



**Huawei MZ611 NIC**  
**V100R001**

## **White Paper**

**Issue**     **06**  
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# About This Document

## Purpose

This document describes the MZ611 in terms of its functions, appearance, features, applications, and technical specifications. You can obtain comprehensive information about the MZ611 by reading this document.





## Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol   | Description   |
|--|---|
|  <b>DANGER</b>  | Alerts you to a high risk hazard that could, if not avoided, result in serious injury or death.   |
|  <b>WARNING</b> | Alerts you to a medium or low risk hazard that could, if not avoided, result in moderate or minor injury.   |
|  <b>CAUTION</b> | Alerts you to a potentially hazardous situation that could, if not avoided, result in equipment damage, data loss, performance deterioration, or unanticipated results. |
|  <b>NOTE</b>    | Provides additional information to emphasize or supplement important points in the main text.   |

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This issue is the second official release.

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# 1 Overview

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## About This Chapter

[1.1 Functions](#)

[1.2 Appearance](#)



## 1.1 Functions

The MZ611 is an InfiniBand (IB) HCA. It is used for E9000 compute nodes and provides two 56G IB fourteen data rate (FDR) ports for compute nodes to connect to switch modules in the chassis.

The MZ611 uses the Mellanox ConnectX-3 (CX3) chip and supports HCA applications. The 56G ports on the MZ611 support 56G/40G auto-negotiation and support 56G (FDR) and 40G (QDR) port applications (QDR stands for quad data rate). The MZ611 also supports the Remote Direct Memory Access (RDMA) feature to address low-latency network applications.

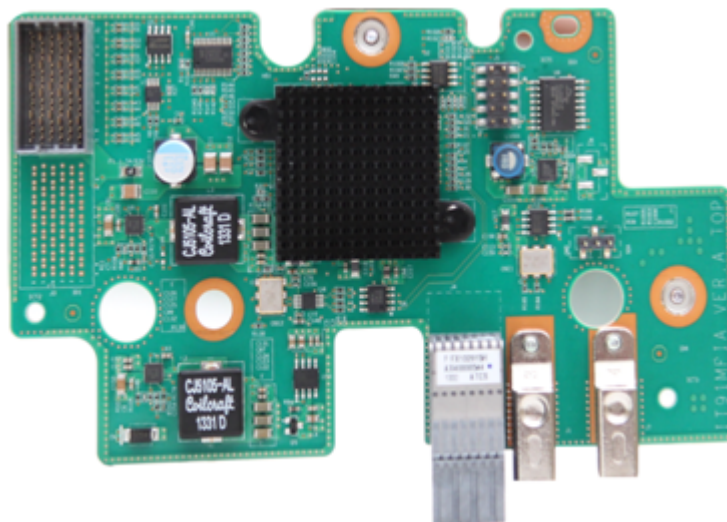
## 1.2 Appearance

The MZ611 can be installed in slot Mezzanine1 (Mezz1 for short) or Mezzanine2 (Mezz2 for short) on a half-width E9000 compute node or in slot Mezz1, Mezz2, Mezzanine3 (Mezz3 for short), or Mezzanine4 (Mezz4 for short) on a full-width E9000 compute node.

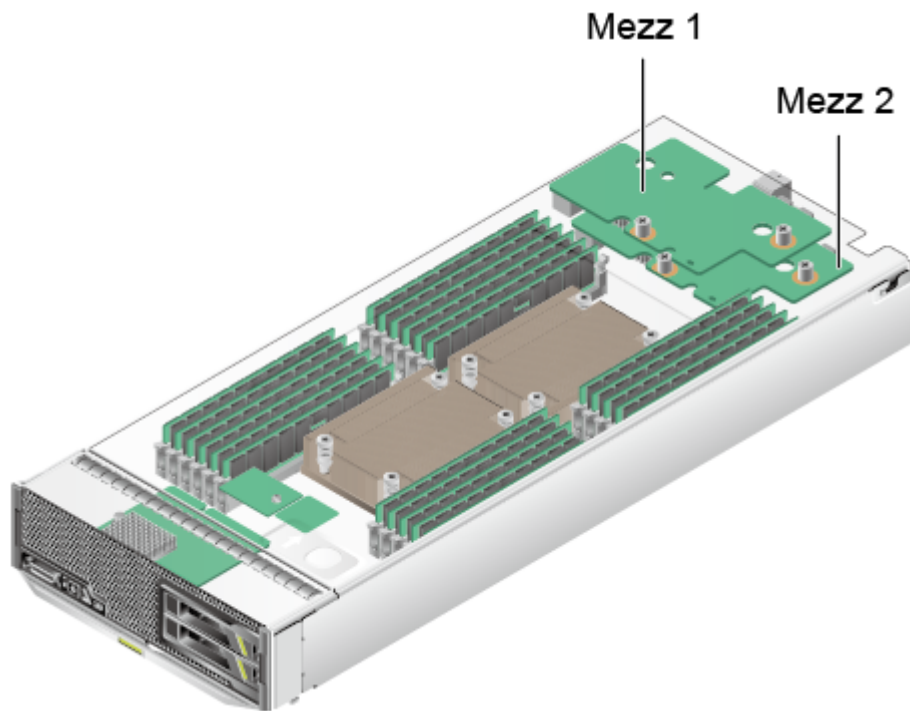
The MZ611 provides network ports for connecting to switch modules:

- When the MZ611 is installed in slot Mezz1 or Mezz3, its two 56GE ports connect to switch modules in slots 2X and 3X.
- When the MZ611 is installed in slot Mezz2 or Mezz4, its two 56GE ports connect to switch modules in slots 1E and 4E.

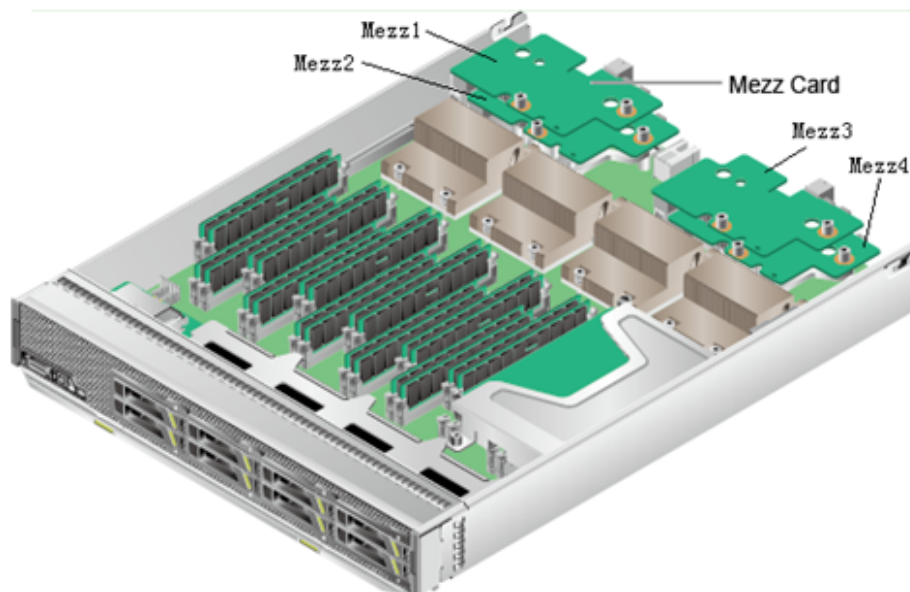
Figure 1-1 MZ611 appearance



**Figure 1-2** MZ611 installation positions on a half-width compute node



**Figure 1-3** MZ611 installation positions on a full-width compute node



# 2 Features

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## About This Chapter

[2.1 Feature List](#)

[2.2 Feature Description](#)

[2.3 Standards Compliance](#)

## 2.1 Feature List

The MZ611 supports the following features and performance specifications:

- InfiniBand Trade Association (IBTA) 1.2.1 specifications
- RDMA
- 16 million I/O channels
- End-to-end QoS and nine virtual lanes (VLs), including eight data VLs and one control VL
- Hardware-based congestion control
- In-band management and support for third-party Subnet Managers (SMs)

## 2.2 Feature Description

### RDMA

The MZ611 supports the RDMA feature. This feature uses the kernel bypass technology to reduce the packet processing and forwarding latency of the HCA, to reduce the CPU usage, and to implement low-latency data transmission over the data center network. With the RDMA feature, the end-to-end read and write delay of the HCA can reach 1 us when the packet length is 128 bytes. The MZ611 supports 16 million I/O channels (equivalent to IB QPs), and provides priority-based scheduling and flow control to support low-latency, high-bandwidth network transmission. The MZ611 supports OpenFabrics Enterprise Distribution for Linux (Linux OFED) and Mellanox OFED for Windows (WinOF).

### QoS

The MZ611 supports end-to-end QoS for IB. It supports the VL mechanism defined in IB specifications, VL arbitration, and control-domain and service-domain prioritizing. The end-to-end QoS priority is represented by the service level (SL) domain of IB packets. Each SL is mapped to a VL. SMs configure VL arbitration and the SL-to-VL mapping table using network management datagrams (MADs). The MZ611 supports nine VLs, including eight data VLs and one control VL.

## 2.3 Standards Compliance

**Table 2-1** lists the standards and protocols that the MZ611 complies with.

**Table 2-1** Standards compliance

| Standard             | Protocol                     |
|----------------------|------------------------------|
| IBTA 1.2.1           | InfiniBand Trade Association |
| ANSI INCITS 365-2002 | SCSI RDMA Protocol (SRP)     |
| IETF                 | iSCSI Extensions for RDMA    |

| Standard | Protocol                                       |
|----------|--|
| DAPL     | User Direct Access Programming Library (uDAPL) |

# 3 Applications

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## About This Chapter

[3.1 Compatible Compute Nodes](#)

[3.2 Connected I/O Modules](#)

[3.3 MZ611 Networking](#)

[3.4 Supported OSs](#)

## 3.1 Compatible Compute Nodes

The MZ611 can be installed in slot Mezz1 or Mezz2 on a half-width compute node or in slot Mezz1, Mezz2, Mezz3, or Mezz4 on a full-width compute node. [Table 3-1](#) lists the compute nodes that support the MZ611 and its installation positions on them.

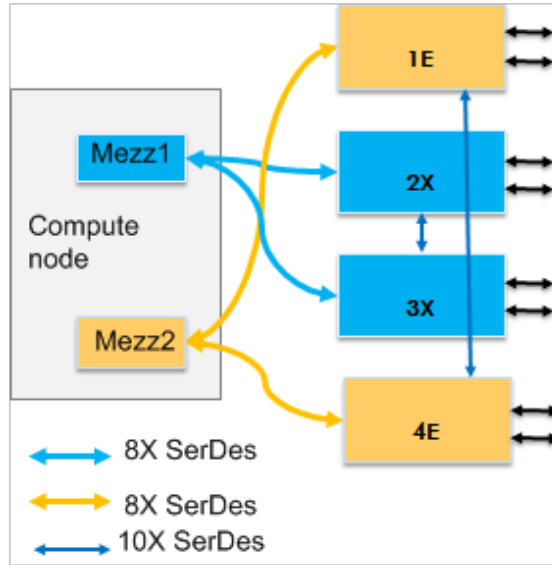
**Table 3-1** Compute nodes that support the MZ611

| Compute Node | Number of Mezz Module Slots | MZ611 Installation Position    |
|--------------|-----------------------------|--------------------------------|
| CH121        | 2                           | Mezz1 and Mezz2                |
| CH121 V3     | 2                           | Mezz1 and Mezz2                |
| CH220        | 1                           | Mezz1                          |
| CH220 V3     | 4                           | Mezz1, Mezz2, Mezz3, and Mezz4 |
| CH221        | 1                           | Mezz1                          |
| CH222        | 2                           | Mezz1 and Mezz2                |
| CH222 V3     | 2                           | Mezz1 and Mezz2                |
| CH240        | 2                           | Mezz1 and Mezz2                |
| CH242        | 4                           | Mezz1, Mezz2, Mezz3, and Mezz4 |
| CH242 V3     | 4                           | Mezz1, Mezz2, Mezz3, and Mezz4 |

## 3.2 Connected I/O Modules

MZ611s can connect to I/O modules (switch modules or interface boards). [Figure 3-1](#) shows the connections between the MZ611s on a half-width compute node and the ports on I/O modules.

**Figure 3-1** Connections between the MZ611s on a half-width compute node and the ports on I/O modules



There are two or four groups of Serializer/Deserializer (SerDes, known as high-speed interconnect line) between each compute node and I/O module slots.

- Mezz1: 8X SerDes for connecting to I/O module slots 2X and 3X
- Mezz2: 8X SerDes for connecting to I/O module slots 1E and 4E
- Mezz3 (available only on a full-width compute node): 8X SerDes for connecting to I/O module slots 2X and 3X
- Mezz4 (available only on a full-width compute node): 8X SerDes for connecting to I/O module slots 1E and 4E

**NOTE**

The MZ611 provides two ports, and only 4X of each 8X SerDes is used.

**Table 3-2** describes the I/O modules to which the MZ611 can connect.

**Table 3-2** I/O modules to which the MZ611 can connect

| I/O Module | I/O Module Slot | MZ611 (Mezz1) | MZ611 (Mezz2) | Typical Configuration | Remarks |
|------------|-----------------|---------------|---------------|-----------------------|---------|
| CX610      | 2X/3X           | √             | X             | No                    | -       |
|            | 1E/4E           | X             | √             | No                    | -       |
| CX611      | 2X/3X           | √             | X             | No                    | -       |



| I/O Module | I/O Module Slot | MZ611 (Mezz1) | MZ611 (Mezz2) | Typical Configuration | Remarks   |
|------------|-----------------|---------------|---------------|-----------------------|---|
|            | 1E/4E           | X             | √             | Yes                   | You are advised to install CX611s in slots 1E and 4E. |

### 3.3 MZ611 Networking

The MZ611 can connect to I/O modules (switch modules or interface boards) to provide IB services.

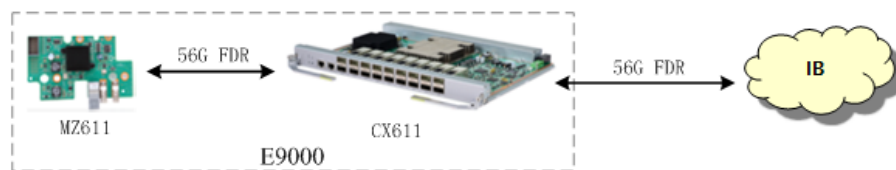
The MZ611 can work with the CX610 switch module to provide 40 Gbit/s bandwidth, and connect to the external IB network through 40G QDR ports on the CX610. See [Figure 3-2](#).

**Figure 3-2** Connection between the MZ611 and the CX610



The MZ611 can work with the CX611 switch module to provide 56 Gbit/s bandwidth, and connect to the external IB network through 56G FDR ports on the CX611. See [Figure 3-3](#).

**Figure 3-3** Connection between the MZ611 and the CX611



**NOTE**

The CX3 chip system on the MZ611 uses a PCIe 3.0 x8 port with a theoretical bandwidth of 64 Gbit/s. The two ports on the MZ611 can actually provide a total bandwidth of 56 Gbit/s instead of 80 Gbit/s because of protocol overhead and efficiency loss.

### 3.4 Supported OSs

[Table 3-3](#) lists the OSs supported by the MZ611.

**Table 3-3** OSs supported by the MZ611

| OS           | Version  | Remarks |
|--------------|--|---------|
| Windows      | Windows Server 2008 Enterprise SP2             | -       |
|              | Windows Server 2008 R2 Enterprise x64          | -       |
|              | Windows Server 2012 Enterprise x64             | -       |
| Red Hat      | Red Hat Enterprise Linux (RHEL) 6.1 x86        | -       |
|              | RHEL 6.1 x86_64                                | -       |
|              | RHEL 6.3 x86                                   | -       |
|              | RHEL 6.3 x86_64                                | -       |
| SUSE         | SUSE Linux Enterprise Server (SLES) 11 SP1 x86 | -       |
|              | SLES 11 SP1 x86_64                             | -       |
|              | SLES 11 SP2 x86                                | -       |
|              | SLES 11 SP2 x86_64                             | -       |
| VMware       | VMware ESXi 5.0                                | -       |
|              | VMware ESXi 5.1                                | -       |
|              | VMware ESXi 5.5                                | -       |
| Oracle Linux | Oracle Linux 6.2 x86                           | -       |
|              | Oracle Linux 6.2 x86_64                        | -       |
|              | Oracle Linux 6.3 x86                           | -       |
|              | Oracle Linux 6.3 x86_64                        | -       |

For the latest versions of OSs, see the [Huawei Server Compatibility Checker](#).

# 4 Technical Specifications

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## About This Chapter

### [4.1 Technical Specifications](#)

## 4.1 Technical Specifications

**Table 4-1** lists the technical specifications for the MZ611.

**Table 4-1** Technical specifications

| Item                        | Specifications   |
|-----------------------------|--|
| Dimensions (length x width) | 148 mm x 85 mm (5.83 in. x 3.35 in.)   |
| Power supply                | 12 V DC  |
| Net weight                  | 0.15 kg (0.33 lb)  |
| Maximum power consumption   | 8 W  |
| Temperature                 | Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Class A3 compliant)   |
|                             | Storage temperature: - 40°C to +65°C ( - 40°F to +149°F)   |
| Temperature change rate     | 15°C/h (27°F/h)  |
| Humidity                    | Operating humidity: 5% RH to 85% RH (non-condensing)   |
|                             | Storage humidity: 5% RH to 95% RH (non-condensing)   |
| Altitude                    | <ul style="list-style-type: none"><li>● 40°C (104°F) at 1800 m (5905.44 ft)</li><li>● 30°C (86°F) at 3000 m (9842.40 ft)</li></ul> When the MZ611 is used at an altitude between 1800 m and 3000 m, the highest operating temperature decreases by 1°C (1.8°F) as the altitude increases by 120 m (393.70 ft). |
| PCIe port bandwidth         | 64 Gbit/s (PCIe 3.0 x8)  |
| Port rate                   | 40 Gbit/s or 56.25 Gbit/s  |
| Number of ports             | 2  |
| Port type                   | IB   |
| Chip model/<br>manufacturer | ConnectX-3 (CX3)/Mellanox  |

# A Acronyms and Abbreviations

|          |   |
|----------|---|
| <b>F</b> |   |
| FDR      | fourteen data rate                        |
|          |   |
| <b>H</b> |   |
| HCA      | host channel adapter                      |
|          |   |
| <b>I</b> |   |
| IB       | InfiniBand                                |
| IBTA     | InfiniBand Trade Association              |
| IO       | input/output                              |
|          |   |
| <b>M</b> |   |
| MAD      | Management Datagram                       |
|          |   |
| <b>O</b> |   |
| OFED     | OpenFabrics Enterprise Distribution       |
| OS       | operating system                          |
|          |   |
| <b>P</b> |   |
| PCIe     | Peripheral Component Interconnect Express |
|          |   |
| <b>Q</b> |   |
| QDR      | quad data rate                            |
| QoS      | quality of service                        |
| QP       | queue pair                                |
|          |   |

|          |                             |
|----------|-----------------------------|
| <b>R</b> |                             |
| RDMA     | Remote Direct Memory Access |
|          |                             |
| <b>S</b> |                             |
| SL       | service level               |
| SM       | Subnet Manager              |
|          |                             |
| <b>V</b> |                             |
| VL       | virtual lane                |