async_send_rtpe_command</del>(int_fd, struct_sip_msg_*msg, void *_param)
        rtpe_async_param *param = (rtpe_async_param *)_param;
        if (param->node->rn_umode == 0) {
                do {
                        len = read(fd, buf, sizeof(buf) - 1);
                } while (len == -1 && errno == EINTR);
                close(fd);
                if (len <= 0) {
                        LM_ERR("can't read reply from a RTP proxy\n");
                        goto error;
       else {
                fds[0].fd = fd;
                fds[0].events = POLLIN;
                fds[0].revents = 0;
                while ((poll(fds, 1, rtpengine_tout * 1000) == 1) && (fds[0].revents & POLLIN) !=
                                len = recv(fd, buf, sizeof(buf)-1, 0);
                        } while (len == -1 && errno == EINTR);
                        if (len <= 0) {
                                LM_ERR("can't read reply from a RTP proxy\n");
                                RTPE_IO_ERROR_CLOSE(param->node->idx);
                                goto error;
```

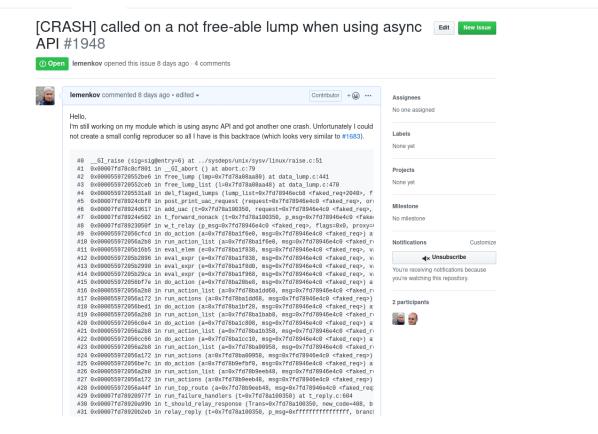
### async in config

```
$acc_extra(rtpstat) = $rtpquery;
                       xlog("L_INFO", "$ci ($cfg_file) RTP UNFORCE - ASYNC STARTING $ci");
                       async(rtpengine_delete(), rtpengine_post_delete);
                       break:
       xlog("L_INFO", "$ci ($cfg_file) RTP Proxy Reply [$avp(rtp_proxy_engaged)] (Res: $var(rtpengine_res) )");
       if ($var(rtpengine_res) == -1) {
               xlog("L_ERROR", "$ci ($cfg_file) RTP Response was -1 clearing rtp_proxy_engaged");
       return($var(rtpengine_res)); # Return retcode from rtpproxy_offer
route[rtpengine_post_delete]{
       xlog("L_INFO", "$ci ($cfg_file) RTP UNFORCE - ASYNC COMPLETE 1 $ci");
       xlog("L_INFO", "$ci ($cfg_file) RTP Server IP: $avp(rtp_server_ip)");
       if (isbflagset("SRC_NAT_BFLAG") && (($rm=="BYE") || ($rm=="CANCEL"))) fix_nated_contact();
       xlog("L_INFO", "$ci ($cfg_file) RTP UNFORCE - ASYNC COMPLETE 2 $ci");
      #if (isbflagset("SRC_NAT_BFLAG") && $rm) fix_nated_contact();
       #if (isbflagset("SRC_NAT_BFLAG"))    fix_nated_contact();
               xlog("L_ERROR", "$ci ($cfg_file) Unable to r_relay");
                       xlog("L_ERROR", "$ci ($cfg_file) Sleeping for 3 seconds");
                       async( sleep(3), egress);
```

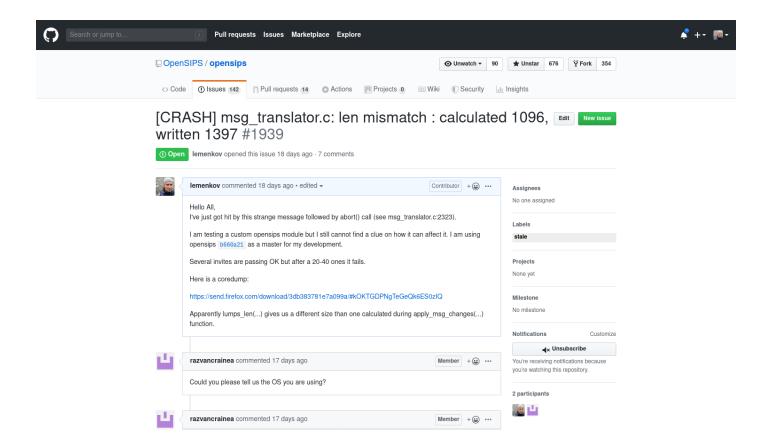
#### async in config (cont.)

```
xlog("L_INFO", "REMOVE HDRS 3 $ci");
# RTP Responses can sometime stop the processing (bug) of the rest to the script route, keep at the end.
if (is_method("BYE")){
        route(set_bye_acc_fields);
        xlog("L_INFO", "$ci ($cfg_file) BYE MESSAGE IN REPLY");
        route(rtpproxy, "unforce");
        if (is_present_hf("Reason")) insert_hf("Reason: SIP ;cause=Timeout ;text=\"$DLG_end_reason\"\r\n",
        xlog("L_INFO", "$ci ($cfg_file) $DLG_end_reason");
if (has_body("application/sdp")){
        if (isflagset("LATE CODEC")){
                xlog("L_INFO", "RTP OFFER $ci");
                route(rtpproxy, "offer");
        } else {
                route(rtpproxy, "update_answer");
                drop();
                exit:
        if ($retcode == -1 && $avp(rtp_mode) == 'strict'){
                xlog("L_WARN", "$ci ($cfg_file) RTP Engagement Error (Late Codec Negotiation)");
                $acc_extra(x_sip_reason) = "RTP Engagement Error (R)";
                drop();
                exit;
```

#### Issues



#### Issues (cont.)



#### Issues

- Sometimes very fragile
- Read logs carefully (I mean it)

```
pensips[16039]: 4-4689@10.6.195.85 (/etc/opensips/route.cfg) [91.183.239.28] To Tag Found pensips[16039]: 4-4689@10.6.195.85 (/etc/opensips/sequential-requests.cfg) [<null>] Sequential Request: ACK pensips[16039]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#002Ŷ pensips[16039]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#002Ŷ pensips[16039]: 4-4689@10.6.195.85 (/etc/opensips/sequential-requests.cfg) [<null>] Dialog Matched pensips[16040]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#002#007 pensips[16039]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#002#007 pensips[16040]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#002#007 pensips[16040]: 1-4689@10.6.195.85 (/etc/opensips/rtpproxy.cfg) RTP UNFORCE - ASYNC COMPLETE 3 1-4689@10.6.195.85 pensips[16040]: 1-4689@10.6.195.85 (/etc/opensips/rtpproxy.cfg) RTP Proxy Reply [3] (Res: <null>) pensips[16040]: ERROR:nathelper:fix_nated_contact_f: SCRIPT BUG - second attempt to change URI Contact pensips[16039]: 10-4689@10.6.195.85 (/etc/opensips/route.cfg) UAC NAT Detected
```

#### Issues (cont.)

Read logs really really carefully

```
ensips[16362]: 1-5025@10.6.195.85 (/etc/opensips/rtpproxy.cfg) RTP OFFER - ASYNC COMPLETE 4 1-5025@10.6.195.85
ensips[16362]: 1-5025@10.6.195.85 (/etc/opensips/rtpproxy.cfg) NON-ASYNC DATA RTP Server IP: udp:178.62.29.244:122:
ensips[16362]: 1-5025@10.6.195.85 (/etc/opensips/rtpproxy.cfg) RTP Proxy Reply [3] (Res: <null> )
ensips[16362]: 1-5025@10.6.195.85 (/etc/opensips/per-branch-ops.cfg) RTP Engagement Error
ensips[16362]: ERROR:tm:t_forward_nonack: failure to add branches
ensips[16362]: ERROR:tm:w_t_relay: t_forward_nonack failed
ensips[16362]: 1-5025@10.6.195.85 (/etc/opensips/relay.cfg) Unable to r_relay
ensips[16362]: ERROR:topology_hiding:topo_callid_post_raw: could not parse resulted sip message: HEP3#001f
ensips[16363]: 1-5025@10.6.195.85 (/etc/opensips/route.cfg) UAC NAT Detected
ensips[16363]: 1-5025@10.6.195.85 (/etc/opensips/route.cfg) [91.183.239.28] To Tag Found
```

# Conclusion

- Go and use it!
- Very careful testing reuired

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## Thank you

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