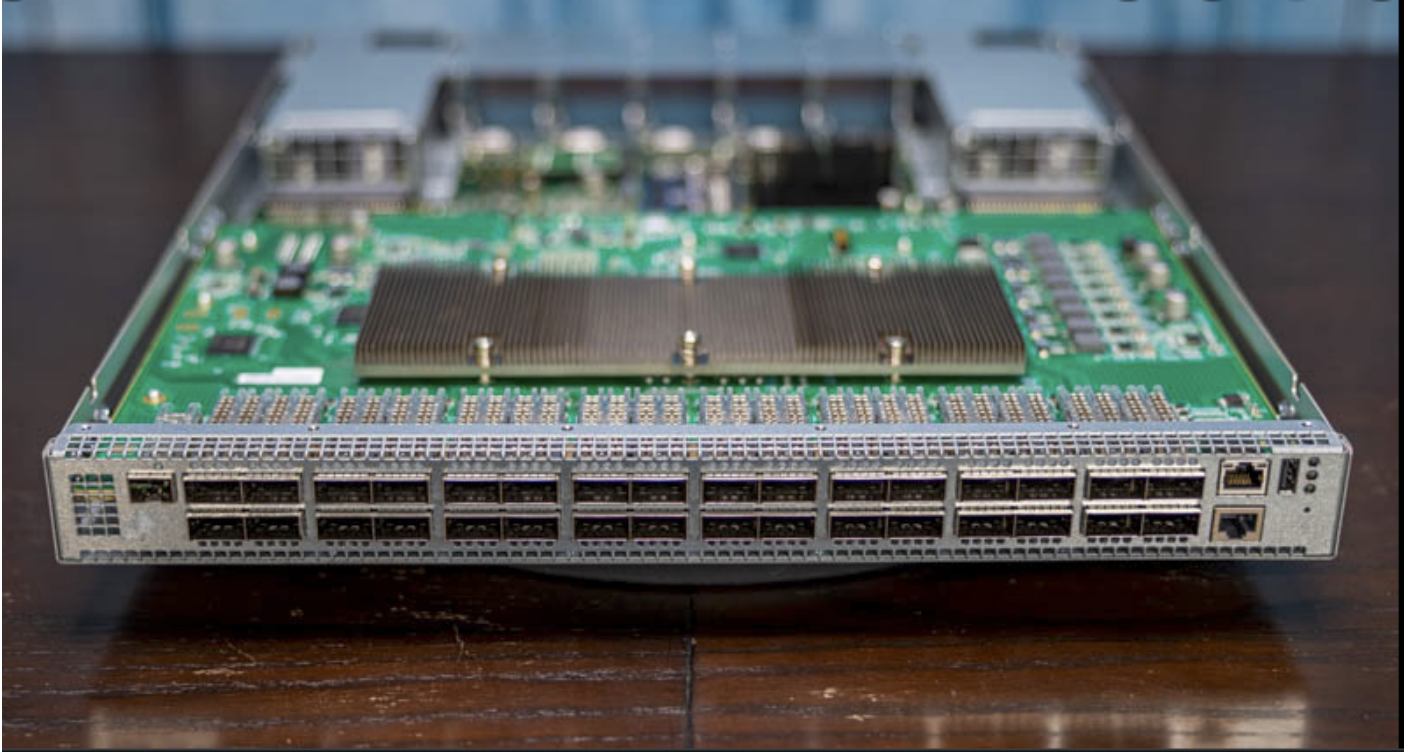# How to install Sonic on Celestica dx010 100g switch

In this document i am going to talk about installation of Sonic Network operating system on celestica dx010 32x100G switches

If you do these steps you'll end up with a l2 switch that can forward 100g per port. Keep in mind that Spanning tree is still an issue on Sonic.

Important : Make sure you check the Sonic HCL, if your model is not there, don't try to do this installation.

Upgrading or re-installing onie

Onie is the Network operating system loader created by open network computing. It is a software to create zero touch provisioning on open compute / Bare metal switches. there are some binaries supplied by open compute platform, and you can compile or cross compile your version of it.

By your version i meant the model of the bare metal switch. before 2016 ONL which is sonic based on, supported powerpc cpu models however with sonic you are stuck with intel and some arm

cpu's, no powerpc cpu is supported or can be compiled.

Compiling onie

To compile onie you need to read this documentation and have many headaches. I can't get in to details here because it will use a lot of space but it is a good documentation and pretty straight-forward to do.

[Onie build documentation](#)

Basically it will create a folder with many permutations of onie for every device out there.

if your device is a Powerpc platform then you'll need to do a cross-compile

installation or upgrading onie using u-boot

After powercycle press any key to stop u-boot process. take backup of current environment using

```
printenv
```

output should look like below, please copy and paste it somwhere safe.

Click for environment details

```
```=> printenv
active=image2
autoload=no
backup=image1
baudrate=115200
bootactive=fsload 1000000 $active; bootm 1000074
bootargs=root=dev/ram console=ttyS0,115200
bootbackup=fsload 1000000 $backup; bootm 1000074
bootcmd=run check_boot_reason; run nos_bootcmd; run onie_bootcmd
bootdelay=3
bootfile=uImage
bootimage1=fsload 1000000 image1; bootm 1000074
bootimage2=fsload 1000000 image2; bootm 1000074
check_boot_reason=if test -n $onie_boot_reason; then setenv onie_bootargs boot_reason=$onie_boot_rea
son; run onie_bootcmd; fi;
consoledev=ttyS0
dboot=setenv bootargs root=/dev/ram mtdparts=physmap-flash.0:126336k(jffs2),4096k(onie),128k(u-boot-
```

env),512k(u-boot) quiet console=ttyS0,$baudrate $dbootfrom && bootimg $dkaddr $draddr $ddaddr

ddaddr=0x0D000000

dhcp_user-class=powerpc-quanta_ly2r-r0_uboot

dhcp_vendor-class-identifier=powerpc-quanta_ly2r-r0

diag_bootcmd=run dsdboot || run flash_bootcmd || run dnetboot

dkaddr=0x0A000000

dmemerase=mw $dkaddr 0 100; mw $draddr 0 100; mw $ddaddr 0 100; setenv dbootfrom

dnetboot=run dmemerase; run dnetcheck; if test -n $dbootfrom && test $dbootfrom = netboot; then run dboot; fi

dnetcheck=echo Checking diag from tftp server...; if tftp $dkaddr uImage && tftp $draddr uInitrd2m && tftp $ddaddr ly2r.dtb; then setenv dbootfrom netboot; fi

draddr=0x0B000000

dsdboot=run dmemerase; run dsdcheck; if test -n $dbootfrom && test $dbootfrom = sdboot; then run dboot; fi

dsdcheck=echo Checking diag from Secure Digital Card...; if mmcinfo && ext2load mmc 0:1 $dkaddr uImage && ext2load mmc 0:1 $draddr uInitrd2m && ext2load mmc 0:1 $ddaddr ly2r.dtb; then setenv dbootfrom sdboot; fi

ethact=eTSEC1

ethaddr=a8:1e:84:58:67:10

flash_bootcmd=setenv bootargs root=/dev/ram mtdparts=physmap-flash.0:58368k(jffs2),3968k(ramdisk),3072k(kernel),128k(dtb),60800k(empty),4096k(onie),128k(u-boot-env),512k(u-boot) console=ttyS0,$baudrate; bootm EBCE0000 EB900000 EBFE0000

hostname=LY2RP2020

hwconfig=usb1:dr_mode=host,phy_type=ulpi,esdhc

ipaddr=192.168.2.1

loadaddr=1000000

loads_echo=1

mtddevnum=0

mtdids=nor0=nor0                                                    [0/0]

mtdparts=nor0:65536k(jffs2),60800k(open),4096k(ONIE),128k(u-boot-env),512k(u-boot)

nfsboot=setenv bootargs root=/dev/nfs rw nfsroot=$serverip:$rootpath ip=$ipaddr:$serverip:$gatewayip:$netmask:$hostname:$netdev:off console=$consoledev,$baudrate $othbootargs;tftp $loadaddr $bootfile;tftp $fdtaddr $fdtfile;bootm $loadaddr - $fdtaddr

nos_bootcmd=run bootactive; run bootbackup; run bootimage1; run bootimage2

onie_args=run onie_initargs onie_platformargs

onie_bootcmd=echo Loading Open Network Install Environment ...; echo Platform: $onie_platform ; echo Version : $onie_version ; cp.b $onie_start $loadaddr ${onie_sz.b} && run onie_args && bootm ${loadaddr}

onie_dropbear_dss_host_key=begin-

base64@600@d#AAAAB3NzaC1kc3MAAACBAOCuKIyK2CzC6aUUNVfJLj6SlJ+anzWWUbuqtyn4#oty/BYzbG7rk
+9exB/I9SOBMf0n8BHGJOdS+hXVFe8CAGf0fI7AlHF0zTZCN#kZAW70T175b4AZC8zCegABBKv86s0s7OT4qO
XLCeYjCM9gMWHRDAYHDfzktY#vBHapERPhIHzAAAAFQDfAxkC7+W/gxwO8BAg9Se08laRBwAAAIEAyjX1GFoX
#oqPyEVn/qQ85xXpo3fr3UNT/NmZZGXQFZ+pUnHDOO6OwTZB0XLpPxzQ8WUVJ#Bt9d2tLC5Sw6rCp7odbp0
Od9uWOc7ljt7HKtQVuodB/yjt9KbQc69sOY25bC#efY2c0IcZ9LiNbQbH4COR6zGMLzA2XgHQ7uJ7xmV1fsAAAC
BAJP+ZxxFAehm#H9Ac5HUHYG4ithFYK7l5MHRrA/pEGuqwUeezUKO9B8soCP9r4SoT/vLzUxQ5#TMwyANyi7B
RjKnkjrRjJ/r6o9t5PS7YuGm/3G6hOL7UHJoDIDFuznL9NG+f4#GhHF6NElGGnpmATry0+5gTN2KDYlZLoMriGaGB
LVAAAAFQCDpjU05iU1Lbci#IvGrJfEo2HQweg==#====#

onie_dropbear_rsa_host_key=begin-
base64@600@r#AAAAB3NzaC1yc2EAAAADAQABAAAAgQC8AVEAfeuMSVYNPJPULsBYL0KrFOOM#62CmnWN
ODmX230TZYW/DDv/NSOMUNFUR109MpzEyy8WmNqqNl+h0X3dK/KUy#H4iZhIxXXYaRu8Yywfaf/xXNnCcQqd
j5JYmNGlaRggcvkbYhnX2Hus7LrkGP#k0xdkl5erOsUGPmnf5RLNQAAAIAqqn3Qh8MiBi6iOGIwICAEo00U+Fufyn
cX#uNYli7z2JrtAPg2YDdpdozHtjubTcrKLadIPfhEv5G4WTigx6Mxwcw1oHUon#LoBzMCEjULMpyReO5xQcyV0W
TLyPncPgqh4wtT7gr2ePkEASwMgcIiXu0tV9#Q81k8UOcMZQz5kc3QQAAAEEA8mO+xK2LBWrmT37yh3c4xbg/
Naj60CPxzRKR#HF0w6FzL8BcCAL009z/YHtlJVpoXo321c8DNazZ47hQEoQpv0QAAAEEAxo/Q#1zXuEwsJUqrOE
5RZ8KdfsQSEw9I+Pl8pDNBV06MTbnQPgjMr9beD6NfSo1po#uZmbPVzaakzOtyduVCqCJQ==#====#
onie_initargs=setenv bootargs quiet console=$consoledev,$baudrate

onie_machine=quanta_ly2r

onie_machine_rev=0

onie_platform=powerpc-quanta_ly2r-r0

onie_platformargs=setenv bootargs $bootargs serial_num=${serial#} eth_addr=$ethaddr $onie_bootargs
$onie_debugargs

onie_rescue=setenv onie_boot_reason rescue && boot

onie_start=0xefb60000

onie_sz.b=0x00400000

onie_uninstall=setenv onie_boot_reason uninstall && boot

onie_update=setenv onie_boot_reason update && boot

onie_vendor_id=7244

onie_version=2015.05-v1.2-9d597eb

partition=nor0,0

platform=quanta_ly2r

ramboot=setenv bootargs root=/dev/ram rw console=$consoledev,$baudrate $othbootargs; tftp
$ramdiskaddr $ramdiskfile;tftp $loadaddr $bootfile;tftp $fdtaddr $fdtfile;bootm $loadaddr $ramdiskaddr
$fdtaddr

rootpath=/opt/nfsroot

serial#=QTFCEA7070054

serverip=192.168.2.11

stderr=serial

stdin=serial

```
stdout=serial

ver=U-Boot 2010.12 (Oct 14 2016 - 16:28:02) - ONIE 2015.05-v1.2-9d597eb


Environment size: 5059/8188 bytes```
```

We are going to change environment as shown and explanied below,

Set ip address to eth0/management port of bare metal switch

```
setenv ipaddr 4.3.2.2
setenv netmask 255.255.255.252
```

Specify tftp server address

```
setenv serverip 4.3.2.1
```

save changes

```
save
```

Make sure have the same subnet with tftp server After this point all the procedure will be destructive, please keep in mind that you might loose the current boot configuration or configurations within device.

specify space in flash

```
setenv start 0xefb60000
setenv sz.b 0x4a0000
```

upload file to ram

```
tftp onie-quanta_ly2r-r0.bin
```

Disable protection on flash and erase the old onie

```
protect off $start +${sz.b} && erase $start +${sz.b}
```

start flashing

```
cp.b $fileaddr $start ${sz.b} && protect on $start +${sz.b}
```

after this point Onie will be upgraded/installed and procedure will reset the device booting into new onie and it's environment

Installing sonic

Before install

Sonic is a buggy software, there are many missing features, and because of that there are many builds for every vendor the list is here

we are going to use 202111 edition on celestica dx010

installation

Onie will boot up and you will be greeted with onie-discovery process, unless you did special dhcp configurations, we will need to stop onie-discovery

```
onie-discover-stop
```

then the ip addressing

```
ip addr add 4.3.2.2/30 dev eth0
ip link set up dev eth0
```

start installing sonic

```
onie-nos-install tftp://4.3.2.1/sonic-buildimage.broadcom
```

at this point onie installer will do its thing after 5-10 minutes you will be greeted with sonics login screen

After install

Default user name: admin default pass : YourPaSsWoRd By default sonic names every 100g interface with steps of 4, Ethernet0,Ethernet4,Ethernet8 and there are aliases for you to see which port are you working on

```
admin@sonic:~$ show interfaces status
Interface       Lanes   Speed   MTU   FEC   Alias   Vlan   Oper   Admin         Type        Asym PFC
-----------  --------------  -------  -----  -----  -------  ------  ------  -------  -------------  ----------
Ethernet0        65     10G   9100   N/A   Eth1/1  routed   down    down  QSFP+ or later      N/A
Ethernet1        66     10G   9100   N/A   Eth1/2  routed   down    down  QSFP+ or later      N/A
Ethernet2        67     10G   9100   N/A   Eth1/3  routed   down    down  QSFP+ or later      N/A
```

Interface	Lanes	Speed	MTU	FEC	Alias	Mode	Oper	Admin	Type	Asym PFC
Ethernet3	68	10G	9100	N/A	Eth1/4	routed	down	down	QSFP+ or later	N/A
Ethernet4	69	10G	9100	N/A	Eth2/1	routed	down	down	QSFP+ or later	N/A
Ethernet5	70	10G	9100	N/A	Eth2/2	routed	down	down	QSFP+ or later	N/A
Ethernet6	71	10G	9100	N/A	Eth2/3	routed	down	down	QSFP+ or later	N/A
Ethernet7	72	10G	9100	N/A	Eth2/4	routed	down	down	QSFP+ or later	N/A
Ethernet8	73,74,75,76	100G	9100	N/A	Eth3	routed	down	up	N/A	N/A
Ethernet12	77,78,79,80	100G	9100	N/A	Eth4	routed	down	up	N/A	N/A
Ethernet16	33,34,35,36	100G	9100	N/A	Eth5	routed	down	up	N/A	N/A
Ethernet20	37,38,39,40	100G	9100	N/A	Eth6	routed	down	up	N/A	N/A
Ethernet24	41,42,43,44	100G	9100	N/A	Eth7	routed	down	up	N/A	N/A
Ethernet28	45,46,47,48	100G	9100	N/A	Eth8	routed	down	up	N/A	N/A
Ethernet32	49,50,51,52	100G	9100	N/A	Eth9	routed	down	up	N/A	N/A
Ethernet36	53,54,55,56	100G	9100	N/A	Eth10	routed	down	up	N/A	N/A
Ethernet40	57,58,59,60	100G	9100	N/A	Eth11	routed	down	up	N/A	N/A
Ethernet44	61,62,63,64	100G	9100	N/A	Eth12	routed	down	up	N/A	N/A
Ethernet48	81,82,83,84	100G	9100	N/A	Eth13	routed	down	up	N/A	N/A
Ethernet52	85,86,87,88	100G	9100	N/A	Eth14	routed	down	up	N/A	N/A
Ethernet56	89,90,91,92	100G	9100	N/A	Eth15	routed	down	up	N/A	N/A
Ethernet60	93,94,95,96	100G	9100	N/A	Eth16	routed	down	up	N/A	N/A
Ethernet64	97,98,99,100	100G	9100	N/A	Eth17	routed	down	up	N/A	N/A
Ethernet68	101,102,103,104	100G	9100	N/A	Eth18	routed	down	up	N/A	N/A
Ethernet72	105,106,107,108	100G	9100	N/A	Eth19	routed	down	up	N/A	N/A
Ethernet76	109,110,111,112	100G	9100	N/A	Eth20	routed	down	up	N/A	N/A
Ethernet80	1,2,3,4	100G	9100	N/A	Eth21	routed	down	up	N/A	N/A
Ethernet84	5,6,7,8	100G	9100	N/A	Eth22	routed	down	up	N/A	N/A
Ethernet88	9,10,11,12	100G	9100	N/A	Eth23	routed	down	up	N/A	N/A
Ethernet92	13,14,15,16	100G	9100	N/A	Eth24	routed	down	up	N/A	N/A
Ethernet96	17	25G	9100	N/A	Eth25/1	routed	down	down	QSFP+ or later	N/A
Ethernet97	18	25G	9100	N/A	Eth25/2	routed	down	down	QSFP+ or later	N/A
Ethernet98	19	25G	9100	N/A	Eth25/3	routed	down	down	QSFP+ or later	N/A
Ethernet99	20	25G	9100	N/A	Eth25/4	routed	down	down	QSFP+ or later	N/A
Ethernet100	21,22,23,24	100G	9100	N/A	Eth26	routed	down	up	N/A	N/A
Ethernet104	25,26,27,28	100G	9100	N/A	Eth27	routed	down	up	N/A	N/A
Ethernet108	29,30,31,32	40G	9100	N/A	Eth28	routed	down	up	QSFP+ or later	N/A
Ethernet112	113,114,115,116	100G	9100	N/A	Eth29	routed	down	up	N/A	N/A
Ethernet116	117,118,119,120	40G	9100	N/A	Eth30	routed	down	up	QSFP+ or later	N/A
Ethernet120	121,122,123,124	100G	9100	N/A	Eth31	routed	down	up	N/A	N/A
Ethernet124	125,126,127,128	100G	9100	N/A	Eth32	routed	down	up	N/A	N/A

Sonic has some problems, it's not the news, it's a fact. One of them is this installation media doesn't create a running environment, to do that follow the steps below

```
sudo sonic-cfggen --preset l2 -p -H -k Seastone-DX010 -w

sudo config reload -y

sudo reboot
```

Clear the IP addresses from each interface

```
show runningconfiguration interfaces | grep \| | awk -F'"' '{ print $2 }' | awk -F'|' '{ print "sudo config interface ip remove "$1" "$2 }' > /var/tmp/remove-l3-ips

bash /var/tmp/remove-l3-ips

rm -f /var/tmp/remove-l3-ips
```

Configure sonic

Layer1

Every port and platform or asic has different abilities or features, for example you can breakout every port on a celestica dx010 how ever an edge-core AS9716-32D will only do breakouts on Ethernet0-20 which is the top row of switch. I was able to work with 3rdparty qsfp modules on sonic however i couldn't find an HCL about qsfps .

Breakouts

You neeed to do everything written on *after install* to be able to do breakouts. Supported breakouts are ;

- 1x100G[100g]
- 1x100G[40g]
- 2x50G[50G]
- 4x25G[25G]
- 4x25G[10G]

to break out 1 port to 4 10g ports

```
sudo config interface breakout Ethernet96 4x25G[10G] -y
```

a normal output should look like below, after this you will need to reboot the switch.

```
admin@sonic:~$ sudo config interface breakout Ethernet96 4x25G[10G] -y


Running Breakout Mode : 1x100G[40G]
Target Breakout Mode : 4x25G[10G]


Ports to be deleted :
 {
    "Ethernet96": "100000"
 }
Ports to be added :
 {
    "Ethernet96": "25000",
    "Ethernet97": "25000",
    "Ethernet98": "25000",
    "Ethernet99": "25000"
 }


After running Logic to limit the impact


Final list of ports to be deleted :
 {
    "Ethernet96": "100000"
 }
Final list of ports to be added :
 {
    "Ethernet96": "25000",
    "Ethernet97": "25000",
    "Ethernet98": "25000",
    "Ethernet99": "25000"
 }
sonic_yang(6):Note: Below table(s) have no YANG models: SNMP, SNMP_COMMUNITY
Below Config can not be verified, It may cause harm to the system
 {}
Do you wish to Continue? [y/N]: y
Breakout process got successfully completed.
Please note loaded setting will be lost after system reboot. To preserve setting, run `config save`.
```

Dont forget to save :)

```
admin@sonic:~$ sudo config save
Existing files will be overwritten, continue? [y/N]: y
Running command: /usr/local/bin/sonic-cfggen -d --print-data > /etc/sonic/config_db.json
```

You **will reboot** the switch so it can show newly emerged ports.

After reboot you will have Ethernet 96 to 99, set the speeed to 10g on those interfaces

```
config interface speed Ethernet96 10000
```

And start the port,

```
config interface startup Ethernet96
```

Do this for every port you broke and want to work immediately

Layer2

Creating Vlans

here

```
sudo config vlan add 1000 
```

vlans and membership

to see the details

```
show vlan brief
```

tagging, untagged ports

- tagged

```
sudo config vlan member add 1000 Ethernet48
```

- untagged

```
sudo config vlan member add -u 1000 Ethernet48
```

You can use the following commands to edit ports in bulk

```
seq 36 39|xargs -i -t sudo config interface speed Ethernet{} 10000

seq 36 39|xargs -i -t sudo config interface startup Ethernet{}

seq 36 39|xargs -i -t sudo config vlan member add -u 1000 Ethernet{}
```

Layer3

intervlan routing

to add an ip or svi to vlan 1 use the command below

```
admin@sonic:~$ sudo config interface ip add Vlan1000 192.168.1.2/24
```

routed interfaces

as in svi configuration but this time use the port name

```
sudo config interface ip add Ethernet4 192.168.1.2/24
```

Revision #3
Created 9 November 2022 11:52:57 by Mesut Bayrak
Updated 5 December 2022 05:37:00 by Mesut Bayrak