Osmocom CTRL protocol

OsmoCon 2017

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April 21, 2017
Agenda

1. Intro
2. Tech details
3. Usage examples
4. Future perspectives
Intention: “CTRL for programs” like “VTY for humans”
Overview

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- Python and C implementations
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Security

None: it’s the task of other layers.
• Binary framing + text based payload
• IPA multiplex based (0xEE 0x00)
• Total 6 messages (both client and server)
• RO, RW, WO variables
### Informal spec

#### Table: Request/Response messages

<table>
<thead>
<tr>
<th>Client</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET</td>
<td>SET_REPLY / ERROR</td>
</tr>
<tr>
<td>GET</td>
<td>GET_REPLY / ERROR</td>
</tr>
<tr>
<td></td>
<td>TRAP</td>
</tr>
</tbody>
</table>

**Figure:** Set `<var>` variable to `<val>` value (`<id> ≠ 0` is unique operation identifier).
def do_set_get(sck, var, value = None):
    (r, c) = Ctrl().cmd(var, value)
    sck.send(c)
    answer = Ctrl().rem_header(sck.recv(4096))
    return (answer,) +
            Ctrl().verify(answer, r, var, value)
Trap command in C

```c
void osmo_bsc_send_trap( struct ctrl_cmd *cmd,
                         struct bsc_msc_connection *msc_con )
{
    struct ctrl_cmd  *trap ;
    struct ctrl_handle  *ctrl ;
    struct bsc_msc_data  *msc_data ;

    msc_data = ( struct bsc_msc_data  *)
                msc_con->write_queue.bfd.data ;
    ctrl = msc_data->network->ctrl ;
    trap = ctrl->cmd_trap(cmd) ;
    ctrl_cmd_send_to_all(ctrl , trap ) ;
    ctrl_cmd_send(&msc_con->write_queue, trap ) ;

    talloc_free(trap );
}
```
Useful CTRL variables

- `rate_ctr.*`
  - Rate counter value, RO
- `fsm.FSM_NAME.id.INSTANCE_ID.state/timer/...`
  - FSM introspection
- `enable-ps/disable-ps`
  - Control GPRS services per-IMSI
Single source of truth

Ideally we’d like to have same “knobs” exposed via both \textit{vty} and \textit{ctrl} using single definition.

- RFC 6241 NETCONF
- RFC 6020 YAML
- Your idea?
Demo time

Let's actually use it for good.

Q & A

If your question have not made it into this part - grab me afterwards or ask at openbsc@lists.osmocom.org.