1 Filesystem update via uSD

1.1 Create uSD

Create uSD from ISO. Be carefull to change `/dev/sdb` with your system uSD device path, minimum 8GB size required.

```
gunzip -c ska-low-smm_v0.4.0_20230516.img.tgz  | sudo dd of=/dev/sdb status=progress
```

1.2 Boot from uSD

Insert uSD into uSD slot of SMB board and power-on the board

1.3 Web server start

No action required. Filesystem start with web_server service active for external control (e.g. with SKALAB).
The filesystem configure CPU ip address calculated from CPLD ip address read from EEPROM, decreasing by 6. (e.g. CPLD ip 10.0.10.70 follow to CPU ip address 10.0.10.64).
Below ip addresses MUST be reserved for board function:

RESERVED IPs	
10.0.10.64	CPU
10.0.10.65	reserved
10.0.10.66	reserved
10.0.10.67	reserved
10.0.10.68	reserved
10.0.10.69	reserved
10.0.10.70	CPLD
10.0.10.71	SLOT-1 TPM
10.0.10.72	SLOT-2 TPM
10.0.10.73	SLOT-3 TPM
10.0.10.74	SLOT-4 TPM
10.0.10.75	SLOT-5 TPM
10.0.10.76	SLOT-6 TPM
10.0.10.77	SLOT-7 TPM
10.0.10.78	SLOT-8 TPM
10.0.10.79	reserved

1.4 Connect to board via SSH

```
sshpass -p SkaUser ssh -o StrictHostKeyChecking=no mnguser@10.0.10.64
```

1.5 Gateway

Configure external HOST as gateway (no DHCP needed) and NTP server [optional required for 1.6 and 1.9]

1.6 BIOS tool update

Check for ska-low-smm-bios update if needed (needs internet access configured at 1.5)

```
(venv) mnguser@ska-low-smm:~/SubrackMngAPI$ pip install git+https://gitlab.com/sanitaseg/ska-
low-smm-bios.git
```

1.7 BIOS update into board

Update BIOS if needed (read below)

1.8 Network configuration

Change ip address if needed (read below)

1.9 SubrackMngAPI update

Check for SubrackMngAPI update if needed (needs internet access configured at 1.5)

```
(venv) mnguser@ska-low-smm:~/SubrackMngAPI$ git pull
Already up to date.
```

1.10 Reboot

Shutdown and reboot to apply changes.

```
sudo poweroff
```

2 BIOS update into board

`ska_low_smm_bios` can be used to update a SMM board, you needs to specify bios version. Ip address is not required because it operate on localhost only.

```
$ python -m ska_low_smm_bios --bios v1.0.0
==============================================================
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BY USING THIS SOFTWARE, YOU ACCEPT THE TERMS OF THE AGREEMENT.
You can read license by '--show-license' option
==============================================================
| BOARD INFO          |                               |
|:--------------------|:------------------------------|
| SN                  |                               |
| PN                  | SKA_SMB                       |
| HARDWARE_REV        | v1.2.4                        |
| BOARD_MODE          | SUBRACK                       |
| LOCATION            | 65535:255:255                 |
| bios                | v1.0.0                        |
| bios_cpld           | 0xbe7a1014_0x202106150954     |
| bios_mcu            | 0xdb000102_0x2021040600125020 |
| bios_uboot          | 2018.03-00005-gda75be7d       |
| bios_krn            | 4.14.98-0002-00003-gffba12ad9 |
| OS                  | Debian GNU/Linux 10           |
| OS_rev              | v0.6.0-12-g0994d5e            |
| CPLD_ip_address     | 10.0.10.86                    |
| CPLD_netmask        | 255.255.255.0                 |
| CPLD_gateway        | 10.0.10.1                     |
| CPLD_ip_address_eep | 10.0.10.86                    |
| CPLD_netmask_eep    | 255.255.255.0                 |
| CPLD_gateway_eep    | 10.0.10.1                     |
| CPLD_MAC            | 04:91:62:b2:28:20             |
| CPU_ip_address      | 10.0.10.80                    |
| CPU_netmask         | 255.255.255.0                 |
| CPU_MAC             | 04:91:62:b2:6c:b8             |


| BIOS   | ACTUAL                        | REQUESTED                     | diff   |
|:-------|:------------------------------|:------------------------------|:-------|
| rev    | v?.?.?                        | v1.0.0                        | *      |
| cpld   | 0xbe7a1014_0x202106150954     | 0xbe7a1014_0x202106150954     |        |
| mcu    | 0xdb000102_0x2021040600125020 | 0xdb000102_0x2021040600125020 |        |
| uboot  | 2018.03-00002-g692c8e6e-dirty | 2018.03-00005-gda75be7d       | *      |
| krn    | 4.14.98-0002-00003-gffba12ad9 | 4.14.98-0002-00003-gffba12ad9 |        |
```

3 Change network configuration

`ska_low_smm_bios` can be also used to change network configuration stored into non-volatile memory. The OS of SMM, at boot time, retrive information from non-volatile memory to generate `/etc/network/interfaces`. OS also assume, for convenience, that a ntp server is available and try to exec a update time at boot.

```
$ python -m ska_low_smm_bios --change-ip 10.0.10.64 --change-netmask 255.255.0.0 --
change-gateway 10.0.10.254
==============================================================
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==============================================================
| BOARD INFO          |                               |
|:--------------------|:------------------------------|
| SN                  |                               |
| PN                  | SKA_SMB                       |
| HARDWARE_REV        | v1.2.4                        |
| BOARD_MODE          | SUBRACK                       |
| LOCATION            | 65535:255:255                 |
| bios                | v1.0.0                        |
| bios_cpld           | 0xbe7a1014_0x202106150954     |
| bios_mcu            | 0xdb000102_0x2021040600125020 |
| bios_uboot          | 2018.03-00005-gda75be7d       |
| bios_krn            | 4.14.98-0002-00003-gffba12ad9 |
| OS                  | Debian GNU/Linux 10           |
| OS_rev              | v0.6.0-12-g0994d5e            |
| CPLD_ip_address     | 10.0.10.86                    |
| CPLD_netmask        | 255.255.255.0                 |
| CPLD_gateway        | 10.0.10.1                     |
| CPLD_ip_address_eep | 10.0.10.86                    |
| CPLD_netmask_eep    | 255.255.255.0                 |
| CPLD_gateway_eep    | 10.0.10.1                     |
| CPLD_MAC            | 04:91:62:b2:28:20             |
| CPU_ip_address      | 10.0.10.80                    |
| CPU_netmask         | 255.255.255.0                 |
| CPU_MAC             | 04:91:62:b2:6c:b8             |


=============== WARNING !!! ===================
Error in netwrok configuration may leads to unreachable board.

Below ip addresses MUST be reserved for board function:
| RESERVED IPs   |            |
|:---------------|:-----------|
| 10.0.10.64     | CPU        |
| 10.0.10.65     | reserved   |
| 10.0.10.66     | reserved   |
| 10.0.10.67     | reserved   |
| 10.0.10.68     | reserved   |
| 10.0.10.69     | reserved   |
| 10.0.10.70     | CPLD       |
| 10.0.10.71     | SLOT-1 TPM |
| 10.0.10.72     | SLOT-2 TPM |
| 10.0.10.73     | SLOT-3 TPM |
| 10.0.10.74     | SLOT-4 TPM |
| 10.0.10.75     | SLOT-5 TPM |
| 10.0.10.76     | SLOT-6 TPM |
| 10.0.10.77     | SLOT-7 TPM |
| 10.0.10.78     | SLOT-8 TPM |
| 10.0.10.79     | reserved   |

|                 | ACTUAL        | NEW         |
|:----------------|:--------------|:------------|
| CPU  ip address | 10.0.10.80    | 10.0.10.64  |
| CPLD ip address | 10.0.10.86    | 10.0.10.70  |
| netmask         | 255.255.255.0 | 255.255.0.0 |
| gateway         | 10.0.10.1     | 10.0.10.254 |
Do you want continue (y/N)
```

Here you can found network configuration applied

```
/etc/network/interfaces

# interfaces(5) file used by ifup(8) and ifdown(8)
# Include files from /etc/network/interfaces.d:
# WARNING!!! This file will be overwritten at boot by hw_init.service
source-directory /etc/network/interfaces.d

auto eth0
allow-hotplug eth0
iface eth0 inet static
    address 10.0.10.80
    netmask 255.255.255.0

/etc/resolv.conf

nameserver 8.8.8.8
nameserver 8.8.4.4

route

Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.10.1       0.0.0.0         UG    0      0        0 eth0
10.0.10.0       0.0.0.0         255.255.255.0   U     0      0        0 eth0
```