ChengMing 3988

Service Manual

Regulatory Model: D19M
Regulatory Type: D19M005

DELL EMC

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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Contents

1

Working on your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

NOTE: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

Turning off your computer — Windows 10

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer or remove the side cover.

1. Click or tap  .
2. Click or tap and then click or tap **Shut down**.

   NOTE: Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

Before working inside your computer

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that you follow the Safety instructions.
2. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.

3. Turn off your computer.
4. Disconnect all the network cables from the computer.

   CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
5. Disconnect your computer and all attached devices from the electrical outlets.
6. Press and hold the power button while the computer is unplugged to ground the system board.

   NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

After working inside your computer

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

1. Connect any telephone or network cables to your computer.

   CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.
2. Connect your computer and all attached devices to their electrical outlets.
3. Turn on your computer.
4. If required, verify that the computer works correctly by running **ePSA diagnostics**.

2

Technology and components

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

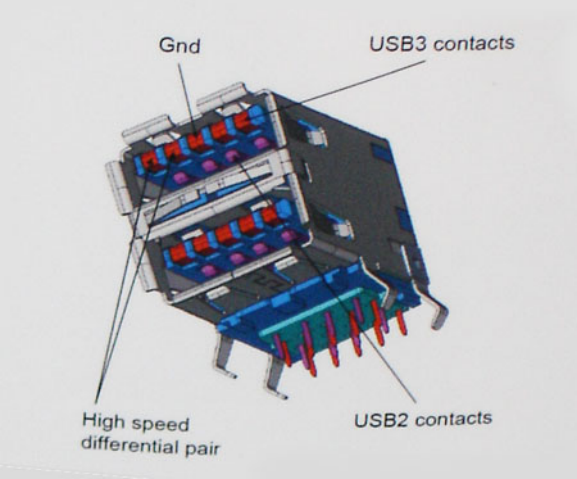
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

HDMI 1.4

This topic explains the HDMI 1.4 and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The intended applications for HDMI TVs, and DVD players. The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

NOTE: The HDMI 1.4 will provide 5.1 channel audio support.

HDMI 1.4 Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality

Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low -cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality

3

Removing and installing components

Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

NOTE: The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4

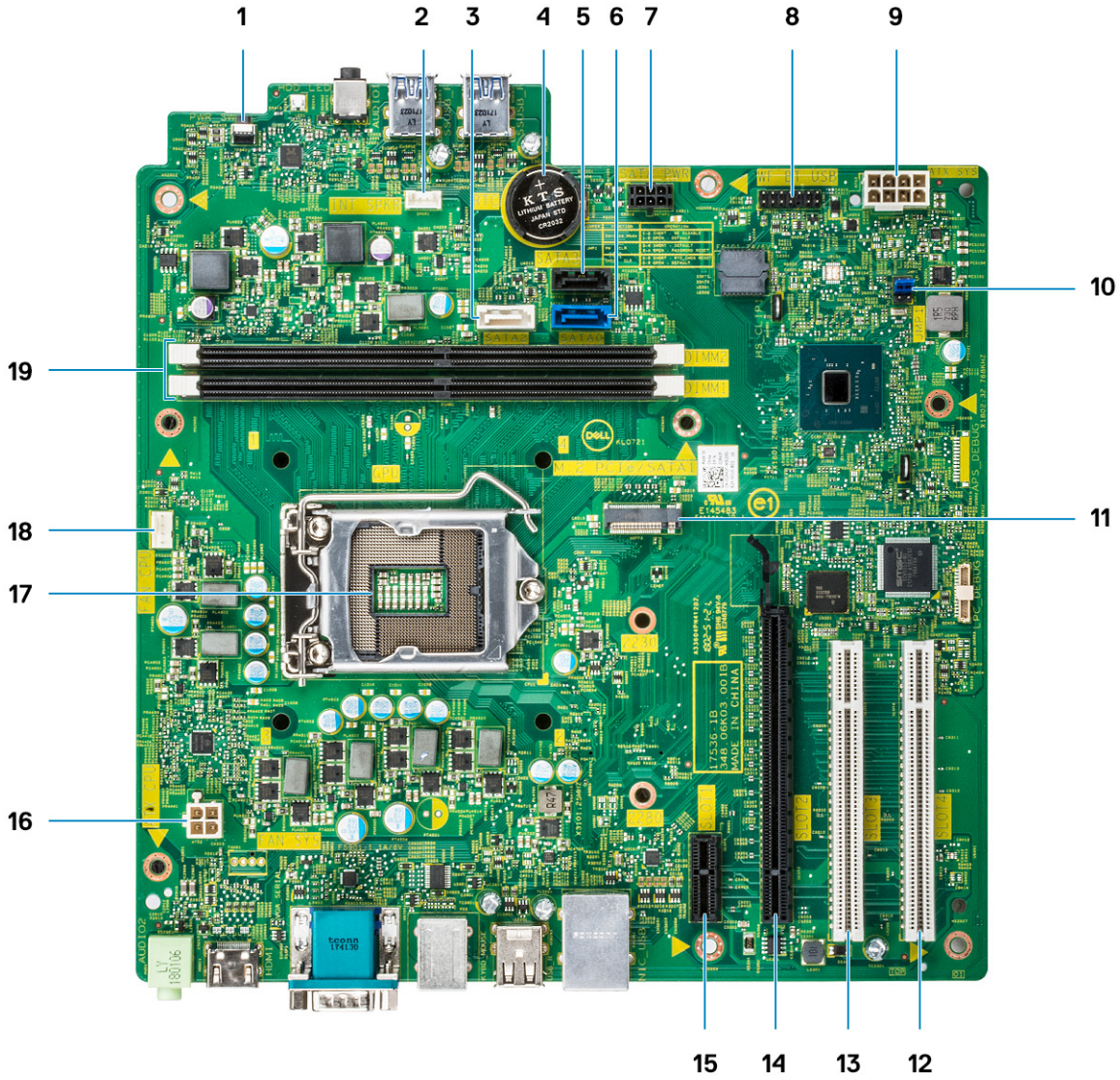
Screw size list

Table 2. Vostro 3988

Component	Screw type	Quantity	Image	Color
System board	6-32xL6.35	8		Black
Power Supply Unit	6-32xL6.35	4		
Cover	6-32xL6.35	2		
Front IO bracket	6-32xL6.35	1		
PCI bracket	6-32xL6.35	1		
Standoff for M.2 SSD	6-32xL4.8	1		Silver
3.5" hard drive	6-32xL3.6	4		Silver
2.5" hard drive	M3xL3.5	2		Silver
M.2 SSD card	M2 x 3.5	1		
Slim optical drive	M2x2	2		Black

System board layout

The following image displays the system board layout of the computer.



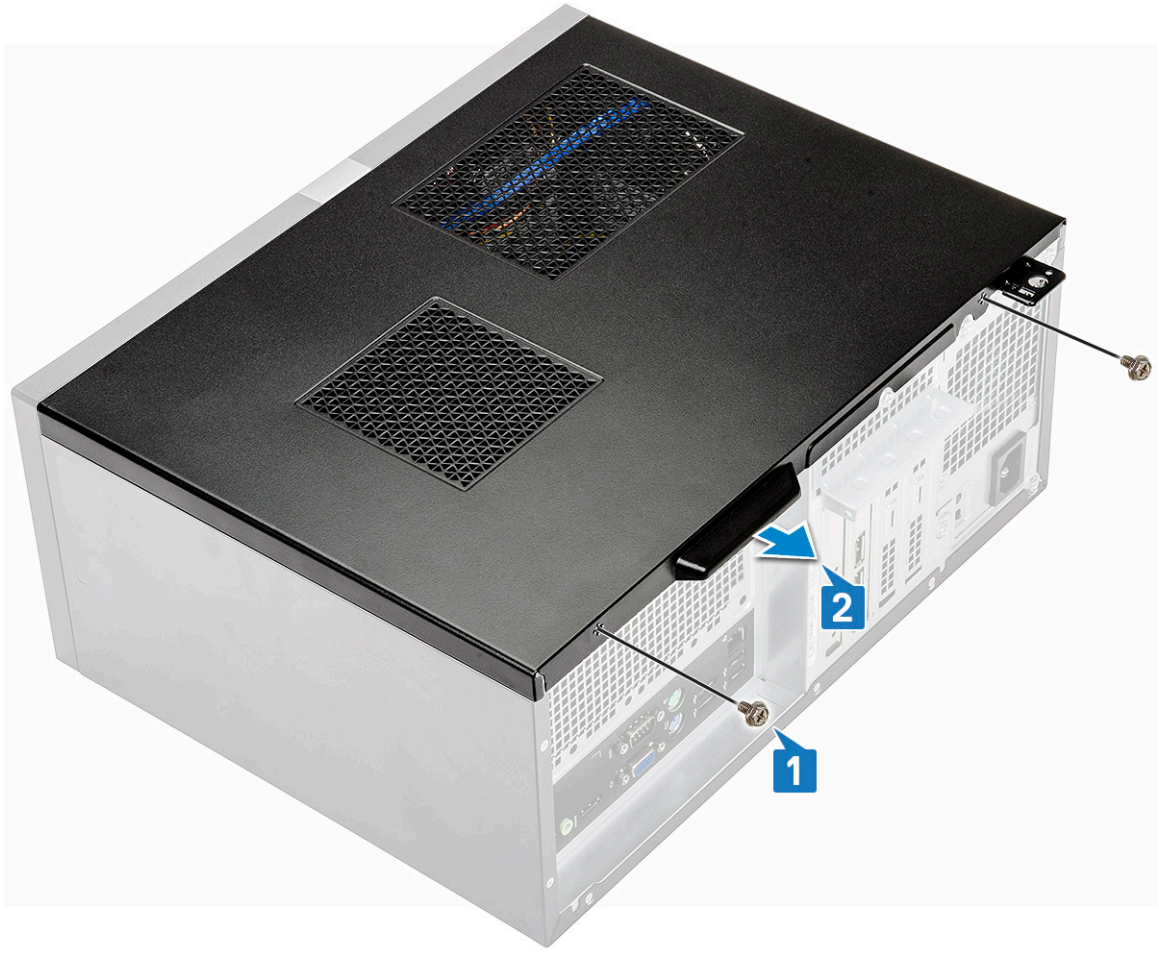
1. Power switch connector
2. Internal Speaker Connector(INT_SPKR)
3. SATA 2 Connector(white color)
4. Coin-cell battery Connector
5. SATA 3 Connector(black color)
6. SATA 0 Connector(Blue color)
7. HDD_ODD_PowerCable Connector(SATA_PWR)
8. Internal USB connector(WF_BT_USB)
9. ATX Power Connector(ATX_SYS)
10. Service Mode / Password clear / CMOS clear Jumper
11. M.2 PCIe/SATA 1 Connector
12. PCI Connector (SLOT4)
13. PCI Connector (SLOT3)
14. PCI-e X16 Connector(SLOT2)
15. PCI-e X1 Connector(SLOT1)
16. CPU Power Connector(ATX_CPU)
17. Processor Socket(CPU)

18. CPU Fan Connector(FAN_CPU)
19. Memory Connectors(DIMM1/DIMM2)

Cover

Removing the cover

1. Follow the procedure in Before working inside your computer.
2. To remove the cover:
   a) Remove the two 6-32xL6.35 screws that secure the cover to the computer [1].
   b) Slide the cover towards the back of your system [2].

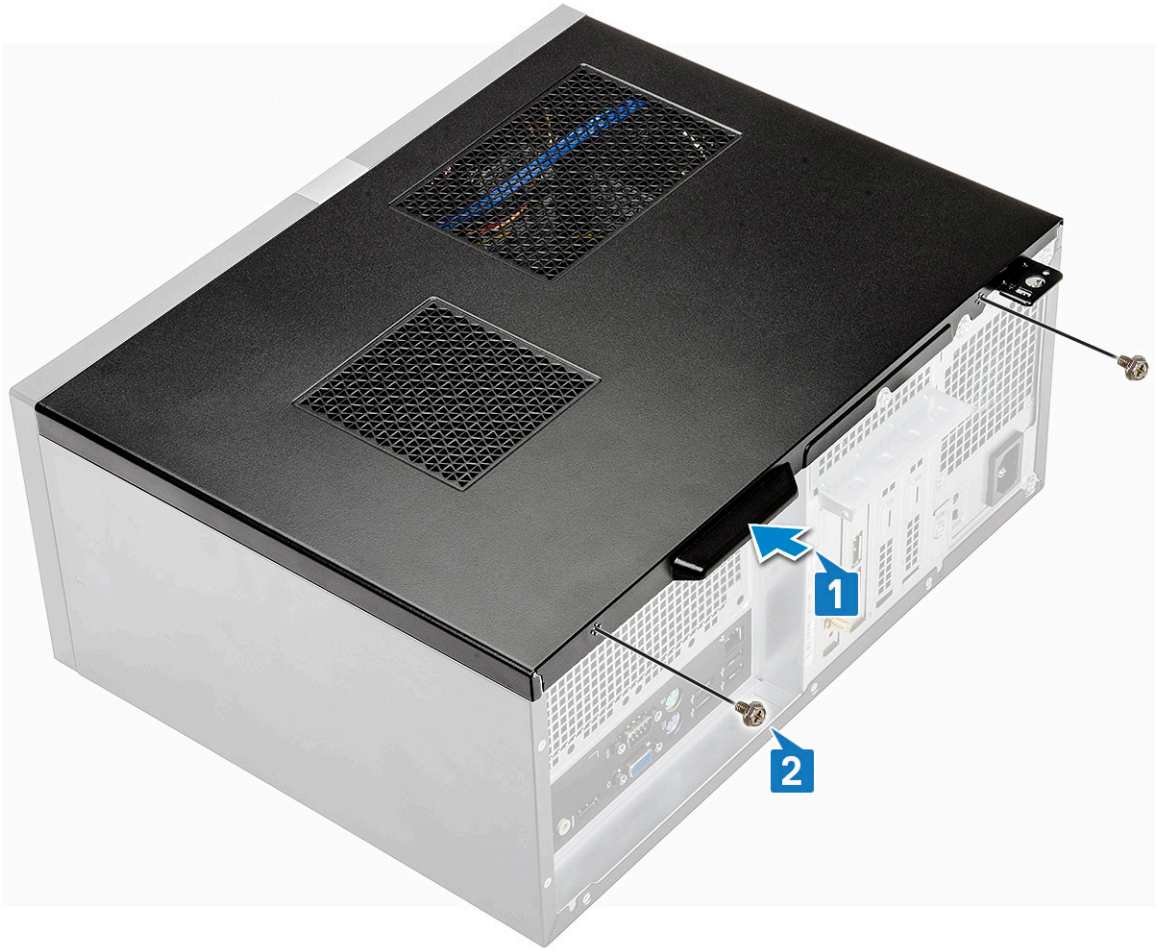


   c) Lift the cover from the system [3].

Installing the cover

1. Place the cover on the computer.

2. Slide the computer cover towards the front of the chassis until it is fully engaged [1].
3. Replace the two 6-32xL6.35 screws to secure the computer cover [2].



4. Follow the procedure in After working inside your computer.

Front Bezel

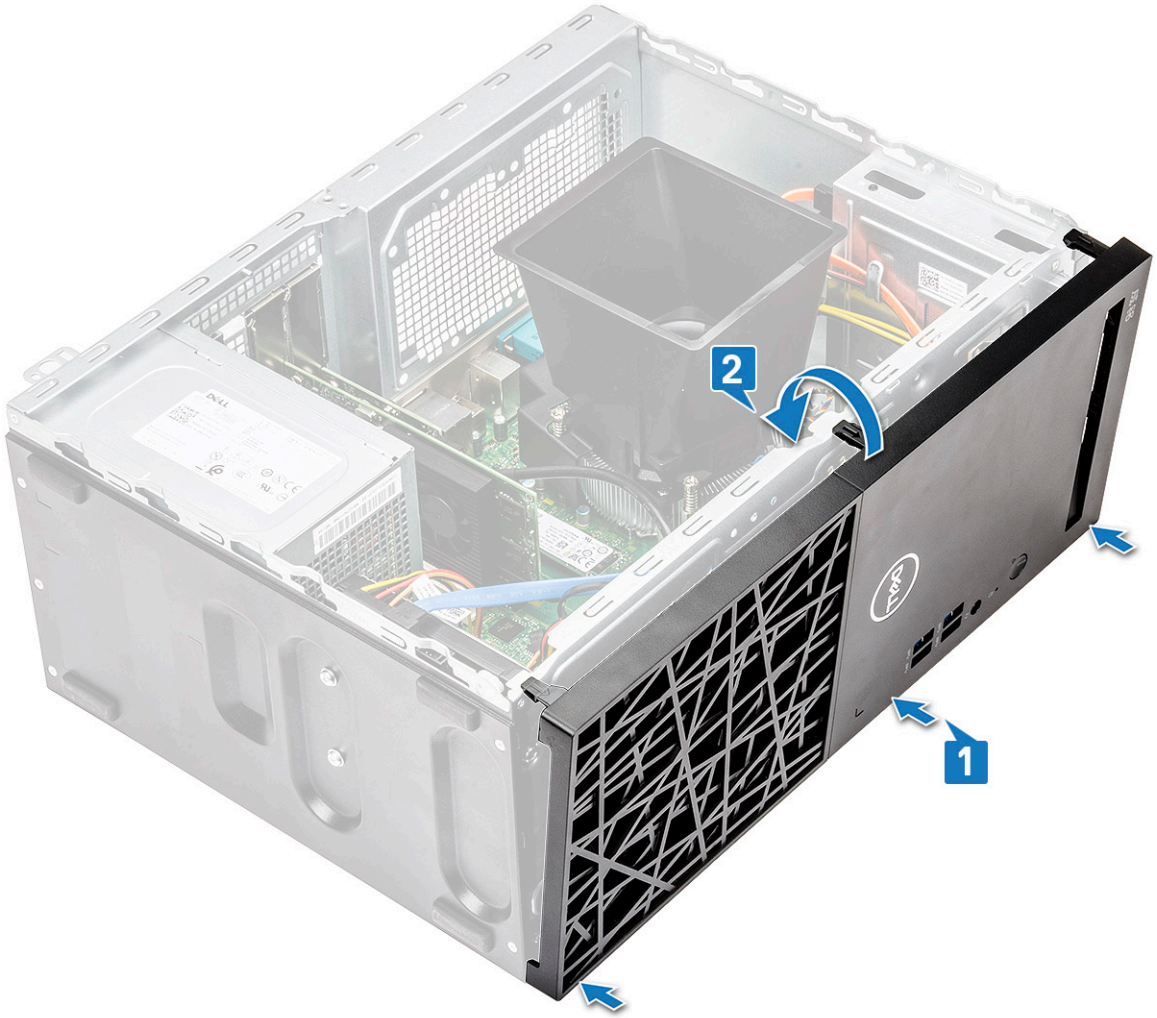
Removing the front bezel

1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the front bezel:
   a) Pry the front bezel retention clips away from the chassis. [1].
   b) Rotate the bezel away from the computer to release the hooks on the opposite edge of the bezel from the chassis [2].

c) Lift the chassis and remove the front bezel from the computer.

Installing the front bezel

1. Insert the hooks along the bottom edge of the front bezel into the slots on the chassis front [1].
2. Push the bezel toward the computer to engage the front bezel retention clips until they click into place [2].

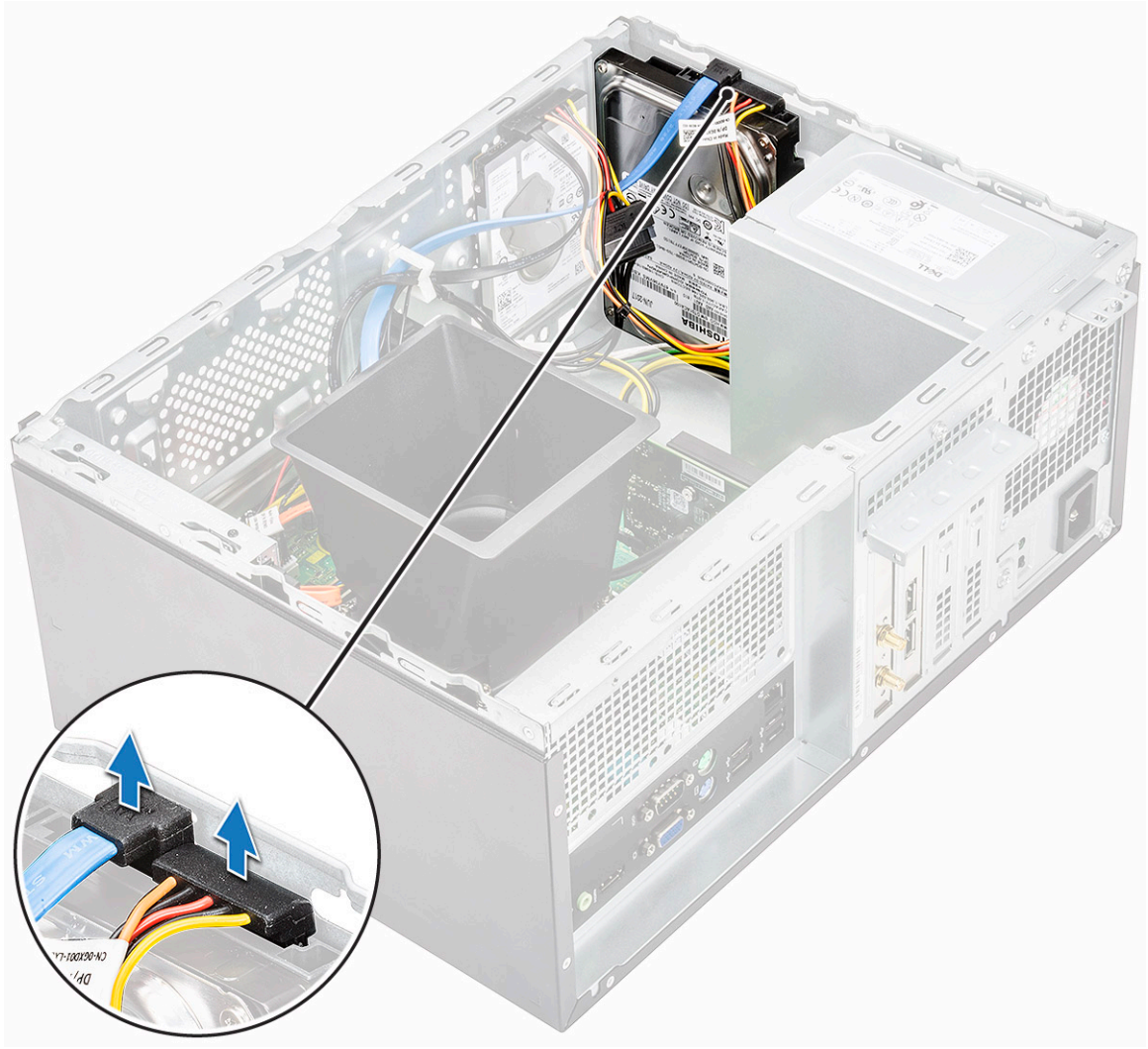


3. Install the cover.
4. Follow the procedure in After working inside your computer.

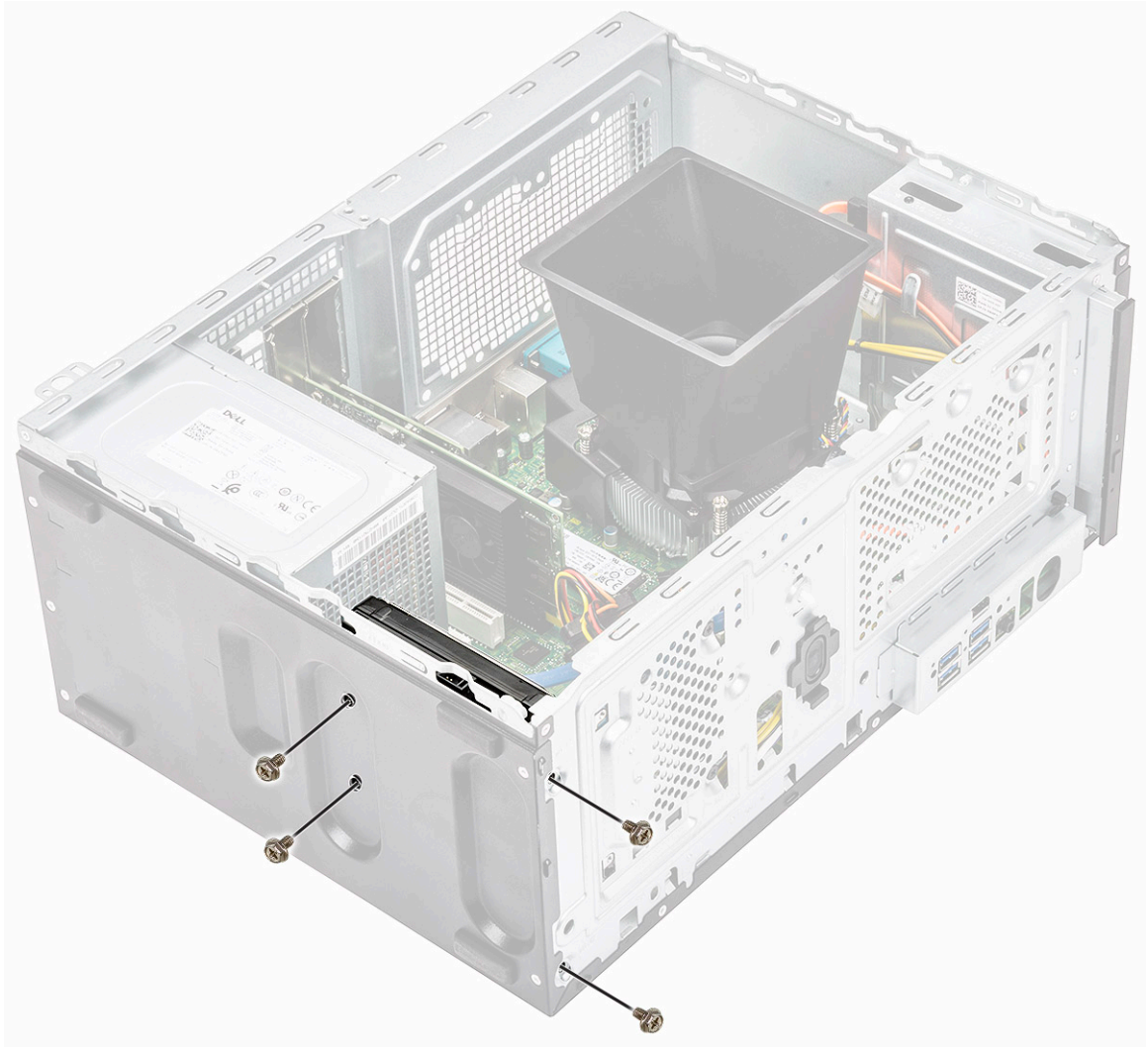
Hard drive

Removing the 3.5 inch hard drive

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) front bezel
3. To remove the 3.5 inch hard drive:
   a) Disconnect the hard drive data cable and power cable from the hard drive [1].



b) Remove the four screws (6-32xL3.6) that secure the hard drive to the computer.

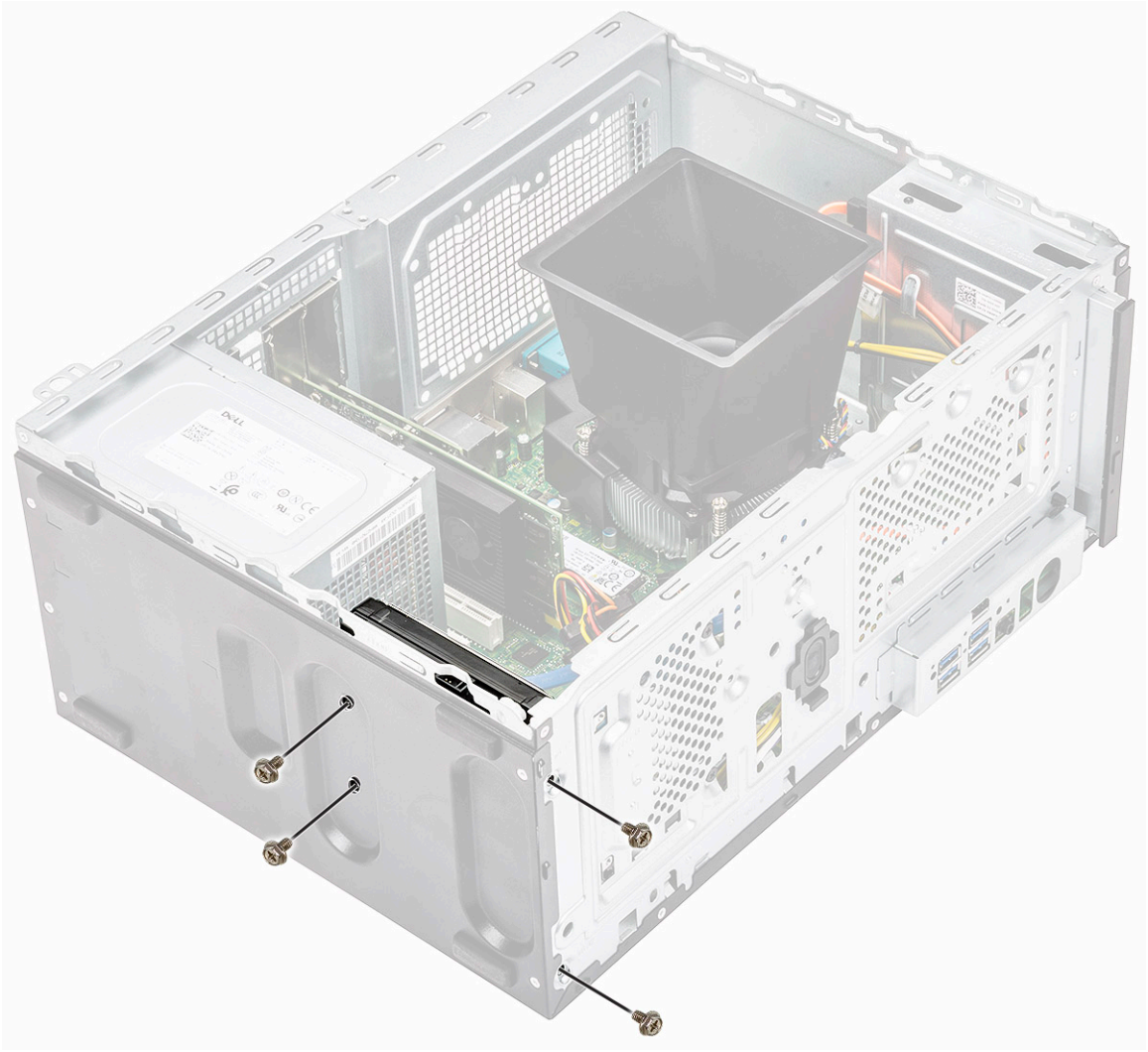


c) Slide and lift the hard drive away from the computer.

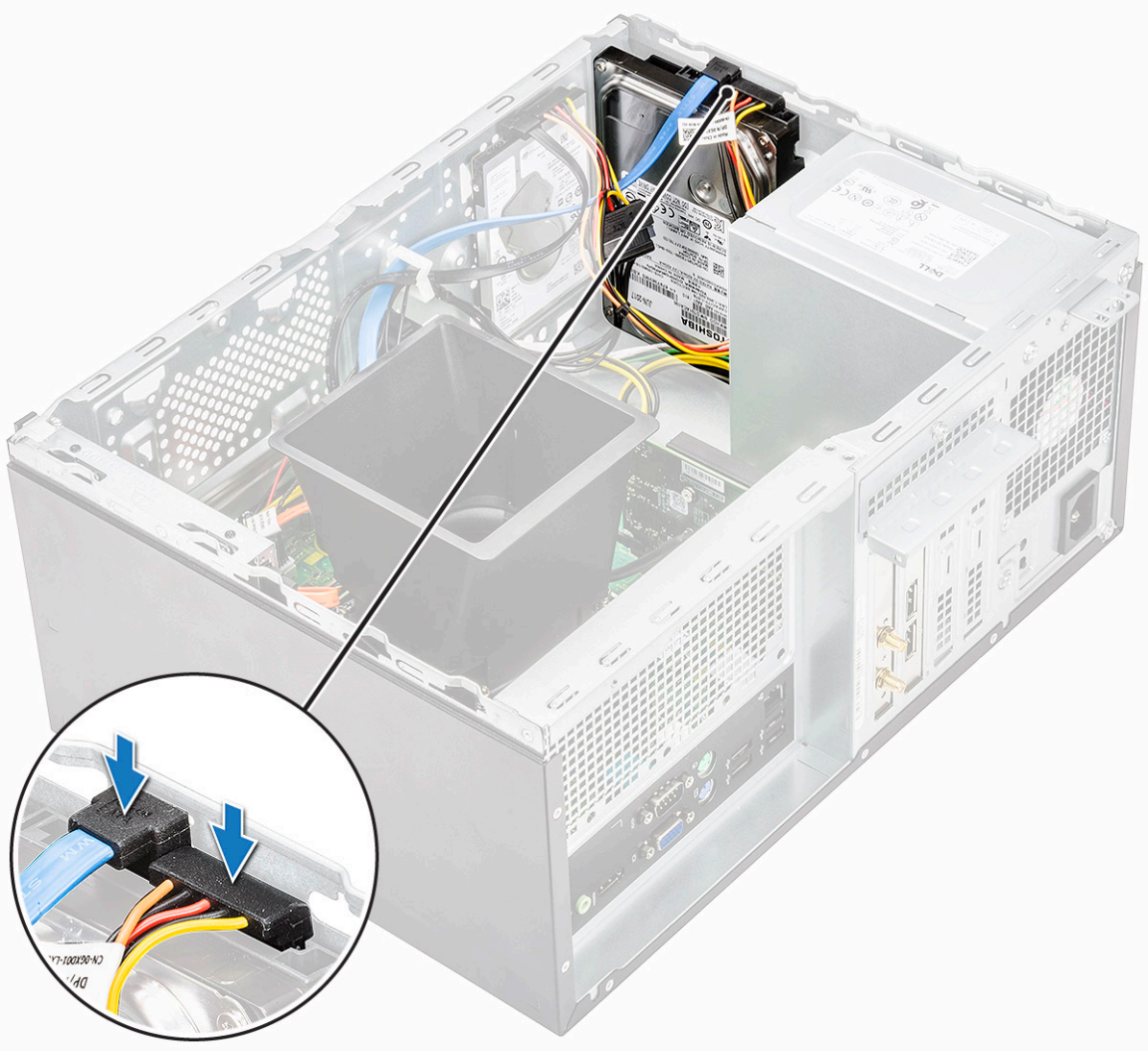
Installing the 3.5 inch hard drive

1. Insert the 3.5 inch hard drive into the slot on the computer.

2. Tighten the four screws(6-32xL3.6) to secure the hard drive to the computer.



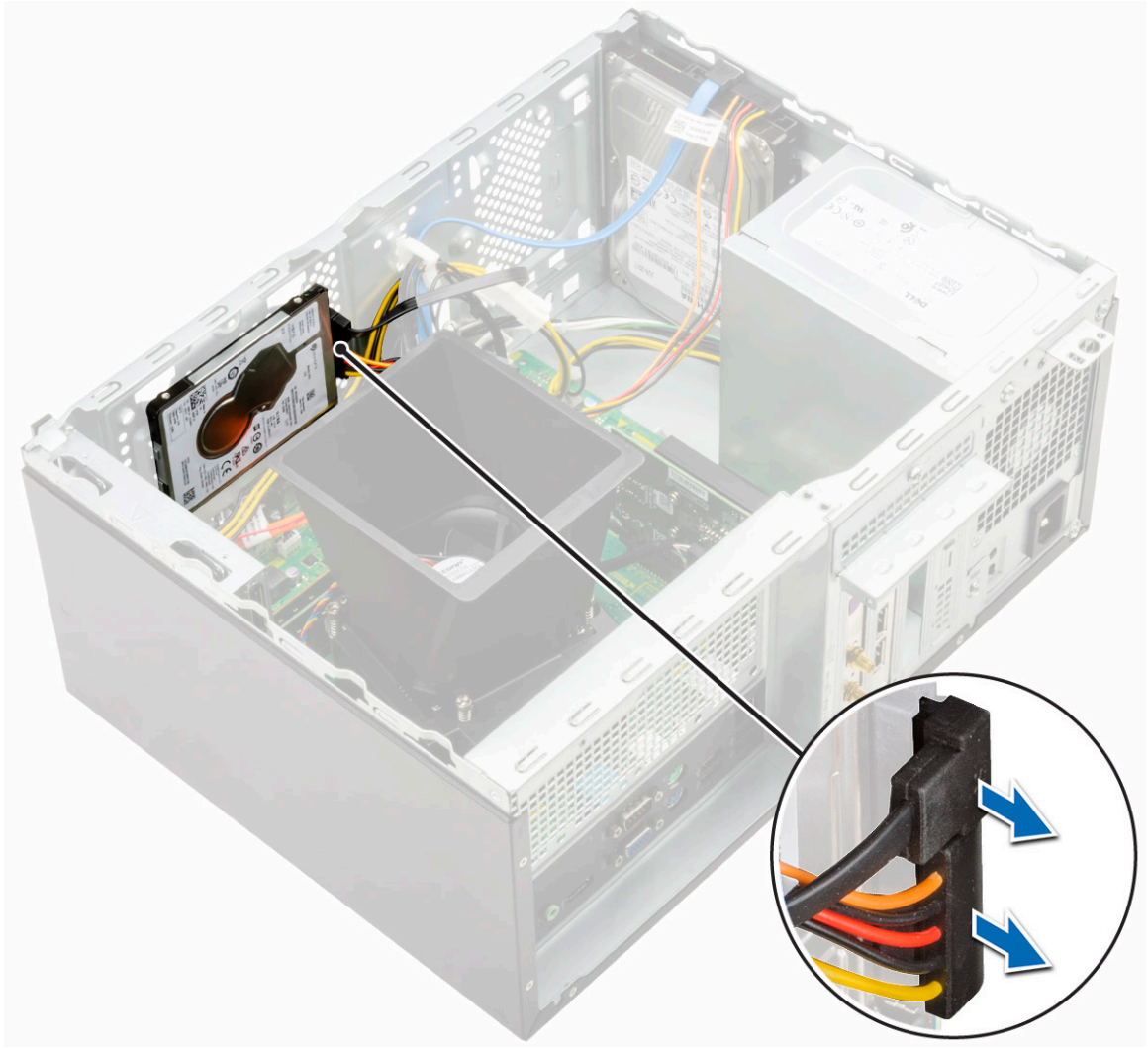
3. Connect the hard drive data cable and power cable to the hard drive.



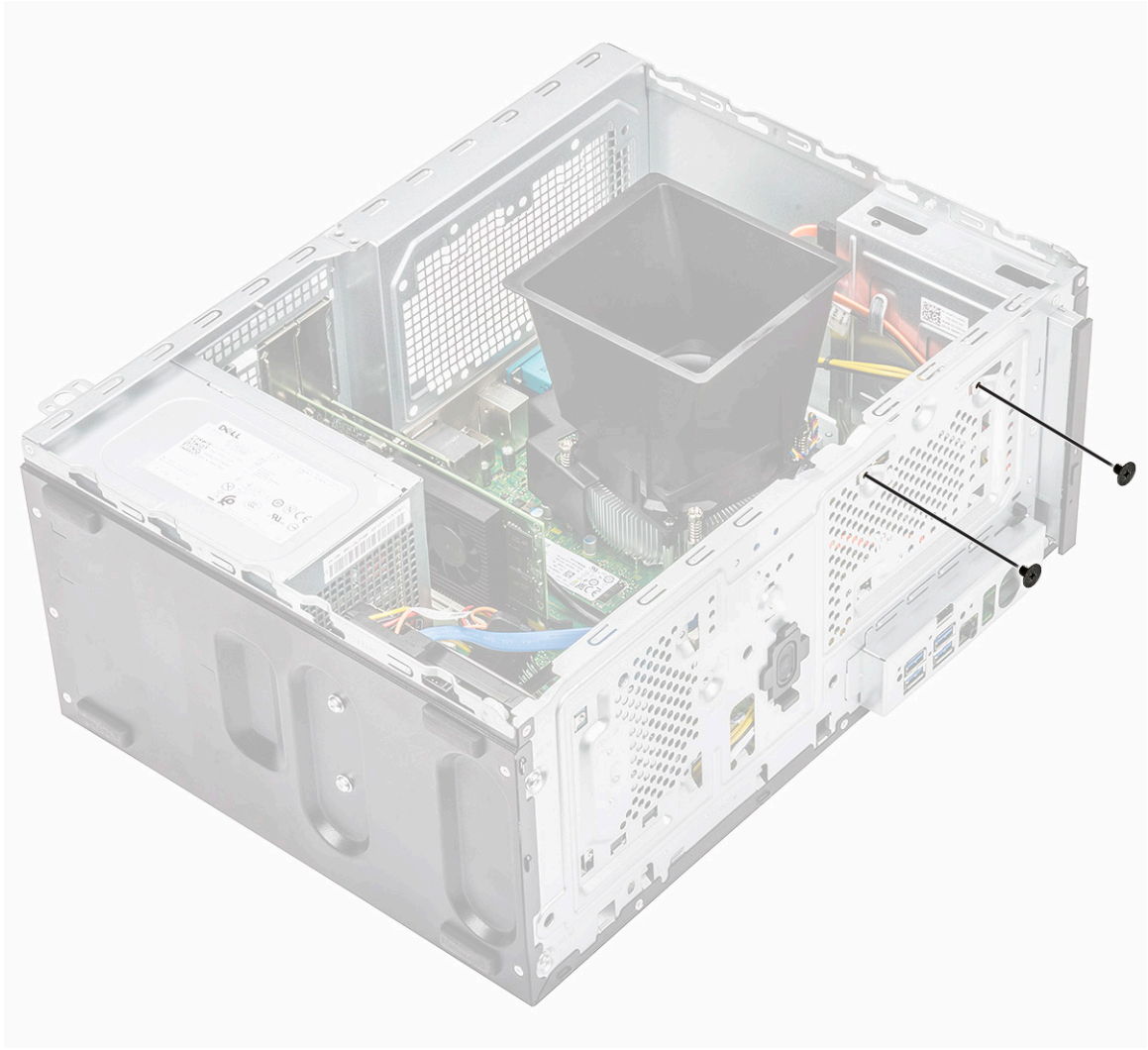
4. Install the:
   a) front bezel
   b) cover
5. Follow the procedure in After working inside your computer.

Removing the 2.5 inch hard drive

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) front bezel
3. To remove the 2.5 inch hard drive:
   a) Disconnect the hard drive data cable and power cable from the hard drive.



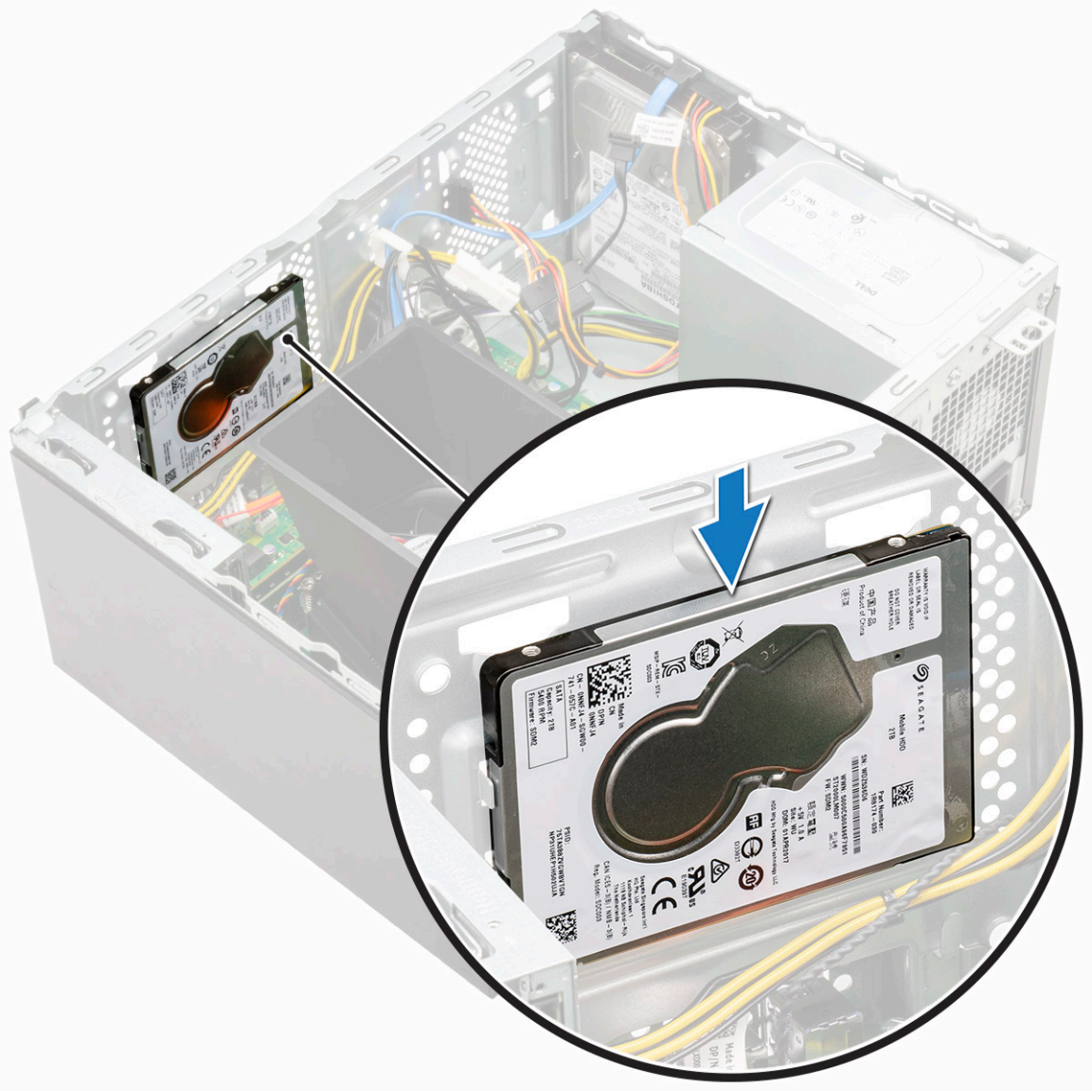
b) Remove the two screws (M3L3.5) that secure the hard drive to the computer.



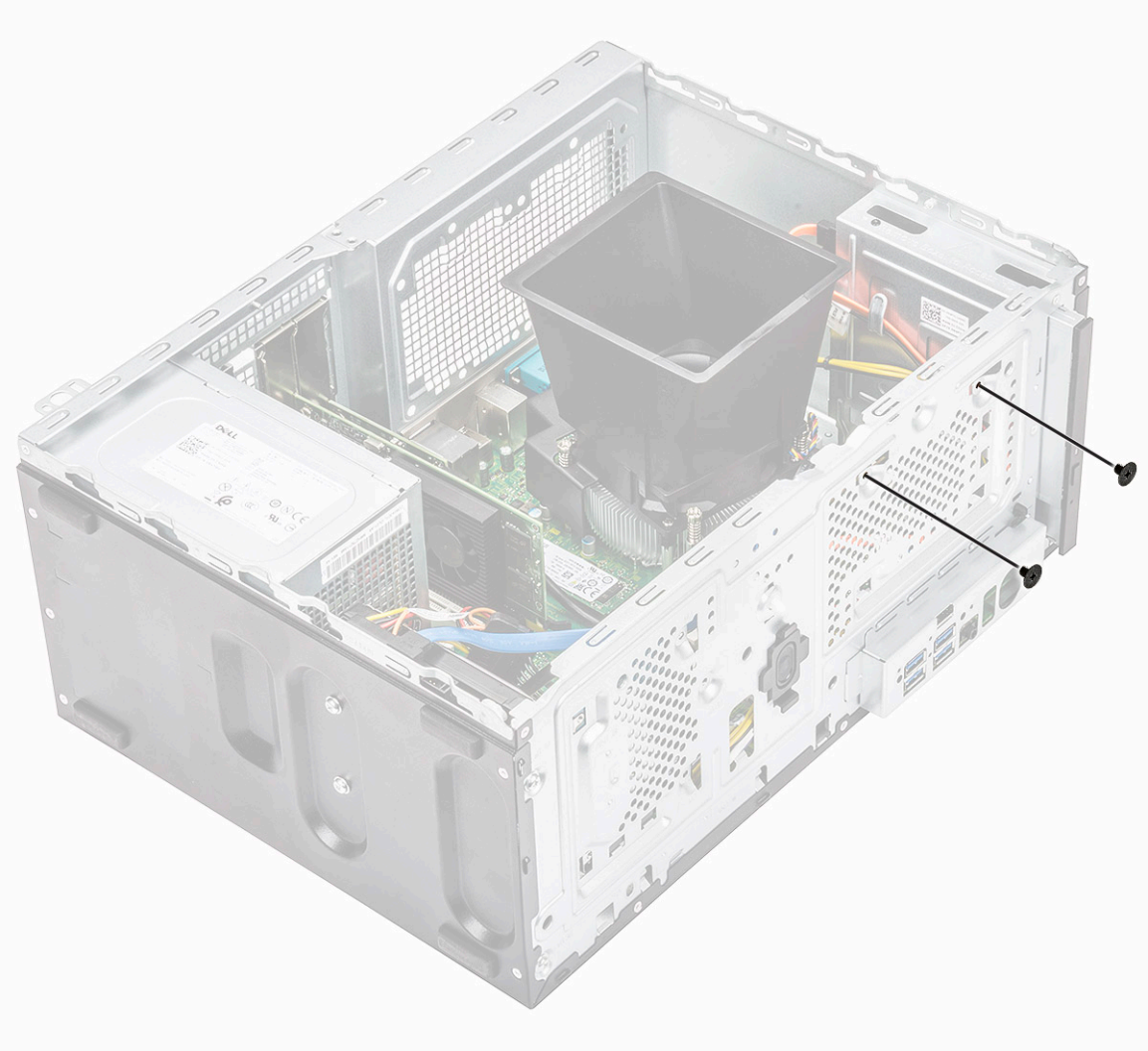
c) Slide and lift the hard drive away from the computer.

Installing the 2.5 inch hard drive

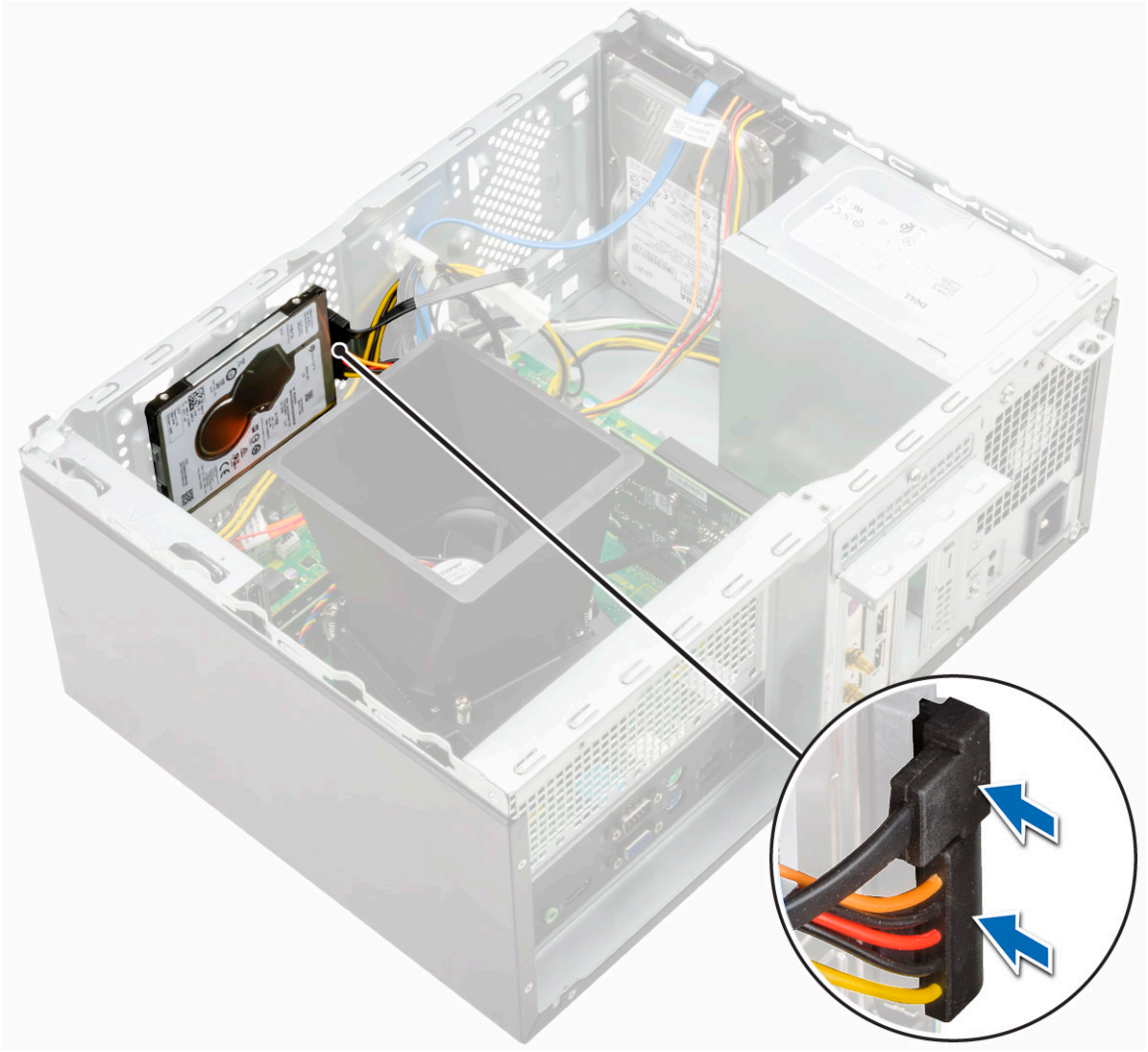
1. Insert the 2.5 inch hard drive into the slot on the computer.



2. Tighten the two screws (M3L3.5) to secure the hard drive to the computer.



3. Connect the hard drive data cable and power cable to the hard drive.

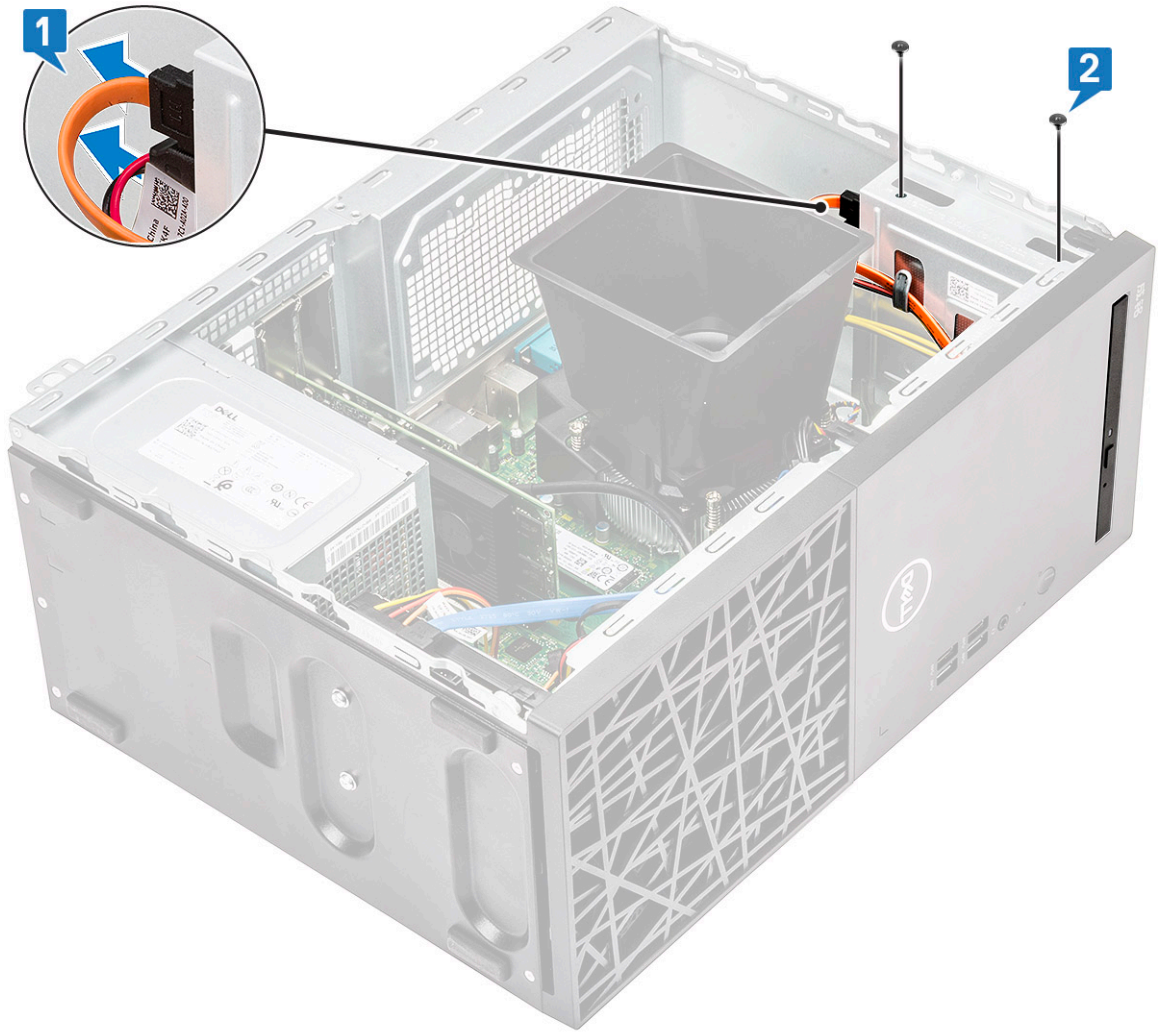


4. Install the:
   a) front bezel
   b) cover
5. Follow the procedure in After working inside your computer.

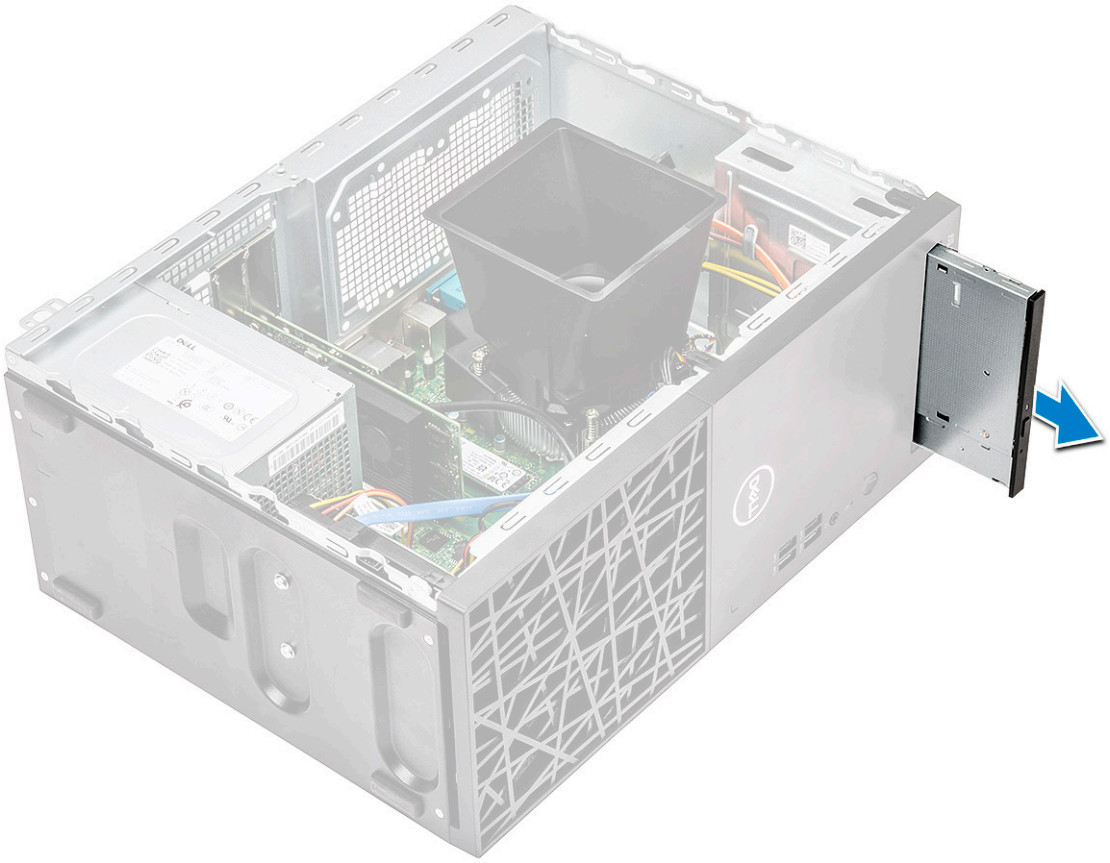
Optical drive

Removing the optical drive

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
3. To remove the optical drive:
   a) Disconnect the optical drive data and the power cable from the optical drive [1].
   b) Remove the two screws (M2 x 2) that secure the optical drive to the computer [2].

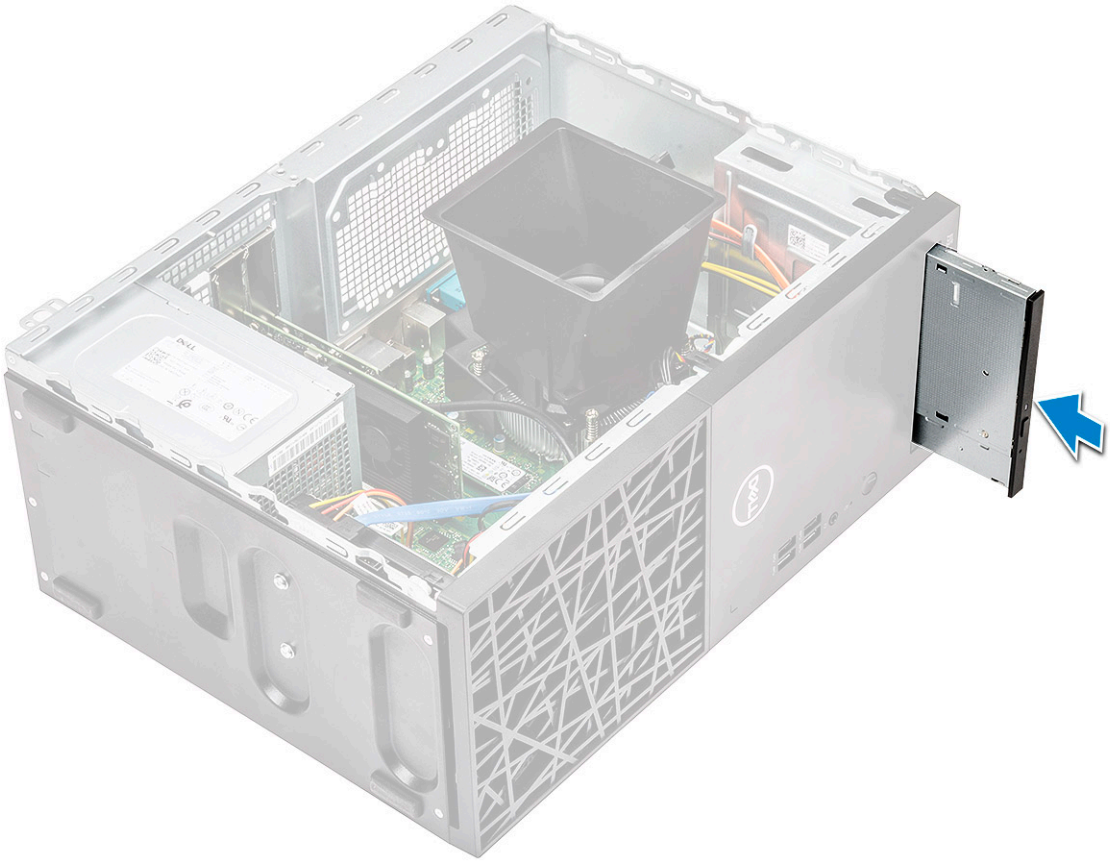


c) Push the optical drive from the inside of the system and pull the optical drive out of the computer [3].

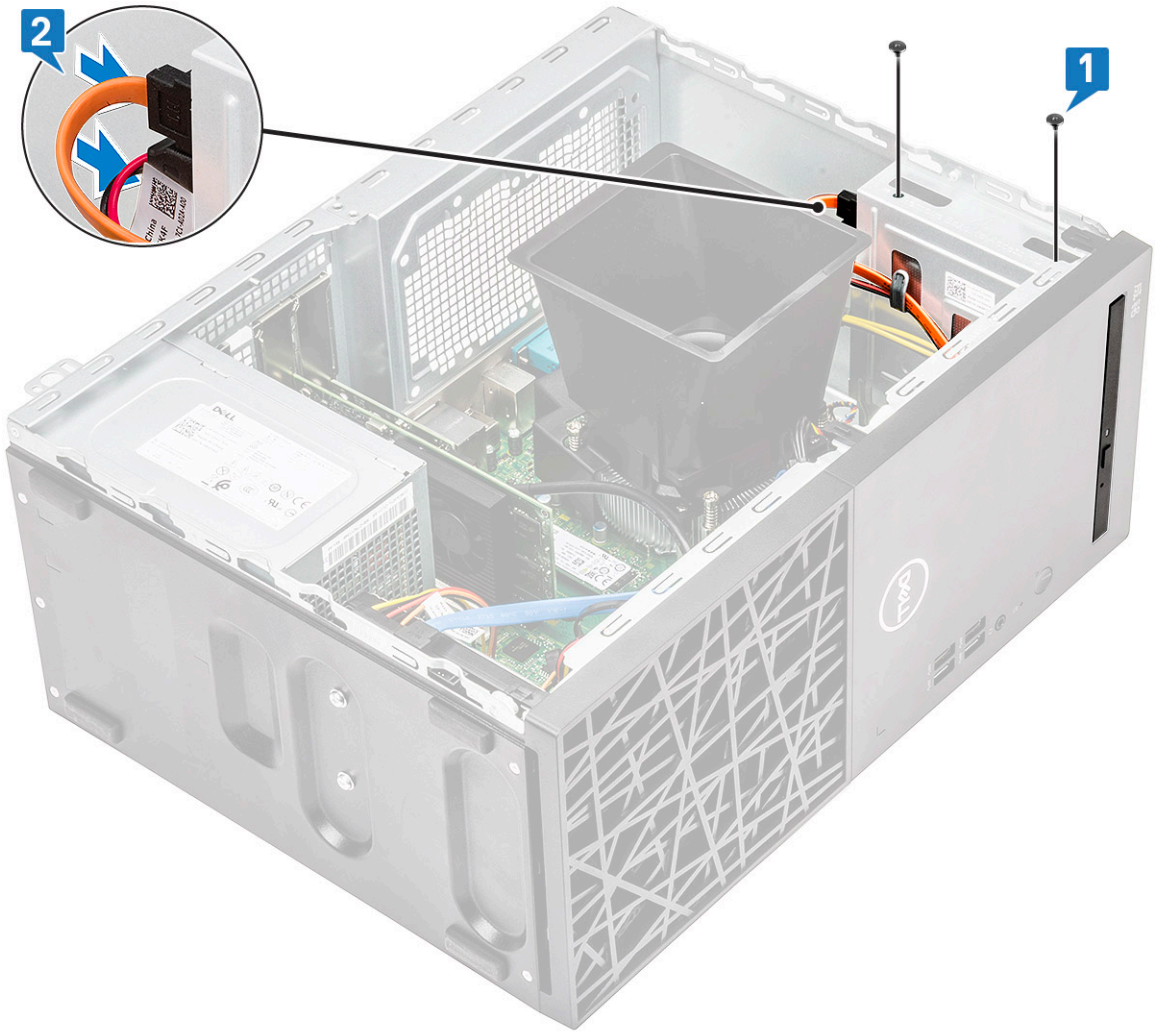


Installing the optical drive

1. Insert the optical drive into the slot on the computer.



2. Tighten the two screws (M2 x 2) to secure the optical drive o the computer [1].
3. Connect the optical drive data cable and power cable to the optical drive [2].

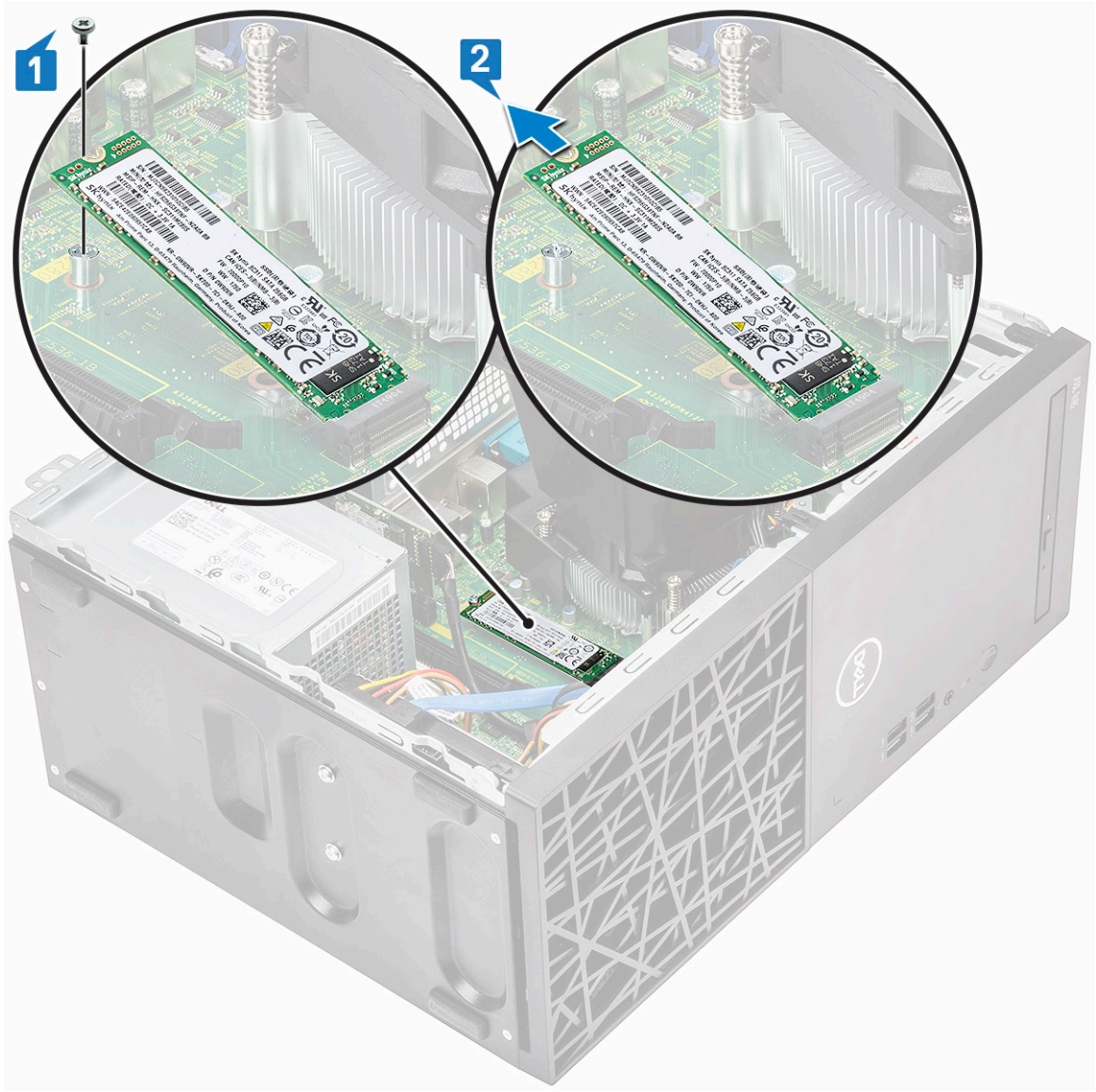


4. Install the:
   a) cover
5. Follow the procedure in After working inside your computer.

M.2 SSD card

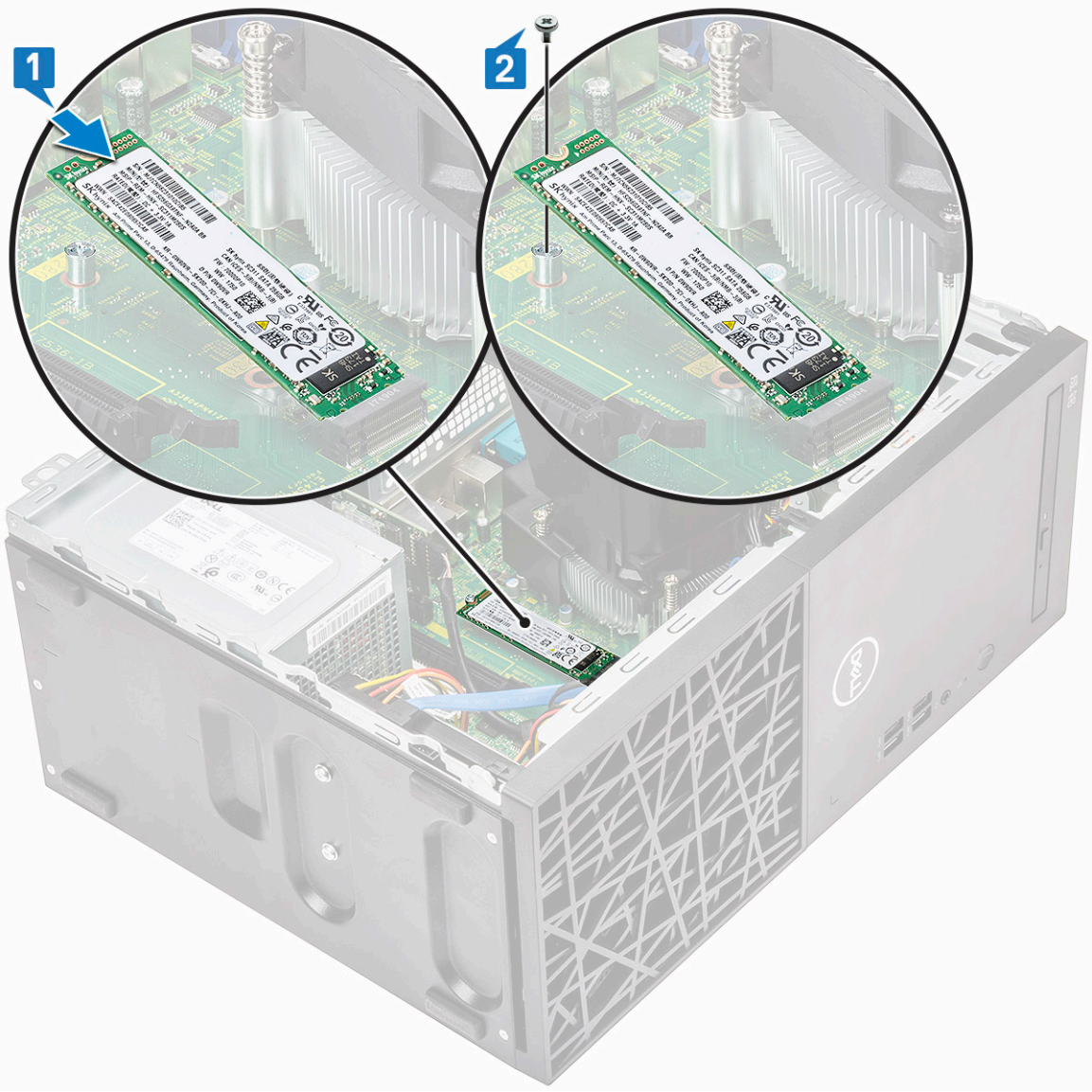
Removing the M.2 SSD card

1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the M.2 PCIe SSD:
   a) Remove the screw (M2 x 3.5) that secures the M.2 SSD card to the system board [1].
   b) Slide and lift the SSD from the system [2].



Installing the M.2 SSD card

1. Slide the M.2 SSD card into the connector on the system board [1].
2. Replace the screw (M2 x 3.5) to secure the M.2 SSD card to the system board [2].

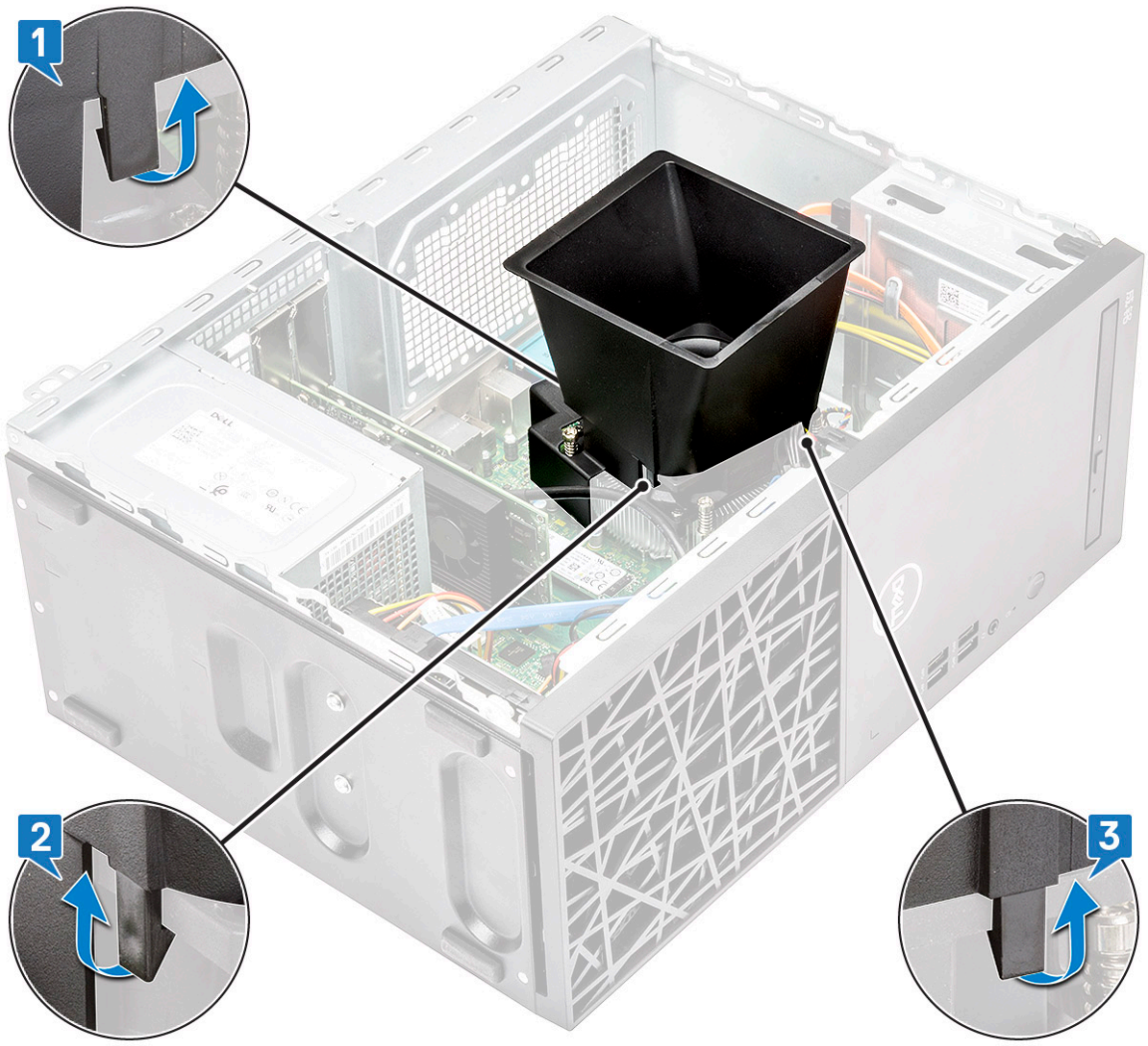


3. Install the cover.
4. Follow the procedure in After working inside your computer.

Cooling shroud

Removing the cooling shroud

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
3. To remove the cooling shroud:
   a) Hold the touch points and pry the edges [1, 2].



b) Lift the cooling shroud away from the computer [3].

Installing the cooling shroud

1. Align the tabs on the cooling shroud with the securing slots on the computer and lower the cooling shroud into the chassis until it is firmly seated.

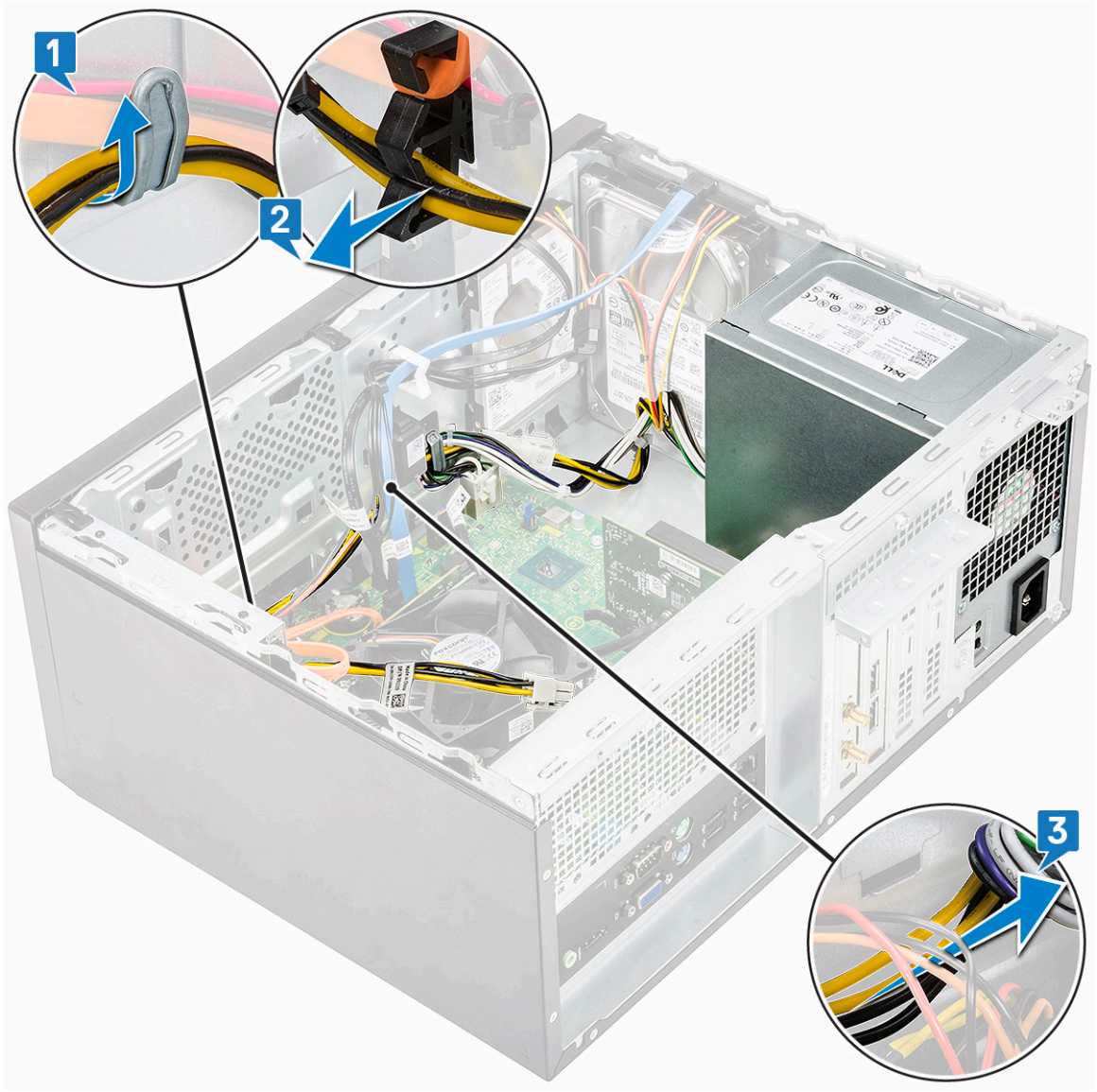
2. Install the:
   a) cover
3. Follow the procedure in After working inside your computer.

Power supply unit

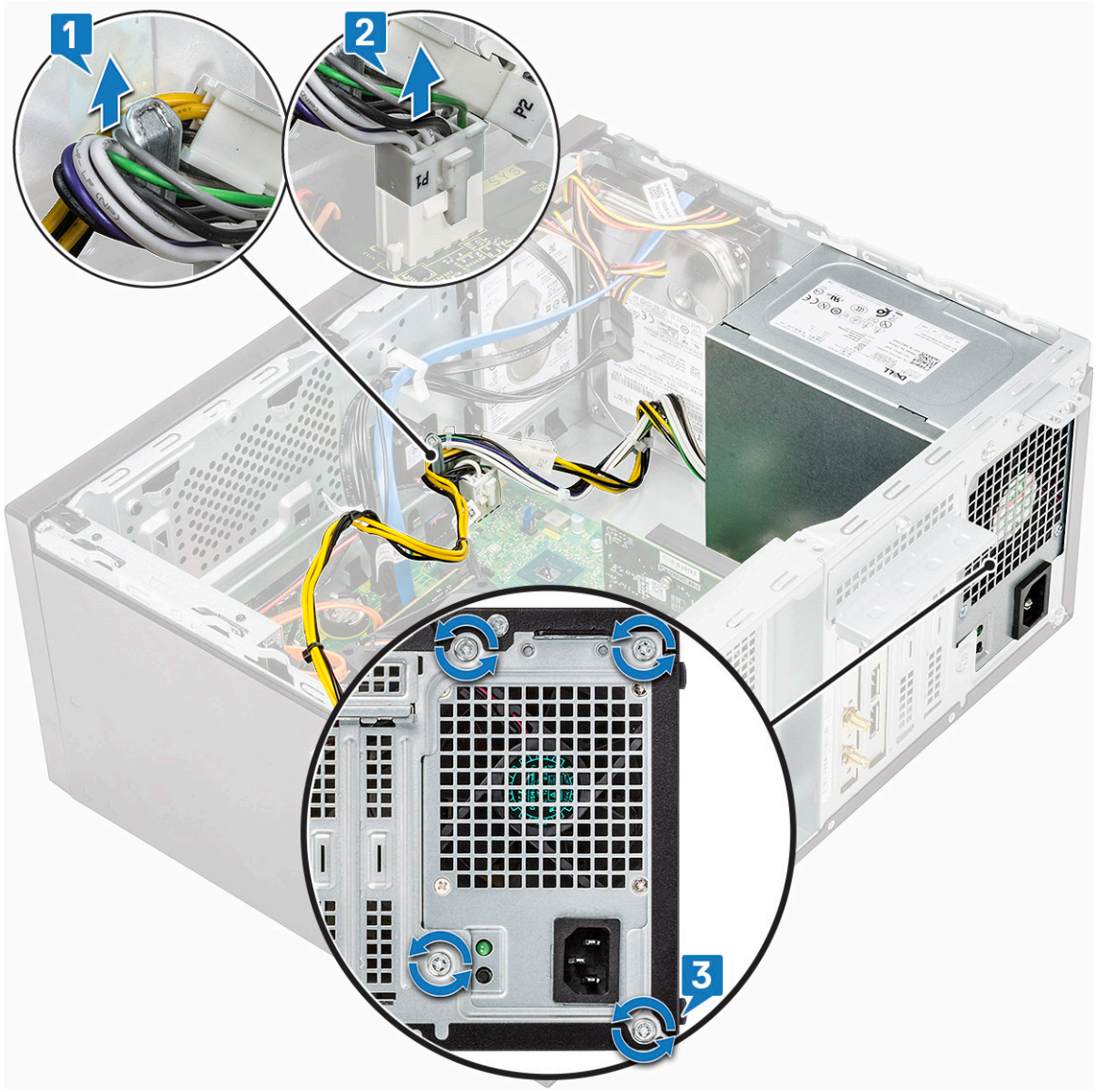
Removing the power supply unit

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) cooling shroud
3. To disconnect the cables:
   a) Press the tab of the 4-pin power cables and disconnect it from the system board.

b) Release the cables from the metal and plastic clips [1,2,3] .



c) Unroute the PSU cable from the metal clip [1], press the tab of the 8-pin power cables and disconnect it from the system board [2], and then remove 4 screws (6-32xL6.35) to release the PSU [3].



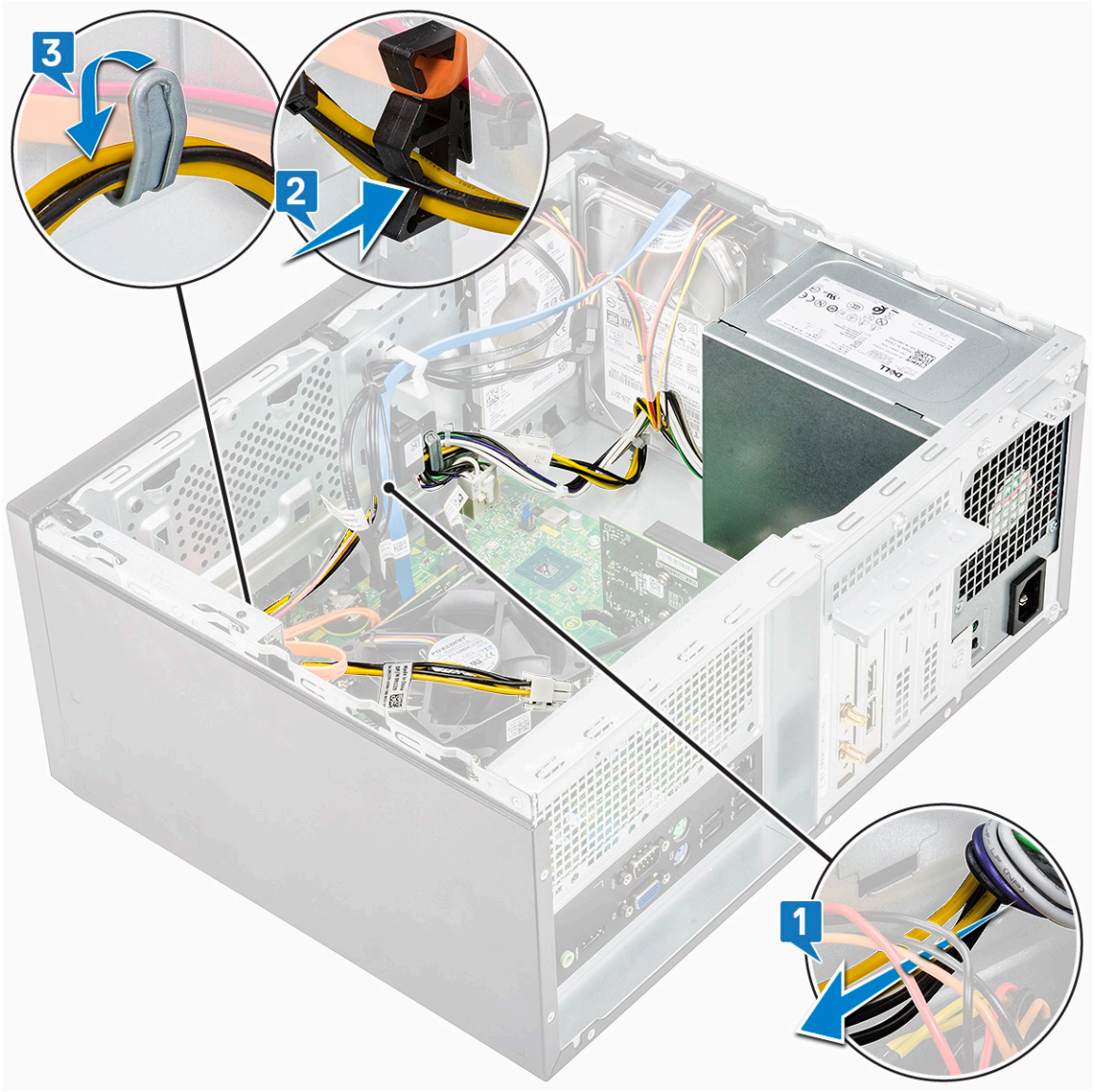
4. Slide and lift the PSU from the computer.

Installing the power supply unit

1. Place the power supply unit in the chassis and slide towards the back of the system to secure it.

2. Replace the four screws (6-32xL6.35) at the back of the computer to secure power supply [1].
3. Route the power cables through the chassis clips [2].
4. Connect the 8-pin power cable to the system board [3].

5. Secure the cables with the metal and plastic clips [1,2,3].



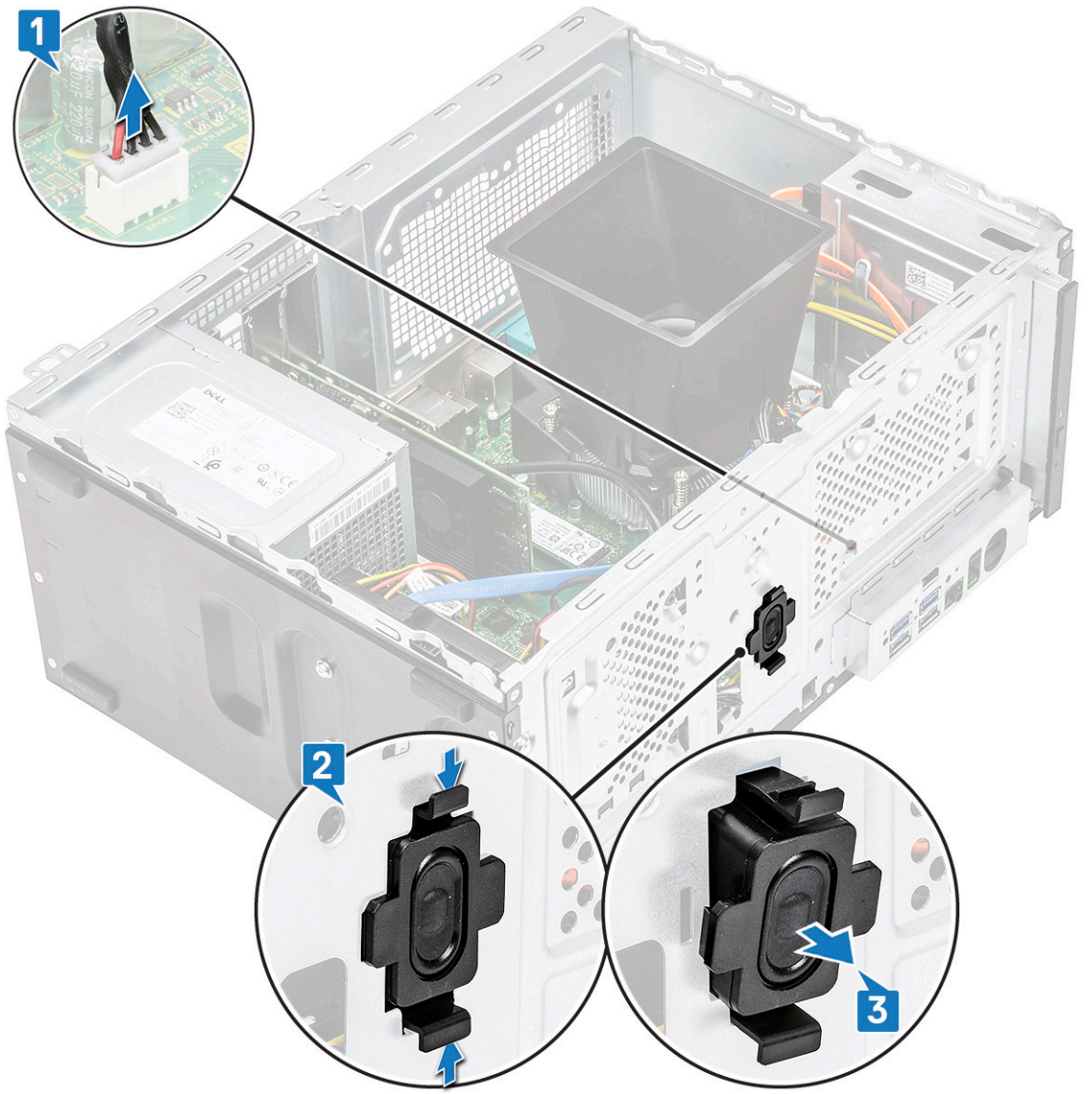
6. Connect the 4-pin power cable to the system board.

7. Install the:
   a) cooling shroud
   b) cover
8. Follow the procedure in After working inside your computer.

Speaker

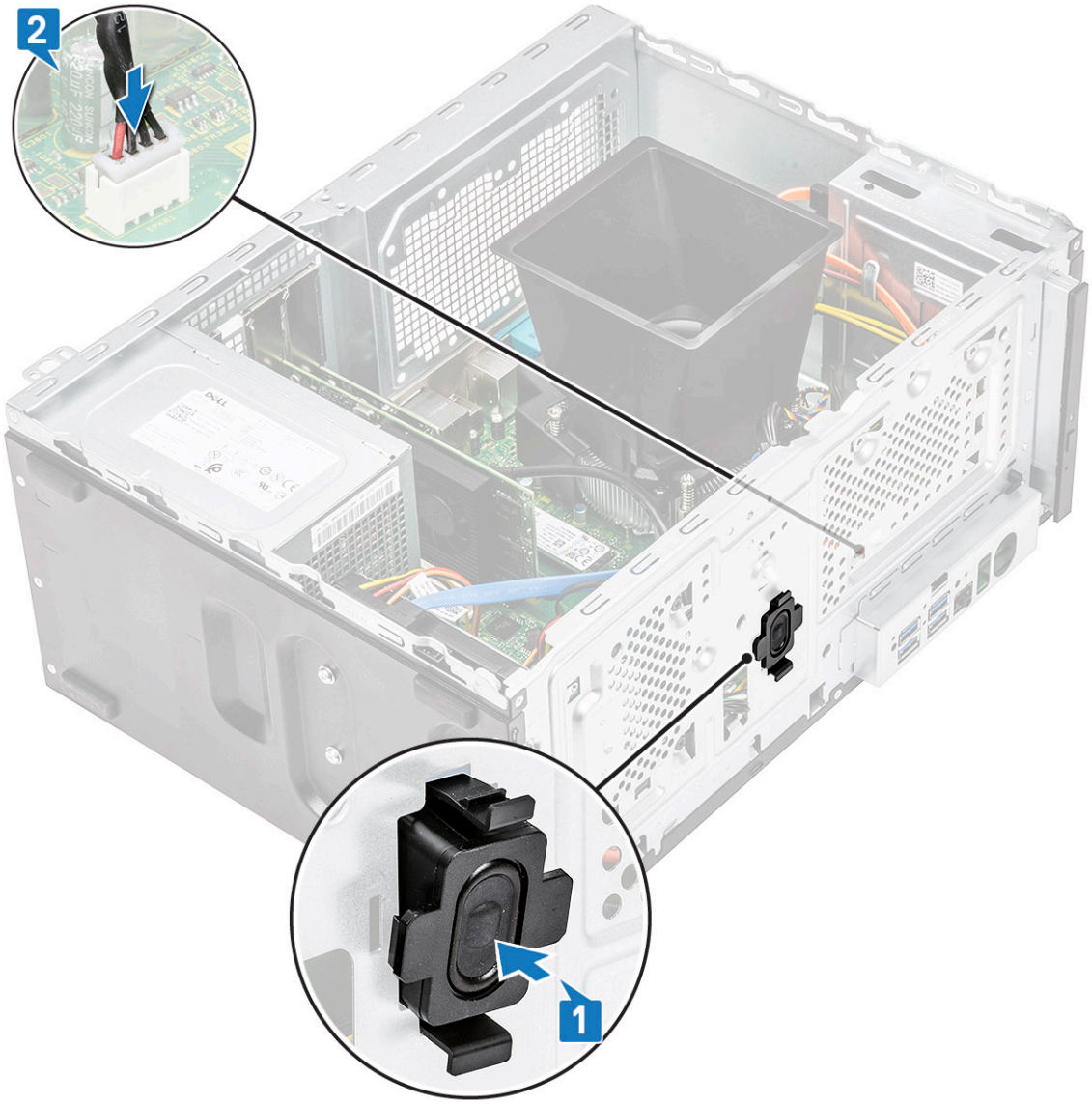
Removing the speaker

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) front bezel
3. To remove the speaker:
   a) Disconnect the speaker cable from system board [1].
   b) Press the securing tab on the speaker and remove the speaker from the chassis [2, 3].



Installing the speaker

1. Slide the speaker module into the slot [1].
2. Connect the speaker cable to the system board [1].



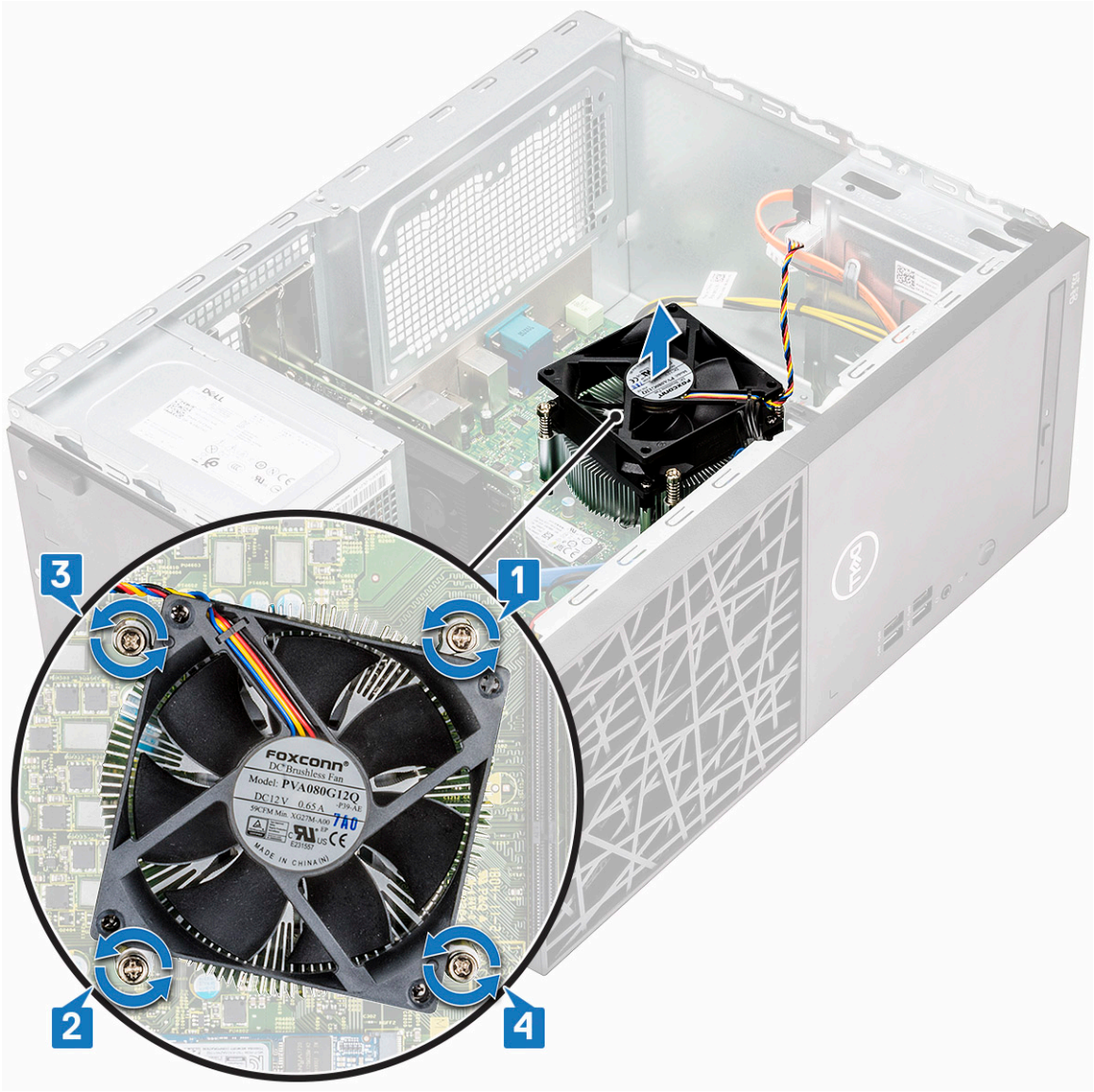
3. Install the:
   a) front bezel
   b) cover
4. Follow the procedure in After working inside your computer.

Heat sink assembly

Removing the heat sink assembly

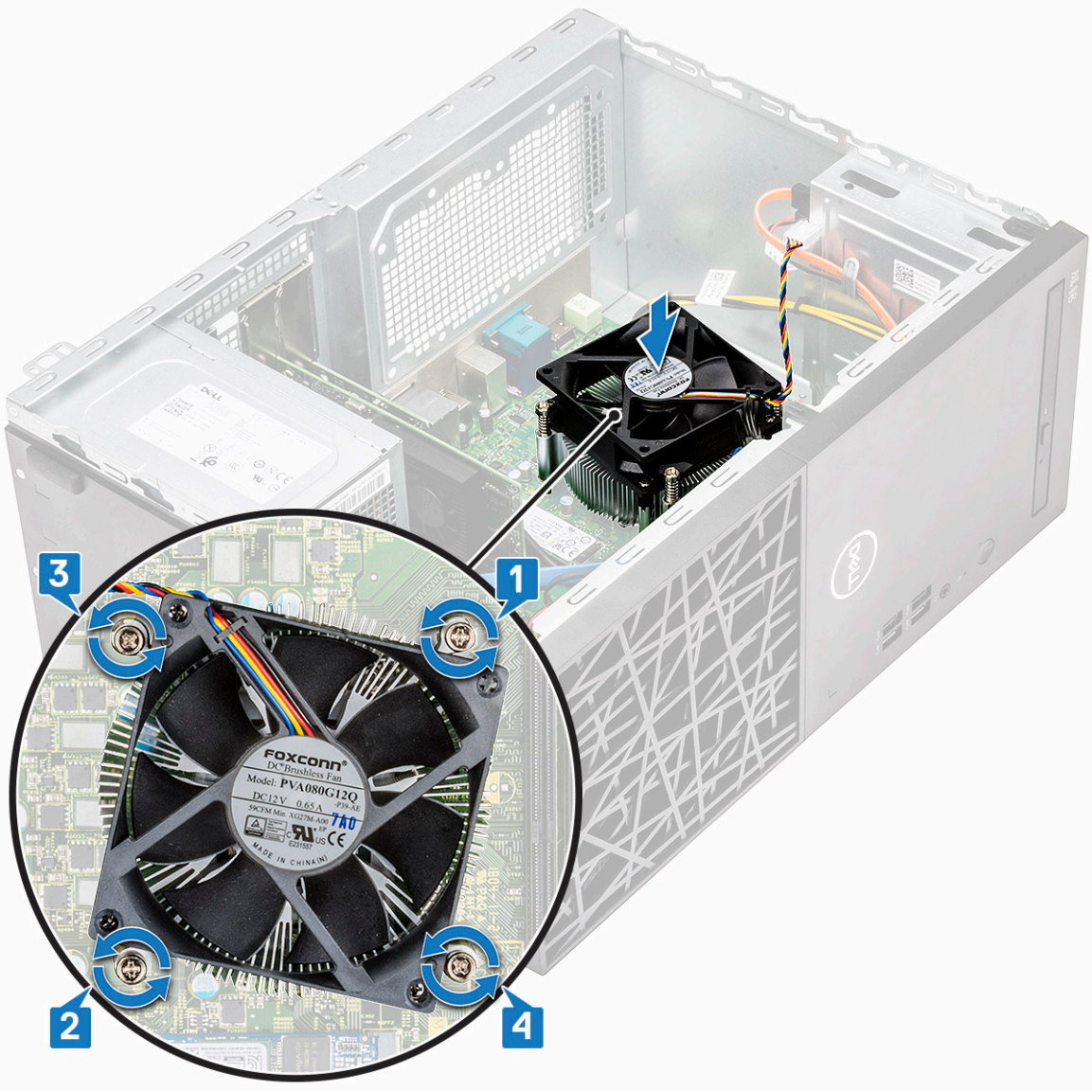
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) cooling shroud
3. To remove the heat sink assembly:
   a) Disconnect the fan cable from the connector on the system board.

b) Loosen the M3 screws in a sequential order [1,2,3,4].
c) Lift the heat sink assembly away from the computer .



Installing the heat sink assembly

1. Align the heat sink assembly with screw holders and place the heat sink assembly on the system board.
2. Tighten the M3 screws in a sequential order to secure the heat sink assembly to the system board [1,2,3,4].



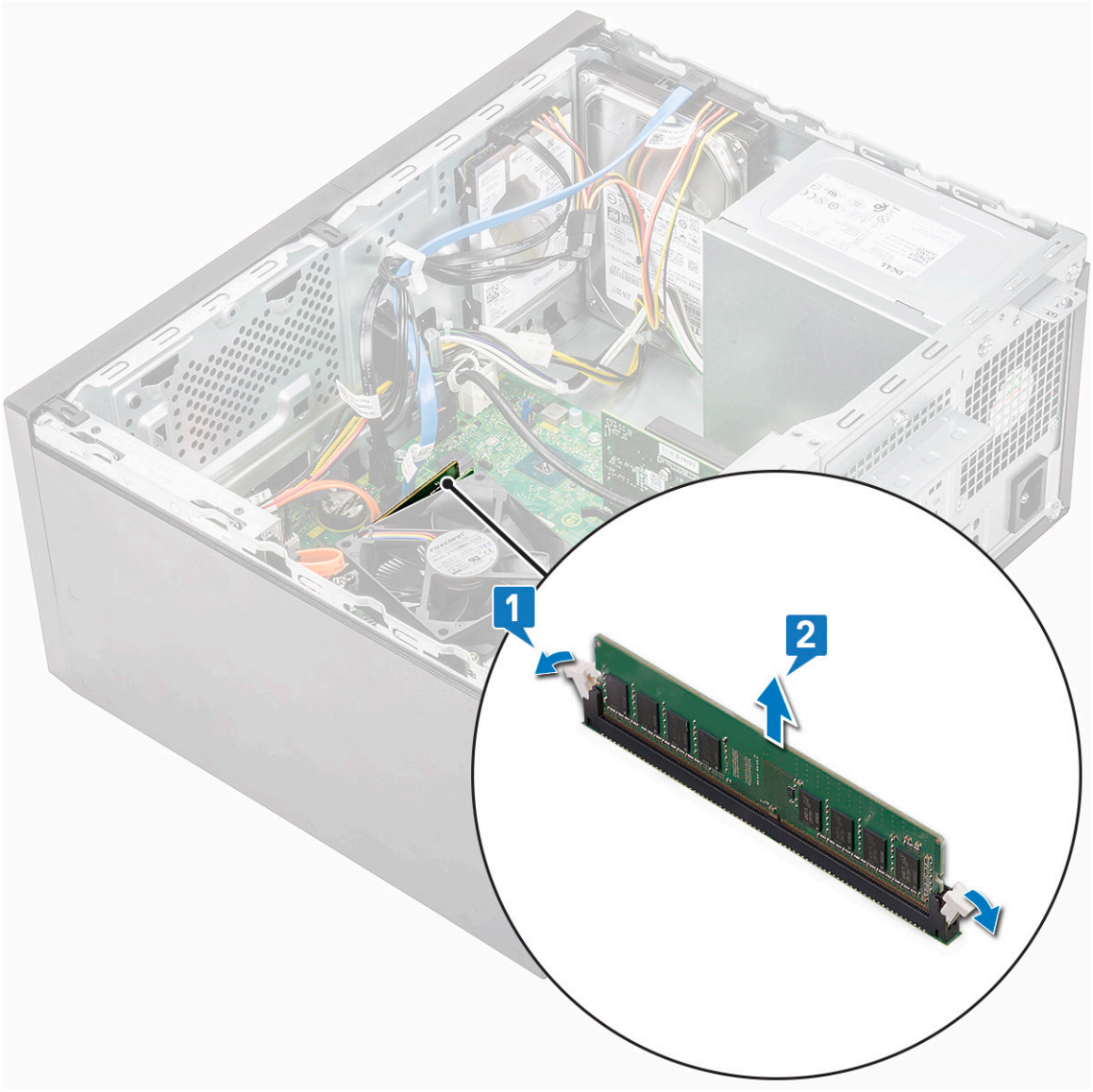
3. Connect the fan cable to the connector on the system board.

4. Install the:
   a) cooling shroud
   b) cover
5. Follow the procedure in After working inside your computer.

Memory modules

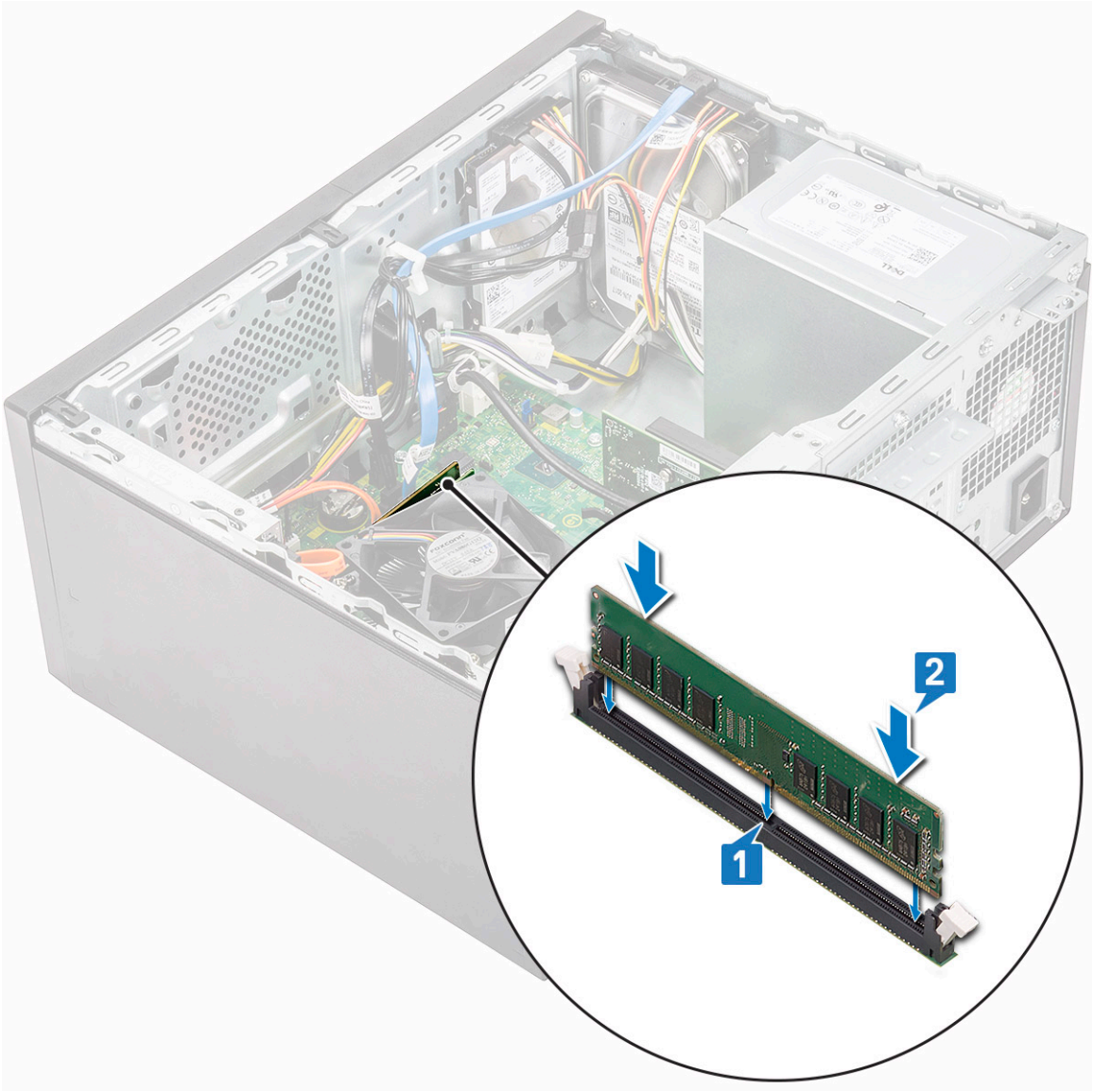
Removing the memory module

1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the memory module:
   a) Pull the clips securing the memory module until the memory module pops up [1].
   b) Lift the memory module from the system board [2].



Installing the memory module

1. Align the memory module with the connector on the system board [1] and insert the memory module into the memory module socket until the clips secure the memory module [2].



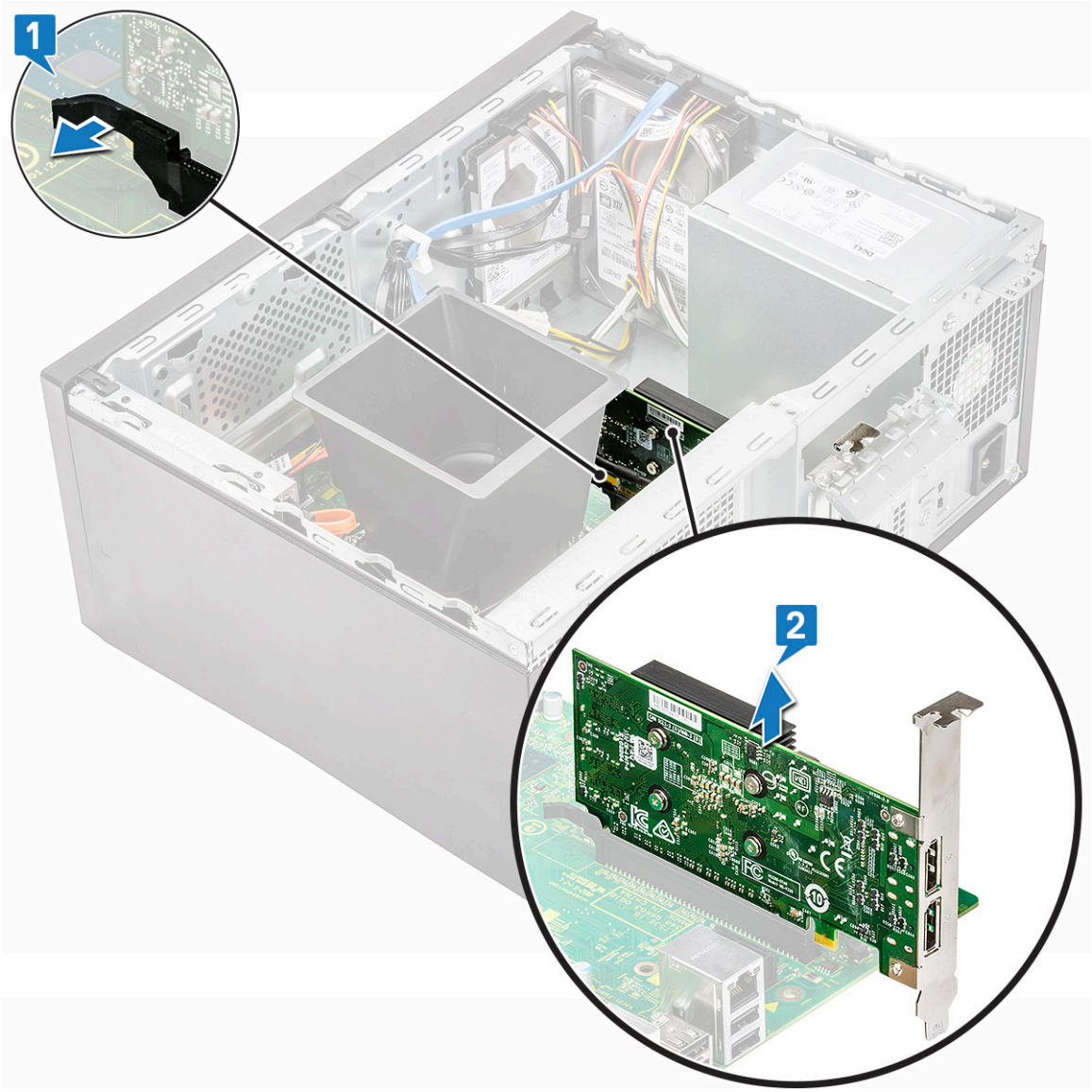
2. Install the cover.
3. Follow the procedure in After working inside your computer.

Expansion card

Removing the expansion card

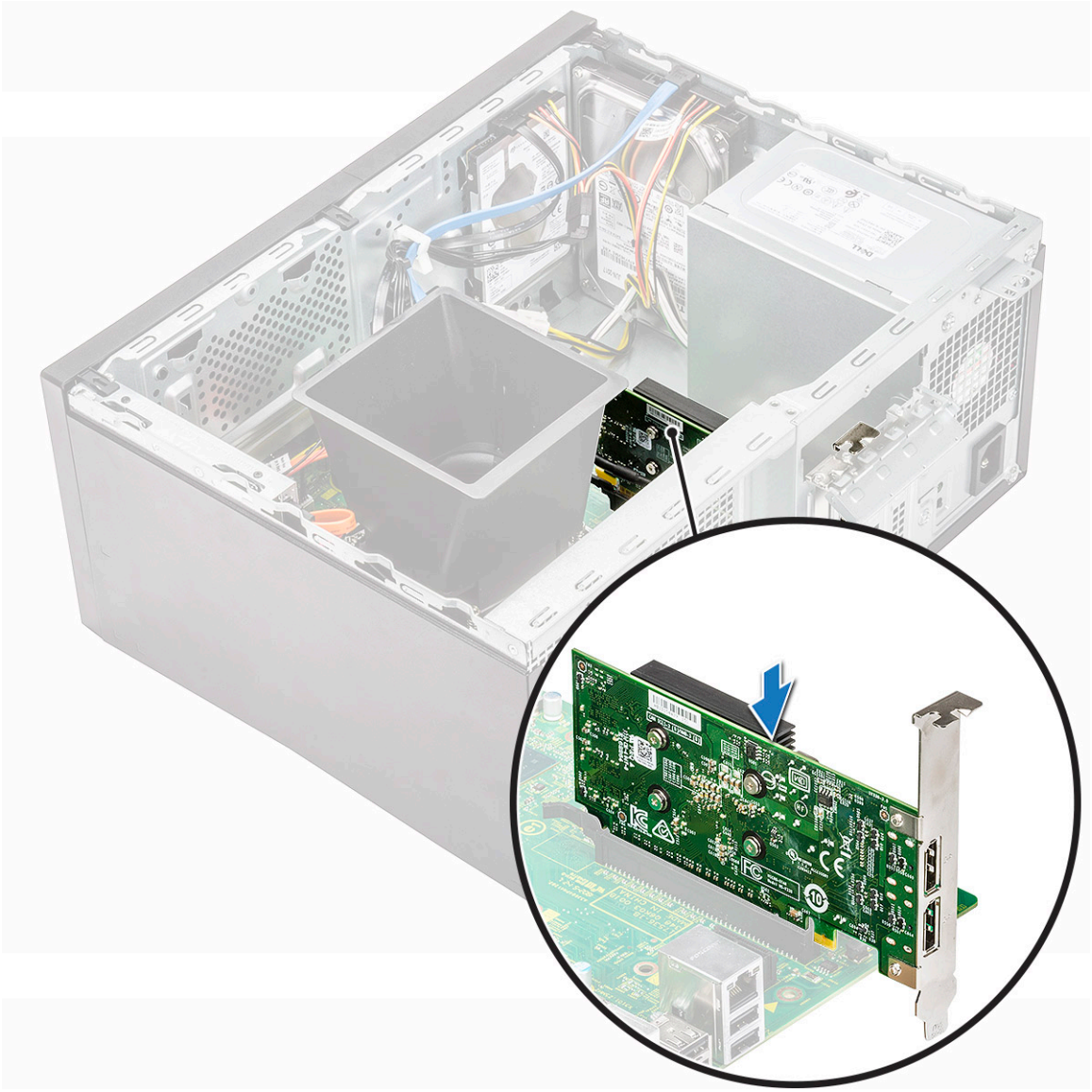
1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the expansion card:
   a) Remove the screw (6-32xL6.35) that secures the PCI bracket to the computer [1].
   b) Pull the PCI bracket downward [2].

c) Push the release tab [1] and lift the expansion card from the system board [2].

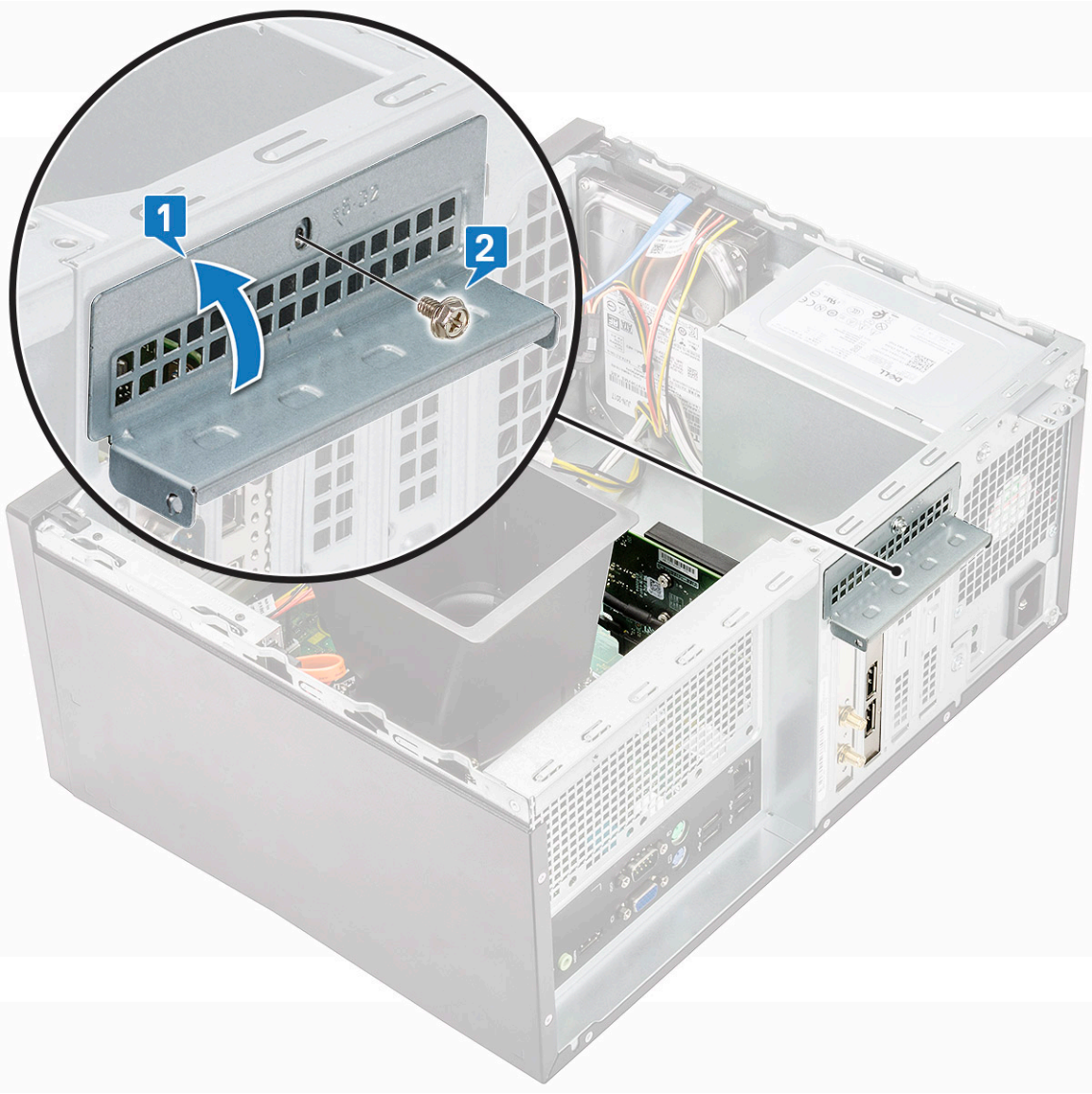


Installing the expansion card

1. Insert the expansion card in the connector on the system board and press down until it is secured.



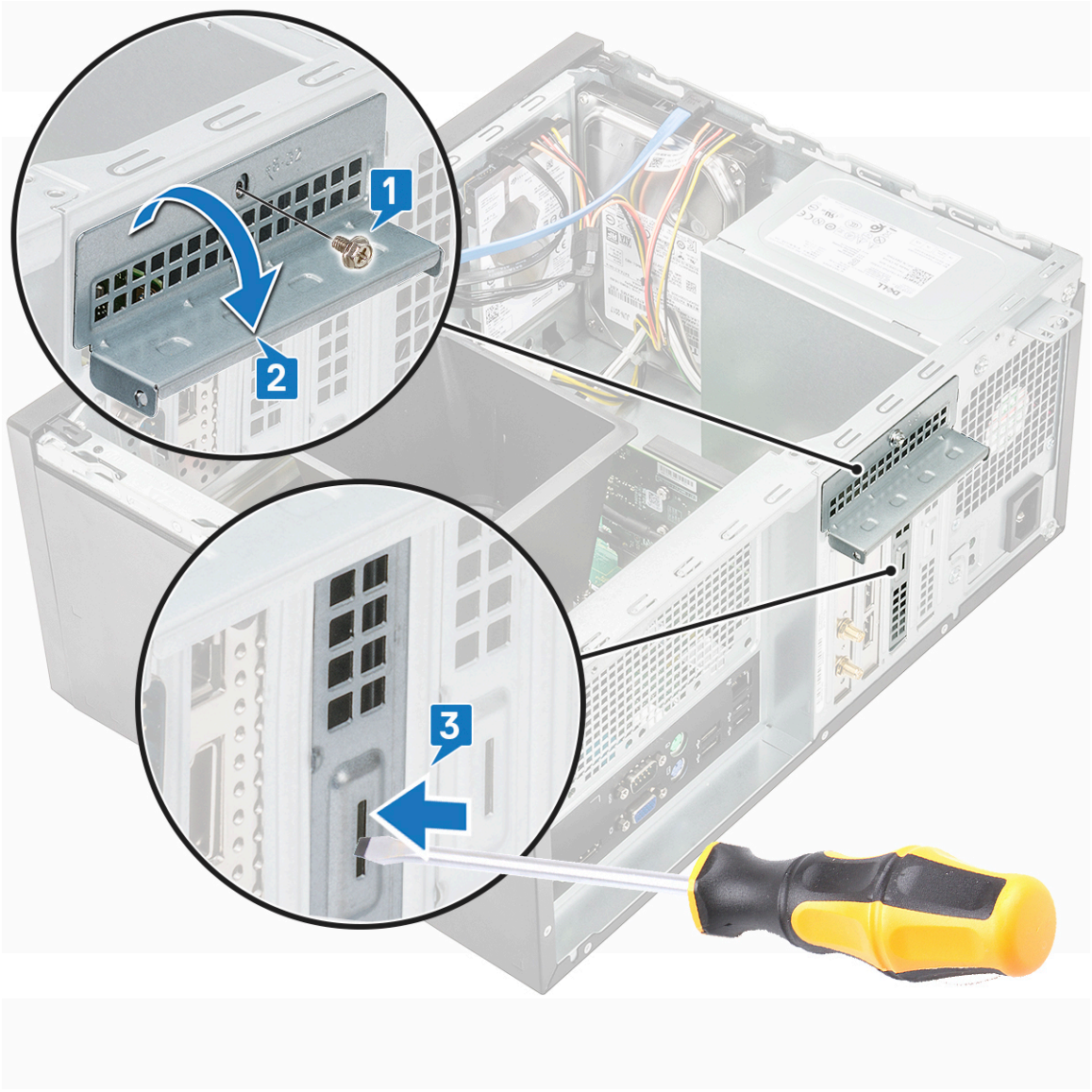
2. Push the PCI bracket back to its position [1].
3. Replace the screw (6-32xL6.35) that secures the PCI bracket to the computer [2].



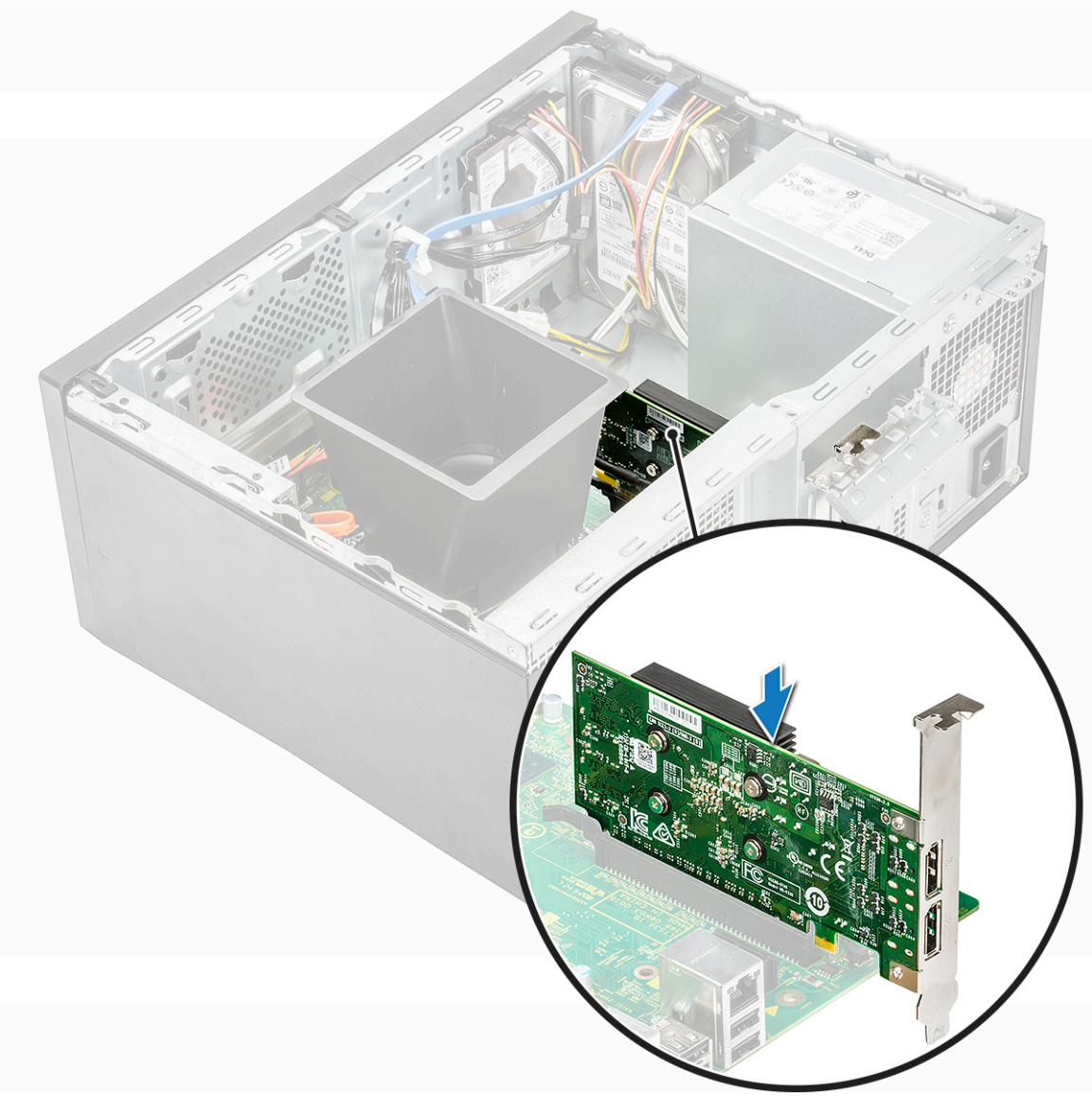
4. Install the cover.
5. Follow the procedure in After working inside your computer.

Installing PCIe expansion card in slots 3 and 4 - optional

1. Remove the screw (6-32xL6.35) that secures the PCI bracket to the computer [1].
2. Pull the metal card-retension latch downward [2].
3. To remove the PCIe brackets as shown below, insert a flathead screwdriver in the hole of PCIe bracket, and repeatedly spin screwdriver from 0-45 degrees to release the bracket [3], and then lift the bracket out from your computer.



4. Insert the PCIe expansion card to the connector on the system board.

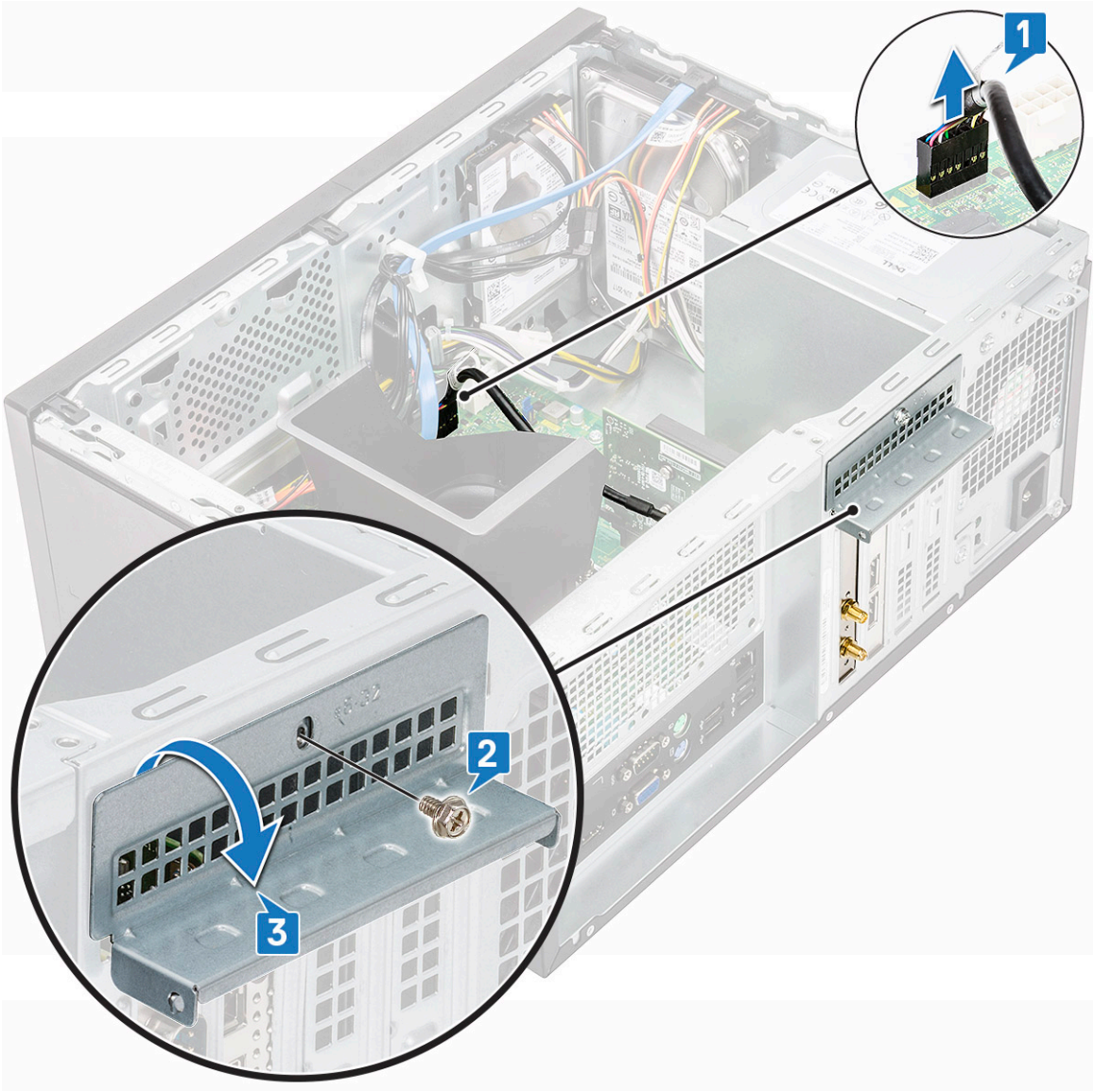


5. Repeat the steps to install any additional PCIe expansion card.
6. Push the PCI bracket back to its position.
7. Replace the screw (6-32xL6.35) that secures the PCI bracket to the computer.
8. Install the:
   a) cover
9. Follow the procedure in After working inside your computer.

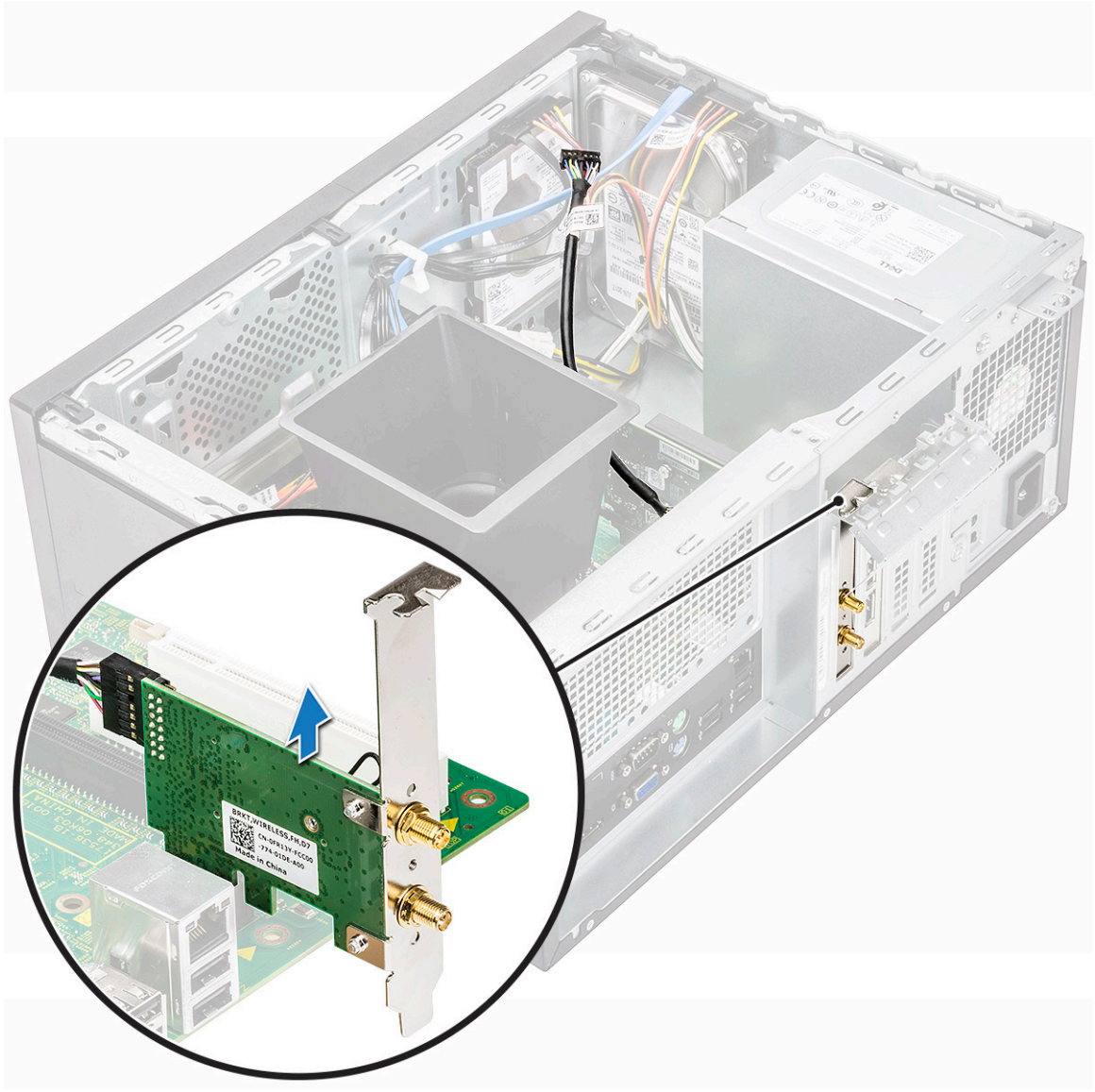
WLAN module

Removing the WLAN module

1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the expansion card:
   a) Disconnect the WLAN module cable from the connector on the system board [1].
   b) Remove the screw (6-32xL6.35) that secures the PCI bracket to the computer [2].
   c) Pull the PCI bracket downward [3].

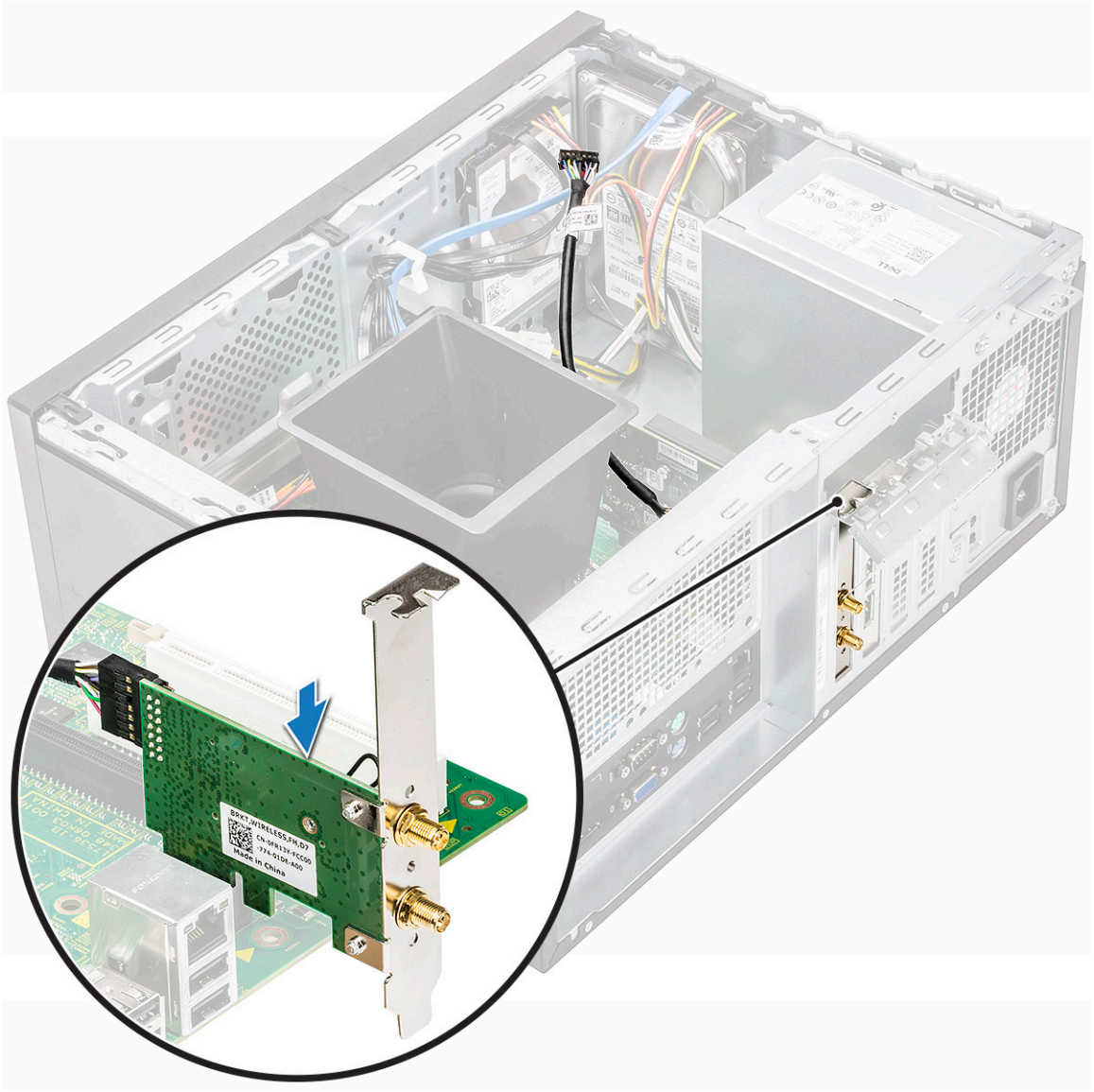


d) Lift the WLAN module from the system board.

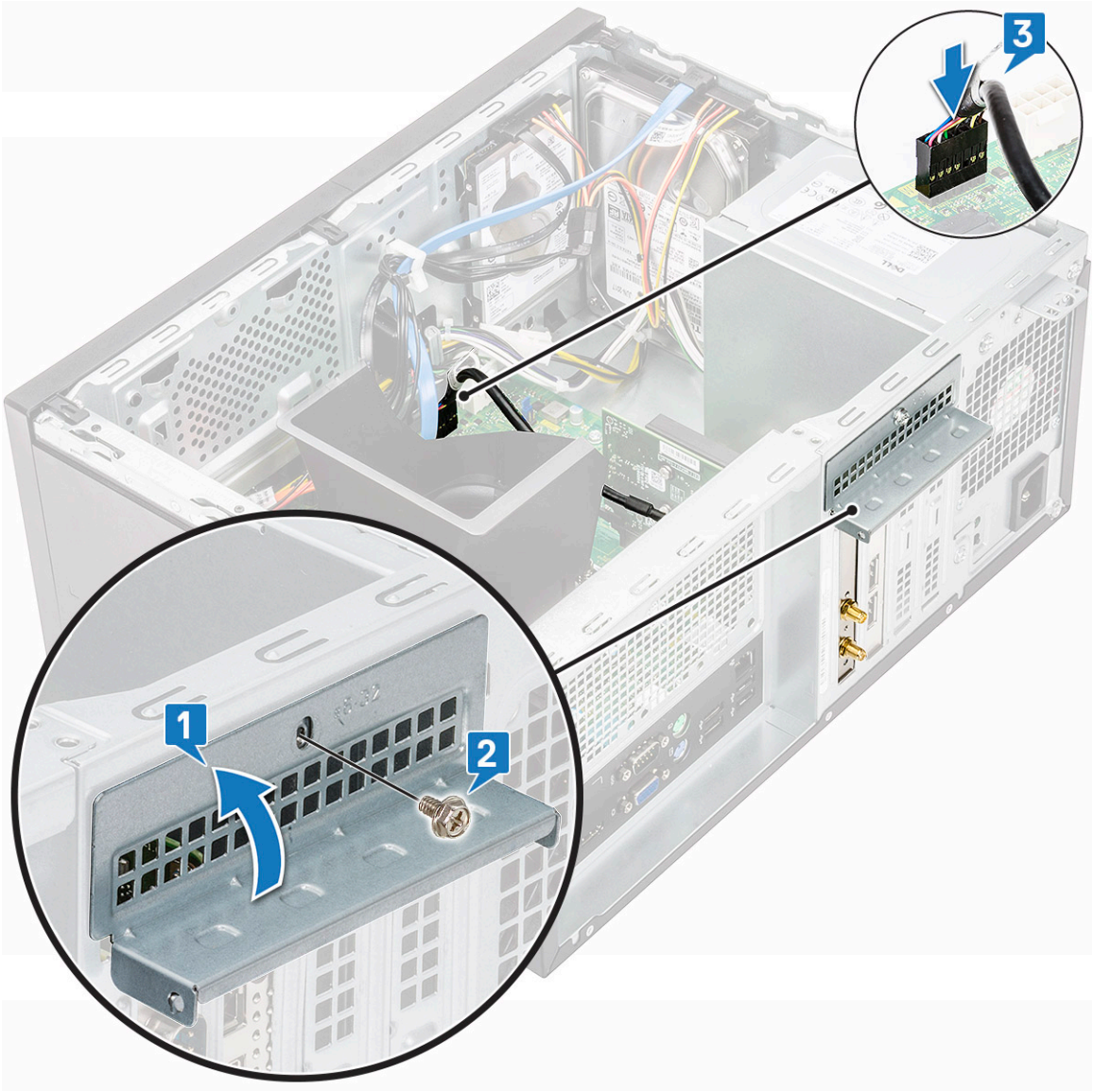


Installing the WLAN module

1. Insert the WLAN module in the connector on the system board and press until it is secured.



2. Push the metal card-retention latch back to its position [1]
3. Tighten the screw (6-32xL6.35) that secures the metal card-retention latch to the computer [2].
4. Connect the WLAN module cable to the connector on the system board [3].

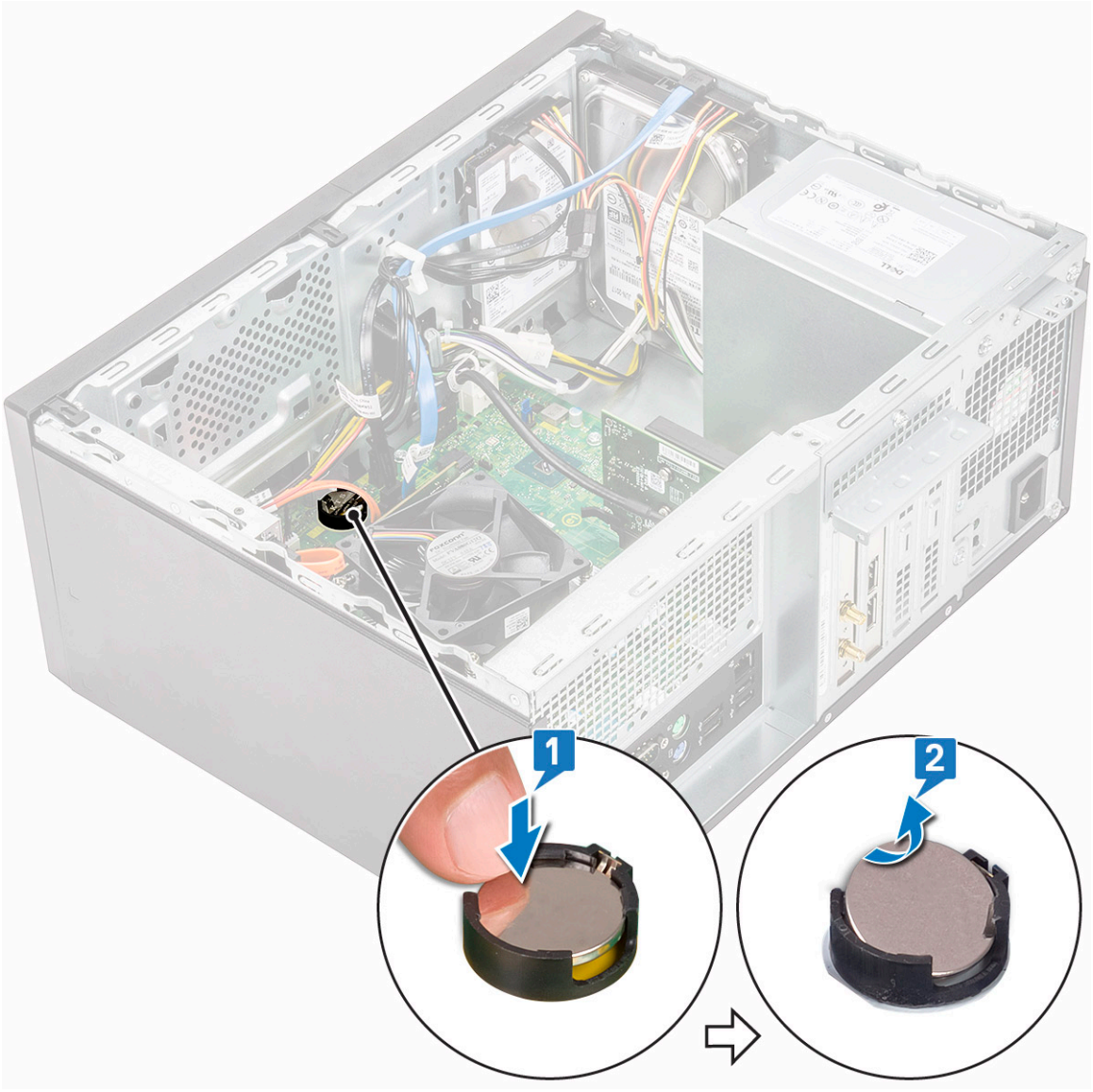


5. Install the cover.
6. Follow the procedure in After working inside your computer.

Coin-cell battery

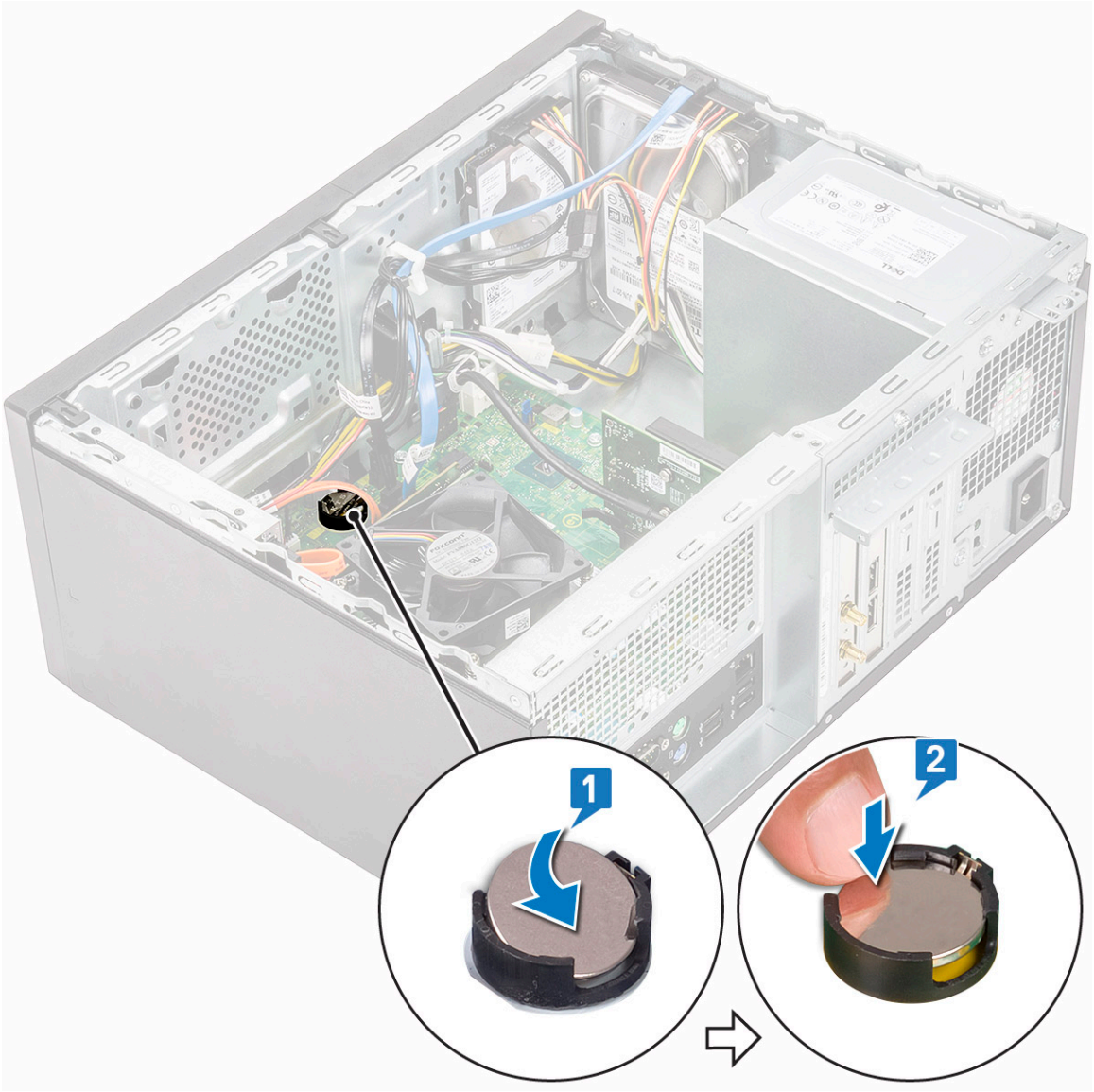
Removing the coin cell battery

1. Follow the procedure in Before working inside your computer.
2. Remove the cover.
3. To remove the coin cell battery:
   a) Press the coin cell battery on the open space of the socket using your finger so that the battery pops up from the socket [1].
   b) Lift the coin-cell battery out of the computer [2].



Installing the coin cell battery

1. Place the coin cell battery in its slot on the system board [1] and press until it snaps in place [2]..



2. Install the cover.
3. Follow the procedure in After working inside your computer.

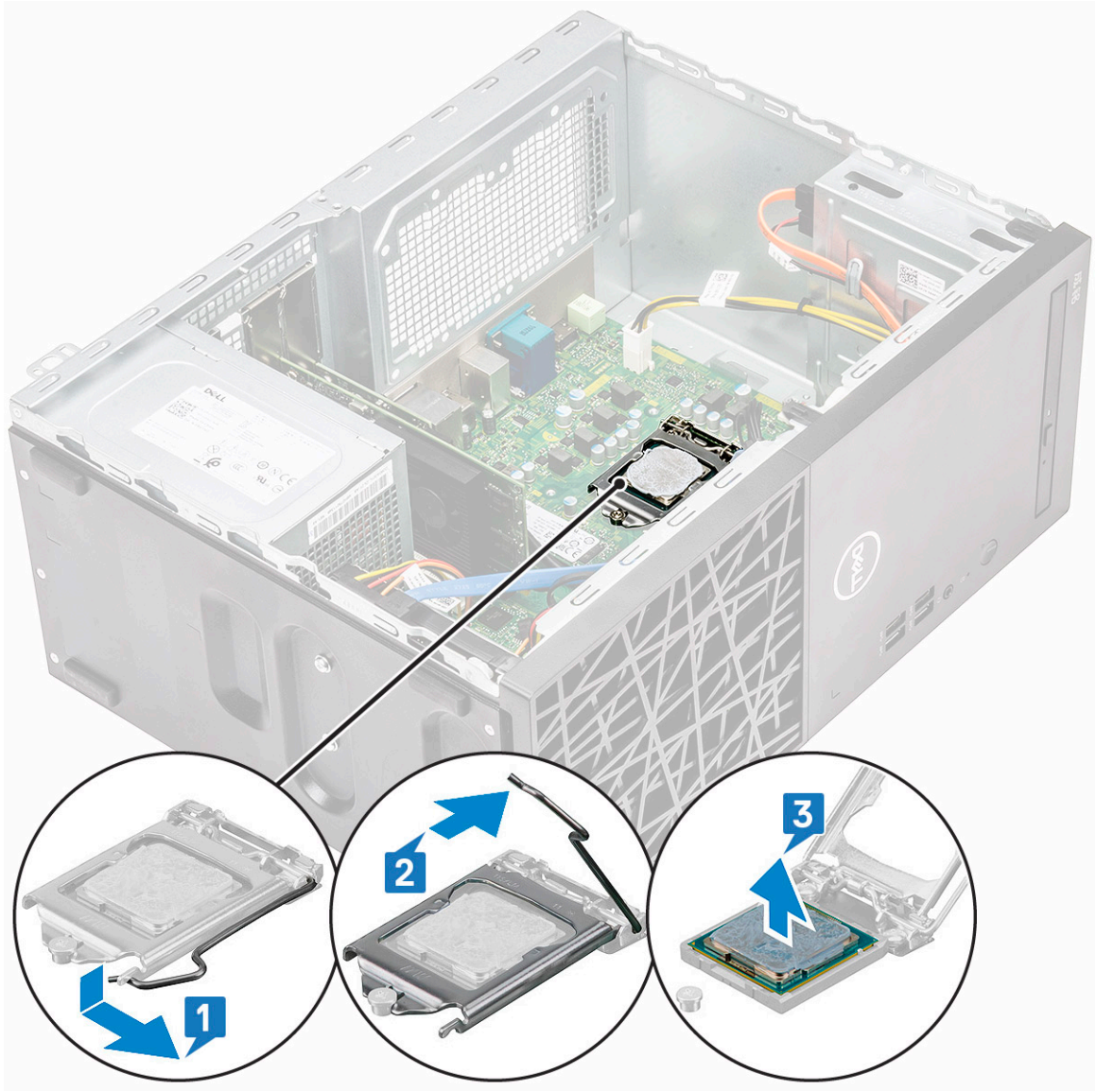
Processor

Removing the processor

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) cooling shroud
   c) heat sink assembly
3. To remove the processor:
   a) Press the release lever down and then move it outward to release it from the retention hook [1,2].

      CAUTION: The processor socket pins are fragile and can be permanently damaged. Be careful not to bend the pins in the processor socket when removing the processor out of the socket.

   b) Lift the processor cover and remove the processor from the socket. Place it in an antistatic bag [3].

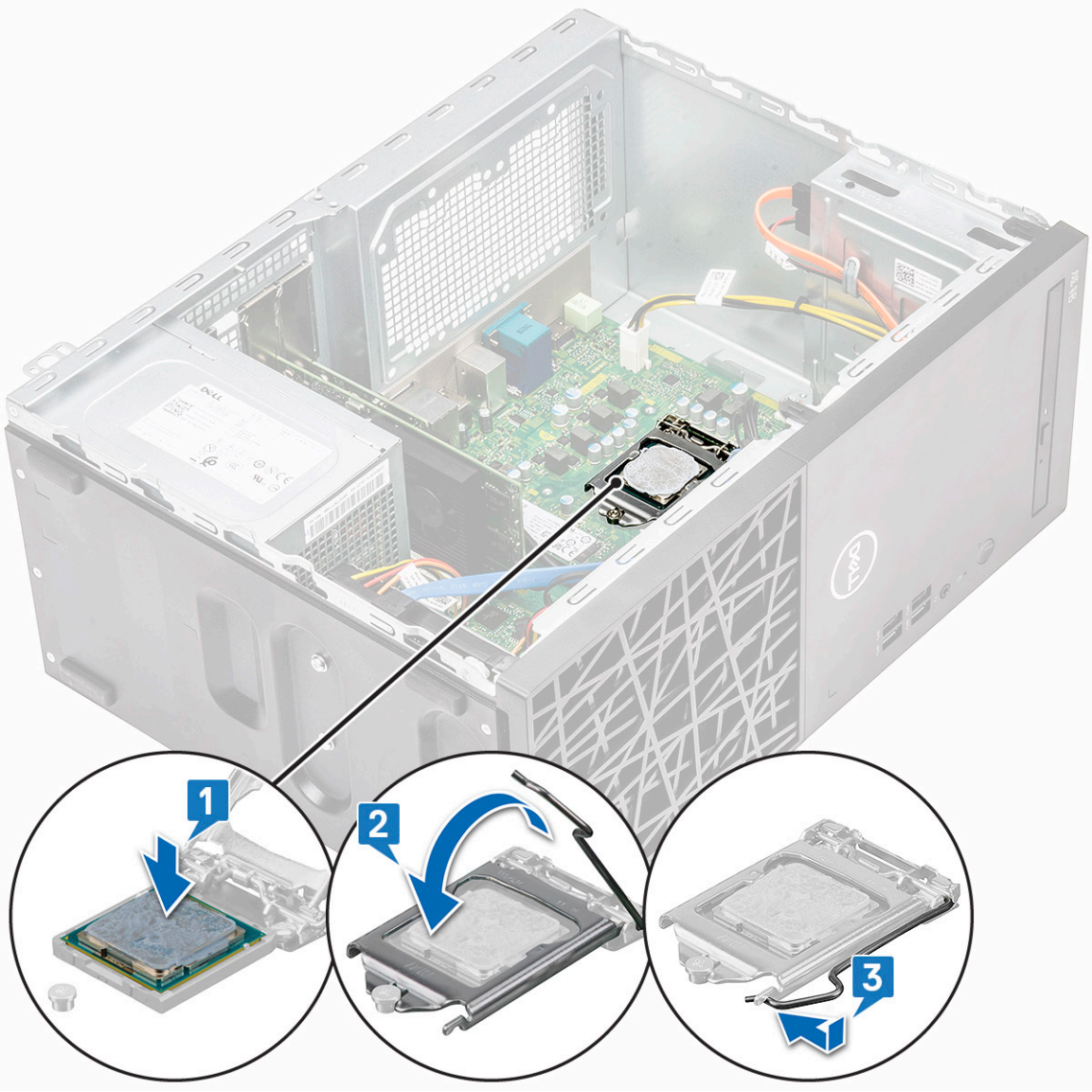


Installing the processor

1. Insert the processor in the processor socket. Ensure the processor is properly seated [1].

   CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.

2. Lower the processor cover [2].
3. Press the release lever down and then move it inward to secure it with the retention hook [3].



4. Install the:
   a) heat sink assembly
   b) cooling shroud
   c) cover
5. Follow the procedure in After working inside your computer.

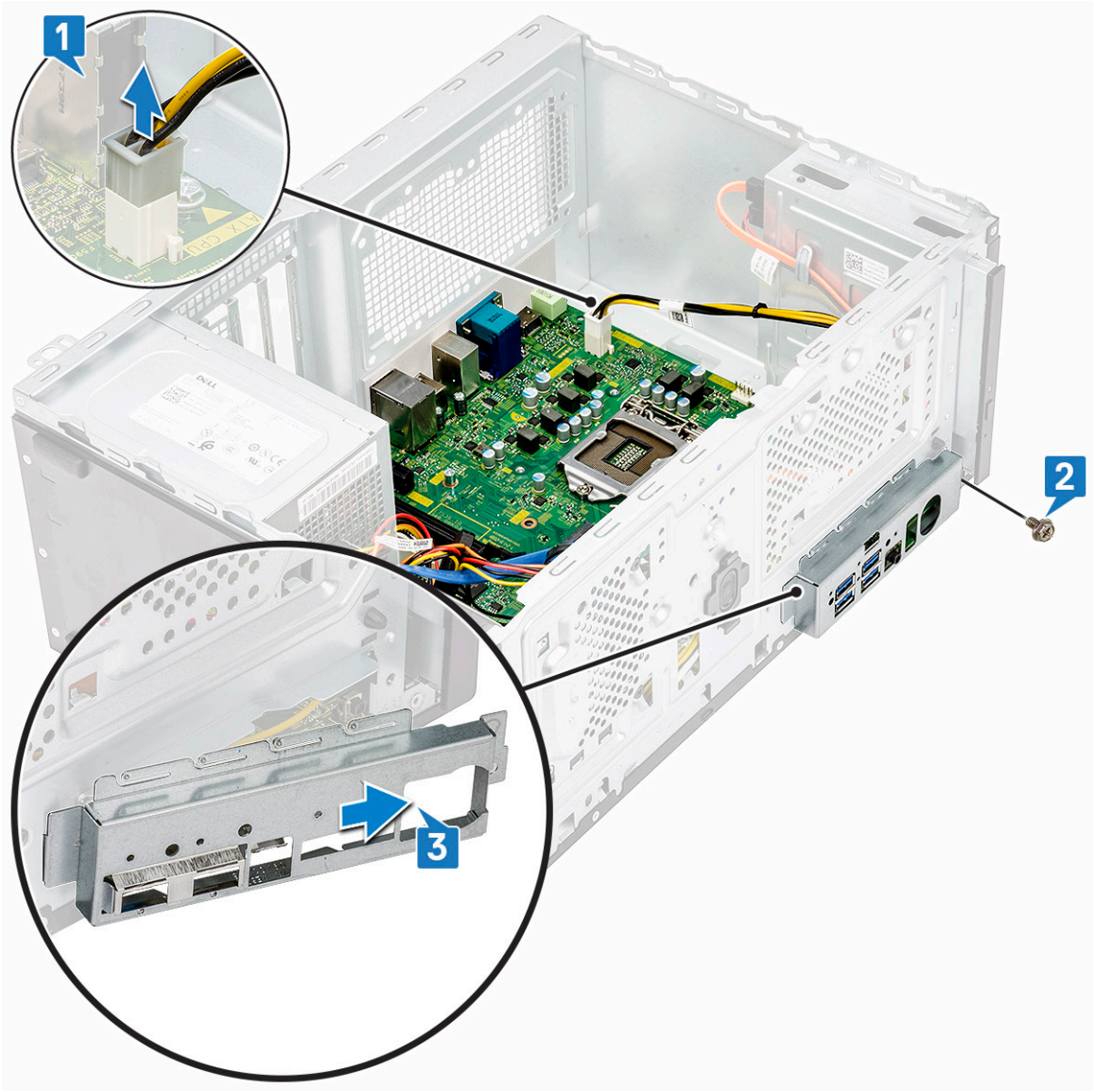
System board

Removing the system board

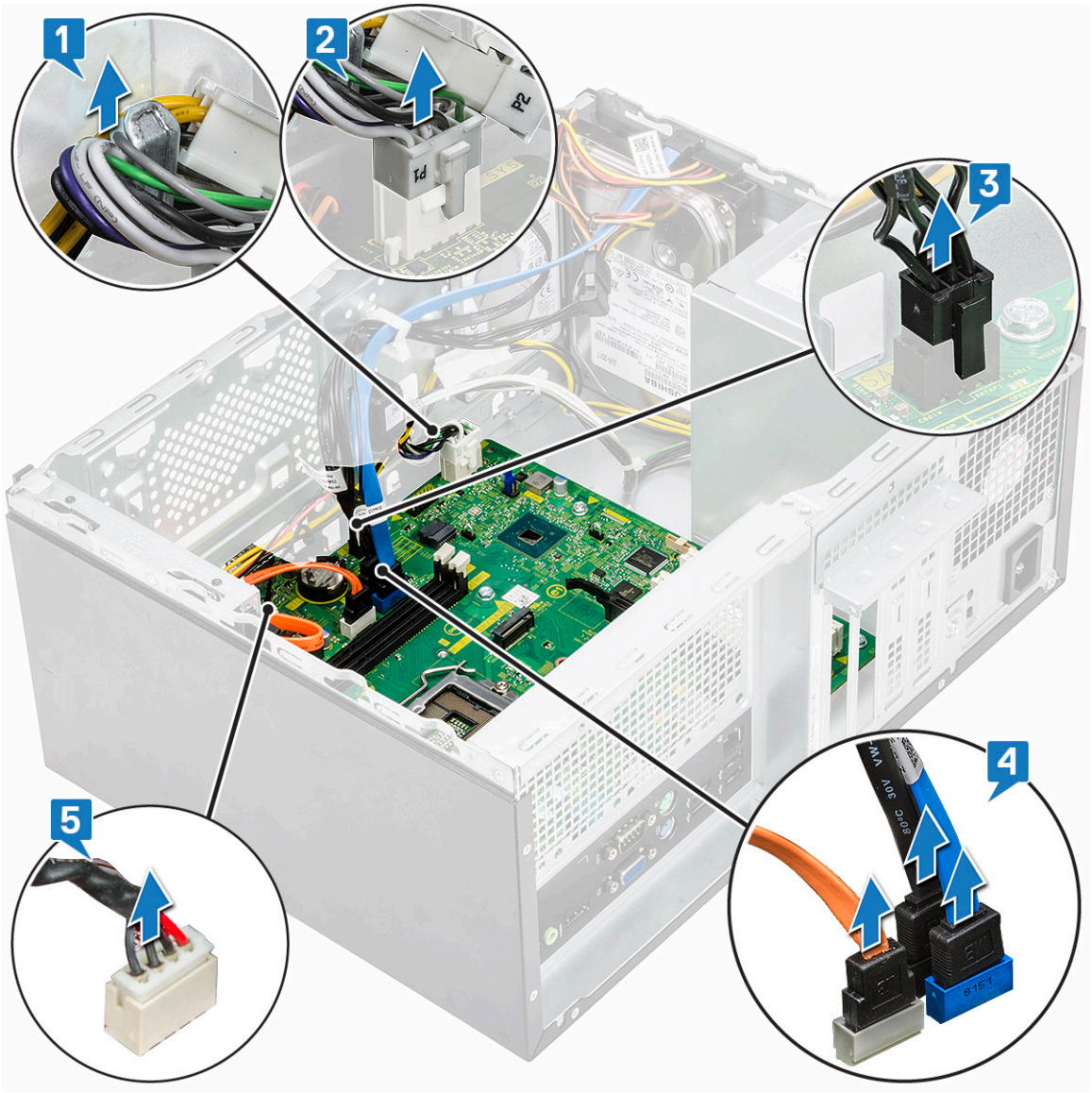
1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) cover
   b) front bezel
   c) M.2 SSD card
   d) cooling shroud
   e) heat sink assembly
   f) memory module
   g) expansion card

h) coin cell battery
i) processor

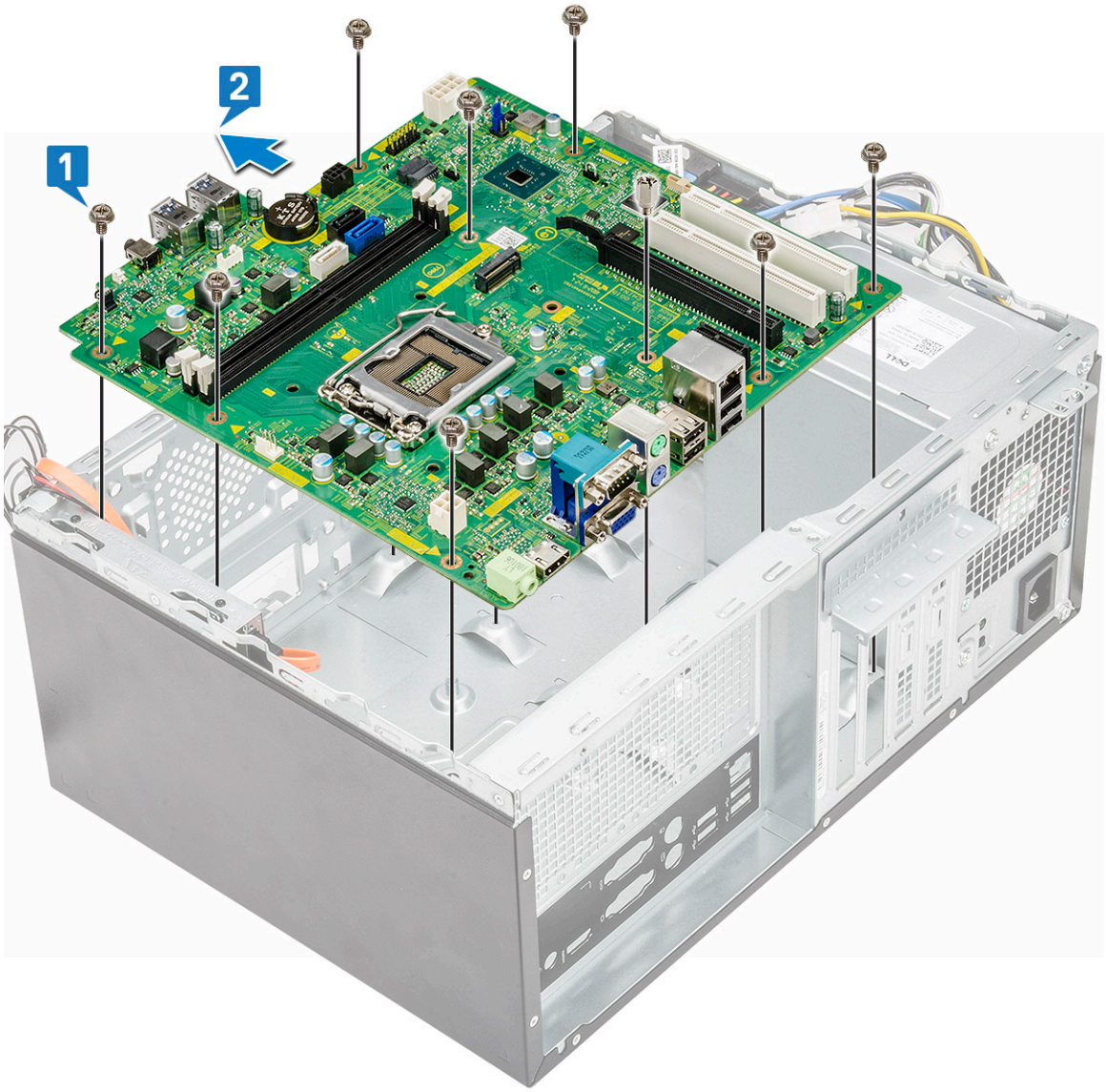
3. To remove I/O panel cover:
   a) Disconnect the PSU cable from the connector on the sytem board [1]
   b) Remove the screw (6-32xL6.35) that secures the I/O panel cover to the computer [2].
   c) Slide the I/O panel cover [3].



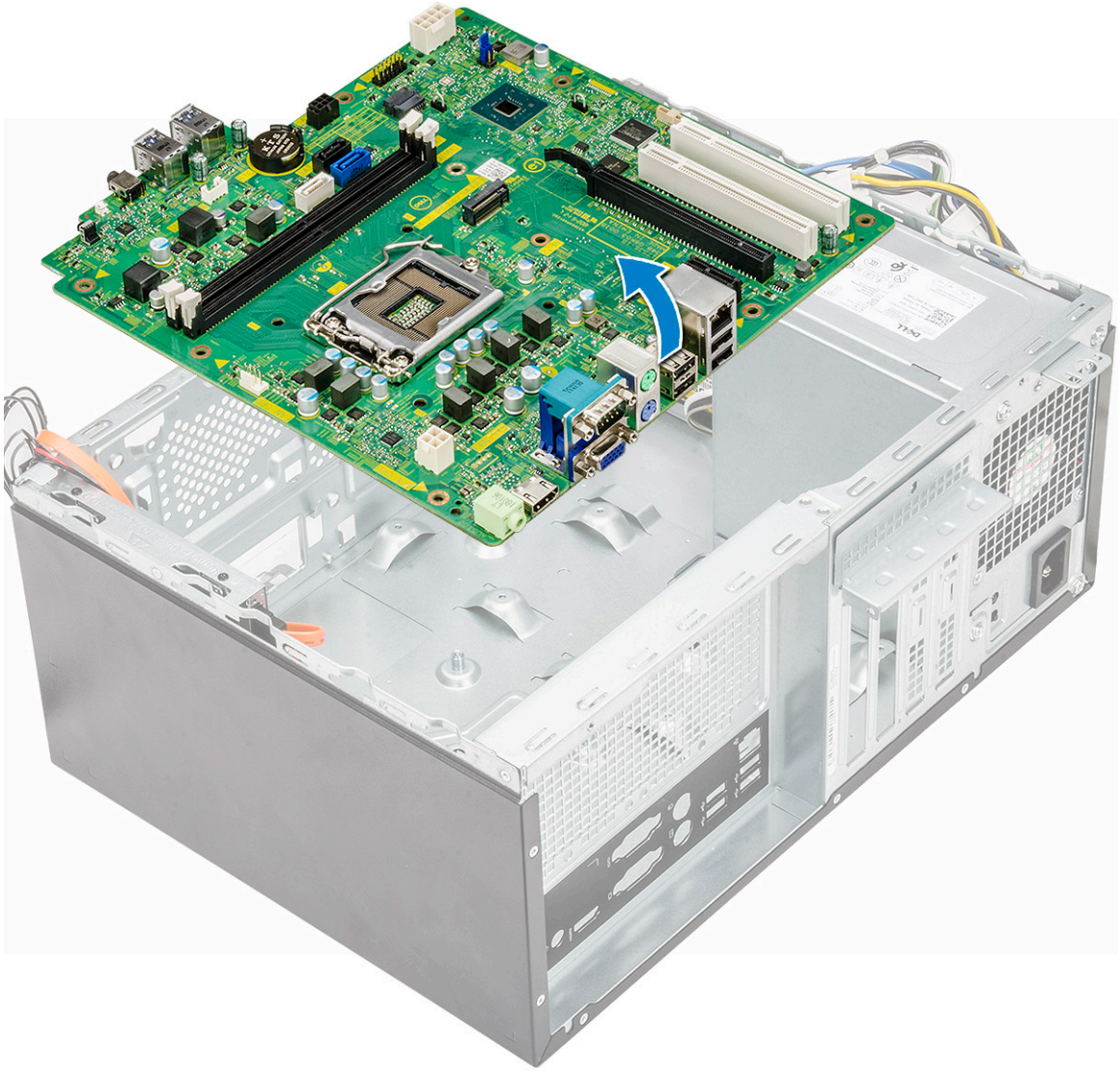
4. Unroute the PSU cable [1], disconnect the power supply unit cable, hard drive power cable and data cable, optical drive power cable, and speaker cable [2, 3,4,5].



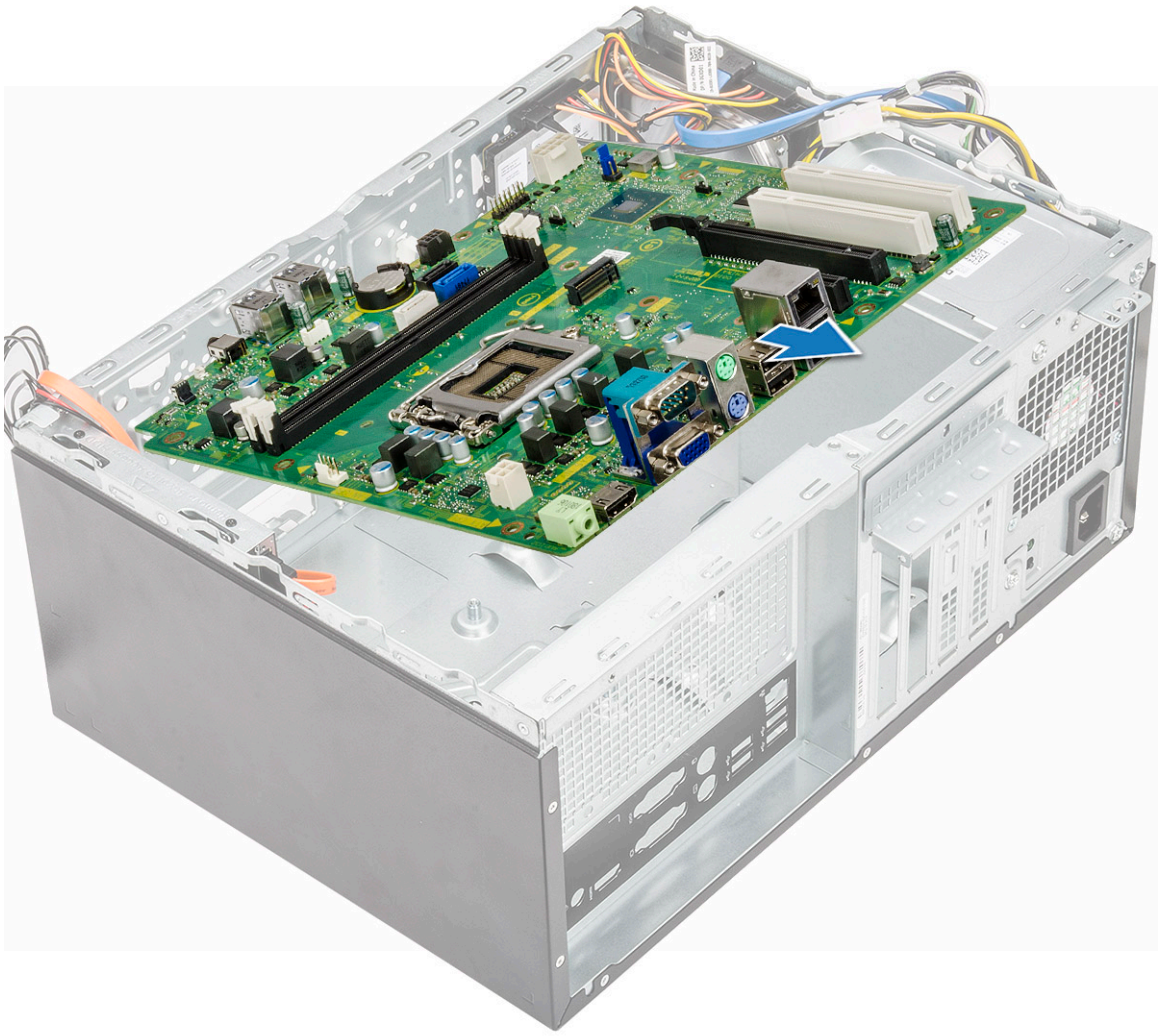
5. To remove the system board:
   a) Remove the eight screws (6-32xL6.35) and one standoff screw (6-32xL4.8) that secure the system board to the computer [1].
   b) Push the system board towards the front of the system [2].



c) Tilt the system board.

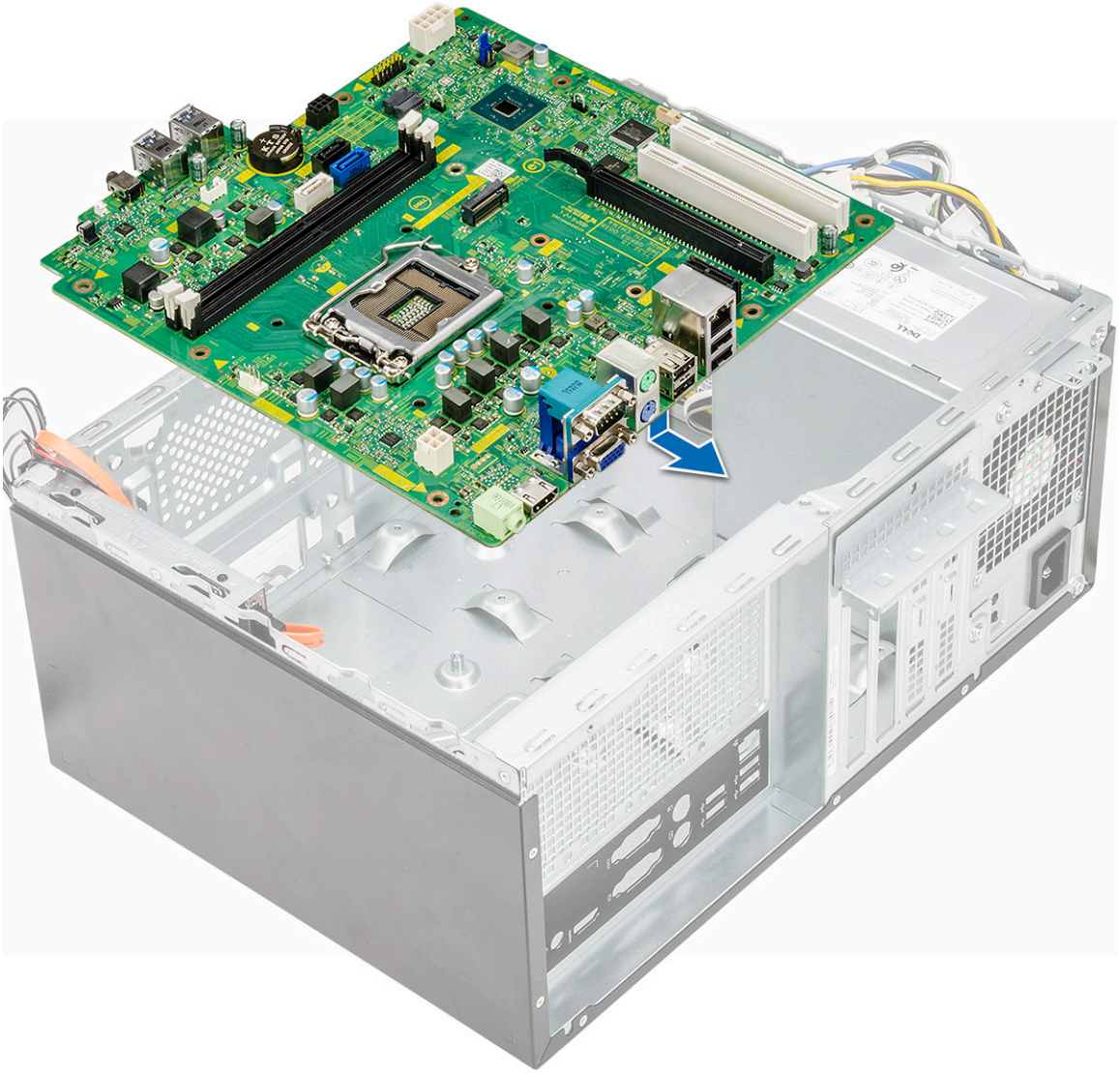


d) Lift the system board from the system.



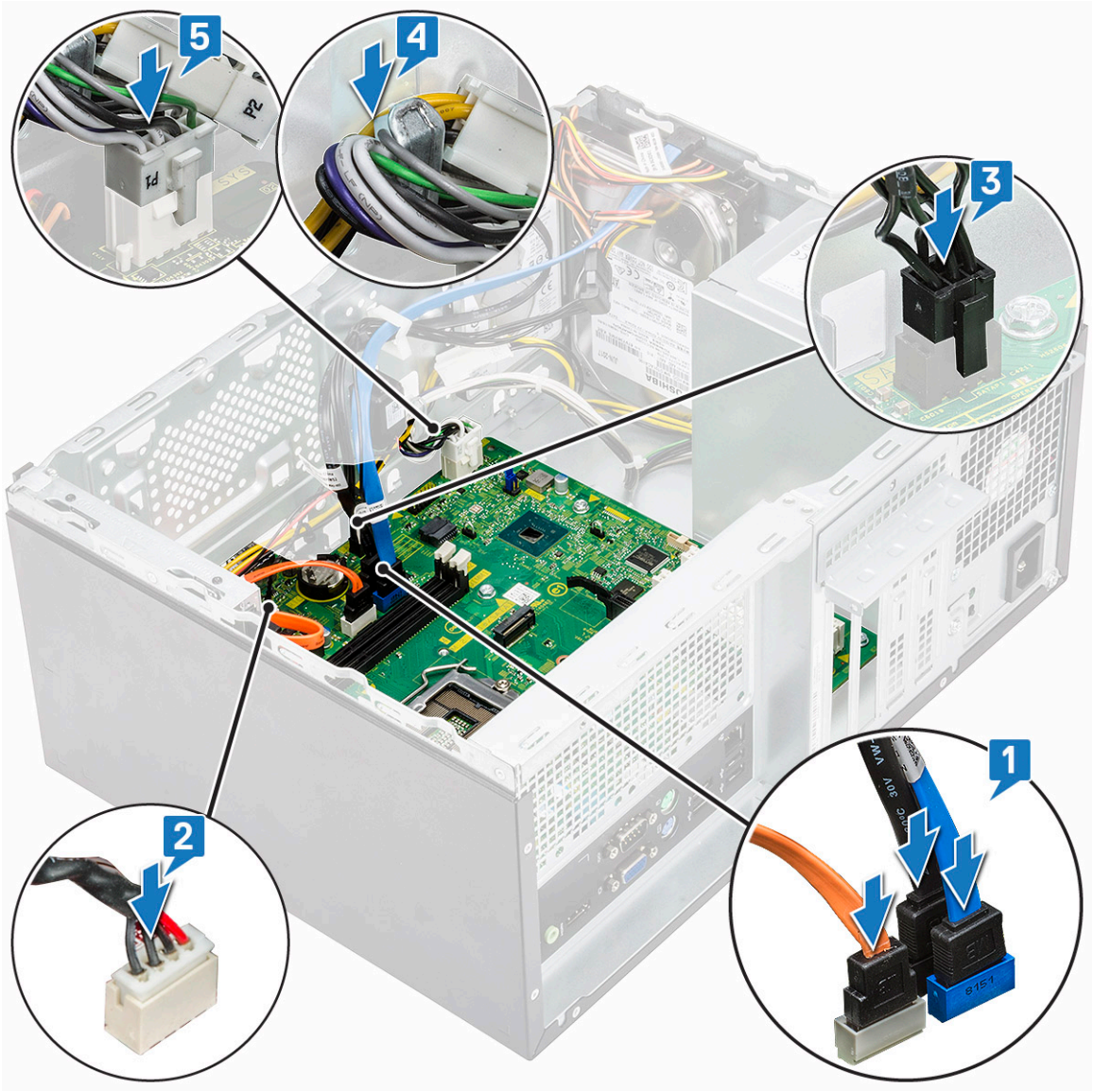
Installing the system board

1. Align the system board to the port connectors on the rear of the chassis and place the system board in the chassis.

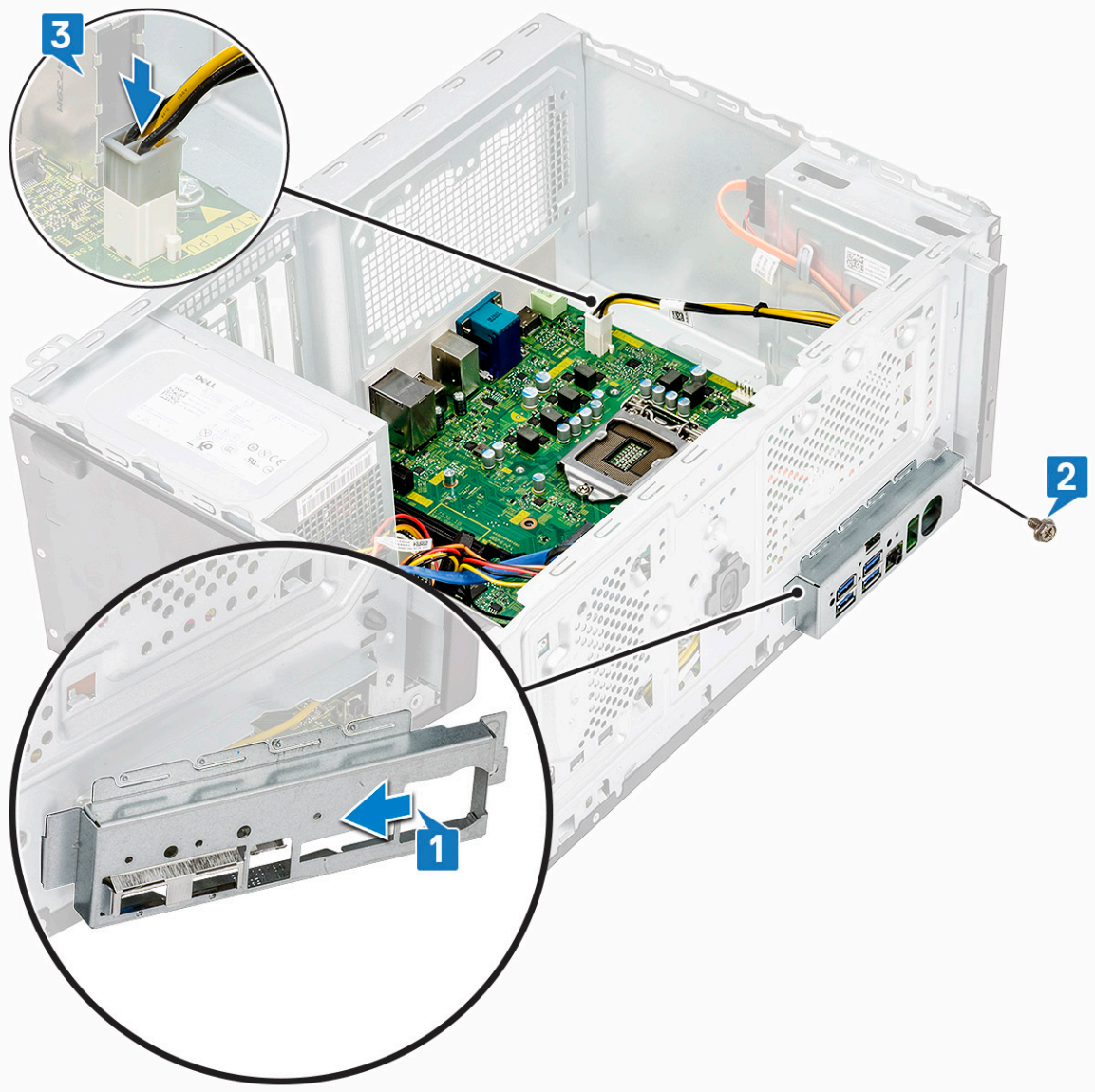


2. Replace the eight screws (6-32xL6.35) and one standoff screw (6-32xL4.8) that secure the system board to the chassis.

3. Connect the optical drive cable, speaker cable, and hard drive data cable and power cable [1,2,3].
4. Route the PSU cable through the metal clip and connect the power supply unit cable to the system board [4,5].



5. Place the front IO bracket.
6. Replace the screw (6-32xL6.35) that secures the front IO bracket to the computer [2].
7. Connect the PSU cable to the connector on the sytem board [3]



8. Install the:
   a) processor
   b) coin cell battery
   c) memory module
   d) expansion card
   e) heat sink assembly
   f) cooling shroud
   g) M.2 SATA SSD
   h) front bezel
   i) cover
9. Follow the procedure in After working inside your computer.

4

Troubleshooting

Diagnostics

The computer POST (Power On Self Test) ensures that it meets the basic computer requirements and the hardware is working appropriately before the boot process begins. If the computer passes the POST, the computer continues to start in a normal mode. However, if the computer fails the POST, the computer emits a series of LED codes during the start-up. The system LED is integrated on the Power button.

The following table shows different light patterns and what they indicate.

Table 3. Diagnostics

Amber Blinking Pattern	Possible Problem	Problem Description
2, 1	System board	System board failure
2, 2	System board, PSU, or cabling	System board, PSU, or cabling failure
2, 3	System board, memory, CPU	System board, memory, or CPU failure
2, 4	CMOS (coin-cell) battery	Coin-cell battery failure
2, 5	BIOS	Corrupt BIOS. Recovery image is not found or is invalid during auto BIOS recovery process.
2, 6	CPU	CPU configuration error or CPU failure
2, 7	Memory	Memory failure
3, 1	PCI/video	PCI or video card / chip failure
3, 2	Storage/USB	Storage and USB configuration error or failure
3, 3	Memory	No memory detected
3, 4	System board	System board error
3, 5	Memory	Memory configuration error, incompatible memory, or invalid memory configuration
3, 6	BIOS	Recovery image not found
3, 7	BIOS	Recovery image found but invalid

Dell Enhanced Pre-Boot System Assessment — ePSA Diagnostic 3.0

You can invoke the ePSA diagnostics by either of the following ways :

- Press the F12 key when the system posts and choose **ePSA or Diagnostics** option on One Time Boot Menu.
- Press and hold Fn(Function key on keyboard) and **Power On** (PWR) the system.

System error messages

Table 4. System error messages

System message	Description
`Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support`	The computer failed to complete the boot routine three consecutive times for the same error.
`CMOS checksum error`	RTC is reset, **BIOS Setup** default has been loaded.
`CPU fan failure`	CPU fan has failed.
`System fan failure`	System fan has failed.
`Hard-disk drive failure`	Possible hard disk drive failure during POST.
`Keyboard failure`	Keyboard failure or loose cable. If reseating the cable does not solve the problem, replace the keyboard.
`No boot device available`	No bootable partition on hard disk drive, the hard disk drive cable is loose, or no bootable device exists. • If the hard drive is your boot device, ensure that the cables are connected and that the drive is installed properly and partitioned as a boot device. • Enter system setup and ensure that the boot sequence information is correct.
`No timer tick interrupt`	A chip on the system board might be malfunctioning or motherboard failure.
`NOTICE - Hard Drive SELF MONITORING SYSTEM has reported that a parameter has exceeded its normal operating range. Dell recommends that you back up your data regularly. A parameter out of range may or may not indicate a potential hard drive problem`	S.M.A.R.T error, possible hard disk drive failure.

5

Getting help

Topics:

- Contacting Dell

Contacting Dell

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

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

1. Go to **Dell.com/support.**
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.