

Hitachi Compute Blade 2500 Intel LAN Driver Instruction Manual for SUSE Linux Enterprise Server

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Preface

This document describes how to install the Intel LAN driver and the Intel LAN driver for the virtual function, for the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter in SUSE Linux Enterprise Server 11 SP3/SP4, SUSE Linux Enterprise Server 12 GA/SP1/SP2/SP3/SP4/SP5, SUSE Linux Enterprise Server 15 SP1 environment.

This preface includes the following information:

- ☐ [Intended Audience](#)
- ☐ [Document organization](#)
- ☐ [Release Notes](#)
- ☐ [Document Conventions](#)
- ☐ [Getting Help](#)
- ☐ [Comments](#)

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Intended Audience

This document is intended for the personnel who are involved in planning, managing, and performing the tasks to prepare your site for Compute Blade installation and to install the same.

This document assumes the following:

- The reader has a background in hardware installation of computer systems.
- The reader is familiar with the location where the Compute Blade will be installed, including knowledge of physical characteristics, power systems and specifications, and environmental specifications.

Document organization

The table below provides an overview of the contents and organization of this document. Click the chapter title in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
Chapter 1, Outline	Describes how to update the LAN driver.
Chapter 2, Driver Installation	Describes how to use LAN Advanced Functions.

Release Notes

Release notes contain requirements and more recent product information that may not be fully described in this manual. Be sure to review the release notes before installation.

Document Conventions





This term "Compute Blade" refers to all the models of the Compute Blade, unless otherwise noted.

The Hitachi Virtualization Manager (HVM) name has been changed to Hitachi Logical Partitioning Manager (LPAR manager, or LP). If you are using HVM based logical partitioning feature, substitute references to Hitachi logical partitioning manager (LPAR manager, or LP) with HVM.

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, fields, and labels. Example: Click OK .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <i>copy source-file target-file</i> Note: Angled brackets (< >) are also used to indicate variables.
screen/code	Indicates text that is displayed on screen or entered by the user. Example: # <code>pairdisplay -g oradb</code>
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # <code>pairdisplay -g <group></code> Note: Italic font is also used to indicate variables.
[] square brackets	Indicates optional values. Example: [a b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a b } indicates that you must choose either a or b.
vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a b] indicates that you can choose a, b, or nothing. { a b } indicates that you must choose either a or b.
<u>underline</u>	Indicates the default value. Example: [<u>a</u> b]

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
	WARNING	This indicates the presence of a potential risk that might cause death or severe injury.
	CAUTION	This indicates the presence of a potential risk that might cause relatively mild or moderate injury.
	NOTICE	This indicates the presence of a potential risk that might cause severe damage to the equipment and/or damage to surrounding properties.
	Tip	This indicates advice on how to make the best use of the equipment.

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Comments

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Outline

This chapter contains an outline of Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter.

- [Features](#)
- [Supported OS](#)

Features

Compute Blade CB2500 10GBase-SR LAN adapter is installed in PCI Express slot of the system device. This product has the following features.

- This adapter corresponds to 10GBase-SR. (IEEE802.3ae)
- This adapter has two network ports.
- This adapter is connected with Multi mode fibre cable.
- This adapter can be installed in PCI Express x8 or x16 slot.
- This adapter has the SR-IOV feature. (only for LPAR manager)

Supported OS

Compute Blade CB2500 10GBase-SR 2-port LAN adapter can be used with the following OS.

- SUSE Linux Enterprise Server 11 SP3 (x86_64)
- SUSE Linux Enterprise Server 11 SP4 (x86_64)
- SUSE Linux Enterprise Server 12 (x86_64)
- SUSE Linux Enterprise Server 12 SP1 (x86_64)
- SUSE Linux Enterprise Server 12 SP2 (x86_64)
- SUSE Linux Enterprise Server 12 SP3 (x86_64)
- SUSE Linux Enterprise Server 12 SP4 (x86_64)
- SUSE Linux Enterprise Server 12 SP5 (x86_64)
- SUSE Linux Enterprise Server 15 SP1 (x86_64)

The virtual function of Compute Blade CB2500 10GBase-SR 2-port LAN adapter can be used with the following OS.

- SUSE Linux Enterprise Server 11 SP3 (x86_64)
- SUSE Linux Enterprise Server 12 (x86_64)
- SUSE Linux Enterprise Server 12 SP1 (x86_64)
- SUSE Linux Enterprise Server 12 SP2 (x86_64)

- SUSE Linux Enterprise Server 12 SP3 (x86_64)
- SUSE Linux Enterprise Server 12 SP4 (x86_64)
- SUSE Linux Enterprise Server 12 SP5 (x86_64)

Driver Installation

This chapter describes how to install the Intel LAN driver and the Intel LAN driver for the virtual function, for Compute Blade CB2500 10GBase-SR LAN adapter in a SUSE Linux Enterprise Server environment.

- ❑ [Intel LAN driver for Compute Blade CB2500 10GBase-SR LAN adapter](#)
- ❑ [Intel LAN Driver for Virtual Function for Compute Blade CB2500 10GBase-SR LAN Adapter](#)

Intel LAN Driver for Compute Blade CB2500 10GBase-SR LAN Adapter

Driver Installation for SUSE Linux Enterprise Server 11 SP3

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 11 SP3 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 11 SP3. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 11 SP3 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.0.X-X.X	ixgbe-kmp-default-4.4.6_3.0.76_0.11-h1.x86_64.rpm

- 3 Execute the following command to check the installed driver :

```
# rpm -qa | grep ixgbe
```

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

```
ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64  
(X is a number.)
```

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```
- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-4.4.6_3.0.76_0.11-h1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-4.4.6_3.0.76_0.11-h1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If "4.4.6-h1" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 11 SP4

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 11 SP4 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 11 SP4. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 11 SP4 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.0.X-X.X	ixgbe-kmp-default-4.4.6_3.0.101_63-h1.x86_64.rpm

- 3 Execute the following command to check the installed driver :

```
# rpm -qa | grep ixgbe
```

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

```
ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```
- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-4.4.6_3.0.101_63-h1.x86_64.rpm /tmp
```
- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-4.4.6_3.0.101_63-h1.x86_64.rpm
```


- 6 Restart the system by entering the following command:

 # reboot
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

 # modinfo -F version ixgbe

 If "4.4.6-h1" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.12.X_X	ixgbe-kmp-default-4.4.6_k3.12.28_4-h1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbe`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-4.4.6_k3.12.28_4-h1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-4.4.6_k3.12.28_4-h1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If "4.4.6-h1" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP1

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP1 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12 SP1. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP1 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.12.X_X	ixgbe-kmp-default-4.4.6_k3.12.49_11-h1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbe`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-4.4.6_k3.12.49_11-h1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-4.4.6_k3.12.49_11-h1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If "4.4.6-h1" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP2

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP2 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12 SP2. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP2 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 4.4.X_X	ixgbe-kmp-default-4.4.6_k4.4.21_69-h1.x86_64.rpm

- 3 Execute the following command to check the installed driver :

```
# rpm -qa | grep ixgbe
```

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

```
ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```
- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-4.4.6_k4.4.21_69-h1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-4.4.6_k4.4.21_69-h1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If "4.4.6-h1" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP3

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP3 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12 SP3. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP3 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version	Filename of rpm package	Note
x86_64	Under Kernel 4.4.140- 94.42.1	ixgbe-kmp-default-5.3.5_k4.4.73_5- h1.x86_64.rpm	Retpoline-unsupported Kernel and Driver
x86_64	Kernel 4.4.140- 94.42.1 or higher	ixgbe-kmp-default-5.3.5_k4.4.73_7- h1a.x86_64.rpm	Retpoline-supported Kernel and Driver

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbe`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

`ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64`
(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

`# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64`

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

(1) In the case of Retpoline-unsupported Kernel

```
# cp /media/Intel/ixgbe-kmp-default-5.3.5_k4.4.73_5-h1.x86_64.rpm /tmp
```

(2) In the case of Retpoline-supported Kernel

```
# cp /media/Intel/ixgbe-kmp-default-5.3.5_k4.4.73_7-h1a.x86_64.rpm /tmp
```

5 Install the rpm package by executing the following command:

(1) In the case of Retpoline-unsupported Kernel

```
# rpm -ivh /tmp/ixgbe-kmp-default-5.3.5_k4.4.73_5-h1.x86_64.rpm
```

(2) In the case of Retpoline-supported Kernel

```
# rpm -ivh /tmp/ixgbe-kmp-default-5.3.5_k4.4.73_7-h1a.x86_64.rpm
```

6 Restart the system by entering the following command:

```
# reboot
```

7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If the following version is displayed, the installation is complete.

(1) In the case of Retpoline-unsupported Kernel

5.3.5-h1

(2) In the case of Retpoline-supported Kernel

5.3.5-h1a

Driver Installation for SUSE Linux Enterprise Server 12 SP4

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP4 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12 SP4. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP4 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Note; The rpm package including the suffix "-h1b" is signed by GPG certificate.

Architecture	Kernel version	Filename of rpm package	Note
x86_64	Kernel 4.12.X_X	ixgbe-kmp-default-5.6.1_k4.12.14_94.41-h1a.x86_64.rpm	Retpoline-supported Kernel and Driver
x86_64	Kernel 4.12.X_X	ixgbe-kmp-default-5.6.1_k4.12.14_94.41-h1b.x86_64.rpm	Retpoline-supported Kernel and Driver (Driver is signed by GPG)

The following procedure is the example when using "-h1b" driver. If you use "-h1a" driver, skip the step 5.

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbe`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

ixgbe-kmp-default-X_X_X_X_X_X_X_X_X_x86_64
(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

`# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_X_x86_64`

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. If using "-h1b" driver, also copy the public key in "/Intel/" directory to /tmp directory. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-5.6.1_k4.12.14_94.41-h1b.x86_64.rpm /tmp
# cp /media/Intel/RPM-GPG-ITPD-KEY /tmp
```

- 5 To verify the RPM package, import the public key by executing the following command:

```
# rpm --import /tmp/RPM-GPG-ITPD-KEY
```

- 6 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-5.6.1_k4.12.14_94.41-h1b.x86_64.rpm
```

- 7 Restart the system by entering the following command:

```
# reboot
```

- 8 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If the following version is displayed, the installation is complete.

```
5.6.1-h1b
```

Driver Installation for SUSE Linux Enterprise Server 12 SP5

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP5 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 12 SP5. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP5 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version	Filename of rpm package	Note
x86_64	Kernel 4.12.X_X	ixgbe-kmp-default-5.6.5_k4.12.14_120-h1b.x86_64.rpm	Retpoline-supported Kernel and Driver (Driver is signed by GPG)

- 3 Execute the following command to check the installed driver :

```
# rpm -qa | grep ixgbe
```

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

```
ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```
- 4 Copy the rpm packages and public key in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-5.6.5_k4.12.14_120-h1b.x86_64.rpm /tmp
# cp /media/Intel/RPM-GPG-ITPD-KEY /tmp
```
- 5 To verify the RPM package, import the public key by executing the following command:

```
# rpm --import /tmp/RPM-GPG-ITPD-KEY
```

- 6 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-5.6.5_k4.12.14_120-  
h1b.x86_64.rpm
```

- 7 Restart the system by entering the following command:

```
# reboot
```

- 8 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If the following version is displayed, the installation is complete.

```
5.6.5-h1b
```

Driver Installation for SUSE Linux Enterprise Server 15 SP1

To use the Hitachi Compute Blade CB2500 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 15 SP1 environment, install the Intel LAN driver for SUSE Linux Enterprise Server 15 SP1. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 15 SP1 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version	Filename of rpm package	Note
x86_64	Kernel 4.12.X_X	ixgbe-kmp-default-5.6.3_k4.12.14_195-h1b.x86_64.rpm	Retpoline-supported Kernel and Driver (Driver is signed by GPG)

- 3 Execute the following command to check the installed driver :

```
# rpm -qa | grep ixgbe
```

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

```
ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```

(X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e ixgbe-kmp-default-X_X_X_X_X_X_X_X_x86_64
```
- 4 Copy the rpm packages and public key in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/ixgbe-kmp-default-5.6.3_k4.12.14_195-h1b.x86_64.rpm /tmp
```

```
# cp /media/Intel/RPM-GPG-ITPD-KEY /tmp
```
- 5 To verify the RPM package, import the public key by executing the following command:

```
# rpm --import /tmp/RPM-GPG-ITPD-KEY
```

- 6 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/ixgbe-kmp-default-5.6.3_k4.12.14_195-  
h1b.x86_64.rpm
```

- 7 Restart the system by entering the following command:

```
# reboot
```

- 8 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbe
```

If the following version is displayed, the installation is complete.

```
5.6.3-h1b
```

Intel LAN Driver for Virtual Function for Compute Blade CB2500 10GBase-SR LAN Adapter

Driver Installation for SUSE Linux Enterprise Server 11 SP3

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 11 SP3 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 11 SP3. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 11 SP3 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.0.X-X.X	intel-ixgbevf-2.16.4-2.1.x86_64.rpm intel-ixgbevf-kmp-default-2.16.4_3.0.76_0.11-2.1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
rpm -qa | grep ixgbevf

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64  
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64
```


- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:


```
# cp /media/Intel/SR-IOV/intel-ixgbevf-2.16.4-2.1.x86_64.rpm /tmp  
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-  
2.16.4_3.0.76_0.11-2.1.x86_64.rpm /tmp
```
- 5 Install the rpm package by executing the following command:


```
# rpm -ivh /tmp/intel-ixgbevf-2.16.4-2.1.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-2.16.4_3.0.76_0.11-  
2.1.x86_64.rpm
```
- 6 Restart the system by entering the following command:


```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:


```
# modinfo -F version ixgbevf
```

If "2.16.4" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.12.X_X	intel-ixgbevf-2.16.4-2.1.x86_64.rpm intel-ixgbevf-kmp-default-2.16.4_k3.12.28_4-2.1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64  
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-2.16.4-2.1.x86_64.rpm /tmp  
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-  
2.16.4_k3.12.28_4-2.1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-2.16.4-2.1.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-2.16.4_k3.12.28_4-2.1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "2.16.4" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP1

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP1 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12 SP1. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP1 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 3.12.X_X	intel-ixgbevf-3.2.2-2.1.x86_64.rpm intel-ixgbevf-kmp-default-3.2.2_k3.12.49_11-2.1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-3.2.2-2.1.x86_64.rpm /tmp
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-3.2.2_k3.12.49_11-2.1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-3.2.2-2.1.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-3.2.2_k3.12.49_11-  
2.1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "3.2.2" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP2

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP2 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12 SP2. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP2 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	kernel 4.4.X_X	intel-ixgbevf-4.1.2-2.1.x86_64.rpm intel-ixgbevf-kmp-default-4.1.2_k4.4.21_69-2.1.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64  
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-4.1.2-2.1.x86_64.rpm /tmp  
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-  
4.1.2_k4.4.21_69-2.1.x86_64.rpm /tmp
```

- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-4.1.2-2.1.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-4.1.2_k4.4.21_69-  
2.1.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "4.1.2" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP3

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP3 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12 SP3. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP3 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	Kernel 4.4.140-94.42.1 or higher	intel-ixgbevf-4.5.1-h2.x86_64.rpm intel-ixgbevf-kmp-default-4.5.1_k4.4.73_7-h2.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_X_x86_64
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm package in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-4.5.1-h2.x86_64.rpm /tmp
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-4.5.1_k4.4.73_7-h2.x86_64.rpm /tmp
```


- 5 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-4.5.1-h2.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-4.5.1_k4.4.73_7-h2.x86_64.rpm
```
- 6 Restart the system by entering the following command:

```
# reboot
```
- 7 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "4.5.1-h2" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP4

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP4 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12 SP4. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP4 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	Kernel 4.12.14-95.29.1 or higher	intel-ixgbevf-4.6.1-h2.x86_64.rpm intel-ixgbevf-kmp-default-4.6.1_k4.12.14_94.41-h2.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64  
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm packages and public key in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-4.6.1-h2.x86_64.rpm /tmp  
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-  
4.6.1_k4.12.14_94.41-h2.x86_64.rpm /tmp  
  
# cp /media/Intel/SR-IOV/RPM-GPG-ITPD-KEY /tmp
```

- 5 These rpm packages are signed by GPG certificate. To verify the RPM packages, import the public key by executing the following command:

```
# rpm --import /tmp/RPM-GPG-ITPD-KEY
```

- 6 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-4.6.1-h2.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-4.6.1_k4.12.14_94.41-h2.x86_64.rpm
```

- 7 Restart the system by entering the following command:

```
# reboot
```

- 8 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "4.6.1-h2" is displayed, the installation is complete.

Driver Installation for SUSE Linux Enterprise Server 12 SP5

To use the virtual function of the 10GBase-SR 2-port LAN adapter (Product Code : GG-CN4NXG1X1-Y) in SUSE Linux Enterprise Server 12 SP5 on an LPAR manager environment, install the Intel virtual function LAN driver for SUSE Linux Enterprise Server 12 SP5. You can also update the already installed driver by the following steps.

- 1 Make sure that the SUSE Linux Enterprise Server 12 SP5 is already installed. Log in with the user name authorized as the root user.
- 2 Prepare the rpm package file listed in the table below to install the driver. The rpm package is contained in the directory "/Intel" in the "Driver&Utility for SUSE Linux CD-ROM" media.

Architecture	Kernel version(X is a number)	Filename of rpm package
x86_64	Kernel 4.12.14-120.1 or higher	intel-ixgbevf-4.6.3-h2.x86_64.rpm intel-ixgbevf-kmp-default-4.6.3_k4.12.14_120-h2.x86_64.rpm

- 3 Execute the following command to check the installed driver :
`# rpm -qa | grep ixgbevf`

If the rpm package is not installed, no messages are displayed. Then go to step 4.

If the rpm package has already been installed, the following is displayed.

intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64 (X is a number.)
intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64 (X is a number.)

The above message indicates that the rpm package has already been installed.

Uninstall the already-installed rpm package, by executing the following command:

```
# rpm -e intel-ixgbevf-kmp-default-X_X_X_X_X_X_X_X_x86_64  
# rpm -e intel-ixgbevf-X_X_X_X_X_X_X_X_x86_64
```

- 4 Copy the rpm packages and public key in "/Intel/" directory in the "Driver&Utility for SUSE Linux CD-ROM" media to /tmp directory by executing the following command. This example assumes that the CD-ROM is mounted in the /media directory:

```
# cp /media/Intel/SR-IOV/intel-ixgbevf-4.6.3-h2.x86_64.rpm /tmp  
# cp /media/Intel/SR-IOV/intel-ixgbevf-kmp-default-  
4.6.3_k4.12.14_120-h2.x86_64.rpm /tmp  
  
# cp /media/Intel/SR-IOV/RPM-GPG-ITPD-KEY /tmp
```

- 5 These rpm packages are signed by GPG certificate. To verify the RPM packages, import the public key by executing the following command:

```
# rpm --import /tmp/RPM-GPG-ITPD-KEY
```

- 6 Install the rpm package by executing the following command:

```
# rpm -ivh /tmp/intel-ixgbevf-4.6.3-h2.x86_64.rpm  
# rpm -ivh /tmp/intel-ixgbevf-kmp-default-4.6.3_k4.12.14_120-  
h2.x86_64.rpm
```

- 7 Restart the system by entering the following command:

```
# reboot
```

- 8 When OS booting is complete, confirm the LAN driver version by executing the following command:

```
# modinfo -F version ixgbevf
```

If "4.6.3-h2" is displayed, the installation is complete.

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