FUJITSU

Configuration guide
DynamicLoM LAN configuration

Server systems with DynamicLoM offer a large number of network connection options which can be configured in different ways. This guide describes the configuration methods from a technical viewpoint.

Introduction

The configuration and initial operation of modern server systems takes place in various phases and is carried out via various user interfaces, for example for RAID, network and operating systems. Before the system can be used productively, it must be cabled accordingly and all the local and central network parameters must be completely configured.

Modern systems use increasingly powerful LAN chips. They offer an increasing number of functions which can be mapped by the chips and which thus relieve the main processor (CPU) workload.
Fujitsu PRIMERGY servers with DynamicLoM also offer a large number of functions, which can be provided via the LAN chip in hardware. The following describes the features and their optimal configuration.

DynamicLoM controller

PRIMERGY RX2530 M1, RX2540 M1, RX2560 M1 and TX2560 M1 are equipped with a dynamic onboard LAN controller (DynamicLoM).
One of the advantages is that the LAN controller can be equipped with different port modules and various connection options can be implemented.

The modules can be freely selected when ordering the system and replaced by others as required during the system lifecycle. The actual connection components such as ports and their signals are no longer soldered directly onto the server system mainboard but onto a board which is attached via plug-in connection (figure 1).

The plug-in connection (blue) between the mainboard and the port module is fixed via 3 screws (yellow) thus ensuring a secure contact to the Emulex XE100 series chip (red) soldered onto the mainboard.
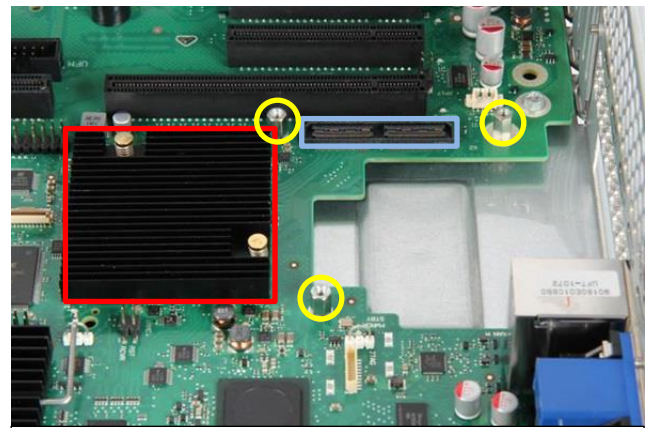

Figure 1: LoM (red outline) and plug-in connection (blue outline)

DynamicLoM Module

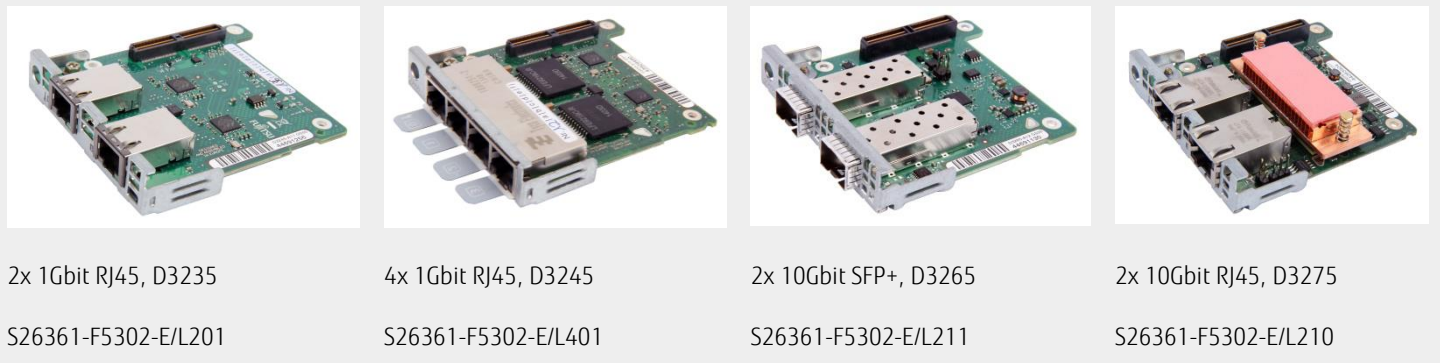| 2x 1Gbit RJ45, D3235	4x 1Gbit RJ45, D3245	2x 10Gbit SFP+, D3265	2x 10Gbit RJ45, D3275
S26361-F5302-E/L201	S26361-F5302-E/L401	S26361-F5302-E/L211	S26361-F5302-E/L210

Figure 2: Overview of available modules

The port configurations with 2 and 4 port Gigabit LAN do not have all the functions of the LAN chip. The setting options for the hardware and the operating system are thus reduced. The full range of functions with many options and various operating modes is available with the 10 Gbit/s SPF+ and 10 Gbit/s RJ45 modules.

The following description (figure 3) shows the different modes and configuration options for the 10Gbit/s adapters. Depending on the mode the representation of the network cards in the operating system and the associated configuration options changes.

The following white paper has more information about DynamicLoM:
https://partners.ts.fujitsu.com/sites/dmsp/Publications/other/wp-py-DynamicLOM.pdf

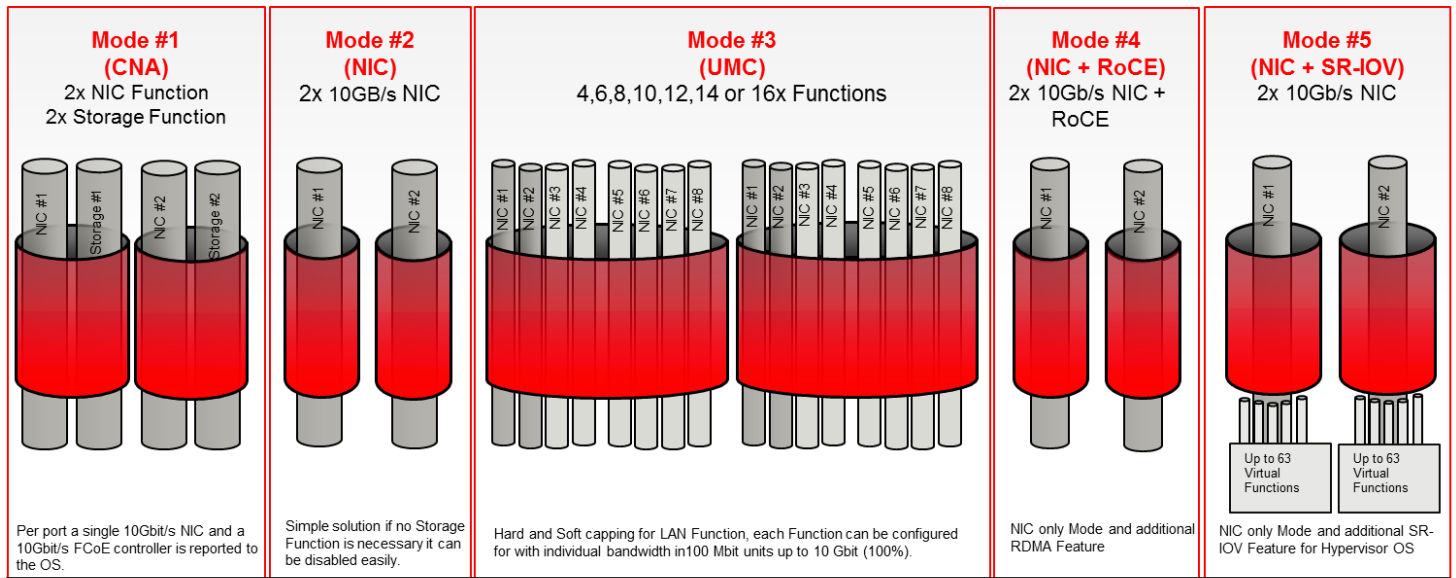The 10 Gbit/s modules can be operated in the following modes.

Figure 3: Operating modes of the DynamicLoM adapters with the 10Gbit/s connection module (SFP+ or RJ45)

Mode #1: The network controller is operated in the CNA mode (Converged Network Adapter). A 10Gbit/s LAN interface and a 10Gbit/s FCoE/iSCSI HBA (Host Bus Adapter) is reported to the operating system per port; they share the bandwidth of the physical 10Gbit/s port. The operating system has a total 2x 10Gbit/s LAN and 2x 10Gbit/s FCoE/iSCSI.

Mode #2: The chip is used as a pure 10Gbit/s LAN card. 2x 10Gbit/s are thus available in the operating system.
Mode #2 is the standard configuration of the DynamicLoM Adapter supplied with the system from production.

Mode #3: The Universal MultiChannel (UMC) mode is used to split a physical 10Gbit/s LAN port into a maximum of 8 physical functions (PF). The minimum and maximum bandwidth which the PF should have can thus be defined in 100Mbit/s steps per PF.
The 2nd PF (storage function) on each physical port can also be assigned with FCoE or iSCSI and thus offers in sum an extended CNA mode. At least two functions per port must be used in UMC mode.
In order to use 16 network functions per adapter, the operating system must support ARI (Alternative Routing ID Interpretation). All versions as of Windows Server 2012 R2, RHEL 6.4, SLES 11 SP2 and VMware ESXi 5.1 offer this support native.

The following white paper has more information about the UMC mode:
http://docs.ts.fujitsu.com/dl.aspx?id=3a3f5062-7e21-477e-a31a-328053a0570f

Mode #4: The network card is used as a pure 10Gbit/s LAN card and acts in exactly the same way for the operating system as in mode #2 but with the extended function that RDMA (Remote Direct Memory Access) over Converged Ethernet (RoCE) can be used. This function provides - especially for file servers based on modern operating systems (e.g. Windows Server 2012 R2) - better performance when transferring data to and from the server system.
In addition to acceleration via RDMA the network traffic can also be given priority by using Converged Ethernet. The network traffic from switch can be transported via a preferred VLAN and the package loss and subsequently required renewed transfers can be excluded (time loss).

Mode #5: The Single Root IO virtualization (SR-IOV) function means that virtual machines (VMs) can use the network hardware functions via the Hypervisor. This reduces the processor workload which does not need to emulate virtual network cards. The VM can directly communicate with the LAN chip of the server and thus operate its own virtual network card.
Each physical port permits up to 63 such communication channels and thus enables 126 VMs to have direct communication via the LAN chip of the physical server system.

PCIe add-on card PCNA EP OCe14102

In addition to the DynamicLoM adapters, PCIe adapter cards are also available for the PRIMERGY servers.
The above functions and operating modes are also possible with the Fujitsu PCNA EP OCe14102 2x 10Gbit/s PCI Express Adapter.
This PCIe adapter card offers connection options for 2x 10Gbit/s SPF+ modules or Twinax cable and is based on the same chip as the DynamicLoM implementation. The Fujitsu PCNA EP OCe14102 2x 10Gbit/s PCI Express Adapter card is supplied per default as CNA (mode #1).

Fujitsu PRIMERGY Blade Server

BX25x0 M1

The PRIMERGY BX Blade Servers of the M1 generation also have the OCe14102 10Gbit/s CNA chip onboard and also support the same functions such as the above rack and tower servers and the specified PCIe adapter card.

BX9x0 S3/S4

The PRIMERGY BX Blade Servers S3 and S4 generation also already have a 10Gbit/s CNA onboard. This is based on the predecessor chip and its range of functions differs only slightly from OCe14102 DynamicLoM implementation.

The controller also supports the modes #1, #2, #3 and #5 described above. However, in the UMC mode (#3) only a maximum of 4 physical functions per 10Gbit/s port are available – see figure 6.

Figure 6: BX LOM with max. 4 functions

### Configuration with the Emulex™ OneCommand Manager

The Emulex OneCommand Manager software under Linux and Windows operating systems is ready for the configuration of the network adapters.
The controller can thus be set in the various modes and the functions of the corresponding mode can be configured (bandwidths, VLANs etc.).

The following screenshots have been taken from the graphic user interface (GUI) of the Emulex OneCommand Manager (OCM) and using the example PRIMERGY RX2540 M1 with 10Gbit/s SFP+ module as well as a Fujitsu PCNA EP OCe14102 2x 10Gbit/s PCI Express Adapter.
The GUI looks the same with other PRIMERGY systems and is configured in the same way.
The Emulex OneCommand Manager (OCM) V10.2.05.29 for Windows was used and is also automatically installed when installing the ServerView Installation Manager.
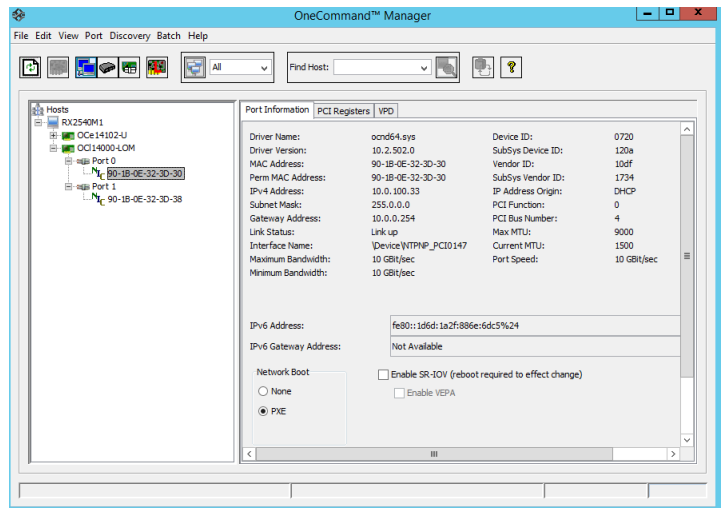
Should the software not be installed, the current version can be downloaded from http://support.ts.fujitsu.com under "Emulex OneCommand Manager for Windows/Linux". The manual for the OneCommand Manager: http://manuals.ts.fujitsu.com/file/10196/ocm-app-ug-en.pdf

Note: A reboot is necessary to change the adapter mode

The various modes are configured in the OCM. The software refers to the modes as "Personality".
The following modes are available:

	Personality	Further parameters	SR-IOV
Single personality (all ports)	NIC	NIC (PID 16)	Can be activated as option
		NIC – ETS Disabled (PID 24)	Is automatically activated
	FCoE		Can be activated as option
	iSCSI		Can be activated as option
	NIC+RoCE	ROCE-1 (PID 20)	Cannot be used
		ROCE-2 (PID 21)	Cannot be used
UMC	Variable		Cannot be used

ETS (Enhanced Transmission Selection) is a protocol responsible for bandwidth management and can assign a priority for specific network traffic. Up to 8 (sometimes 15) groups can be created in the switch and various parameters are defined according to which specific traffic can be prioritized. Expressed simply, ETS is an extension of the Quality of Service (QoS) principle.
ETS can be used with configurations with the Personality NIC, FCoE or iSCSI but it must not be used indeed. It can be explicitly switched off (ETS Disabled).

PID is the profile ID which is required for the configuration via the CLI tool. The ID is not visible in the graphic application but is seen as text.

Adapter configuration with OCM

The controllers installed in the system are shown in a tree structure on the left-hand side in the OCM Manager. The individual physical ports can be seen under each controller and underneath their functions. The example on the right has the adapter configured on mode #2 – 2x 10Gbit/s LAN.
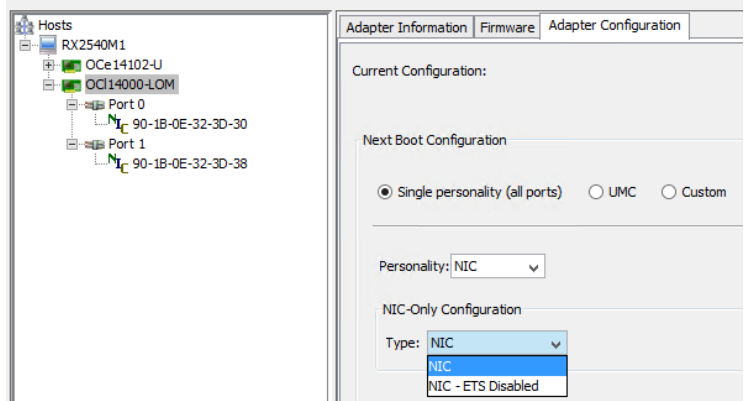
For the tab adapter configuration the **single personality (all ports)** must be set at **NIC**.
Type **NIC** or **NIC ETS Disabled** can be selected.
In order to accept the change, a system reboot is usually required having changed the configuration.

Personality **NIC** with type **NIC** is the standard configuration with DynamicLoM systems. The adapter acts as a pure LAN adapter. And with PCIe CNA plug-in cards standard configuration is Personality **FCoE**

For mode#1 with FCoE, FCoE must be selected with **Single personality (all ports); ISCSI** for iSCSI accordingly.
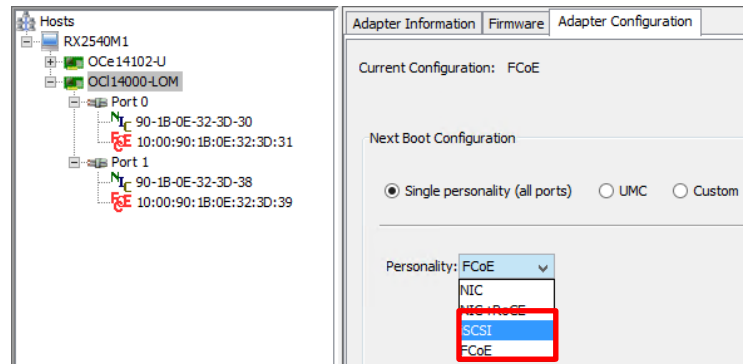
Mode #4 can be obtained by selecting **NIC+RoCE** in the **Single personality (all ports)** section.

Two RoCE types exist which can be selected.
ROCE-1 is intended for Linux operating systems.
ROCE-2 is intended for Windows environments.
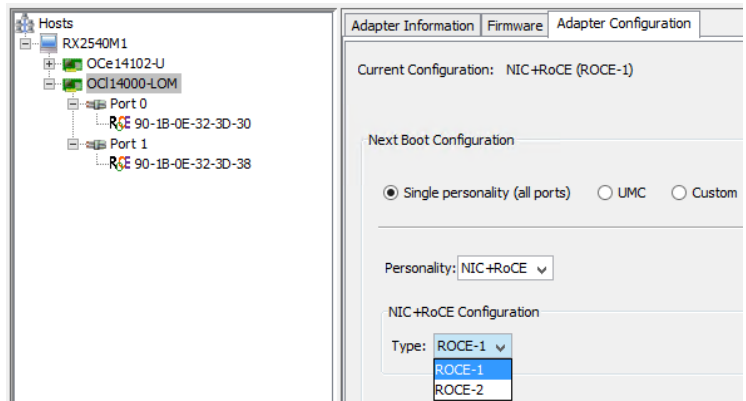
SR-IOV and VEPA

SR-IOV (Single Route I/O virtualization) can be activated in Port Information and for FCoE, iSCSI or NIC configurations per physical port.

The hypervisor can grant the VMs direct access to the associated LAN port via SR-IOV. This function relieves the main processor as no additional LAN port must be emulated in this situation.

Virtual Ethernet Port Aggregator (**VEPA**) can also be activated if **SR-IOV** has been configured.

VEPA (IEEE Standard 802.1Q (bg)) sends SR-IOV function traffic directly to the connected switch and thus prevents a communication of VMs which use the SR-IOV within the system.
If communication is required, hairpinning or reflective-relay must be activated on the external switch port.
If VEPA is deactivated, the LAN adapter acts with SR-IOV for SR-IOV data traffic like a system-internal switch (i.e. VEB, Virtual Edge Bridging).
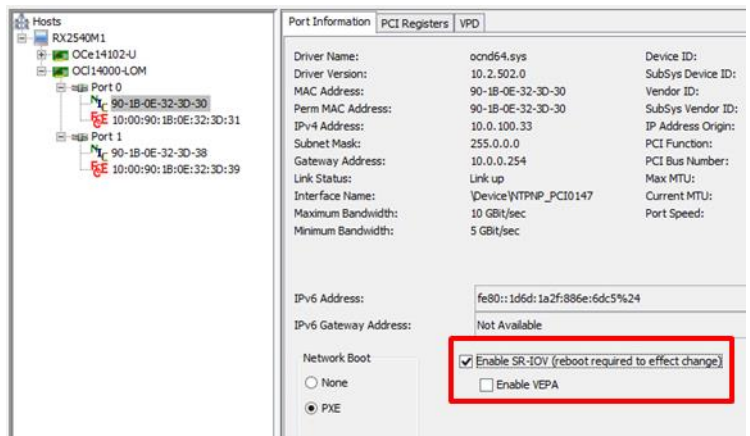
Universal Multi Channel (UMC) configuration

The original UMC mode was introduced with the PRIMERGY BX Blade Server S3 generation and could abstract up to 4 functions per physical port.
Up to 8 functions per physical port are possible with the introduction of DynamicLoM in some PRIMERGY RX and TX systems and the update of the PRIMERGY BX Blade Server M1 generation thanks to the installed new LAN chip.
The normal LAN functions (NIC) are separated via so-called "Logical Port VLAN IDs" (LPVID). Both the physical 10 Gbit/s port as well as the switch to which the port is connected must be configured accordingly.

A storage function (FCoE or iSCSI) can also be configured per port for which no LPVID must be configured.
This storage function may only be configured on the respective second port function.
FCoE requires an FCoE capable switch. This tells the adapter the correct VLAN via the FIP protocol.
If iSCSI is defined as storage function, the VLAN ID and the network settings of the initiator can be configured for this function.

Each function is configured with its minimum and maximum bandwidth. The minimum bandwidth guarantees the network adapter the defined percentage share of 10 Gbit, whereby the maximum permitted percentage share is restricted with the maximum bandwidth.
Should one of maximum 8 functions not require its full bandwidth, another function can use this part until the maximum specified bandwidth has been reached.

Please note that the network function in the operating system is shown with the speed of the maximum bandwidth.
If all 16 functions are thus configured with 100% maximum bandwidth, the operating system has a total bandwidth of 160 Gbit. Please note that some operating systems with a large number of 10Gbit adapters reach their limits. Furthermore, restrictions can occur when monitoring the network load.

If UMC mode is configured, you can select first of all how many functions are required and which ones. They can be added or removed as required.
The minimum bandwidth must total 100% and must be spread across the number of ports accordingly.
The maximum bandwidth can then be entered depending on the requirement.
The LPVID must differ per function, but can differ per physical port.

Configuration of remote hosts

Server settings can also be made via a remote connection with OCM.
A Windows or Linux system can access ESXi remote especially in the VMware environment where administration with OCM on the ESXi itself is not possible. ESXi servers with a graphic application can thus be managed.
The communication between OCM and ESXi server is via the Emulex CIM Provider which is contained in the Fujitsu VMware ESXi Custom Image. Port 5988 (http) or 5989 (https) is used.
Windows or Linux systems can also be managed from a central system. Communication is via port 23333 as default.
OCM can be operated in various management modes. These specify whether accesses from other systems are possible or not.
If other systems are to be able to access a host, OCM must at least be configured in Local Management Plus mode.
This can be defined during the installation. Management Mode can also be later modified via **File** – **Management Mode**.

Other hosts can only be accessed via the OCM Full Management Mode.

The integration of hosts is via **Discovery** – **TCP/IP** – **Add Hosts…**
The host name or IP address can be directly specified for Windows hosts.
The corresponding log-in data for the ESXi server can be entered for VMware ESXi servers.

The hosts are then shown in the left-hand column under the local system. A configuration is then possible in the same way as for a local network adapter.
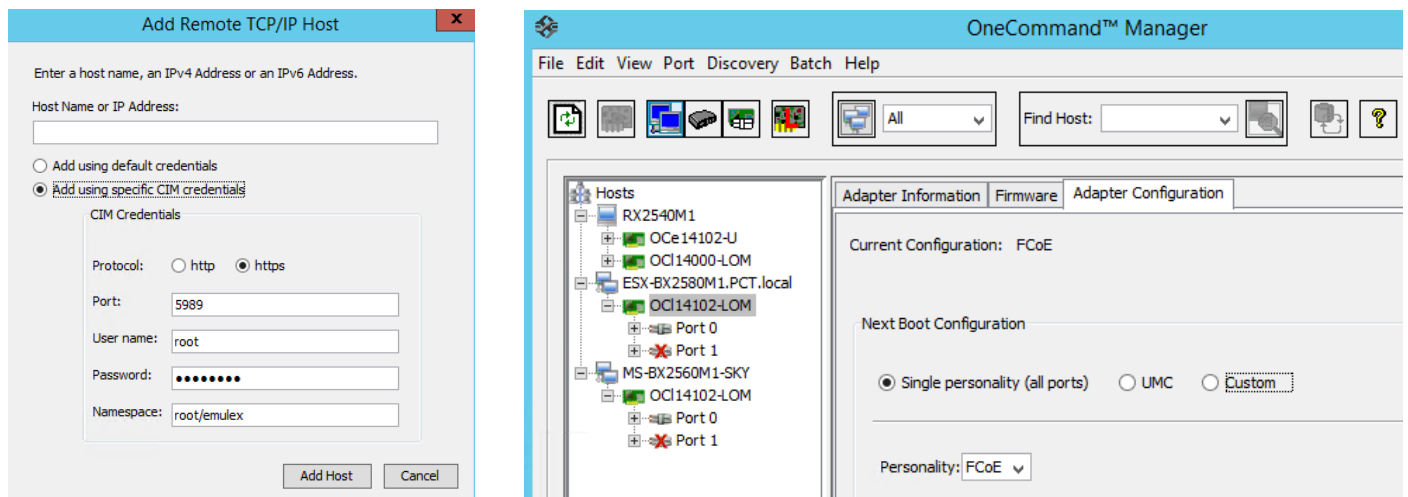
User-specific access authorization is also possible. The OCM must be configured according to the OCM manual or the OCM help for the **OneCommand Manager Secure Management Configuration**.
Link to manual: http://www-dl.emulex.com/support/elx/rt10.2.6/ga/Docs/final/apps/ocm_gui_manual_elx.pdf

Configuration via the command line with HBACmd

A tool is available for the command line interface for the DynamicLoM network adapters of the PRIMERGY RX/TX and BX servers - in addition to the above graphic application; it is included in the Emulex software package.

During the installation the HBACmd tool is stored in the directory of the OneCommand Manager.
Default: *C:\Program Files\Emulex\Util\OCManager\HBACmd.exe*
Usually under */sbin/* or */usr/sbin/* depending on the Linux distribution.

The mode of the DynamicLoM adapter can thus be set and configured. Emulex provides a manual with more information about this tool. It can be directly downloaded from Fujitsu. http://manuals.ts.fujitsu.com/file/11962/ocm-cli-ug-en.pdf

Here is a summary of the main commands. The Appendix has more details about the commands.

Adapter information

HbaCmd listhbas

This shows the network and Fibre Channel adapters installed in the system. Each function is individually listed.
The MAC address is required for the further commands. Please make sure that the respective correct MAC address is used for port-specific actions. The output of port number and PCI function together with the following table is used to see which physical port is configured.

Physical port	PCI function	Function type	MAC sequence
0	0	NIC	MAC +0
	2	NIC or Storage	MAC +1
	4	NIC	MAC +2
	6	NIC	MAC +3
	8	NIC	MAC +4
	10	NIC	MAC +5
	12	NIC	MAC +6
	14	NIC	MAC +7
1	1	NIC	MAC +8
	3	NIC or Storage	MAC +9
	5	NIC	MAC +A
	7	NIC	MAC +B
	9	NIC	MAC +C
	11	NIC	MAC +D
	13	NIC	MAC +E
	15	NIC	MAC +F

HbaCmd getadapterportconfig <MAC>

Shows the current configuration of the physical port and the one that is active after a reboot.

HbaCmd CMGetParams <MAC>

Shows, along with UMC functions of the physical port, a maximum 8 features, such as MAC addresses, minimum and maximal bandwidth as well as VLAN IDs (LPVIDs). A MAC address must be selected on each physical port in order to have information about the two physical ports

HbaCmd listprofiles <MAC>

A profile ID must be specified for configurations of 2x 10Gbit NIC or 2x 10Gbit NIC +RoCE. The command listprofiles lists the IDs of the profiles.

2x 10Gbit NIC configuration		2x 10Gbit NIC + RoCE configuration	
PID=16	NIC	PID=20	ROCE-1
PID=24	NIC - ETS Disabled	PID=21	ROCE-2

Adapter configuration

HbaCmd setadapterportconfig <MAC>

Mode and the configuration of the adapter functions are then defined.
The following parameters are transferred:

p0 and p1 are the physical ports. The individual functions are specified in sequence.
Mctype=none or **mctype=umc** defines whether it is a Single Personality or a UMC configuration.
Pid=XX is the profile ID which is listed with **HbaCmd listprofiles <MAC>**. The PID specifies additional parameter for certain configurations (see table on previous page).

Single personality configuration	Command
2x 10Gbit NIC (mode#2)	HbaCmd setadapterportconfig <MAC> p0=**NIC** p1=**NIC** mctype=none pid=**16**
2x 10Gbit NIC ETS Disabled (mode#2)	HbaCmd setadapterportconfig <MAC> p0=**NIC** p1=**NIC** mctype=none pid=**24**
2x 10Gbit CNA – FCoE (mode#1)	HbaCmd setadapterportconfig <MAC> p0=**NIC,fcoe** p1=**NIC,fcoe** mctype=none
2x 10Gbit CNA – iSCSI (mode#1)	HbaCmd setadapterportconfig <MAC> p0=**NIC,iscsi** p1=**NIC,iscsi** mctype=none
2x 10Gbit NIC+RoCE – RoCE1 (mode#4)	HbaCmd setadapterportconfig <MAC> p0=**NIC+Roce** p1=**NIC+Roce** mctype=none pid=**20**
2x 10Gbit NIC+RoCE – RoCE2 (mode#4)	HbaCmd setadapterportconfig <MAC> p0=**NIC+Roce** p1=**NIC+Roce** mctype=none pid=**21**

These Single Personality configurations can be extended to include SR-IOV and VEPA; the following commands must be used:

HbaCmd SRIOVenable <MAC> 1
HbaCmd VEPAenable <MAC> 1

UMC configuration	Per phy. Port	Command
8x NIC	4x NIC	HbaCmd setadapterportconfig <MAC> p0=**nic,nic,nic,nic** p1=**nic,nic,nic,nic** mctype=**umc**
6x NIC + 2x FCoE	3x NIC + 1x FCoE	HbaCmd setadapterportconfig <MAC> p0=**nic,fcoe,nic,nic** p1=**nic,fcoe,nic,nic** mctype=**umc**
6x NIC + 2x iSCSI	3x NIC + 1x iSCSI	HbaCmd setadapterportconfig <MAC> p0=**nic,iscsi,nic,nic** p1=**nic,iscsi,nic,nic** mctype=**umc**
16x NIC	8x NIC	HbaCmd setadapterportconfig <MAC> p0=**nic,nic,nic,nic,nic,nic,nic,nic** p1=**nic,nic,nic,nic,nic,nic,nic,nic** mctype=**umc**
14x NIC + 2x FCoE	7x NIC + 1x FCoE	HbaCmd setadapterportconfig <MAC> p0=**nic,fcoe,nic,nic,nic,nic,nic,nic** p1=**nic,fcoe,nic,nic,nic,nic,nic,nic** mctype=**umc**
14x NIC + 2x iSCSI	7x NIC + 1x iSCSI	HbaCmd setadapterportconfig <MAC> p0=**nic,iscsi,nic,nic,nic,nic,nic,nic** p1=**nic,iscsi,nic,nic,nic,nic,nic,nic** mctype=**umc**

The above examples can be modified in order to configure 4, 6, 8, 10, 12, 14 or 16 functions.
The following two commands are used to define the bandwidth as well as the VLANs.

HbaCmd CMSetLPVID <MAC> LPVID#1 LPVID#2 LPVID#3...

The LPVIDs of each function must now be defined for each physical port of the 10Gbit network card.
The MAC address of the physical port and the VLAN IDs of each function are transferred to the command.

Example: HbaCmd CMSetLPVID   90-1b-0e-32-3d-38 **10 20 30 40**

LPVID 10 is thus assigned to the first function on the Port, 20 to the second function and so on.
As only one physical port and its functions are configured, this step must be repeated for the second port in the same way.

HbaCmd CMSetBW <MAC> min,max min,max min,max min,max...

Like with the CMSetLPVID, the configuration of individual functions is transferred for a physical port.
The minimum and maximum bandwidth is specified as a percentage, separated by a comma, for each function in sequence. Each function is addressed with a pair of numbers, i.e. 16 numbers with 8 functions per port.

Example for 4 functions: HbaCmd CMSetBW 90-1b-0e-32-3d-38 **10,20** 40,100 <mark>25,50</mark> 25,50

…

```
Results in                           MinBW  MaxBW
Func#  Type    MAC Address     LPVID   (%)    (%)
-----  -----   ---------------  -----  -----  -----
1      NIC     90-1b-0e-32-3d-38  20    10     20
3      iSCSI   90-1b-0e-32-3d-39  N/A   40     100
5      NIC     90-1b-0e-32-3d-3a  30    25     50
7      NIC     90-1b-0e-32-3d-3b  40    25     50
```

Connection to a remote host

The command HBAcmd is used to configure all servers, on which OCM is installed, remote via the command line.
HBAcmd AddHost

Example: HBAcmd AddHost <ip address>   Adds a host to the list of TCP/IP HBAs.

The specified commands can then carry out the configuration of Personality and functions in the same way. Only the MAC address must be specified according to that of the remote host.

The host can then be removed from list of TCP/IP HBAs again:
HBAcmd RemoveHost <ip address>

HBAcmd h=<ip address> <Command>

Alternatively, a command can be directly executed on a remote host. The host is not included in the list and the host (IP address or DNS name) must be specified for each command.

Example: HBAcmd h=<ip address> listhbas   Lists all HBAs in the system with this IP address.

Configuration in VMware ESXi environments

If a VMware ESXi Hypervisor runs on Fujitsu PRIMERGY servers, a direct configuration of the LAN adapters is only possible via BIOS.
A configuration can still be made via the CIM provider contained in the VMware ESXi Fujitsu custom image.
A remote host can communicate with the CIM provider via the OneCommand Manager or the HBACmd command lines tool, thus enabling a remote configuration.

The integration in OCM Manager is described in the section "Configuring remote hosts".

In order to execute HBACmd commands on a remote ESXi Server there are the same options as under a Windows or Linux operating system which has the OneCommand Manager.

The following command is used to put an ESXi server in the TCP/IP HBA list:

hbacmd m=cim [u=<username>] [p=<password>] [n=<namespace>] AddHost <IP_Address>

This command is used to execute a direct command on the remote ESXi server:

hbacmd h=<IP_Address> m=cim [u=<username>] [p=<password>] [n=<namespace>]

Example: hbacmd h=ESX-BX2580M1 m=cim u=root p=Passwort listhbas

Configuration in BIOS

The BIOS offers an extension (OptionROM) for the initial configuration of a server network adapter. The DynamicLoM controller has its own BIOS extension for the configuration of the adapter as well as for its own storage functions.
The OptionROM to configure the adapter and its functions can be opened via **CTRL+P**.

A separate optionROM can be opened for the iSCSI configuration via **CTRL+S or** for FCoE via **CTRL+E**

If the system is equipped with more than one controller, an overview of the installed adapters is displayed and the adapter to be configured must be selected.
The possible options are shown in the grey bar at the bottom.

Adapter configuration

Having selected the controller, the operating mode must be defined.

MultiChannel must be **Disabled** for the operation with mode #1 (CNA mode).
FCoE or **iSCSI** is selected as storage function.
The VLAN ID and the network setting (iSCSI initiator and target settings) must be configured for iSCSI in their own iSCSI BIOS extension (**CTRL+S** when booting).

Mode #2 (2x 1/10Gbit/s) can be obtained by selecting Personality **NIC**.

Mode #4 **NIC+RoCE** is only available if MultiChannel is deactivated. The **RoCE** profiles **1** and **2** are available for selection.

RoCE-1 is intended for Linux operating systems.
RoCE-2 is intended for Windows operating systems.

SR-IOV (mode #5) can also be activated for configurations with **NIC**, **FCoE** or **iSCSI**.
The NIC mode can also be selected when configuring Personality **NIC** in conjunction with SR-IOV.
Enhanced Transmission Selection (ETS) can be deactivated.
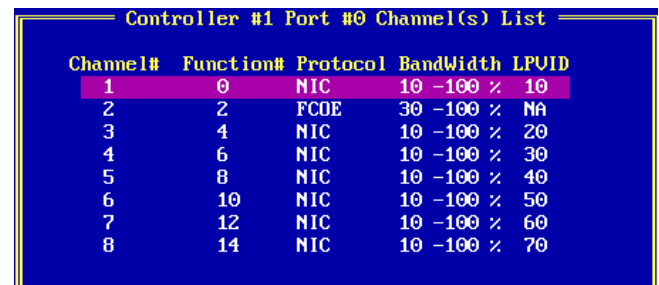
Universal Multi Channel (UMC)

The **MultiChannel** must be activated for the configuration of the UMC mode. The UMC mode can be selected only in **NIC** Personality where up to 8 network cards can be configured per port.
7x network functions and 1x storage function are available per port in **iSCSI** or **FCoE** Personality.

```
=== Controller #1 Configuration ===
Controller Model : OC114000-LOM
Firmware Version : 10.2.405.33
     IPL Version : LS2FFTD0
    MultiChannel : ENABLED
     Personality : NIC
           SRIOV : iSCSI
    RoCE Profile : FCoE
        NIC Mode : NIC - ETS Disabled

   <F6-CONTINUE>  <F8-LOAD DEFAULTS>
```

Having defined the Personality, **F6** is used for the function configuration for each function. The physical port must be selected and then **MultiChannel Configuration** must be activated.

```
=== Controller #1 Port #0 Menu ===

 1. MultiChannel Configuration
 2. Boot Configuration
 3. Port Configuration
```
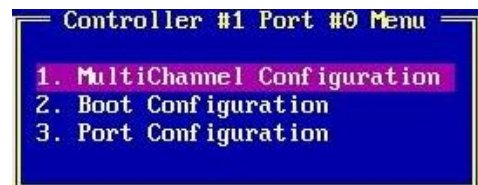
The configuration of each function takes place per physical port. You can define per function how much **bandwidth** and which **PLVID** must be used. If a function is to be deactivated, the protocol must be set at **None**.

The steps must be repeated for the second port.

```
=== Controller #1 Port #0 Channel(s) List ===

 Channel#  Function#  Protocol  BandWidth  LPVID
    1          0        NIC     10 -100 %    10
    2          2        FCOE    30 -100 %    NA
    3          4        NIC     10 -100 %    20
    4          6        NIC     10 -100 %    30
    5          8        NIC     10 -100 %    40
    6         10        NIC     10 -100 %    50
    7         12        NIC     10 -100 %    60
    8         14        NIC     10 -100 %    70
```

Further information about configuring the adapter via the BIOS extension is in the manual:
http://manuals.ts.fujitsu.com/file/11701/emulex-bootcode-ug-en.pdf

Summary

The additional functions within the LAN adapter enable the mapping of increasingly complex requirements when DynamicLoM is installed onboard.
The configuration of the LAN adapters can be made via various interfaces which are shown in compressed form.
The information provided supplements the information in the manuals.
Manuals are available at: http://manuals.ts.fujitsu.com .

Appendix

Command lines examples:

Call adapter information
Identify MAC address for physical port 0 and 1 is possible via the "Port number" and the "PCI function".

C:\Program Files\Emulex\Util\OCManager>hbacmd listhbas

Manageable HBA List


```
Permanent MAC     : 90-1b-0e-32-3d-30
Current MAC       : 90-1b-0e-32-3d-30
Flags             : 80000720
Host Name         : RX2540M1
Mfg               : Emulex Corporation
Serial No.        : FS442900BC
Port Number       : 0
Mode              : Initiator
PCI Bus Number    : 4
PCI Function      : 0
Port Type         : NIC
Model             : OCl14000-LOM

Permanent MAC     : 90-1b-0e-32-3d-38
Current MAC       : 90-1b-0e-32-3d-38
Flags             : 80000720
Host Name         : RX2540M1
Mfg               : Emulex Corporation
Serial No.        : FS442900BC
Port Number       : 1
Mode              : Initiator
PCI Bus Number    : 4
PCI Function      : 1
Port Type         : NIC
Model             : OCl14000-LOM
```

Show current adapter configuration:
C:\Program Files\Emulex\Util\OCManager>HbaCmd getadapterportconfig 90-1b-0e-32-3d-30

Number of Ports   : 2
Maximum FCoE Functions   : 1
Maximum iSCSI Functions : 1
Mixed Mode I/O Allowed   : Yes
Concurrent Mode I/O Allowed : Yes
ROCE Functions Allowed   : Yes
RebootRequired   : No

Active Configuration
   Profile ID   : 16
   MC Type   : UMC
   Port Assignments:
      Port 0: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC
      Port 1: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Reboot Configuration
   Profile ID   : 16
   MC Type   : UMC
   Port Assignments:
      Port 0 (p0): NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC
      Port 1 (p1): NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

      Note: (pN) labels are the port parameter names to use in the
              SetAdapterPortConfig command (e.g. p0=NIC,FCoE p1=NIC,iSCSI).

C:\Program Files\Emulex\Util\OCManager>HbaCmd CMGetParams 90-1b-0e-32-3d-30

Active mode: UMC
Configured mode: UMC
Available modes: UMC

| | | | | MinBW | MaxBW |
Func#	Type	MAC Address	LPVID	(%)	(%)
0	NIC	90-1b-0e-32-3d-30	10	20	100
2	NIC	90-1b-0e-32-3d-31	0	40	100
4	NIC	90-1b-0e-32-3d-32	20	20	100
6	NIC	90-1b-0e-32-3d-33	30	20	20
8	NIC	90-1b-0e-32-3d-34	0	0	0
10	NIC	90-1b-0e-32-3d-35	0	0	0
12	NIC	90-1b-0e-32-3d-36	0	0	0
14	NIC	90-1b-0e-32-3d-37	0	0	0

Warning: Channel 1 has been allocated bandwidth, but LPVID = 0.

You should now assign LPVIDs for all channels on this port.
The LPVID for NIC channels must be between 2 and 4094.

Mode#1: FCOE + NIC configuration
C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=NIC,fcoe p1=NIC,fcoe mctype=none

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

Check the configuration:
C:\Program Files\Emulex\Util\OCManager>HbaCmd getadapterportconfig 90-1b-0e-32-3d-30

Number of Ports   : 2
Maximum FCoE Functions   : 1
Maximum iSCSI Functions   : 1
Mixed Mode I/O Allowed   : Yes
Concurrent Mode I/O Allowed   : Yes
ROCE Functions Allowed   : Yes
RebootRequired   : Yes

Active Configuration
    Profile ID   : 16
    MC Type   : UMC
    Port Assignments:
        Port 0: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC
        Port 1: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Reboot Configuration
    Profile ID   : 23
    MC Type   : None
    Port Assignments:
        Port 0 (p0): NIC, FCoE, None
        Port 1 (p1): NIC, FCoE, None

    Note: (pN) labels are the port parameter names to use in the
            SetAdapterPortConfig command (e.g. p0=NIC,FCoE p1=NIC,iSCSI).

Mode#1: iSCSI + NIC configuration

C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=NIC,iscsi p1=NIC,iscsi mctype=none

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

Check the configuration:
C:\Program Files\Emulex\Util\OCManager>HbaCmd getadapterportconfig 90-1b-0e-32-3d-30

Number of Ports   : 2
Maximum FCoE Functions   : 1
Maximum iSCSI Functions   : 1
Mixed Mode I/O Allowed   : Yes
Concurrent Mode I/O Allowed   : Yes
ROCE Functions Allowed   : Yes
RebootRequired   : Yes

Active Configuration
    Profile ID   : 16
    MC Type   : UMC
    Port Assignments:
        Port 0: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Port 1: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Reboot Configuration
Profile ID   : 17
MC Type   : None
Port Assignments:
Port 0 (p0): NIC, iSCSI, None
Port 1 (p1): NIC, iSCSI, None

Note: (pN) labels are the port parameter names to use in the
SetAdapterPortConfig command (e.g. p0=NIC,FCoE p1=NIC,iSCSI).

Mode#2: 10G NIC only configuration
C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=NIC p1=NIC mctype=none pid=16

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

Check the configuration:
C:\Program Files\Emulex\Util\OCManager>HbaCmd getadapterportconfig 90-1b-0e-32-3d-30

Number of Ports   : 2
Maximum FCoE Functions   : 1
Maximum iSCSI Functions   : 1
Mixed Mode I/O Allowed   : Yes
Concurrent Mode I/O Allowed   : Yes
ROCE Functions Allowed   : Yes
RebootRequired   : Yes

Active Configuration
Profile ID   : 16
MC Type   : UMC
Port Assignments:
Port 0: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC
Port 1: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Reboot Configuration
Profile ID   : 16
MC Type   : None
Port Assignments:
Port 0 (p0): NIC, None, None
Port 1 (p1): NIC, None, None

Note: (pN) labels are the port parameter names to use in the
SetAdapterPortConfig command (e.g. p0=NIC,FCoE p1=NIC,iSCSI).

Mode#3: UMC mode with FCoE storage function
C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=**nic,fcoe,nic,nic** p1=**nic,fcoe,nic,nic** mctype=**umc**

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

Show UMC parameter for a port:
C:\Program Files\Emulex\Util\OCManager>HbaCmd CMGetParams 90-1b-0e-32-3d-30

Active mode: UMC
Configured mode: UMC
Available modes: UMC

Func#	Type	MAC Address	LPVID	MinBW (%)	MaxBW (%)
0	NIC	90-1b-0e-32-3d-30	10	20	100
2	FCoE	90-1b-0e-32-3d-31	N/A	40	100
4	NIC	90-1b-0e-32-3d-32	20	20	100
6	NIC	90-1b-0e-32-3d-33	30	20	20

Configure LPVIDs for a port:
C:\Program Files\Emulex\Util\OCManager>HbaCmd cmsetlpvid   90-1b-0e-32-3d-30 **20   0 30 40**

Successfully updated Logical Port VLAN IDs (LPVIDs).

Check LPVIDs:
C:\Program Files\Emulex\Util\OCManager>HbaCmd CMGetParams 90-1b-0e-32-3d-30

Active mode: UMC
Configured mode: UMC
Available modes: UMC

Func#	Type	MAC Address	LPVID	MinBW (%)	MaxBW (%)
1	NIC	90-1b-0e-32-3d-38	**20**	20	100
3	FCoE	90-1b-0e-32-3d-39	N/A	40	100
5	NIC	90-1b-0e-32-3d-3a	**30**	20	100
7	NIC	90-1b-0e-32-3d-3b	**40**	20	20

Mode#3: UMC mode with iSCSI storage function
C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=nic,**iscsi**,nic,nic p1=nic,iscsi,nic,nic

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

C:\Program Files\Emulex\Util\OCManager>HbaCmd CMGetParams 90-1b-0e-32-3d-30

Active mode: UMC
Configured mode: UMC
Available modes: UMC

Func#	Type	MAC Address	LPVID	MinBW (%)	MaxBW (%)
1	NIC	90-1b-0e-32-3d-38	20	20	100
3	**iSCSI**	90-1b-0e-32-3d-39	N/A	40	100
5	NIC	90-1b-0e-32-3d-3a	30	20	100
7	NIC	90-1b-0e-32-3d-3b	40	20	20

Configure LPVIDs for a port:
C:\Program Files\Emulex\Util\OCManager>HbaCmd cmsetlpvid   90-1b-0e-32-3d-30 **20   0** 30 40

Successfully updated Logical Port VLAN IDs (LPVIDs).

Define bandwidth for the individual functions:
C:\Program Files\Emulex\Util\OCManager>HbaCmd CMSetBW 90-1b-0e-32-3d-30 **10, 20** 40,100 25,50 25,50

Successfully updated channel minimum and maximum bandwidths.

Check the bandwidth change:
C:\Program Files\Emulex\Util\OCManager>HbaCmd CMGetParams 90-1b-0e-32-3d-30

Active mode: UMC
Configured mode: UMC
Available modes: UMC

Func#	Type	MAC Address	LPVID	MinBW (%)	MaxBW (%)
1	NIC	90-1b-0e-32-3d-38	20	**10**	**20**
3	iSCSI	90-1b-0e-32-3d-39	N/A	40	100
5	NIC	90-1b-0e-32-3d-3a	30	25	50
7	NIC	90-1b-0e-32-3d-3b	40	25	50

Show available profile IDs:
C:\Program Files\Emulex\Util\OCManager>HbaCmd listprofiles 90-1b-0e-32-3d-30

Active Profile ID   : 16
Configured Profile ID   : 17

Available Profiles

ID   Description
--   -------------------------------
16   NIC
17   ISCSI initiator, no DIF
20   ROCE-1
21   ROCE-2
23   FCOE initiator + Target, no DIF
24   NIC - ETS Disabled
36   Mixed Storage, 25% ISCSI initiator only, 75% FCOE, no DIF
37   Mixed Storage, 50% ISCSI initiator only, 50% FCOE, no DIF
38   Mixed Storage, 75% ISCSI initiator only, 25% FCOE, no DIF

Warning: A reboot is required to activate the configured profile

Mode#4: ROcE+NIC configuration

C:\Program Files\Emulex\Util\OCManager>HbaCmd setadapterportconfig 90-1b-0e-32-3d-30 p0=**NIC+Roce** p1=**NIC+Roce**   mctype=none pid=**21**

Adapter configuration successfully set to new configuration.

System reboot required to activate it.

Check the configuration:
C:\Program Files\Emulex\Util\OCManager>HbaCmd getadapterportconfig 90-1b-0e-32-3d-30

Number of Ports   : 2
Maximum FCoE Functions   : 1
Maximum iSCSI Functions   : 1
Mixed Mode I/O Allowed   : Yes
Concurrent Mode I/O Allowed : Yes
ROCE Functions Allowed   : Yes
RebootRequired   : Yes

Active Configuration
    Profile ID   : 16
    MC Type   : UMC
    Port Assignments:
       Port 0: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC
       Port 1: NIC, NIC, NIC, NIC, NIC, NIC, NIC, NIC

Reboot Configuration
    Profile ID   : 21
    MC Type   : None
    Port Assignments:
       Port 0 (p0): NIC+RoCE, None, None
       Port 1 (p1): NIC+RoCE, None, None

    Note: (pN) labels are the port parameter names to use in the
            SetAdapterPortConfig command (e.g. p0=NIC,FCoE p1=NIC,iSCSI).

Mode#5: SR-IOV+ NIC configuration

Activate SR-IOV for a port:
C:\Program Files\Emulex\Util\OCManager>HbaCmd sriovenable

SRIOVEnable <MAC address> <0|1>
   MAC   : MAC Address of port
   0   : Disable SRIOV on port
   1   : Enable SRIOV on port

C:\Program Files\Emulex\Util\OCManager>HbaCmd sriovenable 00-90-fa-76-28-46 1

SR-IOV successfully enabled. A system reboot is required.

Activate VEPA for a port:
C:\Program Files\Emulex\Util\OCManager>HbaCmd vepaenable

VEPAEnable <MAC address> <0|1>
   MAC   : MAC Address of port
   0   : Disable SRIOV on port
   1   : Enable SRIOV on port

C:\Program Files\Emulex\Util\OCManager>HbaCmd vepaenable 00-90-fa-76-28-46 1
VEPA successfully enabled.