

User Guide for Roadstar RSU

LEAR CORPORATION

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Reference section

Below are the reference documents for Locomate Roadstar.

- J2735 2016 Specification
- J2945 2016 Specification
- IEEE1609.2 2016 Specification
- IEEE1609.3 2016 Specification
- IEEE1609.4 2016 Specification
- IEEE1609.12 2016 Specification

Chapter 1

Overview of LocoMate

1.1 Introducing LocoMate

LocoMate is a brand name of V2X products from Lear Corporation. Lear offers V2X products for both vehicle and infrastructure. All V2X products have been designed to be installed in automotive environment. These devices provide communication from vehicle to vehicle, vehicle to infrastructure and vehicle to pedestrian. It helps provide safety and data services to the vehicle users.

1.2 V2X vs DSRC

V2X communication can happen with any wireless communication technologies. Underlying wireless technology could be anything from WiFi, BlueTooth, DSRC or Cellular. However, currently in US, wireless technology chosen for V2X is called DSRC. Cellular V2X is another possibility. This technology is being standardized in 3GPP but will take multiple years before users can see V2X based on Cellular technology.

1.3 DSRC Overview

DSRC is “a two-way short-to-medium-range wireless communications capability that permits very high data transmission critical in communications-based active safety applications,” according to the U.S. Department of Transportation’s Intelligent Transportation Systems Joint Program Office, which heads up much of the research related to DSRC. The Federal Communications Commission set aside 75 MHz of spectrum around the 5.9 GHz band (5.850-5.925 GHz) band in 1999 to be used for vehicle-related safety and mobility systems.

DSRC stands for Dedicated Short Range Communications. It is "Dedicated" because 75MHz of spectrum around 5.9GHz frequency was dedicated by FCC for automotive safety. It is "Short Range" because the range expected is around 300m in all directions. DSRC uses exactly the same technology as WiFi where the radio senses the channel to see if the channel is free. If the channel is free, the radio transmits a packet on the air. This method is called CSMA/CA (Carrier Sense Multiple Access / Collision Avoidance).

If the radio senses that the channel is busy, it backs off for a random time interval before attempting to sense again.

1.4 ADAS sensors Vs V2X

ADAS (Advanced Driver Assistance Systems) uses multiple sensors such as radar, infrared and camera. These sensors are used to detect obstacles such as vehicles on the blind spot, vehicle leaving lanes, vehicles stopped in front etc. If these sensors already providing needed support, why do we need V2X sensor ?

The main difference between currently deployed ADAS sensors and V2X is that ADAS sensors are able to detect obstacles only if they are in line of sight. However, if an obstacle is not in line of sight, ADAS sensors won't help detect such obstacles and provide driver assistance. For example, if a vehicle is approaching from a blind corner, ADAS sensors won't see it and won't be able to provide real-time assistance to avoid a collision. However, V2X has the ability to detect vehicles that are not in line of sight. V2X will be part of ADAS sensors and will be installed in every vehicle once the USDOT mandate happens. With existing sensors and V2X, there is room for sensor fusion between line-of-sight sensors and V2X. This fusion will provide solid driver assistance (whether an obstacle is visible or not).

1.5 Autonomous Vs V2X

V2X/ADAS sensors provide assistance only and not active safety (where vehicles do not take any decision such as applying brake etc). As mentioned in the previous section, autonomous vehicles with current sensors will only be able to detect obstacles in line of sight, but V2X helps enhance the detection of non-line-of-sight obstacles as well.

1.6 Technology Overview

In this document, we will use two key words "Host vehicle" (Vehicle under test) and "Remote vehicle" (Another vehicle that might come on a collision path with the host vehicle).

As explained in previous sections, the main benefit of V2X technology is the ability of a Host vehicle to detect any remote vehicle appearing on non-line-of-sight. To achieve this goal, V2X sensor technology requires each remote vehicle to announce its own location. This will allow any host vehicle to detect if a remote vehicle is on a collision path with the Host vehicle. Unless each remote vehicle that appears from a non-line-of-sight announces its location, the host vehicle will not be able to recognize the threat from the remote vehicle.

When the host vehicle receives packets over the air, it compares its own location and path against each of the remote vehicle's path. If the host vehicle detects that it is on a collision path with one of the remote vehicles, then it provides a warning to the driver.

Infrastructure based RSU (Road Side Unit) also has an integrated GNSS device which is used to provide timing information to RSU.

1.6.1 On Board Unit Transmission

The Vehicle OBU (On Board Unit) transmits a Basic Safety Message (BSM) 10 times a second. This BSM consists of the location of the current vehicle (latitude, longitude, altitude and heading), which is obtained from a GNSS device such as GPS. The GNSS device can either be built as part of an OBU or be provided through a vehicle bus such as CAN.

In addition to the current location, BSM also transmits the history of past locations called "Path History". This path history consists of a maximum of 15 past locations. The computation of the past location to be added to BSM history depends on whether the vehicle travels on a straight road or a curvy road. On straight roadway, the vehicle adds path history locations every 300 meters. However, on a curvy road, the vehicle looks at two consecutive locations and adds more location points based on the sharpness of the given curvature. The actual algorithm for this is given in SAE standard. The vehicle also transmits the status of the vehicle which includes: brake status, steering wheel angle, and wiper status (as part of BSM).

1.6.2 Road Side Unit Transmission

The infrastructure-based RSU (Road Side Unit) also has an integrated GNSS device that is used to provide timing information to RSU. The RSU transmits the following messages:

- WSA - Wave Service Advertisement
- SPAT - Signal Phase and Timing
- MAP - Intersection geometric MAP
- TIM - Traveller Information Message
- RTCM - Real Time Correction Message for GPS correction

1.7 Typical V2X Device Details

A V2X device should have a minimum following components

- Application Processor
- DSRC Radio-1
- DSRC Radio-2

- GNSS Device

A V2X OBU will typically have additional interfaces such as CAN or Ethernet. A V2X RSU will typically have additional Ethernet interfaces for back-end connectivity and power.

1.8 Channel Details

DSRC radios can operate on one of the following channels in the range of 5.850GHz to 5.925GHz. They are numbered 172, 174, 176, 178, 180, 182 and 184.

The middle-channel (178) is called "Control Channel". This is where the RSU announces its services using a WSA broadcast. An OBU typically tunes into the Control Channel to obtain services from the RSU. The left-most channel (172) is called "Safety Channel" and is reserved for communicating safety messages including BSM. The right-most channel (184) is reserved for public safety. The remaining channels (174, 176, 180 and 182) are called "Service Channels".

One of the radios on the V2X OBU will be tuned to safety channel 172 and continuously transmits and receives BSM. The second radio on the V2X OBU will be switching between "Control Channel" and "Service Channel". The OBU spends 50ms on Control Channel and 50ms on Service Channel.

Similarly, on the RSU, one of the radios will be tuned to channel 172 to receive BSMs and forward the messages to the back-end system that is installed in the TMC (Traffic Management Center). The second radio on the RSU switches between Control Channel and Service Channel, similar to the OBU.

1.9 Wave Service Advertisement

The RSU transmits a special message called WSA (Wave Service Advertisement) on the control channel (178). This message provides service-channel information that the RSU offers. For example, if the RSU is installed on a toll booth, it will transmit a WSA with content "Tolling service" on channel 180. When an OBU receives this message from this RSU, it knows that the RSU offers a tolling service and tunes to channel 180 to communicate payment details to the RSU.

Chapter 2

LOCOMATE ROADSTAR RSU

2.1 Locomate Roadstar



Locomate Roadstar RSU provides information provided by traffic controller by broadcasting SPAT, MAP and TIM messages. Locomate Roadstar OBU receives and process the messages based on its current GPS co-ordinates. One more feature of RSU is providing IP connectivity to OBU. RSU broadcasts wave service advertisements which will be received by OBU and OBU sets the channel and routing information accordingly. IP connectivity to OBU is achieved by running WSA and Ipservice applications on RSU (By default provider application running on RSU. So IP connectivity achieved by provider application).

2.1.1 Front panel view of Locomate Roadstar RSU



2.1.2 Back panel view of Locomate Roadstar RSU



Chapter 3

Hardware details of Locomate Roadstar RSU

LocoMate package contains:

- Quad-Core ARM® Cortex A9 processor at 1GHz
- 1GByte RAM
- 2MB Serial Flash
- 4GB eMMC Flash
- HDMI 1.4a Display port
- 2 (2x2) QCA6584 Hi-Power DSRC Radios
- Ublox LEA-8ML ADR based Multi GNSS Navigation module
- SLI97 Security Controller
- PC friendly Micro USB based Console Port
- Analog(Headphone & Mic, 3.5mm Audio Jack)and Digital(HDMI)audio
- 10/100/1000 Mbps Ethernet
- 10-pin JTAG interface
- 1 High speed Host USB port Type A
- 1 OTG Micro USB port Type AB
- 2xCAN2.0
- I2C
- Operating Voltage -5V DC.

Chapter 4

Installation of Locomate Roadstar RSU

Below are the steps to install Locomate Roadstar RSU device

- Connect ethernet cable as shown in below,



Ethernet cable act as power supply to RSU.

- There are total seven antennas. Four are belongs to “E02-00003-00” and Three are belongs to “E02-00003-00” as shown below



- Connect four antennas with version number “E02-00003-00” to DSRC ports and three antennas with version number “E02-00003-00” to WiFi as shown



- The antenna having GNSS and XM cable is shown below,



- Connect that antenna to corresponding GNSS and XM device as shown in the below,



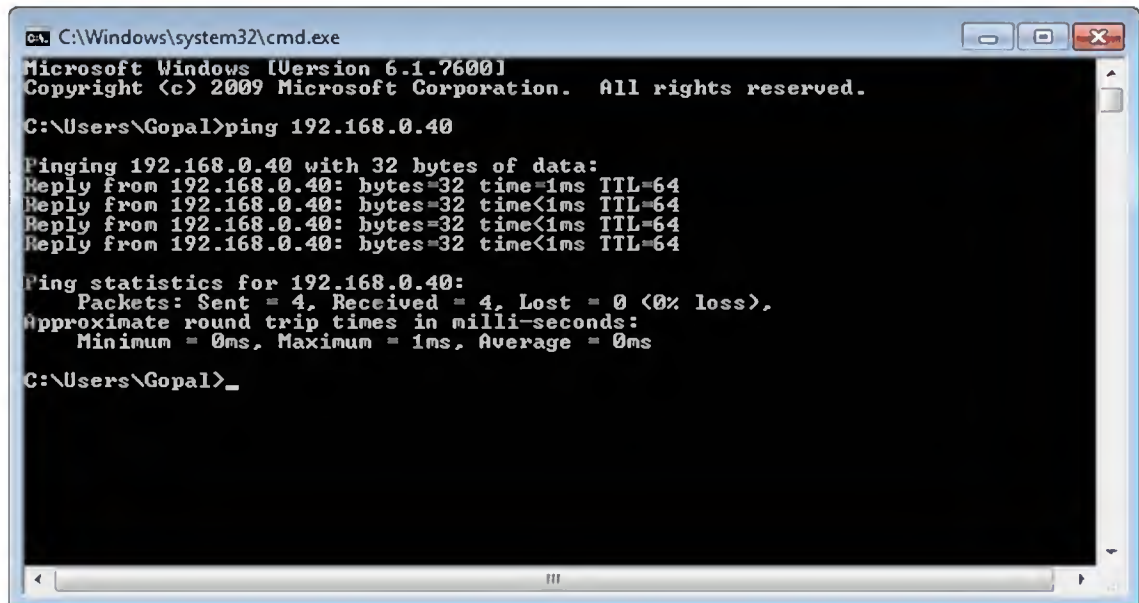
Chapter 5

Accessing Locomate Roadstar from the Laptop

Locomate Roadstar supports SSH remote sessions. In order to start session, make sure your computer IP address and device IP address are in the same subnet. By default Locomate Roadstar will be configured with **192.168.0.40** IP address. Try to ping to 192.168.0.40. Once Ping is success you can access the device in any of the supported remote connections. Once login to Locomate Roadstar is successful, you will land up in **Lear CLI**. We will provide detailed explanation about Lear CLI in next chapters.

5.1 Basic settings

- Power on Locomate Roadstar
- Make necessary IP changes on your laptop as below.
 - **On Linux machine:** If IP of Linux machine not with the prefix of "192.168.0.XX" series, add the IP to Linux machine as below,
sudo ifconfig eth0:1 192.168.0.56
 - **On Windows machine:** If IP of Windows machine not with the prefix of "192.168.0.XX" series, add the IP to Windows machine statically.
- Ping to default IP 192.168.0.40, if ping is successful, Laptop is ready to communicate with Roadstar.

A screenshot of a Windows command prompt window. The title bar reads "C:\Windows\system32\cmd.exe". The window content shows the following text:

```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Gopal>ping 192.168.0.40

Pinging 192.168.0.40 with 32 bytes of data:
Reply from 192.168.0.40: bytes=32 time=1ms TTL=64
Reply from 192.168.0.40: bytes=32 time<1ms TTL=64
Reply from 192.168.0.40: bytes=32 time<1ms TTL=64
Reply from 192.168.0.40: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.0.40:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\Gopal>_
```

5.2 Setting device password and Recovery method

Password recovery provides the facility to recover the admin password in case if it is forgotten by the user. The password recovery mechanism needs the user to answer the pre-stored questions when the user login as admin user at the very first time. Once the questions are answered, the user is provided with an option to set the new password for admin. The user is expected to provide a strong password twice to set a new password as per the guidance given below. If the user is unable to set the new password as per requirement, old or previously set password will be retained.

To recover admin password, user can login as 'recovery' user with password as 'recovery' as given below. Here, the user should answer the questions appropriately which is stored initially while setting the new password. Once the questions are answered, user can reset the admin password.

```
ssh recovery@ip_address_of_the_device with password as recovery
```

5.2.1 Guidance for the password Recovery:

- User is expected to provide a strong password that should involve special characters, Uppercase, lowercase letters and numbers.

- Do not use publicly available facts as responses (e.g. don't use your pet's name, etc.,) when answering the questions.
- Recommend to use different responses for the questions in different devices.

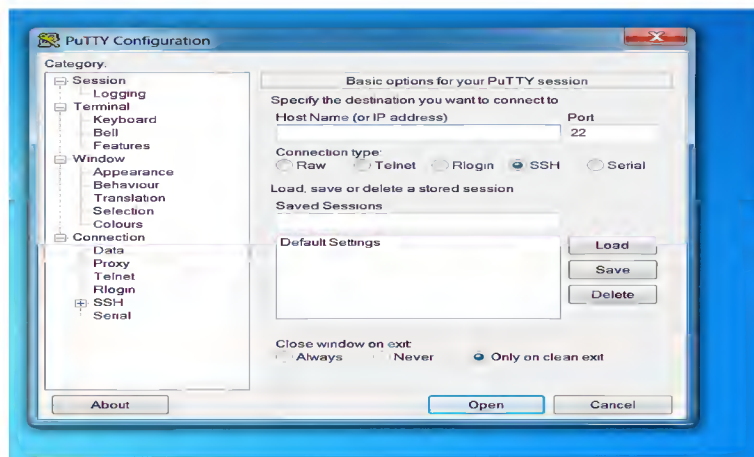
5.3 Connecting from Linux machine using SSH

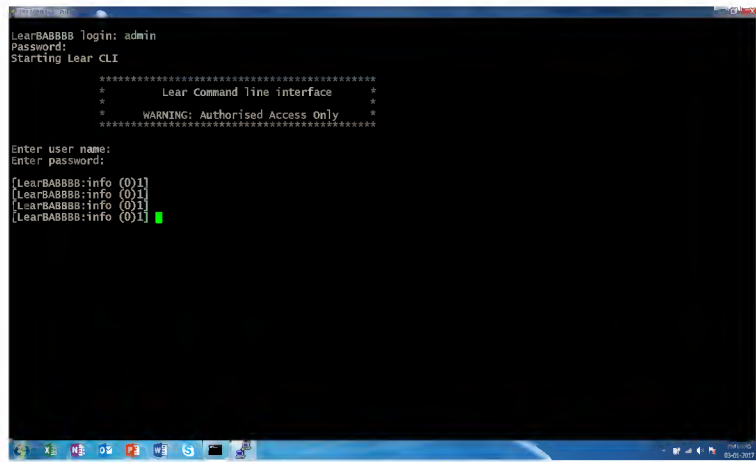
Use `ssh` command from the shell to start ssh session as below.

```
$ ssh admin@192.168.0.40  
admin@192.168.0.40's password- User@321#
```

5.4 Connecting from Windows machine using SSH

In Windows you can use “Putty” application to start ssh sessions with Locomate Roadstar. Select required connection type in putty application as below.





Chapter 6

Lear Command Line Interface

Lear CLI is a customized shell, which is built on Cisco Like Shell framework. You can configure Locomate Roadstar with “config” commands and view the configured parameters with “show” commands. There are three CLI modes on Locomate Roadstar. “Info”, “Config” and “Debug” are the three modes. Brief explanation of three modes is given below, Command reference manual explains each command in detail.

Lear CLI control Keys

? : Provides help message of command and subcommands.

< **tab** >: Completes the command

6.1 Info mode

This is the default mode where user is placed after logging in to system. The “show” commands of “info” mode allows you to view the configured parameters of Locmate Roadstar. The “request” commands allows you perform system operations, like firmware upgrade and reboot. “copy” command allows you to copy files between Locmate Roadstar and any connected machine. “del” allows you to delete files. Use “enable” command of info mode to enter into “config” mode and “debug” command to enter into “debug” mode.

```
[lear334455:info (12)0] show application details
```

```
[lear334455:info (12)0] show application summary <application>
```

6.2 Config mode

In **config** mode you are allowed to configure the application, customApp, rsumode, tunnel, interface, locos, system, remote, log, time and firewall parameters.

```
[lear334455:info (12)0] enable
Moving to conf view...
[lear334455:conf (12)0]
```

exit command is used to exit from current mode.

```
[lear334455:conf (12)0] exit
```

6.3 Debug mode

debug provides network debugging tools like ping and traceroute. “list” command is used to list the files in required directory.

```
[lear334455:info (0)1] debug
Moving to diagnostic view...
[lear334455:debug (0)1]
```

To exit from debug mode use “exit”,

```
[lear334455:debug (12)0] exit
```

For more information on these modes, please refer command reference manual introduction section.

Chapter 7

Default configuration of Locomate Roadstar RSU

The default application details of the Locomate Roadstar RSU is as follows,

```
[Lear052790:info (2)0] show all
----- SYSTEM -----
Product ID                =>    LOCOMATE-300-RSU
System Name               =>    Lear052790
Country                   =>    unitedstates-public-safety (842)
MAC address               =>    00:26:AD:05:27:90
DB version                =>    0.9
RFS version               =>    v0.0.18-0-g7b090fc
SDK version               =>    v16.3.QA_07.01
Kernel version           =>    3.10.17-arada-LC3+
system uptime            =>    0 day(s) 0 hour(s) 1 min(s) 15 sec
dsrbackendseparation     =>    enabled
Number of bridges        =>    2
brwifi interfaces        =>    wifi0vap0
Configured no of cores   =>    25
```

No external media connected!

```
----- LOG -----
Syslog (remote) status   =>    disabled

Time based syslog       =>    enabled
Syslog Rotatetime       =>    2340
Syslog File Size        =>    64kb
Syslog File count       =>    2
```

```
----- APPLICATION -----
```

```

app_name           =>      bsm
app_status         =>      disabled
wme_arg           =>      psid\ 32\ service\ csr\ schan\ 172\ slot\ either
wsm_arg           =>      security\ unsecured\ verifybypass\ disable\
txchan\ 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\
 50\ exptime\ 0
sae_arg           =>      vehicletype\ 1\ vehiclewidth\ 0\ vehiclelength\ 0
oth_arg           =>      txmode\ rx\ tempIdStatus\ disable\ msgCount\ 2\
  printencode\ disable\ printdecode\ disable

app_name           =>      tim
app_status         =>      enabled
wme_arg           =>      psid\ 131\ service\ csr\ schan\ 178\ slot\ slot0
wsm_arg           =>      security\ unsecured\ verifybypass\ enable\ txchan\
 178\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg           =>      txmode\ tx\ srmFolder\ /var/SRM/AML/\ printencode\
  disable\ printdecode\ disable

app_name           =>      spat
app_status         =>      enabled
wme_arg           =>      psid\ 130\ service\ csr\ schan\ 172\ slot\ either
wsm_arg           =>      security\ unsecured\ verifybypass\ enable\ txchan\
 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg           =>      txmode\ tx\ portNumber\ 1516\ printencode\ disable\
  printdecode\ disable

app_name           =>      map
app_status         =>      enabled
wme_arg           =>      psid\ 130\ service\ psr\ wsatype\ any\ psc\ usdot\
  schan\ 172\ chaccess\ continuous\ wsarate\ 50\ wsachan\ 178\ ipservice\ disable\ port\ 0\
  rcpithresh\ 0\ wsacntth\ 0\ wsacntthint\ 0\ infoeleId\ f\ signlifetime\ 0
wsm_arg           =>      security\ unsecured\ verifybypass\ enable\ txchan\
 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg           =>      txmode\ tx\ srmFolder\ /var/SRM/MAP/\ printencode\
  disable\ printdecode\ disable

app_name           =>      ipservice
app_status         =>      disabled

```

```

wme_arg          =>      psid\ 270549118\ service\ psr\ wsatype\ any\ psc\
  ipv6\ schan\ 176\ chaccess\ alternatesch\ wsarate\ 50\ wsachan\ 178\ ipservice\ enable\
  port\ 0\ rcpithresh\ 0\ wsacntth\ 0\ wsacntthint\ 0\ infoeleId\ f\ signlifetime\ 0
wsm_arg          =>      security\ unsecured\ verifybypass\ enable\ txchan\
  178\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg          =>      txmode\ none\ printencode\ disable\ printdecode\
disable

app_name        =>      egoprocess
app_status      =>      disabled
wme_arg         =>
wsm_arg         =>
oth_arg         =>

app_name        =>      pvd
app_status      =>      disabled
wme_arg         =>
wsm_arg         =>
sae_arg         =>
oth_arg         =>

app_name        =>      pdm
app_status      =>      disabled
wme_arg         =>      psid\ 132\ service\ psr\ wsatype\ any\ psc\ probe\
  schan\ 176\ chaccess\ alternatesch\ wsarate\ 50\ wsachan\ 178\ ipservice\ enable\ port\ 0\
  rcpithresh\ 0\ wsacntth\ 0\ wsacntthint\ 0\ infoeleId\ f\ signlifetime\ 0
wsm_arg         =>      security\ unsecured\ verifybypass\ enable\ txchan\
  176\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg         =>      txmode\ txrx\ printencode\ disable\ printdecode\
  disable\ configFile\ /var/PDM/

```

----- TUNNEL -----

```
Status          =>      disabled
```

----- WRA -----

WRA configuration details


```

IP Prefix of WRA           =>    fe80::
Prefix Length of WRA      =>    40
Default Gateway of WRA    =>    fe80::200:1
Primary DNS of WRA        =>    fe80::200:1

```

----- IPv4 -----

```

IPv4 Address               =>    172.20.1.228
IPv4 Netmask               =>    255.255.255.0
IPv4 Gateway              =>    172.20.1.5
Primary DNS                =>    172.20.1.4
Secondary DNS             =>    0.0.0.0
IPv4 DHCP client          =>    enabled

```

----- IPv6 -----

```

brtrunk IPV6 Address      =>    fe80::226:adff:fe05:2790/64
    fe80::200:ff:fe00:1/64
brtrunk IPV6 Network Prefix =>
brtrunk IPV6 Gateway      =>

brwifi IPV6 Address       =>    fe80::200:1/64 fe80::226:adff:fe05:2791/64
    fe80::200:ff:fe00:2/64
brwifi IPV6 Network Prefix =>
brwifi IPV6 Gateway       =>

```

----- AP Params -----

```

channel                   =>    36
password                  =>    Shared#321Le@r
ssid                      =>    Lear051580-11ac

```

----- REMOTE -----

```

SSH daemon                =>    enabled
Telnet daemon             =>    enabled
SNMP daemon               =>    disabled

```

----- TIME -----

```

Current time is           =>    Thu Sep 7 05:38:43 GMT 2017

```

```

Current timezone status      =>    iceland (110)
Daylight time saving status =>    enabled
GPS status                  =>    enabled
Time update interval        =>

```

```
-----
```

```
----- LOCOS -----
```

```

MAC Address Randomization  =>    disabled
LCM Deamon status         =>    disabled
LCM logging status        =>    disabled
LOCOS deployment          =>    default

```

```
-----
```

```
----- BLUETOOTH -----
```

```

hci0:  Type: BR/EDR  Bus: USB
        BD Address: 00:3C:7F:F0:F0:0A  ACL MTU: 1022:8  SCO MTU: 183:5
        DOWN
        RX bytes:547 acl:0 sco:0 events:27 errors:0
        TX bytes:384 acl:0 sco:0 commands:27 errors:0

```

```
-----
```

```
----- FIREWALL -----
```

```
No rules configured.
```

```
-----
```

```
----- OFFLOAD -----
```

```

Status                      =>    enabled
Partition mountpoint       =>    /var
keyfile                     =>    /var/scp_key
sizethreshold1             =>    30
sizethreshold2             =>    50
sizethreshold3             =>    70
size threshold check interval =>    1
offloadinterval            =>    20
directory1 action          =>    added
directory1 srcpath         =>    /var/storage
directory1 server addr     =>    NA
directory1 server port     =>    0
directory1 Destination Directory =>    /tmp

```

```

directory1 server username      =>      NA
directory1 retry count         =>      3
directory2 action              =>      not_added
directory2 srcpath             =>      NA
directory2 server addr         =>      NA
directory2 server port         =>      0
directory2 Destination Directory =>      /tmp
directory2 server username     =>      NA
directory2 retry count         =>      3
directory3 action              =>      not_added
directory3 srcpath             =>      NA
directory3 server addr         =>      NA
directory3 server port         =>      0
directory3 Destination Directory =>      /tmp
directory3 server username     =>      NA
directory3 retry count         =>      3
directory4 action              =>      not_added
directory4 srcpath             =>      NA
directory4 server addr         =>      NA
directory4 server port         =>      0
directory4 Destination Directory =>      /tmp
directory4 server username     =>      NA
directory4 retry count         =>      3
directory5 action              =>      not_added
directory5 srcpath             =>      NA
directory5 server addr         =>      NA
directory5 server port         =>      0
directory5 Destination Directory =>      /tmp
directory5 server username     =>      NA
directory5 retry count         =>      3

```

[Lear052790:info (2)0]

Chapter 8

Configurations of the Locomate Roadstar RSU through CLISH

8.1 Operate mode

This operate mode is supported in both locomate devices. They are two modes

- Standby mode.
- operate mode.

By default the RSU device is in “Standby” mode. If the RSU is in “Standby” mode, the RSU device’s default applications wouldn’t be running and we can’t configure the applications. Change the operate mode to “operate” mode to configure the applications.

To see the mode of the RSU device, run the below command.

```
[LearBABBBB:info (0)0] show operatemode
```

To change the mode of RSU device,

```
[LearBABBBB:info (0)0] enable
[LearBABBBB:conf (0)0] config operatemode <standby/operate>
[LearBABBBB:conf (0)0] exit
```

8.2 WSA and Ipservice Configuration

Connectivity to back-end is provided by the Ipservice application, where the RSU acts as gateway to back-end machine/server. The server’s IP address should be advertised in the WSA’s transmitted by the RSU. Follow the steps highlighted below to setup this configuration.

1. Add a global Ipv6 address to brtrunk of the RSU, Also the IPV6 default gateway should be configured as the back-end machine's global IPV6 address.

```
[LearBABBBB:info (0)0] enable
[LearBABBBB:conf (1)0] config interface brtrunk ipv6 ip 2001:470:100:1111::1 64
[LearBABBBB:conf (1)0] config interface brtrunk ipv6 gateway 2001:470:100:1111::3
[LearBABBBB:conf (1)0] config interface brtrunk ipv6 networkprefix 2000:: 3
[LearBABBBB:conf (0)0] exit
```

2. Configure WRA information for WSA,

```
[LearBABBBB:info (0)0] enable
[LearBABBBB:conf (1)0] config locos wraconf wradefaultgw 2001:470:100:2222::1
[LearBABBBB:conf (1)0] config locos wraconf wraprimarydns 2001:470:100:2222::1
[LearBABBBB:conf (1)0] config locos wraconf wraipprefix 2001:470:100:2222::
[LearBABBBB:conf (1)0] config locos wraconf wraprefixlen 64
[LearBABBBB:conf (0)0] exit
```

NOTE: *By default, one provider application is running on the board. If we need to run multiple provider applications, we need to configure the WSA application through SNMP with a different index.*

3. Check if certificates are present or not.

```
[Lear121210:info (1)0] debug
Moving to diagnostic view...
[Lear121210:debug (1)0] list /var/certificates/
```

If certificates are not there, Enter "request system shell" and open wsaApp.conf file as below:

```
[LearBABBBB:info (0)0]request system shell
#vi /var/wsaApp.conf
```

```
Edit the file /var/wsaApp.conf and set both parameters to 1
# [INTEGER]Security type - sign, encrypt, plain
# value - 1 => UNSECURED
#           2 => SIGN
#           3 => ENCRYPT
securityType=1
```

```
# [INTEGER]verify bypass - do not verify the received packets
# value - 0 => DISABLE (verify received packets)
#           1 => ENABLE (do not verify)
verifyBypass=1
```

4. Configure and start the Ipservice application,

```
[LearBABBBB:info (0)0] enable
[LearBABBBB:conf (1)0] config application update ipservice wmeConfig psid 36 provider
wsatype unsecured psc offload schan 176 chaccess alternatesch wsarepeatrate 50
ipservice enable serviceIpv6Addr 2001:470:100:1111::3 wsachan 178

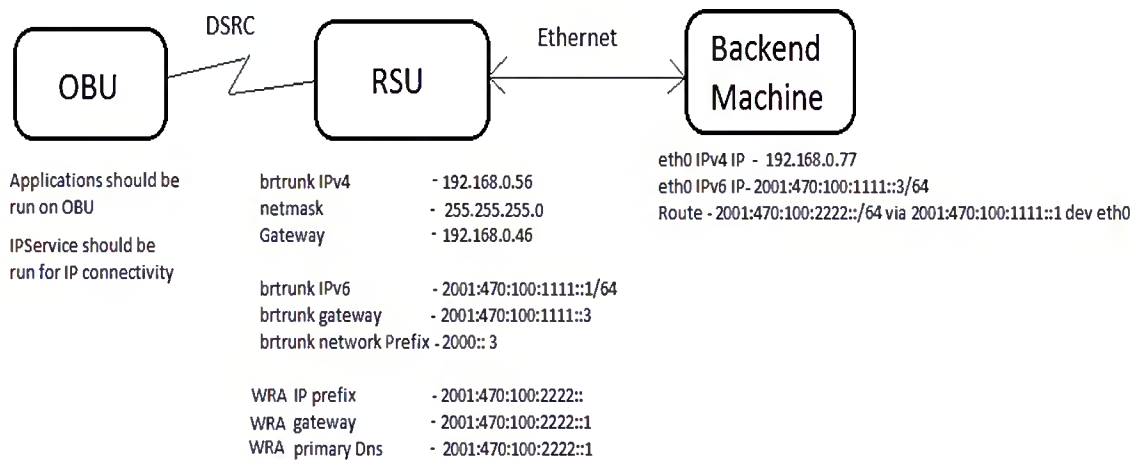
[LearBABBBB:conf (1)0] config application enable ipservice
[LearBABBBB:conf (0)0] exit
```

ON Back-end Machine :- Set a global Ipv6 address to the interface :-

```
ip -6 a a 2001:470:100:1111::3/64 dev eth0

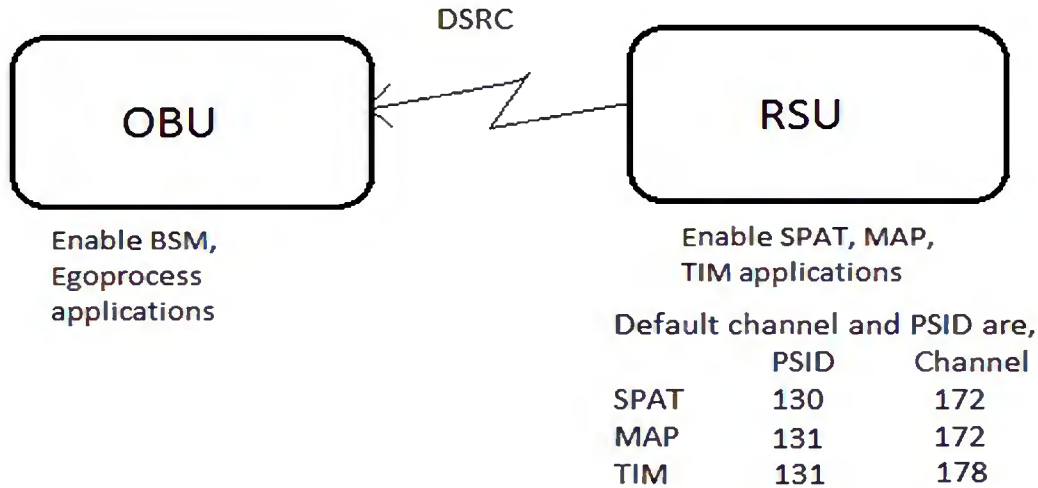
ip -6 r a 2001:470:100:2222::/64 via 2001:470:100:1111::1 dev eth0
```

5. For IP connectivity make sure IP service is running on the OBU side and the provider application should run on the RSU. The setup diagram for the WSA and the Ipservice is as shown below,



8.3 Flow Diagram for SPAT/MAP/TIM

Applications linked SPAT/MAP/TIM must be run on the RSU, while BSM and egoprocess should run on the OBU side to receive the packets from the RSU side applications. A setup diagram with default psid and channel numbers of the different applications is as follows,



8.4 SPAT Application

SPAT application on the RSU is configured to broadcast SPAT messages. The SPAT message contains signalling information that will be provided by a traffic controller.

IFM Application: By default the SPAT application uses the Immediate forward application(IFM). **NTCIP Application:** If the Config file name and port number are set in the "otherConfig" parameter, the NTCIP application will be run on the device to encode the data.

8.4.1 General Syntax for SPAT Configuration

The general syntax for configuring the SPAT application is as follows,

```
config application <update/enable/disable> spat <wmeConfig/wsmConfig/otherConfig>
<PARAMETERS>
```

8.4.2 Example of Configuration of SPAT Application

- Entering config mode

```
[LearBABBBB:conf (1)0] enable  
Moving to conf view..
```

- Disable spat application before configuring parameters

```
[LearBABBBB:conf (1)0] config application disable spat  
Application spat is disabled
```

- Configure WME parameters

```
[LearBABBBB:conf (1)0] config application update spat wmeConfig psid 130  
channel schan 172 slot either  
Updated application spat:spatWmeArg:psid 130 csr schan 172 slot either
```

- Configure WSM parameters

```
[LearBABBBB:conf (1)0] config application update spat wsmConfig security  
encrypt txchan 172 datarate 6.0 txpower 23 repestrate 50 userpriority 0  
expirytime 0  
Updated application spat:spatWsmArg:security encrypt verifybypass disable  
slot either txchan 172 datarate 6.0 txpower 23 chload 0 infoeleId f  
priority 0 txrate 50 expirytime 0
```

- Configure Other config parameters

```
[LearBABBBB:conf (1)0] config application update spat otherConfig txrxmode  
tx portnumber 1516 printencode disable printdecode disable msgcount 2  
configFile /var/phaseToLane.txt  
Updated application spat:spatOthArg:txmode tx portNumber 1516 printencode  
disable printdecode disable configFile /var/phaseToLane.txt
```

- Enable SPAT application

```
[LearBABBBB:conf (1)0] config application enable spat  
Application spat is enabled
```

- Exiting from config mode


```
[LearBABBBB:conf (1)0] exit
Leaving conf mode...
```

8.4.3 Default Configuration File of SPAT

Sample SPAT configuration file.

```
# Message File Format
# Modified Date: 02/17/2012
# Version: 0.5
# Generation Date: Oct/3/2014, 15:43:16 UTC
Version=0.5
#
# Message Dispatch Items
#
# All line beginning with # shall be removed in file sent to radio
#
# Message Type
# Model Deployment allowed values: SPAT, MAP, TIM
Type=SPAT
#
# Message PSID
PSID=0x82
#
# Message Priority in the range of 0 (lowest) through 7
Priority=2
#
# Transmission Channel Mode
# Model Deployment allowed values: CONT, ALT
TxMode=CONT
# Model Deployment allowed values: 172, CCH, SCH
TxChannel=172
#
# Transmission Broadcast Interval in Seconds
# Model Deployment allowed values: 0 for Immediate-Forwarding , 1 to 5 for
# Store-and-Reply
TxInterval=0
#
# Message Delivery (broadcast) start time (UTC date and time) in the form: "mm/dd/yyyy,
hh:mm.#
```

```
# Leave value blank if Immediate Forward mode
DeliveryStart=
#
# Message Delivery (broadcast) stop time (UTC date and time) in the form: "mm/dd/yyyy,
hh:mm."
# Leave value blank if Immediate Forward mode
DeliveryStop=
#
# Message Signature/Encryption
Signature=True
Encryption=False
#
# Status (transmit the payload)
# enable - 1
# disable - 0
Status=1
#
# Message Payload (encoded according to definition)
Payload=00128121112128658771DB38003000201842014EFC43CC39A56B87189802DC1
E580228400404000018E695C1CE77E1EA218E695C3E677E169A0200008B008508008080
00031CD2B938CEFC3D4431CD2B97BCEFC2D4804000116018A10010100000639A57439
9DF87A62639A574DA9DF85A680800022C041420020200000C734AEB973BF0F4C4C734
AECA33BF0B4D0100004580A28400404000018E695DD7A77E1E9918E695DF9277E16A
48200008B01850800802000031CD2BCBBCEFC3D1E31CD2BD0C4EFC2D850400011603
9210010100000639A57DA89DF88C76639A594649DF88CC60800042C0824200202900
```

8.4.4 Verification of SPAT Application

- After configuring the SPAT application, the updated parameters can be viewed by entering the following command.

```
[LearBABBBB:info (0)1] show application details
```

In that, we can observe the reflected parameters in SPAT configuration.

Note: Make sure txrxmode is set to "tx". Please check txrxmode parameter in otherconfig options. If it is not "tx", configure it to "tx" and enable the application.

- Once application is enabled it should run on the device. We can observe that by entering the following command:

```
[LearBABBBB:info (0)1] show system procs
```

- To see that the SPAT is transmitting the packets properly or not, we can check that by entering the following command.

```
[LearBABBBB:info (0)1] show application summary spat
*****spat summary*****
TX                =>      155
TX Drop(.3)       =>      0
TX Error(.2)      =>      0
TX Error(ASN)     =>      0
*****
```

8.5 MAP Application

MAP application on Locomate Roadstar the RSU is configured to broadcast MAP messages. The MAP message contains information about road lanes. Safety applications running on the OBU identifies the current lane of vehicle using the MAP message. The MAP message is processed along with SPAT and TIM to provide lane specific signalling and traveller information. The MAP application uses the standard configuration file.

8.5.1 General syntax for MAP configuration

The general syntax for the MAP application is as follows,

```
config application <update/enable/disable> map <wmeConfig/wsmConfig/otherConfig>
<PARAMETERS>
```

8.5.2 Example of configuration of MAP application

- Entering config mode

```
[LearBABBBB:conf (1)0] enable
Moving to conf view..
```

- Disable MAP application before configuring

```
[LearBABBBB:conf (1)0] config application disable map
Application map is disabled
```

- Configure WME parameters

```
[LearBABBBB:conf (1)0] config application update map wmeConfig psid 130 channel
schan 172 timeslot either
Updated application map:mapWmeArg:psid 130 csr schan 172 slot either
```

- Configure WSM parameters

```
[LearBABBBB:conf (1)0] config application update map wsmConfig security
unsecured verifybypass disable txchan 172 datarate 6.0 txpower 23
chload 0 infoelementIndicator 1 userpriority 0 repeatrate 50 exptime 0
Updated application map:mapWsmArg:security unsecured verifybypass disable
txchan 172 datarate 6.0 txpower 23 chload 0 infoeleId f priority 0 txrate
50 expirytime 0
```

- Configure Other config parameters

```
[LearBABBBB:conf (1)0] config application update map otherConfig txrxmode
tx srmfolder /var/SRM/MAP/ printencode disable printdecode disable
Updated application map:mapOthArg:txmode tx srmfolder /var/SRM/MAP/
printencode disable printdecode disable
```

- Enable MAP application

```
[LearBABBBB:conf (1)0] config application enable map
Application map is enabled
```

- Exiting from config mode

```
[LearBABBBB:conf (1)0] exit
Leaving conf mode...
```

8.5.3 Default Configuration File of MAP

Sample MAP configuration file.

```
# Message File Format
# Modified Date: 02/17/2012
# Version: 0.5
# Generation Date: Oct/3/2014, 15:43:16 UTC
Version=0.5
#
```

```
# Message Dispatch Items
#
# All line beginning with # shall be removed in file sent to radio
#
# Message Type
# Model Deployment allowed values: SPAT, MAP, TIM
Type=MAP
#
# Message PSID
PSID=0x82
#
# Message Priority in the range of 0 (lowest) through 7
Priority=2
#
# Transmission Channel Mode
# Model Deployment allowed values: CONT, ALT
TxMode=CONT
# Model Deployment allowed values: 172, CCH, SCH
TxChannel=172
#
# Transmission Broadcast Interval in Seconds
# Model Deployment allowed values: 1 to 5 for
# Store-and-Reply
TxInterval=1.0
#
# Message Delivery (broadcast) start time (UTC date and time) in the form: "mm/dd/yyyy,
hh:mm.#
# Leave value blank if Immediate Forward mode
DeliveryStart=01/01/2017, 00:00
#
# Message Delivery (broadcast) stop time (UTC date and time) in the form: "mm/dd/yyyy,
hh:mm."
# Leave value blank if Immediate Forward mode
DeliveryStop=12/31/2020, 23:59
#
# Message Signature/Encryption
Signature=True
Encryption=False
#
# Status (transmit the payload)
```

```
# enable - 1
# disable - 0
Status=1
#
# Message Payload (encoded according to definition)
Payload=001281DB38003000201842014EFC43CC39A56B87189802DC1E58022840
0404000018E695C1CE77E1EA218E695C3E677E169A0200008B0085080080800003
1CD2B938CEFC3D4431CD2B97BCEFC2D4804000116018A10010100000639A574399
DF87A62639A574DA9DF85A680800022C041420020200000C734AEB973BF0F4C4C7
34AECA33BF0B4D0100004580A28400404000018E695DD7A77E1E9918E695DF927
7E16A48200008B01850800802000031CD2BCBBCEFC3D1E31CD2BD0C4EFC2D8504
000116039210010100000639A57DA89DF88C76639A594649DF88CC
60800042C082420020290000C734AFBBB3BF11E7CC734B24CD3BF
```

8.5.4 Verification of MAP application

- After configuring the MAP application, the updated parameters can be viewed by entering the following command:

```
[LearBABBBB:info (0)1] show application details
```

We can observe the reflected parameters in the MAP configuration.

Note: Make sure txrxmode should be "tx". So please check txrxmode parameter in otherconfig options. If it is not "tx", configure it to "tx" and enable the application.

- Once application is enabled, it should run on the device. We can view by the entering the following command

```
[LearBABBBB:info (0)1] show system procs
```

- To see that the MAP is transmitting the packets properly or not, we can check that by entering the following command:

```
[LearBABBBB:info (0)1] show application summary map
*****map_sr summary*****
TX => 155
TX Drop(.3) => 0
TX Error(.2) => 0
TX Error(ASN) => 0
*****
```

8.6 TIM Application

The Traveller Information Messages consists of standard ITIS codes. These messages are transmitted by the RSU with a period of 1 second (or configured interval). ITIS codes relevant to a specific region are configured by a traffic controller and encoded as a TIM message, which will be broadcast by Locomate Roadstar the RSU.

8.6.1 General Syntax for TIM Configuration

The general syntax for the TIM application is as follows:

```
config application <update/enable/disable> tim <wmeConfig/wsmConfig/otherConfig>  
<PARAMETERS>
```

8.6.2 Example Configuration of TIM Application

- Entering config mode

```
[LearBABBBB:conf (0)0] enable  
Moving to conf view..
```

- Disable the TIM application before configuring

```
[LearBABBBB:conf (0)0] config application disable tim  
Application tim is disabled
```

- Configure WME parameters

```
[LearBABBBB:conf (0)0] config application update tim wmeConfig psid 131 channel  
schan 178 timeslot slot0  
Updated application tim:timWmeArg:psid 131 csr schan 178 slot slot0
```

- Configure WSM parameters

```
[LearBABBBB:conf (0)0] config application update tim wsmConfig security unsecured  
verifybypass disable txchan 178 datarate 6.0 txpower 23 chload 0 infoelementindicat  
or 45 userpriority 0 repeatrate 50 expirytime 0  
Updated application tim:timWsmArg:security unsecured verifybypass disable txchan  
178 datarate 6.0 txpower 23 chload 0 infoeleId f priority 0 txrate 50 expirytime 0
```

- Configure Other config parameters

```
[LearBABBBB:conf (0)0] config application update tim otherConfig txrxmode tx
srmfolder /var/SRM/AML/ printencode disable printdecode disable
Updated application tim:tim0thArg:txmode tx srmfolder /var/SRM/AML/
printencode disable printdecode disable
```

- Enable TIM application

```
[LearBABBBB:conf (0)0] config application enable tim
Application tim is enabled
```

- Exiting from config mode

```
[LearBABBBB:conf (0)0] exit
Leaving conf mode...
```

8.6.3 Verification of TIM Application

- After configuring the TIM application, the updated parameters can be viewed by entering the following command:

```
[LearBABBBB:info (0)1] show application details
```

We can observe the reflected parameters in the TIM configuration.

Note: Make sure txrxmode is set to "tx". Please check txrxmode parameter in otherconfig options. If it is not "tx", configure it to "tx" and enable the application.

- Once application is enabled, it should run on the device. We can view by the entering the following command.

```
[LearBABBBB:info (0)1] show system procs
```

- To see that the TIM is transmitting the packets properly or not, we can check that by entering the following command:

```
[LearBABBBB:info (0)1] show application summary tim
*****tim summary*****
TX => 155
TX Drop(.3) => 0
TX Error(.2) => 0
TX Error(ASN) => 0
*****
```


8.7 wsmppforward Application

wsmppforward application forwards the received packets with the specified PSID to the host machine over UDP. User can configure required PSID and forward the packets to the host machine.

8.7.1 Setup details for wsmppforward Application

- On back-end machine, application should run with the same port number to receive the wsmppforward packets.
- While configuring the wsmppforward at client side, enter the details of the back-end machine's IPv4/IPv6 address, psid, and port number.

8.7.2 General Syntax of wsmppforward Application

General syntax for the wsmppforward application is,

```
config customApp <enable/disable/update> <app1/app2/app3/app4>
wsmppforward <psid> <ip(4/6) addr> <port> <plain payload (1 - plain / 0 - dot2)>
<WSMP decoded Header forward (1-Enable / 0-Disable)> <channel>
<forward msg type> [1/2 - alternate, 3 - cont] [printDecode 1 - enable
/ 0 - disable]
```

The table below gives the corresponding "PSID" and "forward msg type" values we need to pass for different applications.

| Application | PSID | forward msg type |
|-------------|------|------------------|
| BSM | 32 | 2 |
| MAP | 130 | 6 |
| PDM | 132 | 9 |
| PVD | 132 | 10 |
| SPAT | 130 | 13 |
| TIM | 131 | 16 |

8.7.3 Example Configuration for wsmppforward Application

Steps to configure the wsmppforward application.

- Entering config mode

```
[LearBABBBB:conf (1)0] enable  
Moving to conf view..
```

- Disable the applications

```
[LearBABBBB:conf (1)0] config customApp disable app1  
Application app1 is disabled
```

- Configuring the wsmppforward through customapp

- Through IPv4

```
[LearBABBBB:conf (1)0] config customApp update app1 /usr/local/bin/wsmppforward  
"32 172.20.1.192 57846 1 1 172 2 3"  
path /usr/local/bin/wsmppforward and argument 32 172.20.1.192 57846 1 1 172 2 3
```

Enable the application to apply the changes

- Through IPv6.

```
[LearBABBBB:conf (1)0] config customApp update app1 /usr/local/bin/wsmppforward  
"32 2001:11:22::1 57846 1 1 172 2 3"  
path /usr/local/bin/wsmppforward and argument 32 2001:11:22::1 57846 1 1 172 2 3
```

Enable the application to apply the changes

- Enabling the application

```
[LearBABBBB:conf (1)0] config customApp enable app1  
Application app1 is enabled
```

- Exiting from config mode

```
[LearBABBBB:conf (1)0] exit  
Leaving conf mode...
```

8.7.4 Verification of the wsmppforward Application

- Check the back-end machine (server) regarding whether packets are being received or not.

8.8 PDM Application

The RSU creates and periodically transmits PDM messages for each configuration and also forwards received Probe Vehicle Data (PVD) to the configured back-end servers. The RSU will include Probe Data Service in the WSA, if it supports Probe Data Service.

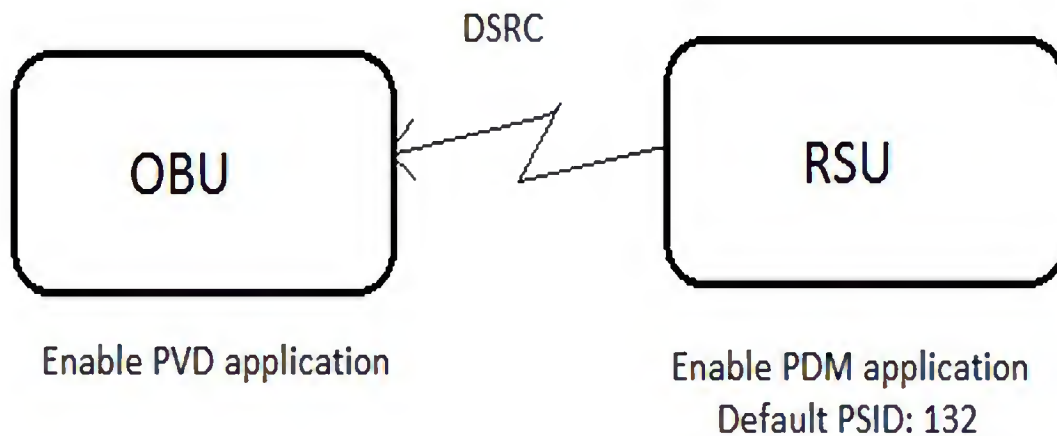
8.8.1 General Syntax for PDM

The general syntax for the PDM application is as follows:

```
config application <update/enable/disable> pdm <wmeConfig/wsmConfig/otherConfig>
<PARAMETERS>
```

8.8.2 General Setup for PDM

Setup diagram for PDM application is shown below:



8.8.3 Example Configuration of PDM Application

- Entering config mode

```
[LearBABBBB:conf (1)0] enable
Moving to conf view..
```

- Disable pdm

```
[LearBABBBB:conf (1)0] config application disable pdm
Application pdm is disabled
```

- Configure WME parameters

```
[LearBABBBB:conf (1)0] config application update pdm wmeConfig psid 132
provider wsatype any psc 24 schan 176 chaccess alternatesch wsarepeatrate
50 wsachan 178 ipservice enable serviceport 0 rcpithresh 0 wsacntthresh
0 wsacountthinterval 0 infoelementind 1 signlifetime 0
```

```
Updated application pdm:pdmWmeArg:psid 36 service psr wsatype any psc 24
schan 176 chaccess alternatesch wsarate 50 dstmac ff:ff:ff:ff:ff:ff
wsachan 178 ipservice enable port 0 serviceIpv6Addr :: providerMac
ff:ff:ff:ff:ff:ff rcpithresh 0 wsacntth 0 wsacntthint 0 infoeleId 1
signlifetime 0
```

- Configure WSM parameters

```
[LearBABBBB:conf (1)0] config application update pdm wsmConfig security
unsecured verifybypass disable txchan 178 datarate 6.0 txpower 23 chload
0 infoelementindicator 1 userpriority 0 repeatrate 50 expirytime 0
```

```
Updated application pdm:pdmWsmArg:security unsecured verifybypass disable
slot either txchan 178 datarate 6.0 txpower 23 chload 0 infoeleId 1
priority 0 txrate 50 exptime 0
```

- Configure Other config parameters

```
[LearBABBBB:conf (1)0] config application update pdm otherConfig txrxmode
txrx printencode disable printdecode disable configFile /var/PDM/
```

```
Updated application pdm:pdmOthArg:txmode tx configFile /var/PDM/
printencode disable printdecode disable
```

- Enable the pdm

```
[LearBABBBB:conf (1)0] config application enable pdm
Application pdm is enabled
```

- Exiting from config mode

```
[LearBABBBB:conf (1)0] exit  
Leaving conf mode...
```

8.8.4 PDM Policies

A RSU shall broadcast a PDM to connected devices to manage the policy for the collection and transmission of probe data by the devices. This requirement allows an agency, such as a traffic management agency, to modify the policy of data collection and transmission inside a connected device.

- Mandatory Policy Requirements
 1. *Sample Size* : A RSU shall include the criteria to determine if the probe data collection policy being transmitted is applicable as part of the probe management message broadcast to connected devices. The sample size is determined inclusively by a start value and an end value of the last two digits of a device's MAC address.
 2. *Termination Parameters* : After a defined period of time or distance, the connected device should return to its default probe collection policy.
 - 2.1 *Termination Time* : A RSU shall include the amount of time (in one second increments), to be travelled by the connected device before the temporary probe management policies ceases.
 - 2.2 *Termination Distance* : A RSU shall include the distance (in one meter units), to be travelled by the connected device before the temporary probe management policies ceases.
 3. *Snapshot Generation Parameters* : A snapshot is comprised of device attributes and sensor data that are collected at a point in time by the connected device. How often a snapshot is generated by a connected device will vary based on the speed and the purpose for collecting the probe data.
 - 3.1 *Generation by Time* : A RSU shall include the parameters to configure the time intervals (in one second units), between snapshots (data accumulation). A lower interval and a higher interval are sent, along with a lower speed threshold and higher speed threshold.
 - 3.2 *Generation by Distance* : A RSU shall include the parameters to configure the distance intervals (in one meter units), between snapshots (data accumulation). A lower interval and a higher interval are sent, along with a lower speed threshold and higher speed threshold.
- Optional Policy Requirement

1. *Heading Slice* : A RSU shall include the heading slices that a device is travelling towards (direction of motion). The broadcast PDM will apply only to those devices travelling in the direction(s) included in the heading slice(s).
 2. *Interval Between Transmissions* : A RSU shall include the time interval (in one second units), between probe data transmissions from the connected device to the RSU.
 3. *Start and Stop Snapshots* : A connected device can generate snapshots based on starts and stops.
 - 3.1 *Stop Time Threshold* : A RSU shall include the stop time threshold (in one tenth of a second units). A connected device is considered stopped when there is no movement for at least this stop time threshold and when no other stops have occurred within another threshold time (last stop threshold).
 - 3.2 *Last Stop Threshold* : A RSU shall include the last stop threshold (in one tenth of a second units). A connected device is considered stopped when there is no movement for at least the stop time threshold and when no other stops have occurred for at least this threshold time (last stop threshold).
 - 3.3 *Start Speed Threshold* : A RSU shall include the start speed threshold (in .02 meters per second units). A connected device is not considered stopped when its point speed exceeds this start speed threshold.
- Event triggered snapshots
 1. A connected device can generate snapshots based on events, that is, based on a change in status elements. This includes either a state change (e.g., from off to on) or when a value exceeds a specific threshold or undergoes a transition.
 - 1.1 *Support Reading* : A RSU shall include an instruction to a connected device to include all sensor readings available and supported by the standard when it generates a snapshot.
 - 1.2 *Support Greater Than Event* : A RSU shall include an instruction to a connected device to generate a snapshot when a specified sensor value exceeds a defined threshold.
 - 1.3 *Support Less Than Event* : A RSU shall include an instruction to a connected device to generate a snapshot when a specified sensor value falls below a defined threshold.

Sample PDM configuration files.
Sample PDM0.conf

```
# version 0.1
# Date :- 06 April 2017
# Value ranges as per SAEJ2735 PDM message
#
# [INTEGER] Sample Starting point
# range 0 - 255
PDMSampleStart=5
#
# [INTEGER] Sample Ending point
# range 0 - 255
PDMSampleEnd=10
#
# [INTEGER] PDM Directions
# range 0 - 65535
PDMDirection=32
#
# [INTEGER] PDM terminate choice
# time(1) or distance(2)
PDMTermChoice=1
#
# [INTEGER] PDM term time
# range 0 - 1800
PDMTermTime=100
#
# [INTEGER] PDM term distance
# range 0 - 30000
PDMTermDistance=200
#
# [INTEGER] snapshot choice
# time(1) or distance(2)
PDMSnapshotChoice=1
#
# [INTEGER] Min snapshot time
# units of seconds
# range 0 - 61
MinSnapshotTime=5 #
# [INTEGER] Max snapshot time
# units of seconds
# range 0 - 61
```

```
MaxSnapshotTime=10
#
# [INTEGER] Min snapshot distance
# units of 1.00 meters
# range 0 - 1023
MinSnapshotDistance=100
#
# [INTEGER] Max snapshot distance
# units of 1.00 meters
# range 0 - 1023
MaxSnapshotDistance=200
#
# [INTEGER] Min snapshot speed
# units of 1.00 m/s
# range 0 - 31
SnapshotMinSpeed=10
#
# [INTEGER] Max snapshot speed
# units of 1.00 m/s
# range 0 - 31
SnapshotMaxSpeed=20
#
# [INTEGER] Tx interval
# units of seconds
# range 0 - 61
TxInterval=5
```

Sample PDM1.conf

```
# version 0.1
# Date:- 7 Apr 2017
#
# [INTEGER] dataType
# range 0 to 28 (may extend)
VehicleStatusDeviceTypeTag=3
#
# [INTEGER] subtype
# range 1..15
```



```
subType=5
#
# [INTEGER] sendOnLessThenValue
# range -3276 7..32767
sendOnLessThenValue=1
#
# [INTEGER] sendOnMoreThenValue
# range -32767..32767
sendOnMoreThenValue=5
#
# [BOOLEAN] sendAll
# 1 - True
# 0 - False
sendAll=1
```

8.9 Event Handling

The event log module is implemented as a daemon application. The event log module is implemented as a daemon application logmonitor. The logmonitor application will be started immediately after the board syncs with the GPS. Applications that have to log events will connect with the logmonitor using the UDP socket. Events that are received by logmonitor will be written to a respective event log file. All event log files will be a maximum of 100 KB.

8.9.1 Configuration and Verification of logmonitor

By default, the logmonitor application will be started upon every boot up. Verify whether the process is running by using the following:

```
[Lear052790:info (2)0] show system procs
```

Event log files will be created in “/var/eventlog” directory. Files created in /var/eventlog are temporary files that are being written by the logmonitor. The threshold size for event log files is 100 KB. The files can be checked by issuing the following:

```
[Lear052790:info (2)0] debug
Moving to diagnostic view...
[Lear052790:debug (2)0] list /var/storage
drwxr-xr-x  13 root    root          4096 Aug  3 11:27 ./
```

```

drwxr-xr-x  22 root    root          4096 Sep  7 05:38 ../
drwxr-xr-x   2 root    root          4096 Aug  4 09:55 ModelDeploymentPktCaptures/
drwxr-xr-x   2 root    root          4096 Aug  3 12:06 bsmLogDuringEvent/
drwxr-xr-x   2 root    root          4096 May  4 18:44 bsmTx/
drwxr-xr-x   2 root    root          4096 Aug  3 12:06 dnMsg/
drwxr-xr-x   2 root    root          4096 Aug  3 12:06 driverAlert/
drwxr-xr-x   2 root    root          4096 May  4 18:44 environmentMsg/
drwxr-xr-x   2 root    root          4096 May  4 18:44 rxMsg/
drwxr-xr-x   2 root    root          4096 May  4 18:44 scms/
drwxr-xr-x   2 root    root          4096 Aug  3 12:06 systemLog/
drwxr-xr-x   2 root    root          4096 Aug  3 12:06 upgrades/
drwxr-xr-x   2 root    root          4096 Aug 29 10:30 wlan_capture/
[Lear052790:debug (2)0] exit
Leaving diagnostic mode...
[Lear052790:info (2)0]

```

Any event log file that reaches the threshold will be moved to its respective offload directory. The offload source directory for event logging is `/var/storage/`. Every event type will have its own directory for event log files in `/var/storage`. The send order and purge order of the files is as follows:

| LogFolder name | Purge order | Send order | MaxLogFileSize |
|-------------------|-------------|------------|----------------|
| wlan_capture | 1 | 10 | - |
| bsmLogDuringEvent | 2 | 9 | 100 |
| bsmTx | 3 | 8 | 100 |
| rxMsg | 4 | 6 | 100 |
| upgrades | 5 | 4 | 100 |
| scms | 6 | 7 | 100 |
| systemLog | 7 | 5 | 100 |
| environmentMsg | 8 | 2 | 100 |
| dnMsg | 9 | 1 | 100 |
| driverAlert | 10 | 3 | 100 |

8.9.2 Configuring Applications to Generate Event Logs

The events in Locomate Roadstar RSU are “systemlog, rxMsg, upgrades”.

RX MSG: For the rxMsg event we need to configure BSM as mentioned below,

```

[Lear052790:info (2)0]
[Lear052790:conf (2)0] config application disable bsm

```

```
[Lear052790:conf (2)0] config application update bsm otherConfig
remoteforwardip 127.0.0.1 remotedataforward wsm_payload
remoteforwardport 13006 logtype remote forwarddirection rx txrxmode rx
[Lear052790:conf (2)0] config application enable bsm
[Lear052790:conf (2)0] exit
```

SystemLog:

- request system reboot
- Application START/STOP message [ENABLE/DISABLE] **Upgrades:** For upgrades,

```
[LearBABBBB:info (0)1] Request firmware upgrade
```

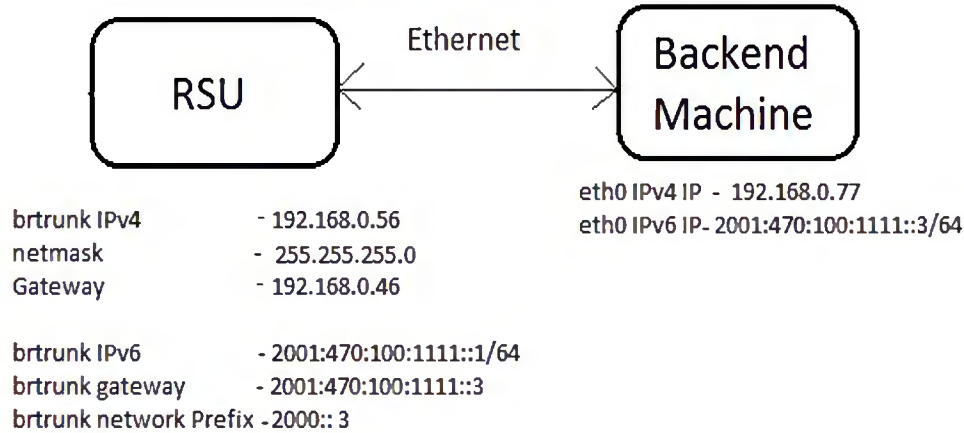
Note: Messages are based on firmware_upgrade_type [types: file,scp,etc]

8.10 RSUoffload Application

The RSUoffload application is used for offloading the Packet capture(pcap) files from the RSU device to the back-end machine. There should be network connectivity between the RSU and the back-end server. In the event the connectivity does not exist between the RSU and the back-end server, purging will come into effect. Purging means deleting the old packets once the partition range reaches the sizethreshold3 value. Follow the setup details highlighted below for RSUoffload setup. Please refer the below figure while configuring the RSU and the back-end machine. There is no need for IP connectivity between the OBU and the RSU for the RSUoffload application.

8.10.1 Setup diagram for RSUoffload

The pictorial representation of RSUoffload setup is as shown below,



8.10.2 Setup details for RSUoffload application

1. Before configuring the RSUoffload, we need to generate a key to create a bridge between the RSU device and the back-end machine.

- We get the ssh key from the board by entering the following command.

```
[Lear03ACE0:info (1)1] enable
[LearBABBBB:conf (0)0] config system sshkeygen
Generating key, this may take a while...
Use 'show system sshpublickey' command to get the public ssh key.
[LearBABBBB:conf (0)0] exit
```

- To see the generated ssh key, enter the below command.

```
[LearBABBBB:info (0)0] show system sshpublickey
```

```
-----
ssh-rsaAAAAB3NzaC1yc2EAAAADAQABAAQDAxK2EoQPxfThuOLU31bHo8S1c0ATvp6u6LTq2+nW20
LXM2sXrgfWVrAOPob7n+5jrQqfOfmc0PeKGYkNuTEWasaPy51U7DE5Ffg7f6tg+YGF66fvt65xztfcgDD
root@LearBABBBB
-----
```

Append this key in host machine's '~/.ssh/authorized_keys'

```
[LearBABBBB:info (0)0]
```

- Append the generated ssh public key to "~/.ssh/authorized_keys" of the back-end machine. In your Ubuntu machine, log in as normal user (not root), and issue these commands:

```
mkdir -p ~/.ssh
chmod 0700 ~/.ssh
vi ~/.ssh/authorized_keys (then paste your clipboard. Again, make sure it is
single line with-out and new line character)
chmod 0600 ~/.ssh/authorized_keys
```

NOTE: After these steps, you should be able to do a password-less scp from the LC3 board to your Ubuntu machine (offload uses this feature). To verify this, please do below optional steps.

1. In LC3, do “request system shell”.

2. `scp -i /var/scp_key <any-file> <user-name>@<ubuntu-machine-ip>`

Note: Please replace <any-file>, <user-name> and <ubuntu-machine-ip>

3. After issuing the above command your file should be automatically copied to your Ubuntu machine without a password prompt. If it prompts for password, that means the above setup is not done properly and offload won't work unless you are able to do password-less scp

2. Before enabling the rsuoffload, make sure board and back-end machine are having IPV6 interface. If it is not there create interface by entering the following command with root privilege .

Back-end Side:

```
ip -6 a a 2001:470:100:1111::3/64 dev eth0
```

RSU Device Side

```
[LearBABBBB:info (3)0] enable
[LearBABBBB:conf (3)0] config interface brtrunk ipv6 ip 2001:470:100:1111::6 64
[LearBABBBB:conf (3)0] config interface brtrunk ipv6 gateway 2001:470:100:1111::3
[LearBABBBB:conf (3)0] config interface brtrunk ipv6 networkprefix 2000:: 3
[LearBABBBB:conf (3)0] exit
[LearBABBBB:info (3)0] request system reboot
```

After the creation of the interface, validate it by running the ping command on the RSU with the IPv6 address of the back-end machine.

```
[LearBABBBB:info (3)0] debug
Moving to diagnostic view...
```

```
[LearBABBBB:debug (3)0] ping ipv6 2001:470:100:1111::3
PING 2001:470:100:1111::3 (2001:470:100:1111::3): 56 data bytes
64 bytes from 2001:470:100:1111::3: seq=0 ttl=64 time=0.450 ms
64 bytes from 2001:470:100:1111::3: seq=1 ttl=64 time=0.321 ms
^C
```

3. By default rsuoffload is enabled. The default configurations of the rsuoffload can be viewed by entering the following command.

```
[LearBABBBB:info (1)0] show locos rsuoffload
Status => enabled
Partition mountpoint => /var
keyfile => /var/scp_key
sizethreshold1 => 30
sizethreshold2 => 50
sizethreshold3 => 70
size threshold check interval => 1
offloadinterval => 20
directory1 action => added
directory1 srcpath => /var/storage
directory1 server addr => NA
directory1 server port => NA
directory1 Destination Directory=> /tmp
directory1 server username => NA
directory1 retry count => 3
directory2 action => not_added
directory2 srcpath => NA
directory2 server addr => NA
directory2 server port => 0
directory2 Destination Directory=> /tmp
directory2 server username => NA
directory2 retry count => 3
directory3 action => not_added
directory3 srcpath => NA
directory3 server addr => NA
directory3 server port => 0
directory3 Destination Directory=> /tmp
directory3 server username => NA
directory3 retry count => 3
directory4 action => not_added
directory4 srcpath => NA
```

```

directory4 server addr      => NA
directory4 server port     => 0
directory4 Destination Directory=> /tmp
directory4 server username => NA
directory4 retry count     => 3
directory5 action          => not_added
directory5 srcpath         => NA
directory5 server addr     => NA
directory5 server port     => 0
directory5 Destination Directory=> /tmp
directory5 server username => NA
directory5 retry count     => 3
[LearBABBBB:info (1)0]

```

4. Below is a brief about rsuoffload parameters.
 - **Mountpoint** indicates where packets will be stored.
 - **sizethreshold values** define the threshold value and once that value is reached the files are copied to the back-end machine.
 - **sizethresholdcheckinterval**(in minutes) defines the interval duration (in minutes) for checking if the threshold value has been reached for the stored files.
 - **offloadinterval**(in minutes) defines the time in minutes by which either packets will be transmitted to the back-end machine or purging will happen.
5. In this application we have five directories. Each directory has its own back-end server address, name, and etc. If you want, we can configure all directories.
6. Now enable the logging interface1 and interface2 for packet capturing.

```

[LearBABBBB:info (0)1] enable
Moving to conf view...
[LearBABBBB:conf (1)1] config locos logging interface1 status enable
[LearBABBBB:conf (1)1] config locos logging interface2 status enable
[LearBABBBB:conf (1)1] exit

```

7. After enabling the rsuoffload the packets will be generated in “/var/storage/wlan_capture”. If size is exceeded, packets are moved to “/var/storage/ModelDeploymentPktCaptures/”
8. By default logmonitor application running on the RSU device. So in “/var/storage/”, directories are created with the name of “bsmLogDuringEvent, bsmTx, dnMsg, driverAlert, environmentMsg, rxMsg, scms, systemLog and upgrades”.

9. While running logmonitor, files are updated at “/tmp/eventlog/”. Once it reaches to MaxLogFileSize, the packet is copied to the corresponding directory in “/var/storage/”.
10. Offloading will happen to all of these directories in a particular order. The priority of deleting these files has been explained in the event handling section.
11. Once it reaches sizethreshold3 value (that was configured in RSUoffload application using config command), the pcap will be forwarded to the back-end machine.

8.10.3 Purging

1. Purging will happen when there is no connectivity between the RSU and the back-end machine, and when the configured threshold limits are reached.
2. After configuring the rsuoffload parameters, we need enable rsuoffload and interface loggings.
3. The priority of deleting these files has been explained in the event handling section above.
4. Once partition reaches the sizethreshold3 value, Enter "show log syslog" command to check the status.

```
offload_rsu: Purge success on /var/storage
```

8.10.4 Example to Configure RSUoffload

Below are the steps to configure the rsuoffload for RSU,

- Entering config mode

```
[LearBABBBB:conf (1)0] enable  
Moving to conf view..
```

- Disable RSUoffload

```
[LearBABBBB:conf (1)0] config locos rsuoffload status disable
```

- Configuring partitions


```
[LearBABBBB:conf (1)0] config locos rsuoffload update partition mountpoint /var
[LearBABBBB:conf (1)0] config locos rsuoffload update partition keyfile /var/scp_key
[LearBABBBB:conf (1)0] config locos rsuoffload update partition sizethreshold1 30
[LearBABBBB:conf (1)0] config locos rsuoffload update partition sizethreshold2 50
[LearBABBBB:conf (1)0] config locos rsuoffload update partition sizethreshold3 70
[LearBABBBB:conf (1)0] config locos rsuoffload update partition
sizethresholdcheckinterval 15
[LearBABBBB:conf (1)0] config locos rsuoffload update partition offloadinterval 12
```

- Configuring Directories

```
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 action add
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 srcpath /var/storage
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 serveraddr
2001:470:11:45::10
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 serverport 23551
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 destdir /home/storage
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 serverusername
offloadserver
[LearBABBBB:conf (1)0] config locos rsuoffload update directory1 retrycount 3
```

- Enable offload

```
[LearBABBBB:conf (1)0] config locos rsuoffload status enable
```

[Note : This is the same way we can add other required directories such as the rsuoffload source directory. Maximum 5 directories are supported for a single partition]

- Exiting from config mode

```
[LearBABBBB:conf (1)0] exit
Leaving conf mode...
```

8.11 Configuring DeploymentId (*Optional Configuration*)

Deploymentid needs to be configured to get deployment specific events. Below is the configuration command for DeploymentId.

```
[LearBABBBB:info (0)1] enable
[LearBABBBB:conf (0)1] config log deploymentid default
[LearBABBBB:conf (0)1] exit
```

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NOTE: *The DeploymentId will be communicated by LEAR which is customer specific.*

Chapter 9

Configuration of the Locomate Roadstar RSU through SNMP

9.1 Simple Network Management Protocol(SNMP)

Simple Network Management Protocol (SNMP) is a popular protocol for network management. It is used to collect information from, and configure network devices, such as servers, printers, hubs, switches, and routers on an Internet Protocol (IP) network.

9.2 Installation steps for SNMP manager

Make sure that you have installed the following SNMP manager on your backend machine. The command below is the example command for the **Ubuntu** machine.

“sudo apt-get install snmp snmpd snmp-mibs-downloader ”

Copying RSU 4.1 MIB:

Download the “RSU-MIB.txt” from our support site and copy it onto the Host machine(s)(where snmp manager will be running) This file will be copied into “~/snmp/mibs/” folder.

NOTE: If the “~/snmp/mibs/” folder is not present on the Host machine, create it by using the following command “mkdir -p ~/snmp/mibs/” and copy “RSU-MIB.txt” into it.

Copying snmp.conf: Copy the “snmp.conf” file from our support site (which has the SNMP credentials for the request) into “~/snmp/” folder. This folder should’ve been created prior to copying the “RSU-MIB.txt” (above) file.

NOTE: snmp.conf has the necessary credentials for the user. Without this file SNMP commands will not work from the Host machine. Otherwise, the user will have to give the credentials explicitly in the SNMP commands as parameters.

9.3 Restoring SNMP configuration

To restore the SNMP user credentials, the following steps must be followed:

In CLISH, disable SNMP and switch to Shell to remove the configuration files

- To disable snmp: "config remote snmp status disable"
- Removing config file: "rm -rf /var/lib/snmp/snmpd.conf"
- Removing config file: "rm -rf /var/snmpd.conf"

After these steps are executed, issue a system reboot. Once the system is rebooted, the configuration is then restored.

9.4 SNMP with IPv4/IPv6 support

By default the SNMP supports IPv4 address for management. To enable IPv6 address support, do the following configurations:

9.4.1 Locomate Device Configuration

- Configure brtrunk IPv6/IPv4 address through CLISH if it is not already configured.

Syntax: # config interface brtrunk <ipv6> ip <IPv6 address> <length>

Example for IPv6:

```
# enable
```

```
# config interface brtrunk ipv6 ip 2001:470:11:22::2 64
```

```
# exit
```

Syntax: # config interface brtrunk <ipv4> ip <IPv4 address> <netmask>

Example for IPv4:

```
# enable
```

```
# config interface brtrunk ipv4 ip 10.163.40.41 255.255.255.0
```

```
# exit
```

- Reboot the device
request system reboot

9.4.2 Host Machine Configuration

- Configure the Host Machine Ipv6 address if it is not configured. Please make sure the Host machine and the Locomate Ipv6 address are in the same subnet.

```
$ sudo ip a a 2001:470:11:22::1/64 dev eth0
```

- Once the Locomate comes up, you can do SNMP configuration with Ipv4 as well as Ipv6 address now.
\$ snmpwalk 192.168.0.40 RSU-MIB::rsuMIB or
\$ snmpwalk udp6:2001:470:11:22::2 RSU-MIB::rsuMIB

9.5 Configuration commands of SNMP for RSU

The steps highlighted below will help you to configure the device with SNMP commands as per RSU 4.1 specifications. Here we have explained the available SNMP table/scalar entry to configure the RSU device based on the specification.

9.5.1 Operate mode configuration

Provides the configuration parameters for the Operating mode of the RSU. Supported modes are standby, operate and off.

Standby State:Core Operating System is operational, DSRC radios are not operational/broadcasting and Interface logging is disabled.

Operate State:All DSRC radios are operational/broadcasting, and System log is enabled.

Off State: Not supported in the current implementation.

Note : Values for modes are standby = 2, operate = 4 and off = 16.

Set operate mode for RSU

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuMode.0 = 4
```

```
RSU-MIB::rsuMode.0 = INTEGER: operate(4)
```

Get the RSU Mode

```
root@Lear-PC:~# snmpget -t 15 192.168.0.40 RSU-MIB::rsuMode.0
```

```
RSU-MIB::rsuMode.0 = INTEGER: operate(4)
```

9.5.2 WSA Service Table

Provides general configuration parameters for the RSU WAVE Service Advertisement.

Prerequisites:

1. rsuWsaStatus.x – where 'x' indicates the index number. If you want to configure/delete the index, use the proper index number here. Index numbers are unique numbers.

If the same index number is already present, the SET command will update the respective index file.

2. `rsuWsaPsid.x` – Use hex format PSID. For example, if you want to configure 0x1020407E as a PSID, then use “1020407E” to configure it (SNMP expects 4 bytes PSID).
3. `rsuWsaIpAddress.x` – Configures IP address of destination host. Only Ipv6 addressing is supported. For example, if you want to configure “2001:470:11:22::1” as an IP address, then enter the complete (16 byte) IP address like “20010470001100220000000000000001”.

Configure multiple WSA configurations one for each provider instance

This is a new provider application that replaces the previous IPservice application on the RSU. A key difference is that there are multiple provider instances that are running. Each provider instance is configured to handle communication for a specific Psid (Provider Service Identifier).

The communication configuration for each provider instance is defined in a `wsa_n.conf` file (n being an index identifier 1, 2, ... n). Currently, these WSA configuration files can only be updated or created through SNMP. When a new `wsa_n.conf` file is created this automatically spawns a new provider instance running on the RSU.

The name for each provider instance includes a suffix of the Psid that the provider instance is configured with. For example, the process name for the provider instance running for the IPservice process (Psid 270549118) is: `provider270549118_index`

Two provider instances can be handling IPservice and handling offload.

- provider – IPservice
Use the WSA index 1 configuration for this provider setup. Configuring the WSA config file is done through SNMP commands from the server.

- Check the existing WSA fields. The following is the SNMP command issued using the RSU IPv4 address.

```
root@Lear-PC:~# snmpwalk -t 15 192.168.0.40 RSU-MIB::rsuWsaServiceTable  
RSU-MIB::rsuWsaPsid.1 = STRING: 1020407e  
RSU-MIB::rsuWsaPriority.1 = INTEGER: 1  
RSU-MIB::rsuWsaProviderContext.1 = STRING: "ipv6"  
RSU-MIB::rsuWsaIpAddress.1 = STRING: 0:0:0:0:0:0:0  
RSU-MIB::rsuWsaPort.1 = INTEGER: 16092
```

```
RSU-MIB::rsuWsaChannel.1 = INTEGER: 176
RSU-MIB::rsuWsaStatus.1 = INTEGER: active(1)
```

The IP address and port are not set in this example, so we will generate a new set of parameters for this WSA configuration.

- Delete the WSA configuration at index 1.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWsaStatus.1 = 6
```

- Create a new WSA configuration at index 1.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWsaStatus.1 = 4
rsuWsaPsid.1 x "1020407E" rsuWsaPriority.1 = 1 rsuWsaProviderContext.1
= "scms" rsuWsaIpAddress.1 x "20010470110122220000000000000009"
rsuWsaPort.1 = 16092 rsuWsaChannel.1 = 176
```

Note: 1. The Psid in the snmp command is a hex value "1020407E" = 270549118
 2. The rsuWsaIpAddress is the IPv6 address of the back end host server as a full hex value "20010470110122220000000000000009"
 3. The rsuWsaProviderContext is set to "scms" according to Lear. This is not used now, but will be in the future.

- provider – offload

The second provider instance handles communication for Psid 50. This service handles the file offload communication from the OBU's when it gets connected to the RSU. This WSA configuration will be build for index 2.

Confirm that there is no existing index 2 WSA configuration. Use the check WSA fields command as shown in step 1 above. If there is an existing index 2 WSA configuration, then delete it, as described in step 2 above, by substituting index 2 for index 1 in the SNMP command.

- Create a new WSA configuration at index 2

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWsaStatus.2 = 4
rsuWsaPsid.2 x "00000032" rsuWsaPriority.2 = 1 rsuWsaProviderContext.2
= "scms" rsuWsaIpAddress.2 x "20010470110122220000000000000009"
rsuWsaPort.2 = 16092 rsuWsaChannel.1 = 176
```

Again this provider will be handling routing to the backend host server for file offload. Note the rsuWsaPsid.2 is a hex value "00000032" = 50.

- Once this SNMP command is executed you should be able to see that application by entering "show system procs".

- After this configuration works the RSU is rebooted using the RSU CLI command.

```
[Lear334455:info (25)0] request system reboot
```

Upon restart, all processes are checked and communication between the RSU and host server are confirmed using ping and scp commands.

9.5.3 WRA Configuration

Provides general configuration parameters for the RSU WAVE Routing Advertisement.

Set WRA IP Prefix:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWraIpPrefix.0 x  
"20010470001100220000000000000000"
```

```
RSU-MIB::rsuWraIpPrefix.0 = STRING: 2001:470:11:22:0:0:0:0
```

Get WRA IP Prefix:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuWraIpPrefix.0
```

```
RSU-MIB::rsuWraIpPrefix.0 = STRING: 2001:470:11:22:0:0:0:0
```

NOTE: IP prefix length should be configured by HEX value. For example, if you want to configure 64 as prefix length, then use HEX value “40”.

Set Prefix Length:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40  
RSU-MIB::rsuWraIpPrefixLength.0 x "40"
```

```
RSU-MIB::rsuWraIpPrefixLength.0 = STRING: “@”
```

Get prefix Length:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuWraIpPrefixLength.0
```



```
RSU-MIB::rsuWraIpPrefixLength.0 = STRING: "@"
```

Set Gateway:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWraGateway.0  
x "20010470001100220000000000000001"
```

```
RSU-MIB::rsuWraGateway.0 = STRING: 2001:470:11:22:0:0:0:1
```

Get Gateway:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuWraGateway.0
```

```
RSU-MIB::rsuWraGateway.0 = STRING: 2001:470:11:22:0:0:0:1
```

Set Primary DNS:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuWraPrimaryDns.0  
x "20010470001100220000000000000001"
```

```
RSU-MIB::rsuWraPrimaryDns.0 = STRING: 2001:470:11:22:0:0:0:1
```

Get Primary DNS:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuWraPrimaryDns.0
```

```
RSU-MIB::rsuWraPrimaryDns.0 = STRING: 2001:470:11:22:0:0:0:1
```

Get all WRA Parameters:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuWraConfiguration
```

```
MIB::rsuWraConfiguration
```

```
RSU-MIB::rsuWraIpPrefix.0 = STRING: 2001:470:11:22:0:0:0:0
```

```
RSU-MIB::rsuWraIpPrefixLength.0 = STRING: "@"
```

RSU-MIB::rsuWraGateway.0 = STRING: 2001:470:11:22:0:0:0:1

RSU-MIB::rsuWraPrimaryDns.0 = STRING: 2001:470:11:22:0:0:0:1

9.5.4 Store and Repeat Message(SRM)

Provides configuration information for each Store and Repeat Message sent by a RSU. The Store and Repeat Message(SRM) table is a read/write table entry. User has the access to create/modify/delete any entry. Example of SRM messages are TIM messages and MAP messages.

Prerequisites:

1. rsuSRMStatus.x – where 'x' indicates the index number. If you want to configure/delete the index, use the proper index number here.

Index numbers are unique numbers. If the same index number is already present, the SET command will update the respective index file.

2. rsuSRMTxMode.x – Configure 0 for continuous mode and 1 for alternate mode.
3. rsuSRMPsid.x – Use hex format PSID. For example, if you want to configure 0x82 as a PSID, then use “00000082” to configure it (SNMP expects 4 bytes PSID)
TIM PSID = 0x83 and MAP PSID = 0x204097
4. 4. rsuSRMDsrcMsgId.x – Message id’s MAP =18, SPAT = 19 and TIM = 31.

Note: If you configure any other ID’s apart from this value, the config file won’t be created.

5. rsuSRMTxInterval.x – Interval should be 0 for IFM and 1 to 5 for SRM.
6. rsuSRMDeliveryStart.x or rsuSRMDeliveryStop.x – Expects date and time in 6 bytes hex format. Allowed format is “dd/mm/yyyy hh:mm”

For example – If you want to configure “01/01/2017, 11:59”, then it should be converted into “010114110b3b” hex format.

| | 1 st byte | 2 nd byte | 3 rd byte | 4 th byte | 5 th byte | 6 th byte |
|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Actaul data: | 01 | 01 | 20 | 17 | 11 | 59 |
| Hex Data: | 01 | 01 | 14 | 11 | 0b | 3b |

Creating an Entry:

createAndGo (4) is used to create a new entry. Assign this value to rsuSRMStatus.x to create a new entry.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSRMStatus.2 = 4
rsuSRMTxChannel.2 = 172 rsuSRMTxMode.2 = 0 rsuSRMPsid.2 x "0x00204097"
rsuSRMDsrcMsgId.2 = 18 rsuSRMTxInterval.2 = 1 rsuSRMDeliveryStart.2 x
"010114111530" rsuSRMDeliveryStop.2 x "010114130000" rsuSRMPayload.2 x
"0EFF82445566778899000000AABBCCDDEEFF00E0EA0C12A00" rsuSRMEnable.2 = 1
```

RSU-MIB::rsuSRMStatus.2 = INTEGER: createAndGo(4)

RSU-MIB::rsuSRMTxChannel.2 = INTEGER: 172

RSU-MIB::rsuSRMTxMode.2 = INTEGER: cont(0)

RSU-MIB::rsuSRMPsid.2 = STRING: 204097

RSU-MIB::rsuSRMDsrcMsgId.2 = INTEGER: 18

RSU-MIB::rsuSRMTxInterval.2 = INTEGER: 1

RSU-MIB::rsuSRMDeliveryStart.2 = Hex-STRING: 01 01 14 11 15 30

RSU-MIB::rsuSRMDeliveryStop.2 = Hex-STRING: 01 01 14 13 00 00

RSU-MIB::rsuSRMPayload.2 = Hex-STRING: 0E FF 82 44 55 66 77 88 99 00 00 00
AA BB CC DD EE FF 00 E0 0E A0 C1 2A 00

RSU-MIB::rsuSRMEnable.2 = INTEGER: on(1)

Updating the existing Entry:

For updating the conf file no need to provide any values for rsuSRMStatus.x. Just use the variables with proper index to update the conf file.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuSRMPsid.2 x "0x00204097"
rsuSRMPayload.2 x "0EFF82445566778899000000AABBCCDDEEFF00E0EA0C12A00"
```

RSU-MIB::rsuSRMPsid.2 = STRING: 204097

RSU-MIB::rsuSRMPayload.2 = Hex-STRING: 0E FF 82 44 55 66 77 88 99 00 00 00
AA BB CC DD EE FF 00 E0 0E A0 C1 2A 00

Getting the SRM Entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSRMStatusTable

RSU-MIB::rsuSRMPsid.2 = STRING: 204097
RSU-MIB::rsuSRMDsrcMsgId.2 = INTEGER: 18
RSU-MIB::rsuSRMTxMode.2 = INTEGER: alt(1)
RSU-MIB::rsuSRMTxChannel.2 = INTEGER: 182
RSU-MIB::rsuSRMTxInterval.2 = INTEGER: 4
RSU-MIB::rsuSRMDeliveryStart.2 = Hex-STRING: 01 01 14 11 15 30
RSU-MIB::rsuSRMDeliveryStop.2 = Hex-STRING: 01 01 14 13 00 00
RSU-MIB::rsuSRMPayload.2 = Hex-STRING: 82 44 55 66 77 88 99 00 00 00 AA BB
CC DD EE FF 00 E0 0E A0 C1 2A 00
RSU-MIB::rsuSRMEnable.2 = INTEGER: on(1)
RSU-MIB::rsuSRMStatus.2 = INTEGER: createAndGo(4)
```

Deleting an Entry:

destroy (6) is used to delete the entry.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuSRMStatus.2 = 6

RSU-MIB::rsuSRMStatus.2 = INTEGER: destroy(6)

root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSRMStatusTable
```

RSU-MIB::rsuSRMStatusTable = No Such Object available on this agent at this OID
NOTE: Index 1 is configured by default. If you want to configure index 1, please delete it and create it again. Otherwise, you can update the index directly.

9.5.5 Immediate Forward Message(IFM)

Provides configuration parameters for each Immediate Forward Message sent by a RSU. The Immediate Forward message table is a read only table entry. The user can read the IFM entries, but can't configure them.

Getting the IFM Entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuIFMStatusTable
```

RSU-MIB::rsuIFMPsid.1 = STRING: 204097

RSU-MIB::rsuIFMDsrcMsgId.1 = INTEGER: 19

RSU-MIB::rsuIFMTxMode.1 = INTEGER: cont(0)

RSU-MIB::rsuIFMTxChannel.1 = INTEGER: 172

RSU-MIB::rsuIFMEnable.1 = INTEGER: off(0)

RSU-MIB::rsuIFMStatus.1 = INTEGER: active(1)

NOTE: By default, no IFM entries will be present in the device. If the IFM data is fed to the RSU, then the IFM entries will be created.

9.5.6 DSRC Forward Table

Contains the DSRC PSID being forwarded to a network host, the IP Address and port number of the destination host, as well as other configuration parameters as defined. Forward table is a read/write table entry. Users have the access to create/modify/delete any entry.

Prerequisites:

1. rsuDsrcFwdStatus.x – where 'x' indicates the index number. If you want to configure/delete the index, use the proper index number here. Index numbers are unique numbers.
If the same index number is already present, the SET command will update respective index file.
2. rsuDsrcFwdPsid.x – Use hex format PSID. For example, if you want to configure 0x82 as a PSID, then use “00000082” to configure it (SNMP expects 4 bytes PSID). TIM PSID = 0x83, MAP/SPAT PSID = 0x82, BSM PSID = 0x20, IPService PSID = 0x85 and WSA PSID = 0x87.
3. rsuDsrcFwdDestIpAddr.x – Configures IP address of destination host. Only Ipv6 addressing is supported. For example, if you want to configure “2001:470:11:22::1” as a IP address, then enter the complete (16 byte) IP address like “200104700011002200000000000000001”.
4. rsuDsrcFwdProtocol.x – Configure 1 for TCP and 2 for UDP protocol.

5. rsuDsrcFwdRssi.x – Configure the RSSI between -60 to -100.
6. rsuDsrcFwdDeliveryStart.x or rsuDsrcFwdDeliveryStart.x – Expects date and time in 6 byte’s hexformat. Allowed format is “dd/mm/yyyy hh:mm”. For example – If you want to configure “01/01/2017, 11:59”, then it should be converted into “010114110b3b” hex format.

| | 1 st byte | 2 nd byte | 3 rd byte | 4 th byte | 5 th byte | 6 th byte |
|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Actaul data: | 01 | 01 | 20 | 17 | 11 | 59 |
| Hex Data: | 01 | 01 | 14 | 11 | 0b | 3b |

Creating an Entry:

createAndGo (4) is used to create a new entry. Assign this value to rsuDsrcFwdStatus.x to create a new entry.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuDsrcFwdStatus.2 = 4
rsuDsrcFwdPsid.2 x "00204097" rsuDsrcFwdDestIpAddr.2 x
"20010470001100220000000000000001" rsuDsrcFwdDestPort.2 = 2077
rsuDsrcFwdProtocol.2 = 2 rsuDsrcFwdRssi.2 =-61 rsuDsrcFwdMsgInterval.2 = 1
rsuDsrcFwdDeliveryStart.2 x "010114111530" rsuDsrcFwdDeliveryStop.2 x
"010114130101" rsuDsrcFwdEnable.2 = 1
```

```
RSU-MIB::rsuDsrcFwdStatus.2 = INTEGER: createAndGo(4)
RSU-MIB::rsuDsrcFwdPsid.2 = STRING: 204097
RSU-MIB::rsuDsrcFwdDestIpAddr.2 = STRING: 2001:470:11:22:0:0:0:1
RSU-MIB::rsuDsrcFwdDestPort.2 = INTEGER: 2077
RSU-MIB::rsuDsrcFwdProtocol.2 = INTEGER: udp(2)
RSU-MIB::rsuDsrcFwdRssi.2 = INTEGER: -61
RSU-MIB::rsuDsrcFwdMsgInterval.2 = INTEGER: 1
RSU-MIB::rsuDsrcFwdDeliveryStart.2 = Hex-STRING: 01 01 14 11 15 30
RSU-MIB::rsuDsrcFwdDeliveryStop.2 = Hex-STRING: 01 01 14 13 01 01
RSU-MIB::rsuDsrcFwdEnable.2 = INTEGER: on(1)
```

Updating the Existing Entry:

For updating the conf file no need to provide any values for rsrcFwdStatus.x. Just use the variables with proper index to update the conf file.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSrcFwdMsgInterval.2  
= 2 rsrcFwdDeliveryStop.2 x "010114130000"
```

```
RSU-MIB::rsuSrcFwdMsgInterval.2 = INTEGER: 2
```

```
RSU-MIB::rsuSrcFwdDeliveryStop.2 = Hex-STRING: 01 01 14 13 00 00
```

Getting the Forward Entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSrcForwardTable
```

```
RSU-MIB::rsuSrcFwdPsid.2 = STRING: 204097
```

```
RSU-MIB::rsuSrcFwdDestIpAddr.2 = STRING: 2001:470:11:22:0:0:0:1
```

```
RSU-MIB::rsuSrcFwdDestPort.2 = INTEGER: 2077
```

```
RSU-MIB::rsuSrcFwdProtocol.2 = INTEGER: udp(2)
```

```
RSU-MIB::rsuSrcFwdRssi.2 = INTEGER: -61
```

```
RSU-MIB::rsuSrcFwdMsgInterval.2 = INTEGER: 2
```

```
RSU-MIB::rsuSrcFwdDeliveryStart.2 = Hex-STRING: 01 01 14 11 15 30
```

```
RSU-MIB::rsuSrcFwdDeliveryStop.2 = Hex-STRING: 01 01 14 13 00 00
```

```
RSU-MIB::rsuSrcFwdEnable.2 = INTEGER: on(1)
```

```
RSU-MIB::rsuSrcFwdStatus.2 = INTEGER: active(1)
```

Deleting an Entry:

destroy (6) is used to delete the entry.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSrcFwdStatus.2 = 6
```

```
RSU-MIB::rsuSrcFwdStatus.2 = INTEGER: destroy(6)
```

NOTE: Index 1 is configured by default. If you want to configure index 1, please delete it and create it again. Otherwise, you can update the index directly.

9.5.7 DSRC Channel Mode Table

Provides configuration parameters to configure the Radio channel mode of an RSU.

Prerequisites:

Make sure the interface/radio that you want to configure is not used by any application. The best way is to disable all of the applications on the RSU and configure the interface/radio mode. After configuring the interface/radio, the application settings need to be changed to the configured channel number for each interface, otherwise the application will fail. Index 1 is used to configure wifi0vap0 interface and Index 2 is used to configure wifi1vap0 interface.

Limitations: User can't set the wifi0vap0 to continuous mode. It will always be in alternate mode.

Set/Update Radio1 Channel Mode:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuDCMMode.1 = 1
rsuDCMCCH.1 = 178 rsuDCMSCH.1 = 180
```

```
RSU-MIB::rsuDCMMode.1 = INTEGER: alt(1)
RSU-MIB::rsuDCMCCH.1 = INTEGER: 178
RSU-MIB::rsuDCMSCH.1 = INTEGER: 180
```

Set/Update Radio2 Channel Mode:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuDCMMode.2 = 0
rsuDCMCCH.2 = 184 rsuDCMSCH.2 = 184
```

```
RSU-MIB::rsuDCMMode.2 = INTEGER: cont(0)
RSU-MIB::rsuDCMCCH.2 = INTEGER: 184
RSU-MIB::rsuDCMSCH.2 = INTEGER: 184
```

Reading All Radio's DSRC Channel Mode:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuDsSrcChannelModeTable
```



```
RSU-MIB::rsuDCMRadio.2 = STRING: wifi1vap0
RSU-MIB::rsuDCMMode.1 = INTEGER: alt(1)
RSU-MIB::rsuDCMMode.2 = INTEGER: cont(0)
RSU-MIB::rsuDCMCCH.1 = INTEGER: 178
RSU-MIB::rsuDCMCCH.2 = INTEGER: 184
RSU-MIB::rsuDCMSCH.1 = INTEGER: 180
RSU-MIB::rsuDCMSCH.2 = INTEGER: 184
```

9.5.8 Probe Data Management(PDM) Message

Provides configuration parameters to configure the Probe Data Management(PDM) message

Set the PDMSampleStart.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMSampleStart.0 = 5
```

```
RSU-MIB::rsuPDMSampleStart.0 = INTEGER: 5
```

Get the PDMSampleStart.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMSampleStart.0
```

```
RSU-MIB::rsuPDMSampleStart.0 = INTEGER: 5
```

Set the PDMSampleEnd.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMSampleEnd.0 = 20
```

```
RSU-MIB::rsuPDMSampleEnd.0 = INTEGER: 20
```

Get the PDMSampleEnd.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMSampleEnd.0
```

```
RSU-MIB::rsuPDMSampleEnd.0 = INTEGER: 20
```

Set the PDMDirections

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMDirections.0 = 32
```

RSU-MIB::rsuPDMDirections.0 = INTEGER: 32

Get the PDMDirections

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMDirections.0
```

RSU-MIB::rsuPDMDirections.0 = INTEGER: 32

Set the PDMTermChoice

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMTermChoice.0 = 1
```

RSU-MIB::rsuPDMTermChoice.0 = INTEGER: time(1)

Get the PDMTermChoice

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMTermChoice.0
```

RSU-MIB::rsuPDMTermChoice.0 = INTEGER: time(1)

Set the PDMTermTime

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMTermTime.0 = 100
```

RSU-MIB::rsuPDMTermTime.0 = INTEGER: 100

Get the PDMTermTime

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMTermTime.0
```

RSU-MIB::rsuPDMTermTime.0 = INTEGER: 100

Set the PDMTermDistance

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMTermDistance.0 = 200
```

RSU-MIB::rsuPDMTermDistance.0 = INTEGER: 200

Get the PDMTermDistance

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMTermDistance.0
```

```
RSU-MIB::rsuPDMTermDistance.0 = INTEGER: 200
```

Set the PDMSnapshotChoice

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMSnapshotChoice.0 = 1
```

```
RSU-MIB::rsuPDMSnapshotChoice.0 = INTEGER: time(1)
```

Get the PDMSnapshotChoice

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMSnapshotChoice.0
```

```
RSU-MIB::rsuPDMSnapshotChoice.0 = INTEGER: time(1)
```

Set the PDMMinSnapshotTime

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMMinSnapshotTime.0 = 5
```

```
RSU-MIB::rsuPDMMinSnapshotTime.0 = INTEGER: 5
```

Get the PDMMinSnapshotTime

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMMinSnapshotTime.0
```

```
RSU-MIB::rsuPDMMinSnapshotTime.0 = INTEGER: 5
```

Set the PDMMaxSnapshotTime

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMMaxSnapshotTime.0 = 10
```

```
RSU-MIB::rsuPDMMaxSnapshotTime.0 = INTEGER: 10
```

Get the PDMMaxSnapshotTime

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMMaxSnapshotTime.0
```

RSU-MIB::rsuPDMMaxSnapshotTime.0 = INTEGER: 10

Set the PDMMinSnapshotDistance

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMMinSnapshotDistance.0  
= 100
```

RSU-MIB::rsuPDMMinSnapshotDistance.0 = INTEGER: 100

Get the PDMMinSnapshotDistance

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMMinSnapshotDistance.0
```

RSU-MIB::rsuPDMMinSnapshotDistance.0 = INTEGER: 100

Set the PDMMaxSnapshotDistance

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMMaxSnapshotDistance.0  
= 200
```

RSU-MIB::rsuPDMMaxSnapshotDistance.0 = INTEGER: 200

Get the PDMMaxSnapshotDistance

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMMaxSnapshotDistance.0
```

RSU-MIB::rsuPDMMaxSnapshotDistance.0 = INTEGER: 200

Set the PDMSnapshotMinSpeed

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMSnapshotMinSpeed.0  
= 10
```

RSU-MIB::rsuPDMSnapshotMinSpeed.0 = INTEGER: 10

Get the PDMSnapshotMinSpeed

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMSnapshotMinSpeed.0
```

```
RSU-MIB::rsuPDMSnapshotMinSpeed.0 = INTEGER: 10
```

Set the PDMSnapshotMaxSpeed

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMSnapshotMaxSpeed.0  
= 20
```

```
RSU-MIB::rsuPDMSnapshotMaxSpeed.0 = INTEGER: 20
```

Get the PDMSnapshotMaxSpeed

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMSnapshotMaxSpeed.0
```

```
RSU-MIB::rsuPDMSnapshotMaxSpeed.0 = INTEGER: 20
```

Set the PDMTxInterval

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMTxInterval.0 = 5
```

```
RSU-MIB::rsuPDMTxInterval.0 = INTEGER: 5
```

Get the PDMTxInterval

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuPDMTxInterval.0
```

```
RSU-MIB::rsuPDMTxInterval.0 = INTEGER: 5
```

1. PDM Table Entry Configuration

Creating an Entry: createAndGo (4) is used to create a new entry. Assign this value to rsuPDMVSReqStatus.x to create a new entry.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMVSReqStatus.2 = 4  
rsuPDMVSReqTag.2 = 5 rsuPDMVSReqSubTag.2 = 3 rsuPDMVSReqLessThenValue.2  
= 5 rsuPDMVSReqMoreThenValue.2 = 10 rsuPDMVSReqSendAll.2 = 1  
rsuPDMVSReqEnable.2 = 1
```

```
RSU-MIB::rsuPDMVSReqStatus.2 = INTEGER: createAndGo(4)
```

```
RSU-MIB::rsuPDMVSReqTag.2 = INTEGER: 5
```

```
RSU-MIB::rsuPDMVSReqSubTag.2 = INTEGER: 3
```

```
RSU-MIB::rsuPDMVSReqLessThenValue.2 = INTEGER: 5
RSU-MIB::rsuPDMVSReqMoreThenValue.2 = INTEGER: 10
RSU-MIB::rsuPDMVSReqSendAll.2 = INTEGER: on(1)
RSU-MIB::rsuPDMVSReqEnable.2 = INTEGER: on(1)
```

Updating the existing Entry: For updating the conf file, there is no need to provide any values for rsuPDMVSReqStatus.x. Just use the variables with proper index to update the conf file.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMVSReqLessThenValue.2
= 1 rsuPDMVSReqMoreThenValue.2 = 5 rsuPDMVSReqEnable.2 = 0
```

```
RSU-MIB::rsuPDMVSReqLessThenValue.2 = INTEGER: 1
RSU-MIB::rsuPDMVSReqMoreThenValue.2 = INTEGER: 5
RSU-MIB::rsuPDMVSReqEnable.2 = INTEGER: off(0)
```

Getting the PDM Table Entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuPDMVSReqListTable
```

```
RSU-MIB::rsuPDMVSReqTag.2 = INTEGER: 5
RSU-MIB::rsuPDMVSReqSubTag.2 = INTEGER: 3
RSU-MIB::rsuPDMVSReqLessThenValue.2 = INTEGER: 1
RSU-MIB::rsuPDMVSReqMoreThenValue.2 = INTEGER: 5
RSU-MIB::rsuPDMVSReqSendAll.2 = INTEGER: on(1)
RSU-MIB::rsuPDMVSReqEnable.2 = INTEGER: off(0)
RSU-MIB::rsuPDMVSReqStatus.2 = INTEGER: active(1)
```

Deleting an Entry: destroy (6) is used to delete the entry.

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuPDMVSReqStatus.2 = 6
```

```
RSU-MIB::rsuPDMVSReqStatus.2 = INTEGER: destroy(6)
```

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuPDMVSReqListTable
```

```
RSU-MIB::rsuPDMVSReqListTable = No Such Object available on this agent at this  
OID
```

NOTE: Index 1 is configured by default. If you want to configure index 1, please delete and recreate it. Otherwise, you can update the index directly.

2. Getting all the PDM entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuPDMStatus
```

```
RSU-MIB::rsuPDMSampleStart.0 = INTEGER: 5  
RSU-MIB::rsuPDMSampleEnd.0 = INTEGER: 10  
RSU-MIB::rsuPDMDirections.0 = INTEGER: 32  
RSU-MIB::rsuPDMTermChoice.0 = INTEGER: time(1)  
RSU-MIB::rsuPDMTermTime.0 = INTEGER: 100  
RSU-MIB::rsuPDMTermDistance.0 = INTEGER: 200  
RSU-MIB::rsuPDMSnapshotChoice.0 = INTEGER: time(1)  
RSU-MIB::rsuPDMMinSnapshotTime.0 = INTEGER: 5  
RSU-MIB::rsuPDMMaxSnapshotTime.0 = INTEGER: 10  
RSU-MIB::rsuPDMMinSnapshotDistance.0 = INTEGER: 100  
RSU-MIB::rsuPDMMaxSnapshotDistance.0 = INTEGER: 200  
RSU-MIB::rsuPDMSnapshotMinSpeed.0 = INTEGER: 10  
RSU-MIB::rsuPDMSnapshotMaxSpeed.0 = INTEGER: 20  
RSU-MIB::rsuPDMTxInterval.0 = INTEGER: 5  
RSU-MIB::rsuPDMVSReqTag.1 = INTEGER: 3  
RSU-MIB::rsuPDMVSReqSubTag.1 = INTEGER: 5  
RSU-MIB::rsuPDMVSReqLessThenValue.1 = INTEGER: 1  
RSU-MIB::rsuPDMVSReqMoreThenValue.1 = INTEGER: 5  
RSU-MIB::rsuPDMVSReqSendAll.1 = INTEGER: on(1)  
RSU-MIB::rsuPDMVSReqEnable.1 = INTEGER: on(1)
```

9.5.9 Interface Logging

Provides configuration information for capturing log files for each communication interface. All of the entries have read/write access. The maximum allowed index is 2.

NOTE: While configuring the interface name, please provide a proper interface name. By default, pcap logging is disabled for both interfaces.

Set/Update Interface1 logging:

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuIfaceGenerate.1 = 1
rsuIfaceMaxFileSize.1 = 5 rsuIfaceMaxFileTime.1 = 2 rsuIfaceLogByDir.1
= 1 rsuIfaceName.1 = "wifi0vap0"
```

RSU-MIB::rsuIfaceGenerate.1 = INTEGER: on(1)

RSU-MIB::rsuIfaceMaxFileSize.1 = INTEGER: 5

RSU-MIB::rsuIfaceMaxFileTime.1 = INTEGER: 2

RSU-MIB::rsuIfaceLogByDir.1 = INTEGER: on(1)

RSU-MIB::rsuIfaceName.1 = STRING: wifi0vap0

Set/Update Interface2 logging:

```
root@Lear-PC:~# snmpset 192.168.0.40 RSU-MIB::rsuIfaceGenerate.2 = 1
rsuIfaceMaxFileSize.2 = 5 rsuIfaceMaxFileTime.2 = 2 rsuIfaceLogByDir.2
= 1 rsuIfaceName.2 = "wifi1vap0"
```

RSU-MIB::rsuIfaceGenerate.2 = INTEGER: on(1)

RSU-MIB::rsuIfaceMaxFileSize.2 = INTEGER: 5

RSU-MIB::rsuIfaceMaxFileTime.2 = INTEGER: 2

RSU-MIB::rsuIfaceLogByDir.2 = INTEGER: on(1)

RSU-MIB::rsuIfaceName.2 = STRING: wifi1vap0

Reading all the Interface logging entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuInterfaceLogTable
```

RSU-MIB::rsuIfaceGenerate.1 = INTEGER: off(0)

RSU-MIB::rsuIfaceGenerate.2 = INTEGER: off(0)


```
RSU-MIB::rsufaceMaxFileSize.1 = INTEGER: 10
```

```
RSU-MIB::rsufaceMaxFileSize.2 = INTEGER: 10
```

```
RSU-MIB::rsufaceMaxFileTime.1 = INTEGER: 0
```

```
RSU-MIB::rsufaceMaxFileTime.2 = INTEGER: 0
```

```
RSU-MIB::rsufaceLogByDir.1 = INTEGER: on(1)
```

```
RSU-MIB::rsufaceLogByDir.2 = INTEGER: on(1)
```

```
RSU-MIB::rsufaceName.1 = STRING: wifi0vap0
```

```
RSU-MIB::rsufaceName.2 = STRING: wifi1vap0
```

9.5.10 Continuous Mode DSRC Radio MAC Address

Represents an 802 MAC address of the DSRC Radio operating in Continuous Mode. This is a read-only object.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuContMacAddress.0  
RSU-MIB::rsuContMacAddress.0 = STRING: 0:26:ad:3:ac:e2
```

Alternate Mode DSRC Radio MAC Address

Represents an 802 MAC address of the DSRC Radio operating in Alternate Mode. This is a read-only object.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuAltMacAddress.0  
RSU-MIB::rsuAltMacAddress.0 = STRING: 0:26:ad:3:ac:e1
```

GPS Status

Provides the number of GPS Satellites RSU's internal GPS receiver is tracking. This is a read-only entry.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsStatus.0  
RSU-MIB::rsuGpsStatus.0 = INTEGER: 12
```

9.5.11 RSU System Object ID

The vendor's authoritative identification of the network management subsystem contained in the entity. 1.0.15628.4.1.6.0 indicates a RSU. This is a read-only entry.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysObjectID.0
```

RSU-MIB::rsuSysObjectID.0 = OID: RSU-MIB::rsuSysObjectID.0 To get the OID in numerical format, pass “-On” option to the SNMP get command

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysObjectID.0 -On  
.1.0.15628.4.1.6.0 = OID: .1.0.15628.4.1.6.0
```

9.5.12 GPS Output

Provides the configuration parameters for GPS as well as the configuration parameters to forward GPGGA sentences to the destination host. Multiple scalar entries are defined under this. All of the entries have read/write access except “rsuGpsOutputString”, which is a read only entry.

Configure the GPS Out External Server Port Number.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsOutputPort.0 =  
14569
```

RSU-MIB::rsuGpsOutputPort.0 = INTEGER: 14569

Read the GPS Out External Server Port Number.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsOutputPort.0
```

RSU-MIB::rsuGpsOutputPort.0 = INTEGER: 14569

Configure the Remote host IPv6 address to send the GPS string to.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsOutputAddress.0 x  
"20010470001100220000000000000001"
```

```
RSU-MIB::rsuGpsOutputAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

Read the Remote host IPv6 address to send the GPS string to.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsOutputAddress.0
```

```
RSU-MIB::rsuGpsOutputAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

Configure the Local interface to output the GPS string to.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsOutputInterface.0  
= "eth0"
```

```
RSU-MIB::rsuGpsOutputInterface.0 = STRING: eth0
```

Read the Local interface to output the GPS string to.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsOutputInterface.0
```

```
RSU-MIB::rsuGpsOutputInterface.0 = STRING: eth0
```

Configure the Interval at which to send the GPS GPGGA NMEA String to the external Server.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsOutputInterval.0  
= 100
```

```
RSU-MIB::rsuGpsOutputInterval.0 = INTEGER: 100
```

Read the Interval at which to send the GPS GPGGA NMEA String to the external Server.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsOutputInterval.0
```

```
RSU-MIB::rsuGpsOutputInterval.0 = INTEGER: 100
```

Configure the actual GPS latitude.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsRefLat.0 = 22
```

```
RSU-MIB::rsuGpsRefLat.0 = INTEGER: 22
```

Read the actual GPS latitude.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsRefLat.0
```

```
RSU-MIB::rsuGpsRefLat.0 = INTEGER: 22
```

Configure the actual GPS longitude.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsRefLon.0 = 45
```

```
RSU-MIB::rsuGpsRefLon.0 = INTEGER: 45
```

Read the actual GPS longitude.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsRefLon.0
```

```
RSU-MIB::rsuGpsRefLon.0 = INTEGER: 45
```

Configure the actual GPS elevation.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsRefElv.0 = 10
```

```
RSU-MIB::rsuGpsRefElv.0 = INTEGER: 10
```

Read the actual GPS elevation.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsRefElv.0
```

```
RSU-MIB::rsuGpsRefElv.0 = INTEGER: 10
```

Configure the maximum allowable deviation (radius in meters).

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuGpsMaxDeviation.0 = 5
```

```
RSU-MIB::rsuGpsMaxDeviation.0 = INTEGER: 5
```

Read the maximum allowable deviation (radius in meters).

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuGpsMaxDeviation.0
```

```
RSU-MIB::rsuGpsMaxDeviation.0 = INTEGER: 5
```

Reading all GPS Output Entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuGpsOutput
```

```
RSU-MIB::rsuGpsOutputPort.0 = INTEGER: 14569
```

```
RSU-MIB::rsuGpsOutputAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

```
RSU-MIB::rsuGpsOutputInterface.0 = STRING: eth0
```

```
RSU-MIB::rsuGpsOutputInterval.0 = INTEGER: 100
```

```
RSU-MIB::rsuGpsOutputString.0 = STRING:
```

```
GPGGA,075156.60,1254.99035,N,07737.07045,E,1,12,0.77,905.4,M,-86.5,M,,*71
```

RSU-MIB::rsuGpsRefLat.0 = INTEGER: 22

RSU-MIB::rsuGpsRefLon.0 = INTEGER: 45

RSU-MIB::rsuGpsRefElv.0 = INTEGER: 10

RSU-MIB::rsuGpsMaxDeviation.0 = INTEGER: 5

9.5.13 Security Credential Request

Provides configuration parameters for when a RSU should request new 1609.2 security credentials in the days before existing credentials expire. This is a read/write entry.

Set:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSecCredReq.0 x "1E"
```

RSU-MIB::rsuSecCredReq.0 = Hex-STRING: 1E

Get:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSecCredReq.0
```

RSU-MIB::rsuSecCredReq.0 = Hex-STRING: 1E

9.5.14 Security Credential Attach Interval

Provides configuration parameters for when a RSU will attach 1609.2 security credentials to a WAVE Short Message Protocol (WSMP) Message. This is a read/write entry.

Set:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSecCredAttachInterval.0  
= 50
```

RSU-MIB::rsuSecCredAttachInterval.0 = INTEGER: 50

Get:

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSecCredAttachInterval.0
```

RSU-MIB::rsuSecCredAttachInterval.0 = INTEGER: 50

9.5.15 Message Statistics

Provides the Number of messages sent on the Service/Control channel in Alternate/Continuous mode.

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuMessageStats
```

RSU-MIB::rsuAltSchMsgSent.0 = Counter32: 0

RSU-MIB::rsuAltSchMsgRcvd.0 = Counter32: 0

RSU-MIB::rsuAltCchMsgSent.0 = Counter32: 388

RSU-MIB::rsuAltCchMsgRcvd.0 = Counter32: 1740

RSU-MIB::rsuContSchMsgSent.0 = Counter32: 0

RSU-MIB::rsuContSchMsgRcvd.0 = Counter32: 0

RSU-MIB::rsuContCchMsgSent.0 = Counter32: 33

RSU-MIB::rsuContCchMsgRcvd.0 = Counter32: 1433

- Message Count by PSID

Provides a count of transmitted messages sorted by PSID.

9.5.16 System Statistics

Provides RSU uptime, total runtime, last user login, and Temperature related information. This is a read-only entry.

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSystemStats
```

RSU-MIB::rsuTimeSincePowerOn.0 = Counter32: 2159

```
RSU-MIB::rsuTotalRunTime.0 = Counter32: 453447
RSU-MIB::rsuLastLoginTime.0 = STRING: 2017-3-15,12:15:18.0,+0:0
RSU-MIB::rsuLastLoginUser.0 = STRING: admin
RSU-MIB::rsuLastLoginSource.0 = STRING: sathish-dt.arada-blr.com
RSU-MIB::rsuLastRestartTime.0 = STRING: 2017-3-15,12:14:15.0,+0:0
RSU-MIB::rsuIntTemp.0 = INTEGER: 0
```

9.5.17 System Description

Provides RSU MIB version, FW version, Location, RSU ID, and Manufacturer information. MIB version, FW version, and Manufacturer are read-only entries. Location Description and RSU ID have read/write access

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSysDescription
```

```
RSU-MIB::rsuMibVersion.0 = STRING: RSU 4.1
RSU-MIB::rsuFirmwareVersion.0 = STRING: v16.3.QA04
RSU-MIB::rsuLocationDesc.0 = STRING: N/A
RSU-MIB::rsuID.0 = STRING: LearBABBBB
RSU-MIB::rsuManufacturer.0 = STRING: Lear Corporation
```

Set Location Description:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuLocationDesc.0
= "Detroit"
```

```
RSU-MIB::rsuLocationDesc.0 = STRING: Detroit
```

Set RSU ID:

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuID.0 = "LearDUT123"
```



```
RSU-MIB::rsuID.0 = STRING: LearDUT123
```

9.5.18 System Settings

Provides configuration parameters to configure the RSU TX Power, Notification Server IP, and Port and Log file cleaning related settings.

Set the output power of the RSU antennas.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuTxPower.0 = 20
```

```
RSU-MIB::rsuTxPower.0 = INTEGER: 20
```

Get the RSU output power.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuTxPower.0
```

```
RSU-MIB::rsuTxPower.0 = INTEGER: 20
```

Set the IP Address of SNMP manager to receive notification.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuNotifyIpAddress.0 x  
"20010470001100220000000000000001"
```

```
RSU-MIB::rsuNotifyIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

Get the IP Address of SNMP manager that will receive notification.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuNotifyIpAddress.0
```

```
RSU-MIB::rsuNotifyIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

Set the port number of the SNMP manager that will receive the SNMP Notifications.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuNotifyPort.0 = 162
```

```
RSU-MIB::rsuNotifyPort.0 = INTEGER: 162
```

Get the port number of the SNMP manager.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuNotifyPort.0
```

```
RSU-MIB::rsuNotifyPort.0 = INTEGER: 162
```

Set the day of the week on which to close the system log file.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSysLogCloseDay.0 = 1
```

```
RSU-MIB::rsuSysLogCloseDay.0 = INTEGER: monday(1)
```

Get the day of the week on which to close the system log file.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysLogCloseDay.0
```

```
RSU-MIB::rsuSysLogCloseDay.0 = INTEGER: monday(1)
```

NOTE: Time should be configured in 3-byte HEX value(hhmmss). For example, if you want to configure “12:59:00” as the log close time, then it should be configured as “123B00”

Set the time of day at which to close the system log file.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSysLogCloseTime.0 x  
"123B00"
```

```
RSU-MIB::rsuSysLogCloseTime.0 = Hex-STRING: 12 3B 00
```

Get the time of day at which to close the system log file.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysLogCloseTime.0
```

```
RSU-MIB::rsuSysLogCloseTime.0 = Hex-STRING: 12 3B 00
```

Set the day of the week on which to delete the system log file.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSysLogDeleteDay.0 = 1
```

```
RSU-MIB::rsuSysLogDeleteDay.0 = INTEGER: monday(1)
```

Get the day of the week on which to delete the system log file.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysLogDeleteDay.0
```

```
RSU-MIB::rsuSysLogDeleteDay.0 = INTEGER: monday(1)
```

Set the age at which to delete old log files.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSysLogDeleteAge.0 = 15
```

```
RSU-MIB::rsuSysLogDeleteAge.0 = INTEGER: 15
```

Get the age at which to delete old log files.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSysLogDeleteAge.0
```

```
RSU-MIB::rsuSysLogDeleteAge.0 = INTEGER: 15
```

Read all system setting entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSysSettings
```

RSU-MIB::rsuTxPower.0 = INTEGER: 20

RSU-MIB::rsuNotifyIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1

RSU-MIB::rsuNotifyPort.0 = INTEGER: 162

RSU-MIB::rsuSysLogCloseDay.0 = INTEGER: monday(1)

RSU-MIB::rsuSysLogCloseTime.0 = Hex-STRING: 12 3B 00

RSU-MIB::rsuSysLogDeleteDay.0 = INTEGER: monday(1)

RSU-MIB::rsuSysLogDeleteAge.0 = INTEGER: 15

9.5.19 System Status

Provides the channel modes that are operating in RSU. Note: Operating means the device is functioning as designed, configured, and intended.

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSystemStatus
```

RSU-MIB::rsuChanStatus.0 = INTEGER: bothOp(0)

9.5.20 Situation Data Clearing

Provides configuration parameters to configure the RSU Situation data clearing house and Situation data warehouse information.

Set the IPv6 address of the Situation Data Clearinghouse.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSdcDestIpAddress.0  
x "20010470001100220000000000000001"
```

RSU-MIB::rsuSdcDestIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1

Get the IPv6 address of the Situation Data Clearinghouse.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSdcDestIpAddress.0
```

```
RSU-MIB::rsuSdcDestIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

Set the port on which the Situation Data Clearinghouse will receive data.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSdcDestPort.0 = 7701
```

```
RSU-MIB::rsuSdcDestPort.0 = INTEGER: 7701
```

Get the port on which the Situation Data Clearinghouse will receive data.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSdcDestPort.0
```

```
RSU-MIB::rsuSdcDestPort.0 = INTEGER: 7701
```

Set the interval in seconds at which the RSU will send data to the Situation Data Clearinghouse.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSdcInterval.0 = 3600
```

```
RSU-MIB::rsuSdcInterval.0 = INTEGER: 3600
```

Get the interval at which the RSU will send data to the Situation Data Clearinghouse(seconds).

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSdcInterval.0
```

```
RSU-MIB::rsuSdcInterval.0 = INTEGER: 3600
```

Set the IPv6 address of the Situation Data Warehouse.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSdwIpAddress.0 x  
"2001047000110022000000000000000002"
```

```
RSU-MIB::rsuSdwIpAddress.0 = STRING: 2001:470:11:22:0:0:0:2
```

Get the IPv6 address of the Situation Data Warehouse.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSdwIpAddress.0
```

```
RSU-MIB::rsuSdwIpAddress.0 = STRING: 2001:470:11:22:0:0:0:2
```

Set the port on which the Situation Data Warehouse will receive requests from the RSU.

```
root@Lear-PC:~# snmpset -t 15 192.168.0.40 RSU-MIB::rsuSdwPort.0 = 7702
```

```
RSU-MIB::rsuSdwPort.0 = INTEGER: 7702
```

Get the port on which the Situation Data Warehouse will receive requests from the RSU.

```
root@Lear-PC:~# snmpget 192.168.0.40 RSU-MIB::rsuSdwPort.0
```

```
RSU-MIB::rsuSdwPort.0 = INTEGER: 7702
```

Reading all SDC entries:

```
root@Lear-PC:~# snmpwalk 192.168.0.40 RSU-MIB::rsuSitData
```

```
RSU-MIB::rsuSdcDestIpAddress.0 = STRING: 2001:470:11:22:0:0:0:1
```

```
RSU-MIB::rsuSdcDestPort.0 = INTEGER: 7701
```

```
RSU-MIB::rsuSdcInterval.0 = INTEGER: 3600
```

```
RSU-MIB::rsuSdwIpAddress.0 = STRING: 2001:470:11:22:0:0:0:2
```

```
RSU-MIB::rsuSdwPort.0 = INTEGER: 7702
```

9.6 SNMP TRAP setup

9.6.1 Locomate Configuration(Agent)

- Remove the `/var/snmpd.conf` and restart the device. Once the device comes up, open the `/var/snmpd.conf` file and update the `<host machine IP>` (where you want to receive the traps) in the “trapsess” command and restart the device.

```
trapsess -v3 -u <username> -l <secllevel> -a SHA -A <password> -x AES -X  
<password> <host machine IP>:port
```

Example:

```
trapsess -v3 -u v3user -l authPriv -a SHA -A "Loc#123@Lear" -x AES -X  
"Loc#123@Lear" 192.168.0.100:162
```

NOTE: Make sure to restart the device once the `snmpd.conf` is configured with TRAP settings. We are restarting the the device to restart the “snmpd” to use the updated configuration.

9.6.2 Host Machine Configuration(Master)

- Run below command to find out the EngineID of the SNMP Agent that is running on the Locomate. Note the way the EngineID is used in step 3.

```
$ snmpget <IP addr of Locomate> SNMP-FRAMEWORK-MIB::snmpEngineID.0
```

Example: `$ snmpget 192.168.0.40 SNMP-FRAMEWORK-MIB::snmpEngineID.0`

```
$ SNMP-FRAMEWORK-MIB::snmpEngineID.0 = Hex-STRING: 80 00 1F 88 80 E9  
8B 44 7C B5 90 E7 58
```

NOTE: If you face any error in getting `snmpEngineID`, then do “**export MIBS=ALL**” in the current shell and try to get the `snmpEngineID`.

- Stop `snmptrapd` if running.
First check if `snmptrapd` is running or not by `ps -e | grep snmptrapd`
If it is running then stop it by `sudo killall snmptrapd`
- Add the following lines to `/etc/snmp/snmptrapd.conf` to create a user for receiving TRAP’s.

```
createUser -e EnginedID <username> MD5 <password> DES <password>  
authUser log,execute,net <username>
```

Example:

```
createUser -e 0x80001F8880E98B447CB590E758 v3user SHA Loc#123@Lear AES  
Loc#123@Lear\par authUser log,execute,net v3trapuser
```

NOTE: Username in Locomate's /var/snmpd.conf and Host machine's /etc/snmp/snmptrapd.conf should match.

- Run snmptrapd on the host as below.
sudo /usr/sbin/snmptrapd -f -Lf /log_file_path
Example: sudo /usr/sbin/snmptrapd -f -Lf ~/traps_log (or) sudo /usr/sbin/snmptrapd -f -Le
- Trap should be received on the receiver side.

9.6.3 Required Header File and Libraries

- If we want to use any of the TRAP API, we need to include the rsu_notif_api.h header file (which is present under locOS/include/snmp/ folder) and link it with SNMP libraries

```
-L$(build_dir)/build-rsu-linux-arm-lc3-Arada-d0-p0/bin-rel-dir/locOS/libs/  
-lsnmptrap -L$(build_dir)/open_rfs/usr/lib -lnl-3 -lnetsnmpagent -lnetsnmpmibs  
-lnetsnmphelpers -lnetsnmp -lcrypto -lssl
```


COMMAND REFERENCE FOR LOCOMATE ROADSTAR

Chapter 10

Introduction

CLI is clish based

Welcome

10.1 How CLI is organised

On system boot user is presented a CLI prompt as below:

```
[lear-1c3:info (1)2]
```

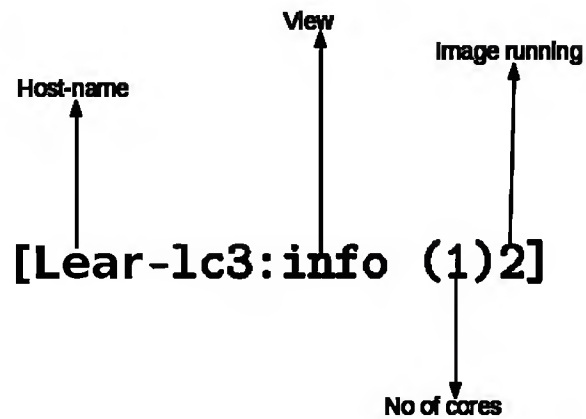


Figure 10.1: Components of CLI prompt.

1. **view:** As of now info, conf, debug views are provided.
2. **Image running:** Displays 0 for Image 0, 1 for Image 1 and 2 for recover or netboot image.

10.2 What is view

View is nothing but the modes that exist in the device. After login time of the device, we are in info mode. By default, we are in this info mode. We have another three modes: debug, config and request mode.

10.3 Context sensitive help

[?] - Display context sensitive help. This is either a list of possible command completions with summaries, or the full syntax of the current command. A subsequent repeat of this key, when a command has been resolved, will display a detailed reference.

10.4 Auto-completion

The following keys both perform auto-completion for the current command line. If the command prefix is not unique then the bell will ring and a subsequent repeat of the key will display possible completions.

[enter] - Auto-completes, syntax-checks then executes a command. If there is a syntax error then offending part of the command line will be highlighted and explained.

[space] - Auto-completes, or if the command is already resolved inserts a space.

10.5 Movement keys

[CTRL-A] - Move to the start of the line.

[CTRL-E] - Move to the end of the line.

[up] - Move to the previous command line held in history.

[down] - Move to the next command line held in history.

[left] - Move the insertion point left one character.

[right] - Move the insertion point right one character.

10.6 Deletion keys

[CTRL-C] - Delete and abort the current line.

[CTRL-D] - Delete the character to the right on the insertion point.

[CTRL-K] - Delete all the characters to the right of the insertion point.

[CTRL-U] - Delete the whole line.

[backspace] - Delete the character to the left of the insertion point.

10.7 Escape sequences

!! - Substitute the last command line.

!N - Substitute the Nth command line (absolute as per 'history' command)

!-N - Substitute the command line entered N lines before (relative)

Taken from clish webpage¹.

¹<http://clish.sourceforge.net/clish-0.7.3/>

Chapter 11

Home menu

This is the default place where user is placed after system login, ? shows all the commands and views available here.

```
[Lear-1c3:info (1)2]
!           Comments
copy       Copy commands
debug      Move to debug view
del        Del commands
enable     Turn on privileged commands
exit       Exit from the CLI
request    Request commands
show       Show commands
```

```
[Lear-1c3:info (1)2]
```

Chapter 12

show system

Service and monitoring commands

Requires no privilege

12.1 show system cores

Syntax:

```
show system cores
```

Description:

Shows total number of cores present in this image instance and their file names. This file name can be used to copy the cores to any host machine for further debugging. Netboot and recovery image shows number of cores for image 0.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)0] show system cores
```

```
Number of cores => 0  
[Learxxxxx:info (0)0]
```

12.2 show system name

Syntax:

```
show system name
```

Description:

Shows configured system name, this is the string which is present in the database for system hostname.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxx:info (0)0] show system name  
System Name => Learxxxxx  
[Learxxxxx:info (0)0]
```

12.3 show system region

Syntax:

```
show system region
```

Description:

Shows configured region of the device.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxx:info (0)0] show system region  
Country      =>    unitedstates-public-safety (842)  
[Learxxxxx:info (0)0]
```

12.4 show system mac

Syntax:

```
show system mac
```

Description:

Shows the basemac of the configured device.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxx:info (0)0] show system mac  
MAC address is => 00:11:22:33:44:55  
[Learxxxxx:info (0)0]
```

12.5 show system version

Syntax:

```
show system version [detail]
```

Description:

Shows different software versions of system components. Details are added as hidden arguments which show more about the build and firmware.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Updates:

v0.0.2 (detail argument added.)

Example log:

```
[Learxxxxx:info (0)0] show system version
DB version is      =>      0.3
RFS version is     =>      v0.0.7-120415-1559-IST-0-g993e0c5
SDK version is     =>      v0.0.5-18-gd3bc8bf-dirty
Kernel version is  =>      3.10.17-arada-LC3-00004-g993e0c5+
[Learxxxxx:info (0)0]
```

12.6 show system procs

Syntax:

```
show system procs
```

Description:

Shows current processes running in system.

Default state:

N/A

Privileged?:

No

Added in:

Initial

Example log:

```
[Learxxxxx:info (0)0] show system procs
S  UID  PID  PPID  VSZ  RSS  TTY  STIME TIME  CMD
S   0   1    0  2760  668  0:0  06:03 00:00:08  init
S   0  402    1  2760  600  0:0  06:03 00:00:00  /sbin/klogd -n
```

```

S 0 417 1 2760 500 0:0 06:03 00:00:03 /sbin/syslogd -S -D -0 /var/log/messages -s 64 -b 2 -t 9999
S 0 767 1 17972 3092 0:0 06:03 00:00:00 /usr/sbin/configd
S 0 769 1 17972 3092 0:0 06:03 00:00:00 /usr/sbin/configd
S 0 788 1 3044 936 0:0 06:03 00:00:00 /sbin/udev -d
S 1003 791 1 14136 1312 0:0 06:03 00:00:00 /usr/local/bin/rhttpd 8080
S 1003 800 1 14136 1312 0:0 06:03 00:00:00 {libmicrohttpd} /usr/local/bin/rhttpd 8080
S 0 799 1 64976 3052 0:0 06:03 00:00:00 /usr/local/bin/dot3 /var/16093.conf
S 0 816 1 64976 3052 0:0 06:03 00:00:03 /usr/local/bin/dot3 /var/16093.conf
S 0 824 1 64976 3052 0:0 06:03 00:00:00 /usr/local/bin/dot3 /var/16093.conf
S 0 825 1 64976 3052 0:0 06:03 00:00:02 /usr/local/bin/dot3 /var/16093.conf
S 0 840 1 64976 3052 0:0 06:03 00:00:30 /usr/local/bin/dot3 /var/16093.conf
S 0 841 1 64976 3052 0:0 06:03 00:00:02 /usr/local/bin/dot3 /var/16093.conf
S 0 860 1 64976 3052 0:0 06:03 00:00:00 /usr/local/bin/dot3 /var/16093.conf
S 81 872 1 2584 748 0:0 06:03 00:00:02 dbus-daemon --system
S 1003 909 1 3284 1336 0:0 06:03 00:00:26 gpsd -b /dev/ttyACMO
S 0 911 1 26268 2284 0:0 06:03 00:00:01 /usr/local/bin/gpsc
S 0 919 1 26268 2284 0:0 06:03 00:00:01 /usr/local/bin/gpsc
S 0 922 1 26268 2284 0:0 06:03 00:00:06 /usr/local/bin/gpsc
S 1003 917 1 11092 592 0:0 06:03 00:00:00 /usr/local/bin/logmonitor
S 1003 921 1 11092 592 0:0 06:03 00:00:00 /usr/local/bin/logmonitor
S 1003 926 1 23032 2924 0:0 06:03 00:00:00 /usr/local/bin/ldm
R 1003 929 1 23032 2924 0:0 06:03 00:40:31 /usr/local/bin/ldm
S 1003 930 1 23032 2924 0:0 06:03 00:00:34 /usr/local/bin/ldm
S 1003 936 1 11964 1060 0:0 06:03 00:00:13 /usr/local/bin/hmi-safety
S 1003 952 1 11964 1060 0:0 06:03 00:00:00 /usr/local/bin/hmi-safety
S 0 953 1 4848 596 0:0 06:03 00:00:00 /usr/sbin/sshd -E /var/log/sshd.log
S 1003 1013 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1032 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1033 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1034 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1035 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1036 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1037 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1038 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1039 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1040 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1041 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1042 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1045 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1063 1 138m 3584 0:0 06:03 00:00:01 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1064 1 138m 3584 0:0 06:03 00:00:01 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1115 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1116 1 138m 3584 0:0 06:03 00:00:00 /usr/local/bin/dn /tmp/dn.conf /tmp/dnOpt.conf
S 1003 1057 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1072 1 113m 3572 0:0 06:03 00:00:01 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1075 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1076 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1077 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1078 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1079 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1080 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1081 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1082 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1083 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1084 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1085 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1087 1 113m 3572 0:0 06:03 00:00:00 /usr/local/bin/wsarx /var/wsaApp.conf /var/wsaAppOpt.conf
S 1003 1103 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1119 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1120 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1121 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1122 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1123 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1124 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1125 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1126 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1127 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1128 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1129 1 130m 3636 0:0 06:03 00:00:00 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg

```

```

S 1003 1132 1 130m 3636 0:0 06:03 00:00:01 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1133 1 130m 3636 0:0 06:03 00:00:02 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1134 1 130m 3636 0:0 06:03 00:00:01 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1168 1 130m 3636 0:0 06:03 00:00:05 /usr/local/bin/bsm /tmp/bsm.cfg /tmp/bsmOpt.cfg
S 1003 1138 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1151 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1152 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1154 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1155 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1156 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1157 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1158 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1159 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1160 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1161 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1162 1 140m 3932 0:0 06:03 00:00:00 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1163 1 140m 3932 0:0 06:03 00:00:05 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1164 1 140m 3932 0:0 06:03 00:00:31 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1165 1 140m 3932 0:0 06:03 00:00:09 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1166 1 140m 3932 0:0 06:03 00:00:09 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 1003 1167 1 140m 3932 0:0 06:03 00:00:08 /usr/local/bin/egoprocess /tmp/egoprocess.cfg /tmp/egoprocessOpt.cfg
S 0 4783 1 1788 540 207:17 06:40 00:00:00 /bin/arash --
S 0 4784 4783 2760 540 207:17 06:40 00:00:00 sh -c /bin/su admin -s /bin/sh -c "/usr/bin/clish -l -x /home/cli/arada-cli -
S 1003 4785 4784 2760 544 207:17 06:40 00:00:00 sh -c /usr/bin/clish -l -x /home/cli/arada-cli -f /var/.cli_history -z 143
S 1003 4786 4785 5108 3412 207:17 06:40 00:00:11 /usr/bin/clish -l -x /home/cli/arada-cli -f /var/.cli_history -z 143
S 1003 5801 4786 2760 544 207:17 06:44 00:00:00 sh -c /bin/sh /tmp/klish.fifo.1cedti
S 1003 5802 5801 3156 1032 207:17 06:44 00:00:00 /bin/sh /tmp/klish.fifo.1cedti
R 1003 5806 5802 2764 676 207:17 06:44 00:00:00 ps -w -l -T
[Learxxxxxx:info (0)0]

```

12.7 show system board

Syntax:

```
show system board
```

Description:

Shows the manufacturing data of the board.

Default state:

N/A

Privileged?:

NO

Added in:

v0.0.2

Example log:

```
[Learxxxxx:info (0)0] show system board
-----
Displaying board details.
ProductID = LCS
HWVer = 0011
reginfo = 0
basemac = 001122334455
serno = 007
Manufacturing data version number =
Ethernet base Mac =
Dummy Mac 0 =
Dummy Mac 1 =
Dummy Mac 2 =
[Learxxxxx:info (0)0]
```

12.8 show system externalmedia

Syntax:

```
show system externalmedia
```

Description:

Display externally connected media and Mount point.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.4

Example log:

```
[LearBABBBB:info (0)2] show system externalmedia
usb is mounted on /tmp/usb.
-----
Filesystem      Size      Used Available Use% Mounted on
/dev/sda1      3.6G    1012.2M    2.4G   29% /tmp/usb
-----
[LearBABBBB:info (0)2]
```

12.9 show system uptime

Syntax:

```
show system uptime
```

Description:

Shows the time the system was awake for in days, hours, minutes and seconds.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.5

Example log:

```
[Learxxxxxx:info (6)2] show system uptime
system uptime => 0 day(s) 2 hour(s) 17 min(s) 56 sec
[Learxxxxxx:info (6)2] show system uptime
system uptime => 0 day(s) 2 hour(s) 18 min(s) 1 sec
[Learxxxxxx:info (6)2]
```

12.10 show system corelimit

Syntax:

```
show system corelimit
```

Description:

Shows configured number of cores which can be stored at a time and after which loop will start.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.6

Example log:

```
[Lear557722:info (11)0] show system corelimit  
Maximum no of cores => 15  
[Lear557722:info (11)0]
```

12.11 show system boot

Syntax:

```
show system boot
```

Description:

Shows the SDK version of images in Recovery (if running), Image 0 and Image 1. Currently running image is marked by '*'.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.6

Example log:

```
[Learxxxxxx:info (11)2] show system boot
Recovery *      =>      v0.0.5
Image 0         =>      v0.0.5
Image 1         =>      v0.0.4
```

12.12 show system dsrbackendseparation

Syntax:

```
show system dsrbackendseparation
```

Description:

Show dsrbackendseparation status and number of bridges.

Default state:

Enabled. (number of bridge 2)

Privileged?:

No.

Added in:

v0.0.6

Updates:

v0.0.7 (status enabled by default)

v0.0.20 (showing the interfaces for second bridge).

Example log:

```
Leaving conf mode...
[LearBABBBB:info (0)2] show system dsrbackendseparation
dsrbackendseparation => enabled
Number of bridges => 2
brwifi interfaces => wifi0vap0 wifi1vap0
[LearBABBBB:info (0)2]
```

12.13 show system sshpublickey

Syntax:

```
show system sshpublickey
```

Description:

Used to get the ssh public keys. This public ssh key must be appended in host machine's `~/.ssh/authorized_keys` file.

You can also get this ssh public key using command `'copy scp var scp_key.pub remote username@host:scp_key.pub'` then append this key using this command in host machine `'cat ~/scp_key.pub » ~/.ssh/authorized_keys'`.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.17

Example log:

```
[LearAABBCC:info (0)2] show system sshpublickey
```

```
-----  
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCIDq217Rj2P5IpV3YBZT8n1/12WXkn8bYC2VNqzaLiLw117/y/xBXiop9l/HXNidxXxLD1yr03DHErtd2fS5e9WaVtftvnxSG79LQZ  
VZS5dy7R+a/rF7qhsCE08WVXmI9yNrjdFBcop1cKo67emXVafShbazbG5BtzBj2yT8Y2/ZTc0/dxddFQX7YHnv18h6fkyvR/3Jok7mF2HADYdeMHhvK2N11fLLmGyB93Xmsr+vTBc2c1E  
6H7yFw30gf9i0VBqrD8siw3fD7QjvWTS1SMVkJWnf4kpF14BDdjwk08oB3aczt2F3pb2CnN1E4C0gUSmrYTiiUPRTjFWWj root@AradaAABBCC  
-----
```

```
Append this key in host machine's '~/.ssh/authorized_keys'
```

```
[LearAABBCC:info (0)2]
```

Chapter 13

Show operatemode

Syntax:

```
[Learxxxxxx:info (0)2] show operatemode
```

Description:

It shows the mode of the device that is configured.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show operatemode  
operatemode      => operate
```

Chapter 14

Show interface

14.1 show interface <interface> ipv4

Syntax:

```
show interface <interface> ipv4
```

Description:

Command shows ipv4 settings of interface selected, interface can be selected from the options which tab completion presents. This commands lists all interfaces in devices on tab completion request.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show interface brtrunk ipv4
Details for brtrunk

IPV4 Address          =>      172.20.1.244
IPV4 Netmask          =>      255.255.255.0
```

```
IPV4 Gateway           =>      172.20.1.255
Primary DNS             =>      0.0.0.0
Secondary DNS          =>      0.0.0.0
IPV4 DHCP client       =>      disable
```

14.2 show interface <interface> ipv6

Syntax:

```
show interface <interface> ipv6
```

Description:

Command shows ipv6 settings of interface selected, interface can be selected from the options which tab completion presents. This commands lists all interfaces in devices on tab completion request.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show interface brtrunk ipv6
```

```
IPV6 Address           =>      fe80::211:22ff:fe33:4455/64
fe80::200:ff:fe00:1/64
```

```
IPV6 Netmask           => fe80::211:22ff:fe33:4455/64
fe80::200:ff:fe00:1/64
IPV6 Gateway           => fe80::211:22ff:fe33:4455/64
fe80::200:ff:fe00:1/64
Primary DNS             => 0.0.0.0
Secondary DNS          => 0.0.0.0
```

14.3 show interface <interface> route

Syntax:

```
show interface <interface> route
```

Description:

Shows route settings for selected interface.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show interface brtrunk route
Route for interface brtrunk => default via 172.20.1.5 dev brtrunk
```

14.4 show interface <interface> stats

Syntax:

```
show interface <interface> stats
```

Description:

Shows selected interface stats in detail.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show interface brtrunk stats
```

```
Stats for interface brtrunk:
```

```
collisions                =>0
multicast                  =>0
rx_bytes                   =>2971530
rx_compressed              =>0
rx_crc_errors              =>0
rx_dropped                 =>0
rx_errors                  =>0
rx_fifo_errors             =>0
rx_frame_errors            =>0
```

```
rx_length_errors      =>0
rx_missed_errors      =>0
rx_over_errors        =>0
rx_packets            =>32904
tx_aborted_errors     =>0
tx_bytes              =>754
tx_carrier_errors     =>0
tx_compressed         =>0
tx_dropped            =>0
tx_errors             =>0
tx_fifo_errors        =>0
tx_heartbeat_errors   =>0
tx_packets            =>9
tx_window_errors      =>0
```

14.5 show interface ath0 apParams

Syntax:

```
show interface ath0 apParams
```

Description:

Shows ath0 apParams interface. apParams works only for ath0 interface.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show interface ath0 apParams
channel          =>      36
password         =>      Shared#321Le@r
ssid             =>      Lear051580-11ac
```

Chapter 15

Show remote

15.1 show remote

Syntax:

```
show remote
```

Description:

Shows remote settings config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show remote
SSH daemon          =>    enabled
SNMP daemon         =>    diabled
```

15.2 show remote ssh

Syntax:

```
show remote ssh
```

Description:

Shows ssh settings in remote config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show remote ssh  
SSH daemon          =>      enabled
```

15.3 show remote snmp

Syntax:

```
show remote snmp
```

Description:

Shows snmp daemon status.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show remote snmp  
SNMP daemon          =>          enabled
```

Chapter 16

Show time

16.1 show time

Syntax:

```
show time
```

Description:

Shows time related settings of unit.

Default state:

N/A

Privileged?:

No

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show time
Current time is                => Sun Jan  4 01:02:11 UTC 1970
Current timezone is           => india(110)
Daylight time saving is       => enabled
GPS is                         => enabled
```

16.2 show time timezone

Syntax:

```
show time timezone
```

Description:

Shows timezone related setting in time config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show time timezone
Current time is           =>      Sun Jan  4 01:07:33 UTC 1970
Current timezone is      =>      110
```

16.3 show time daylight

Syntax:

```
show time daylight
```

Description:

Shows daylight settings of time config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show time daylight
Daylight time saving is          =>    enabled
```

16.4 show time gps

Syntax:

```
show time gps
```

Description:

Shows gps related settings in time config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[LEAR:info (2)1] show time gps
GPS is                =>enabled
=== Connections ===
GPSD Server IP        =>172.20.1.176
GPSD Server Port      =>2947
GPSC IP               =>172.20.1.20
Global GPSD           =>0
=== Physical Configuration ===
Vehicle Center        =>Fw: 0, Up 0
Antenna Position      =>Fw: 0, Left 0, Up 0
Device Position       =>Fw: 0, Left 0, Up 0
=== RSU/SNMP ===
UDP Output Address    =>
UDP Output Port       =>
Snmp Output Interval  =>
Snmp Max Deviation    =>
Snmp Ref Lat          =>
Snmp Ref Lon          =>
Snmp Ref Elev         =>
=== OBU Advanced ===
NMEA Mode             =>1
Send Frozen COG       =>1
Low Pass Filter COG   =>76
Low Speed COG Filter  =>0
Low Pass Speed Filter =>153
Static Hold Thresh    =>0
Min Positional Accuracy =>100
Gps Timeout Notif Seconds => 5
Path Prediction Cutoff Frequency => ppCutoffFreq
=== Dead Reckoning ===
GPS Ublx ADR status  =>0
Auto Mount Alignment =>0
Mount Alignment (YPR) =>0, 0, 0
[LEAR:info (0)1]
```


Chapter 17

Show locos

17.1 show locos deployment

Syntax:

```
show locos deployment
```

Description:

Shows deployment details from locos config area.

Default state:

N/A

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (0)2] show locos deployment
LOCOS deployment          =>      default
```

17.2 show locos bt status

Syntax:

```
show locos bt status
```

Description:

Shows bluetooth status under locos.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] show locos bt status
hci0:  Type: BR/EDR  Bus: USB
      BD Address: 00:3C:7F:F0:F0:0A  ACL MTU: 1022:8  SCO MTU: 183:5
      DOWN
      RX bytes:547 acl:0 sco:0 events:27 errors:0
      TX bytes:384 acl:0 sco:0 commands:27 errors:0
[Learxxxxxx:info (4)2]
```

17.3 show locos bt detail

Syntax:

```
show locos bt detail
```

Description:

Shows bluetooth details in paged output.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] show locos bt detail
hci0: Type: BR/EDR Bus: USB
      BD Address: 00:3C:7F:F0:F0:0A ACL MTU: 1022:8 SCO MTU: 183:5
      Features page 0: 0xff 0xfe 0x0d 0xfe 0xd8 0x7f 0x7b 0x87
        <3-slot packets> <5-slot packets> <encryption> <slot offset>
        <timing accuracy> <role switch> <hold mode> <sniff mode>
        <RSSI> <channel quality> <SCO link> <HV2 packets>
        <HV3 packets> <u-law log> <A-law log> <CVSD> <power control>
        <transparent SCO> <EDR ACL 2 Mbps> <EDR ACL 3 Mbps>
        <enhanced iscan> <interlaced iscan> <interlaced pscan>
        <inquiry with RSSI> <extended SCO> <AFH cap. slave>
        <AFH class. slave> <LE support> <3-slot EDR ACL>
        <5-slot EDR ACL> <sniff subrating> <pause encryption>
        <AFH cap. master> <AFH class. master> <EDR eSCO 2 Mbps>
        <EDR eSCO 3 Mbps> <extended inquiry> <LE and BR/EDR>
        <simple pairing> <encapsulated PDU> <err. data report>
        <non-flush flag> <LSTO> <inquiry TX power> <EPC>
        <extended features>
      Features page 1: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
      Commands: Octet 0 = 0xbf (Bit 0 1 2 3 4 5 7)
                Octet 1 = 0xff (Bit 0 1 2 3 4 5 6 7)
                Octet 2 = 0xfb (Bit 0 1 3 4 5 6 7)
                Octet 3 = 0x03 (Bit 0 1)
                Octet 4 = 0xce (Bit 1 2 3 6 7)

--More--
```

17.4 show locos safetyApps

Syntax:

```
show locos safetyApps
```

Description:

Displays the safetyApps configured values.

Default state:

Example below has default values for all fields.

Privileged?:

No

Added in:

v0.0.18:

Example log:

```
[Lear334455:info (0)1] show locos safetyApps
fcwAdvisoryTriggerTTC      => 10 second
fcwImminentTriggerTTC     => 5 second
bswRVTimeToReachEV        => 5 second
icwAdvisoryEVTimeToIntersection => 10 second
icwAdvisoryEVRVTimeGap    => 4 second
icwImminentEVTimeToIntersection => 5 second
icwImminentEVRVTimeGap    => 2 second
icwMinimumMergingAngle    => 15 degree
imaAdvisoryEVTimeToIntersection => 20 second
imaRVTimeToReachImpactArea => 10 second
ltaRVTimeToCrossEV        => 10 second
smvaEVSpeedThresholdWrtrVSpeed => 10 mile/hour
rlvMinSpeedLimit          => 5 meter/second
dnpwRVTimeToCrossEV      => 12 second
dnpwRadialDistanceToAheadRV => meter
laneWidth                 => 4 meter
elevationNoiseThreshold   => 3 meter
rvFilter                  => disabled
zoneLimit:ahead           => 13 second
zoneLimit:farAhead        => 20 second
zoneLimit:behind          => 4 second
zoneLimit:farBehind       => 12 second
zoneLimit:referenceSpeed  => 5 meter/second
```

17.5 show locos distressNotification

Syntax:

```
show locos distressNotification
```

Description:

Displays the status of the distressNotification.

Default state:

Example below has default values for all fields.

Privileged?:

No

Added in:

v0.0.18:

Example log:

```
[Lear334455:info (0)1] show locos distressNotification
status          => 1
appname         => dn
psid            => 16514
servicetype     => usr
securitytype    => 1
verifybypass    => 0
expirytime      => 2880
repeatrate      => 50
printencode     => 0
printdecode     => 0
logtype         => remote
forwarddirection => disabled
forwardip       => N/A
forwardport     => N/A
[Learxxxxxx:info (0)2]
```

17.6 show locos ota

Syntax:

```
show locos ota
```

Description:

Displays the status of the ota

Default state:

Example below has default values for all fields.

Privileged?:

No

Added in:

v0.0.18:

Example log:

```
[Lear334455:info (0)1] show locos ota
ota configuration details
app name      => ota
status       => 0
psid         => 52
userRequestType => 1
wsaType      => 4
psc         => ota
advertiserIdentifier => LEAR
serviceChannel => 176
```

17.7 show locos provider advertiserid

Syntax:

```
show locos provider advertiserid
```

Description:

This command gives the advertiser ID.

Default state:

NONE

Privileged?:

No

Added in:

v0.0.18:

Example log:

```
[Lear334455:info (0)1] show locos provider advertiserid  
#advertiserIdentifier=
```

17.8 show locos can

Syntax:

```
show locos can
```

Description:

Displays the status of the CAN bus

Default state:

Example below has default values for all fields.

Privileged?:

No

Added in:

v0.0.18:

Example log:

```
[Lear334455:info (0)1] show locos can
filterIDs => 1
status => 0
server => 1
loopback => 0
listenonly => 0
decodePGN => 0
interface => can0
bitrate => 0
pidList => 0
dbcFile => 0
metaFile => 0
[Learxxxxx:info (0)2]
```

17.9 show locos security asm

Syntax:

```
show locos security asm
```

Description:

Displays all the configurations of Lear Security Module.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.21

Example log:

```
[Lear121210:info (0)2] show locos security asm
WSMP signBypass => disabled
WSA signBypass => disabled
WSMP verifyBypass => disabled
WSA verifyBypass => disabled
ASM log status =>disabled
ASM log level =>crit
ASM log file size(kb) =>976
ASM log file name =>asm.log
MAC Address Randomization =>enabled
Certificate reload time =>0
Certificate loading path =>/usb/ModelDeploymentConfigurationItems/1609Certificates/
```

17.10 show locos security lcm

Syntax:

```
show locos security lcm
```

Description:

Displays all the configurations of LCM.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.21

Example log:

```
[Lear121210:info (0)2] show locos security lcm
LCM Deamon status => enabled
SCMS server address => 12.172.124.234
SCMS server port => 16092
```

```

LCM device specific ID => ARADA
LCM device name => obe
Storage Space(kb) => 20480
BootStrap Request Timeout(seconds) => 30
Batch Duration Units => 2
Batch Duration Value => 120
Super Batch Duration Units => 2
Super Batch Duration Value => 120
Certificate Request Status InquiryInterval(seconds) => 70
Certificate Request ConfirmationTimeout(seconds) => 30
DecryptionKey RequestInterval(seconds) => 5
Maximum CertificateStorageTime(seconds) => 31536000
Request CertificateTime(seconds) => 30000
Request DecryptionKey Time(seconds) => 15000
Connection Retry Interval(seconds) => 5
DecryptionKey Retry(seconds) => 3
Default timeout(seconds) => 30
LCM CRL status => enabled
LCM logging status => enabled
LCM log file name => lcm.log
LCM AdditionalInfo logging status => enabled
LCM BootstrapRequest logging status => enabled
LCM BootstrapConfirm logging status => enabled
LCM BootstrapAck logging status => enabled
LCM CertRequest logging status => enabled
LCM CertRequestConfirm logging status => enabled
LCM CertStatusRequest logging status => enabled
LCM CertStatusConfirm logging status => enabled
LCM CertStatusConfirmData logging status => disabled
LCM CertResponseAck logging status => enabled
LCM DecryptKeyRequest logging status => enabled
LCM DecryptKeyConfirm logging status => enabled
LCM DecryptKeyAck logging status => enabled
LCM SignEncryptInput logging status => enabled
LCM SignEncryptBeforeEncrypt logging status => enabled
LCM SignEncryptAfterEncrypt logging status => enabled
LCM ImportedFile logging status => disabled
[Lear121210:info (0)2]

```

17.11 show locos wsacnf

Syntax:

```
show locos wraconf
```

Description:

Displays the WRA configuration details.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.16

Example log:

```
[Lear000031:info (0)1] show locos wraconf
WRA configuration details
IP Prefix of WRA           => 2001:470:11:456::
Prefix Length of WRA      => 64
Default Gateway of WRA    => 2001:470:11:456::9
Primary DNS of WRA        => 2001:470:11:456::9
```

17.12 show locos offload

Syntax:

```
show locos offload
```

Description:

Used to check the configured offload parameters.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.17

Example log:

```
[Lear121210:info (0)0] show locos offload
appName                =>    offload
Status                 =>    enabled
psid                   =>    50
user Request Type     =>    1
wsaType                =>    4
PSC                    =>    offload
Service Channel       =>    176
Adevertizer identifier =>    LEAR
RemoteUserName        =>    None
RemoteDestDir         =>    /tmp
LocalSrcDir           =>    /var/storage
SizeThreshold1        =>    30
SizeThreshold2        =>    50
SizeThreshold3        =>    70
RetryCount             =>    3
```

17.13 show locos rsuoffload

Syntax:

```
show locos offload
```

Description:

Used to check the configured rsuoffload parameters.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.17

Example log:

```
[Lear052790:info (1)1] show locos rsuoffload
Status => enabled
Partition mountpoint => /var
keyfile => /var/scp_key
sizethreshold1 => 30
sizethreshold2 => 50
sizethreshold3 => 70
size threshold check interval => 15
offloadinterval => 20
directory1 action => added
directory1 srcpath => /var/storage
directory1 server addr => NA
directory1 server port => 0
directory1 Destination Directory => /tmp
directory1 server username => NA
directory1 retry count => 3
directory2 action => not_added
directory2 srcpath => NA
directory2 server addr => NA
directory2 server port => 0
directory2 Destination Directory => /tmp
directory2 server username => NA
directory2 retry count => 3
directory3 action => not_added
directory3 srcpath => NA
directory3 server addr => NA
directory3 server port => 0
directory3 Destination Directory => /tmp
directory3 server username => NA
directory3 retry count => 3
directory4 action => not_added
directory4 srcpath => NA
directory4 server addr => NA
directory4 server port => 0
directory4 Destination Directory => /tmp
directory4 server username => NA
directory4 retry count => 3
directory5 action => not_added
directory5 srcpath => NA
directory5 server addr => NA
directory5 server port => 0
directory5 Destination Directory => /tmp
directory5 server username => NA
directory5 retry count => 3
```

17.14 show locos logging**Syntax:**

```
show locos logging
```

Description:

Displays the configuration of Packet Logging Module

Default state:

N/A

Privileged?:

No.

Added in:

v0.0.19

Example log:

```
[Lear050E32:info (0)2] show locos logging
Packet logging status
***** Interface1 *****
Interface logging =>disabled
LogFile Size(MB) =>
LogFile time(Hrs) =>
Direction based logging =>disabled
Interface Name =>
***** Interface2 *****
Interface logging =>disabled
LogFile Size(MB) =>
LogFile time(Hrs) =>
Direction based logging =>disabled
Interface Name =>
***** Other Config *****
Transmit log =>disabled
Receive log =>disabled
Forward PCAP =>disabled
Remote machine IP Addr =>
Remote machine port number =>
[Lear050E32:info (0)2]
```

17.15 show locos hmi

Syntax:

```
show locos hmi
```

Description:

Displays HMI related settings.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.23

Example log:

```
[Lear334450:info (0)1] show locos hmi
Status                               =>    enabled
Connection mode                       =>    wifi
Wifi Destination IP                   =>    192.168.10.150
Wifi Destination Port                  =>    5500
Wifi Tx Interval                       =>    100
Wifi Connection Timeout                =>    3000
Wifi Data Timeout                      =>    1500
Bluetooth Client MAC                  =>    00\:00\:00\:00\:00\:00
Bluetooth UUID                        =>    00001101-0000-1000-8000-00805F9B34FB
Bluetooth Tx Interval                 =>    100
Bluetooth Connection Timeout           =>    3000
Bluetooth Data Timeout                 =>    1500
LiveMap Status                         =>    enabled
LiveMap Server IP                      =>    192.168.0.96
LiveMap Server Port                    =>    6000
LiveMap RV Update                      =>    enabled
LiveMap Path History Trail              =>    enabled
```

Chapter 18

Show log

18.1 show log kernel

Syntax:

```
show log kernel [<number of lines to display, - for lines from end>]
```

Description:

Shows kernel ring buffer logs.

Default state:

When command is given without number of lines it displays last 10 lines.

Privileged?:

No

Added in:

Initial

Example log:

```
[Lear-lc3:info (1)2] show log kernel -2
```

```
Going to display last 2 lines.
```

```
imx-sgtl5000 sound.24: snd_soc_register_card failed (-517)
```

```
platform sound.24: Driver imx-sgtl5000 requests probe deferral
```

```
[Lear-lc3:info (1)2]
```

18.2 show log syslog

Syntax:

```
show log syslog [facility <facility name to look in log file>]
                 [priority <priority name to look in log file>]
                 [matching <string to look in log file>]
                 [<number of lines to display, - for lines from end>]
```

Description:

Displays syslog default file as per command. Command works only for number of lines as of now. Manual will be updated once it is working properly.

Default state:

Displays last 10 lines of `/var/log/messages` (Still not configurable).

Privileged?:

No

Added in:

Initial

Example log:

```
[Lear-lc3:info (1)2] show log syslog -2

Going to display last 2 lines.
Jan  6 18:45:55 arada-lc3 authpriv.warn ....._ecdsa_host_key
Jan  6 18:45:55 arada-lc3 authpriv.info ..... available

[Lear-lc3:info (1)2]
```

18.3 show log trace

Syntax:

```
show log trace
```

Description:

Place holder for command, Not supported as of now.

Default state:

N/A

Privileged?:

N/A

Added in:

N/A

Example log:

N/A

18.4 show log status remote

Syntax:

```
show log status remote
```

Description:

Displays the status the remote syslog settings

Default state:

Disabled

Privileged?:

No

Added in:

v0.0.3

Example log:

```
[Learxxxxxx:info (0)2] show log status remote
Syslog (remote) is      =>    disable
[Learxxxxxx:info (0)2]
```

18.5 show log status local

Syntax:

```
show log status local
```

Description:

Displays the status of local syslog settings.

Default state:

Disabled

Privileged?:

No

Added in:

v0.0.3

Updates:

v0.0.6 (Updated)

Example log:

```
[Learxxxxxx:info (0)0] show log status local
Time based syslog      =>    disable
Syslog Rotatetime     =>    0000
Syslog File Size      =>    64kb
Syslog File count     =>    2
[Learxxxxxx:info (0)0]
```

18.6 show log lcmlog

Syntax:

```
show log lcmlog
show log lcmlog <no of lines>
show log lcmlog <-no of lines>
```

Description:

Displays the contents of lcm log file.

Default state:

N/A

Privileged?:

No

Added in:

v0.0.6

Example log:

```
[Learxxxxxx:info (0)0] show log lcmlog
Oct 6 16:55:37 : 2.5
Oct 6 16:55:37 : [BOOTSTRAP_REQ]:Sent bytes:167 to --> 12.172.124.234
Oct 6 16:55:37 : rcv:error,size=0 0
Oct 6 16:55:37 : [BOOTSTRAP_CFM]:timed out retry:1,[Err:-1]
Oct 6 16:55:37 : [BOOTSTRAP_CFM]:Max Retries Excedded [Err:-1]
Oct 6 16:55:37 : 1
```

```
Oct 6 16:55:37 : Connecting ...16092
Oct 6 16:55:37 : Connecting ...1
Oct 6 16:55:37 : Connecting ...2
Oct 6 16:55:37 : Connecting ...2.1
[Learxxxxx:info (0)0]
```

Chapter 19

Show application

19.1 show application details

Syntax:

```
show application details
```

Description:

Shows configured applications details.

Default state:

N/A

Privileged?:

No.

Added in:

v0.0.9

Updates:

v0.0.10 (Updated the command to show details of all apps)

v0.0.15 (added wsmppforward app support).

Example log:

```
[Lear050E52:info (0)1] show application details
app_name      =>      bsm
app_status    =>      enabled
wme_arg       =>      psid\ 32\ service\ csr\ schan\ 172\ slot\ either\
wsm_arg       =>      security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\
```

```

chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\ 0
sae_arg => vehicletype\ 1\ vehiclewidth\ 0\ vehiclelength\ 0
oth_arg => txmode\ txrx\ tempIdStatus\ disable\ msgCount\ 2\ printencode\ disable\ printdecode\ disable

app_name => tim
app_status => enabled
wme_arg => psid\ 131\ service\ csr\ schan\ 172\ slot\ either
wsm_arg => security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\
chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\ 0
oth_arg => txmode\ rx\ srmFolder\ /var/AML/\ printencode\ disable\ printdecode\ disable

app_name => spat
app_status => enabled
wme_arg => psid\ 130\ service\ csr\ schan\ 172\ slot\ either
wsm_arg => security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\
chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\ 0
oth_arg => txmode\ rx\ tempIdStatus\ disable\ msgCount\ 2\ printencode\ disable\ printdecode\ disable

app_name => map
app_status => enabled
wme_arg => psid\ 130\ service\ csr\ schan\ 172\ slot\ either
wsm_arg => security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\
chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\ 0
oth_arg => txmode\ rx\ srmFolder\ /var/MAP/\ printencode\ disable\ printdecode\ disable

app_name => ipservice
app_status => enabled
wme_arg => psid\ 35\ service\ psr\ wsatype\ any\ psc\ scms\ schan\ 172\ chaccess\ alternatcch\
wsarate\ 50\ wsachan\ 178\ ipservice\ disable\ port\ 0\ rcpthresh\ 0\ wsacntth\ 0\ wsacntthint\ 0\ infoeleId\ f\ signlifetime\ 0
wsm_arg => security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\
chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\ 0
oth_arg => txmode\ rx\ printencode\ disable\ printdecode\ disable

app_name => egoprocess
app_status => enabled
wme_arg => psid\ 32\ service\ csr\ schan\ 172\ slot\ either
wsm_arg => security\ unsecured\ verifybypass\ disable\ txchan\ 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\
priority\ 0\ txrate\ 50\ exptime\ 0
oth_arg => txmode\ rx\ printencode\ disable\ printdecode\ disable

[Lear050E52:info (0)1]

```

19.2 show application summary

Syntax:

```
show application summary <appname>
```

Description:

Shows summary of packet tx/rx for given application.

Summary for ipservice and wsmppforward application will not be available.

Default state:

N/A

Privileged?:

No.

Added in:

v0.0.9

Updates:

v0.0.10 (updated command syntax)

Example log:

```
[Lear01BA01:info (0)0] show application summary egoprocess
*****egoprocess summary*****
TX      =>    0
TX Drop =>    0
TX Error =>   0
RX      =>  17510
*****
[Learxxxxx:info (0)0]
```

Chapter 20

Show tunnel

20.1 show tunnel details

Syntax:

```
show tunnel details
```

Description:

Shows configured tunnel details.

Note:- Tunnel details will be shown only when tunnel status is enabled.

Default state:

N/A

Privileged?:

No.

Added in:

v0.0.13

Example log:

```
[LearBABABA:info (0)1] show tunnel details
Status          => enabled
Name            => tun3
Remote IPv4     => 216.218.221.42
Local IPv6      => 2001\:470\:baba\:\:1/64
IPv6 gateway    => 2001\:470\:baba\:\:1
IPv6 Network Prefix => 2000\:\:/3
[LearBABABA:info (0)1]
```


Chapter 21

Show firewall

21.1 show firewall details

Syntax:

```
show firewall details
```

Description:

Displays the configured firewall rules.

Default state:

N/A

Privileged?:

NO

Added in:

v0.0.13

Example log:

```
[LearAABBCC:info (0)0] show firewall details
:INPUT ACCEPT [2676:10510098]
:OUTPUT ACCEPT [1658:358176]
-A INPUT -s 192.168.0.69/32 -j DROP
```

Chapter 22

Show all

22.1 show all

Syntax:

```
show all
```

Description:

Shows configured values for user relevant configurations.

Default state:

N/A

Privileged?:

NO

Added in:

v0.0.16

Example log:

```
[LearBABBBB:info (0)0] show all
----- SYSTEM -----
Product ID           =>      LOCOMATE-300-ASD
System Name          =>      Lear121210
Country              =>      unitedstates-public-safety (842)
MAC address          =>      00:26:ad:12:12:10
DB version           =>      0.13
```

```

RFS version           =>      v0.0.20-0-g8cbc5e9
SDK version           =>      v16.3.QA_09.01
Kernel version        =>      3.10.17-arada-LC3-00009-g8cbc5e9+
system uptime         =>      0 day(s) 0 hour(s) 6 min(s) 15 sec
dsrbackendseparation  =>      enabled
Number of bridges     =>      2
brwifi interfaces     =>      wifi0vap0
Configured no of cores =>      25

```

No external media connected!

----- LOG -----

```

Syslog (remote) status  =>      disabled

Time based syslog      =>      disabled
Syslog Rotatetetime    =>      0000
Syslog File Size       =>      64kb
Syslog File count     =>      2

```

----- APPLICATION -----

```

app_name               =>      bsm
app_status             =>      enabled
wme_arg                =>      psid\ 32\ service\ csr\ schan\ 172\ slot\ either
wsm_arg                =>      security\ unsecured\ verifybypass\ disable\ txchan\
172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\
sae_arg                =>      vehicletype\ 1\ vehiclewidth\ 0\ vehiclelength\ 0
oth_arg                =>      txmode\ tx\ tempIdStatus\ disable\ msgCount\ 2\
printencode\ disable\ printdecode\ disable

app_name               =>      tim
app_status             =>      disabled
wme_arg                =>      psid\ 131\ service\ csr\ schan\ 176\ slot\ slot1
wsm_arg                =>      security\ unsecured\ verifybypass\ disable\ txchan\
178\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\
oth_arg                =>      txmode\ rx\ srmFolder\ /var/SRM/AML/\ printencode\
disable\ printdecode\ disable

app_name               =>      spat
app_status             =>      disabled

```

```

wme_arg          =>      psid\ 130\ service\ csr\ schan\ 172\ slot\ either
wsm_arg          =>      security\ unsecured\ verifybypass\ disable\ txchan\
 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\
oth_arg          =>      txmode\ rx\ tempIdStatus\ disable\ msgCount\ 2\
  printencode\ disable\ printdecode\ disable

app_name        =>      map
app_status      =>      disabled
wme_arg          =>      psid\ 130\ service\ csr\ schan\ 172\ slot\ either
wsm_arg          =>      security\ unsecured\ verifybypass\ disable\ txchan\
 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\ exptime\
oth_arg          =>      txmode\ rx\ srmFolder\ /var/SRM/MAP/\ printencode\
  disable\ printdecode\ disable

app_name        =>      ipservice
app_status      =>      enabled
wme_arg          =>      psid\ 270549118\ service\ usr\ usrReq\ auto\
wsatype\ any\ psc\ ipv6\ schan\ 176\ srcMac\ ff\:ff\:ff\:ff\:ff\:ff\ adentifier\ USDOT\
 linkquality\ 0\ immaccess\ 0
wsm_arg          =>      security\ unsecured\ verifybypass\ enable\ txchan\
 178\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg          =>      txmode\ none\ printencode\ disable\ printdecode\
  disable

app_name        =>      egoprocess
app_status      =>      enabled
wme_arg          =>      psid\ 32\ service\ csr\ schan\ 172\ slot\ either
wsm_arg          =>      security\ unsecured\ verifybypass\ disable\ txchan\
 172\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\
  exptime\ 0
oth_arg          =>      txmode\ rx\ printencode\ disable\ printdecode\
  disable

app_name        =>      pvd
app_status      =>      disabled
wme_arg          =>      psid\ 132\ service\ usr\ usrReq\ auto\ wsatype\
any\ psc\ probe\ schan\ 176\ srcMac\ ff\:ff\:ff\:ff\:ff\:ff\ adentifier\ USDOT\
 linkquality\ 0\ immaccess\ 0
wsm_arg          =>      security\ unsecured\ verifybypass\ enable\ txchan\
 176\ datarate\ 6.0\ txpower\ 23\ chload\ 0\ infoeleId\ f\ priority\ 0\ txrate\ 50\

```

```

exptime\ 0
sae_arg          =>      vehicletype\ 1\ vehiclewidth\ 0\ vehiclelength\ 0
oth_arg          =>      txmode\ txrx\ printencode\ disable\ printdecode\
                        disable\ configFile\ /var/PVD/pvdOptions.conf

```

```

app_name         =>      pdm
app_status       =>      disabled
wme_arg         =>
wsm_arg         =>
oth_arg         =>

```

```
-----
```

```
----- TUNNEL -----
```

```
Status          =>      disabled
```

```
-----
```

```
----- IPv4 -----
```

```

IPV4 Address     =>      172.20.1.65
IPV4 Netmask     =>      255.255.255.0
IPV4 Gateway     =>      172.20.1.5
Primary DNS      =>      172.20.1.4
Secondary DNS    =>      0.0.0.0
IPV4 DHCP client =>      enabled

```

```
----- IPv6 -----
```

```

brtrunk IPV6 Address     =>      fe80::ccf3:7dff:fec0:cfda/64
brtrunk IPV6 Network Prefix =>
brtrunk IPV6 Gateway     =>

brwifi IPV6 Address     =>      fe80::226:adff:fe12:1211/64
brwifi IPV6 Network Prefix =>
brwifi IPV6 Gateway     =>

```

```
-----
```

```
----- AP Params -----
```

```

channel          =>      36
password         =>      Shared#321Le@r
ssid             =>      Lear051580-11ac

```



```
-----  
----- REMOTE -----  
SSH daemon          =>    enabled  
SNMP daemon         =>    disabled  
-----  
----- TIME -----  
Current time is     =>    Wed Oct 18 05:48:34 GMT 2017  
Current timezone status =>    iceland (110)  
Daylight time saving status =>    enabled  
GPS status          =>    enabled  
Time update interval =>  
-----  
----- LOCOS -----  
MAC Address Randomization =>    enabled  
LCM Deamon status    =>    enabled  
LCM logging status   =>    enabled  
LOCOS deployment    =>    default  
-----  
----- BLUETOOTH -----  
hci0:  Type: BR/EDR  Bus: USB  
      BD Address: 00:3C:7F:F0:F0:0A  ACL MTU: 1022:8  SCO MTU: 183:5  
      UP RUNNING  
      RX bytes:547 acl:0 sco:0 events:27 errors:0  
      TX bytes:384 acl:0 sco:0 commands:27 errors:0  
-----  
----- FIREWALL -----  
:INPUT ACCEPT [0:0]  
:OUTPUT ACCEPT [0:0]  
-----  
----- OFFLOAD -----  
appName            =>    offload  
Status             =>    enabled  
psid               =>    50
```

```

user Request Type      =>      1
wsaType                =>      4
PSC                    =>     offload
Service Channel       =>     176
Adevertizer identifier =>     LEAR
RemoteUserName        =>     None
RemoteDestDir         =>     /tmp
LocalSrcDir           =>     /var/storage
RetryCount            =>      3

```

```
-----
```

```
----- Safety Apps -----
```

```

FCW advisory TTC      =>     10 second
FCW imminent TTC     =>     5 second
BSW RV time to reach EV =>     5 second
Ahead zone limit     =>    13 second
Far Ahead zone limit =>    20 second
Behind zone limit    =>     4 second
Far Behind limit     =>    12 second
Reference speed      =>     5 meter/second
ICW advisory EV time to intersection => 10 second
ICW advisory EVRV time gap =>    4 second
ICW imminent EV time to intersection => 5 second
ICW imminent EVRV time gap =>    2 second
ICW minimum merging angle =>    15 degree
IMA advisory EV time to intersection => 20 second
IMA RV time to reach impact area => 10 second
LTA RV time to cross EV =>    10 second
SMVA EV speed threshold wrt to RV speed => 10 mile/hour
RLV minimum speed limit =>    5 meter/second
DNPW RV time to cross EV =>    12 second
Lane width           =>     4 meter
RV filter            =>    enabled

```

```
-----
```

```
[LearBABBBB:info (0)0]
```

Chapter 23

Request commands

Administration related commands

Requires no privilege

23.1 request firmware upgrade

23.1.1 request firmware upgrade scp

Syntax:

```
request firmware upgrade scp <path to firmware file> <IP or hostname>  
<Username> [reboot]
```

Description:

This command uses ssh client to get supplied file from host machine pointed by hostname or IP. There is an optional argument reboot which can reboot after upgrade when specified. Recovery or netboot image will upgrade first image and flash boot images will upgrade non used image.

Default state:

None

Privileged?:

No

Added in:

v0.0.13

Example log:

```
[Lear000031:info (1)0] request firmware upgrade scp /tftpboot/lc3-rsu_US_Arada_sathish-030216-1228-v0.0.13.ara 192.168.0.136
sathish reboot
Getting firmware file
/tftpboot/lc3-rsu_US_Arada_sathish-030216-1228-v0.0.13.ara using scp from host 192.168.0.136
sathish@192.168.0.136's password:
lc3-rsu_US_Arada_sathish-030216-1228-v0.0.13. 100% 15MB 7.6MB/s 00:02
Updating firmware...
rebooting..
```

23.1.2 request firmware upgrade file**Syntax:**

```
request firmware upgrade file <path to firmware file> [reboot]
```

Description:

This command upgrades the locally present firmware. User need to copy the firmware file to device(/tmp) or User can have firmware file in USB to upgrade the firmware. There is an optional argument reboot which can reboot after upgrade when specified. Recovery or netboot image will upgrade first image and flash boot images will upgrade non used image.

Default state:

None

Privileged?:

No

Added in:

v0.0.13

Example log:

```
[Lear000031:info (0)1] request firmware upgrade file /tmp/lc3-rsu_US_Arada_sathish-030216-1228-v0.0.13.ara reboot
Getting firmware file lc3-rsu_US_Arada_sathish-030216-1228-v0.0.13.ara
Updating firmware...
rebooting..
```

23.1.3 request firmware check sign

Syntax:

```
request firmware check sign
```

Description:**Default state:**

None

Privileged?:**Added in:**

v0.0.13

Example log:

```
[Lear000031:info (0)1] request firmware check sign
```

23.1.4 request firmware check validity

Syntax:

```
request firmware check validity
```

Description:**Default state:**

None

Privileged?:

No

Added in:

v0.0.13

Example log:

```
[Lear000031:info (0)1] request firmware check validity
```

23.2 request system

23.2.1 request system reboot

Syntax:

```
request system reboot
```

Description:

Requests system reboot.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

No Log

23.2.2 request system shell

Syntax:

```
request system shell
```

Description:

Provides system shell.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

```
[Lear-lc3:info (0)1] request system shell
Forking system Shell.
$
```

23.2.3 request system halt

Syntax:

```
request system halt
```

Description:

Halt the device.

Default state:

NA

Privileged?:

NO

Example log:

```
[Lear-lc3:info (0)1] request system halt
```

23.2.4 request system restore

Syntax:

```
request system restore
```

Description:

Restores system to default state.

Default state:

NA

Privileged?:

NO

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] request system restore  
Restoring system
```


23.2.5 request system snapshot

Syntax:

```
request system snapshot
```

Description:

Command gives the snapshot of the device.

Default state:

NA

Privileged?:

NO

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] request system snapshot
```

23.2.6 request system logout

Syntax:

```
request system logout
```

Description:

This command gives the device logout.

Default state:

N/A

Privileged?:

NO

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] request system logout
```

23.2.7 request system cleanup

Syntax:

```
request system cleanup
```

Description:

Cleanup the device

Default state:

N/A

Privileged?:

NO

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:info (4)2] request system cleanup
```

Chapter 24

Debug commands

Debugging related commands

Requires no privilege

Sending command "debug" on cli main view takes you to debug view, prompt changes as below:

```
[Lear-lc3:info (0)1] debug
Moving to diagnostic view...
[Lear-lc3:debug (0)1]
```

This view will house all the commands which are required to debug things on this board.

24.1 ping

Syntax:

```
ping [ip | ipv6 | arp] <destination> [source <Source interface>]
[repeat <count>] [resolve] [broadcast] [size <packet size>]
[flood] [duplicate-detect]
```

Description:

Ping to different hosts on network.

Default state:

Default ping count is 5.
duplicate-detect option is when arp ping is done.

Privileged?:

NO

Added in:

Initial

Example log:

```
[Lear-lc3:debug (0)1] ping 172.20.1.68
PING 172.20.1.68 (172.20.1.68): 56 data bytes
64 bytes from 172.20.1.68: seq=0 ttl=64 time=0.788 ms
64 bytes from 172.20.1.68: seq=1 ttl=64 time=0.298 ms
64 bytes from 172.20.1.68: seq=2 ttl=64 time=0.377 ms
64 bytes from 172.20.1.68: seq=3 ttl=64 time=0.294 ms
64 bytes from 172.20.1.68: seq=4 ttl=64 time=0.277 ms

--- 172.20.1.68 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.277/0.406/0.788 ms
[Lear-lc3:debug (0)1]
```

24.2 list

Syntax:

```
list [<absolute path of directory whose listing is required>]
```

Description:

List content of the directory supplied as argument, when no argument given lists root(/)

Default state:

On no arguments list content of root(/).

Privileged?:

NO

Added in:

Initial

Example log:

```
[Lear-lc3:debug (1)2] list /tmp
/
drwxrwxrwt    4 root    root    220 Jan  6 00:22 ./
drwxrwxr-x   18 1000   input   0 Sep  9 2015 ../
-rw-r--r--    1 root    root    0 Jan  6 00:22 clish.lock
.....
lrwxrwxrwx    1 root    root    4 Jan  6 00:22 tmp -> /tmp/
[Lear-lc3:debug (1)2]
```

24.3 exit

Syntax:

```
exit
```

Description:

This command will take you out of debug mode and will change to info view.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

```
[Lear-lc3:debug (0)1] exit
Leaving diagnostic mode...
[Lear-lc3:info (0)1]
```

24.4 traceroute

Syntax:

```
traceroute ip/ipv6 <address>
```

Description:

This command is used to trace out the devices which are connected to it.

Default state:

No

Privileged?:

NO

Added in:

Initial

Example log:

```
[Lear-1c3:debug (0)1] traceroute ip 172.20.1.230  
1 manne-System.arada-blr.com (172.20.1.208) 0.271 ms 0.165 ms 0.140 ms
```

Chapter 25

Copy commands

File transfer commands

Requires no privilege

25.1 copy

Syntax:

```
copy <scp|rcp> <core|file|var|tmp|remote> <source file>  
<file|var|tmp|remote> <destination file>
```

Description:

Copying file to and from this box, source for the file can be from core, normal file, persistent file (var) or remote file. Similarly destination could be similar except core file. both source and destination cannot be remote.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Example log:

```
[Learxxxxxx:info (4)2] copy scp core ntp.553-0-0.11.587186.tar.gz remote ramanuj@172.20.1.68:/home/ramanuj/.
```

```
Coping from /var/cores/ntp.553-0-0.11.587186.tar.gz to ramanuj@172.20.1.68:/home/ramanuj/..
Host '172.20.1.68' is not in the trusted hosts file.
(ecdsa-sha2-nistp256 fingerprint md5 a9:de:11:4e:28:43:61:50:93:12:9e:a6:29:6b:21:92)
Do you want to continue connecting? (y/n) y
ramanuj@172.20.1.68's password:
ntp.553-0-0.11.587186.tar.gz          100% 28KB 27.6KB/s 00:00
[Learxxxxxx:info (4)2]
```

Chapter 26

Del commands

Deletes files and cores

Requires no privilege

26.1 del system

Syntax:

```
del system <cores|files> < <Tab to select file name>|all>
```

Description:

By using this command you can delete all or selected core files.
Added support for deleting files from /var/ folder.

Default state:

NA

Privileged?:

NO

Added in:

Initial

Updates:

v0.0.17 (Added support for /var/ files deletion).

Example log:

```
[Learxxxxxx:info (2)2] del system cores  
gps.559-0-0.11.587399.tar.gz gps.561-0-0.11.587186.tar.gz  
[Learxxxxxx:info (2)2] del system cores gps.559-0-0.11.587399.tar.gz  
Deleting core file gps.559-0-0.11.587399.tar.gz  
[Learxxxxxx:info (1)2] show system cores  
We have 1 cores is system.  
gps.561-0-0.11.587186.tar.gz  
[Learxxxxxx:info (1)2]
```

Chapter 27

Config interface

Configuration commands

Requires privilege

Below are the commands supported in this area as of this release.

```
[Learxxxxxx:conf (0)2]
!      Comments
config config commands
exit   Go back to main menu
```

27.1 config interface <interface> ipv4 ip

Syntax:

```
config interface <interface> ipv4 ip <ipaddr> <netmask>
```

Description:

Configures interface ipv4 address and netmask.

Default state:

```
ipv4 addr 192.168.0.40
netmask 255.255.255.0
```

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxxx:conf (0)2] config interface brtrunk ipv4 ip 192.168.0.52 255.255.255.248  
[Learxxxxxx:conf (0)2]
```

27.2 config interface <interface> ipv4 gateway

Syntax:

```
config interface <interface> ipv4 gateway <ip addr>
```

Description:

Configure interface ipv4 gateway.

Default state:

192.168.0.255

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv4 gateway 192.168.0.1  
[Learxxxxx:conf (0)2]
```

27.3 config interface <interface> ipv4 dns

Syntax:

```
config interface <interface> ipv4 dns <primary dns server ip> <secondary dns server ip>
```

Description:

Configure interface dns (primary and secondary) server(s) ipv4 address.

Default state:

0.0.0.0

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv4 dns 4.4.4.4 8.8.8.8  
[Learxxxxx:conf (0)2]
```

27.4 config interface <interface> ipv4 dhcp-client

Syntax:

```
config interface brtrunk ipv4 dhcp-client <enable|disable>
```

Description:

enable/disable interface dhcp-client status.

Default state:

disable

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv4 dhcp-client disable  
Dhcp client is already disabled.  
[Learxxxxx:conf (0)2] config interface brtrunk ipv4 dhcp-client enable  
[Learxxxxx:conf (0)2]
```

27.5 config interface <interface> ipv4 route

Syntax:

```
config interface <interface> ipv4 route <ip addr>
```

Description:

Configure interface ipv4 route.

Default state:

0.0.0.0

Privileged?:

Yes.

Added in:

v0.0.4

Example log:

```
[Learxxxxxx:conf (0)2] config interface brtrunk ipv4 route 192.168.0.12  
[Learxxxxxx:conf (0)2]
```

27.6 config interface <interface> ipv6 ip

Syntax:

```
config interface <interface> ipv6 ip <ipv6 addr> <netprefix>
```

Description:

Configures interface ipv6 address and network prefix.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv6 ip 2001:470:1111::1 64  
[Learxxxxx:conf (0)2]
```

27.7 config interface <interface> ipv6 gateway

Syntax:

```
config interface <interface> ipv6 gateway <ipv6 addr>
```

Description:

Configure interface ipv6 gateway.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv6 gateway 200:470:1111::2  
[Learxxxxx:conf (0)2]
```

27.8 config interface <interface> ipv6 networkprefix

Syntax:

```
config interface <interface> ipv6 networkprefix <netprefix> <prefix length>
```

Description:

Configures interface ipv6 network prefix and prefix length.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.4

Example log:

```
[Learxxxxx:conf (0)2] config interface brtrunk ipv6 networkprefix 2000:: 3  
[Learxxxxx:conf (0)2]
```

27.9 config interface ath0 apParams channel

Syntax:

```
config interface ath0 apParams channel <integer>
```

Description:

Configures interface ath0 apParam channel.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.11

Example log:

```
[Learxxxxx:conf (0)2] config interface ath0 apParams channel 178  
[Learxxxxx:conf (0)2]
```

27.10 config interface ath0 apParams password

Syntax:

```
config interface ath0 apParams password <string>
```

Description:

Configures interface ath0 apParam password.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.11

Example log:

```
[Learxxxxxx:conf (0)2] config interface ath0 apParams password Lear@456  
[Learxxxxxx:conf (0)2]
```

27.11 config interface ath0 apParams ssid

Syntax:

```
config interface ath0 apParams ssid <string>
```

Description:

Configures interface ath0 apParam ssid.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.11

Example log:

```
[Learxxxxxx:conf (0)2] config interface ath0 apParams ssid Lear051580-11ac  
[Learxxxxxx:conf (0)2]
```

Chapter 28

config application

28.1 config application update

Syntax:

Example log:

```
config application update <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd> wmeConfig
config application update <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd> wsmConfig
config application update <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd> saeConfig
config application update <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd> otherConfig
```

Description:

Configures application profiles.

Application configuration is divided into 4 different type of configuration as per 2016 standard.

wmeConfig has all wme configurations for application registration like user, provider, channel service selection, psid, txchannel, mode, etc.

wsmConfig has all packet tx/rx related configurations like security, txpower, txchan datarate, etc.

saeConfig has vehiclewidth(vehicle width value in meters) , vehiclelegh(vehicle length value in meters), vehicleheight(vehicle height value in meters) configurations. saeConfig only applicable for BSM application.

otherConfig is for debug purpose and most of the parameters are not under development. Application names bsm, spat, map, tim, ipservice, egoprocess only supported.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.5

Updates:

v0.0.7 (Updated)

v0.0.9 (fixed app names, status -> enable)

v0.0.11 (added port support for spat/map)

v0.0.12 (updated the command syntax)

v0.0.15 (added wsmppforward app support)

v0.0.17 (added vehicle type and tempid randomization support)

v0.0.21 (removed vehicle type and tempid from application).

v0.0.21 (Added txrate and wsmpps config support).

Example log:

```
[Lear050E52:conf (0)1] config application disable bsm
[Lear050E52:conf (0)1] config application update bsm
wmeConfig wsmConfig saeConfig otherConfig
[Lear050E52:conf (0)1] config application update bsm wmeConfig psid 32
provider user channel
[Lear050E52:conf (0)1] config application update bsm wmeConfig psid 32 channel schan
172 174 176 180 182 184
[Lear050E52:conf (0)1] config application update bsm wmeConfig psid 32 channel schan 172 timeslot
slot0 slot1 either
[Lear050E52:conf (0)1] config application update bsm wmeConfig psid 32 channel schan 172 timeslot either
Updated application bsm:bsmWmeArg:psid 32 service csr schan 172 slot either

Enable the application to apply the changes
[Lear050E52:conf (0)1] config application enable bsm
```

28.2 config application disable

Syntax:

```
config application disable <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd>
```

Description:

Disables configured application profiles.

Default state:

NA

Privileged?:

Yes.

Added in:

v0.0.5

Updates:

v0.0.9 (disabling app require name instead of psid)

v0.0.11 (removed parameter "name", as autocomplete is supported).

v0.0.15 (added wsmppforward app support).

Example log:

```
[Lear050E52:conf (0)1] config application disable bsm
Application bsm is disabled
[Lear050E52:conf (0)1]
```

28.3 config application enable

Syntax:

```
config application enable <bsm/tim/spat/map/ipservice/egoprocess/pdm/pvd>
```

Description:

Enables the application.

Application name is mandatory.

Application names bsm,tim,spat,map, ipservice and egoprocess only supported.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.12

Updates:

v0.0.15 (added wsmppforward app support).

Example log:

```
[Lear050E52:conf (0)1] config application enable bsm  
Application bsm is enabled  
[Lear050E52:conf (0)1]
```

Chapter 29

config customApp

29.1 config customApp update

Syntax:

Example log:

```
config customApp update <app1/app2/app3/app4>
```

Description:

To configure the required application, this command is used. Here app1, app2, app3, app4 are the user defined customise applications. So user can select any type of application and configure the customApp. To configure this user need to provide the absolute path of the application and arguments for that application.

Default state:

NA

Privileges?:

Yes

Added in:

v0.0.14

Example log:

```
[LearBABBBB:conf (17)1] config customApp update app1 /var/csrTx "p 23 c 180 n 50"  
path /var/csrTx and argument p 23 c 180 n 50  
  
Enable the application to apply the changes  
[LearBABBBB:conf (17)1]
```

29.2 config customApp enable

Syntax:

Example log:

```
config customApp enable <app1/app2/app3/app4>
```

Description:

Enables the application.

Application name is mandatory.

Application names app1, app2, app3 and app4 only supported.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.14

Example log:

```
[LearBABBBB:conf (17)1] config customApp enable app1
Application app1 is enabled
[LearBABBBB:conf (17)1]
```

29.3 config customApp disable

Syntax:

Example log:

```
config customApp disable <app1/app2/app3/app4>
```

Description:

Enables the application.

Application name is mandatory.

Application names app1, app2, app3 and app4 only supported.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.14

Example log:

```
[LearBABBBB:conf (17)1] config customApp disable app1
Application app1 is disabled
[LearBABBBB:conf (17)1]
```

Chapter 30

config operatemode

30.1 config operatemode

Syntax:

Example log:

```
config operatemode <operate/standby>
```

Description:

setting the mode of RSU

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.14

Example log:

```
[LearBABBBB:conf (17)1] config operatemode operate  
[LearBABBBB:conf (17)1]
```

Chapter 31

config system

31.1 config system name

Syntax:

```
config system name <string>
```

Description:

Configures the system name.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config system name Lear  
configuring system name as Lear  
md5 checksum computed  
[Learxxxxxx:conf (0)2]
```

31.2 config system password

Syntax:

```
config system password
```

Description:

Configures the system password.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Learxxxxx:conf (0)2] config system password
changing the password for admin
Old Password :
New Password :
Retype Password :
[Learxxxxx:conf (0)2]
```

31.3 config system region

Syntax:

```
config system region <string>
```

Description:

Configures system region.

Default state:

Unites-states-public-safety (842)

Privileged?:

Yes

Added in:

v0.0.2

Updates:

0.0.3 (modified argument from unsigned integer to string.)

Example log:

```
[Learxxxxx:conf (0)2] config system region india
Configuring system region india
md5 checksum computed
Stopping Lear Process manager: OK
pcd: Caught fault signal.
Stopping system message bus: done
Saving random seed... done.
Stopping logging: OK
Stopping Lear utilities: OK
Applying basic configurations.
mount: mounting proc on /proc failed: Device or resource busy
mount: mounting none on /dev failed: Device or resource busy
can't run '/sbin/swapoff': No such file or directory
umount: tmpfs busy - remounted read-only
umount: can't remount tmpfs read-only
umount: devtmpfs busy - remounted read-only
The system is going down NOW!
Sent SIGTERM to all processes
Sent SIGKILL to all processes
Requesting system reboot
Restarting system.
```

31.4 config system corelimit

Syntax:

```
config system corelimit <value in range 1-25>
```

Description:

Configures the number of cores device will store at maximum. Oldest core(s) will be deleted automatically upon generation of new core(s) beyond the configured limit.

If cores present in system are already more than newly configured value this will be adjusted when new core is generated.

Default state:

25 is the default and maximum value for LC3.

Privileged?:

Yes

Added in:

v0.0.6

Updates:

v0.0.7 (updated corelimit value)

Example log:

```
[Lear557722:conf (11)0] config system corelimit 15
```

31.5 config system imageswitch

Syntax:

```
config system imageswitch
```

Description:

Changes currently configured flash image to other one.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.6

Example log:

```
[Lear557722:conf (11)0] config system imageswitch  
Marked image 1 as default boot.
```

31.6 config system dsrckbackendseparation status

Syntax:

```
config system dsrckbackendseparation status <enable/disable>
```

Description:

Configures number of bridges.
If enabled separates the wired and wireless interfaces.

Default state:

Enabled. (number of bridge 2)

Privileged?:

Yes.

Added in:

v0.0.6

Updates:

v0.0.7 (status enabled by default)

v0.0.20 (updated the command syntax).

Example log:

```
[LearBABBBB:conf (0)2] config system dsrbackendseparation status enable
dsrbackendseparation is already enabled..!!
[LearBABBBB:conf (0)2] config system dsrbackendseparation status disable
Reboot is required.
[LearBABBBB:conf (0)2] config system dsrbackendseparation status enable
Reboot is required.
[LearBABBBB:conf (0)2]
```

31.7 config system dsrbackendseparation interfaceForWifiBridge

Syntax:

```
config system dsrbackendseparation interfaceForWifiBridge <interface>
```

Description:

Configures the interface for wifi bridge.

Default state:

wifivap0 wifilvap0 (both interfaces part of bridge).

Privileged?:

Yes.

Added in:

v0.0.20

Example log:

```
[LearBABBBB:conf (0)2] config system dsrckbackendseparation interfaceForWifiBridge wifi0vap0
wifi0vap0 is already part of bridge.
[LearBABBBB:conf (0)2] config system dsrckbackendseparation interfaceForWifiBridge wifi1vap0
Reboot is required.
[LearBABBBB:conf (0)2] config system dsrckbackendseparation interfaceForWifiBridge both
Reboot is required.
[LearBABBBB:conf (0)2]
```

31.8 config system sshkeygen

Syntax:

```
config system sshkeygen
```

Description:

Used to generate ssh keys. The generated public ssh key must be appended in host machine's `~/.ssh/authorized_keys` file.

You can get ssh public key using command `'show system sshpublickey'`. Or using command `'copy scp var scp_key.pub remote username@host:scp_key.pub'` then append this key using this command in host machine `'cat ~/scp_key.pub » ~/.ssh/authorized_keys'`.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.17

Example log:

```
[LearAABBCC:conf (0)2] config system sshkeygen  
Generating key, this may take a while...  
Use 'show system sshpublickey' command to get the public ssh key.  
[LearAABBCC:conf (0)2]
```

Chapter 32

config time

32.1 config time daylight

Syntax:

```
config time daylight enable|disable
```

Description:

Enables/disables Daylight settings.

Default state:

Enable.

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config time daylight enable  
Configuring daylightSaving enablemd5 checksum computed  
[Learxxxxxx:conf (0)2] config time daylight disable  
Configuring daylightSaving disablemd5 checksum computed  
[Learxxxxxx:conf (0)2]
```

32.2 config time timezone

Syntax:

```
config time timezone <string>
```

Description:

Configures system time zone.

Default state:

iceland (110)

Privileged?:

Yes

Added in:

v0.0.2

Updates:

v0.0.3 (modified argument from unsigned integer to string.)

Example log:

```
[Learxxxxx:conf (0)2] config time timezone india  
Configuring TimeZone india
```

32.3 config time gps status

Syntax:

```
config time gps status enable|disable
```

Description:

Enables/Disables gps time syncing.

Default state:

Enabled

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config time gps status enable
gps status already enabled.
[Learxxxxxx:conf (0)2] config time gps status disable
Configuring gps status...
[Learxxxxxx:conf (0)2] config time gps status enable
Configuring gps status...
[Learxxxxxx:conf (0)2]
```

32.4 config time gps ntp-server

Syntax:

```
config time gps ntp-server < <url> | <ipv4addr> >
```

Description:

Configures NTP server URL.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.2

Updates:

v0.0.6 (command bifurcated to take either URL or IP to have aid in validation.)

Example log:

```
[Learxxxxx:conf (0)2] config time gps ntp-server time.windows.com  
[Learxxxxx:conf (0)2] config time gps ntp-server 172.20.1.100
```

32.5 config time gps gpsscserverip

Syntax:

```
config time gps gpsscserverip <IP address>
```

Description:

This command updates the GPSC server ip.
Reboot is required for changes to take effect.

Default value:

127.0.0.1

Privileged?:

Yes

Added in:

v0.0.11

Example log:

```
[Learxxxxx:conf (0)2] config time gps gpserverip 172.20.1.69  
Reboot required
```

32.6 config time gps gpserverip

Syntax:

```
config time gps gpserverip <IP address>
```

Description:

This command updates the GPSD server ip.
Reboot is required for changes to take effect.

Default value:

127.0.0.1

Privileged?:

Yes

Added in:

v0.0.11

Example log:

```
[Learxxxxx:conf (0)2] config time gps gpserverip 172.20.1.69  
Reboot required
```

32.7 config time gps serverport

Syntax:

```
config time gps serverport <port number>
```

Description:

This command updates the GPSD server port from range [2000-65535]. Reboot is required for changes to take effect.

Default value:

2947

Privileged?:

Yes

Added in:

v0.0.11

Example log:

```
[Learxxxxx:conf (0)2] config time gps serverport 6969  
Reboot required
```

32.8 config time gps devicePosition

Syntax:

```
config time gps devicePosition <X Offset> <Y Offset> <Z Offset>
```

Description:

This command sets the position of the LC3 Device in the vehicle. Offsets are measured in centimeters from the center of the rear axle and should be accurate to at least 0.1 meters. The dimensions x,y,z represent forward, left and up respectively relative to the vehicle.

Default value:

0 0 0

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps devicePosition 71 0 43  
[Learxxxxxx:conf (2)0]
```

32.9 config time gps antennaPosition

Syntax:

```
config time gps antennaPosition <X Offset> <Y Offset> <Z Offset>
```

Description:

This command sets the position of the GPS antenna in the vehicle. Offsets are measured in centimeters from the center of the rear axle and should be accurate to at least 0.1 meters. The dimensions x,y,z represent forward, left and up respectively relative to the vehicle.

Default value:

0 0 0

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps antennaPosition 173 0 102  
[Learxxxxxx:conf (2)0]
```

32.10 config time gps ublxhnrfeaturestatus

Syntax:

```
config time gps ublxhnrfeaturestatus <enable/disable>
```

Description:

This command enables/disables the High Navigation Rate ublox feature, which enables fixes of up to 20hz. With HNR disabled the interval should only be configured to 200ms, with it enabled 50ms is the shortest.

Default value:

enable

Privileged?:

Yes

Added in:

v0.0.24

Example log:

```
[Learxxxxxx:conf (2)0] config time gps ublxhrfeaturestatus disable  
Configuring Ublx HNR status... [Reboot required]  
[Learxxxxxx:conf (2)0]
```

32.11 config time gps autoMountAlign

Syntax:

```
config time gps autoMountAlign <enable/disable>
```

Description:

This command enables/disables automatic mount alignment in the ublox chip. Only useful when ADR is enabled, this feature enables alignment of the ublox sensors relative to the vehicle frame. Without autoMountAlignment ADR results may be skewed.

Default value:

disable

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps autoMountAlign enable  
[Learxxxxxx:conf (2)0]
```

32.12 config time gps lowSpeedCOGFilter

Syntax:

```
config time gps lowSpeedCOGFilter <enable/disable>
```

Description:

This command enables/disables the low speed course over ground feature supported by the Ublox GPS hardware.

Default value:

disable

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps lowSpeedCOGFilter enable  
[Learxxxxxx:conf (2)0]
```

32.13 config time gps sendFrozenCOG

Syntax:

```
config time gps sendFrozenCOG <enable/disable>
```

Description:

This command enables/disables the publishing of course over ground data when the COG has been frozen. The COG is sometimes frozen by various ublox features when position accuracy is poor at low speeds.

Default value:

enabled

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps sendFrozenCOG enable  
[Learxxxxxx:conf (2)0]
```

32.14 config time gps lowPassFilterCOG

Syntax:

```
config time gps lowPassFilterCOG <filter value>
```

Description:

This command sets the filter strength for the low pass course over ground filter in the Ublox gps receiver. Range from 0 (no filter) to 255 (max filter).

Default value:

76

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps lowPassFilterCOG 123
[Learxxxxxx:conf (2)0]
```

32.15 config time gps lowPassFilterSpeed

Syntax:

```
config time gps lowPassFilterSpeed <filter value>
```

Description:

This command sets the filter strength for the low pass speed filter in the Ublox gps receiver. Range from 0 (no filter) to 255 (max filter).

Default value:

153

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps lowPassFilterSpeed 123  
[Learxxxxxx:conf (2)0]
```

32.16 config time gps staticHoldThreshold

Syntax:

```
config time gps staticHoldThreshold <speed cm/s>
```

Description:

This command set the static hold threshold value such that if a speed is below this threshold, the position becomes fixed and the speed is set to zero by the receiver. Note that the speed should be set in units of cm/s

Default value:

0

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxxx:conf (2)0] config time gps staticHoldThreshold 5  
[Learxxxxxx:conf (2)0]
```

32.17 config time gps enableGlobal

Syntax:

```
config time gps enableGlobal <enable/disable>
```

Description:

This command adds the -G argument when starting GPSD in the translator. This flag lets GPSD listen on all interfaces for clients, enabling gpsd access from development machines.

Default value:

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxx:conf (2)0] config time gps enableGlobal enable  
Changes will take effect after reboot.  
[Learxxxxx:conf (2)0]
```

32.18 config time gps manualMountAlignment

Syntax:

```
config time gps manualMountAlignment <yaw>
```

Description:

Program in units of centi-degrees the Yaw, Pitch and Roll corrections for the device relative to the ideal reference frame.

Default value:

0 0 0

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[Learxxxxx:conf (2)0] config time gps manualMountAlignment 100 200 300  
[Learxxxxx:conf (2)0]
```

Chapter 33

config locos

33.1 config locos deployment

Syntax:

```
config locos deployment <string>
```

Description:

Configures locos deployment value.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config locos deployment usdot  
configuring deployment usdot  
  
[Learxxxxxx:conf (0)2] config locos deployment default  
configuring deployment default  
  
[Learxxxxxx:conf (0)2]
```

33.2 config locos bt status

Syntax:

```
config locos bt status enable|disable
```

Description:

Bring up/down BT device.

Default state:

Down

Privileged?:

Yes.

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config locos bt status disable
[Learxxxxxx:conf (0)2] config locos bt status enable
Successfully brought up hci0.
[Learxxxxxx:conf (0)2] config locos bt status disable
[Learxxxxxx:conf (0)2]
```

33.3 config locos can bitrate

Syntax:

```
config locos can bitrate [ 1000000 800000 500000 250000 125000 100000 50000 20000
10000 ]
```

Description:

Set the bitrate of the can0 interface

Default state:

0 (disabled)

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.4 config locos can loopback

Syntax:

```
config locos can loopback enable/disable
```

Description:

Enable loopback on the can0 interface

Default state:

Enabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.5 config locos can listenonly

Syntax:

```
config locos can listenonly enable/disable
```

Description:

Enable listenonly on the can0 interface

Default state:

Enabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.6 config locos can status

Syntax:

```
config locos can status enable/disable
```

Description:

Enable or disable the can_module

Default state:

disabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.7 config locos can interface

Syntax:

```
config locos can interface [ can0 vcan0 .. ]
```

Description:

Defines the CAN interface which the can_module should listen on. vcan0 is used for testing.

Default state:

can0

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.8 config locos can filterIDs

Syntax:

```
config locos can filterIDs enable/disable
```

Description:

Filter IDs of incoming packets based on the CAN ids described in the dbc file

Default state:

Enabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.9 config locos can server

Syntax:

```
config locos can server enable/disable
```

Description:

Enable the server component of the can_ module which will allow it to respond to UDP requests

Default state:

Enabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.10 config locos can decodePGN

Syntax:

```
config locos can decodePGN enable/disable
```

Description:

Informs the can_module that incoming can_ids must be treated as J1939 PGNs

Default state:

Disabled

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.11 config locos can pidList

Syntax:

```
config locos can pidList 1,2,3,4,5,...
```

Description:

A csv list of PIDs to monitor on the CAN bus. Find supported values in a shell with 'can_module -P'

Default state:

0 (disabled)

Privileged?:

Yes

Added in:

v0.0.19

Example log:

33.12 config locos can dbcFile

Syntax:

```
config locos can dbcFile (file path)
```

Description:

The DBC file to be used by the can_ module in order to decode messages from the CAN bus.

Default state:

0 (disabled)

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear334455:conf (4)1] config locos can dbcFile /var/testfile.dbc  
Warning: file does not currently exist. '/var/testfile.dbc'
```

33.13 config locos can metaFile

Syntax:

```
config locos can metaFile (file path)
```

Description:

The meta-file to be used by the can_ module in order to store messages decoded from the CAN bus in the proper field.

Default state:

0 (disabled)

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear334455:conf (4)1] config locos can metaFile /var/testfile.meta  
Warning: file does not currently exist. '/var/testfile.meta'
```

33.14 config locos rsuoffload status

Syntax:

```
config locos rsuoffload status <disable/enable>
```

Description:

Disabling the offload.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos rsuoffload status enable  
rsuoffload status disabled  
[Lear000031:conf (0)1]
```

33.15 config locos rsuoffload update partition mountpoint

Syntax:

```
config locos rsuoffload update partition mountpoint <path>
```

Description:

Setting the mount point path

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos rsuoffload update partition mountpoint /var  
[Lear000031:conf (0)1]
```

33.16 config locos rsuoffload update partition keyfile

Syntax:

```
config locos rsuoffload update partition keyfile <keyfile path>
```

Description:

Setting the keyfile path

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition keyfile /var/scp_key  
[Lear000031:conf (0)1]
```

33.17 config locos rsuoffload update partition sizethreshold1

Syntax:

```
config locos rsuoffload update partition sizethreshold1 <size>
```

Description:

Setting the threshold size

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition sizethreshold1 50  
[Lear000031:conf (0)1]
```

33.18 config locos rsuoffload update partition sizethreshold2

Syntax:

```
config locos rsuoffload update partition sizethreshold2 <size>
```

Description:

Setting the threshold size

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition sizethreshold2 60  
[Lear000031:conf (0)1]
```

33.19 config locos rsuoffload update partition sizethreshold3

Syntax:

```
config locos rsuoffload update partition sizethreshold3 <size>
```

Description:

Setting the threshold size

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition sizethreshold3 80  
[Lear000031:conf (0)1]
```

33.20 config locos rsuoffload update partition sizethresholdcheckinterval

Syntax:

```
config locos rsuoffload update partition sizethresholdcheckinterval <interval  
in minuets>
```

Description:

Setting the sizethresholdcheckinterval

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition sizethresholdcheckinterval 15  
[Lear000031:conf (0)1]
```

33.21 config locos rsuoffload update partition offloadinterval

Syntax:

```
config locos rsuoffload update partition offloadinterval <integer>
```

Description:

Setting the interval

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update partition offloadinterval 12  
[Lear000031:conf (0)1]
```

33.22 config locos rsuoffload update directory(1/2/3/4/5) action

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> action <add/delete>
```

Description:

update directory1/directory2/directory3/directory4/directory5 action with add or delete

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update <directory1/directory2/directory3/directory4/directory5>  
action add  
[Lear000031:conf (0)1]
```

33.23 config locos rsuoffload update directory(1/2/3/4/5) srcpath

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> srcpath <path>
```

Description:

update directory1/directory2/directory3/directory4/directory5 srcpath

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update <directory1/directory2/directory3/directory4/directory5>  
srcpath /var/storage  
[Lear000031:conf (0)1]
```

33.24 config locos rsuoffload update directory(1/2/3/4/5) serveraddr

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> serveraddr <address>
```

Description:

update directory1/directory2/directory3/directory4/directory5 server address

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update directory1/directory2/directory3/directory4/directory5>  
serveraddr 2001:470:11:45::10  
[Lear000031:conf (0)1]
```

33.25 config locos rsuoffload update directory(1/2/3/4/5) serverport

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> serverport <integer>
```

Description:

update directory1/directory2/directory3/directory4/directory5 server port number

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update <directory1/directory2/directory3/directory4/directory5>  
serverport 23551  
[Lear000031:conf (0)1]
```

33.26 config locos rsuoffload update directory(1/2/3/4/5) destdir

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> destdir <destination path>
```

Description:

update directory1/directory2/directory3/directory4/directory5 destination directory

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update directory1/directory2/directory3/directory4/directory5>  
destdir /home/storage  
[Lear000031:conf (0)1]
```

33.27 config locos rsuoffload update directory(1/2/3/4/5) serverusername

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> serverusername <string>
```

Description:

update directory1/directory2/directory3/directory4/directory5 serverusername

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update <directory1/directory2/directory3/directory4/directory5>  
serverusername offloadserver  
[Lear000031:conf (0)1]
```

33.28 config locos rsuoffload update directory(1/2/3/4/5) retrycount

Syntax:

```
config locos rsuoffload update <directory1/directory2/directory3/directory4/  
directory5> retrycount <integer>
```

Description:

update directory1/directory2/directory3/directory4/directory5 retrycount

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos rsuoffload update <directory1/directory2/directory3/directory4/directory5> retrycount 3  
[Lear000031:conf (0)1]
```

33.29 config locos offload status

Syntax:

```
config locos offload status <enable/disable>
```

Description:

offload status enable/disable

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos offload status enable  
[Lear000031:conf (0)1]
```

33.30 config locos offload update wmeconfig appname

Syntax:

```
config locos offload update wmeconfig appname <name>
```

Description:

setting the name for the offload

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig appname weathercloud
```

33.31 config locos offload update wmeconfig psid

Syntax:

```
config locos offload update wmeconfig psid <integer>
```

Description:

setting offload wme psid

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig psid 36
```

33.32 config locos offload update wmeconfig userRequestType

Syntax:

```
config locos offload update wmeconfig userRequestType <integer>
```

Description:

setting offload user request type

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig userRequestType 1
```

33.33 config locos offload update wmeconfig serviceChannel

Syntax:

```
config locos offload update wmeconfig serviceChannel <172/174/176/178/180/182/184>
```

Description:

setting offload service channel

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig serviceChannel 176
```

33.34 config locos offload update wmeconfig wsaType**Syntax:**

```
config locos offload update wmeconfig wsaType <integer>
```

Description:

setting offload wsatype

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig wsaType 4
```

33.35 config locos offload update wmeconfig psc**Syntax:**

```
config locos offload update wmeconfig psc offload
```

Description:

setting offload wmeconfig psc

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update wmeconfig psc offload
```

33.36 config locos offload update Optconfig RemoteUserName

Syntax:

```
config locos offload update Optconfig RemoteUserName <string>
```

Description:

setting offload optconfig remote user name

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig RemoteUserName back end_machine_name
```

33.37 config locos offload update Optconfig RemoteDestDir**Syntax:**

```
config locos offload update Optconfig RemoteDestDir <directory path>
```

Description:

setting offload optconfig remote destination directory

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig RemoteDestDir /tmp
```

33.38 config locos offload update Optconfig LocalSrcDir

Syntax:

```
config locos offload update Optconfig LocalSrcDir <directory path>
```

Description:

setting offload optconfig local source directory

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig LocalSrcDir /var/offload
```

33.39 config locos offload update Optconfig threshold1

Syntax:

```
config locos offload update Optconfig threshold1 <integer>
```

Description:

setting offload threshold1 value. Its a minimum size of partition.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig threshold1 30
```

33.40 config locos offload update Optconfig threshold2

Syntax:

```
config locos offload update Optconfig threshold2 <integer>
```

Description:

setting offload optconfig threshold2 value.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig threshold2 40
```

33.41 config locos offload update Optconfig threshold3**Syntax:**

```
config locos offload update Optconfig threshold3 <integer>
```

Description:

setting offload optconfig threshold3 value. Its maximum limit of partition.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig threshold3 50
```

33.42 config locos offload update Optconfig retrycount

Syntax:

```
config locos offload update Optconfig retrycount <integer>
```

Description:

setting offload optconfig retry count

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos offload update Optconfig retrycount 3
```

33.43 config locos distressNotification status

Syntax:

```
config locos distressNotification status <enable/disable>
```

Description:

Starting or stopping DN application

-

*Default state: N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos distressNotification status enable
```

33.44 config locos distressNotification appname

Syntax:

```
config locos distressNotification appname <string>
```

Description:

appname of the DN application

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos distressNotification appname DN
```

33.45 config locos distressNotification psid**Syntax:**

```
config locos distressNotification psid <Integer>
```

Description:

psid of the DN application

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos distressNotification psid 23
```

33.46 config locos distressNotification servicetype

Syntax:

```
config locos distressNotification servicetype <string>
```

Description:

service type to use psr/usr/csr.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1]config locos distressNotification servicetype usr
```

33.47 config locos distressNotification security

Syntax:

```
config locos distressNotification security <string>
```

Description:

security service of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification security encrypt
```

33.48 config locos distressNotification verifybypass

Syntax:

```
config locos distressNotification verifybypass <enable/disable>
```

Description:

verifybypass of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification verifybypass enable
```

33.49 config locos distressNotification expirytime**Syntax:**

```
config locos distressNotification expirytime <Integer>
```

Description:

expirytime of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification expirytime 20
```

33.50 config locos distressNotification repeatrate

Syntax:

```
config locos distressNotification repeatrate <Integer>
```

Description:

repeatrate of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification repeatrate 10
```

33.51 config locos distressNotification printencode

Syntax:

```
config locos distressNotification printencode <enable/disable>
```

Description:

enable or disable printencode of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification printencode disable
```

33.52 config locos distressNotification printdecode

Syntax:

```
config locos distressNotification printdecode <enable/disable>
```

Description:

enable or disable printdecode of the DN transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification printdecode disable
```

33.53 config locos distressNotification logtype**Syntax:**

```
config locos distressNotification logtype <string>
```

Description:

where to go the packet of the DN transmission.(disable/file/remote/stdout)

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification logtype file
```

33.54 config locos distressNotification forwarddirection

Syntax:

```
config locos distressNotification forwarddirection <string>
```

Description:

Log of Tx, Rx or both.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification forwarddirection Tx
```

33.55 config locos distressNotification forwardip

Syntax:

```
config locos distressNotification forwardip <string>
```

Description:

forward Ip or filename of Dn

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification forwardip dn.txt
```

33.56 config locos distressNotification forwardport

Syntax:

```
config locos distressNotification forwardport <integer>
```

Description:

forward port number of Dn.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos distressNotification forwardport 121
```

33.57 config locos ota status

Syntax:

```
config locos ota status <enable/disable>
```

Description:

Status of the OTA application

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota status enable  
[Lear000031:conf (0)1]
```

33.58 config locos ota wmeconfig appname

Syntax:

```
config locos ota wmeconfig appname <String>
```

Description:

Application name of the OTA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wmeconfig appname OTAApp  
[Lear000031:conf (0)1]
```

33.59 config locos ota wmeconfig psid

Syntax:

```
config locos ota wmeconfig psid <Integer>
```

Description:

Psid of the application.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wmeconfig psid 23  
[Lear000031:conf (0)1]
```

33.60 config locos ota wmeconfig wsatype

Syntax:

```
config locos ota wmeconfig wsatype <string>
```

Description:

Security of OTA packet transmission.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wstype unsecured  
[Lear000031:conf (0)1]
```

33.61 config locos ota wmeconfig userRequestType

Syntax:

```
config locos ota wmeconfig userRequestType <Integer>
```

Description:

configuring the User request type of application (auto/user)

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wmeconfig userRequestType 0  
[Lear000031:conf (0)1]
```

33.62 config locos ota wmeconfig psc

Syntax:

```
config locos ota wmeconfig psc <string>
```

Description:

psc of application that maybe any string.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wmeconfig psc name  
[Lear000031:conf (0)1]
```

33.63 config locos ota wmeconfig advertiserIdentifier

Syntax:

```
config locos ota wmeconfig advertiserIdentifier <String>
```

Description:

advertiserIdentifier for OTA .

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos ota wmeconfig advertiserIdentifier oTA  
[Lear000031:conf (0)1]
```

33.64 config locos wraconf wraipprefix

Syntax:

```
config locos wraconf wraipprefix <IPv6 Address>
```

Description:

Configures the IP prefix in WRA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wraipprefix
A:B:C:D::E or ::A or any IPv6 Address

[Lear000031:conf (0)1] config locos wraconf wraipprefix 2001:470:11:22::
[Lear000031:conf (0)1]
```

33.65 config locos wraconf wraprefixlen

Syntax:

```
config locos wraconf wraprefixlen <integer>
```

Description:

Configures the IP prefix length in WRA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wraprefixlen
positive integer [0-254] Prefix Length

[Lear000031:conf (0)1] config locos wraconf wraprefixlen 64
[Lear000031:conf (0)1]
```

33.66 config locos wraconf wraefaultgw

Syntax:

```
config locos wraconf wraefaultgw <IPv6 Address>
```

Description:

Configures the default gateway in WRA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wraefaultgw  
A:B:C:D::E or ::A or any IPv6 Address  
  
[Lear000031:conf (0)1] config locos wraconf wraefaultgw 2001:470:11:22::2  
[Lear000031:conf (0)1]
```

33.67 config locos wraconf wraprimarydns

Syntax:

```
config locos wraconf wraprimarydns <IPv6 Address>
```

Description:

Configures the primary DNS address in WRA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wrprimarydns
A:B:C:D::E or ::A or any IPv6 Address

[Lear000031:conf (0)1] config locos wraconf wrprimarydns 2001:470:11:22::2
[Lear000031:conf (0)1]
```

33.68 config locos wraconf wrasecondarydns

Syntax:

```
config locos wraconf wrasecondarydns <IPv6 Address>
```

Description:

Configures the secondary DNS address in WRA

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wrasecondarydns
A:B:C:D::E or ::A or any IPv6 Address

[Lear000031:conf (0)1] config locos wraconf wrasecondarydns 2001:470:11:22::4
[Lear000031:conf (0)1]
```

33.69 config locos wraconf wragatewaymacaddr

Syntax:

```
config locos wraconf wragatewaymacaddr <IPv6 Address>
```

Description:

WRA IPv6 MAC address.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.16

Example log:

```
[Lear000031:conf (0)1] config locos wraconf wragatewaymacaddr
A:B:C:D::E or ::A or any IPv6 Address

[Lear000031:conf (0)1] config locos wraconf wragatewaymacaddr 2001:470:11:22::2
[Lear000031:conf (0)1]
```

33.70 config locos logging interface1/interface2 status

Syntax:

```
config locos logging interface1/interface2 status <enable/disable>
```

Description:

interface status Enabling or disabling.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging interface1/interface2
enable disable
[Lear050E32:conf (0)2] config locos logging interface1/interface2 disable
[Lear050E32:conf (0)2]
```

33.71 config locos logging interface1/interface2 logfilesize

Syntax:

```
config locos logging interface1/interface2 logfilesize <positive integer>
```

Description:

Size of the log file in MB.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging interface1/interface2
logfilesize 10
[Lear050E32:conf (0)2]
```

33.72 config locos logging interface1/interface2 logfiletime

Syntax:

```
config locos logging interface1/interface2 logfiletime <positive integer>
```

Description:

Time of the log file in hours.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging interface1/interface2
logfiletime 10
[Lear050E32:conf (0)2]
```

33.73 config locos logging interface1/interface2 status**Syntax:**

```
config locos logging interface1/interface2 logbydirection <enable/disable>
```

Description:

logby direction is Enabling or disabling.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging interface1/interface2
logbydirection disable
[Lear050E32:conf (0)2]
```

33.74 config locos logging interface1/interface2 logfiletime

Syntax:

```
config locos logging interface1/interface2 interfacename <string>
```

Description:

Name of the interface.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging interface1/interface2
wifi0vap0
[Lear050E32:conf (0)2]
```

33.75 config locos logging otherConfig transmitlog

Syntax:

```
config locos logging otherConfig transmitlog <enable/disable>
```

Description:

Configures the status of Transmitted packets to be captured or not.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging otherConfig transmitlog
enable disable
[Lear050E32:conf (0)2] config locos logging otherConfig transmitlog disable
[Lear050E32:conf (0)2]
```

33.76 config locos logging otherConfig receiveolog

Syntax:

```
config locos logging otherConfig receiveolog <enable/disable>
```

Description:

Configures the status of received packets to be captured or not.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging otherConfig receiveLog
enable disable
[Lear050E32:conf (0)2] config locos logging otherConfig receiveLog disable
[Lear050E32:conf (0)2]
```

33.77 config locos logging otherConfig fwdpcapstatus

Syntax:

```
config locos logging otherConfig fwdpcapstatus <enable/disable>
```

Description:

Configures the status of forward pcap packets to forward or not.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging otherConfig fwdpcapstatus
enable disable
[Lear050E32:conf (0)2] config locos logging otherConfig fwdpcapstatus disable
[Lear050E32:conf (0)2]
```

33.78 config locos logging otherConfig ipaddress

Syntax:

```
config locos logging otherConfig ipaddress <IPv6 Address>
```

Description:

Configures the remote machine IPv6 address to forward the packets.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging otherConfig ipaddress  
A:B:C:D::E or ::A or any IPv6 Address  
  
[Lear050E32:conf (0)2] config locos logging otherConfig ipaddress 2001:470:11:22::3  
[Lear050E32:conf (0)2]
```

33.79 config locos logging otherConfig port

Syntax:

```
config locos logging otherConfig port <port number>
```

Description:

Configures the remote machine port number to forward the packets.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.19

Example log:

```
[Lear050E32:conf (0)2] config locos logging otherConfig port
positive integer [0-65535] Configure remote machine Port

[Lear050E32:conf (0)2] config locos logging otherConfig port 16092
[Lear050E32:conf (0)2]
```

33.80 config locos hmi settings

Syntax:

```
config locos hmi settings <param> <value>
```

Description:

To configure HMI related settings.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[LearAABBCC:conf (0)0] config locos hmi settings connectionmode wifi
```

33.81 config locos hmi wifi settings

Syntax:

```
config locos hmi wifi settings <param> <value>
```

Description:

To configure HMI WiFi related settings.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[LearAABBCC:conf (0)0] config locos hmi wifi settings destinationip 192.168.10.150
```

33.82 config locos hmi bluetooth settings

Syntax:

```
config locos hmi bluetooth settings <param> <value>
```

Description:

To configure HMI Bluetooth related settings.

Default state:

N/A

Privileged?:

YES

Added in:

v0.0.23

Example log:

```
[LearAABCC:conf (0)0] config locos hmi bluetooth settings clientmac AA:BB:CC:DD:EE:FF
```

33.83 config locos hmi livemap settings

Syntax:

```
config locos hmi livemap settings <param> <value>
```

Description:

To configure HMI Livemap related settings.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.23

Example log:

```
[LearAABCC:conf (0)0] config locos hmi livemap settings severip 192.168.0.69
```

Chapter 34

config log

34.1 config log syslog remote

Syntax:

```
config log syslog remote <enable ip addr port portno>|<disable>
```

Description:

Configure the remote syslog server settings.

Default state:

Disabled

Privileged?:

Yes

Added in:

v0.0.2

Updates:

v0.0.6 (Added Enable / disable and moved ip and port configuration as mandatory when enable is selected.)

Example log:

```
[Learxxxxx:conf (0)2] config log syslog remote enable ip 172.20.1.115 port 514
stopped /sbin/syslogd (pid 1367)
sh: you need to specify whom to kill
stopped /sbin/syslogd (pid 2380)
sh: you need to specify whom to kill
```

34.2 config log syslog local syslogrotateday

Syntax:

```
config log syslog local syslogrotateday <Name of the day from Monday to Sunday>
```

Description:

Configure the syslog file rotation day .

Default state:

Sunday

Privileged?:

Yes

Added in:

PR11.01

Example log:

```
[Learxxxxx:conf (0)2] config log syslog local syslogrotateday Sunday
```

34.3 config log syslog local syslogdeleteday

Syntax:

```
config log syslog local syslogdeleteday <Name of the day from Monday to Sunday>
```

Description:

Configure the syslog file delete day. This will be effective only when `syslogdeleteage` is configured as 0

Default state:

Sunday

Privileged?:

Yes

Added in:

PR11.01

Example log:

```
[Learxxxxx:conf (0)2] config log syslog local syslogdeleteday Sunday
```

34.4 config log syslog local syslogdeleteage

Syntax:

```
config log syslog local syslogdeleteage <Value>
```

Description:

Configure the syslog file deleted after given number of day(s). If both `syslogdeleteday` and `syslogdeleteage` is configurated, `syslogdeleteage` will be considered. If `syslogdeleteage` is configured as 0, then, `syslogdeleteday` will be considered. The `syslogdeleteage` is computed from the time the board is booted.

Default state:

30

Privileged?:

Yes

Added in:

PR11.01

Example log:

```
[Learxxxxxx:conf (0)2] config log syslog local syslogdeleteage 5
```

34.5 config log syslog local syslogloglevel

Syntax:

```
config log syslog local syslogloglevel <String>
```

Description:

Configure the syslog file logging level (emerg, alert, crit, err, warning, notice, info, debug).

Default state:

info

Privileged?:

Yes

Added in:

PR11.01

Example log:

```
[Learxxxxxx:conf (0)2] config log syslog local syslogloglevel info
```

34.6 config log syslog local syslogrotatettime

Syntax:

```
config log syslog local syslogrotatettime <value in hhmm range 0000-2359>
```

Description:

Configure the syslog file rotation time

Default state:

0000

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxx:conf (0)2] config log syslog local syslogrotatettime 1230
```

Chapter 35

config remote

35.1 config remote ssh

Syntax:

```
config remote ssh enable|disable
```

Description:

Enables / disables ssh server on board.

Default state:

Enabled.

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
[Learxxxxxx:conf (0)2] config remote ssh enable  
ssh status already enabled.
```

35.2 config remote snmp status

Syntax:

```
config remote snmp status enable|disable
```

Description:

Enables/disables SNMP server on board.

Default state:

Disable.

Privileged?:

Yes

Added in:

v0.0.2

Example log:

```
config remote snmp status disable
```

35.3 config remote snmp createuser

Syntax:

```
config remote snmp createuser username <user> authprotocol  
<SHA/MD5> authpassword <password> privprotocol <AES/DES> privpassword  
<password> access <rouser/rwuser>
```

Description:

User creation with SNMP.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.12

Example log:

```
config remote snmp createuser username Lear authprotocol SHA authpassword password privprotocol AES privpassword password access
rouser
```

35.4 config remote snmp deleteuser

Syntax:

```
config remote snmp deleteuser <user>
```

Description:

Deleting the existing snmp user.

Default state:

NA

Privileged?:

Yes

Added in:

v0.0.12

Example log:

```
config remote snmp deleteuser Lear
```

Chapter 36

config tunnel

36.1 config tunnel status

Syntax:

```
config tunnel status <enable|disable>
```

Description:

Configures the tunnel status.

Default state:

Disabled.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel status enable  
Tunnel status is already enabled...  
[LearBABABA:conf (0)1] config tunnel status disable  
[LearBABABA:conf (0)1]
```

36.2 config tunnel name

Syntax:

```
config tunnel name [sit1/tun1]
```

Description:

Configures the tunnel name.

Note:- Name should contain sit<index> or tun<index>

Default state:

NA.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel name
String Enter tunnel name e.g. sit1, tun1
[LearBABABA:conf (0)1] config tunnel name LearTun
Enter proper name
Allowed names => sit[if_num]|tun[if_num]
[LearBABABA:conf (0)1] config tunnel name sit2
[LearBABABA:conf (0)1] config tunnel name tun3
[LearBABABA:conf (0)1]
```

36.3 config tunnel localIpv6

Syntax:

```
config tunnel localIpv6 <IPv6 addr> prefixLen <prefix length>
```

Description:

Configures the tunnel local IPv6 address.

Note:- Tunnel localIPv6 addr is client IPv6 address which is assigned by tunnel broker.

Default state:

NA.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel localIPv6
  A:B:C:D::E or ::A or any IPv6 addr

[LearBABABA:conf (0)1] config tunnel localIPv6 2001:470:baba::1 prefixLen
  Unsigned integer IPv6 addr prefix len

[LearBABABA:conf (0)1] config tunnel localIPv6 2001:470:baba::1 prefixLen 64
[LearBABABA:conf (0)1]
```

36.4 config tunnel remoteIPv4

Syntax:

```
config tunnel remoteIPv4 <IPv4 addr>
```

Description:

Configures the tunnel remote endpoint IPv4 address.

Note:- Tunnel remoteIPv4 addr is server IPv4 address which is assigned by tunnel broker.

Default state:

NA.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel remoteIpv4
  A.B.C.D IPv4 addr

[LearBABABA:conf (0)1] config tunnel remoteIpv4 216.218.221.42
[LearBABABA:conf (0)1]
```

36.5 config tunnel ipv6Gateway

Syntax:

```
config tunnel ipv6Gateway <IPv6 addr>
```

Description:

Configures the tunnel IPv6 gateway address.

Note:- Tunnel ipv6Gateway addr is generally server IPv6 address which is assigned by tunnel broker.

Default state:

NA.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel ipv6Gateway
  A:B:C:D::E or ::A or any IPv6 addr

[LearBABABA:conf (0)1] config tunnel ipv6Gateway 2001:470:baba::1
[LearBABABA:conf (0)1]
```

36.6 config tunnel ipv6NetPrefix

Syntax:

```
config tunnel ipv6NetPrefix <IPv6 addr> prefixLen <prefix length>
```

Description:

Configures the tunnel IPv6 network prefix.

Note:- Tunnel ipv6NetPrefix is generally IPv6 addr subnet. e.g. 2000::/3

Default state:

NA.

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearBABABA:conf (0)1] config tunnel ipv6NetPrefix
  A:B:C:D::E or ::A or any IPv6 addr
```

```
[LearBABABA:conf (0)1] config tunnel ipv6NetPrefix 2000::  
    prefixLen IPv6 prefix length  
  
[LearBABABA:conf (0)1] config tunnel ipv6NetPrefix 2000:: prefixLen 3  
[LearBABABA:conf (0)1]
```

Chapter 37

config firewall

37.1 config firewall rule

Syntax:

```
config firewall rule <block/allow> <incoming/outgoing> <ipv4/ipv6/port> [ip/all]  
<ip or port val> [optional: mask] [optional: port upper limit]
```

Description:

To add new firewall rule.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.13

Updates:

v0.0.15 (updated the command syntax).

Example log:

```
[LearAABBCC:conf (0)0] config firewall rule block incoming ipv4 ip 192.168.0.50  
[LearAABBCC:conf (0)0]
```

37.2 config firewall reset

Syntax:

```
config firewall reset
```

Description:

To delete all firewall rules.

Default state:

N/A

Privileged?:

Yes

Added in:

v0.0.13

Example log:

```
[LearAABBCC:conf (0)0] config firewall reset  
All rules deleted.  
[LearAABBCC:conf (0)0]
```

Disclaimer

15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: -Reorient or relocate the receiving antenna - Increase the separation between the equipment and the receiver. -Connect the equipment into an outlet on a circuit different from that to which the receiver is connected -Consult the dealer or an experienced radio/TV technician for help

15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

RF Exposure warning: This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. The device should be installed and operated with a minimum distance of 20cm between the radiator and your body. This device must not be collocated or operating in conjunction with any other antenna or transmitter