Dell Edge Gateway 3001
Installation and Operation Manual
Notes, cautions, and warnings

- **NOTE:** A NOTE indicates important information that helps you make better use of your product.
- **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.
- **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.
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Overview

The Edge Gateway 3000 Series is an Internet-of-Things (IoT) device. It is mounted at the edge of a network, enabling you to collect, secure, analyze, and act on data from multiple devices and sensors. It enables you to connect with devices used in transportation, building automation, manufacturing, and other applications. The Edge Gateway has a low-power architecture, which is capable of supporting industrial automation workloads while remaining fanless for environmental and reliability requirements. It supports Windows 10 IoT Enterprise LTSB 2016 and Ubuntu Core 16 operating systems.
System views

Top view

Table 1. Top view

<table>
<thead>
<tr>
<th>Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WLAN/Bluetooth/GPS connector</td>
<td>Connect the antenna to increase the range and strength of wireless/bluetooth/satellite signals.</td>
</tr>
<tr>
<td>2 Mobile broadband antenna-connector one (3G/</td>
<td>Connect the mobile broadband antenna to increase the range and strength of mobile broadband signals.</td>
</tr>
<tr>
<td>LTE)</td>
<td></td>
</tr>
<tr>
<td>3 ZigBee antenna connector</td>
<td>Connect the ZigBee antenna for intermittent data transmissions from a ZigBee-compliant sensor or input device.</td>
</tr>
<tr>
<td>4 Mobile broadband antenna-connector two (LTE</td>
<td>Connect the mobile broadband antenna to increase the range and strength of mobile broadband signals.</td>
</tr>
<tr>
<td>Auxiliary only)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Depending on the configuration ordered, some of the antenna connectors may not be present or may be capped. For more information about connecting antennas to the Edge Gateway, see the documentation that is shipped with the antenna.

Bottom view
Table 2. Bottom view

<table>
<thead>
<tr>
<th>Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Service Tag label</td>
<td>The Service Tag is a unique alphanumeric identifier that enables the Dell service technicians to identify the hardware components in your Edge Gateway and access warranty information.</td>
</tr>
<tr>
<td>2 Earth ground</td>
<td>A large conductor attached to one side of the power supply, which serves as the common return path for current from many different components in the circuit.</td>
</tr>
</tbody>
</table>

Left view

Table 3. Left view

<table>
<thead>
<tr>
<th>Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Intrusion switch</td>
<td>An intrusion event is triggered when the enclosure (in which the Edge Gateway is installed) is opened.</td>
</tr>
<tr>
<td>NOTE: External enclosure is sold separately.</td>
<td></td>
</tr>
<tr>
<td>NOTE: An intrusion event is triggered by a third-party enclosure to the Edge Gateway through a sensor. The sensor should have a cable, which is compatible with the intrusion switch connector on the Edge Gateway.</td>
<td></td>
</tr>
<tr>
<td>2 Power/Ignition port</td>
<td>Connect a 12-57 VDC power cable for supplying power to the Edge Gateway.</td>
</tr>
<tr>
<td>NOTE: Power cable is sold separately.</td>
<td></td>
</tr>
<tr>
<td>3 Power/System status light</td>
<td>Indicates the power status and system status.</td>
</tr>
<tr>
<td>4 WLAN/Bluetooth status light</td>
<td>Indicates if WLAN/Bluetooth is ON or OFF.</td>
</tr>
<tr>
<td>5 Cloud-connection status light</td>
<td>Indicates the cloud connection status.</td>
</tr>
<tr>
<td>6 Ethernet port one (with Power over Ethernet support)</td>
<td>Connect an Ethernet (RJ45) cable for network access. Provides data transfer speeds up to 10/100 Mbps and support Power over Ethernet.</td>
</tr>
<tr>
<td>NOTE: The Edge Gateway is IEEE 802.3af compliant Powered Device (PD).</td>
<td></td>
</tr>
</tbody>
</table>
Features

7 USB 3.0 port 
Connect a USB enabled device. Provides data transfer speeds up to 5 Gbps.

8 SIM card slot (optional)
Insert a micro-SIM card into the slot.

9 SD card slot (optional)
Insert a micro-SD card into the slot.

**NOTE:** Remove the SD card slot filler before inserting the micro-SD card.

10 Quick Resource Locator label
Scan with a QR reader to access documentation and other system information.

11 micro-SIM/micro-SD card access door
Open the access door to access the micro-SIM/micro-SD card.

### Table 4. Status-light indicators

<table>
<thead>
<tr>
<th>Function</th>
<th>Indicator</th>
<th>Color</th>
<th>Control</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Power status/System status</td>
<td>Green/Amber</td>
<td>BIOS</td>
<td>Off: System off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On (Solid Green): System on or Boot successful</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On (Solid Amber): Power up or boot fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blinking Amber: Fault or error</td>
</tr>
<tr>
<td>WLAN/bluetooth</td>
<td>Green</td>
<td>Hardware</td>
<td></td>
<td>Off: WLAN/bluetooth module is off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On: WLAN/bluetooth module is on</td>
</tr>
<tr>
<td>Cloud</td>
<td>Green</td>
<td>Software</td>
<td></td>
<td>Off: No connection to the cloud device or service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On: Edge Gateway connected to a cloud device or service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blinking Green: Activity to a cloud device or service</td>
</tr>
<tr>
<td>LAN (RJ-45)</td>
<td>Link</td>
<td>Green/Amber</td>
<td>Driver (LAN)</td>
<td>Off: No network link or cable is not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On (Green): High-speed connection (100 Mbps)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On (Amber): Low-speed connection (10 Mbps)</td>
</tr>
<tr>
<td></td>
<td>Activity</td>
<td>Green</td>
<td>Driver (LAN)</td>
<td>Off: No activity on link</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blinking Green: LAN activity. The blink rate is</td>
</tr>
</tbody>
</table>
Function Indicator Color Control Status
related to packet density.

NOTE: The power/system status light may operate differently during different boot-up scenarios. For example, when a USB script file is run during boot-up.

Table 5. Power connector pin definition details

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC+</td>
<td>12–57 VDC power</td>
</tr>
<tr>
<td>2</td>
<td>DC–</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>IG</td>
<td>9–32 VDC ignition</td>
</tr>
</tbody>
</table>

NOTE: Pin 3 (IG) is connected to the vehicle’s ignition status indicator (optional) or a wake pin. A voltage of more than 9 V on the signal indicates that the vehicle’s engine is running. The Ignition or Wake pin is used to prevent the draining of the vehicle battery when the vehicle is turned off for an extended amount of time.

NOTE: The IG signal can be used to gracefully shutdown or enter low-power sleep state when the vehicle is turned off (battery powered). It can also be used for turning on the Edge Gateway when the vehicle starts.

Right view

Table 6. Right view—3001

Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RS-232/RS-422/RS-485 port one (configurable in the BIOS)</td>
</tr>
<tr>
<td>2</td>
<td>RS-232/RS-422/RS-485 port two (configurable in the BIOS)</td>
</tr>
</tbody>
</table>

Connect a RS-232/RS-422/RS-485 cable to the Edge Gateway. Provides data transfer speeds up to 1 Mbps in RS-232 mode and 12 Mbps in RS-422/RS-485 mode.
Features

3 USB 2.0 port
Connect a USB enabled device. Provides data transfer speeds up to 480 Mbps.

4 GPIO port
Connect a GPIO enabled device or dongles.

The USB power is limited to 0.4 A/2 W so that the Edge Gateway is within the 13 W PoE Class 0 envelope.

Table 7. GPIO-port pin definition details

<table>
<thead>
<tr>
<th>Pin</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>11</th>
<th>13</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>GPIO0</td>
<td>GPIO1</td>
<td>GPIO2</td>
<td>GPIO3</td>
<td>GPIO4</td>
<td>GPIO5</td>
<td>GPIO6</td>
<td>GPIO7</td>
</tr>
<tr>
<td>Pin</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Signal</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
</tbody>
</table>

NOTE: GPIO0 to the GPIO7 pins are 0-5 V input/output and digital/analog configurable pins.

NOTE: GPIO port is powered by analog devices' AD5593R.

NOTE: Each pin has 1K series resistor between the connector and the AD5593R.

Table 8. RS-232 pin definition details

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>Data Carrier Detect</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
<td>Received Data</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
<td>Transmitted Data</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>Data Terminal Ready</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
<td>Data Set Ready</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Request To Send</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Clear To Send</td>
</tr>
</tbody>
</table>
### Table 9. RS-485/RS-422 full duplex pin definition details

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TXD–</td>
<td>Transmit Data A</td>
</tr>
<tr>
<td>2</td>
<td>TXD+</td>
<td>Transmit Data B</td>
</tr>
<tr>
<td>3</td>
<td>RXD+</td>
<td>Receive Data B</td>
</tr>
<tr>
<td>4</td>
<td>RXD–</td>
<td>Receive Data A</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>7</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>8</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>9</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td>Ground</td>
</tr>
</tbody>
</table>

### Table 10. RS-485 half-duplex pin definition details

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data–</td>
<td>(–) TX/RX data</td>
</tr>
<tr>
<td>2</td>
<td>Data+</td>
<td>(+) TX/RX data</td>
</tr>
<tr>
<td>3</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>4</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>7</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>8</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>9</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td>Ground</td>
</tr>
</tbody>
</table>
Installing your Edge Gateway

WARNING: Before you begin any of the procedures in this section, read the safety and regulatory information that is shipped with your system. For additional best practices information, go to www.dell.com/regulatory_compliance.

Safety and regulatory information

WARNING: The Edge Gateway must be installed by knowledgeable, skilled persons familiar with local and/or international electrical codes and regulations.

WARNING: The Edge Gateway is not designed for use in wet environments. If the Edge Gateway is to be installed in a wet environment, depending on the location and environment, it must be installed in a panel box or enclosure with an Ingress Protection (IP) rating of IP54, IP65, or higher.

WARNING: To reduce the risk of electric shock, power to the DC+ and DC- terminals must be provided by a power supply or transformer/rectifier circuit that is designed with double-insulation. The power supply or power circuit source must comply with local codes and regulations; for example, in the USA, NEC Class 2 (SELV/limited energy circuit, or LPS circuitry). If powered by a battery, double-insulation is not required.

WARNING: When installing the Edge Gateway, the responsible party or integrator shall use the 12-57 VDC or Power over Ethernet (PoE) power source 37-57 VDC, with a minimum of 13 W power already present as part of the client’s installation.

WARNING: Ensure that the power source providing power to the Edge Gateway is reliably grounded and filtered such that the peak-to-peak ripple component is less than 10 percent of the input DC voltage.

WARNING: When installing the Edge Gateway, use a cable appropriate for the load currents: 3-core cable rated 5 A at 90°C (194°F) minimum, which conform to either IEC 60227 or IEC 60245. The system accepts cables from 0.8 mm to 2 mm. The maximum operating temperature of the Edge Gateway is 70°C (158°F). Do not exceed this maximum temperature while operating the Edge Gateway inside an enclosure. Internal heating of the Edge Gateway electronics, other electronics, and the lack of ventilation inside an enclosure can cause the operating temperature of the Edge Gateway to be greater than the outside ambient temperature. Continuous operation of the Edge Gateway at temperatures greater than 70°C (158°F) may result in an increased failure rate and a reduction of the product life. Ensure that the maximum operating temperature of the Edge Gateway when placed inside an enclosure is 70°C (158°F) or less.

WARNING: The symbol ![hot surface](image) indicates hot surface or adjacent hot surface that can obtain temperature during normal use that can cause a burn. Allow equipment to cool off or use protective gloves when handling to reduce risk of a burn.

WARNING: Always ensure that the available power source matches the required input power of the Edge Gateway. Check the input power markings next to power connector(s) before making connections. The 12-57 V DC or the PoE power source must be compliant with local Electrical Codes and Regulations.

WARNING: To ensure the protection provided by the Edge Gateway is not impaired, do not use or install the system in any manner other than what is specified in this manual.

WARNING: If a battery is included as part of the system or network, the battery must be installed within an appropriate enclosure in accordance with local fire and electrical codes and laws.

WARNING: The system is for installation in a suitable industrial enclosure (provides electrical, mechanical, and fire hazard protection).
WARNING: The core module only can be wall-mounted (without the need for an additional enclosure).

Professional installation instructions

Installation personnel
This product is designed for specific applications and needs to be installed by qualified personnel with RF and regulatory-related knowledge. The general user shall not attempt to install or change the setting.

Installation location
The product shall be installed at a location where the radiating antenna is kept 20 cm from nearby persons in its normal operation condition in order to meet regulatory RF exposure requirements.

External antenna
Use only approved antenna(s). Non-approved antenna(s) may produce spurious or excessive RF transmitting power which may lead to a violation of FCC/IC limits.

Installation procedure
Refer to user’s manual for installation instructions.

WARNING: Carefully select the installation position and make sure that the final output power does not exceed the limits described in the product’s documentation. The violation of these rules could lead to serious federal penalties.

Instructions d'installation professionnelles

Le personnel d'installation
Ce produit est conçu pour des applications spécifiques et doit être installé par un personnel qualifié avec RF et connaissances réglementaire. L'utilisateur ne doit pas tenter générale d'installer ou de modifier le réglage.

Lieu d'installation
Le produit doit être installé à un endroit où l'antenne de rayonnement est maintenue à 20 cm de personnes à proximité dans son état de fonctionnement normal, afin de répondre aux exigences réglementaires d'exposition aux radiofréquences.

Antenne externe
Utilisez uniquement l'antenne(s) qui ont été approuvés par le demandeur. Antenne (s) peuvent produire de l'énergie RF parasite indésirable ou excessive transmission qui peut conduire à une violation des normes de la FCC / IC est interdite et non-approuvé.

Procédure d'installation
ATTENTION: S'il vous plaît choisir avec soin la position d'installation et assurez-vous que la puissance de sortie final ne dépasse pas les limites fixées dans les règles pertinentes. La violation de ces règles pourrait conduire à des sanctions fédérales graves.

Federal Communication Commission interference statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC caution:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation exposure statement:

This equipment complies with FCC radiation exposure limits for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the active transceiver and your body.

NOTE: The country code selection is for a non-US model only and is not available to all US model. Per FCC regulation, all WiFi products marketed in the US must be fixed to US operation channels only.

Industry Canada statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, the radio transmitter(s) may only operate using an antenna(s) of a type and maximum (or lesser) gain approved for the transmitter(s). To reduce potential radio interference to other users, the antenna type(s) and gain(s) should be chosen so that the Equivalent Isotropic Radiated Power (E.I.R.P.) is not more than what was approved for the transmitter(s).

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This device complies with RSS-210 of Industry Canada. Operation is subject to the condition that this device does not cause harmful interference.

Cet appareil est conforme à la norme RSS-210 d’Industrie Canada. L’opération est soumise à la condition que cet appareil ne provoque aucune interférence nuisible.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except tested built-in radios.
Setting up your Edge Gateway

NOTE: Edge Gateway mounting options are sold separately.

NOTE: Mounting can be done before or after configuring your Edge Gateway.

1. Connect an Ethernet cable to Ethernet port one.

2. Connect the antennas depending on the configuration ordered (optional).
   
   NOTE: The antennas supported in the Edge Gateway vary depending on the configuration ordered.

Table 11. Antennas supported in Edge Gateway 3001
NOTE: Use only the supplied antennas or third-party antennas that meet the minimum specifications.

NOTE: Depending on the configuration ordered, some of the antenna connectors may not be present or may be capped.

NOTE: Mobile broadband antenna connector two is for LTE Auxiliary only, it does not support 3G.

3. Place the antenna onto the connector.

NOTE: If you are installing multiple antennas, follow the sequence as indicated in the following image.

4. Secure the antenna by tightening the rotating head of the connector until it firmly holds the antenna in the preferred position (upright or straight).

NOTE: Antenna images are for illustrative purposes only. Actual appearance may differ from the images provided.
5. Connect all desired cables to the appropriate I/O ports on the Edge Gateway.
6. Open the micro-SIM/micro-SD card access door.
7. Insert a micro-SIM card into the top micro-SIM card slot and activate your mobile broadband service.
CAUTION: Dell recommends that you insert the micro-SIM card before turning on the Edge Gateway.

NOTE: Ensure that you firmly screw back the access door after closing.

NOTE: Contact your service provider to activate your micro-SIM card.

8. Insert a micro-SD card into the bottom micro-SD card slot.

NOTE: Remove the SD card slot filler before inserting micro-SD card.

NOTE: Ensure that you firmly screw back the access door after closing.

9. Connect a grounding cable between the Edge Gateway and the secondary enclosure.
**NOTE:** Secondary enclosures are sold separately.

10. Connect the Edge Gateway to one of the following power sources:

- DC-IN

- PoE
NOTE: Shut down your system before you change the power sources.

11. Replace the dust caps on any unused ports.

12. When setting up the Edge Gateway for the first time, complete the operating system setup. For more information, see Setting up your operating system.

   NOTE: MAC addresses and the IMEI number are available on the label at the front of the Edge Gateway. Remove the label at install.

   NOTE: The Edge Gateway is shipped with Windows 10 IoT Enterprise LTSB 2016 or Ubuntu Core 16 operating system.

   NOTE: The default user name and password for Windows 10 IoT Enterprise LTSB 2016 is admin.

   NOTE: The default user name and password for Ubuntu Core 16 is admin.

13. Access the BIOS by connecting remotely with the Dell Command | Configure application.

    Accessing Dell Command | Configure on Windows 10 IOT Enterprise LTSB 2016

    Click Start → All Programs → Dell → Command Configure → Dell Command | Configure Wizard.

    Accessing Dell Command | Configure on Ubuntu Core 16

    On the systems running Ubuntu Core 16, Dell Command | Configure can be accessed from any location using the command dcc.cctk.


    NOTE: For more information about BIOS settings on the Edge Gateway, see Default BIOS settings.

14. Install the Edge Gateway using one of the following mounting options:

    NOTE: An open space of 63.50 mm (2.50 in) is recommended around the Edge Gateway for optimal air circulation.

    • Standard mount
    • DIN rail mount
    • Quick mount
    • Perpendicular mount
    • Cable control bar
Activating your mobile broadband service

⚠️ CAUTION: Before turning on the Edge Gateway, insert the micro-SIM card.

 świeza

NOTE: Ensure that the service provider has already activated the micro-SIM card before using it in the Edge Gateway.

1. Remove the screw to open the micro-SIM card access door.
2. Insert a micro-SIM card into the top micro-SIM card slot.
3. Replace the screw, and close the micro-SIM card access door.
4. Turn on the Edge Gateway.
5. Connect to a mobile network.

Windows operating system

a. Click the network icon from the taskbar, and then click Cellular.
b. Select Mobile Broadband Carrier → Advanced Options.
c. Make a note of the International Mobile Equipment Identity (IMEI) and Integrated Circuit Card Identifier (ICCID).
d. Enter your APN number and other necessary credentials that your service provider requires.

Ubuntu operating system

a. Open the Terminal window.
b. Enter $sudo su - to access super user mode.
c. Configure the Mobile Broadband connection profile:
   Command line:
   ```
   network-manager.nmcli con add type <type> ifname <ifname> con-name <connection-name> apn <apn>
   
   Example (Verizon):
   ```
   network-manager.nmcli con add type gsm ifname cdc-wdm0 con-name VZ_GSMDEMO apn vzwinternet
Example (AT&T):
```
network-manager.nmcli con add type gsm ifname cdc-wdm0 con-name ATT_GSMDEMO apn broadband
```
Example (3G):
```
network-manager.nmcli con add type gsm ifname cdc-wdm0 con-name 3G_GSMDEMO apn internet
```
d. Connect to the mobile network:
Command line:
```
network-manager.nmcli con up <connection-name>
```
Example (Verizon):
```
network-manager.nmcli con up VZ_GSMDEMO
```
Example (AT&T):
```
network-manager.nmcli con up ATT_GSMDEMO
```
Example (3G):
```
network-manager.nmcli con up 3G_GSMDEMO
```
To disconnect from the mobile network:
Command line: `network-manager.nmcli con down <connection-name>`
Example (Verizon):
```
network-manager.nmcli con down VZ_GSMDEMO
```
Example (AT&T):
```
network-manager.nmcli con down ATT_GSMDEMO
```
Example (3G):
```
network-manager.nmcli con down 3G_GSMDEMO
```

## Mounting your Edge Gateway

- **NOTE:** Mounting can be completed before or after configuring your Edge Gateway.
- **NOTE:** Mounting options are sold separately. Mounting instructions are available in the documentation shipped with the mounting device.

### Mounting the Edge Gateway using the standard-mount bracket

**Mounting dimensions**
NOTE: The mounting brackets are shipped with only those screws that are required for securing the mounting brackets to the Edge Gateway.

1. Secure the standard-mount bracket to the back of the Edge Gateway by using the four M4×4.5 screws.

   NOTE: Torque the screws at 8 ± 0.5 kilograms-centimeter (17.64 ± 1.1 pounds-inch).
2. Place the Edge Gateway against the wall, and align the holes in the standard-mount bracket with the holes on the wall. Screw holes on the bracket have a diameter of 3 mm (0.12 in).
3. Place the standard-mount bracket on the wall, and using the holes above the screw holes on the bracket, mark the positions to drill the four holes.
4. Drill four holes in the wall as marked.

5. Insert and tighten four screws (not supplied) to the wall. Purchase screws that fit the diameter of the screw holes.
6. Align the screw holes on the standard-mount bracket with the screws on the wall, letting the assembly hang on the screws.
7. Tighten the screws to secure the assembly to the wall.
Mounting the Edge Gateway on a DIN rail using the DIN-rail bracket

NOTE: The DIN-rail bracket includes the screws that are required for securing the bracket to the Edge Gateway.

1. Align the screw holes on the DIN-rail bracket with the screw holes at back of the Edge Gateway.
2. Place the two M4x7 screws on the DIN-rail bracket and secure it to the Edge Gateway.
3. Secure the DIN-rail mounting bracket to the Edge Gateway by using the two M4x7 screws provided.

   \[\text{NOTE: Torque the screws at 8±0.5 kilograms-centimeter (17.64±1.1 pounds-inch) on the DIN-rail mounting bracket.}\]
4. Place the Edge Gateway on the DIN rail at an angle, and then pull the Edge Gateway down to compress the springs at the top of the DIN-rail mounting bracket.

5. Push the Edge Gateway towards the DIN-rail bracket to secure the lower clip of the bracket onto the DIN rail.
Mounting the Edge Gateway using the quick-mount bracket

NOTE: For more information about demounting the DIN-rail, see Demounting DIN rail.

The quick-mount bracket is a combination of the standard-mount bracket and the DIN-rail bracket.

NOTE: The mounting brackets are shipped with only those screws that are required for securing the mounting brackets to the Edge Gateway.

Mounting dimensions

Mounting instructions

1. Place the standard-mount bracket on the wall, and using the holes above the screw holes on the bracket, mark the positions to drill the four holes.
2. Drill four holes in the wall as marked.

3. Insert and tighten four screws (not supplied) to the wall. Purchase screws that fit the diameter of the screw holes.
4. Align the screw holes on the standard-mount bracket with the screws on the wall, letting the bracket hang on the screws.
5. Tighten the screws to secure the assembly to the wall.
6. Align the screw holes on the DIN-rail bracket with the screw holes at the back of the Edge Gateway.

7. Place the two M4x7 screws on the DIN-rail bracket and secure it to the Edge Gateway.
8. Place the Edge Gateway on the standard mount at an angle, and then pull the Edge Gateway down to compress the springs at the top of the DIN-rail bracket.
9. Push the Edge Gateway towards the DIN-rail brackets to secure it on the standard-mount bracket.
NOTE: For more information about demounting the DIN-rail, see Demounting DIN rail.

Mounting the Edge Gateway using the perpendicular mount

NOTE: The perpendicular mount is designed for DIN-rail applications only.

1. Align the screw holes on the perpendicular-mount bracket with the screw holes on the Edge Gateway.
2. Tighten the four M4x7 screws to secure the Edge Gateway to the perpendicular-mount bracket.

NOTE: Torque the screws at 8±0.5 kilograms-centimeter (17.64±1.1 pounds-inch).
3. Align the screw holes on the DIN-rail mount bracket with the screw holes on the perpendicular-mount bracket, and tighten the two screws.

NOTE: Torque the screws at 8±0.5 kilograms-centimeter (17.64±1.1 pounds-inch).
4. Place the Edge Gateway on the DIN rail at an angle and push the Edge Gateway down to compress the springs on the DIN-rail mount brackets.

5. Push the Edge Gateway towards the DIN-rail brackets to secure the bottom of the bracket to the DIN rail.
6. Push the Edge Gateway towards the DIN-rail brackets to secure the lower clip of the bracket onto the DIN rail.

7. Secure the Edge Gateway on the DIN rail.
Attaching the cable control bars to the standard-mount bracket

1. Mount the Edge Gateway on the wall using the standard-mount bracket or quick-mount bracket.
2. Place the cable control bar on the mounting bracket and secure it to the notch.

⚠️ CAUTION: Use the top cable control bar only with coaxial cable connections. Do not use with antennas.
3. Align the screw holes on the cable control bar with the screw holes on the mounting bracket.

4. Tighten the six M3 x 3.5 mm screws that secure the cable control bar to the mounting bracket.

NOTE: Torque the screws at 5±0.5 kilograms-centimeter (11.02±1.1 pounds-inch).
5. Connect the cables to the Edge Gateway.
6. Loop the cable lock (not supplied) to secure each cable to the cable control bar.
Mounting the Edge Gateway using a VESA mount

The Edge Gateway can be mounted on a standard VESA mount (75 mm x 75 mm).

⚠️ NOTE: The VESA mount option is sold separately. For VESA mounting instructions, see the documentation that is shipped with the VESA mount.
Setting up the ZigBee dongle

⚠️ CAUTION: Do not connect the ZigBee dongle if the Edge Gateway is installed inside the enclosure.

1. Turn off your Edge Gateway.
2. Connect the ZigBee dongle to any external USB port on your Edge Gateway.

3. Turn on your Edge Gateway, and complete the setup.

⚠️ NOTE: For more information about the ZigBee development, see www.silabs.com.
Setting up the operating system

⚠️ **WARNING:** To prevent operating system corruption from sudden power loss, use the operating system to gracefully shut down the Edge Gateway.

The Edge Gateway is shipped with one of the following operating systems:

- Windows 10 IoT Enterprise LTSB 2016
- Ubuntu Core 16

**NOTE:** For more information about Windows 10 operating system, see [https://support.microsoft.com/en-us](https://support.microsoft.com/en-us).

**NOTE:** For more information about the Ubuntu Core 16 operating system, see [www.ubuntu.com/desktop/snappy](http://www.ubuntu.com/desktop/snappy).

**Windows 10 IoT Enterprise LTSB 2016**

**Overview**

The Edge Gateway is shipped with Windows 10 IoT Enterprise LTSB 2016. For more information about Windows 10 operating system, see [https://support.microsoft.com/en-us](https://support.microsoft.com/en-us).

**Boot up and login—Remote system configuration**

⚠️ **NOTE:** The Edge Gateway 3003 can also be configured remotely.

1. Connect a network cable from the Ethernet port one on the Edge Gateway to a DHCP-enabled network or router that provides IP addresses.

   ⚠️ **NOTE:** The first-time boot to Windows takes about five minutes for system configuration. Subsequent boots take approximately 50 seconds.

2. Using the MAC address, obtain the IP address through your network’s DHCP server or through a network analyzer.

3. On the Windows computer, search for **Remote Desktop Connection** and launch the application.

4. Log in using the IP address or with the following details:

   - Computer name: D+<Service Tag>
   - User name: admin
   - Password: admin

   ⚠️ **NOTE:** Your computer must be on the same subnet as the Edge Gateway.

   ⚠️ **NOTE:** Ignore any certification errors when connecting to your Edge Gateway.
Restoring Windows 10 IoT Enterprise LTSB 2016

You can restore Windows 10 IoT Enterprise LTSB 2016 on the Edge Gateway using the recovery USB image. You can download and save the ISO recovery image file from [www.dell.com/support](http://www.dell.com/support). The recovery USB image resets the run-time image back to the factory image.

1. Insert the USB flash drive into the USB port on the Edge Gateway.
2. Turn on the Edge Gateway.
   The USB flash drive automatically boots and installs Windows. The Edge Gateway turns off after the USB installation is complete. The USB installation takes approximately 25 minutes to complete.
3. Remove the USB flash drive after the Edge Gateway turns off.
4. Turn on the Edge Gateway without connecting the USB flash drive.
   The provisioning of the Edge Gateway begins automatically. After five minutes, the system is ready for Remote Desktop Protocol (RDP).
5. Look up the IP address from the DHCP client list using the MAC address provided. (LAN 2, where applicable, is set to the factory Static IP address)
6. Use Remote Desktop Connection to connect to the device through an IP address.

Creating the recovery USB flash drive

**Prerequisites**:
- Dell ISO recovery image. Download and save the Dell ISO recovery image file from [www.dell.com/support](http://www.dell.com/support).
- Dell OS Recovery Tool. Download and install the Dell OS Recovery Tool on your computer.
- A blank USB flash drive with at least 8 GB of storage space.
- .NET Framework 4.5.2 or higher
- A working computer with administrator user rights and at least 8 GB of available data storage to download the Dell ISO recovery image.

1. Double-click the **Dell OS Recovery Tool** icon from your desktop. Click **Yes** in the **User Account Control** prompt.
2. Connect the USB flash drive to the computer.
3. Click **Browse** and browse to the location where the Dell ISO recovery image file is saved.
4. Select the Dell ISO recovery image file and click **Open**.
5. Click **Start** to begin creating the bootable USB recovery media.
   **NOTE:** A message appears indicating that all the data on the USB flash drive will be lost. Ensure to backup any existing data on the USB flash drive. Click **Yes** to continue.
6. Click **OK** to complete.

Windows 10 IOT Enterprise LTSB 2016 basic functions

**BIOS Update**

Download BIOS updates for the Edge Gateway from [www.dell.com/support](http://www.dell.com/support). The download includes an executable file that may be ran from the local machine.

**Watchdog Timer**

The Watchdog Timer for Windows 10 IoT Enterprise LTSB 2016 is controlled through the BIOS setting. The Watchdog Timer is enabled and disabled under the BIOS setting **Watchdog Timer**.

**NOTE:** For more information about BIOS settings on the Edge Gateway, see [Default BIOS settings](http://www.dell.com/support).
Cloud LED

NOTE: To utilize the Cloud LED, download the necessary tools and drivers from www.dell.com/support.

One unique feature of the Edge Gateway 3000 Series is the Cloud LED. Cloud LED enables you to visually inspect the operational status of the Edge Gateway by looking at the display light on the left panel of the Edge Gateway.

To enable this feature, you must expose and program a GPIO register on the Edge Gateway.

Follow these steps to control the Cloud LED on the Edge Gateway:
1. Download the Cloud LED utility from www.dell.com/support.
2. Extract the following files:
   a. DCSTL64.dll
   b. DCSTL64.sys
   c. DCSTL64.inf
   d. DCSTL64.cat
   e. CloudLED.exe

   NOTE: These files must be in the same directory.
3. Run the CloudLED.exe from Command Prompt or Power Shell with administrative rights. The accepted commands are as follows:
   • CloudLED.exe ON
   • CloudLED.exe OFF

TPM Support

Windows 10 IoT Enterprise LTSB 2016 supports TPM 2.0. For more information about TPM resources, see technet.microsoft.com/en-us/library/cc749022(v=ws.10).aspx.

System Shutdown and Restart

Click Start and then press Power then Restart or Shutdown the Edge Gateway.

LAN/WLAN Network configuration

Click Start and then type 6HWWLQJV and open the Settings window. Select Network & Internet from the settings menu.

Bluetooth configuration

Click Start and then type 6HWWLQJV and open the Settings window. Select Devices from the settings menu and then select Bluetooth from the menu on the left panel.

WWAN (5815) Network configuration

NOTE: Ensure that the micro-SIM card is already activated by your service provider before using it in the Edge Gateway. For more information, see activate your mobile broadband service.

Follow the Service Manual to install and configure the WWAN module and the corresponding micro-SIM card for the system. Follow these steps after the WWAN module (5815) and the micro-SIM cards are installed:
1. Click Start and then type Settings and open the Settings window.
2. Select Network & Internet from the Settings menu.
3. Locate the WWAN connection in the Wi-Fi section and select the entry to connect and disconnect from the WWAN adapter.
Ubuntu Core 16

Overview

Ubuntu Core 16 is a Linux OS distribution that is an entirely new mechanism for managing a system and its applications. For more information about Ubuntu Core 16 OS, see

- [www.ubuntu.com/cloud/snappy](http://www.ubuntu.com/cloud/snappy)

Prerequisites

Infrastructure

An active connection to the internet is needed to update the Ubuntu Core 16 operating system as well as applications (snaps).

Prior knowledge

- Internet connection
- Knowledge of:
  - Unix/Linux commands
  - Serial communication protocol
  - SSH terminal emulators (for example, PuTTY)
  - Network settings (for example, proxy URL)

Boot up and log in

NOTE:

Turn on the Edge Gateway. The system sets up the operating system automatically and restarts multiple times to apply all the configurations. The system takes approximately one minute to boot to the operating system.

When prompted, log in using the default credentials. The default user name and password is `admin` (both lowercase), and the default computer name is the service tag.

For example;

```
DGPLQ#ORFDOKRVW
```

Updating operating system and applications

After enabling the network connections, and connecting to the internet, it is recommended to have the latest OS components and applications installed. To update Ubuntu Core 16, run the `admin@localhost:~$ sudo snap refresh` command.

Viewing operating system and application versions

Running command,
```
admin@localhost:~$ sudo uname -a
```
returns
```
Linux ubuntu.localdomain 4.4.30-xenial_generic #1 SMP Mon Nov 14 14:02:48 UTC 2016 x86_64 x86_64 x86_64 GNU/Linux
```
Running command,
```
admin@localhost:~$ sudo snap list
```
returns
**Useful commands**

To access the built-in help, run the `admin@localhost:~$ sudo snap --help` command.

To see a list of all the snaps that are currently installed, run the `admin@localhost:~$ sudo snap list` command.

### Updating the system name

Run the following command:

```
admin@localhost:$ network-manager.nmcli general hostname <NAME>
```

### Changing the time zone

When the system arrives from the factory, the OS is usually set to UTC time zone. To change the time zone to your location, you will must run the command:

```
admin@localhost:~$ sudo timedatectl --help
```

* the help file above will tell you commands you need to know.

### System reboot

Run the following command:

```
admin@localhost:$ sudo reboot
```

Returns:

System reboot successfully

### Root user credential

Run the following command:

```
admin@localhost:$ sudo su -
```

Returns:

```
$ admin@localhost:~$ sudo su -
$ root@localhost:~$
```

### UEFI capsule update capability

**NOTE:** For more information about fwupd commands, see [www.fwupd.org/users](http://www.fwupd.org/users).

This `fwupdmgr` tool or commands are used to update the UEFI BIOS firmware on the system. The UEFI BIOS for this platform is released through online Linux Vendor File System (LVFS) based methods.

It is recommended to enable the Capsule update by default so that it is running in the background to get the system firmware up-to-date.
Follow these steps to perform an offline BIOS firmware update (locally):

1. Extract the firmware.cab file from BIOS-XXXXXX.zip.
2. Check the current firmware details.
   $ sudo uefi-fw-tools.fwupdmgr get-devices
   $ sudo cp firmware.cab /root/snap/uefi-fw-tools/common/
4. Check the details of the firmware from the .zip file.
   $ sudo uefi-fw-tools.fwupdmgr get-details [Full path of firmware.cab]
5. Apply the update.
   $ sudo uefi-fw-tools.fwupdmgr install [Full path of firmware.cab] -v --allow-older --allow-reinstall
6. Check the EFI boot details.
   $ sudo efibootmgr -v
7. Restart the system.
   $ sudo reboot

Follow these steps to perform an online BIOS firmware update:

1. Ensure that the path to LVFS server is correct.
   /var/snap/uefi-fw-tools/3/etc/fwupd.conf
2. Set the URL to the following location:
   https://secure-lvfs.rhcloud.com/downloads/firmware-c1255377a9c3465f605183b8b648e57a5202a890.xml.gz
3. Check current firmware details.
   $sudo uefi-fw-tools.fwupdmgr get-devices
4. Check if the update is available from LVFS service.
   $sudo uefi-fw-tools.fwupdmgr refresh
5. Download the firmware.
   $sudo uefi-fw-tools.fwupdmgr get-updates
6. Apply the update.
   $sudo uefi-fw-tools.fwupdmgr update -v --allow-older --allow-reinstall
7. Check EFI boot details.
   $ sudo efibootmgr -v
8. Restart the system.
   $ sudo reboot

**System Service Tag identity**

Run the following command:

admin@localhost:$ cat /sys/class/dmi/id/product_serial

The system tag is printed.

**Dell/OEM system identity**

Run the following commands:

admin@localhost:$ cat /sys/class/dmi/id/board_vendor

Returns:

Dell Inc.

Or
System PowerOff

Run the following command:

```
admin@localhost:$ sudo poweroff
```

The system shuts down successfully.

Network communication interfaces

The Edge Gateway 3000 series comes with one Ethernet connection, one 802.11b/g/n wireless network connection, and one Bluetooth network connection.

Ethernet (Port 1, eth0)

Assuming that you have an internet-enabled Ethernet cable plugged into Port1, your screen should be similar to the one below after running the `ifconfig` command. If the WLAN and Bluetooth are not configured, they are not displayed in the network device list.

```
admin@localhost:~$ ifconfig
```

After running the `ifconfig` command:

```
eth0 Link encap:Ethernet HWaddr 74:e6:e2:e3:0f:12
    inet addr:192.168.28.216 Bcast:192.168.28.255 Mask:255.255.255.0
    inet6 addr: fe80::76e6:e2ff:fee3:f12/64 Scope:Link
    UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
    RX packets:11 errors:0 dropped:0 overruns:0 frame:0
    TX packets:19 errors:0 dropped:0 overruns:0 carrier:0
    Collisions:0 txqueuelen:1000
    RX bytes:1740 (1.7 KB) TX bytes:2004 (3.0 KB)
lo    Link encap:Local Loopback
    inet addr:127.0.0.1 Mask:255.0.0.0
    inet6 addr: ::1/128 Scope:Host
    UP LOOPBACK RUNNING MTU:65536 Metric:1
    RX packets:160 errors:0 dropped:0 overruns:0 frame:0
    TX packets:160 errors:0 dropped:0 overruns:0 carrier:0
    Collisions:0 txqueuelen:1000
    RX bytes:13920 (13.9 KB) TX bytes:13920 (13.9 KB)
```

WLAN (wlan0)

Use these identifiers in the following examples:

- `<ssidname>` = `iotisvlab`, where `ssid` is the name of access point.
- `<name>` = `testwifi`, where name is the connection name, which is basically a connection identifier.
- `<keytype>` = `wpa-psk`, where `keytype` is the WLAN key management security type being used.
- `<passco>` = `happy`, where `passco` is the WLAN passcode or password for the access point.

Enter the following at the command prompt to view the network interfaces.

```
$ network-manager.nmcli d
```

Enter the following at the command prompt to find a list of available access points.

```
$ network-manager.nmcli d wifi
```

Run the following commands and replace `$SSID`, `$PSK`, and `$WIFI_INTERFACE` of your environment.

```
Connect
$ sudo network-manager.nmcli dev wifi connect $SSID password $PSK ifname $WIFI_INTERFACE
OR
$ sudo network-manager.nmcli dev wifi connect $SSID password $PSK
```
•  Disconnect

$ sudo network-manager.nmcli dev disconnect $WIFI_INTERFACE

Enter the following at the command prompt to add a connection to the system.

$ >: network-manager.nmcli con add con-name <name> ifname wlan0 type wifi ssid <ssidname>

For example:

$ >: network-manager.nmcli con add con-name testwifi ifname wlan0 type wifi ssid iotisvlab

Enter the following at the command prompt to provide the system what passkey is used on the access point.

$ >: network-manager.nmcli con modify <name> wifi-sec.key-mgmt <keytype>

For example:

$ >: network-manager.nmcli con modify testwifi wifi-sec.key-mgmt wpa-psk

Enter the following at the command prompt to provide the system what is the pass code for the access point.

$ >: network-manager.nmcli con modify <name> wifi-sec.psk <passco>

For example:

$ >: network-manager.nmcli con modify testwifi wifi-sec.psk happy

Enter the following at the command prompt to bring up the connection (allows it to connect to the access point and get an IP address).

$ >: network-manager.nmcli con up id <name>

For example:

$ >: network-manager.nmcli con up id testwifi

Bluetooth

Run the following commands (For example, bluetooth keyboard):

1. Start the bluetoothctl console.
   
   #bluez.bluetoothctl -a

2. Turn on the device.
   
   $ power on

3. Register the agent for keyboard.
   
   $ agent KeyboardOnly
   $ default-agent

4. Put the controller in pairable mode.
   
   $ pairable on

5. Scan for nearby bluetooth device.
   
   $ scan on

6. Stop scanning after the bluetooth keyboard is found.
   
   $ scan off

7. Pair bluetooth devices.
   
   $ pair <MAC address of bluetooth keyboard>

8. Enter PIN code on the bluetooth keyboard, if required.

9. Trust the bluetooth keyboard.
   
   $ trust [MAC address of bluetooth keyboard]

10. Connect to the bluetooth keyboard.
    
    $ connect [MAC address of bluetooth keyboard]

11. Close the bluetoothctl console.
    
    $ quit
You can start using the Bluetooth keyboard.

**Software enabled Access Point (SoftAP)**

The Software enabled Access Point (SoftAP) feature depends on the WiFi card and associated driver support to act as a wireless access point.

Run the following commands:

1. Check the access point status.
   
   `$ wifi-ap.status`

2. By default, SoftAP is disabled. Turn on SoftAP.
   
   `$ wifi-ap.config set disabled=false`

3. To secure the WiFi access point with WPA 2 personal, change two configuration items.
   
   `$ wifi-ap.config set wifi.security=wpa2 wifi.security-passphrase=Test1234`

   This enables WPA2 security with the passphrase set to Test1234.

   **NOTE:** If the passphrase contains any special characters or space, ensure that it is added correctly. For example 'My WiFi', 'Pa$$word', or "Alan's AP".

**Security**

**Trusted Platform Module (TPM)**


TPM is supported only on devices that have TPM hardware and for those products which offers Snappy enhanced security support. The TPM on/off setting is configurable in the firmware and manageable in the operating system.

Running command:

```
admin@localhost:$ ls /dev/tpm0
```

If TPM is turned off, the device node (/dev/tpm0) does not exist.

```
(plano)ubuntu@localhost:$ ls /dev/tpm0
ls: cannot access /dev/tpm0: No such file or directory
```

If TPM is turned on, the device node (/dev/tpm0) exists.

```
(plano)ubuntu@localhost:$ ls /dev/tpm0
/dev/tpm0
```

**Watchdog Timer (WDT)**

**NOTE:** For more information about Watchdog Timer (WDT) commands, see [www.sat.dundee.ac.uk/~psc/watchdog/Linux-Watchdog.html](http://www.sat.dundee.ac.uk/~psc/watchdog/Linux-Watchdog.html).

It is recommended to enable the WDT by default to activate the fail-safe circuitry. Snappy, a WDT-compatible operating system provides capability to detect and recover the system from malfunctions or unexpected crashes.

Running command:

```
admin@localhost:$ systemctl show | grep -i watchdog
```

Returns:

```
RuntimeWatchdogUSec=10s
ShutdownWatchdogUSec=10min
```

**NOTE:** The default value is 10. The actual value should be greater than 0.
Restoring Ubuntu Core 16

⚠️ CAUTION: Following the steps deletes all the data on your system.

The following steps refer to different methods through which the Ubuntu Core 16 operating system can be restored to the factory image.

External storage

On supported platforms, you can download the factory image from www.dell.com to restore your Edge Gateway by external media kit. For more information, see www.dell.com/support/article/us/en/19/SLN301761.

Run the following command to trigger native eMMC recovery partition.

```bash
$ sudo efibootmgr -n $(efibootmgr | grep "factory_restore" | sed 's/Boot//g' | sed 's/[^0-9A-B]*//g'); reboot
```

Flashing a new OS image

Prerequisites

- USB 2.0 or USB 3.0 flash drive with a minimum capacity of 4 GB
- Ubuntu Desktop ISO
  
- A released Ubuntu Core 16 image from Dell/Canonical: <unique name> img.xz
- Dell Edge Gateway 3000 series hardware
- USB keyboard
- USB mouse
- Ubuntu workstation with Ubuntu 14.04 or higher

Flashing new Ubuntu OS image

1. Insert a USB flash drive into the Ubuntu Desktop workstation.
3. Flash the installation image to USB flash drive.
   a. Start the Terminal application. It can be found by typing Terminal in the Unity Dash.
   
   ⚠️ CAUTION: The dd command erases the content of the drive it writes to.
   
   b. Type the following command and press Enter.
      ```bash
      xzcat /cdrom/ caracalla-20161020-3.img.xz | sudo dd of=/dev/sdb bs=32M; sync
      ```
      
      📌 NOTE: The sdb may have to be replaced with the actual name of the drive on the system.
   
4. Unmount and remove USB flash drive.
5. Connect the power, keyboard, monitor, and the Ethernet cable, to your Edge Gateway.
6. Insert the USB flash drive into your Edge Gateway.
7. Turn on and boot-up the Edge Gateway from the USB flash drive.
   The installation USB flash drive flashes the Ubuntu Core 16 installation image into storage automatically. After the installation is complete, it will shutdown the system.
8. Remove the USB flash drive.
9. Restart the system.
   Ubuntu Core 16 is installed on your Edge Gateway.
BIOS and UEFI

BIOS overview

The BIOS enables enterprise class security and manageability. You can use Dell Command | Configure (DCC) and Edge Device Manager (EDM) to configure the BIOS settings on the Edge Gateway.

DCC is factory installed in the Edge Gateway and configures the BIOS settings. It consists of a Command Line Interface (CLI) to configure various BIOS features.

EDM enables you to perform remote management and system configuration. By using the EDM cloud console, you can view and configure the BIOS settings. For more information about the Edge Device Manager, see www.dell.com/support/home/us/en/19/product-support/product/wyse-cloud-client-manager/research.

Accessing BIOS

1. Connect to the Edge Gateway remotely on a Windows computer.
   For more information about connecting to the Edge Gateway, see Remote system configuration.
   • On Windows: Click Start → All Programs → Command Configure → Dell Command | Configure Wizard.
   • On Ubuntu Core 16: On the connected computer running Ubuntu Core, access Dell Command | Configure using the command dcc.cct.k.

   For more information on how to use the Dell Command | Configure application, see the Dell Command | Configure Installation Guide and User's Guide at www.dell.com/dellclientcommandssuitemanuals.

   For more information about BIOS settings on the Edge Gateway, see Default BIOS settings.

Flashing BIOS

You must flash or update the BIOS when the BIOS program is updated. The procedure to update the BIOS varies depending on the operating system installed.

Windows 10 IoT Enterprise LTSB 2016

Update the BIOS using the following methods:

• USB Invocation Script
• Dell Command | Configure (DCC)
• Edge Device Manager (EDM)

USB Invocation script

The Edge Gateway 3000 Series come in headless configurations—that is, configurations without any video output. Certain basic system administration tasks traditionally accomplished by the BIOS Setup program are not possible without video. Therefore, in order to provide the ability to perform these system administration tasks, Edge Gateways contain a facility for running a script file from a USB flash drive containing a limited set of BIOS commands.
For more information about USB Invocation script, see *Edge Gateway USB script utility User's Guide*.

**Dell Command | Configure (DCC)**

Use DCC to update and configure the BIOS settings.

For more information on how to use the Dell Command | Configure application, see the Dell Command | Configure *Installation Guide* and *User's Guide* at www.dell.com/dellclientcommandsuitemanuals.

For more information about BIOS settings on the Edge Gateway, see [Default BIOS settings](#).

**Edge Device Manager (EDM)**

BIOS can be updated remotely through the EDM console connected to a remote system.


**Ubuntu Core 16**

Update the BIOS using the following methods:

- UEFI capsule update
- Dell Command | Configure (DCC)
- Edge Device Manager (EDM)

**UEFI capsule update**

The fwupgmgr tool or commands are used to update UEFI BIOS firmware on the system.

For more information about UEFI capsule update methods, see [UEFI capsule update capability](#).

**Dell Command | Configure (DCC)**

Use DCC to update and configure the BIOS settings.

For more information on how to use the Dell Command | Configure application, see the Dell Command | Configure *Installation Guide* and *User's Guide* at www.dell.com/dellclientcommandsuitemanuals.

For more information about BIOS settings on the Edge Gateway, see [Default BIOS settings](#).

**Edge Device Manager (EDM)**

BIOS can be updated remotely through the EDM console connected to a remote system.

References

In addition to the Installation and Operation Manual, you can see the following documents available at www.dell.com/support/manuals:

- Dell Edge Gateway Specifications
- Dell Edge Gateway Service Manual
- Dell SupportAssist For Dell OpenManage Essentials Quick Start Guide
- Dell Command | Configure User's Guide
- Dell Command | Configure Reference Guide
- Dell Command | Monitor User's Guide
- Dell Command | PowerShell Provider User's Guide

For more information on using Dell Data Protection | Encryption see the documentation for the software at www.dell.com/support/manuals.
Appendix

Antenna specifications

The Edge Gateway is a professionally installed equipment. The Radio Frequency output power does not exceed the maximum limit allowed in the country of operation.

⚠️ CAUTION: Unauthorized antennas, modifications, or attachments may damage the device and potentially violate international regulations.

⚠️ NOTE: Use only the supplied or an approved replacement antenna.

⚠️ NOTE: Modifications to the device and/or use of unauthorized antennas not expressly approved by Dell is the sole responsibility of the user or configurator or operator to reassess the equipment in accordance to all applicable international Safety, EMC, and RF standards.

The Dell authorized antenna specifications are as follows:

- Mobile Broadband
  - Main: Dipole
  - LTE Auxiliary: PIFA
- GPS/WiFi/Zigbee: Monopole

The following tables provide the gain specifications for different antenna positions.

**Table 12. Mobile broadband main antenna maximum gain (dBi)**

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Antenna position—Bent</th>
<th>3G (dBi)</th>
<th>4G (dBi)</th>
<th>Antenna position—Straight</th>
<th>3G (dBi)</th>
<th>4G (dBi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>704~806</td>
<td>2</td>
<td>1.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>824~894</td>
<td>1</td>
<td>1.4</td>
<td>2.1</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>880~960</td>
<td>0.5</td>
<td>1.4</td>
<td>1.4</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1710~1880</td>
<td>3.2</td>
<td>4.2</td>
<td>1.9</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1850~1990</td>
<td>3.9</td>
<td>4.3</td>
<td>3.2</td>
<td>3.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1920~2170</td>
<td>4</td>
<td>4.4</td>
<td>3.2</td>
<td>3.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 13. Mobile broadband auxiliary antenna maximum gain (dBi)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Antenna position—Bent</th>
<th>Antenna position—Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>704–806</td>
<td>0.6</td>
<td>1.9</td>
</tr>
<tr>
<td>824–894</td>
<td>–0.3</td>
<td>–0.1</td>
</tr>
<tr>
<td>880–960</td>
<td>–1.9</td>
<td>–2.5</td>
</tr>
<tr>
<td>1710–1880</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>1850–1990</td>
<td>3.6</td>
<td>3.2</td>
</tr>
<tr>
<td>1920–2170</td>
<td>3.6</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Table 14. WiFi/GPS antenna maximum gain (dBi)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Antenna position—Bent</th>
<th>Antenna position—Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GPS (dBi)</td>
<td>WLAN (dBi)</td>
</tr>
<tr>
<td>1561–1602</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>2400–2500</td>
<td>3.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>

De-mounting from DIN-rail bracket

1. Pull the Edge Gateway down to release from DIN-rail bracket.
2. Lift the Edge Gateway bracket off the DIN rail.
# Default BIOS settings

## System configuration (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated NIC</td>
<td>Integrated NIC</td>
<td>Enable UEFI Network Stack</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Enable/Disable]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Disabled, Enabled, Enabled w/ PXE]</td>
<td>Enabled w/PXE</td>
</tr>
<tr>
<td>USB Configuration</td>
<td>USB Configuration</td>
<td>Enable Boot Support [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable USB 3.0 Controller [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable USB Port1 [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable USB Port2 [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Audio</td>
<td>Enable Audio [Enable/Disable]</td>
<td>Enabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miscellaneous Devices</td>
<td>Enable WWAN [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable WLAN/Bluetooth [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable CANBus [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable ZigBee [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable Dedicated GPS Radio [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enable MEMs Sensor [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Watchdog Timer Support</td>
<td>Watchdog Timer Support</td>
<td>Enable Watchdog Timer [Enable/Disable]</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

## Security (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin Password</td>
<td>Admin Password</td>
<td>Enter the old password</td>
<td>Not Set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter the new password</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confirm new password</td>
<td>Not applicable</td>
</tr>
<tr>
<td>BIOS level 2</td>
<td>BIOS level 3</td>
<td>Item</td>
<td>Default value</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>-----------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>System Password</td>
<td>System Password</td>
<td>Enter the old password</td>
<td>Not Set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter the new password</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confirm new password</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Strong Password</td>
<td>Strong Password</td>
<td>Enable Strong Password [Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td>Password Configuration</td>
<td>Password Configuration</td>
<td>Admin Password Min</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Admin Password Max</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>System Password Min</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>System Password Max</td>
<td>32</td>
</tr>
<tr>
<td>Password Bypass</td>
<td>Password Bypass</td>
<td>[Disabled/Reboot Bypass]</td>
<td>Disabled</td>
</tr>
<tr>
<td>Password Change</td>
<td>Password Change</td>
<td>Allow Non-Admin Password Changes [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>UEFI Capsule Firmware Updates</td>
<td>UEFI Capsule Firmware Updates</td>
<td>Enable UEFI Capsule Firmware Updates [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPM On [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PPI Bypass for Enable Commands [Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PPI Bypass for Disable Commands [Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attestation Enable [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Key Storage Enable [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SHA-256 [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clear [Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td>Computrace(R)</td>
<td>Computrace(R)</td>
<td>Deactivate/Disable/Activate</td>
<td>Deactivate</td>
</tr>
<tr>
<td>Chassis Intrusion</td>
<td>Chassis Intrusion</td>
<td>[Disable/Enable/On-Silent]</td>
<td>Disable</td>
</tr>
<tr>
<td>CPU XD Support</td>
<td>CPU XD Support</td>
<td>Enable CPU XD Support [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Admin Setup Lockout</td>
<td>Admin Setup Lockout</td>
<td>Enable Admin Setup Lockout [Enable/Disable]</td>
<td>Disabled</td>
</tr>
</tbody>
</table>
## Secure boot (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure Boot Enable</td>
<td>Secure Boot Enable</td>
<td>[Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td>Expert Key Management</td>
<td>Expert Key Management</td>
<td>Enable Custom Mode [Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Custom Mode Key Management (PK/KEK/db/dbx)</td>
<td>PK</td>
</tr>
</tbody>
</table>

## Performance (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-States Control</td>
<td>Inter SpeedStep</td>
<td>Enable Intel SpeedStep [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>C-States Control</td>
<td>C-States Control</td>
<td>C states [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Limit CPUID Value</td>
<td>Limit CPUID Value</td>
<td>Enable CPUID Limit [Enable/Disable]</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

## Power management (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto On Time</td>
<td>Auto On Time</td>
<td>Time Selection: [HH:MM A/P ] Auto On Time (if Wake Period =0)</td>
<td>12:00AM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Value Selection: [0-254] Auto-Wake Period (0-254 minutes)</td>
<td>000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Day Selection: [Disabled/Every Day/Weekdays/Select Days]</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Under [Select Days] when enabled [Sunday/Monday.../Saturday]</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Wake on LAN/WLAN</td>
<td>Wake on LAN/WLAN</td>
<td>[Disabled/LAN Only/WLAN only/LAN or WLAN]</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

## POST behavior (BIOS level 1)

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard Errors</td>
<td>Numlock LED</td>
<td>Enable Numlock LED [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Keyboard Errors</td>
<td>Keyboard Errors</td>
<td>Enable Keyboard Error Detection [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>BIOS level 2</td>
<td>BIOS level 3</td>
<td>Item</td>
<td>Default value</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>Fastboot</td>
<td>Fastboot</td>
<td>[Minimal/Thorough/Auto]</td>
<td>Thorough</td>
</tr>
<tr>
<td>Extend BIOS POST Time</td>
<td>Extend BIOS POST Time</td>
<td>[0 seconds/5 seconds/10 seconds]</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Full Screen Logo</td>
<td>Enable Full Screen Logo</td>
<td>[Enable/Disable]</td>
<td>Disabled</td>
</tr>
<tr>
<td>Warnings and Errors</td>
<td>Warnings and Errors</td>
<td>[Prompt on Warnings and Errors/Continue on Warnings/Continue on Warnings and Errors]</td>
<td>Prompt on Warnings and Errors</td>
</tr>
</tbody>
</table>

**Virtualization support (BIOS level 1)**

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtualization</td>
<td>Virtualization</td>
<td>Enable Intel Virtualization Technology [Enable/Disable]</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

**Maintenance (BIOS level 1)**

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Tag</td>
<td>Service Tag</td>
<td>&lt;System Service Tag&gt;, text entry capability when blank</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Asset Tag</td>
<td>Asset Tag</td>
<td>&lt;System Asset Tag&gt;, text entry capability</td>
<td>Not applicable</td>
</tr>
<tr>
<td>SERR Messages</td>
<td>SERR Messages</td>
<td>Enable SERR Messages [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>BIOS Downgrade</td>
<td>BIOS Downgrade</td>
<td>Allow BIOS Downgrade [Enable/Disable]</td>
<td>Enabled</td>
</tr>
<tr>
<td>Data Wipe</td>
<td>Data Wipe</td>
<td>Wipe on Next Boot [Enable/Disable]</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

**System logs (BIOS level 1)**

<table>
<thead>
<tr>
<th>BIOS level 2</th>
<th>BIOS level 3</th>
<th>Item</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Events</td>
<td>BIOS Events</td>
<td>List of BIOS events with &quot;Clear Log&quot; button to clear the log</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Contacting Dell

To contact Dell for sales, technical assistance, or customer service issues:

2. Verify your country or region in the drop-down list at the bottom of the page.
3. Select the appropriate service or support link based on your requirement or choose the method of contacting Dell that is convenient for you.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area.

NOTE: If you do not have an active internet connection, you can find the contact information on your purchase invoice, packing slip, bill, or Dell product catalog.