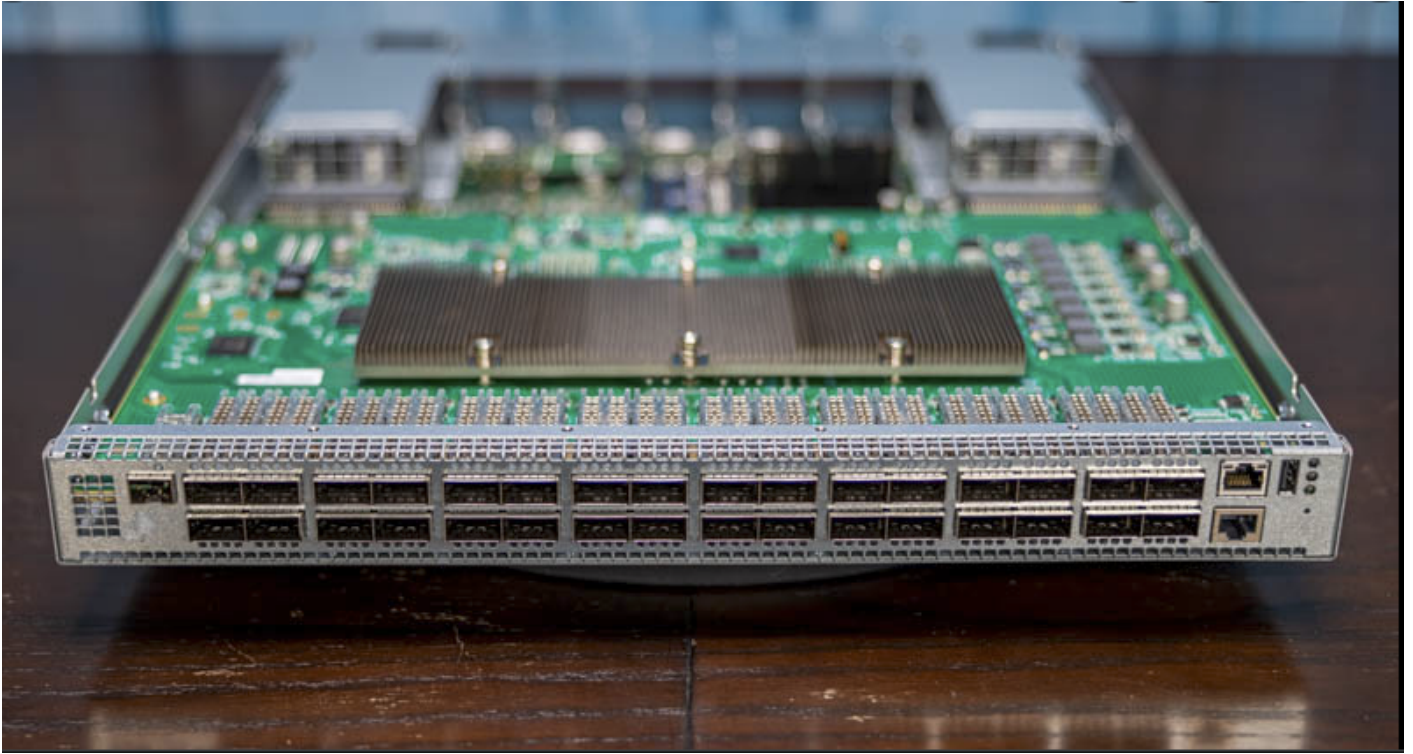


Open networking

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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 I2 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 straightforward 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 somewhere 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
$dddaddr
```

```
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 dbo
ot; 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 $ddaddr ly2r.dtb; then setenv
dbootfrom
sdboot; fi
ethact=eTSEC1
ethaddr=a8:1e:84:58:67:10
flash_bootcmd=setenv bootargs root=/dev/ram mtdparts=physmap-
flash.0:58368k(jffs2),3968k(ramdisk),30
72k(kernel),128k(dtb),60800k(empty),4096k(onie),128k(u-boot-env),512k(u-boot)
console=ttyS0,$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 ${loadaddr}
onie_dropbear_dss_host_key=begin-
base64@600@d#AAAAB3NzaC1kc3MAAACBA0CuKIyK2CzC6aUUNVfJLj6SlJ+anzWWUbuqtn4#oty/BYzbG7rk+9ex
B/I9S0BMf0n8BHGJ0dS+hXVFe8CAGf0fI7AlHF0zTZCN#kZAW70T175b4AZC8zCegABBKv86s0s70T4q0XLCeYjCM9
gMWRDAYHDfzktY#vBHapERPhIHzaAAAFQDfAxkC7+W/gxw08BAg9Se08laRBwAAAIeAyjX1GFoX#oqPyEVn/qQ85x
Xpo3fr3UNT/NmZGZXFZ+pUnHD0060wTZB0XLpPxzQ8WUVJ#Bt9d2tLC5Sw6rCp7odbp00d9uW0c7ljt7HKtQVuoDB
/yjt9KbQc69s0Y25bC#efY2c0IcZ9LiNbQbH4C0R6zGMLzA2XgHQ7uJ7xmV1fsAAACBAJP+ZxxFAehm#H9Ac5HUHYG
4ithFYK7l5MHRrA/pEGuqwUeezUK09B8soCP9r4SoT/vLzUxQ5#TMwyANYi7BRjKnkj rRjJ/r6o9t5PS7YuGm/3G6h
0L7UHJoDIDFuznL9NG+f4#GhHF6NElGGnPMATry0+5gTN2KDYLZLoMriGaGBLVAAAAFQCDpjU05iU1Lbci#IvGrJfE
o2HQweg==#====#
onie_dropbear_rsa_host_key=begin-
base64@600@r#AAAAB3NzaC1yc2EAAAADAQABAAQgQC8AVEAfeuMSVYNPJPULsBYL0KrF00M#62CmnWN0DmX230TZ
YW/DDv/NSOMUNFUR109MpzEyy8WmNqqNl+h0X3dK/KUy#H4iZhIXXXYaRu8Yywfaf/xXNnCcQqdj5JYmNGlaRggcvk
bYhnX2Hus7LrkGP#k0xdkl5er0sUGPmnf5RLNQAIAAq3Qh8MiBi6i0GIwICAEo00U+FufyncX#uNYli7z2JrtAP
g2YDdpdozHtjubTcrKLadIPfhEv5G4WTigx6Mxwcl0HUon#LoBzMCEjULMpyRe05xQcyV0WTLyPncPgqh4wtT7gr2
ePkEASwMgcIiXu0tV9#Q81k8U0cMZQz5kc3QQAEEA8m0+xK2LBWrmT37yh3c4xbg/Naj60CPxzRKR#HF0w6FzL8B
cCAL009z/YHtIJVpoXo321c8DNazZ47hQEoQpv0QAAEEAxo/Q#1zXuEwsJUqr0E5RZ8KdfsQSEw9I+Pl8pDNBv06M
TbnQPgjMr9beD6NfSolpo#uZmbPVzaakz0tyduVCqCJQ==#====#
onie_initargs=setenv bootargs quiet console=$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 explained 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								
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 need 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 speed 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
```

Installing Onie installer

To install onie install on celestica d2030 switches you'll need to upload a binary file using u-boot, you can find the steps below

After rebooting the device you have to press ctrl+c continuously to stop u-boot autoboot process. Then you will be greeted with the command line interface as shown below.

```
=>
```

After you see this sign you can configure u-boot to retrieve and start onie-install through tftp. In celestica d2030 models you will need compile the machine-code before doing it.

It took too many time and precious knowledge from a friend i am uploading it here so no one needs to rebuilt it again.

```
setenv start 0xefb60000
setenv sz.b 0x4a0000
setenv ipaddr 192.168.5.101
setenv serverip 192.168.5.5
setenv netmask 255.255.255.0
setenv ethaddr 00:e0:ec:3e:8a:ca
tftp onie-cel_d2030-r0.bin
protect off $start +${sz.b} && erase $start +${sz.b}
cp.b $fileaddr $start ${sz.b} && protect on $start +${sz.b}

saveenv
```