HP Apollo 2000 System Maintenance and Service Guide

Abstract

This guide describes identification and maintenance procedures, diagnostic tools, specifications and requirements for hardware components and software. This guide is for an experienced service technician. HP assumes that you are qualified in the servicing of computer equipment, trained in recognizing hazards in products, and are familiar with weight and stability precautions.

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Customer self repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

NOTE: Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website (http://www.hp.com/go/selfrepair).

Parts only warranty service

Your HP Limited Warranty may include a parts only warranty service. Under the terms of parts only warranty service, HP will provide replacement parts free of charge.

For parts only warranty service, CSR part replacement is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

Réparation par le client (CSR)

Les produits HP comportent de nombreuses pièces CSR (Customer Self Repair = réparation par le client) afin de minimiser les délais de réparation et faciliter le remplacement des pièces défectueuses. Si pendant la période de diagnostic, HP (ou ses partenaires ou mainteneurs agréés) détermine que la réparation peut être effectuée à l'aide d'une pièce CSR, HP vous l'envoie directement. Il existe deux catégories de pièces CSR:

Obligatoire - Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

Facultatif - Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

REMARQUE: Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

Les pièces CSR sont livrées le jour ouvré suivant, dans la limite des stocks disponibles et selon votre situation géographique. Si votre situation géographique le permet et que vous demandez une livraison le jour même ou dans les 4 heures, celle-ci vous sera facturée. Pour bénéficier d'une assistance téléphonique, appelez le Centre d'assistance technique HP. Dans les documents envoyés avec la pièce de rechange CSR, HP précise s'il est nécessaire de lui retourner la pièce défectueuse. Si c'est le cas, vous devez le faire dans le délai indiqué, généralement cinq (5) jours ouvrés. La pièce et sa documentation doivent être retournées dans l'emballage fourni. Si vous ne retournez pas la pièce défectueuse, HP se réserve le droit de vous facturer les coûts de remplacement. Dans le cas d'une pièce CSR, HP supporte l'ensemble des frais d'expédition et de retour, et détermine la société de courses ou le transporteur à utiliser.

Pour plus d'informations sur le programme CSR de HP, contactez votre Mainteneur Agrée local. Pour plus d'informations sur ce programme en Amérique du Nord, consultez le site Web HP (http://www.hp.com/go/selfrepair).

Service de garantie "pièces seules"

Votre garantie limitée HP peut inclure un service de garantie "pièces seules". Dans ce cas, les pièces de rechange fournies par HP ne sont pas facturées.

Dans le cadre de ce service, la réparation des pièces CSR par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

Riparazione da parte del cliente

Per abbreviare i tempi di riparazione e garantire una maggiore flessibilità nella sostituzione di parti difettose, i prodotti HP sono realizzati con numerosi componenti che possono essere riparati direttamente dal cliente (CSR, Customer Self Repair). Se in fase di diagnostica HP (o un centro di servizi o di assistenza HP) identifica il guasto come riparabile mediante un ricambio CSR, HP lo spedirà direttamente al cliente per la sostituzione. Vi sono due categorie di parti CSR:

Obbligatorie – Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

Opzionali – Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

NOTA: alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

In base alla disponibilità e alla località geografica, le parti CSR vengono spedite con consegna entro il giorno lavorativo seguente. La consegna nel giorno stesso o entro quattro ore è offerta con un supplemento di costo solo in alcune zone. In caso di necessità si può richiedere l'assistenza telefonica di un addetto del centro di supporto tecnico HP. Nel materiale fornito con una parte di ricambio CSR, HP specifica se il cliente deve restituire dei componenti. Qualora sia richiesta la resa ad HP del componente difettoso, lo si deve spedire ad HP entro un determinato periodo di tempo, generalmente cinque (5) giorni lavorativi. Il componente difettoso deve essere restituito con la documentazione associata nell'imballo di spedizione fornito. La mancata restituzione del componente può comportare la fatturazione del ricambio da parte di HP. Nel caso di riparazione da parte del cliente, HP sostiene tutte le spese di spedizione e resa e sceglie il corriere/vettore da utilizzare.

Per ulteriori informazioni sul programma CSR di HP contattare il centro di assistenza di zona. Per il programma in Nord America fare riferimento al sito Web HP (http://www.hp.com/go/selfrepair).

Servizio di garanzia per i soli componenti

La garanzia limitata HP può includere un servizio di garanzia per i soli componenti. Nei termini di garanzia del servizio per i soli componenti, HP fornirà gratuitamente le parti di ricambio.

Per il servizio di garanzia per i soli componenti è obbligatoria la formula CSR che prevede la riparazione da parte del cliente. Se il cliente invece richiede la sostituzione ad HP, dovrà sostenere le spese di spedizione e di manodopera per il servizio.

Customer Self Repair

HP Produkte enthalten viele CSR-Teile (Customer Self Repair), um Reparaturzeiten zu minimieren und höhere Flexibilität beim Austausch defekter Bauteile zu ermöglichen. Wenn HP (oder ein HP Servicepartner) bei der Diagnose feststellt, dass das Produkt mithilfe eines CSR-Teils repariert werden kann, sendet Ihnen HP dieses Bauteil zum Austausch direkt zu. CSR-Teile werden in zwei Kategorien unterteilt:

Zwingend – Teile, für die das Customer Self Repair-Verfahren zwingend vorgegeben ist. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.

Optional – Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

HINWEIS: Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No“ bzw. „Nein“ gekennzeichnet.

CSR-Teile werden abhängig von der Verfügbarkeit und vom Lieferziel am folgenden Geschäftstag geliefert. Für bestimmte Standorte ist eine Lieferung am selben Tag oder innerhalb von vier Stunden gegen einen Aufpreis verfügbar. Wenn Sie Hilfe benötigen, können Sie das HP technische Support Center anrufen und sich von einem Mitarbeiter per Telefon helfen lassen. Den Materialien, die mit einem CSR-Ersatzteil geliefert werden, können Sie entnehmen, ob das defekte Teil an HP zurückgeschickt werden muss. Wenn es erforderlich ist, das defekte Teil an HP zurückzuschicken, müssen Sie dies innerhalb eines vorgegebenen Zeitraums tun, in der Regel innerhalb von fünf (5) Geschäftstagen. Das defekte Teil muss mit der zugehörigen Dokumentation in der Verpackung zurückgeschickt werden, die im Lieferumfang enthalten ist. Wenn Sie das

defekte Teil nicht zurückschicken, kann HP Ihnen das Ersatzteil in Rechnung stellen. Im Falle von Customer Self Repair kommt HP für alle Kosten für die Lieferung und Rücksendung auf und bestimmt den Kurier-/Frachtdienst.

Weitere Informationen über das HP Customer Self Repair Programm erhalten Sie von Ihrem Servicepartner vor Ort. Informationen über das CSR-Programm in Nordamerika finden Sie auf der HP Website unter (http://www.hp.com/go/selfrepair).

Parts-only Warranty Service (Garantieservice ausschließlich für Teile)

Ihre HP Garantie umfasst möglicherweise einen Parts-only Warranty Service (Garantieservice ausschließlich für Teile). Gemäß den Bestimmungen des Parts-only Warranty Service stellt HP Ersatzteile kostenlos zur Verfügung.

Für den Parts-only Warranty Service ist das CSR-Verfahren zwingend vorgegeben. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.

Reparaciones del propio cliente

Los productos de HP incluyen muchos componentes que el propio usuario puede reemplazar (*Customer Self Repair*, CSR) para minimizar el tiempo de reparación y ofrecer una mayor flexibilidad a la hora de realizar sustituciones de componentes defectuosos. Si, durante la fase de diagnóstico, HP (o los proveedores o socios de servicio de HP) identifica que una reparación puede llevarse a cabo mediante el uso de un componente CSR, HP le enviará dicho componente directamente para que realice su sustitución. Los componentes CSR se clasifican en dos categorías:

- **Obligatorio:** componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
- **Opcional:** componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

NOTA: Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

Según la disponibilidad y la situación geográfica, los componentes CSR se enviarán para que lleguen a su destino al siguiente día laborable. Si la situación geográfica lo permite, se puede solicitar la entrega en el mismo día o en cuatro horas con un coste adicional. Si precisa asistencia técnica, puede llamar al Centro de asistencia técnica de HP y recibirá ayuda telefónica por parte de un técnico. Con el envío de materiales para la sustitución de componentes CSR, HP especificará si los componentes defectuosos deberán devolverse a HP. En aquellos casos en los que sea necesario devolver algún componente a HP, deberá hacerlo en el periodo de tiempo especificado, normalmente cinco días laborables. Los componentes defectuosos deberán devolverse con toda la documentación relacionada y con el embalaje de envío. Si no

enviara el componente defectuoso requerido, HP podrá cobrarle por el de sustitución. En el caso de todas sustituciones que lleve a cabo el cliente, HP se hará cargo de todos los gastos de envío y devolución de componentes y escogerá la empresa de transporte que se utilice para dicho servicio.

Para obtener más información acerca del programa de Reparaciones del propio cliente de HP, póngase en contacto con su proveedor de servicios local. Si está interesado en el programa para Norteamérica, visite la página web de HP siguiente (http://www.hp.com/go/selfrepair).

Servicio de garantía exclusivo de componentes

La garantía limitada de HP puede que incluya un servicio de garantía exclusivo de componentes. Según las condiciones de este servicio exclusivo de componentes, HP le facilitará los componentes de repuesto sin cargo adicional alguno.

Para este servicio de garantía exclusivo de componentes, es obligatoria la sustitución de componentes por parte del usuario (CSR). Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

Customer Self Repair

Veel onderdelen in HP producten zijn door de klant zelf te repareren, waardoor de reparatieduur tot een minimum beperkt kan blijven en de flexibiliteit in het vervangen van defecte onderdelen groter is. Deze onderdelen worden CSR-onderdelen (Customer Self Repair) genoemd. Als HP (of een HP Service Partner) bij de diagnose vaststelt dat de reparatie kan worden uitgevoerd met een CSR-onderdeel, verzendt HP dat onderdeel rechtstreeks naar u, zodat u het defecte onderdeel daarmee kunt vervangen. Er zijn twee categorieën CSR-onderdelen:

Verplicht: Onderdelen waarvoor reparatie door de klant verplicht is. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

Optioneel: Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

OPMERKING: Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

Afhankelijk van de leverbaarheid en de locatie worden CSR-onderdelen verzonden voor levering op de eerstvolgende werkdag. Levering op dezelfde dag of binnen vier uur kan tegen meerkosten worden aangeboden, indien dit mogelijk is gezien de locatie. Indien assistentie gewenst is, belt u een HP Service Partner om via de telefoon technische ondersteuning te ontvangen. HP vermeldt in de documentatie bij het vervangende CSR-onderdeel of het defecte onderdeel aan HP moet worden geretourneerd. Als het defecte onderdeel aan HP moet worden teruggezonden, moet u het defecte onderdeel binnen een bepaalde periode, gewoonlijk vijf (5) werkdagen, retourneren aan HP. Het defecte onderdeel moet met de bijbehorende documentatie worden geretourneerd in het meegeleverde verpakkingsmateriaal. Als u het defecte onderdeel niet terugzendt, kan HP u voor het vervangende onderdeel kosten in rekening brengen. Bij reparatie door de klant betaalt HP alle verzendkosten voor het vervangende en geretourneerde onderdeel en kiest HP zelf welke koerier/transportonderneming hiervoor wordt gebruikt.

Neem contact op met een Service Partner voor meer informatie over het Customer Self Repair programma van HP. Informatie over Service Partners vindt u op de HP website (http://www.hp.com/go/selfrepair).

Garantieservice "Parts Only"

Het is mogelijk dat de HP garantie alleen de garantieservice "Parts Only" omvat. Volgens de bepalingen van de Parts Only garantieservice zal HP kosteloos vervangende onderdelen ter beschikking stellen.

Voor de Parts Only garantieservice is vervanging door CSR-onderdelen verplicht. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

Reparo feito pelo cliente

Os produtos da HP são projetados com muitas peças para reparo feito pelo cliente (CSR) de modo a minimizar o tempo de reparo e permitir maior flexibilidade na substituição de peças com defeito. Se, durante o período de diagnóstico, a HP (ou fornecedores/parceiros de serviço da HP) concluir que o reparo pode ser efetuado pelo uso de uma peça CSR, a peça de reposição será enviada diretamente ao cliente. Existem duas categorias de peças CSR:

Obrigatória – Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

Opcional – Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

OBSERVAÇÃO: Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

Conforme a disponibilidade e o local geográfico, as peças CSR serão enviadas no primeiro dia útil após o pedido. Onde as condições geográficas permitirem, a entrega no mesmo dia ou em quatro horas pode ser feita mediante uma taxa adicional. Se precisar de auxílio, entre em contato com o Centro de suporte técnico da HP para que um técnico o ajude por telefone. A HP especifica nos materiais fornecidos com a peça CSR de reposição se a peça com defeito deve ser devolvida à HP. Nos casos em que isso for necessário, é preciso enviar a peça com defeito à HP dentro do período determinado, normalmente cinco (5) dias úteis. A peça com defeito deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso não o faça, a HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, a HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.

Para obter mais informações sobre o programa de reparo feito pelo cliente da HP, entre em contato com o fornecedor de serviços local. Para o programa norte-americano, visite o site da HP (http://www.hp.com/go/selfrepair).

Serviço de garantia apenas para peças

A garantia limitada da HP pode incluir um serviço de garantia apenas para peças. Segundo os termos do serviço de garantia apenas para peças, a HP fornece as peças de reposição sem cobrar nenhuma taxa.

No caso desse serviço, a substituição de peças CSR é obrigatória. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

カスタマーセルフリペア

修理時間を短縮し、故障部品の交換における高い柔軟性を確保するために、HP製品には多数のCSR部品があります。診断の際に、CSR部品を使用すれば修理ができるとHP（HPまたはHP正規保守代理店）が判断した場合、HPはその部品を直接、お客様に発送し、お客様に交換していただきます。CSR部品には以下の2通りがあります。

- **必須 -** カスタマーセルフリペアが必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。
- **任意 -** カスタマーセルフリペアが任意である部品。この部品もカスタマーセルフリペア用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、別途費用を負担していただくことなく保証サービスを受けることができます。

注： HP製品の一部の部品は、カスタマーセルフリペア用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品がカスタマーセルフリペア除外品である旨が記載されています。

部品供給が可能な場合、地域によっては、CSR部品を翌営業日に届くように発送します。また、地域によっては、追加費用を負担いただくことにより同日または4時間以内に届くように発送することも可能な場合があります。サポートが必要なときは、HPの修理受付窓口に電話していただければ、技術者が電話でアドバイスします。交換用のCSR部品または同梱物には、故障部品をHPに返送する必要があるかどうかが表示されています。故障部品をHPに返送する必要がある場合は、指定期限内（通常は5営業日以内）に故障部品をHPに返送してください。故障部品を返送する場合は、届いた時の梱包箱に関連書類とともに入れてください。故障部品を返送しない場合、HPから部品費用が請求されます。カスタマーセルフリペアの際には、HPは送料および部品返送費を全額負担し、使用する宅配便会社や運送会社を指定します。

部品のみ保証サービス

HP保証サービスには、部品のみ保証サービスが適用される場合があります。このサービスでは、交換部品は無償で提供されます。

部品のみ保証サービスにおいては、CSR部品をお客様により交換作業していただくことが必須となります。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費はお客様の負担となります。

客户自行维修

HP 产品提供许多客户自行维修 (CSR) 部件，以尽可能缩短维修时间和在更换缺陷部件方面提供更大的灵活性。如果在诊断期间 HP（或 HP 服务提供商或服务合作伙伴）确定可以通过使用 CSR 部件完成维修，HP 将直接把该部件发送给您进行更换。有两类 CSR 部件：

- **强制性的** — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。
- **可选的** — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

注：某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

CSR 部件将在下一个工作日发运（取决于备货情况和允许的地理范围）。在允许的地理范围内，可在当天或四小时内发运，但要收取额外费用。如果需要帮助，您可以致电 HP 技术支持中心，将会有技术人员通过电话为您提供帮助。HP 会在随更换的 CSR 部件发运的材料中指明是否必须将有缺陷的部件返还给 HP。如果要求您将有缺陷的部件返还给 HP，那么您必须在规定期限内（通常是五 (5) 个工作日）将缺陷部件发给 HP。有缺陷的部件必须随所提供的发运材料中的相关文件一起返还。如果未能送还有缺陷的部件，HP 可能会要求您支付更换费用。客户自行维修时，HP 将承担所有相关运输和部件返回费用，并指定快递商/承运商。

有关 HP 客户自行维修计划的详细信息，请与您当地的服务提供商联系。有关北美地区的计划，请访问 HP 网站 (http://www.hp.com/go/selfrepair)。

仅部件保修服务

您的 HP 有限保修服务可能涉及仅部件保修服务。根据仅部件保修服务条款的规定，HP 将免费提供更换的部件。

仅部件保修服务要求进行 CSR 部件更换。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

客戶自行維修

HP 產品設計了許多「客戶自行維修」(CSR) 的零件以減少維修時間，並且使得更換瑕疵零件時能有更大的彈性。如果在診斷期間 HP（或 HP 服務供應商或維修夥伴）辨認出此項維修工作可以藉由使用 CSR 零件來完成，則 HP 將直接寄送該零件給您作更換。CSR 零件分為兩種類別：

- **強制的** — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。
- **選購的** — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

備註：某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

基於材料取得及環境允許的情況下，CSR 零件將於下一個工作日以快遞寄送。在環境的允許下當天或四小時內送達，則可能需要額外的費用。若您需要協助，可致電「HP 技術支援中心」，會有一位技術人員透過電話來協助您。不論損壞的零件是否必須退回，HP 皆會在與 CSR 替換零件一起運送的材料中註明。若要將損壞的零件退回 HP，您必須在指定的一段時間內（通常為五 (5) 個工作天），將損壞的零件寄回 HP。損壞的零件必須與寄送資料中隨附的相關技術文件一併退還。如果無法退還損壞的零件，HP 可能要向您收取替換費用。針對客戶自行維修情形，HP 將負責所有運費及零件退還費用並指定使用何家快遞/貨運公司。

如需 HP 的「客戶自行維修」方案詳細資訊，請連絡您當地的服務供應商。至於北美方案，請參閱 HP 網站 (http://www.hp.com/go/selfrepair)。

僅限零件的保固服務

您的「HP 有限保固」可能包含僅限零件的保固服務。在僅限零件的保固服務情況下，HP 將免費提供替換零件。

針對僅限零件的保固服務，CSR 零件替換是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

고객 셀프 수리

HP 제품은 수리 시간을 최소화하고 결함이 있는 부품 교체 시 더욱 융통성을 발휘할 수 있도록 하기 위해 고객 셀프 수리(CSR) 부품을 다량 사용하여 설계되었습니다. 진단 기간 동안 HP(또는 HP 서비스 공급업체 또는 서비스 협력업체)에서 CSR 부품을 사용하여 수리가 가능하다고 판단되면 HP는 해당 부품을 바로 사용자에게 보내어 사용자가 교체할 수 있도록 합니다. CSR 부품에는 두 가지 종류가 있습니다.

- **고객 셀프 수리가 의무 사항인 필수 부품.** 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.
- **고객 셀프 수리가 선택 사항인 부품.** 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

참고: 일부 HP 부품은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 만족스러운 고객 보증을 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다. 이러한 부품들은 Illustrated Parts Catalog에 "No"라고 표시되어 있습니다.

CSR 부품은 재고 상태와 지리적 조건이 허용하는 경우 다음 영업일 납품이 가능하도록 배송이 이루어집니다. 지리적 조건이 허용하는 경우 추가 비용이 청구되는 조건으로 당일 또는 4시간 배송이 가능할 수도 있습니다. 도움이 필요하시면 HP 기술 지원 센터로 전화하십시오. 전문 기술자가 전화로 도움을 줄 것입니다. HP는 결함이 발생한 부품을 HP로 반환해야 하는지 여부를 CSR 교체 부품과 함께 배송된 자료에 지정합니다. 결함이 발생한 부품을 HP로 반환해야 하는 경우에는 지정된 기간 내(통상 영업일 기준 5일)에 HP로 반환해야 합니다. 이 때 결함이 발생한 부품은 제공된 포장 재료에 넣어 관련 설명서와 함께 반환해야 합니다. 결함이 발생한 부품을 반환하지 않는 경우 HP가 교체 부품에 대해 비용을 청구할 수 있습니다. 고객 셀프 수리의 경우, HP는 모든 운송 및 부품 반환 비용을 부담하며 이용할 운송업체 및 택배 서비스를 결정합니다.

HP 고객 셀프 수리 프로그램에 대한 자세한 내용은 가까운 서비스 제공업체에 문의하십시오. 북미 지역의 프로그램에 대해서는 HP 웹 사이트(http://www.hp.com/go/selfrepair)를 참조하십시오.

부품 제공 보증 서비스

HP 제한 보증에는 부품 제공 보증 서비스가 포함될 수 있습니다. 이러한 경우 HP는 부품 제공 보증 서비스의 조건에 따라 교체 부품만을 무료로 제공합니다.

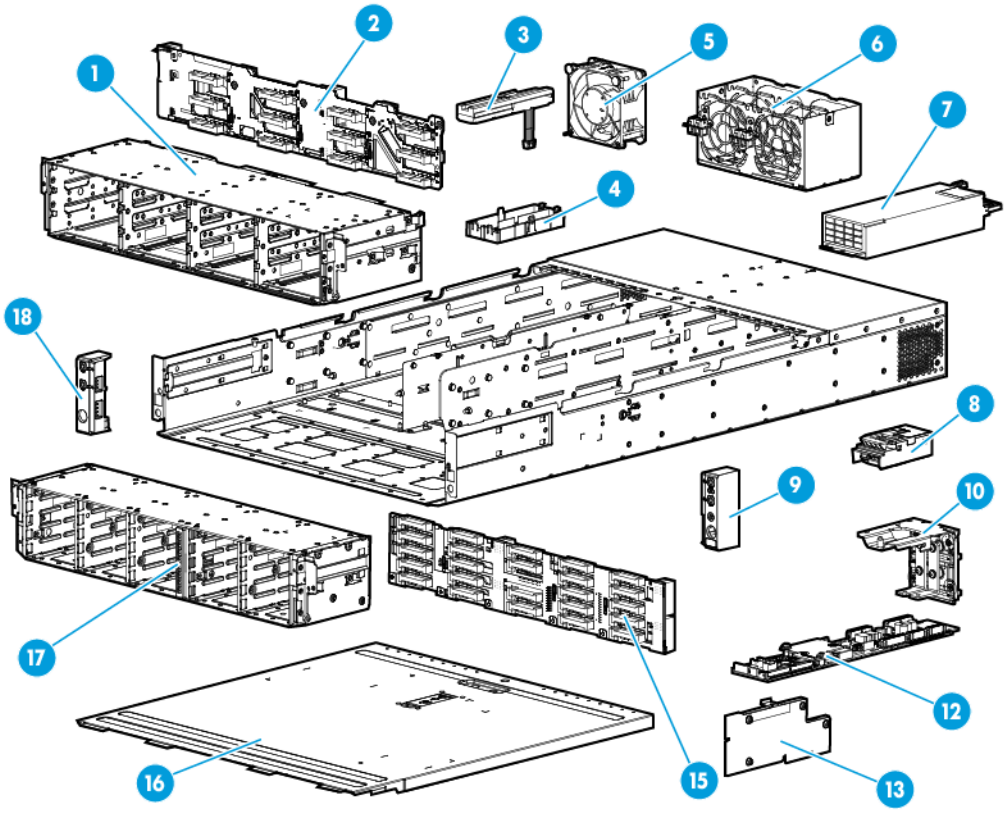
부품 제공 보증 서비스 제공 시 CSR 부품 교체는 의무 사항입니다. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

Illustrated parts catalog

System components

HP continually improves and changes product parts. For complete and current supported parts information, see the HP PartSurfer website (http://partsurfer.hp.com).

Chassis system components



Item	Description	Spare part number	Customer self repair (on page 6)
1	12 low-profile LFF drive cage	—	—
2	12 low-profile LFF drive backplane for HP Apollo r2200 Chassis	800357-001	No[3]
3	HP Smart Storage Battery	750450-001	Mandatory[1]
4	HP Smart Storage Battery holder	—	—
5	Fan module	808849-001	Optional[2]
6	Fan cage	—	—
7	Power supplies	—	—

Item	Description	Spare part number	Customer self repair (on page 6)
	a) HP 1400W Flex Slot Platinum Plus Hot Plug Power Supply Kit – 94% efficiency*	754383-001	Mandatory[1]
	b) HP 800W Flex Slot Platinum Hot Plug Power Supply Kit – 94% efficiency*	754381-001	Mandatory[1]
	c) HP 800W Flex Slot Universal Hot Plug Power Supply Kit – 94% efficiency*	754379-001	Mandatory[1]
	d) HP 800W Flex Slot Titanium Hot Plug Power Supply Kit – 96% efficiency*	754378-001	Mandatory[1]
	e) HP 800W Flex Slot -48VDC Hot Plug Power Supply Kit – 94% efficiency*	754382-001	Mandatory[1]
8	RCM module	800361-001	Mandatory[1]
9	Right bezel ear	—	—
10	PDB pass-through board assembly	—	—
11	PDB pass-through board	800356-001	No[3]
12	Power distribution board	800355-001	No[3]
13	RPS link board assembly	—	—
14	RPS link board	800375-001	Optional[2]
15	24 SFF backplane for HP Apollo r2600 Chassis	800358-001	No[3]
16	Chassis access panel	—	—
17	24 SFF drive cage	—	—
18	Left bezel ear	808850-001	Optional[2]
19	Fan power cable assembly	808848-001	Mandatory[1]
20	Chassis cable kit	811569-001	Mandatory[1]
	a) RCM 2.0 cable*	—	—
	b) PDB pass-through cable*	—	—
	c) Front I/O cables (left and right)*	—	—
	d) RCM 2.0 to 1.0 adapter cable*	—	—

* Not shown

[1]Mandatory—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

[2]Optional—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

[3]No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

[1]Mandatory: Obligatoire—Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

[2]Optional: Facultatif—Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

[3]No: Non—Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention “Non” dans le Catalogue illustré.

[1]Mandatory: Obbligatorie—Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

[2]Optional: Opzionali—Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.
[3]No: Non CSR—Alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

[1]Mandatory: Zwingend—Teile, die im Rahmen des Customer Self Repair Programms ersetzt werden müssen. Wenn Sie diese Teile von HP ersetzen lassen, werden Ihnen die Versand- und Arbeitskosten für diesen Service berechnet.
[2]Optional: Optional—Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.
[3]No: Kein—Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No" bzw. „Nein" gekennzeichnet.

[1]Mandatory: Obligatorio—componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
[2]Optional: Opcional— componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.
[3]No: No—Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

[1]Mandatory: Verplicht—Onderdelen waarvoor Customer Self Repair verplicht is. Als u HP verzoekt deze onderdelen te vervangen, komen de reiskosten en het arbeidsloon voor uw rekening.
[2]Optional: Optioneel—Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.
[3]No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

[1]Mandatory: Obrigatória—Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.
[2]Optional: Opcional—Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.
[3]No: Nenhuma—Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

[1]Mandatory：必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。

[2]Optional：任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、費用を負担していただくことなく保証サービスを受けることができます。

[3]No：除外 - HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

[1]Mandatory: 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

[2]Optional: 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

[3]No: 否 — 某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

[1]Mandatory: 強制的 — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

[2]Optional: 選購的 — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

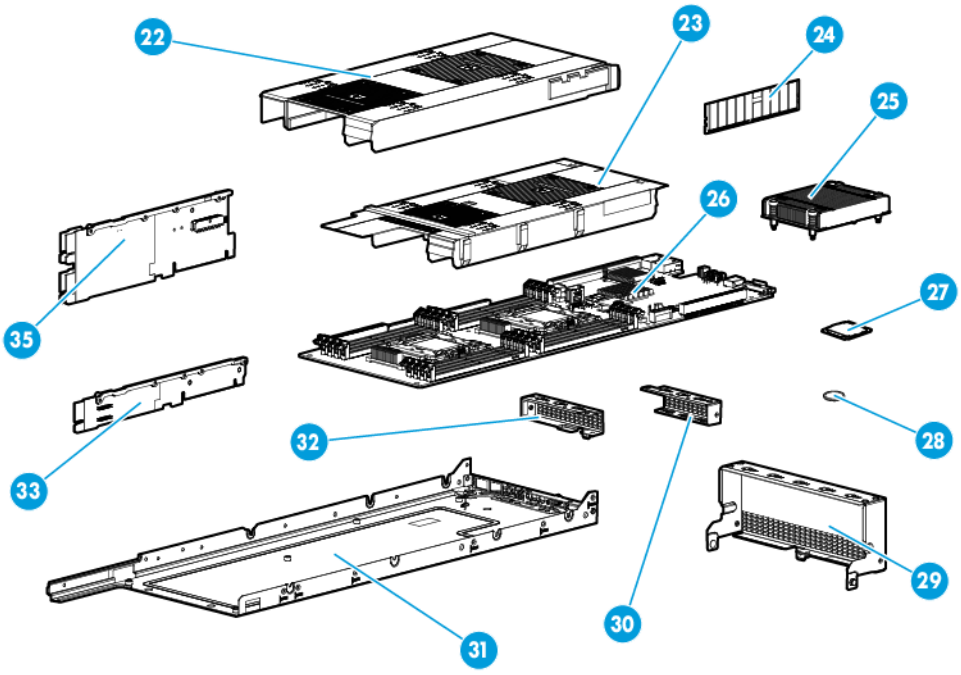
[3]No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

[1] Mandatory: 필수 — 고객 셀프 수리가 의무 사항인 필수 부품. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

[2] Optional: 옵션 — 고객 셀프 수리가 선택 사항인 부품. 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

[3] No: No — 고객 셀프 수리가 불가능하도록 설계된 HP 부품. 이 부품들은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 고객 보증을 만족시키기 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다.

Node system components



Item	Description	Spare part number	Customer self-repair
21	Air baffle kit (includes 1U baffle and 2U baffle)	811223-001	Mandatory[1]
22	1U air baffle	—	—
23	2U air baffle	—	—
24	DIMM	—	—
	a) 4 GB, single-rank x8 PC4-2133R-15	774169-001	Mandatory[1]
	b) 8 GB, single-rank x4 PC4-2133R-15*	774170-001	Mandatory[1]
	c) 8 GB, dual-rank x8 PC4-2133R-15*	774171-001	Mandatory[1]
	d) 16 GB, dual-rank x4 PC4-2133R-15*	774172-001	Mandatory[1]
	e) 16 GB, dual-rank x4 PC4-2133L-15*	774173-001	Mandatory[1]
	f) 32 GB, quad-rank x4 PC4-2133L-15*	774174-001	Mandatory[1]
	g) 32 GB, dual-rank x4 PC4-2133R-15*	774175-001	Mandatory[1]
25	Heatsink	—	—
	a) Heatsink for Processor 1 (49 fins)	800377-001	Optional[2]
	b) Heatsink for Processor 2* (18 fins)	800376-001	Optional[2]
26	System board	800362-001	No[3]
27	Processor	—	—
	a) 1.6-GHz Intel Xeon E5-2603 v3, 6C, 85W	762441-001	Optional[2]
	b) 1.8-GHz Intel Xeon E5-2650L v3, 12C, 65W*	762461-001	Optional[2]

Item	Description	Spare part number	Customer self-repair
	c) 1.9-GHz Intel Xeon E5-2609 v3, 6C, 85W*	762443-001	Optional[2]
	d) 2.3-GHz Intel Xeon E5-2698 v3, 16C, 135W*	780760-001	Optional[2]
	e) 2.3-GHz Intel Xeon E5-2670 v3, 12C, 120W*	762450-001	Optional[2]
	f) 2.3-GHz Intel Xeon E5-2650 v3, 10C, 105W*	762448-001	Optional[2]
	g) 2.4-GHz Intel Xeon E5-2630 v3, 8C, 85W*	762446-001	Optional[2]
	h) 2.6-GHz Intel Xeon E5-2640 v3, 8C, 90W*	762447-001	Optional[2]
	i) 2.6-GHz Intel Xeon E5-2660 v3, 10C, 105W*	762449-001	Optional[2]
	j) 2.6-GHz Intel Xeon E5-2690 v3, 12C, 135W*	762452-001	Optional[2]
	k) 3.2-GHz (2U) Intel Xeon E5-2667 v3, 8C, 135W*	762457-001	Optional[2]
	l) 3.4-GHz (2U) Intel Xeon E5-2643 v3, 6C, 135W*	762456-001	Optional[2]
	m) 3.5-GHz (2U) Intel Xeon E5-2637 v3, 4C, 135W*	762455-001	Optional[2]
28	System battery	—	—
29	2U rear I/O blank	—	—
30	Left 1U rear I/O blank	—	—
31	Node tray	—	—
32	Right rear I/O blank	—	—
33	1U bayonet board assembly	—	—
34	1U bayonet board	811224-001	Optional[2]
35	2U bayonet board assembly	—	—
36	2U bayonet board	811225-001	Optional[2]
37	PCIe x16 right 1U node riser board*	800366-001	Optional[2]
38	FlexibleLOM x8 1U node riser board*	800367-001	Optional[2]
39	FlexibleLOM x16x8 2U node riser board*	800368-001	Optional[2]
40	Dedicated iLO management port*	800369-001	Optional[2]
42	Low-profile PCIe x16 left 1U/2U node riser board (for the single-slot left PCI riser cage assembly and single-slot 2U node PCI riser cage assembly)*	800370-001	Optional[2]
43	M.2 SATA SSD enablement board*	800371-001	Optional[2]
44	PCIe transfer board*	800372-001	Optional[2]
45	Three-slot PCIe x16 2U node riser board*	800373-001	Optional[2]
46	Three-slot GPU-direct PCIe x16 2U node riser board*	800374-001	Optional[2]
47	Storage cable kit *	808851-001	Optional[2]
	a) r2600 power cable for Node 1 and Node 2*	—	—
	b) r2200/r2600 power cable for Node 3 and Node 4*	—	—
	c) Power cable for hot-plug drives*	—	—
	d) r2200 power cable for Node 1 and Node 2*	—	—
	e) Mini-SAS P440/P840 cable*	—	—
	f) Mini-SAS H240 1U node cable*	—	—
	g) B140i 1U node SATA cable*	—	—

Item	Description	Spare part number	Customer self-repair
	h) Mini-SAS H240 2U node cable*	—	—
	i) Mini-SAS P440 2U node cable*	—	—
	j) RCM 2.0 to RCM 1.0 adapter cable*	—	—
48	Graphic cable kit*	808852-001	Mandatory[1]
	a) Dual graphic card / coprocessor power cable*	—	—
	b) Single graphic card / coprocessor power cable*	—	—
	c) 2-pin graphic card adapter cable*	—	—

* Not shown

[1]Mandatory—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

[2]Optional—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

[3]No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

[1]Mandatory: Obligatoire—Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

[2]Optional: Facultatif—Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

[3]No: Non—Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention “Non” dans le Catalogue illustré.

[1]Mandatory: Obbligatorie—Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

[2]Optional: Opzionali—Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

[3]No: Non CSR—Alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un “No” nel Catalogo illustrato dei componenti.

[1]Mandatory: Zwingend—Teile, die im Rahmen des Customer Self Repair Programms ersetzt werden müssen. Wenn Sie diese Teile von HP ersetzen lassen, werden Ihnen die Versand- und Arbeitskosten für diesen Service berechnet.

[2]Optional: Optional—Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

[3]No: Kein—Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No“ bzw. „Nein“ gekennzeichnet.

[1]Mandatory: Obligatorio—componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

[2]Optional: Opcional— componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su

sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.
[3]No: No—Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra “No” en el catálogo ilustrado de componentes.

[1]Mandatory: Verplicht—Onderdelen waarvoor Customer Self Repair verplicht is. Als u HP verzoekt deze onderdelen te vervangen, komen de reiskosten en het arbeidsloon voor uw rekening.
[2]Optional: Optioneel—Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.
[3]No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

[1]Mandatory: Obrigatória—Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.
[2]Optional: Opcional—Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.
[3]No: Nenhuma—Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca “No” (Não), no catálogo de peças ilustrado.

[1]Mandatory：必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。

[2]Optional：任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、費用を負担していただくことなく保証サービスを受けることができます。

[3]No：除外 - HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

[1]Mandatory: 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

[2]Optional: 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

[3]No: 否 — 某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

[1]Mandatory: 強制的 — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

[2]Optional: 選購的 — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

[3]No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

[1] Mandatory: 필수 — 고객 셀프 수리가 의무 사항인 필수 부품. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

[2] Optional: 옵션 — 고객 셀프 수리가 선택 사항인 부품. 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

[3] No: No — 고객 셀프 수리가 불가능하도록 설계된 HP 부품. 이 부품들은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 고객 보증을 만족시키기 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다.

Removal and replacement procedures

Required tools

You need the following items for some procedures:

- T-10/T-15/T-20 Torx screwdriver
- Flathead screwdriver (for replacing the system battery)
- HP Insight Diagnostics (on page 92)
- Thin-nose pliers (for replacing the chassis power distribution board).

Safety considerations

Before performing service procedures, review all the safety information.

Preventing electrostatic discharge

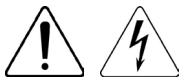
To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Symbols on equipment

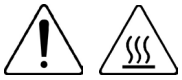
The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.



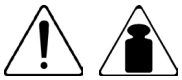
This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.
WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.
WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.
WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.
WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Server warnings and cautions

WARNING: This node is very heavy. To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. HP recommends that a minimum of two people are required for all rack server installations. A third person may be required to help align the node if the server is installed higher than chest level.
- Use caution when installing the node in or removing the node from the rack; it is unstable when not fastened to the rails.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the node. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

CAUTION: Do not operate the node for long periods with the access panel open or removed. Operating the node in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Rack warnings

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

WARNING: To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and might become unstable when being moved on its casters.
- Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.

WARNING: To reduce the risk of personal injury or damage to the equipment, adequately stabilize the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.

WARNING: When installing a server in a telco rack, be sure that the rack frame is adequately secured at the top and bottom to the building structure.

Preparation procedures

To access some components and perform certain service procedures, you must perform one or more of the following procedures:

- Power down the system (on page 27).
- Power down the node (on page 27).
- Remove the node from the chassis (on page 27).
- Remove the power supply (on page 28).
- Remove the RCM module (on page 29).
- Remove the chassis from the rack (on page 30).
- Remove the security bezel (on page 31).
- Remove the PDB cover (on page 31).
- Remove the chassis access panel (on page 32).
- Remove the fan cages (on page 33).
- Remove the chassis PDB assembly (on page 34).
- Remove the 1U left rear I/O blank (on page 36).
- Remove the 1U right rear I/O blank (on page 36).
- Remove the 2U rear I/O blank (on page 37).

- Remove the air baffle (on page 38).
- Remove the bayonet board assembly (on page 39)
- Remove the bayonet board bracket (on page 40).
- Remove the PCI riser cage assembly (on page 41).

Power down the system

IMPORTANT: When the nodes are in standby mode, auxiliary power is still being provided to the system.

1. Power down the node (on page 27).
2. Disconnect the power cords from the power supplies.

Power down the node

Before powering down the node for any upgrade or maintenance procedures, perform a backup of critical server data and programs.

IMPORTANT: When the node is in standby mode, auxiliary power is still being provided to the system.

To power down the node, use one of the following methods:

- Press and release the Power On/Standby button.

  This method initiates a controlled shutdown of applications and the OS before the node enters standby mode.
- Press and hold the Power On/Standby button for more than 4 seconds to force the node to enter standby mode.

  This method forces the node to enter standby mode without properly exiting applications and the OS. If an application stops responding, you can use this method to force a shutdown.
- Use a virtual power button selection through iLO 4.

  This method initiates a controlled remote shutdown of applications and the OS before the node enters standby mode.

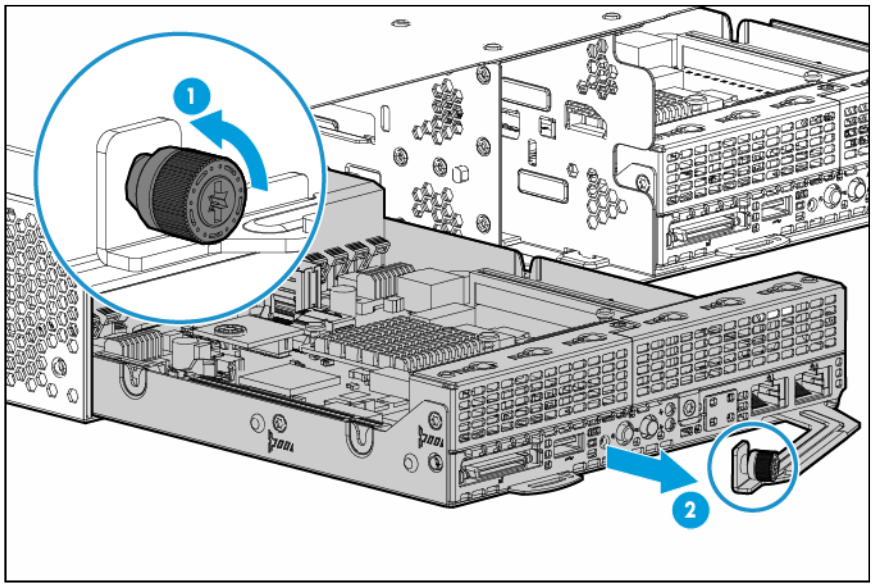
Before proceeding, verify the node is in standby mode by observing that the system power LED is amber.

Remove the node from the chassis

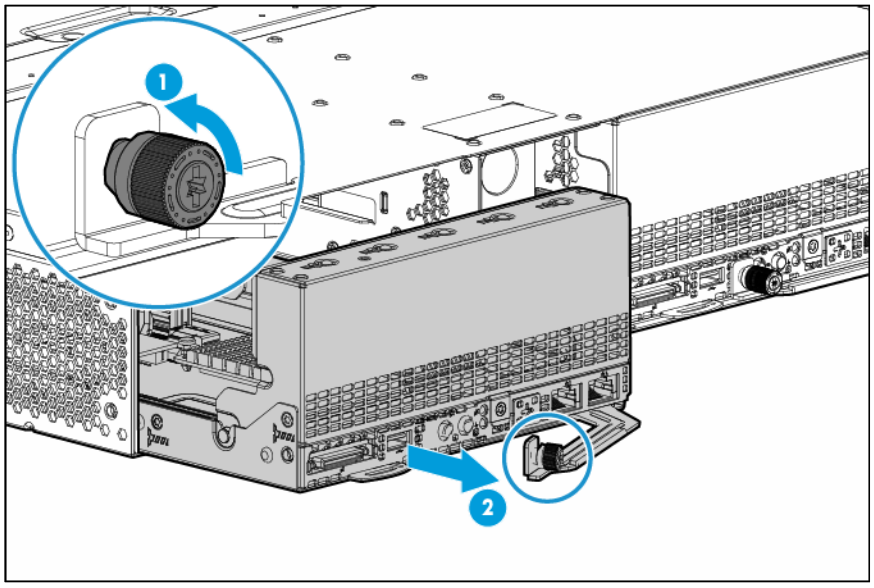
CAUTION: To avoid damage to the node, always support the bottom of the node when removing it from the chassis.

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis:
   a. Loosen the thumbscrew.
   b. Pull back the handle and remove the node.

1U node



2U node



△ **CAUTION:** To avoid damage to the device, do not use the removal handle to carry it.

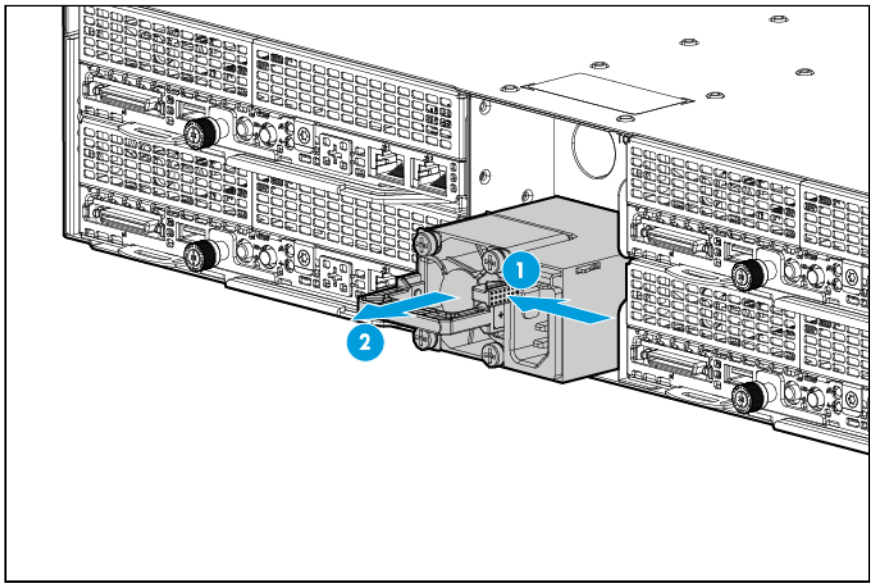
4. Place the node on a flat, level surface.

Remove the power supply

To remove the component:

1. Power down the system (on page 27).
2. Access the product rear panel.
3. If installed, remove the RCM module (on page 29).
4. Release the power cord from the relief strap.

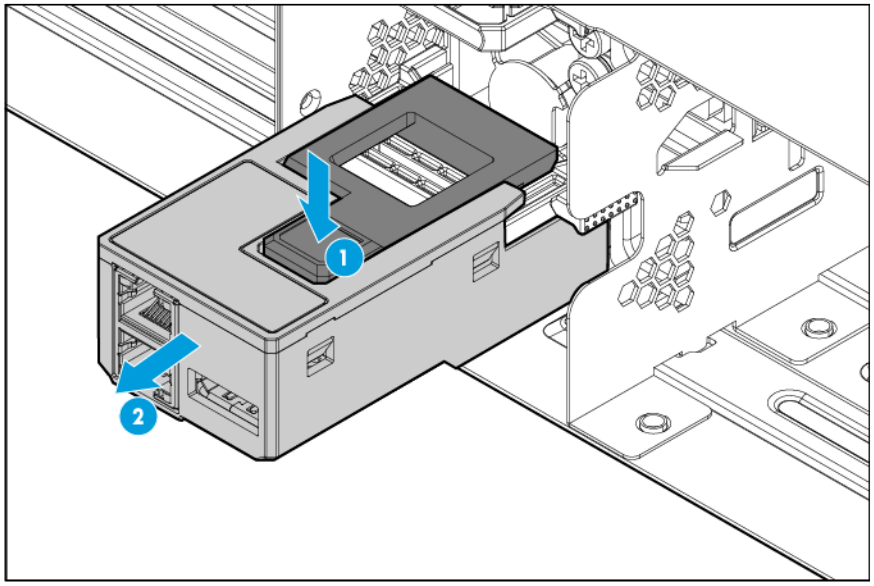
5. Remove all power:
   a. Disconnect the power cord from the power source.
   b. Disconnect the power cord from the chassis.
6. Remove the power supply.



Remove the RCM module

To remove the component:

1. Power down the system (on page 27).
2. Access the product rear panel.
3. Disconnect all cables from the RCM module.
4. Remove the RCM module.



Remove the chassis from the rack

WARNING: The chassis is very heavy. To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Remove all installed components from the chassis before installing or moving the chassis.
- Use caution and get help to lift and stabilize the chassis during installation or removal, especially when the chassis is not fastened to the rack.

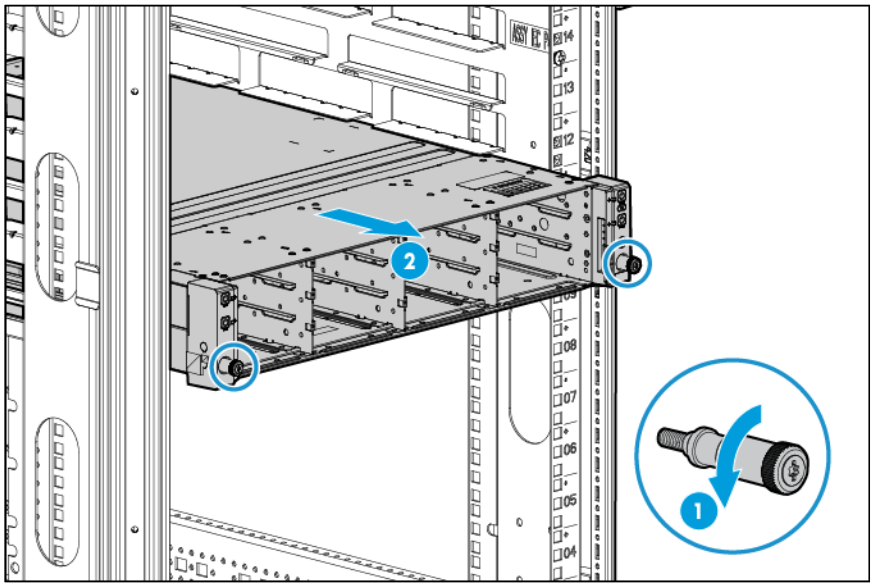
WARNING: To reduce the risk of personal injury or damage to the equipment, you must adequately support the chassis during installation and removal.

WARNING: Always use at least two people to lift the chassis into the rack. If the chassis is being loaded into the rack above chest level, a third person must assist with aligning the chassis with the rails while the other two people support the weight of the chassis.

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.

IMPORTANT: Label the drives before removing them. The drives must be returned to their original locations.

3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Loosen the thumbscrews and extend the chassis from the rack.



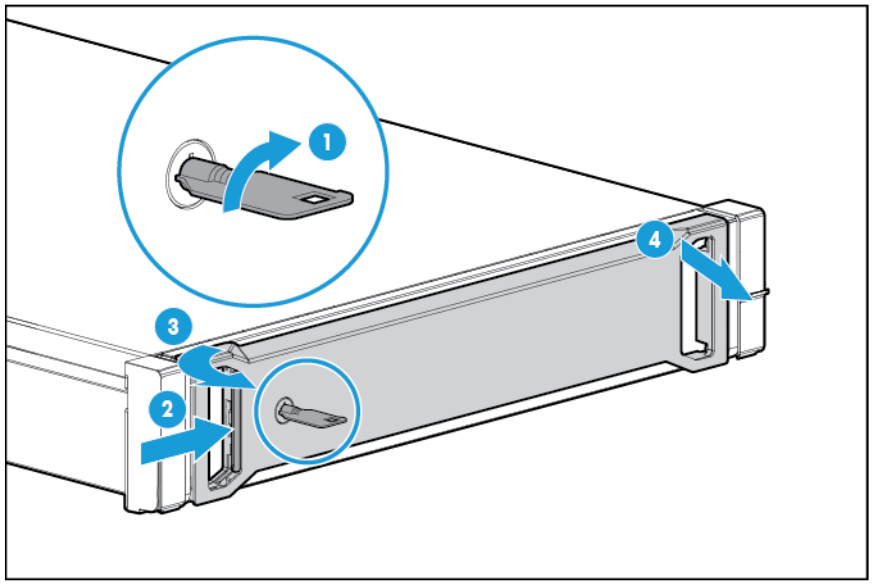
9. Remove the chassis from the rack.

   For more information, see the documentation that ships with the rack mounting option.

10. Place the chassis on a flat surface.

Remove the security bezel

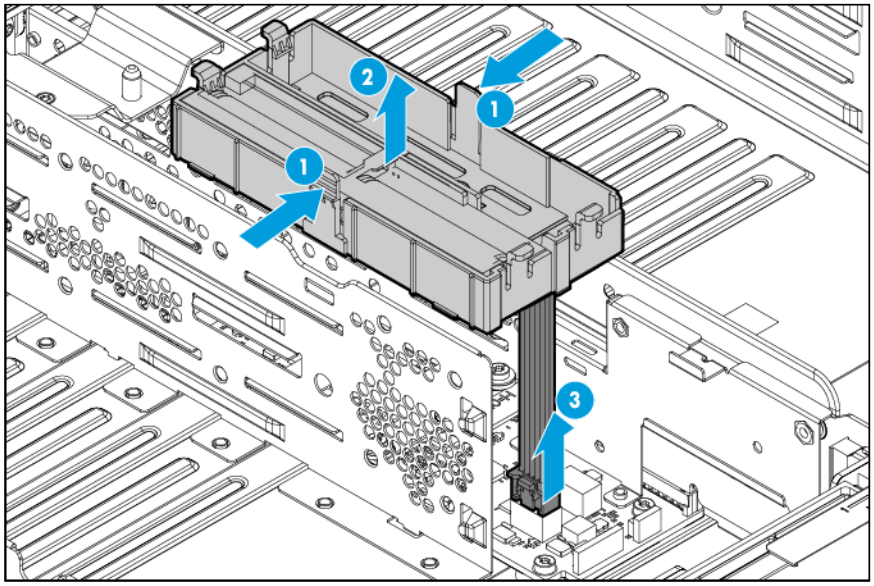
To access the front panel components, unlock and then remove the security bezel.



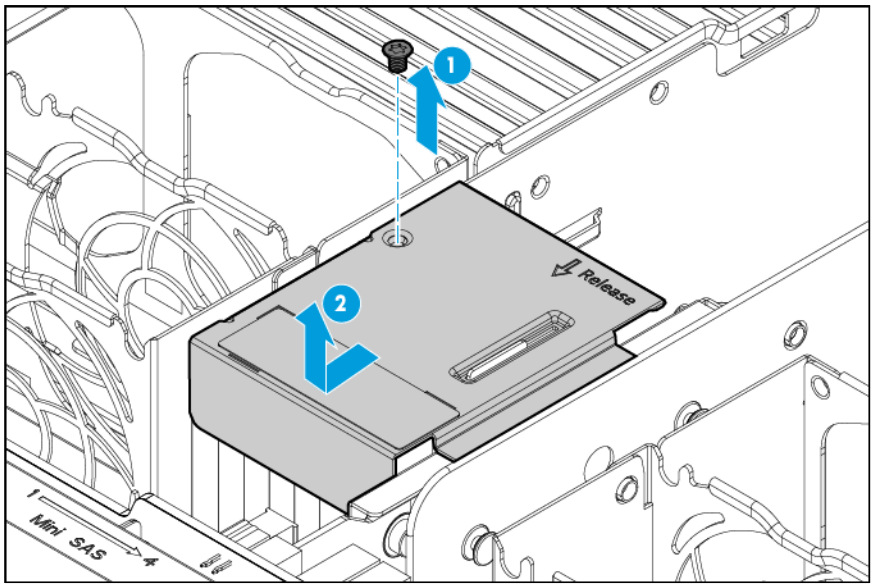
Remove the PDB cover

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).

10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



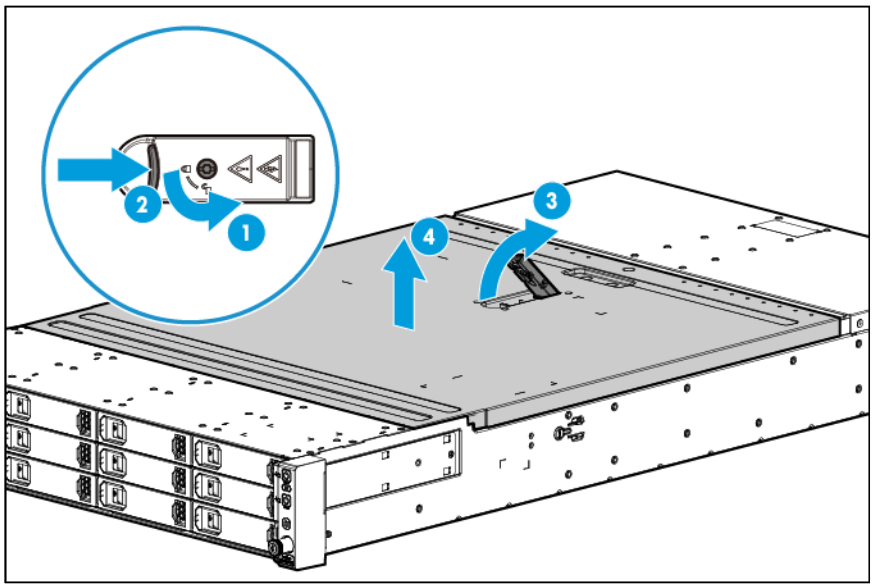
11. Remove the PDB cover (on page 31).
    a. Remove the screw.
    b. Slide back the PDB cover and remove it from the chassis.



Remove the chassis access panel

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).

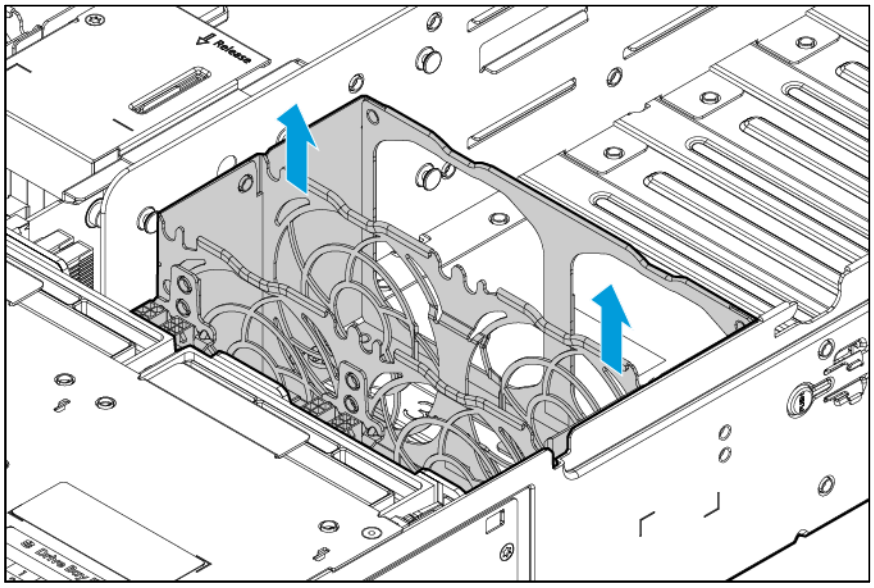
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Unlock the access panel latch using the T-15 Torx screwdriver and release the access panel latch.
10. Slide the access panel back about 1.5 cm (0.5 in).
11. Lift and remove the access panel.



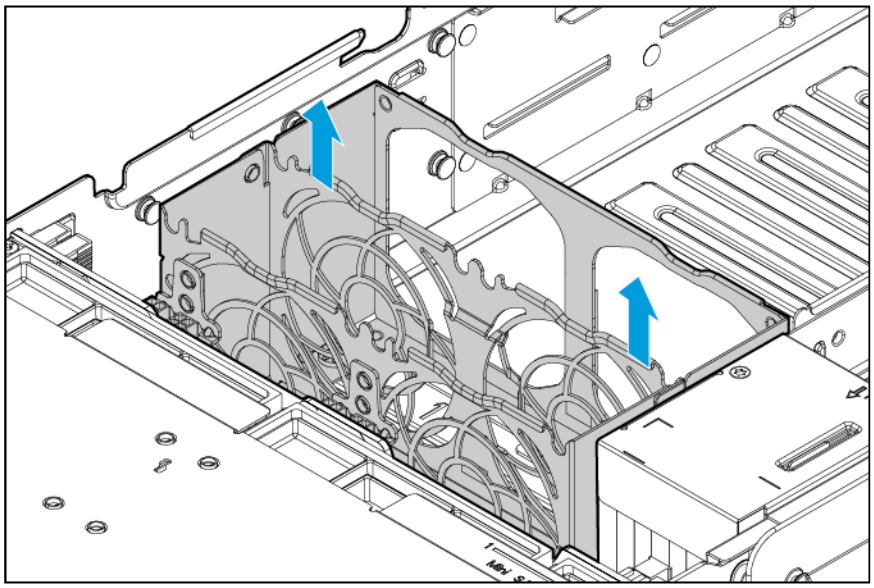
Remove the fan cages

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).
10. Remove all fan modules ("Fan module" on page 55).
11. Disconnect the fan power cable assemblies from the fan cages.
12. Remove the fan cages.

- Right fan cage



- Left fan cage

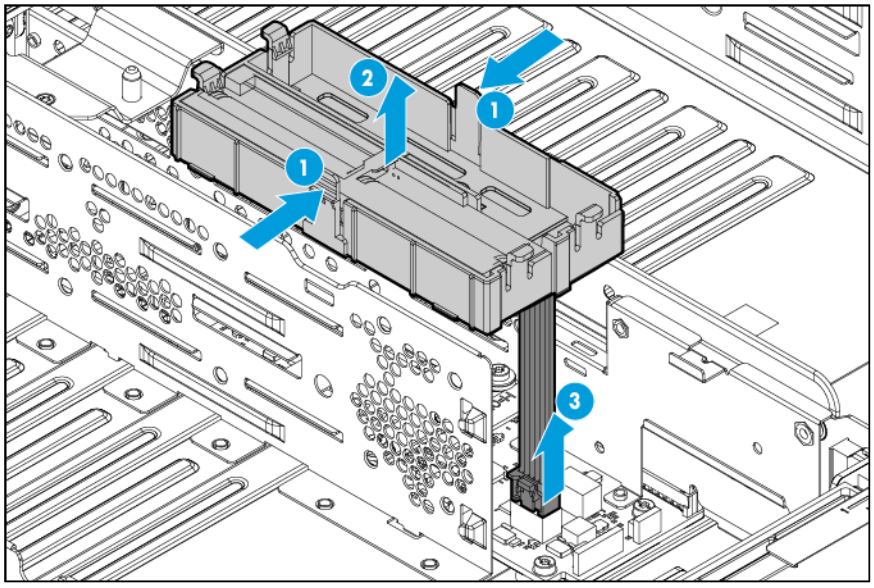


Remove the chassis PDB assembly

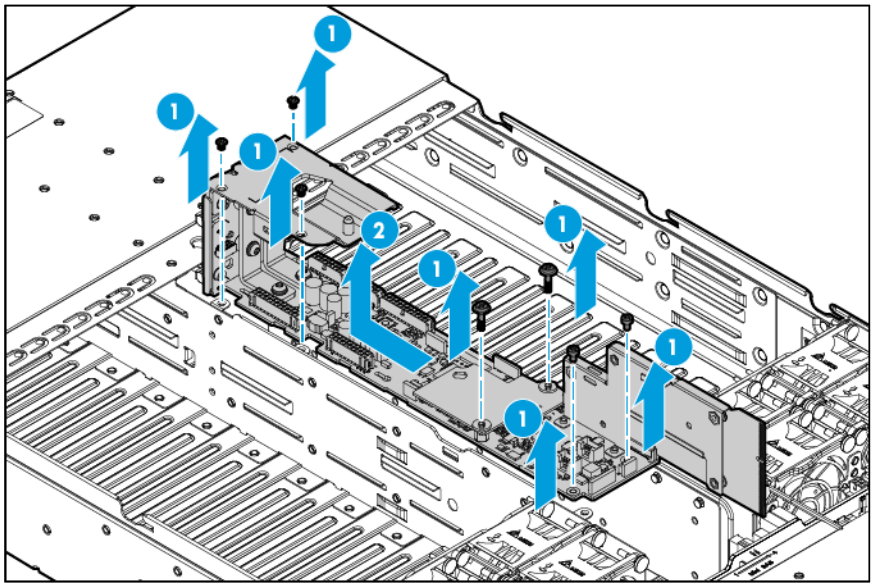
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).

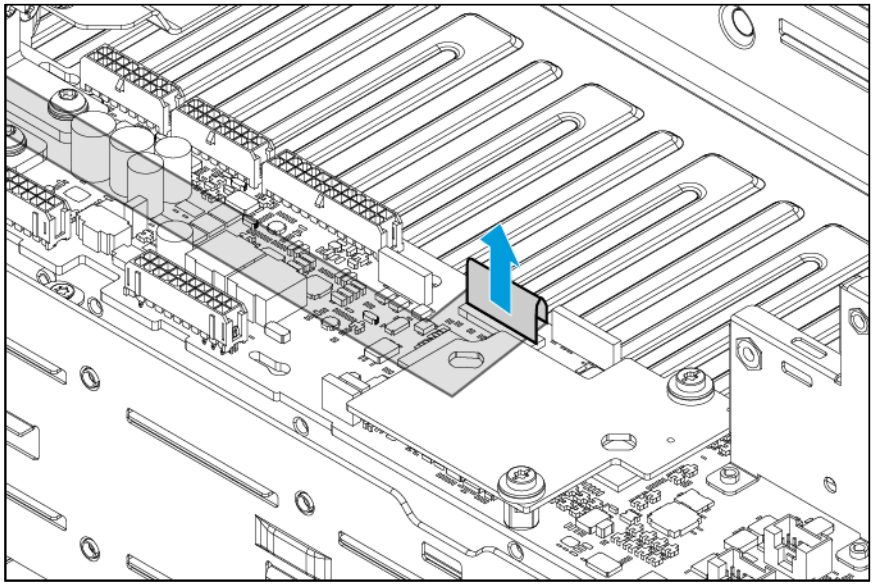
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).
10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly.
    a. Remove the screw.
    b. Slide the chassis PDB assembly toward to the rear of the server to disconnect the RPS link board from drive backplane.
    c. Slightly lift the chassis PDB assembly from the chassis.

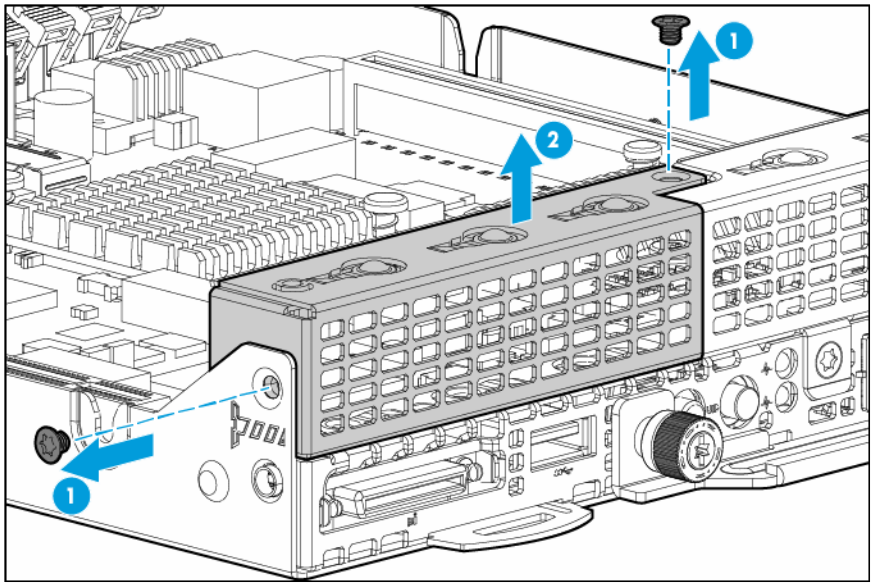


d. Disconnect the RCM 2.0 cable from the power distribution board and remove the chassis PDB assembly.



Remove the 1U left rear I/O blank

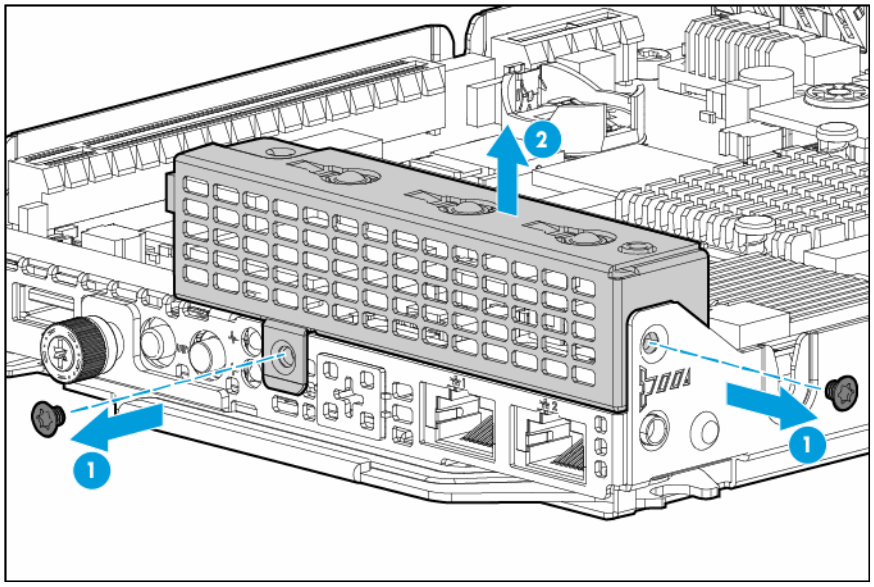
1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove the 1U left rear I/O blank.



Remove the 1U right rear I/O blank

1. Power down the node (on page 27).

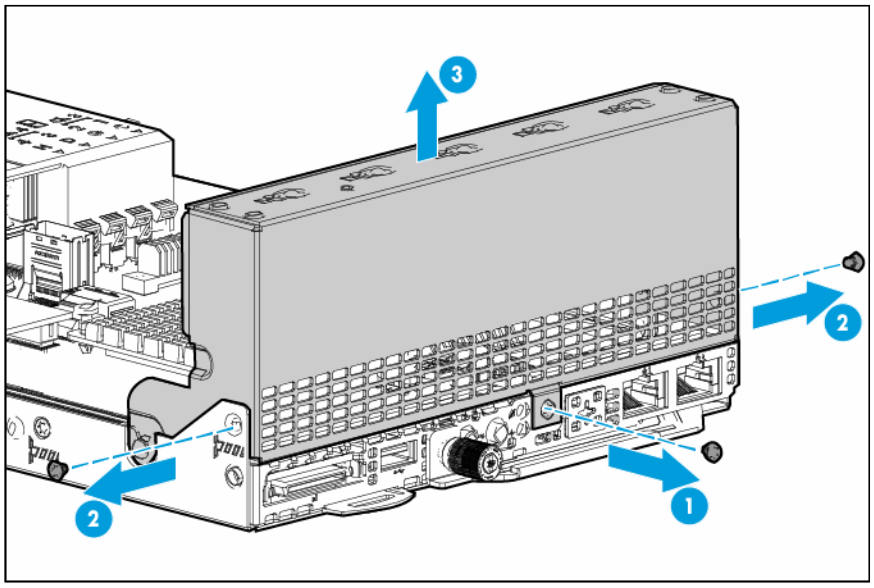
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Do one of the following:
   - Remove the 1U left rear I/O blank (on page 36).
   - Remove the single-slot left PCI riser cage assembly (on page 41).
6. Remove the 1U right rear I/O blank.



Remove the 2U rear I/O blank

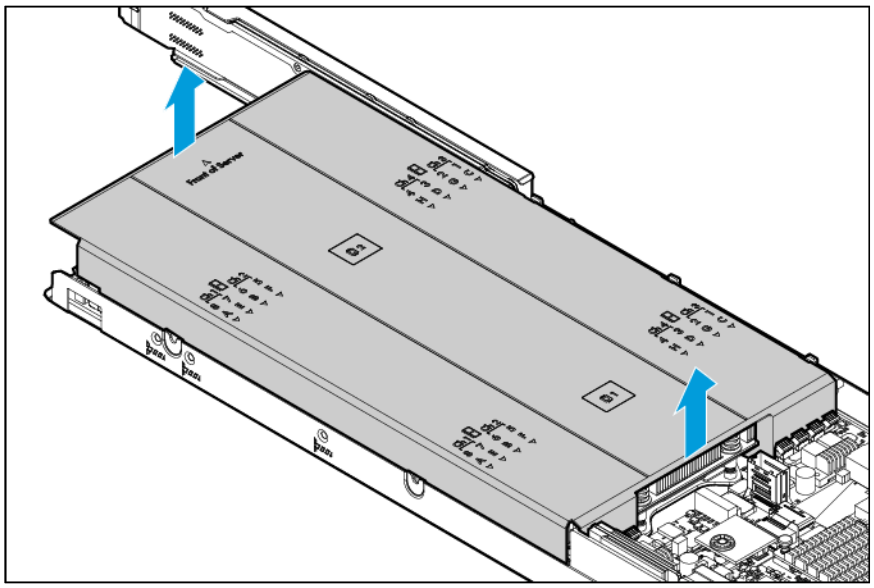
1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.

5. Remove the 2U rear I/O blank.

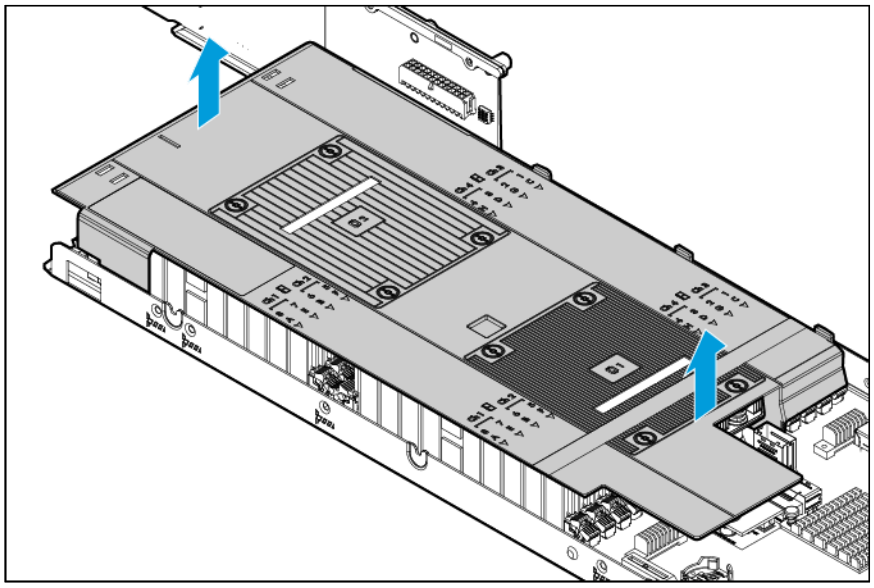


Remove the air baffle

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. If installed in a 2U node, remove the FlexibleLOM 2U node riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. If installed in a 2U node, remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
7. Remove the air baffle:
   - 1U air baffle



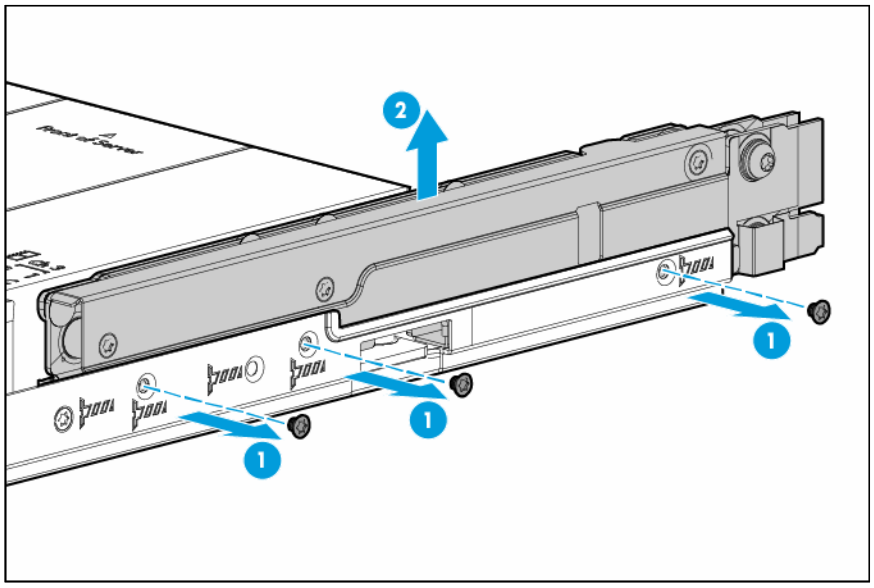
- 2U air baffle



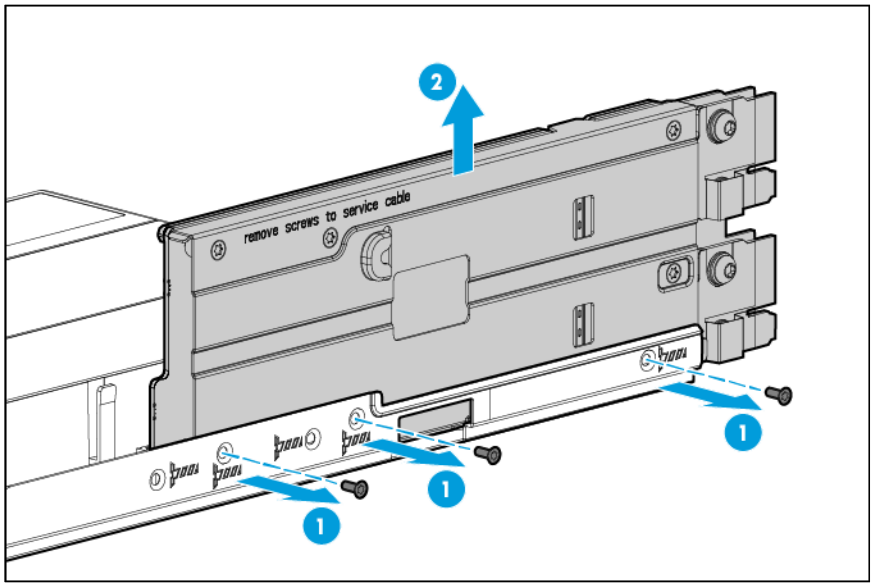
Remove the bayonet board assembly

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. If installed in a 2U node, remove the FlexibleLOM 2U node riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. If installed in a 2U node, remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
7. If a graphic card/ coprocessor power cable is installed, disconnect it from the bayonet board.
8. If a B140i SATA cable is installed, disconnect it from the connectors on the system board.
9. Remove the bayonet board assembly from the node.

- 1U bayonet board assembly



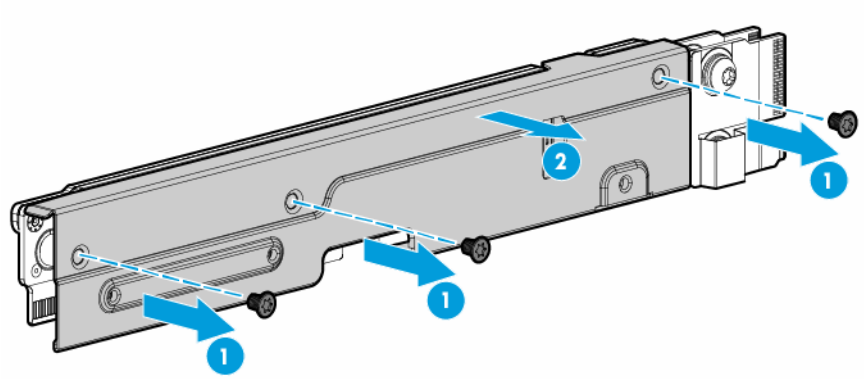
- 2U bayonet board assembly



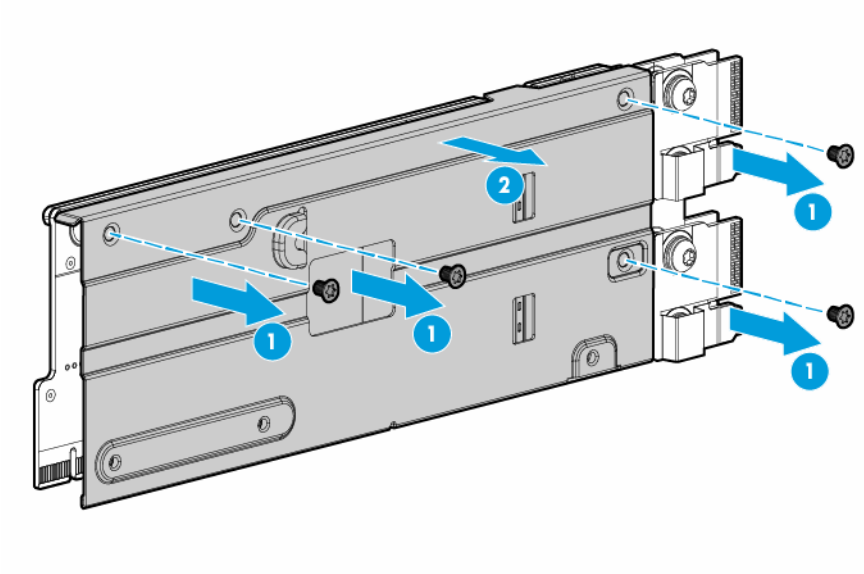
Remove the bayonet board bracket

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. If installed in a 2U node, remove the FlexibleLOM 2U node riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. If installed in a 2U node, remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
7. If a graphic card/ coprocessor power cable is installed, disconnect it from the bayonet board.

8. If a B140i SATA cable is installed, disconnect it from the connectors on the system board.
9. Remove the bayonet board assembly from the node ("Remove the bayonet board assembly" on page 39).
10. Remove the bayonet board bracket from the bayonet board.
    - 1U bayonet board bracket



    - 2U bayonet board bracket



Remove the PCI riser cage assembly

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

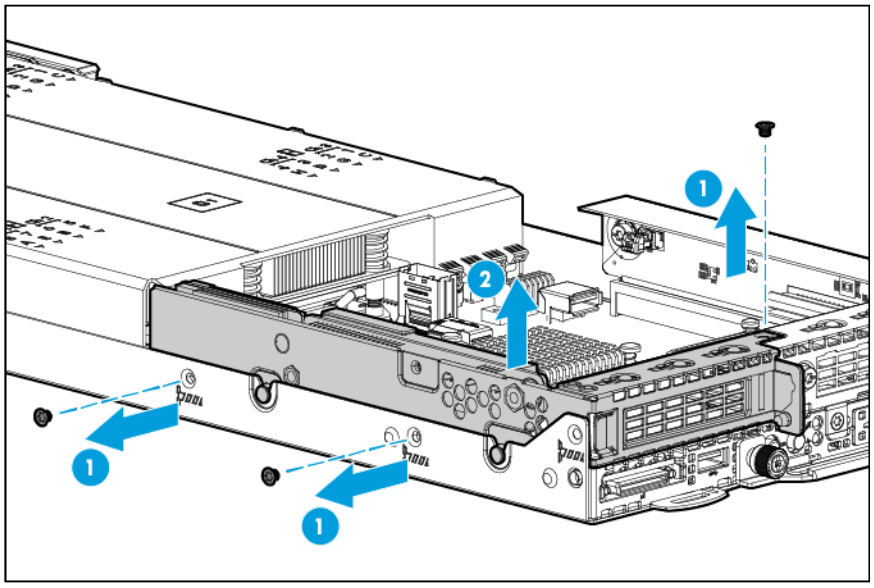
CAUTION: To prevent damage to the server or expansion boards, power down the server, and disconnect all power cords before removing or installing the PCI riser cage.

Single-slot left PCI riser cage assembly

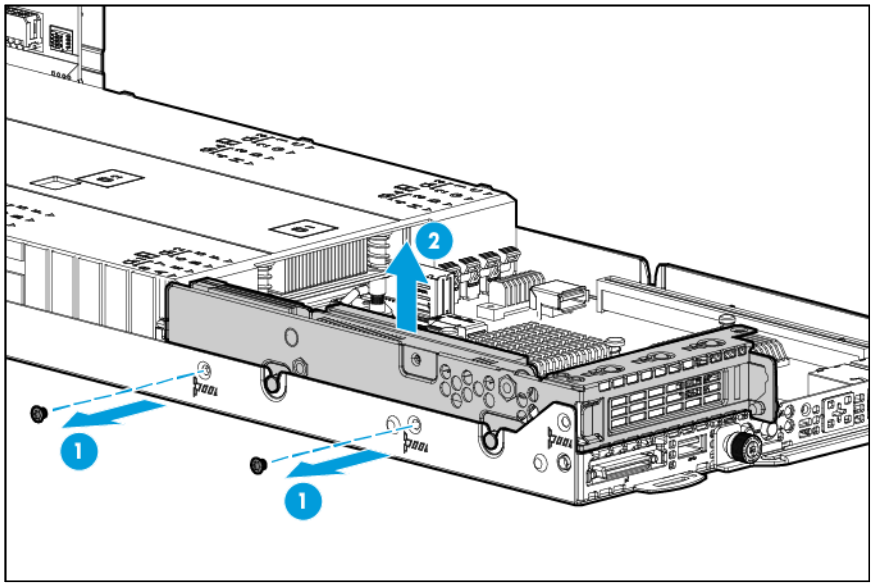
To remove the component:

1. Power down the node (on page 27).

2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. In a 2U node, remove the three-slot riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
6. Remove the single-slot left PCI riser cage assembly:
   - 1U node



   - 2U node

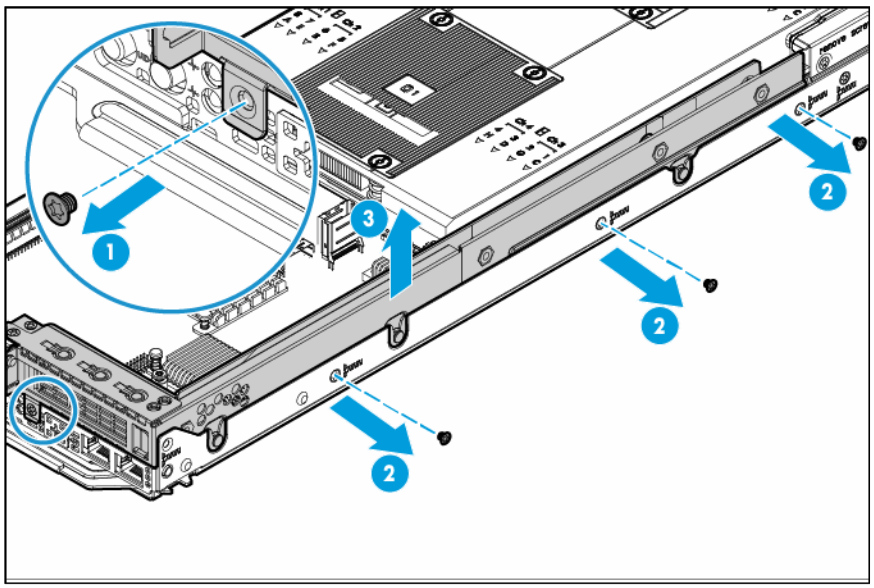


△ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the node unless all PCI riser cages or rear I/O blanks are installed, and do not operate the node unless all PCI slots have either an expansion slot cover or an expansion board installed.

Single-slot 1U node right PCI riser cage assembly

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Do one of the following:
   a. Remove the 1U left rear I/O blank (on page 36).
   b. Remove the single-slot left PCI riser cage assembly (on page 41).
5. Remove the single-slot 1U node right PCI riser cage assembly.



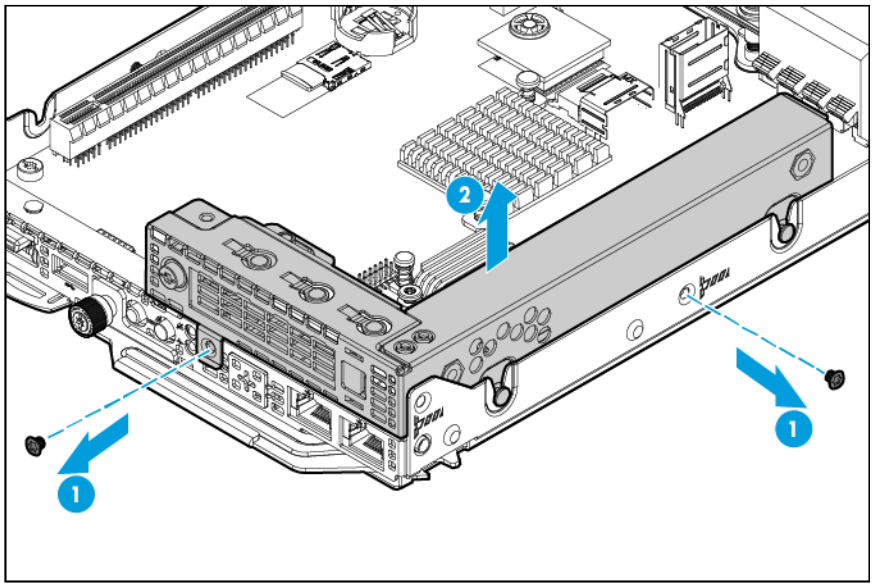
CAUTION: To prevent improper cooling and thermal damage, do not operate the node unless all PCI riser cages or rear I/O blanks are installed, and do not operate the node unless all PCI slots have either an expansion slot cover or an expansion board installed.

FlexibleLOM 1U node riser cage assembly

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Do one of the following:
   a. Remove the 1U left rear I/O blank (on page 36).
   b. Remove the single-slot left PCI riser cage assembly (on page 41).

5. Remove the FlexibleLOM 1U node riser cage assembly.



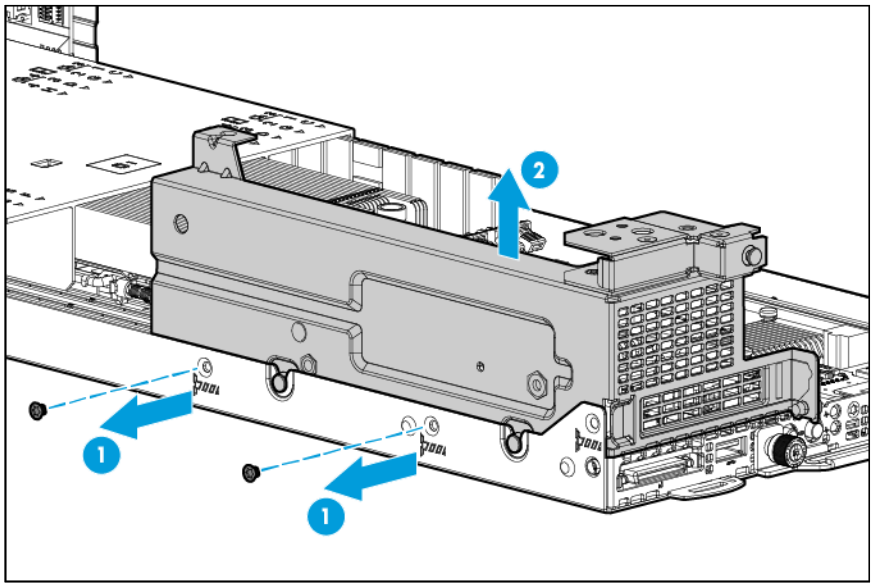
△ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the node unless all PCI riser cages or rear I/O blanks are installed, and do not operate the node unless all PCI slots have either an expansion slot cover or an expansion board installed.

Single-slot 2U node PCI riser cage assembly

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove the FlexibleLOM 2U node riser cage assembly (on page 45).

6. Remove the single-slot 2U node PCI riser cage assembly.

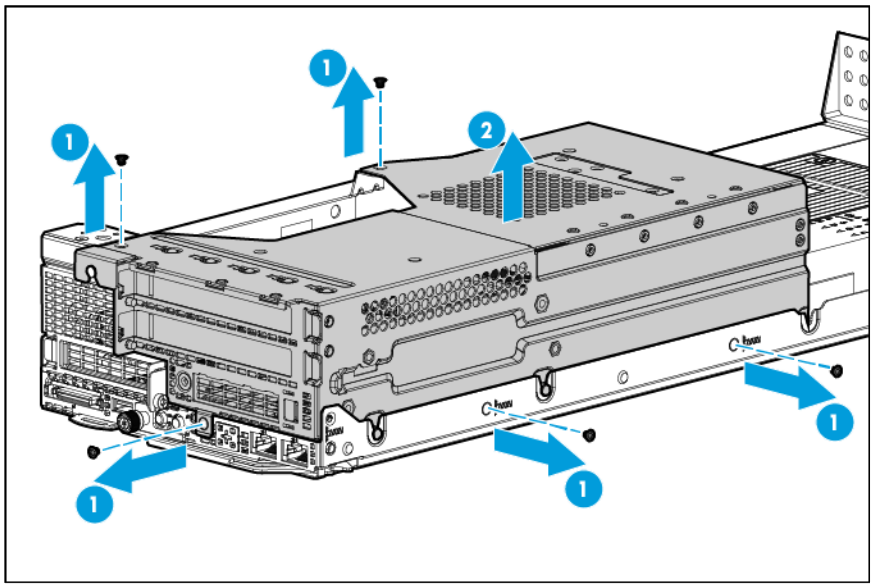


CAUTION: To prevent improper cooling and thermal damage, do not operate the node unless all PCI riser cages or rear I/O blanks are installed, and do not operate the node unless all PCI slots have either an expansion slot cover or an expansion board installed.

FlexibleLOM 2U node riser cage assembly

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove the FlexibleLOM 2U node riser cage assembly.

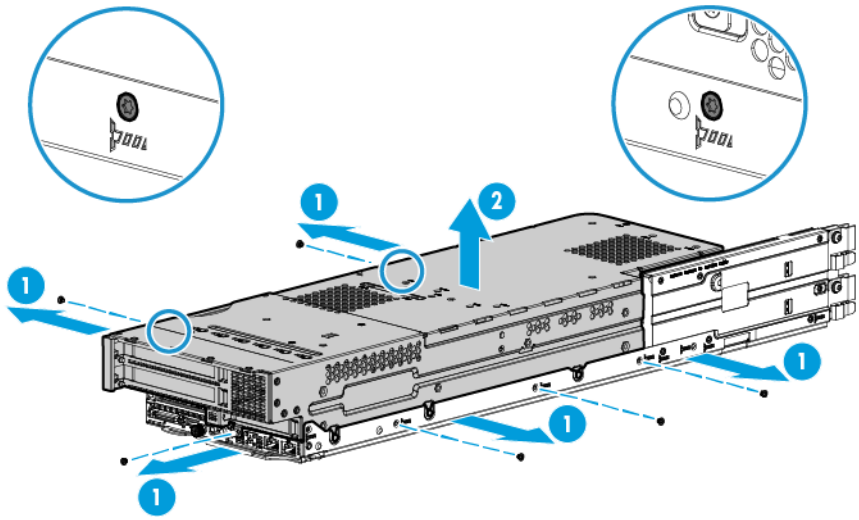


Three-slot PCI riser cage assemblies

NOTE: The three-slot PCI riser cage assembly and the three-slot GPU-direct PCI riser cage assembly, share the same riser cage but have a different riser board. For more information on the riser board slot specifications, see "PCIe riser board slot definitions (on page 114)."

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove the three-slot riser cage assembly.



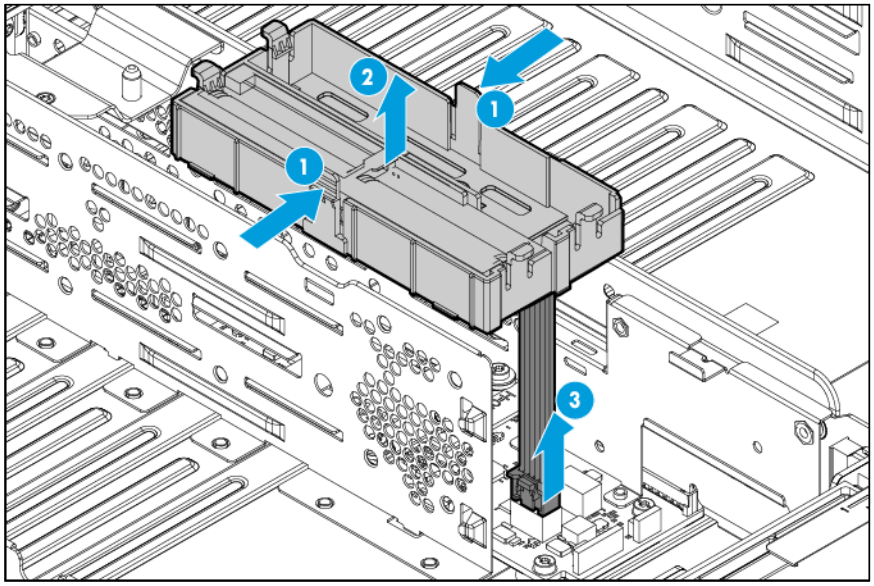
CAUTION: To prevent improper cooling and thermal damage, do not operate the node unless all PCI riser cages or rear I/O blanks are installed, and do not operate the node unless all PCI slots have either an expansion slot cover or an expansion board installed.

Power distribution board (PDB)

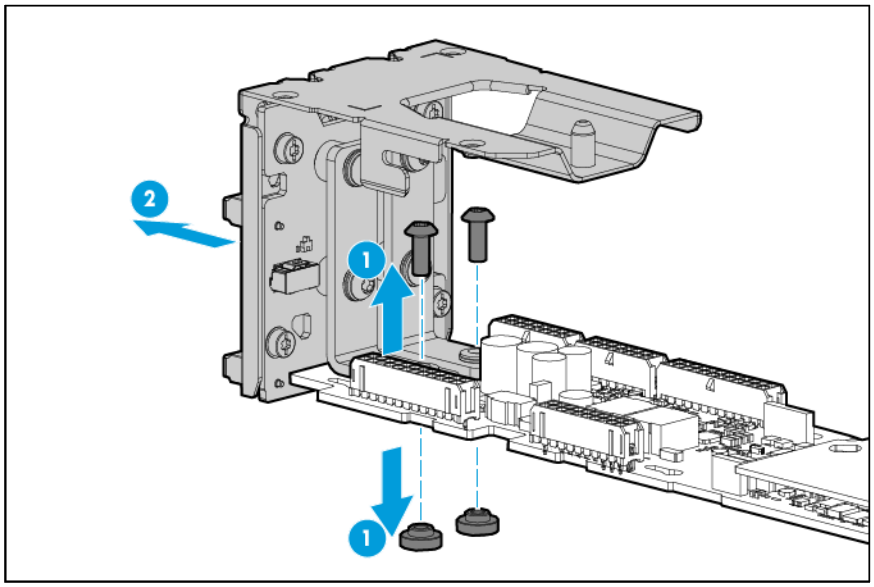
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).

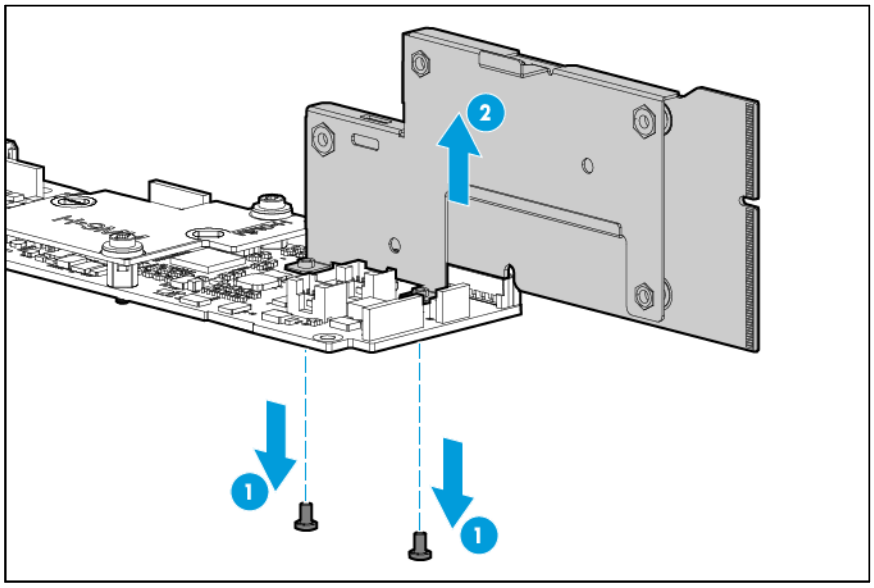
10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly (on page 34).
15. Remove the PDB pass-through board assembly.
    a. Use a pair of thin-nose pliers to firmly grasp the cap nuts on the bottom of the PDB.
    b. Remove the screws with a T-20 Torx screwdriver.
    c. Remove the PDB pass-through board assembly from the PDB.



16. Using a T-15 Torx screwdriver, remove the RPS link board assembly.



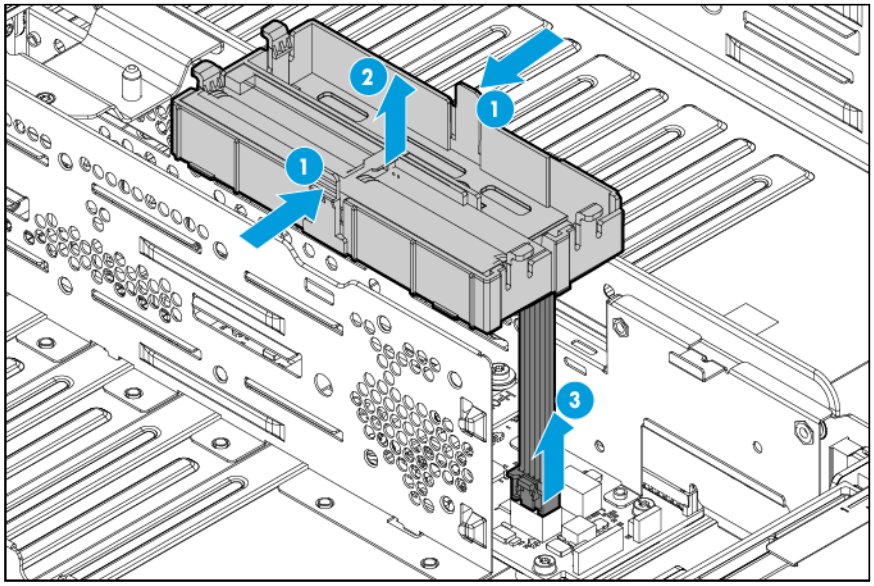
To replace the component, reverse the removal procedure.

PDB pass-through board

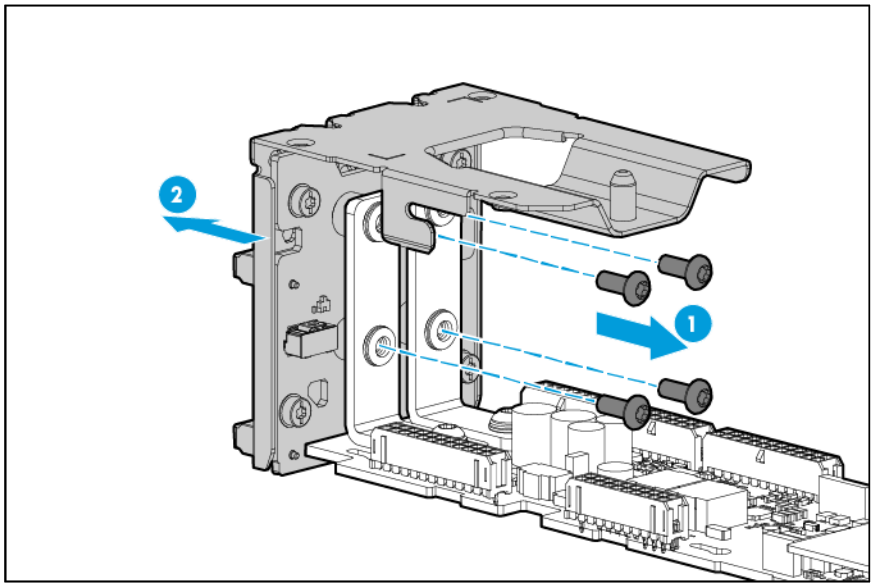
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).

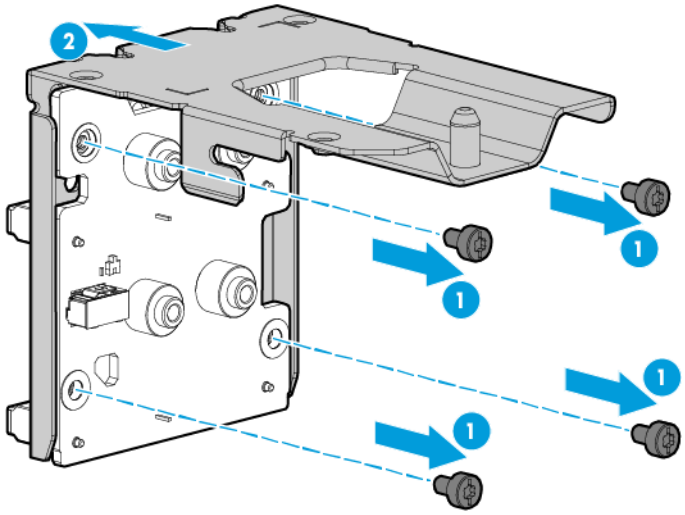
10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly (on page 34).
15. Using a T-20 Torx screwdriver, remove the PDB pass-through board assembly from the bus bars.



16. Using a T-15 Torx screwdriver, remove the support bracket.

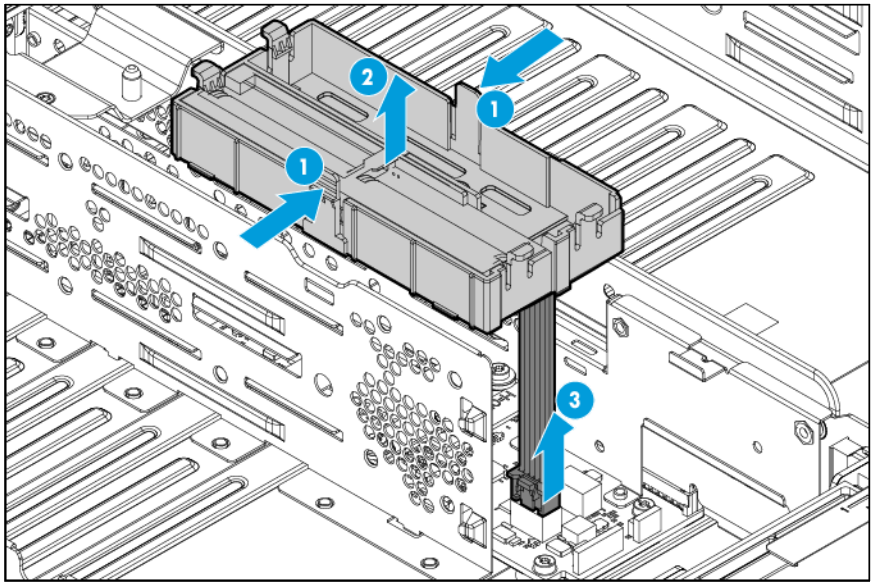


To replace the component, reverse the removal procedure.

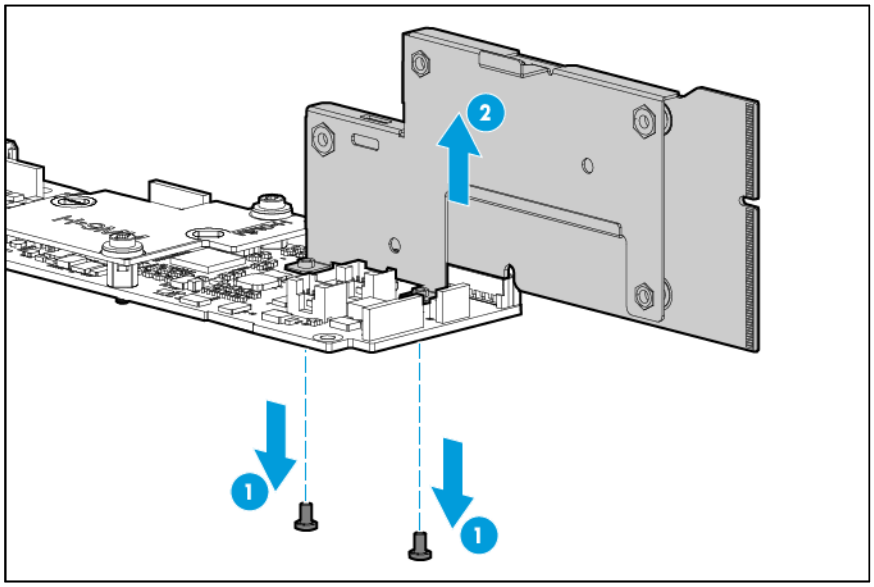
RPS link board

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).

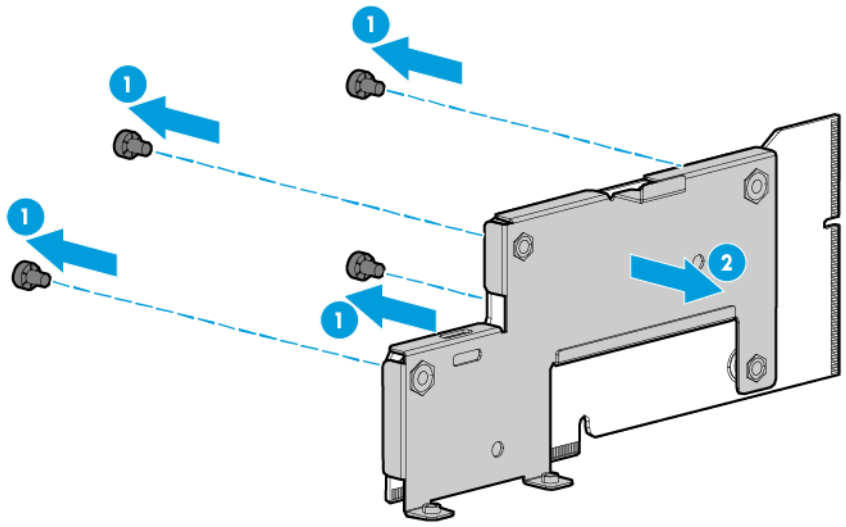
10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly (on page 34).
15. Using a T-15 Torx screwdriver, remove the RPS link board assembly.



16. Remove the support bracket from the RPS link board.



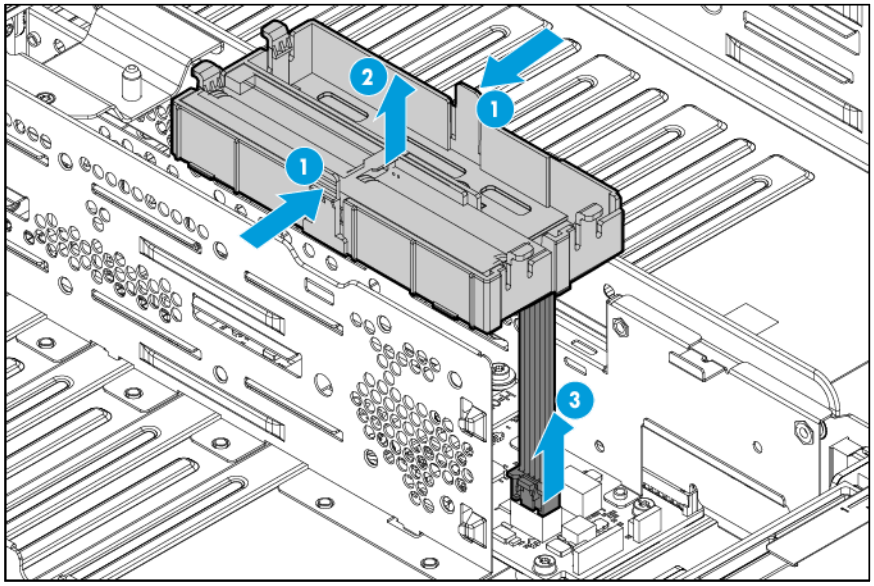
To replace the component, reverse the removal procedure.

RCM 2.0 cable

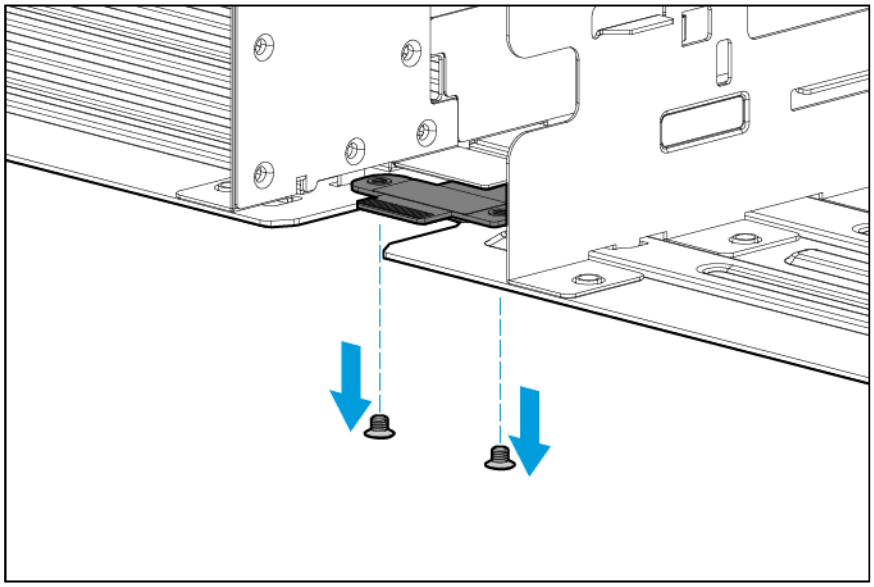
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).

10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly (on page 34).
15. Remove the two screws from the bottom of the chassis.



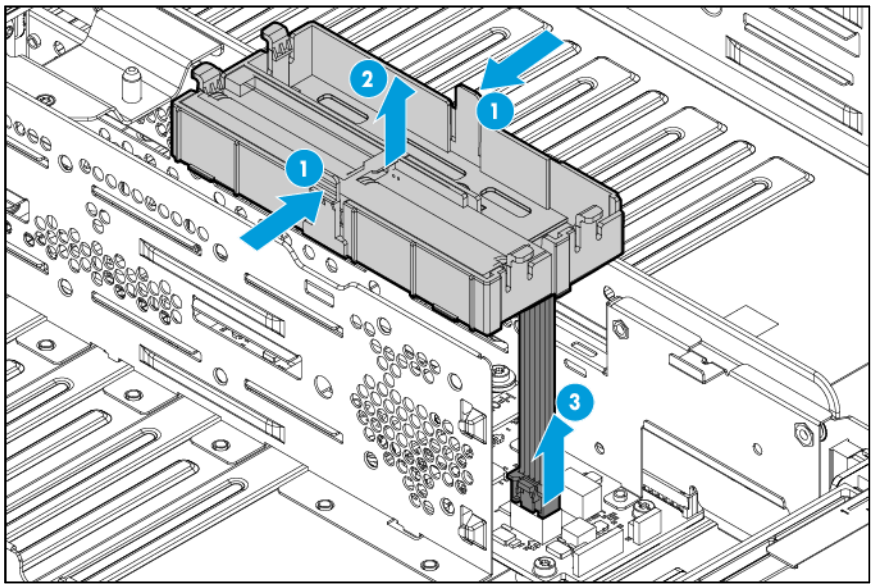
16. Remove the RCM 2.0 cable.

To replace the component, reverse the removal procedure.

Drive backplane

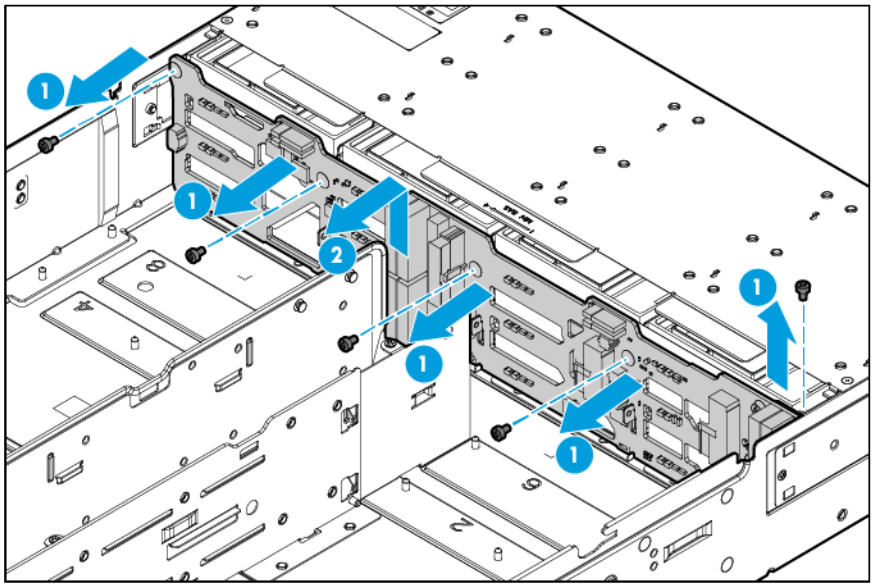
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).
10. If an HP Smart Storage Battery is installed, slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.

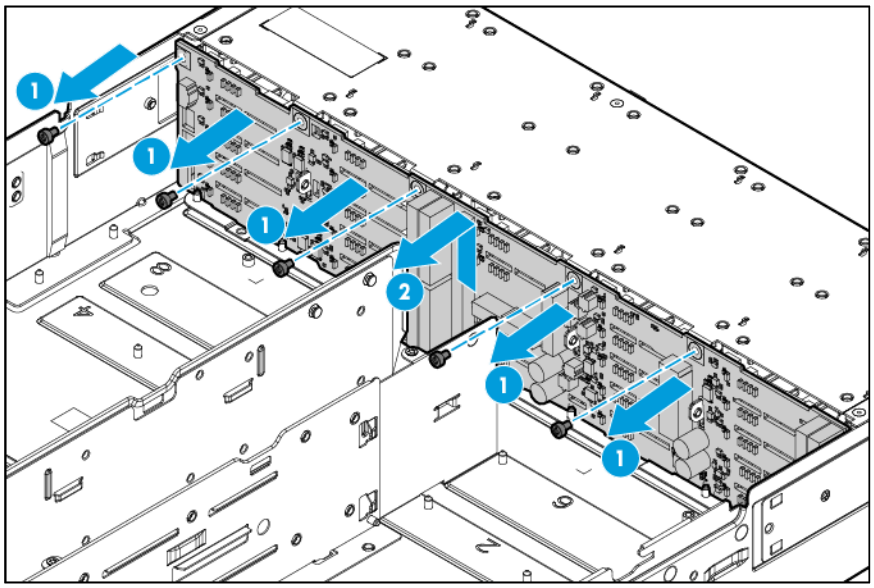


11. Remove the PDB cover (on page 31).
12. Disconnect all cables from the PDB.
13. Disconnect the PDB pass-through cable from the pass-through board.
14. Remove the chassis PDB assembly (on page 34).
15. Remove all fan modules ("Fan module" on page 55).
16. Remove the fan cages (on page 33).
17. Disconnect all the cables from the drive backplane.
18. Remove the drive backplane.

- 12 low-profile LFF drive backplane for HP Apollo r2200 Chassis



- 24 SFF drive backplane for HP Apollo r2600 Chassis



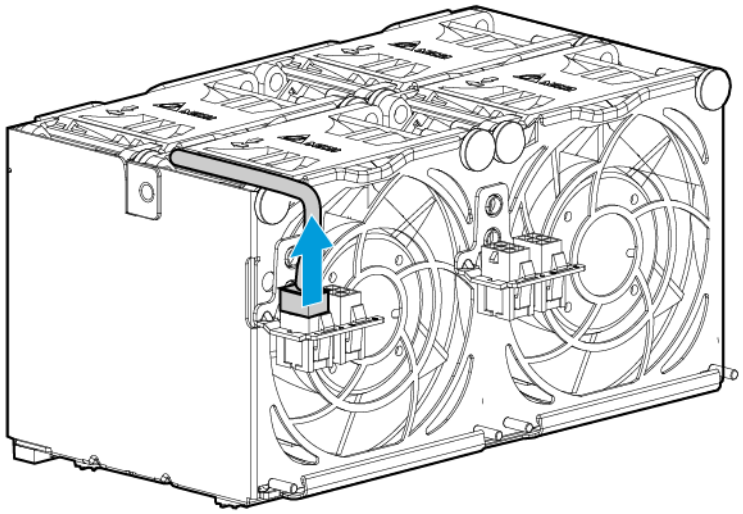
To replace the component, reverse the removal procedure.

Fan module

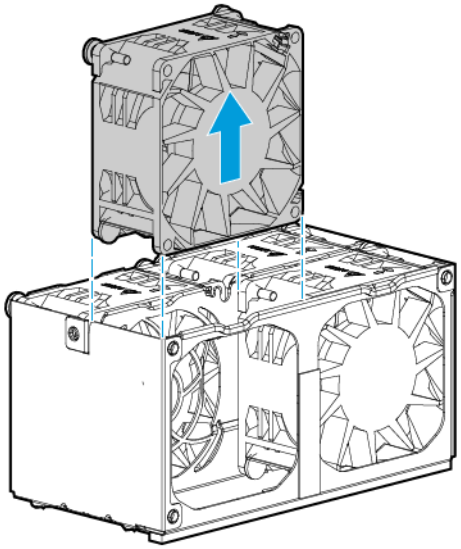
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module. ("Remove the RCM module" on page 29)

7. Remove all power supplies ("Remove the power supply" on page 28).
8. Loosen the thumbscrews and extend the chassis from the rack.
9. Remove the chassis from the rack (on page 30)
10. Remove the access panel ("Remove the chassis access panel" on page 32).
11. Disconnect the cable from the fan cage.



12. Remove the fan module.



To replace the component, reverse the removal procedure.

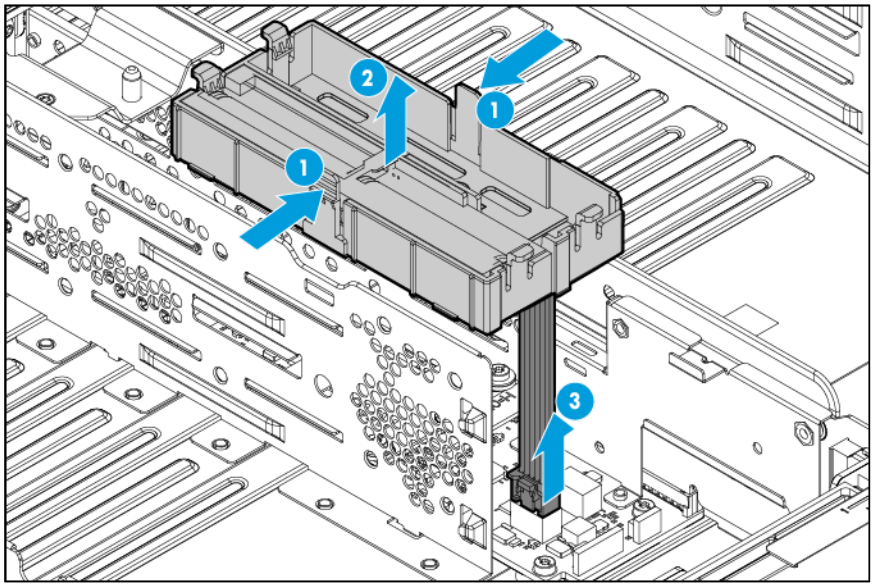
HP Smart Storage Battery

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

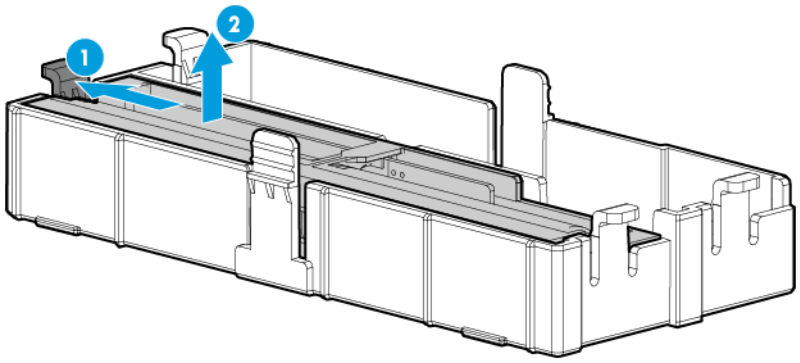
CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module. ("Remove the RCM module" on page 29)
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Loosen the thumbscrews and extend the chassis from the rack.
9. Remove the chassis from the rack (on page 30).
10. Remove the access panel ("Remove the chassis access panel" on page 32).
11. Slightly pull up the battery holder from the chassis to access the battery cable connection underneath it, and then disconnect the HP Smart Storage Battery cable.



12. Remove the HP Smart Storage Battery from its holder.



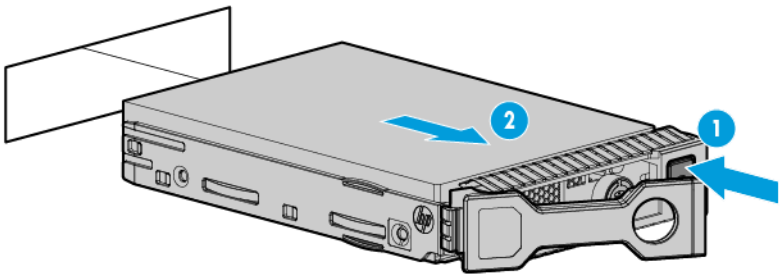
To replace the component, reverse the removal procedure.

Hot-plug drive

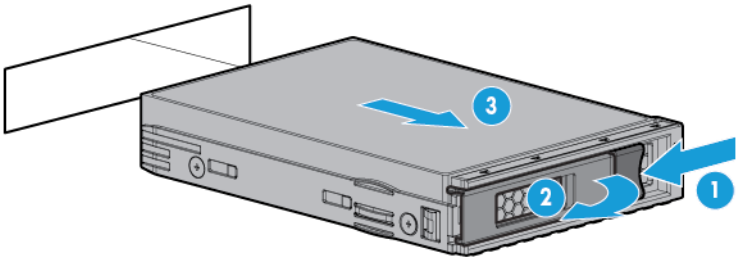
CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the component:

1. Back up all node data on the drive.
2. Determine the status of the drive from the hot-plug drive LED definitions (on page 109).
3. Remove the hot-plug drive.
   - SFF HP SmartDrive



- Low-profile LFF hot-plug drive



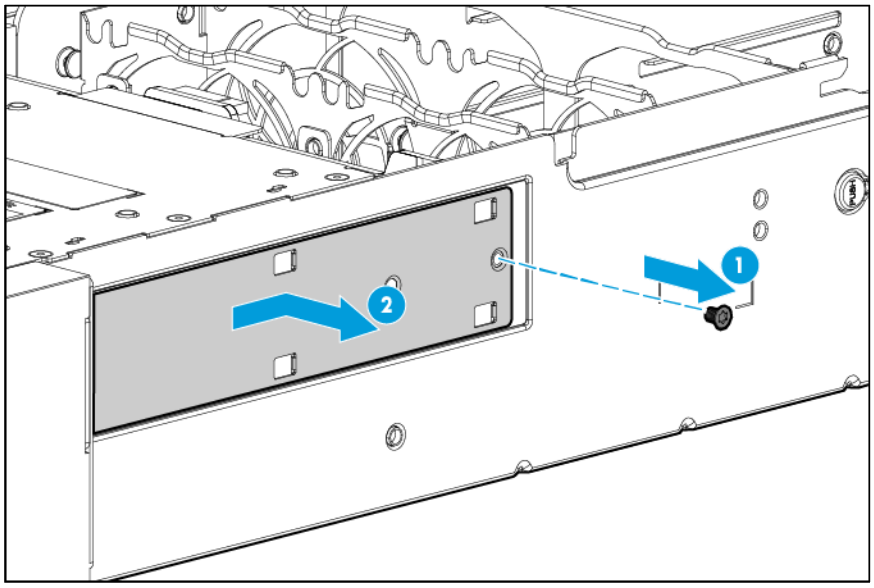
To replace the component, reverse the removal procedure.

Bezel ear

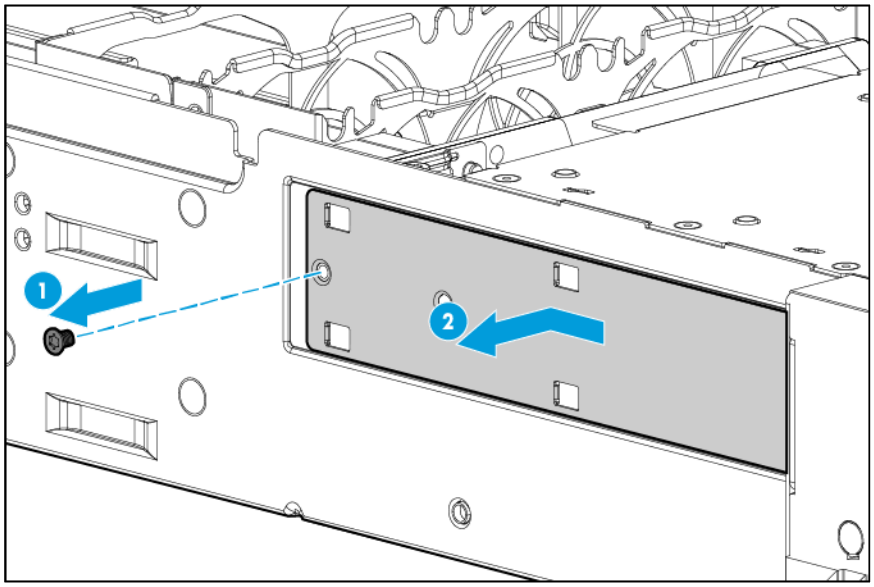
To remove the component:

1. Power down the system (on page 27).
2. Disconnect all peripheral cables from the nodes and chassis.
3. Remove all nodes from the chassis ("Remove the node from the chassis" on page 27).
4. If installed, remove the security bezel (on page 31).
5. Remove all drives ("Hot-plug drive" on page 58).
6. If installed, remove the RCM module (on page 29).
7. Remove all power supplies ("Remove the power supply" on page 28).
8. Remove the chassis from the rack (on page 30).
9. Remove the access panel ("Remove the chassis access panel" on page 32).
10. Remove all fan modules ("Fan module" on page 55).
11. Remove the fan cages (on page 33).
12. Remove the front I/O cable cover.

- Right front I/O cable cover

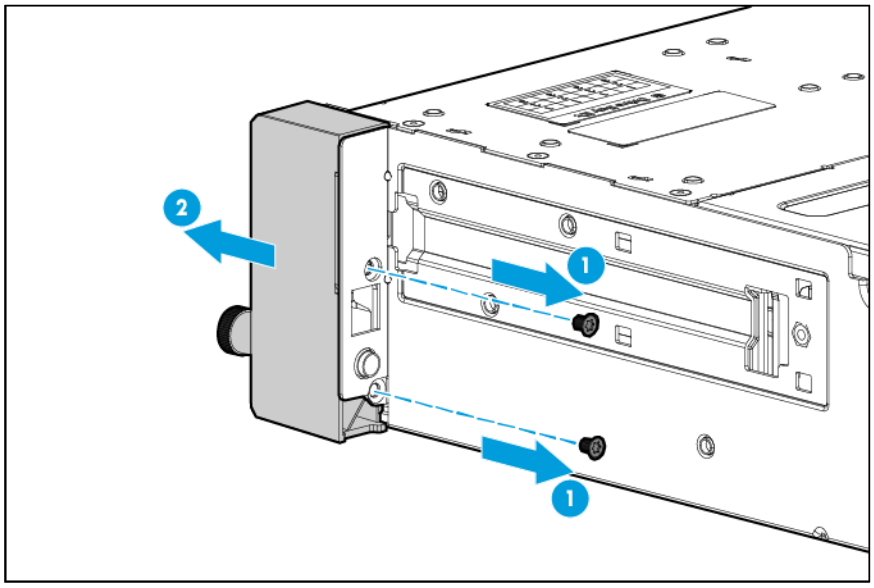


- Left front I/O cable cover

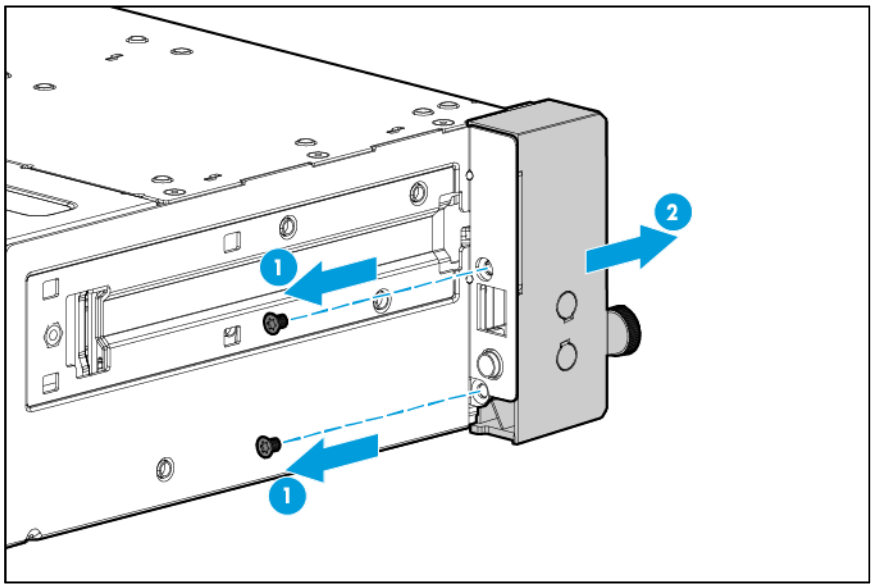


13. Disconnect the front I/O cable from the drive backplane.
14. Remove the bezel ear.

- Right bezel ear



- Left bezel ear



15. Disconnect the front I/O cable from the bezel ear.

To replace the component, reverse the removal procedure.

FBWC module

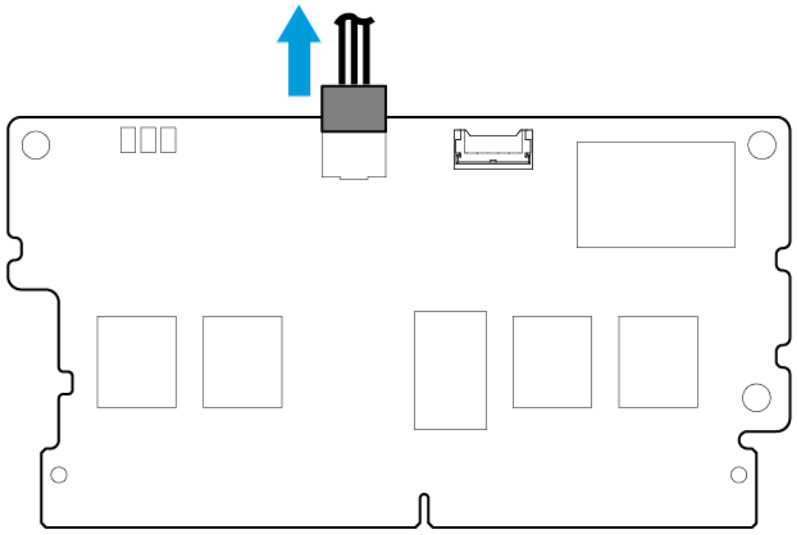
WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: In systems that use external data storage, be sure that the server is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server is powered up.

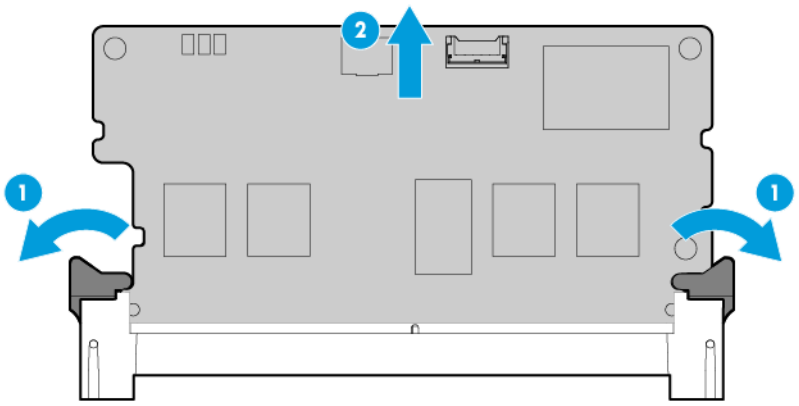
CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Remove the PCI riser cage assembly (on page 41).
5. Disconnect any internal cables that are connected to the expansion board.
6. Remove all expansion boards from the riser cage assembly.
7. If necessary for easier access to the cache module connector and/or removal of an air scoop, remove the storage controller from the PCI riser cage or from the system board.
8. If the cache module is covered by an air scoop, remove the air scoop.
9. Disconnect the cache module backup power cable from the cache module.



10. Remove the cache module.

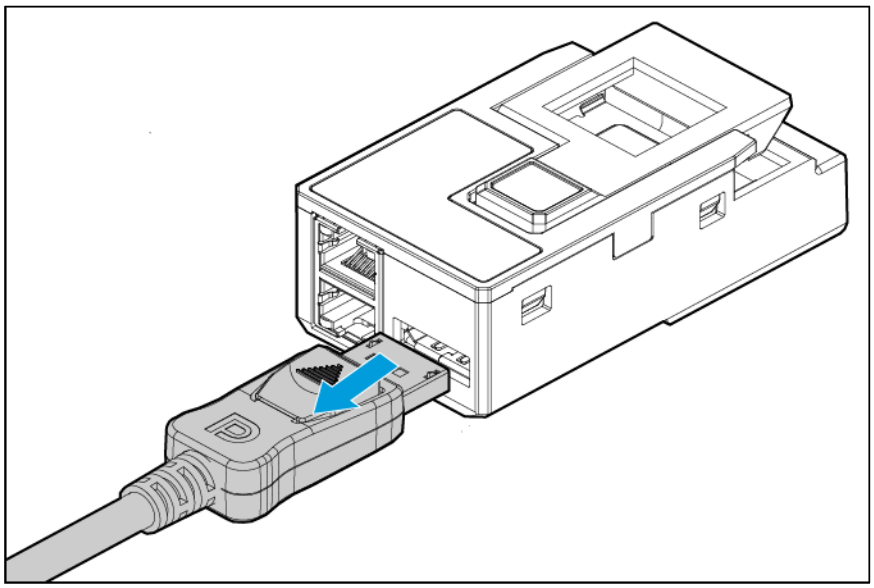


To replace the component, reverse the removal procedure.

RCM 2.0 to 1.0 adapter cable

To remove the component:

1. Power down the system (on page 27).
2. Disconnect the RCM 2.0 to 1.0 adapter cable from HP APM.
3. Disconnect the RCM 2.0 to 1.0 adapter cable from the RCM module.



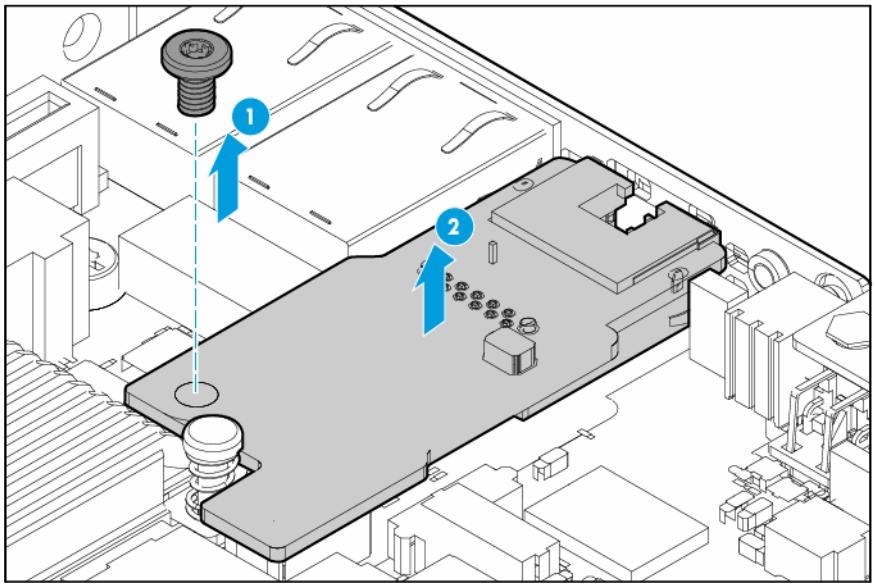
To replace the component, reverse the removal procedure.

Dedicated iLO management port module option

To install the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the server node from the chassis ("Remove the node from the chassis" on page 27).
4. Place the node on a flat, level surface.
5. Remove any installed PCI riser cage assemblies ("Remove the PCI riser cage assembly" on page 41).
6. Remove all rear I/O blanks:
   - Remove the 1U left rear I/O blank (on page 36).
   - Remove the 1U right rear I/O blank (on page 36).
   - Remove the 2U rear I/O blank (on page 37).

7. Remove the failed dedicated iLO management port card.



To replace the component, reverse the removal procedure.

Enabling the dedicated iLO management module

To enable the dedicated iLO management module:

1. During the server startup sequence after installing the module, press **F9** in the POST screen.

   The System Utilities screen appears.
2. Select **System Configuration** | **iLO 4 Configuration Utility**.

   The iLO 4 Configuration Utility screen appears.
3. Select **Network Options**, and then press **Enter**.

   The Network Options screen appears.
4. Set the **Network Interface Adapter** field to **ON**, and then press **Enter**.
5. Press **F10** to save your changes.

   A message prompt to confirm the iLO settings reset appears.
6. Press **Enter** to reboot the iLO settings.
7. Press **Esc** until the main menu is displayed.
8. Select **Reboot the System** to exit the utility and resume the boot process.

   The IP address of the enabled dedicated iLO connector appears on the POST screen on the subsequent boot-up. Access the Network Options screen again to view this IP address for later reference.

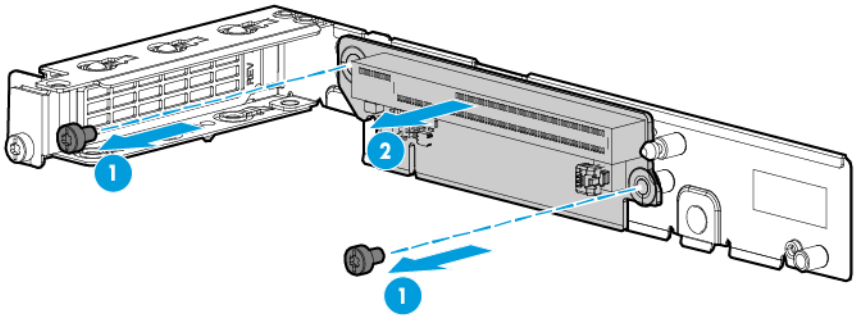
Riser boards

To remove the component:

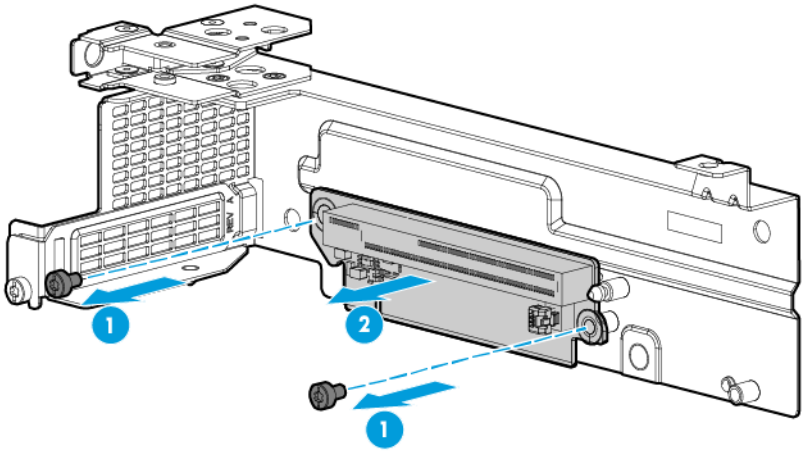
△ **CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser board assembly.

1. Power down the node (on page 27).

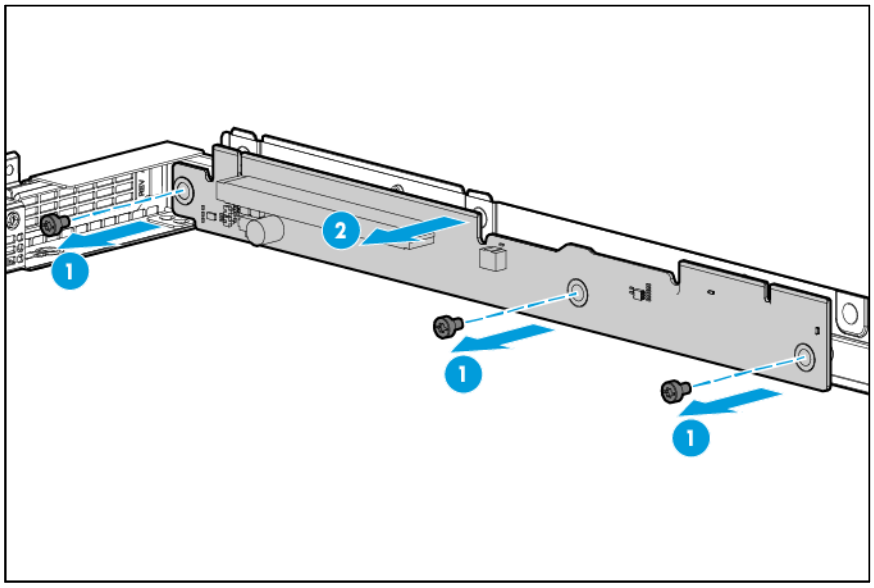
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Remove the PCI riser cage assembly (on page 41).
5. Remove all expansion boards from the riser cage assembly.
6. Disconnect any internal cables that are connected to the expansion board.
7. If replacing a riser board in a three-slot riser cage assembly, remove the PCIe transfer board ("PCIe transfer board" on page 68).
8. Remove the failed riser board.
   - PCIex16 left riser board (Single-slot left PCI riser cage assembly)



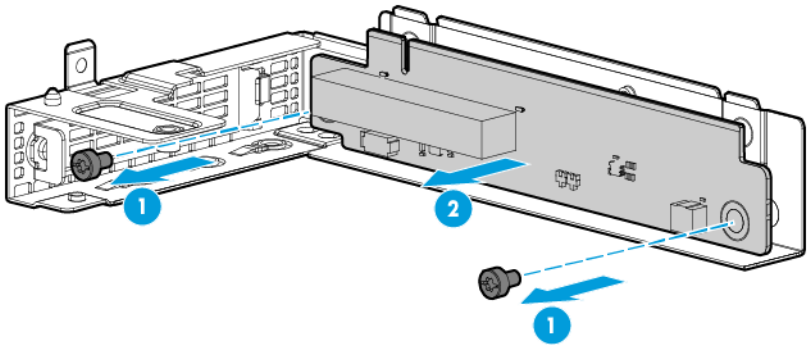
   - PCIex16 left riser board (Single-slot 2U node PCI riser cage assembly)



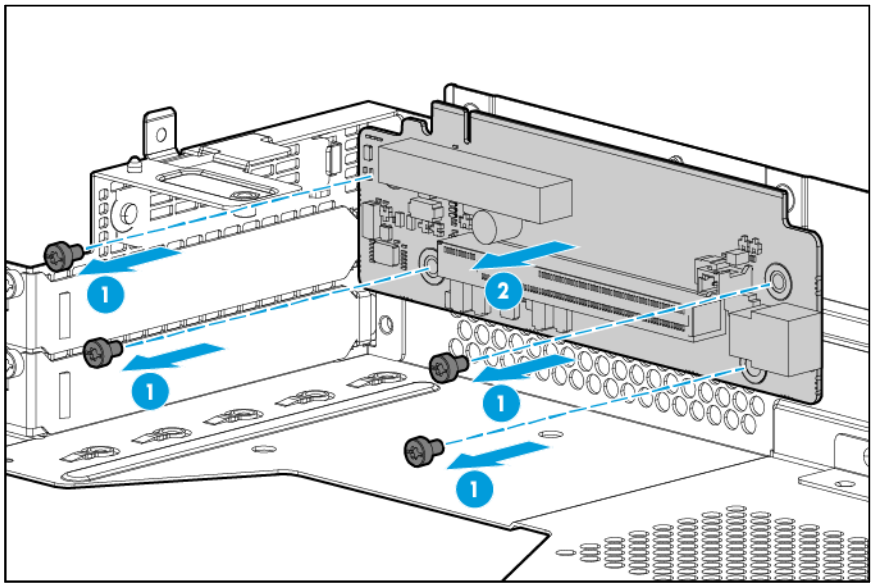
- PCIe x16 right 1U node riser board



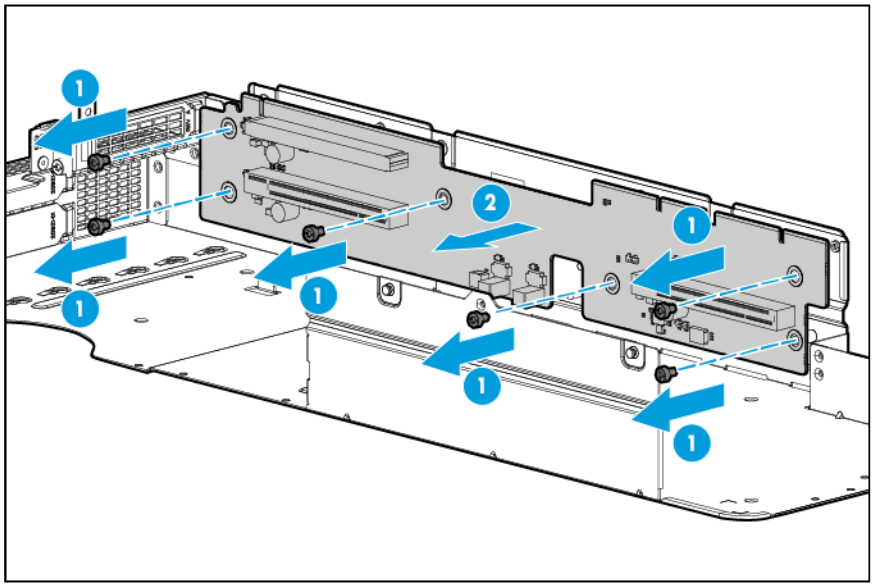
- FlexibleLOM x8 1U node riser board



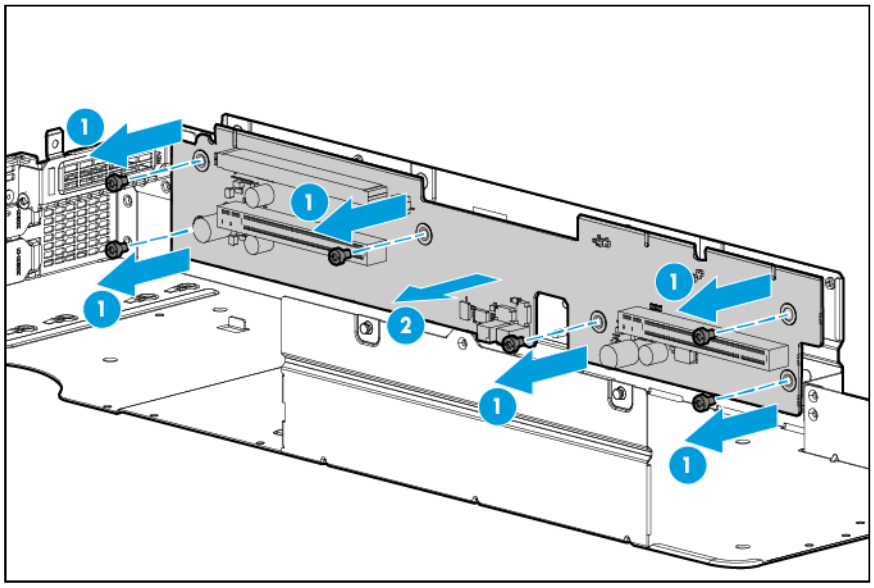
- FlexibleLOM x16x8 2U node riser board



- Three-slot PCIe x16 2U node riser board



- Three-slot GPU-direct PCIe x16 2U node riser board

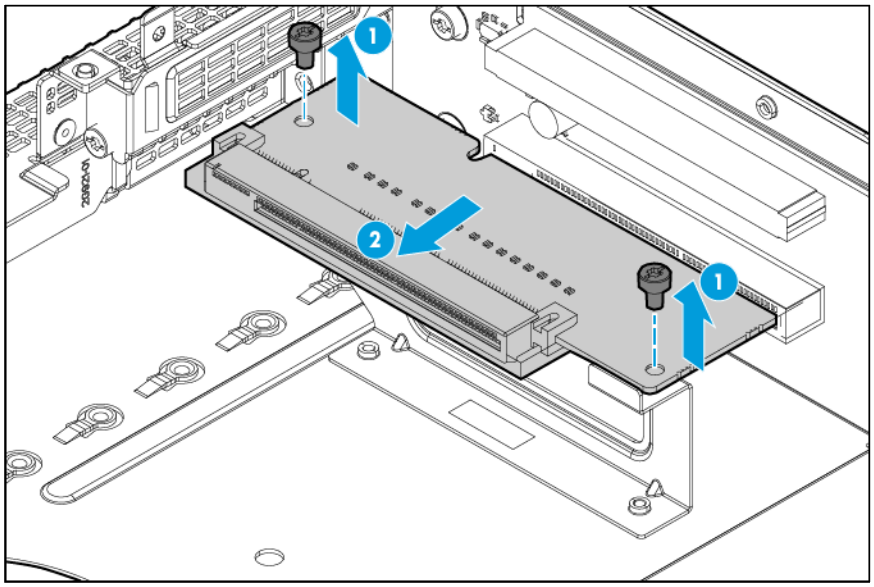


To replace the component, reverse the removal procedure.

PCIe transfer board

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
5. Remove all expansion boards from the riser cage assembly.
6. Disconnect all cables from the riser board.
7. Remove the PCIe transfer board.

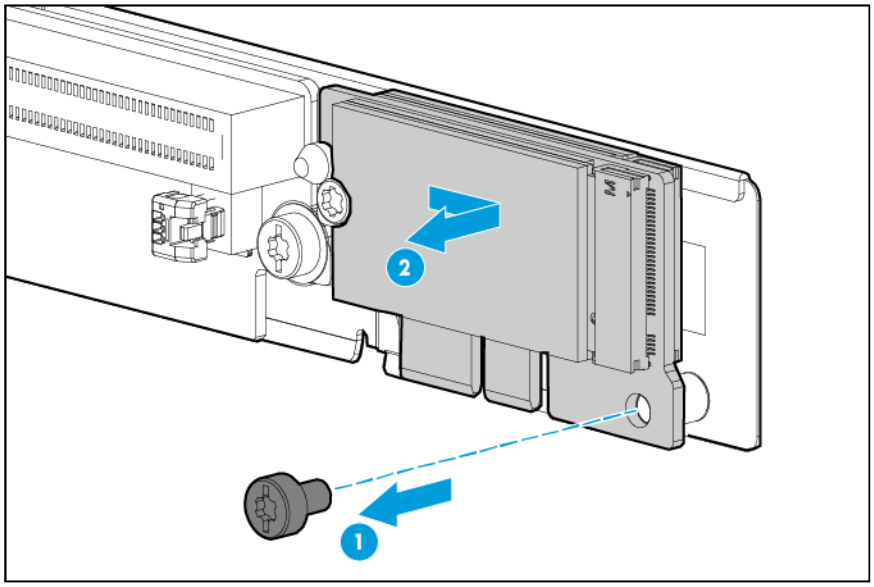


To replace the component, reverse the removal procedure.

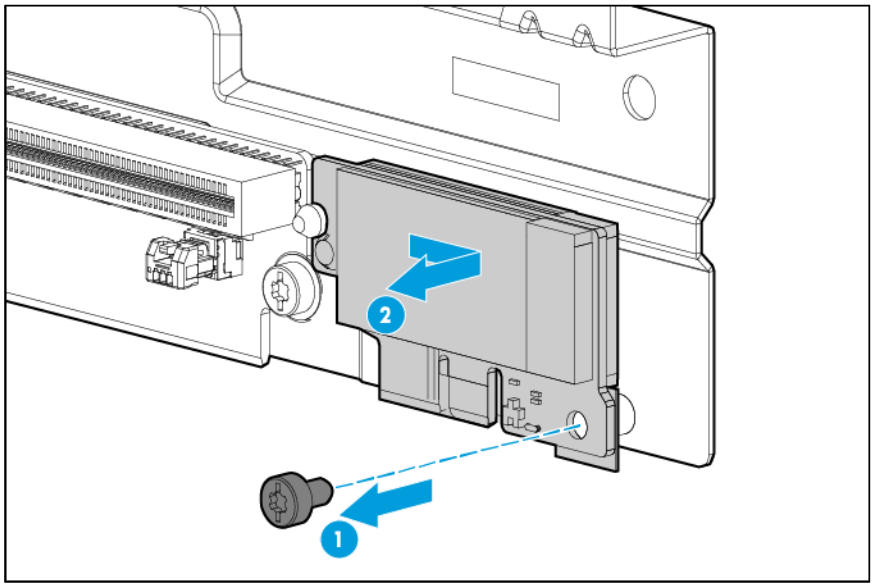
M.2 SATA SSD enablement board

To remove the component:

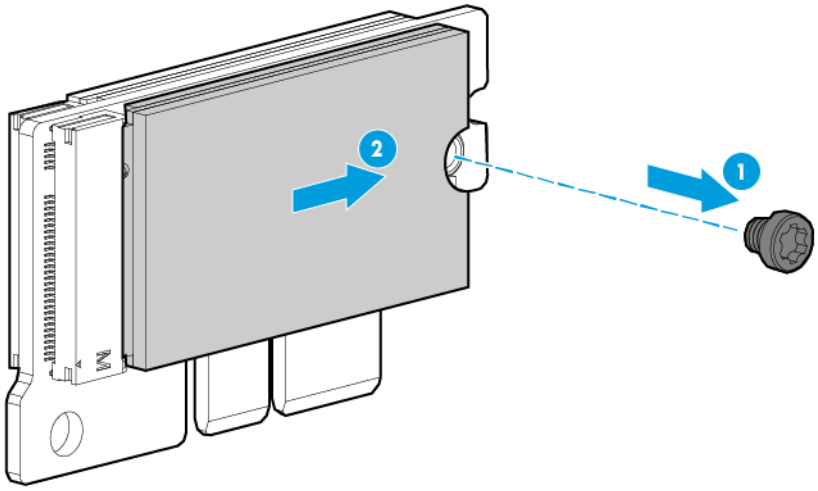
1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. In a 2U node, do one of the following:
   - Remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
   - Remove the FlexibleLOM 2U node PCI riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
5. Do one of the following:
   - Remove the single-slot left PCI riser cage assembly ("Single-slot left PCI riser cage assembly" on page 41).
   - Remove the single-slot 2U node PCI riser cage assembly ("Single-slot 2U node PCI riser cage assembly" on page 44).
6. If installed, remove the storage controller.
7. Disconnect all cables from the riser board.
8. Loosen the T-15 screw and remove the enablement board from the PCI riser cage assembly.
   - Single-slot left PCI riser cage assembly



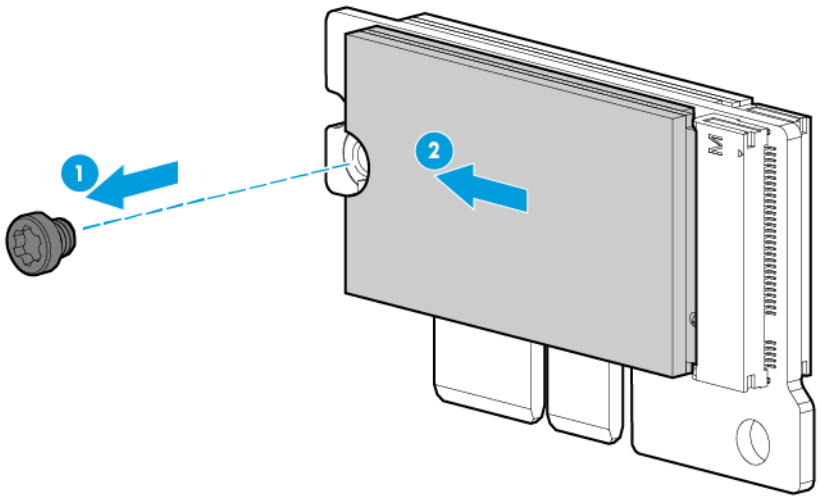
- Single-slot 2U node PCI riser cage assembly



9. Loosen the T-10 screw and remove the M2. SATA SSD cards from the failed enablement board.
   - Remove the first M.2 SATA SSD card



- Remove the second M.2 SATA SSD card



To replace the component, reverse the removal procedure.

Heatsink

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To avoid damage to the processor and system board, only authorized personnel should attempt to replace or install the processor in this node.

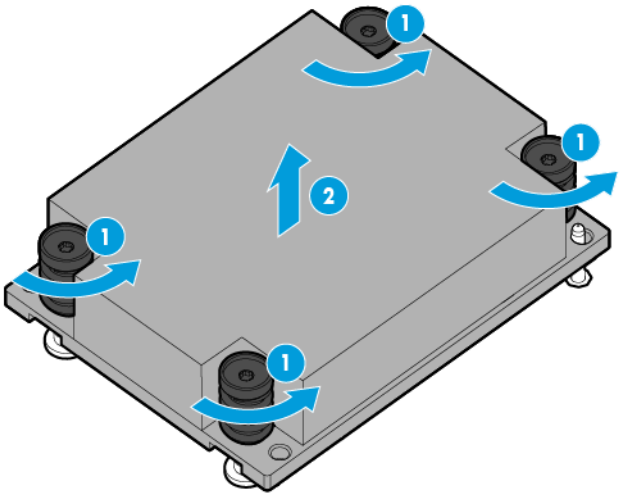
CAUTION: To prevent possible node malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

CAUTION: The heatsink thermal interface media is not reusable and must be replaced if the heatsink is removed from the processor after it has been installed.

IMPORTANT: Processor socket 1 must be populated at all times or the node does not function.

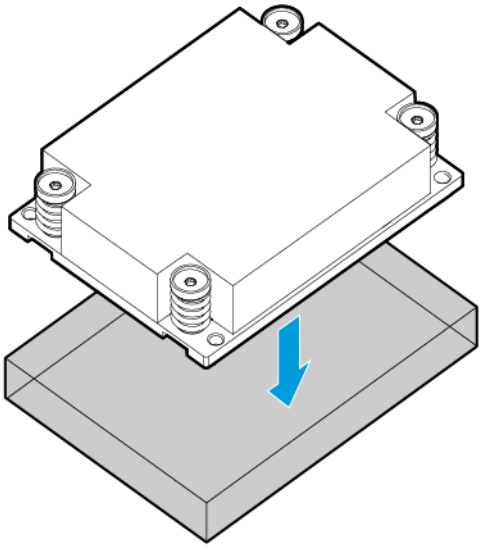
1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. In a 2U node, do one of the following:
   - Remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
   - Remove the FlexibleLOM 2U node PCI riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. Remove the air baffle (on page 38).

7. Remove the heatsink.



To replace the component:

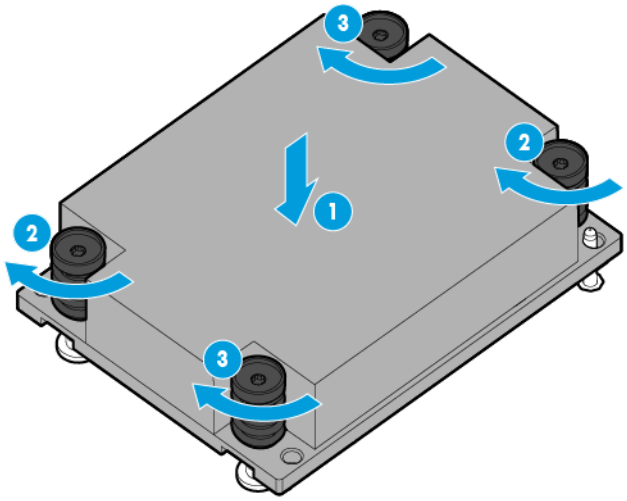
1. Clean the old thermal grease from the processor with the alcohol swab. Allow the alcohol to evaporate before continuing.
2. Remove the thermal interface protective cover from the heatsink.



△ **CAUTION:** Heatsink retaining screws should be tightened in diagonally opposite pairs (in an "X" pattern).

3. Install the heatsink:
   a. Position the heatsink on the processor backplate.
   b. Tighten one pair of diagonally opposite screws halfway, and then tighten the other pair of screws.

c. Finish the installation by completely tightening the screws in the same sequence.



4. Install the air baffle.
5. Install any removed PCI riser cage assemblies.
6. Install the node into the chassis.
7. Connect all peripheral cables to the node.
8. Power up the node.

Processor

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To avoid damage to the processor and system board, only authorized personnel should attempt to replace or install the processor in this node.

CAUTION: To prevent possible node malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

CAUTION: To prevent possible node overheating, always populate processor socket 2 with a processor and a heatsink or a processor socket cover and a heatsink blank.

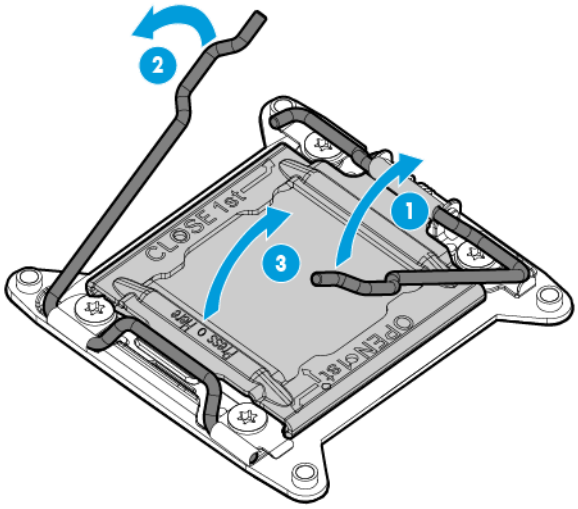
CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

IMPORTANT: If installing a processor with a faster speed, update the system ROM before installing the processor.

IMPORTANT: Processor socket 1 must be populated at all times or the node does not function.

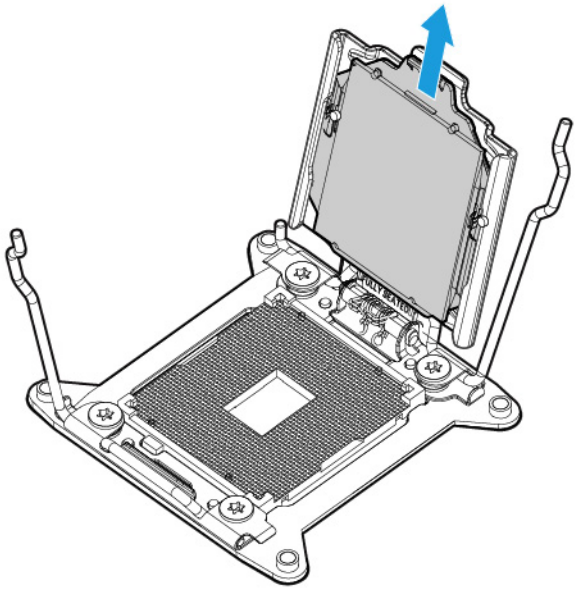
To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. In a 2U node, do one of the following:
   - Remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
   - Remove the FlexibleLOM 2U node PCI riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. Remove the air baffle (on page 38).
7. Remove the heatsink ("Heatsink" on page 71).
8. Open each of the processor locking levers in the order indicated, and then open the processor retaining bracket.



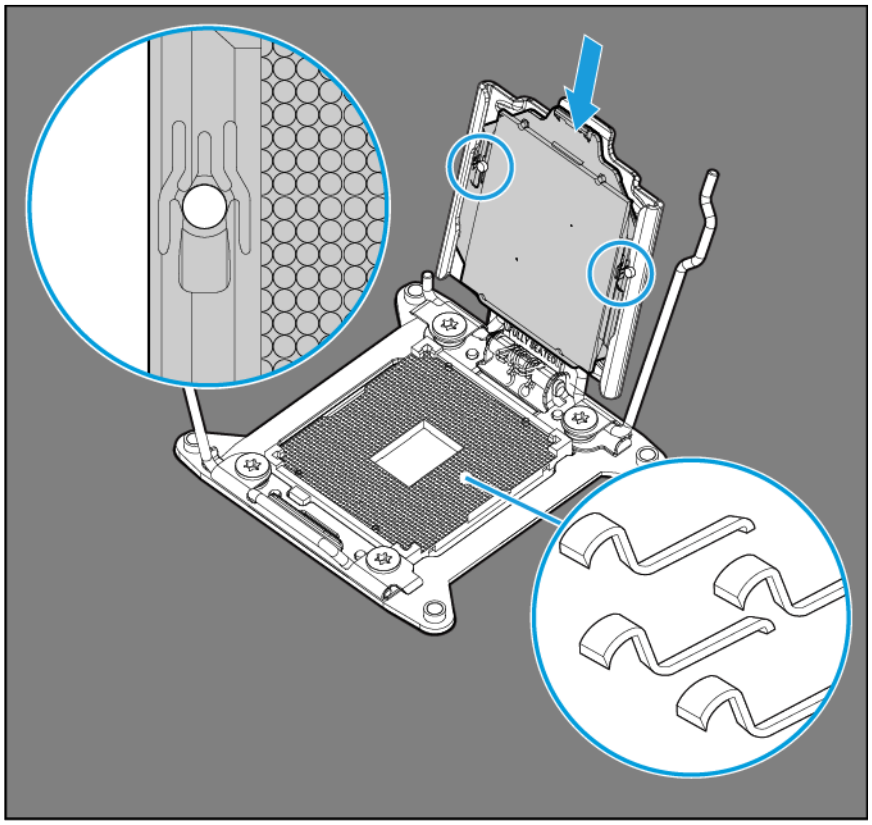
△ **CAUTION: THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the system board, do not touch the processor or the processor socket contacts.

9. Remove the processor from the processor retaining bracket.



To replace the component:

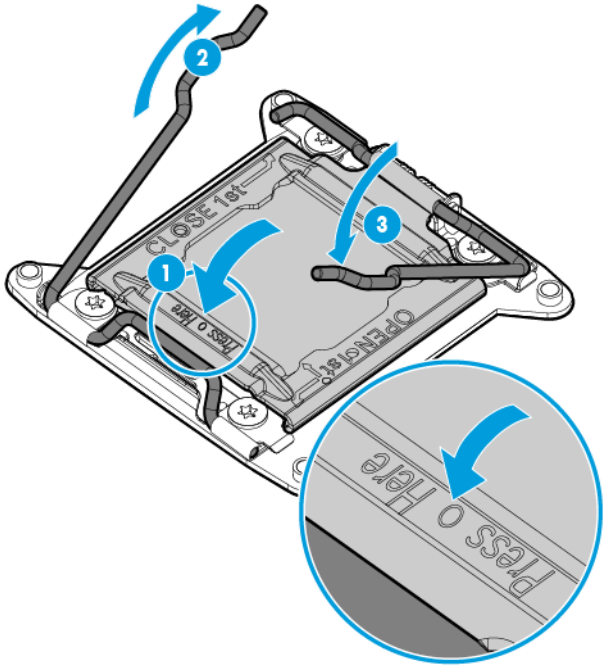
1. Install the processor. Verify that the processor is fully seated in the processor retaining bracket by visually inspecting the processor installation guides on either side of the processor. **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED**.



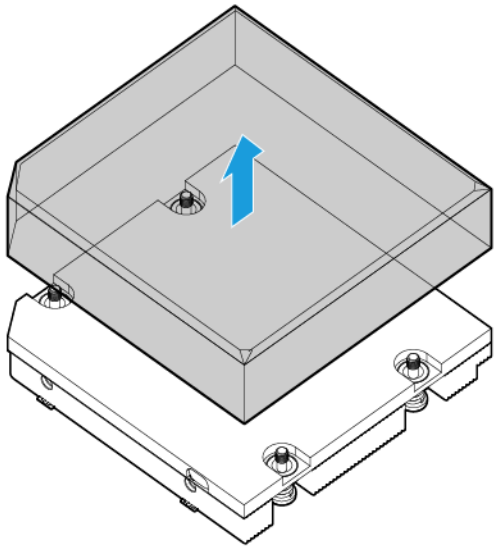
CAUTION: **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the system board, do not touch the processor or the processor socket contacts.

CAUTION: Do not press down on the processor. Pressing down on the processor may cause damage to the processor socket and the system board. Press only in the area indicated on the processor retaining bracket.

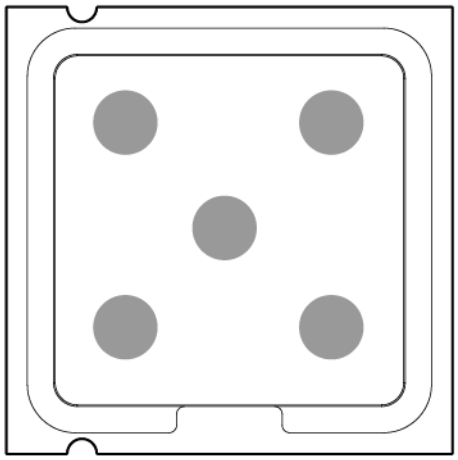
2. Close the processor retaining bracket. When the processor is installed properly inside the processor retaining bracket, the processor retaining bracket clears the flange on the front of the socket.
3. Press and hold the processor retaining bracket in place, and then close each processor locking lever. Press only in the area indicated on the processor retaining bracket.



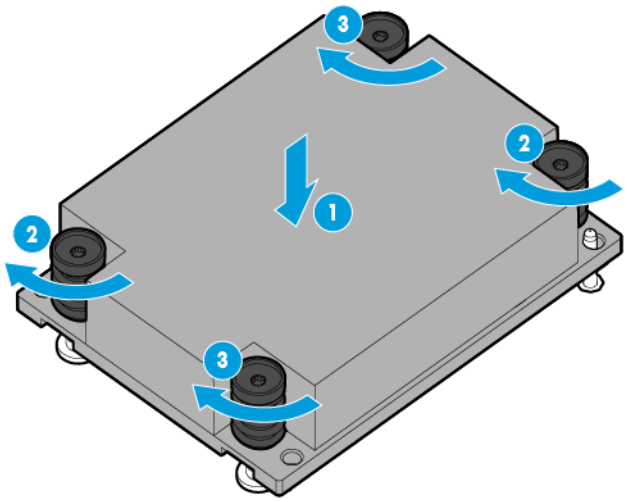
4. Remove the thermal interface protective cover from the heatsink.



5. Clean the old thermal grease from the heatsink with the alcohol swab. Allow the alcohol to evaporate before continuing.
6. Apply all the grease to the top of the processor in one of the following patterns to ensure even distribution.



7. Install the heatsink:
   a. Position the heatsink on the processor backplate.
   b. Tighten one pair of diagonally opposite screws halfway, and then tighten the other pair of screws.
   c. Finish the installation by completely tightening the screws in the same sequence.



8. Install the air baffle.
9. Install any removed PCI riser cage assemblies.
10. Install the node into the chassis.
11. Connect all peripheral cables to the node.
12. Power up the node.

Expansion board

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Remove the PCI riser cage assembly (on page 41).
5. Remove the failed system board.
6. Disconnect all cables from the riser board.
7. Disconnect any internal cables that are connected to the expansion board.
8. If you are removing a storage controller board with a cache module installed, remove the cache module ("FBWC module" on page 61).

To replace the component, reverse the removal procedure.

DIMMs

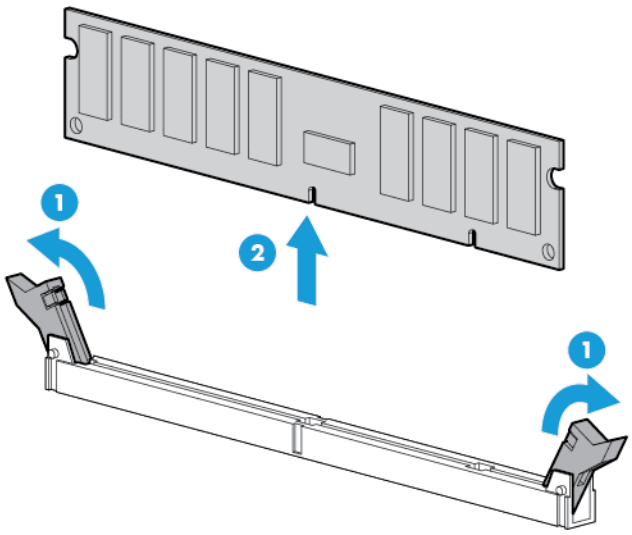
WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. In a 2U node, do one of the following:
   - Remove the three-slot PCI riser cage assembly ("Three-slot PCI riser cage assemblies" on page 46).
   - Remove the FlexibleLOM 2U node PCI riser cage assembly ("FlexibleLOM 2U node riser cage assembly" on page 45).
6. Remove the air baffle (on page 38).
7. Open the DIMM slot latches.

8. Remove the DIMM.



To replace the component, reverse the removal procedure.

System battery

If the node no longer automatically displays the correct date and time, then replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

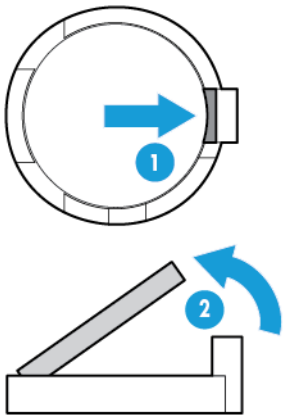
⚠ **WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

To remove the component:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove any installed PCI riser cage assemblies ("Remove the PCI riser cage assembly" on page 41).
6. Locate the battery on the system board ("System board components" on page 103).
7. If the system battery is secured by a metal tab, do the following:
   a. Use your finger or a small flat-bladed, nonconductive tool to press the metal tab. This will partially release the battery from the socket.

b. Remove the battery.



IMPORTANT: Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU.

To replace the component, reverse the removal procedure.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

System board

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

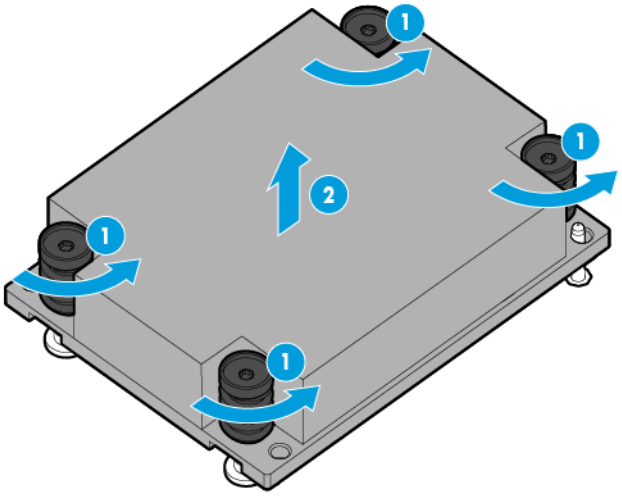
CAUTION: To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

CAUTION: To avoid ESD damage, when removing electrostatic-sensitive components from the failed system board, place the components on a static-dissipating work surface or inside separate antistatic bags.

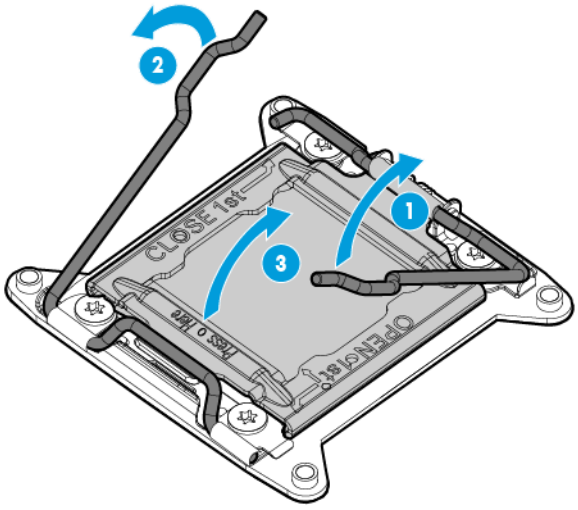
To remove the system board:

1. Power down the node (on page 27).
2. Disconnect all peripheral cables from the node.
3. Remove the node from the chassis (on page 27).
4. Place the node on a flat, level surface.
5. Remove any installed PCI riser cage assemblies ("Remove the PCI riser cage assembly" on page 41).
6. Remove all rear I/O blanks:
   - Remove the 1U left rear I/O blank (on page 36).
   - Remove the 1U right rear I/O blank (on page 36).
   - Remove the 2U rear I/O blank (on page 37).
7. Remove the bayonet board assembly (on page 39).

8. Remove the air baffle (on page 38).
9. Remove all DIMMs ("DIMMs" on page 78).
10. Remove the heatsink:
    a. Loosen one pair of diagonally opposite screws halfway, and then loosen the other pair of screws.
    b. Completely loosen all screws in the same sequence.
    c. Remove the heatsink from the processor backplate.

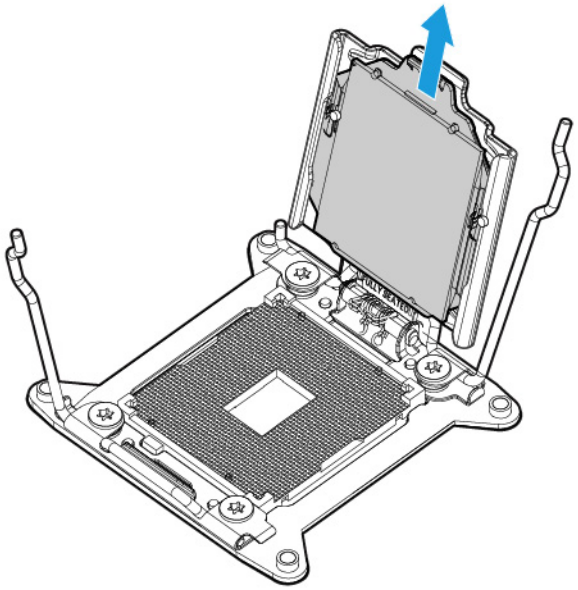


11. Open each of the processor locking levers in the order indicated, and then open the processor retaining bracket.

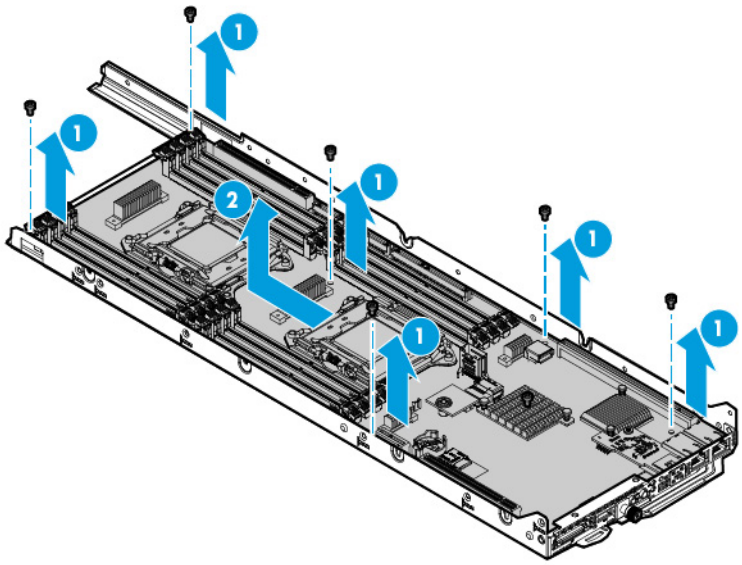


△ **CAUTION: THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the system board, do not touch the processor or the processor socket contacts.

12. Remove the processor from the processor retaining bracket.

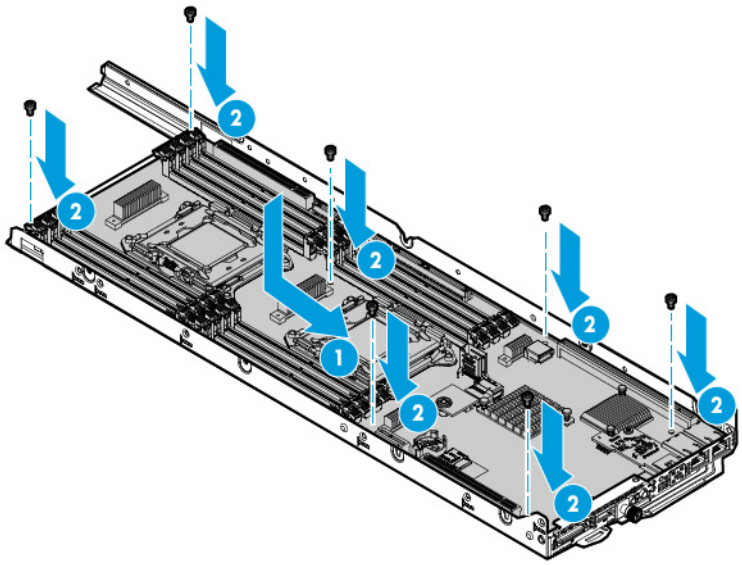


13. If installed, remove the dedicated iLO module ("Dedicated iLO management port module option" on page 63).
14. Disconnect all cables connected to the system board.
15. Remove the failed system board.

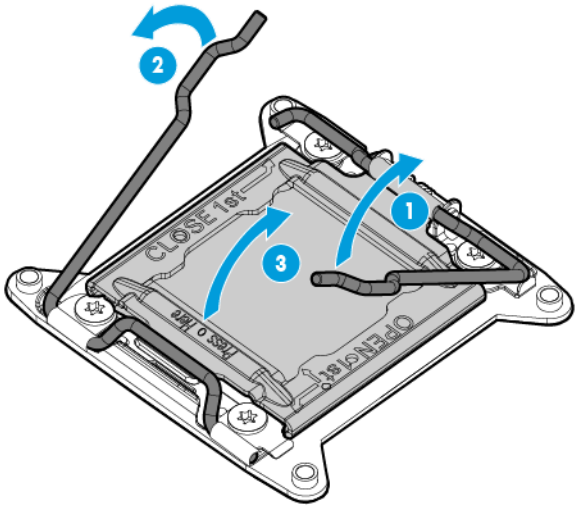


To replace the system board:

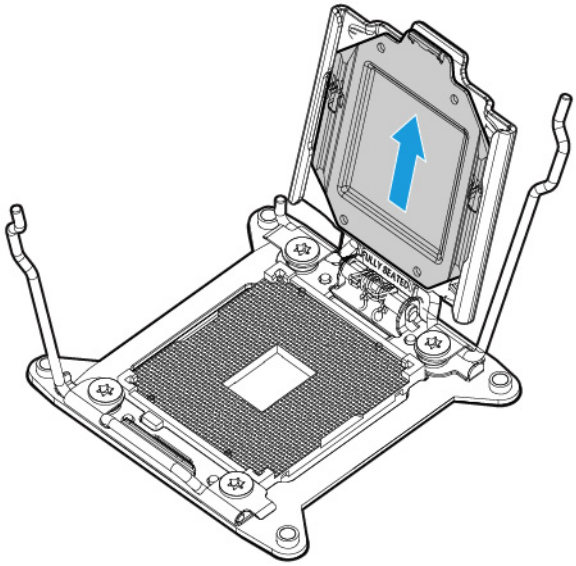
1. Install the system board.



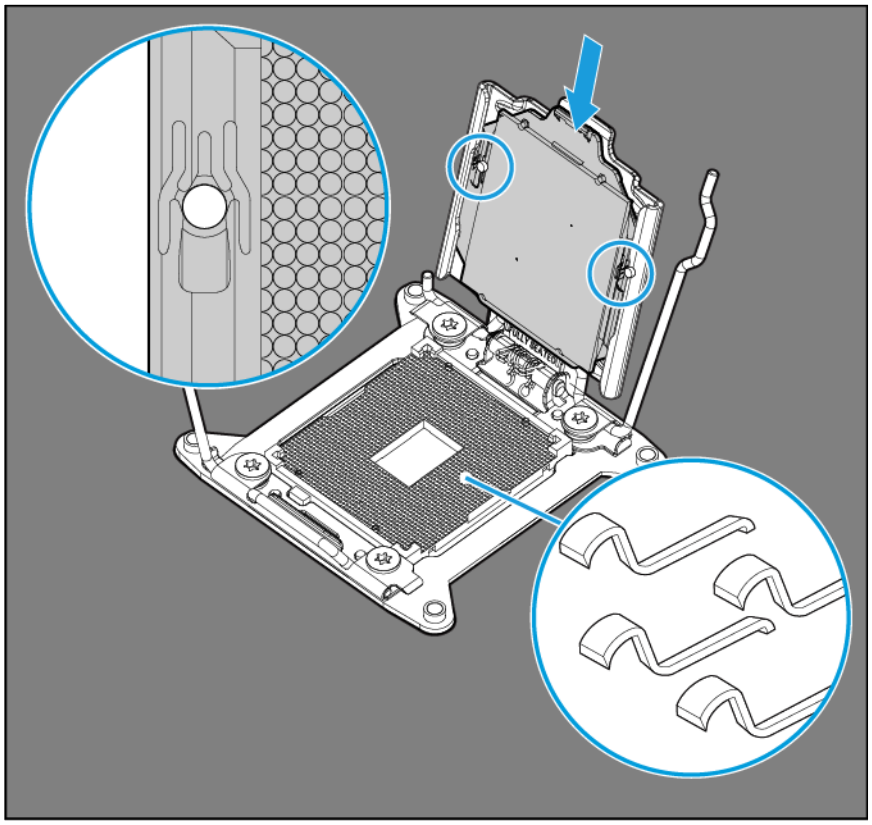
2. Open each of the processor locking levers in the order indicated, and then open the processor retaining bracket.



3. Remove the clear processor socket cover. Retain the processor socket cover for future use.



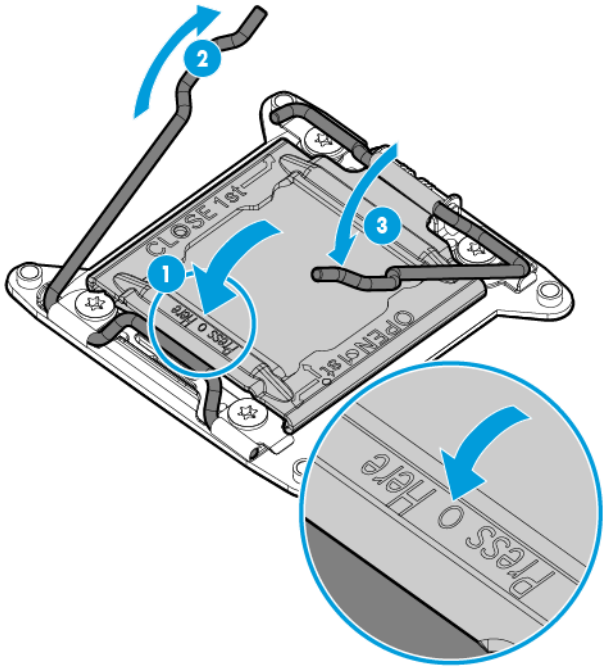
4. Install the processor. Verify that the processor is fully seated in the processor retaining bracket by visually inspecting the processor installation guides on either side of the processor. **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED.**



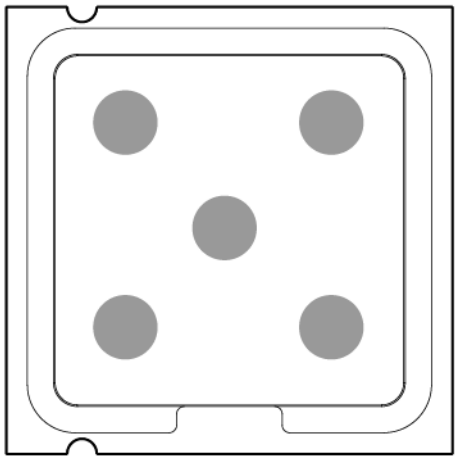
△ **CAUTION:** Do not press down on the processor. Pressing down on the processor may cause damage to the processor socket and the system board. Press only in the area indicated on the processor retaining bracket.

△ **CAUTION:** Close and hold down the processor cover socket while closing the processor locking levers. The levers should close without resistance. Forcing the levers closed can damage the processor and socket, requiring system board replacement.

5. Close the processor retaining bracket. When the processor is installed properly inside the processor retaining bracket, the processor retaining bracket clears the flange on the front of the socket.
6. Press and hold the processor retaining bracket in place, and then close each processor locking lever. Press only in the area indicated on the processor retaining bracket.

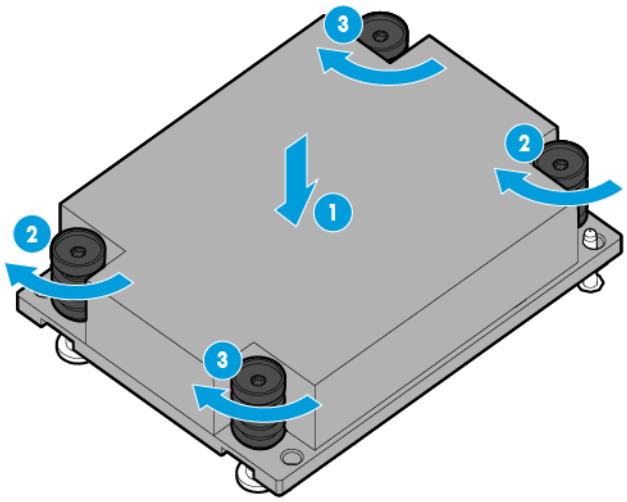


7. Install the processor socket cover on the failed system board.
8. Clean the old thermal grease from the heatsink and the top of the processor with the alcohol swab. Allow the alcohol to evaporate before continuing.
9. Apply all the grease to the top of the processor in the following pattern to ensure even distribution.



10. Install the heatsink:

a. Position the heatsink on the processor backplate.
b. Tighten one pair of diagonally opposite screws halfway, and then tighten the other pair of screws.
c. Finish the installation by completely tightening the screws in the same sequence.



11. Install all components removed from the failed system board.
12. Install the air baffle.
13. Install the bayonet board assembly into the node.
14. If any SATA or Mini-SAS cables are installed, secure the cables under the thin plastic covers along the side of the node tray.
15. Connect all cables disconnected from the failed system board.
16. Install any removed PCI riser cage assemblies and rear I/O blanks.
17. Install the node into the chassis.
18. Connect all peripheral cables to the nodes.
19. Press the Power On/Standby button.

    The node exits standby mode and applies full power to the system. The system power LED changes from amber to green.

Re-entering the server serial number and product ID

IMPORTANT: The serial number is located on the node serial number and iLO label pull tab. For more information, see "Node rear panel components (on page 100)."

After you replace the system board, you must re-enter the node serial number and the product ID.

1. During the node startup sequence, press the **F9** key to access RBSU.
2. Select the **Advanced Options** menu.
3. Select **Service Options**.
4. Select **Serial Number**. The following warning appears:

```
Warning: The serial number should ONLY be modified by qualified service
personnel. This value should always match the serial number located on the
chassis.
```

5. Press the **Enter** key to clear the warning.
6. Enter the serial number and press the **Enter** key.
7. Select **Product ID**. The following warning appears:

```
Warning: The Product ID should ONLY be modified by qualified service
personnel. This value should always match the Product ID located on the
chassis.
```

8. Enter the product ID and press the **Enter** key.
9. Press the **Esc** key to close the menu.
10. Press the **Esc** key to exit RBSU.
11. Press the **F10** key to confirm exiting RBSU. The node automatically reboots.

HP Trusted Platform Module

The TPM is not a customer-removable part.

> △ **CAUTION:** Any attempt to remove an installed TPM from the system board breaks or disfigures the TPM security rivet. Upon locating a broken or disfigured rivet on an installed TPM, administrators should consider the system compromised and take appropriate measures to ensure the integrity of the system data.

If you suspect a TPM board failure, leave the TPM installed and remove the system board. Contact an HP authorized service provider for a replacement system board and TPM board.

Troubleshooting

Troubleshooting resources

The *HP ProLiant Gen9 Troubleshooting Guide, Volume I: Troubleshooting* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance on ProLiant servers and server blades. To view the guide, select a language:

- English (http://www.hp.com/support/Gen9_TSG_en)
- French (http://www.hp.com/support/Gen9_TSG_fr)
- Spanish (http://www.hp.com/support/Gen9_TSG_es)
- German (http://www.hp.com/support/Gen9_TSG_de)
- Japanese (http://www.hp.com/support/Gen9_TSG_ja)
- Simplified Chinese (http://www.hp.com/support/Gen9_TSG_zh_cn)

The *HP ProLiant Gen9 Troubleshooting Guide, Volume II: Error Messages* provides a list of error messages and information to assist with interpreting and resolving error messages on ProLiant servers and server blades. To view the guide, select a language:

- English (http://www.hp.com/support/Gen9_EMG_en)
- French (http://www.hp.com/support/Gen9_EMG_fr)
- Spanish (http://www.hp.com/support/Gen9_EMG_es)
- German (http://www.hp.com/support/Gen9_EMG_de)
- Japanese (http://www.hp.com/support/Gen9_EMG_ja)
- Simplified Chinese (http://www.hp.com/support/Gen9_EMG_zh_cn)

Diagnostic tools

HP UEFI System Utilities

The HP UEFI System Utilities is embedded in the system ROM. The UEFI System Utilities enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options
- Enabling and disabling system features
- Displaying system information
- Selecting the primary boot controller
- Configuring memory options
- Selecting a language
- Launching other pre-boot environments such as the Embedded UEFI Shell and Intelligent Provisioning

For more information on the HP UEFI System Utilities, see the *HP UEFI System Utilities User Guide for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

Scan the QR code located at the bottom of the screen to access mobile-ready online help for the UEFI System Utilities and UEFI Shell. For on-screen help, press **F1**.

Using HP UEFI System Utilities

To use the System Utilities, use the following keys.

Action	**Key**
Access System Utilities	F9 during server POST
Navigate menus	Up and Down arrows
Select items	Enter
Save selections	F10
Access Help for a highlighted configuration option*	F1

*Scan the QR code on the screen to access online help for the UEFI System Utilities and UEFI Shell.

Default configuration settings are applied to the server at one of the following times:

- Upon the first system power-up
- After defaults have been restored

Default configuration settings are sufficient for typical server operations; however, you can modify configuration settings as needed. The system prompts you for access to the System Utilities each time the system is powered up.

Flexible boot control

This feature enables you to do the following:

- Add Boot Options
  - Browse all FAT16 and FAT32 file systems.
  - Select an X64 UEFI application with an .EFI extension to add as a new UEFI boot option, such as an OS boot loader or other UEFI application.

    The new boot option is appended to the boot order list. When you select a file, you are prompted to enter the boot option description (which is then displayed in the Boot menu), as well as any optional data to be passed to an .EFI application.
- Boot to System Utilities

  After pre-POST, the boot options screen appears. During this time, you can access the System Utilities by pressing the **F9** key.
- Choose between supported modes: Legacy BIOS Boot Mode or UEFI Boot Mode

IMPORTANT: If the default boot mode settings are different than the user defined settings, the system may not boot the OS installation if the defaults are restored. To avoid this issue, use the User Defined Defaults feature in UEFI System Utilities to override the factory default settings.

For more information, see the *HP UEFI System Utilities User Guide for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

Restoring and customizing configuration settings

You can reset all configuration settings to the factory default settings, or you can restore system default configuration settings, which are used instead of the factory default settings.

You can also configure default settings as necessary, and then save the configuration as the custom default configuration. When the system loads the default settings, it uses the custom default settings instead of the factory defaults.

Secure Boot configuration

Secure Boot is integrated in the UEFI specification on which the HP implementation of UEFI is based. Secure Boot is completely implemented in the BIOS and does not require special hardware. It ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards
- UEFI drivers loaded from mass storage devices
- Pre-boot UEFI shell applications
- OS UEFI boot loaders

Once enabled, only firmware components and operating systems with boot loaders that have an appropriate digital signature can execute during the boot process. Only operating systems that support Secure Boot and have an EFI boot loader signed with one of the authorized keys can boot when Secure Boot is enabled. For

more information about supported operating systems, see the *HP UEFI System Utilities and Shell Release Notes* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

A physically present user can customize the certificates embedded in the UEFI BIOS by adding/removing their own certificates.

Embedded UEFI shell

The system BIOS in all HP ProLiant Gen9 servers includes an Embedded UEFI Shell in the ROM. The UEFI Shell environment provides an API, a command line prompt, and a set of CLIs that allow scripting, file manipulation, and system information. These features enhance the capabilities of the UEFI System Utilities.

For more information, see the following documents:

- *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs)
- *UEFI Shell Specification* on the UEFI website (http://www.uefi.org/specifications)

Embedded Diagnostics option

The system BIOS in all HP ProLiant Gen9 servers includes an Embedded Diagnostics option in the ROM. The Embedded Diagnostics option can run comprehensive diagnostics of the server hardware, including processors, memory, drives, and other server components.

For more information on the Embedded Diagnostics option, see the *HP UEFI System Utilities User Guide for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

HP RESTful API support for UEFI

HP ProLiant Gen9 servers include support for a UEFI compliant System BIOS, along with UEFI System Utilities and Embedded UEFI Shell pre-boot environments. HP ProLiant Gen9 servers also support configuring the UEFI BIOS settings using the HP RESTful API, a management interface that server management tools can use to perform configuration, inventory, and monitoring of an HP ProLiant server. A REST client uses HTTPS operations to configure supported server settings, such as UEFI BIOS settings.

For more information about the HP RESTful API and the HP RESTful Interface Tool, see the HP website (http://www.hp.com/support/restfulinterface/docs).

Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the node serial number and the product ID.

1. During the node startup sequence, press the **F9** key to access UEFI System Utilities.
2. Select the **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Advanced Options** > **Advanced System ROM Options** > **Serial Number**, and then press the **Enter** key.
3. Enter the serial number and press the **Enter** key. The following message appears:

   ```
   The serial number should only be modified by qualified service personnel.
   This value should always match the serial number located on the chassis.
   ```
4. Press the **Enter** key to clear the warning.
5. Enter the serial number and press the **Enter** key.
6. Select **Product ID**. The following warning appears:

```
Warning: The Product ID should ONLY be modified by qualified service
personnel. This value should always match the Product ID located on the
chassis.
```

7. Enter the product ID and press the **Enter** key.
8. Press the **F10** key to confirm exiting System Utilities. The node automatically reboots.

HP ProLiant Pre-boot Health Summary

If the node will not start up, you can use iLO 4 to display diagnostic information on an external monitor. This feature is supported on nodes that support external video and have a UID button or an SUV connector. When power is available to the node but the node is not powered on, iLO runs on auxiliary power and can take control of the node video adapter to display the HP ProLiant Pre-boot Health Summary.

For additional information, see the following documents:

- *HP iLO 4 User Guide* — See the HP website (http://www.hp.com/go/ilo/docs).
- *HP ProLiant Gen9 Troubleshooting Guide, Volume I: Troubleshooting* — See "Troubleshooting Resources (on page 88)."

HP Insight Diagnostics

HP Insight Diagnostics is a proactive node management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify node installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, boot the node using Intelligent Provisioning.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective node management. Available in Microsoft Windows and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, see the HP website (http://www.hp.com/servers/diags). HP Insight Diagnostics Online Edition is also available in the SPP.

HP Insight Diagnostics survey functionality

HP Insight Diagnostics (on page 92) provides survey functionality that gathers critical hardware and software information on ProLiant nodes.

This functionality supports operating systems that are supported by the node. For operating systems supported by the node, see the HP website (http://www.hp.com/go/supportos).

If a significant change occurs between data-gathering intervals, the survey function marks the previous information and overwrites the survey data files to reflect the latest changes in the configuration.

Survey functionality is installed with every Intelligent Provisioning-assisted HP Insight Diagnostics installation, or it can be installed through the SPP.

Active Health System

HP Active Health System provides the following features:

- Combined diagnostics tools/scanners
- Always on, continuous monitoring for increased stability and shorter downtimes
- Rich configuration history
- Health and service alerts
- Easy export and upload to Service and Support

The HP Active Health System monitors and records changes in the server hardware and system configuration. The Active Health System assists in diagnosing problems and delivering rapid resolution if server failures occur.

The Active Health System collects the following types of data:

- Server model
- Serial number
- Processor model and speed
- Storage capacity and speed
- Memory capacity and speed
- Firmware/BIOS

HP Active Health System does not collect information about Active Health System users' operations, finances, customers, employees, partners, or data center, such as IP addresses, host names, user names, and passwords. HP Active Health System does not parse or change operating system data from third-party error event log activities, such as content created or passed through by the operating system.

The data that is collected is managed according to the HP Data Privacy policy. For more information see the HP website (http://www.hp.com/go/privacy).

The Active Health System, in conjunction with the system monitoring provided by Agentless Management or SNMP Pass-thru, provides continuous monitoring of hardware and configuration changes, system status, and service alerts for various server components.

The Agentless Management Service is available in the SPP, which can be downloaded from the HP website (http://www.hp.com/go/spp/download). The Active Health System log can be downloaded manually from iLO 4 or HP Intelligent Provisioning and sent to HP.

For more information, see the following documents:

- *HP iLO User Guide* on the HP website (http://www.hp.com/go/ilo/docs)
- *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/intelligentprovisioning/docs)

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM
- From within HP UEFI System Utilities (on page 89)
- From within the Embedded UEFI shell (on page 91)

- From within operating system-specific IML viewers:
  - For Windows: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO 4 web interface
- From within HP Insight Diagnostics (on page 92)

USB support

HP nodes support both USB 2.0 ports and USB 3.0 ports. Both types of ports support installing all types of USB devices (USB 1.0, USB 2.0, and USB 3.0), but may run at lower speeds in specific situations:

- USB 3.0 capable devices operate at USB 2.0 speeds when installed in a USB 2.0 port.
- When the node is configured for UEFI Boot Mode, HP provides legacy USB support in the pre-boot environment prior to the operating system loading for USB 1.0, USB 2.0 , and USB 3.0 speeds.
- When the node is configured for Legacy BIOS Boot Mode, HP provides legacy USB support in the pre-boot environment prior to the operating system loading for USB 1.0 and USB 2.0 speeds. While USB 3.0 ports can be used with all devices in Legacy BIOS Boot Mode, they are not available at USB 3.0 speeds in the pre-boot environment. Standard USB support (USB support from within the operating system) is provided by the OS through the appropriate USB device drivers. Support for USB 3.0 varies by operating system.

For maximum compatibility of USB 3.0 devices with all operating systems, HP provides a configuration setting for USB 3.0 Mode. Auto is the default setting. This setting impacts USB 3.0 devices when connected to USB 3.0 ports in the following manner:

- **Auto (default)**—If configured in Auto Mode, USB 3.0 capable devices operate at USB 2.0 speeds in the pre-boot environment and during boot. When a USB 3.0 capable OS USB driver loads, USB 3.0 devices transition to USB 3.0 speeds. This mode provides compatibility with operating systems that do not support USB 3.0 while still allowing USB 3.0 devices to operate at USB 3.0 speeds with state-of-the art operating systems.
- **Enabled**—If Enabled, USB 3.0 capable devices operate at USB 3.0 speeds at all times (including the pre-boot environment) when in UEFI Boot Mode. This mode should not be used with operating systems that do not support USB 3.0. If operating in Legacy Boot BIOS Mode, the USB 3.0 ports cannot function in the pre-boot environment and are not bootable.
- **Disabled**—If configured for Disabled, USB 3.0 capable devices function at USB 2.0 speeds at all times.

The pre-OS behavior of the USB ports is configurable in System Utilities, so that the user can change the default operation of the USB ports. For more information, see the *HP UEFI System Utilities User Guide for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

External USB functionality

HP provides external USB support to enable local connection of USB devices for node administration, configuration, and diagnostic procedures.

For additional security, external USB functionality can be disabled through USB options in UEFI System Utilities.

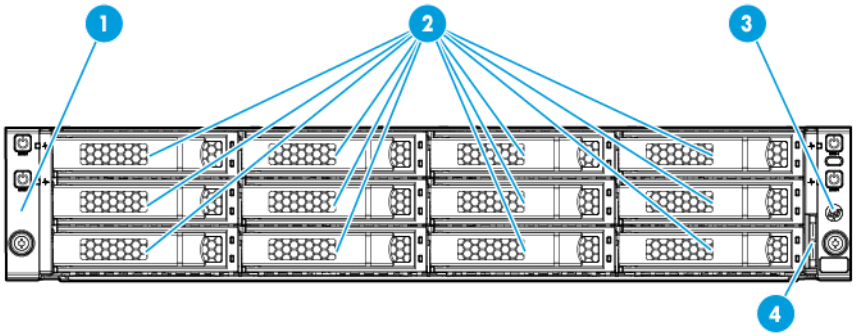
Internal USB functionality

An internal USB connector is available for use with security key devices and USB drive keys. This solution provides for use of a permanent USB key installed in the internal connector, avoiding issues of clearance on the front of the rack and physical access to secure data.

Component identification

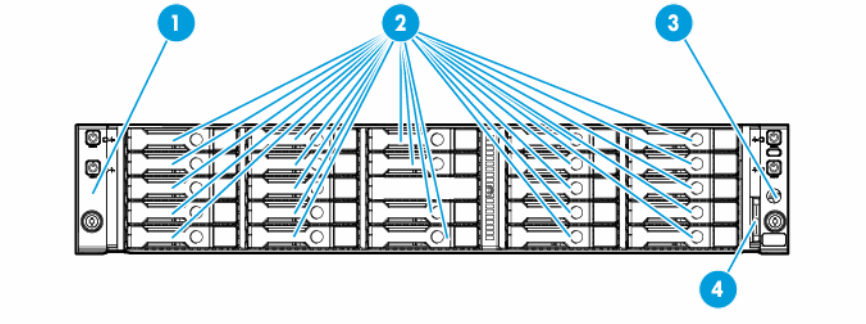
Chassis front panel components

- HP Apollo r2200 Chassis



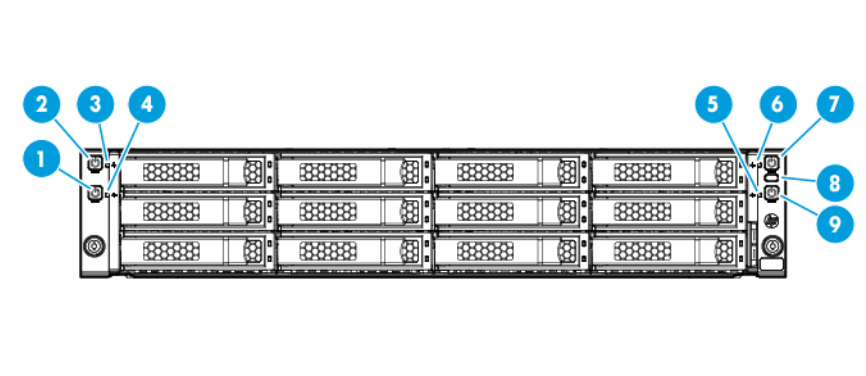
Item	Description
1	Left bezel ear
2	Low-profile LFF hot-plug drives
3	Right bezel ear
4	Chassis serial label pull tab

- HP Apollo r2600 Chassis



Item	Description
1	Left bezel ear
2	SFF HP SmartDrives
3	Right bezel ear
4	Chassis serial label pull tab

Chassis front panel LEDs and buttons



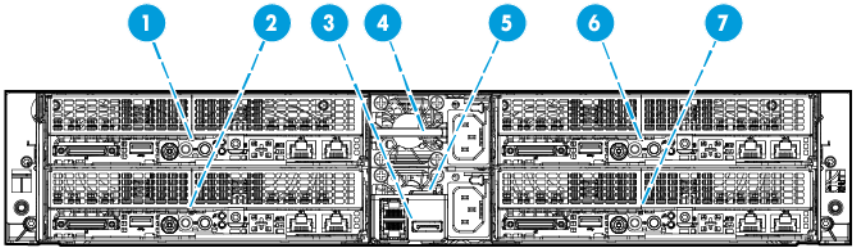
Item	Description	Status
1	Power On/Standby button and system power LED (Node 1)*	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present**
2	Power On/Standby button and system power LED (Node 2)*	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present**
3	Health LED (Node 2)*	Solid green = Normal Flashing amber = System degraded Flashing red = System critical†
4	Health LED (Node 1)*	Solid green = Normal Flashing amber = System degraded Flashing red = System critical†
5	Health LED (Node 3)*	Solid green = Normal Flashing amber = System degraded Flashing red = System critical†
6	Health LED (Node 4)*	Solid green = Normal Flashing amber = System degraded Flashing red = System critical†
7	Power On/Standby button and system power LED (Node 4)*	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present**
8	UID button/LED*	Solid blue = Activated Flashing blue: • 1 Hz/cycle per sec = Remote management or firmware upgrade in progress • 4 Hz/cycle per sec = iLO manual soft reboot sequence initiated • 8 Hz/cycle per sec = iLO manual hard reboot sequence in progress Off = Deactivated

Item	Description	Status
9	Power On/Standby button and system power LED (Node 3)*	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present**

* When the LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see "Power fault LEDs (on page 103)."
** Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the front I/O cable is disconnected.
† If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

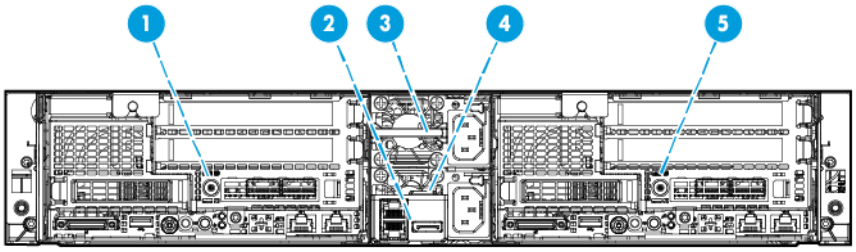
Chassis rear panel components

- Four 1U nodes



Item	Description
1	Node 4
2	Node 3
3	RCM module
4	Power Supply 2
5	Power Supply 1
6	Node 2
7	Node 1

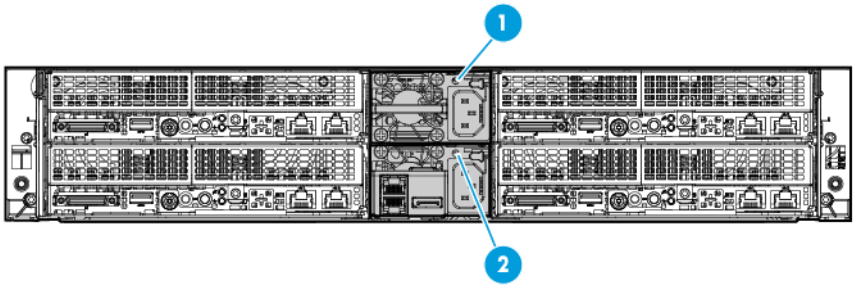
- Two 2U nodes



Item	Description
1	Node 3

Item	Description
2	RCM module
3	Power Supply 2
4	Power Supply 1
5	Node 1

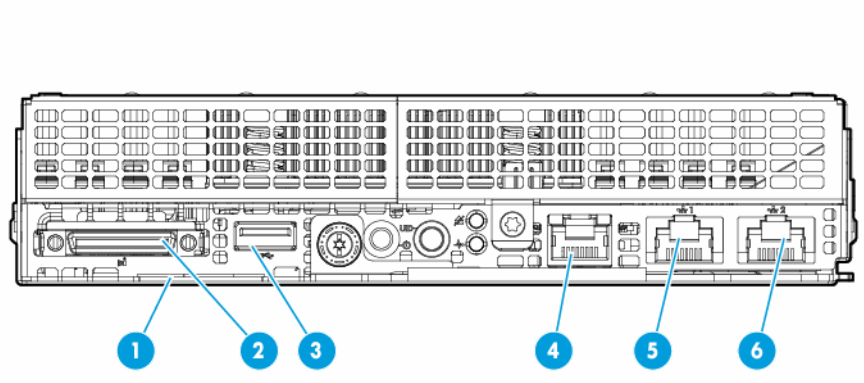
Chassis rear panel LEDs



Item	Description	Status
1	Power supply 2 LED	Solid green = Normal Off = One or more of the following conditions exists: • Power is unavailable • Power supply failed • Power supply is in standby mode • Power supply error
2	Power supply 1 LED	Solid green = Normal Off = One or more of the following conditions exists: • Power is unavailable • Power supply failed • Power supply is in standby mode • Power supply error

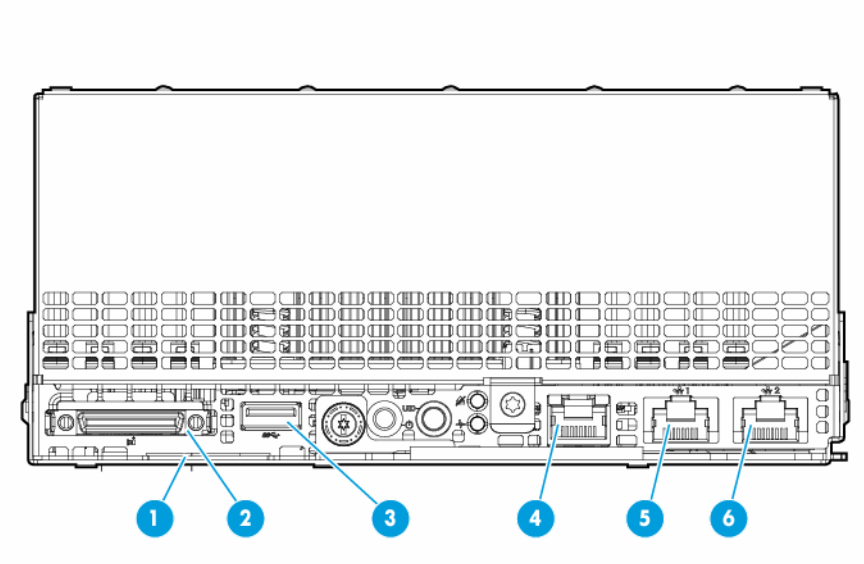
Node rear panel components

- 1U node rear panel components



Item	Description
1	Node serial number and iLO label pull tab
2	SUV connector
3	USB 3.0 connector
4	Dedicated iLO port (optional)
5	NIC connector 1
6	NIC connector 2

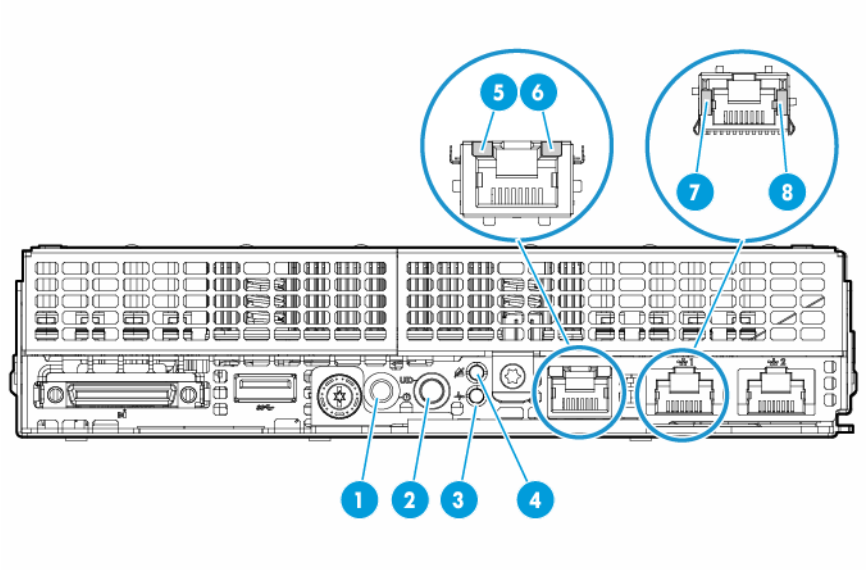
- 2U node rear panel components



Item	Description
1	Node serial number and iLO label pull tab
2	SUV connector
3	USB 3.0 connector
4	Dedicated iLO port (optional)
5	NIC connector 1
6	NIC connector 2

Node rear panel LEDs and buttons

- 1U node

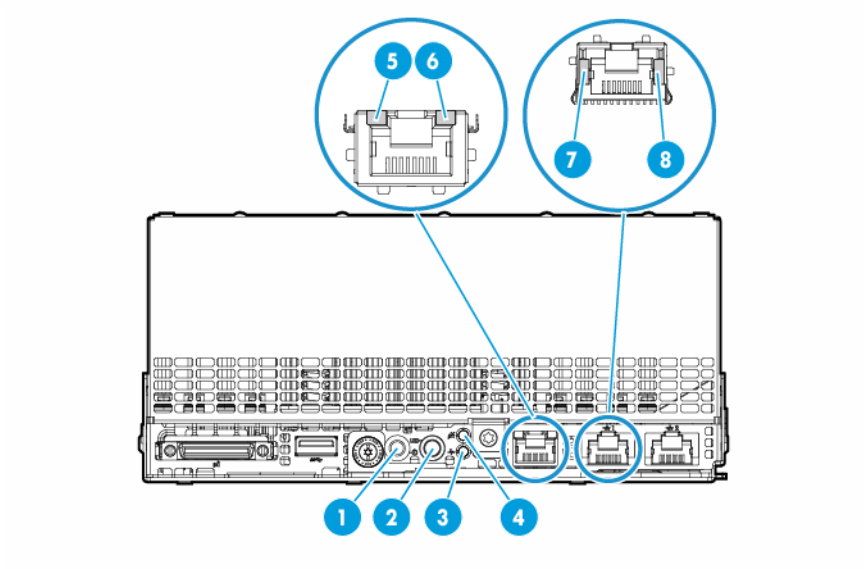


Item	Description	Status
1	Power button/LED*	Solid green = System on Flashing green (1 Hz/cycle per sec) = Performing power on sequence Solid amber = System in standby Off = No power present**
2	UID button/LED*	Solid blue = Activated Flashing blue: • 1 Hz/cycle per sec = Remote management or firmware upgrade in progress • 4 Hz/cycle per sec = iLO manual soft reboot sequence initiated • 8 Hz/cycle per sec = iLO manual hard reboot sequence in progress Off = Deactivated
3	Health LED*	Solid green = Normal Flashing green (1 Hz/cycle per sec) = iLO is rebooting Flashing amber = System degraded Flashing red (1 Hz/cycle per sec) = System critical†
4	Do not remove LED	Flashing white (1 Hz/cycle per sec) = Do not remove the node. Removing the node may terminate the current operation and cause data loss. Off = The node can be removed.
5	iLO activity LED	Green or flashing green = Network activity Off = No network activity

Item	Description	Status
6	iLO link LED	Green = Linked to network Off = No network connection
7	NIC link LED*	Green = Linked to network Off = No network connection
8	NIC activity LED*	Green or flashing green = Network activity Off = No network activity

* When the LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see "Power fault LEDs (on page 103)."
** Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the front I/O cable is disconnected.
† If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

- 2U node



Item	Description	Status
1	Power button/LED*	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present**
2	UID button/LED*	Solid blue = Activated Flashing blue: • 1 Hz/cycle per sec = Remote management or firmware upgrade in progress • 4 Hz/cycle per sec = iLO manual soft reboot sequence initiated • 8 Hz/cycle per sec = iLO manual hard reboot sequence in progress Off = Deactivated
3	Health LED*	Solid green = Normal Flashing amber = System degraded Flashing red = System critical†

Item	Description	Status
4	Do not remove LED	Flashing white (1 Hz/cycle per sec) = Do not remove the node. Removing the node may terminate the current operation and cause data loss. Off = The node can be removed.
5	iLO activity LED	Green or flashing green = Network activity Off = No network activity
6	iLO link LED	Green = Linked to network Off = No network connection
7	NIC link LED*	Green = Linked to network Off = No network connection
8	NIC activity LED*	Green or flashing green = Network activity Off = No network activity

* When the LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see "Power fault LEDs (on page 103)."
** Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the front I/O cable is disconnected.
† If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

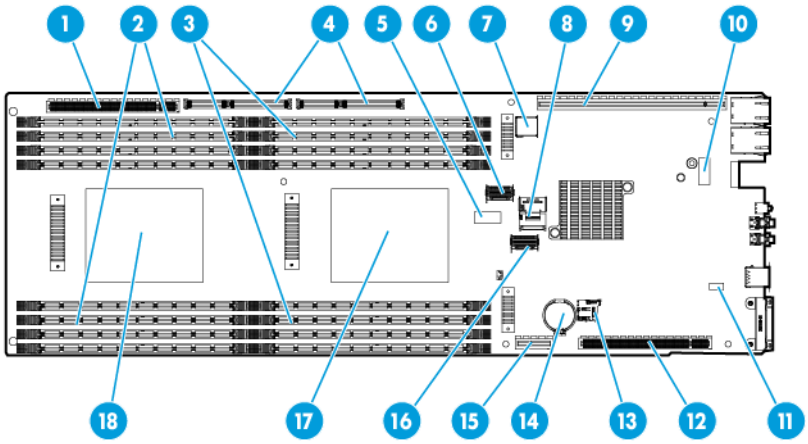
Power fault LEDs

The following table provides a list of power fault LEDs, and the subsystems that are affected. Not all power faults are used by all servers.

Subsystem	LED behavior
System board	1 flash
Processor	2 flashes
Memory	3 flashes
Riser board PCIe slots	4 flashes
FlexibleLOM	5 flashes
Removable HP Flexible Smart Array controller/Smart SAS HBA controller	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

System board components

NOTE: HP ProLiant XL170r and XL190r Gen9 Server Nodes share the same system board.



Item	Description
1	Bayonet board slot
2	DIMMs for processor 2
3	DIMMs for processor 1
4	PCIe x40 riser board connector*
5	System maintenance switch
6	Mini-SAS connector 1 (SATA x4)
7	Internal USB 3.0 connector
8	Mini-SAS connector 2 (SATA x4)
9	PCIe x24 riser board connector*
10	Dedicated iLO port connector
11	NMI header
12	PCIe x16 riser board connector*
13	microSD slot
14	System battery
15	M.2 SSD riser connector
16	TPM connector
17	Processor 1
18	Processor 2

* For more information on the riser board slots supported by the onboard PCI riser connectors, see "PCIe riser board slot definitions (on page 114)."

System maintenance switch

Position	Default	Function
S1	Off	Off = iLO 4 security is enabled. On = iLO 4 security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved

Position	Default	Function
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function On = ROM reads system configuration as invalid.
S7	Off	Off = Set default boot mode to UEFI. On = Set default boot mode to legacy.
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved
S11	—	Reserved
S12	—	Reserved

To access the redundant ROM, set S1, S5, and S6 to on.

When the system maintenance switch position 6 is set to the On position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM.

CAUTION: Clearing CMOS and/or NVRAM deletes configuration information. Be sure to properly configure the server or data loss could occur.

IMPORTANT: Before using the S7 switch to change to Legacy BIOS Boot Mode, be sure the HP Dynamic Smart Array B140i Controller is disabled. Do not use the B140i controller when the server is in Legacy BIOS Boot Mode.

NMI functionality

An NMI crash dump creates a crash dump log before resetting a system which is not responding.

Crash dump log analysis is an essential part of diagnosing reliability problems, such as failures of operating systems, device drivers, and applications. Many crashes freeze a system, and the only available action for administrators is to restart the system. Resetting the system erases any information which could support problem analysis, but the NMI feature preserves that information by performing a memory dump before a system reset.

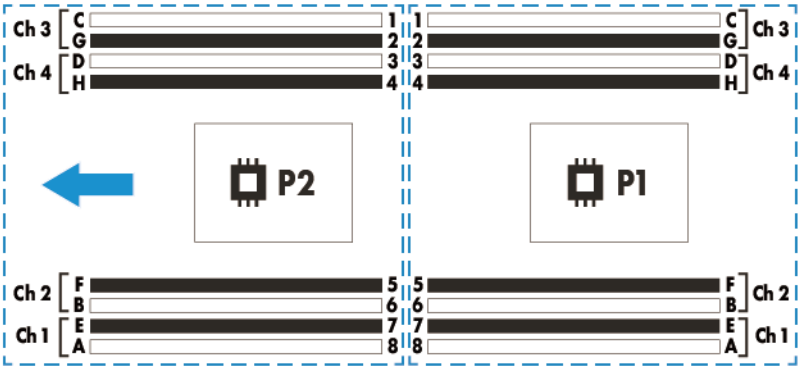
To force the system to invoke the NMI handler and generate a crash dump log, do one of the following:

- Use the iLO Virtual NMI feature.
- Short the NMI header ("System board components" on page 103).

For more information, see the HP website (http://www.hp.com/support/NMI).

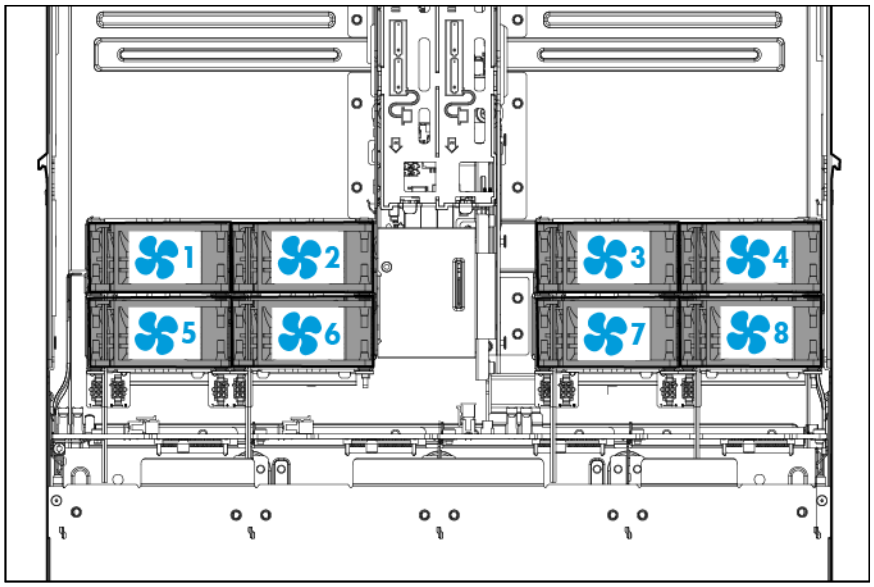
DIMM slot locations

DIMM slots are numbered sequentially (1 through 8) for each processor. The supported AMP modes use the letter assignments for population guidelines.



NOTE: The arrow indicates the front of the chassis.

Fan locations



Drive numbering

△ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the chassis unless all bays are populated with a component or a blank.

NOTE: A storage cable option must be installed in a node for the node to correspond to drives in the chassis.

HP Apollo r2200 Chassis drive numbering

One 1U node corresponds to a maximum of three low-profile LFF hot-plug drives:

- Node 1 corresponds to drives 1-1 through 1-3.
- Node 2 corresponds to drives 2-1 through 2-3.
- Node 3 corresponds to drives 3-1 through 3-3.
- Node 4 corresponds to drives 4-1 through 4-3.

One 2U node corresponds to a maximum of six low-profile LFF hot-plug drives:

- Node 1 corresponds to drives 1-1 through 2-3.
- Node 3 corresponds to drives 3-1 through 4-3.

HP Apollo r2600 Chassis drive numbering

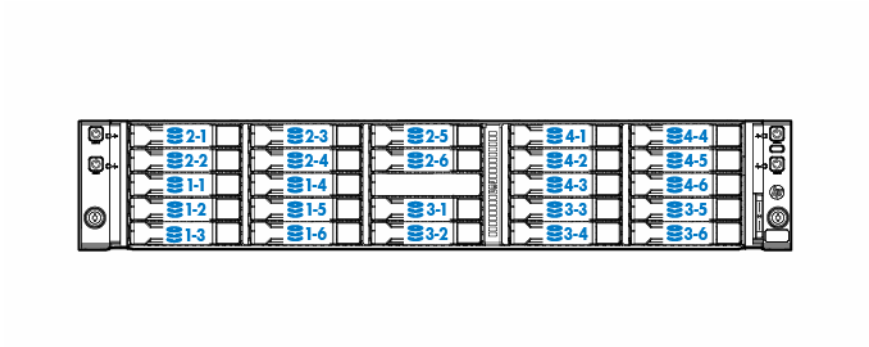
One 1U node corresponds to a maximum of six SFF HP SmartDrives.

- Node 1 corresponds to drives 1-1 through 1-6.
- Node 2 corresponds to drives 2-1 through 2-6.
- Node 3 corresponds to drives 3-1 through 3-6.
- Node 4 corresponds to drives 4-1 through 4-6.

If a P840 Smart Array controller is installed, one 2U node corresponds to a maximum of twelve SFF HP SmartDrives.

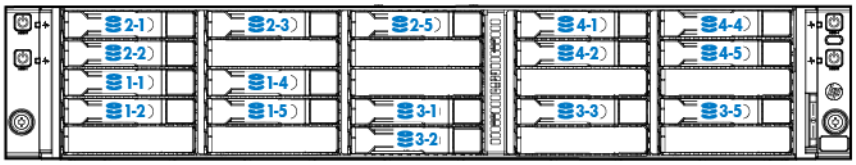
- Node 1 corresponds to drives 1-1 through 2-6.

- Node 3 corresponds to drives 3-1 through 4-6.



One 2U node corresponds to a maximum of eight SFF HP SmartDrives if using the HP Dynamic Smart Array B140i Controller, HP H240 Host Bus Adapter, or HP P440 Smart Array Controller.

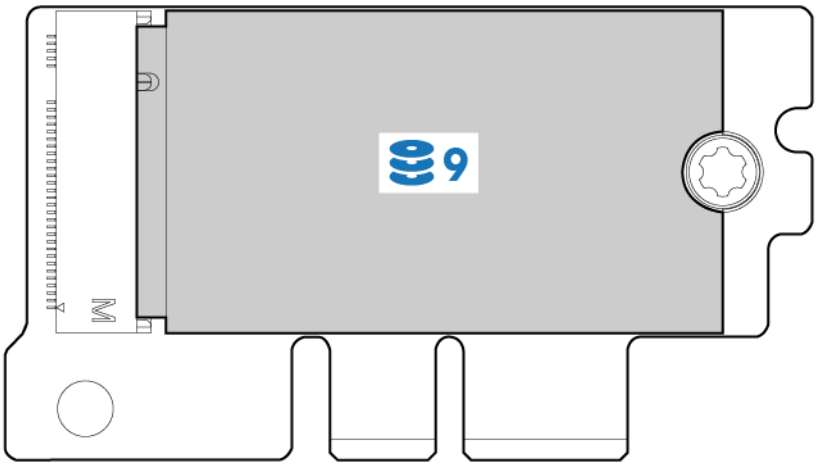
- Node 1 corresponds to drives 1-1, 1-2, 1-4, 1-5, 2-1, 2-2, 2-3 and 2-5.
- Node 3 corresponds to drives 3-1, 3-2, 3-3, 3-5, 4-1, 4-2, 4-4 and 4-5.



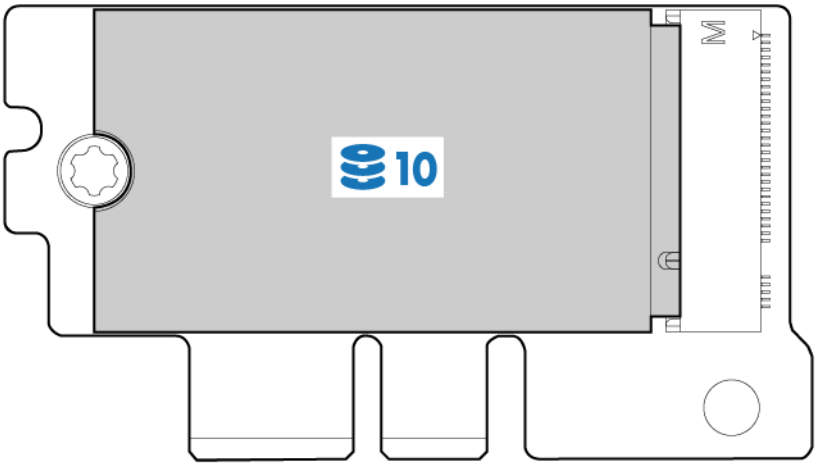
For more information on installing a storage controller, see “Controller options” in the user guide.

M.2 SATA SSD bay numbering

- Bay 9



- Bay 10

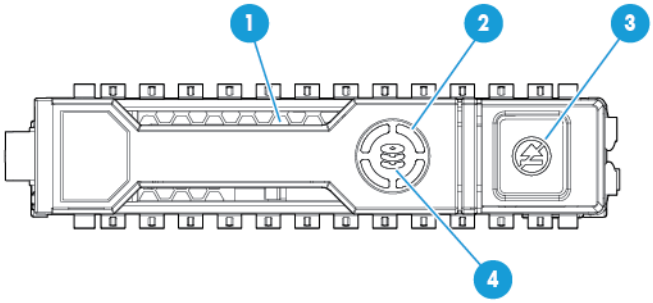


Hot-plug drive LED definitions

HP SmartDrive LED definitions

HP SmartDrives are the latest HP drive technology, and they are supported beginning with ProLiant Gen8 servers and server blades. The HP SmartDrive is not supported on earlier generation servers and server blades. Identify an HP SmartDrive by its carrier, shown in the following illustration.

When a drive is configured as a part of an array and connected to a powered-up controller, the drive LEDs indicate the condition of the drive.



Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity
3	Do not remove	Solid white	Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.
		Off	Removing the drive does not cause a logical drive to fail.
4	Drive status	Solid green	The drive is a member of one or more logical drives.
		Flashing green	The drive is rebuilding or performing a RAID migration, strip size migration, capacity expansion, or logical drive extension, or is erasing.
		Flashing amber/green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.

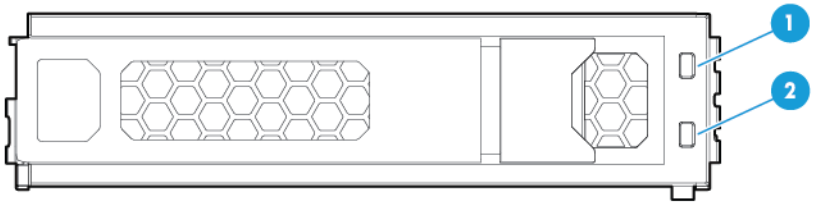
The blue Locate LED is behind the release lever and is visible when illuminated.

IMPORTANT: The HP Dynamic Smart Array B140i Controller is only available in UEFI Boot Mode. It cannot be enabled in Legacy BIOS Boot Mode. If the B140i controller is disabled, drives connected to the system board Mini-SAS connectors operate in AHCI or Legacy mode. Under this condition:

- The drives cannot be a part of a hardware RAID or a logical drive.
- The Locate, Drive status, and Do not remove LEDs of the affected drives are disabled.

Use BIOS/Platform Configuration (RBSU) in the UEFI System Utilities ("HP UEFI System Utilities" on page 89) to enable or disable the B140i controller (System Configuration → BIOS/Platform Configuration (RBSU) → System Options → SATA Controller Options → Embedded SATA Configuration).

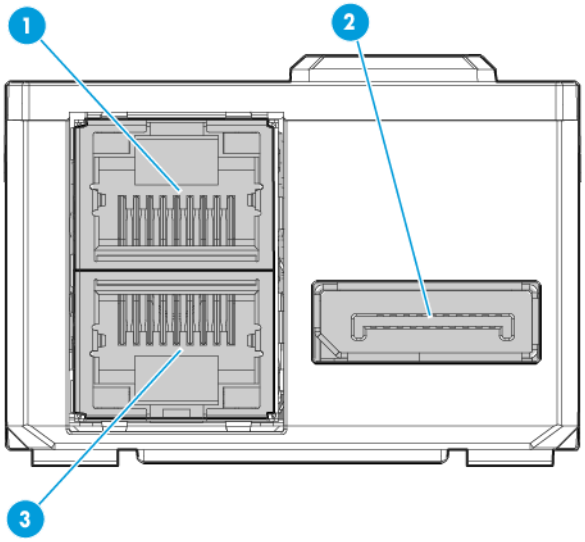
Low-profile LFF hot-plug drive LED definitions



Item	Definition
1	Fault/UID (amber/blue)
2	Online/Activity (green)

Online/activity LED (green)	Fault/UID LED (amber/blue)	Definition
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, Flashing (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.
Flashing (1 Hz)	Amber, Flashing (1 Hz)	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing (1 Hz)	Off	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is rebuilding, erasing, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing (4 Hz)	Amber, Flashing (1 Hz)	The drive is active, but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Flashing (4 Hz)	Off	The drive is active, and it is operating normally.
Off	Steadily amber	A critical fault condition has been identified for this drive, and the controller has placed it offline. Replace the drive as soon as possible.
Off	Amber, Flashing (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

RCM module components

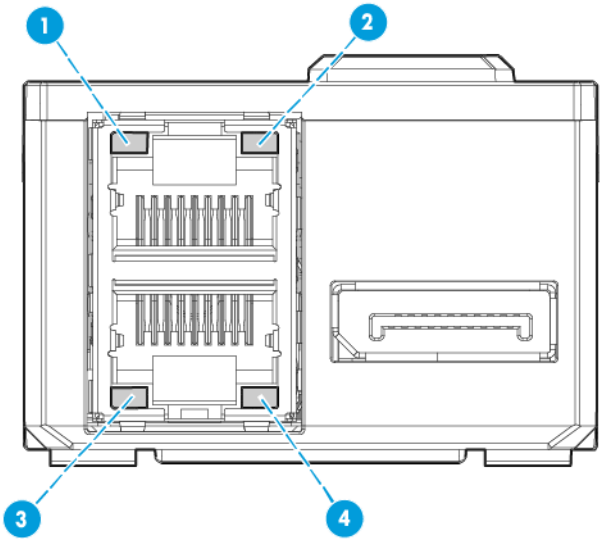


Item	Description
1	iLO connector
2	HP APM 2.0 connector
3	iLO connector

IMPORTANT: Use either the HP APM port or an iLO port to connect to a network. Having both ports connected at the same time results in a loopback condition.

IMPORTANT: Do not connect both iLO ports to the network at the same time. Only one iLO port can be connected to the network, while the other iLO port can be used only as a connection to a second enclosure. Having both ports connected at the same time results in a loopback condition.

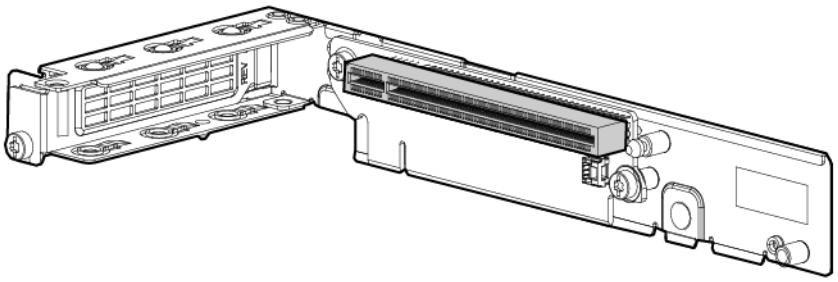
RCM module LEDs



Item	Description
1	iLO activity LED Green or flashing green = Network activity Off = No network activity
2	iLO link LED Green = Linked to network Off = No network connection
3	iLO link LED Green = Linked to network Off = No network connection
4	iLO activity LED Green or flashing green = Network activity Off = No network activity

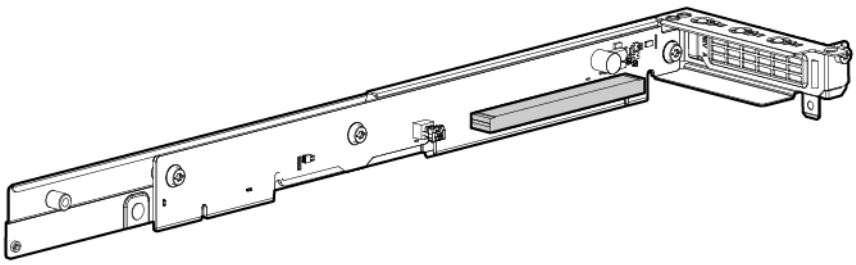
PCIe riser board slot definitions

- Single-slot left PCI riser cage assembly



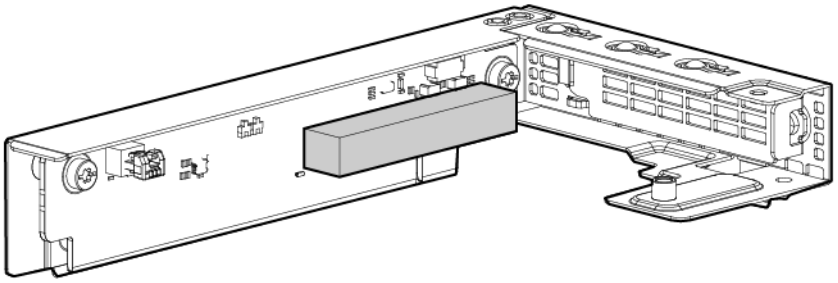
Form factor	Slot number	Slot description
Low-profile PCIe card	1	PCIe3 x16 (16, 8, 4, 1) for Processor 1

- Single-slot 1U node right PCI riser cage assembly



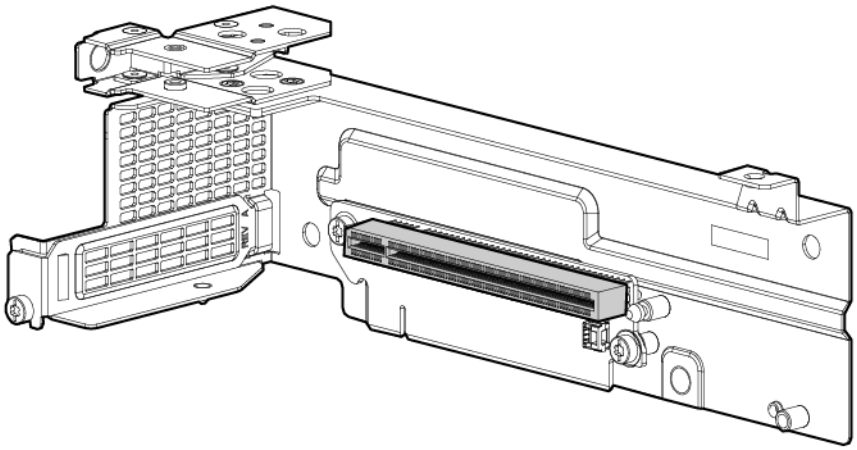
Form factor	Slot number	Slot description
Low-profile PCIe NIC card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 2

- FlexibleLOM 1U node riser cage assembly



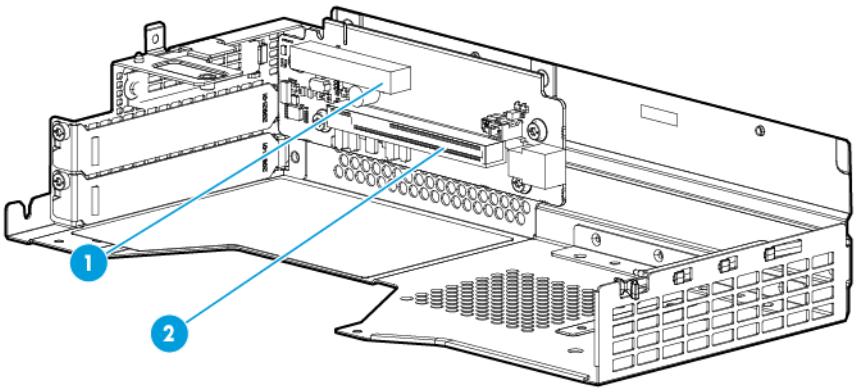
Form factor	Slot number	Slot description
FlexibleLOM	FlexibleLOM slot	PCIe3 x8 for Processor 1

- Single-slot 2U node PCI riser cage assembly



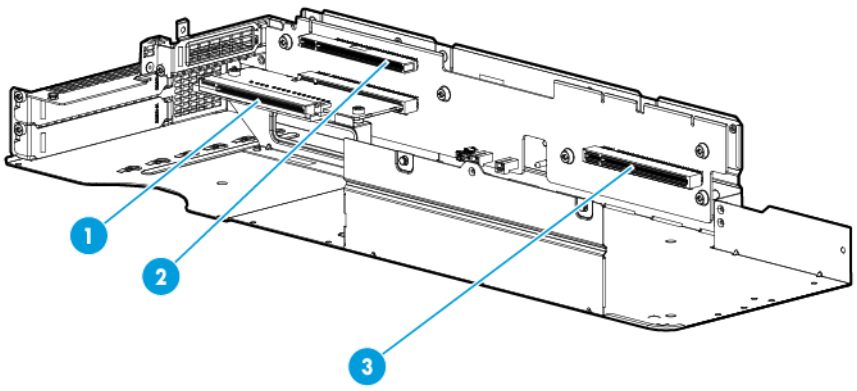
Form factor	Slot number	Slot description
Low-profile PCIe card	1	PCIe3 x16 (16, 8, 4, 1) for Processor 1

- FlexibleLOM 2U node riser cage assembly



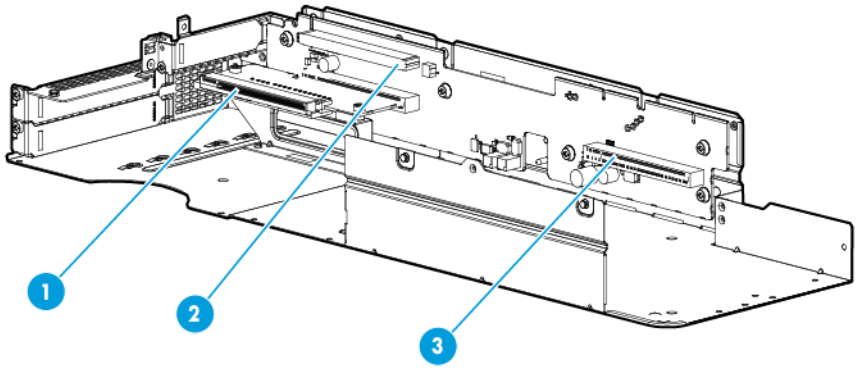
Item	Form factor	Slot number	Slot description
1	FlexibleLOM	FlexibleLOM slot	PCIe3 x8 for Processor 1
2	Storage controller or graphic card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 1

- Three-slot PCI riser cage assembly



Item	Form factor	Slot number	Slot description
1	Storage controller or graphic card	3	PCIe3 x16 (16, 8, 4, 1) for Processor 1
2	Low-profile PCIe NIC card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 2
3	Graphic card	4	PCIe3 x16 (16, 8, 4, 1) for Processor 2

- Three-slot GPU-direct PCI riser cage assembly

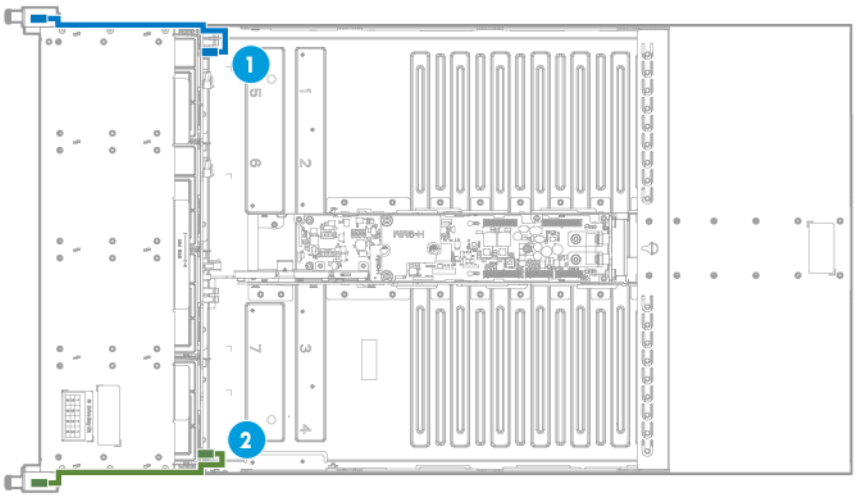


Item	Form factor	Slot number	Slot description
1	Storage controller or graphic card	3	PCIe3 x16 (16, 8, 4, 1) for Processor 2
2	Low-profile PCIe NIC card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 2
3	Graphic card	4	PCIe3 x16 (16, 8, 4, 1) for Processor 2

Cabling

Chassis cabling

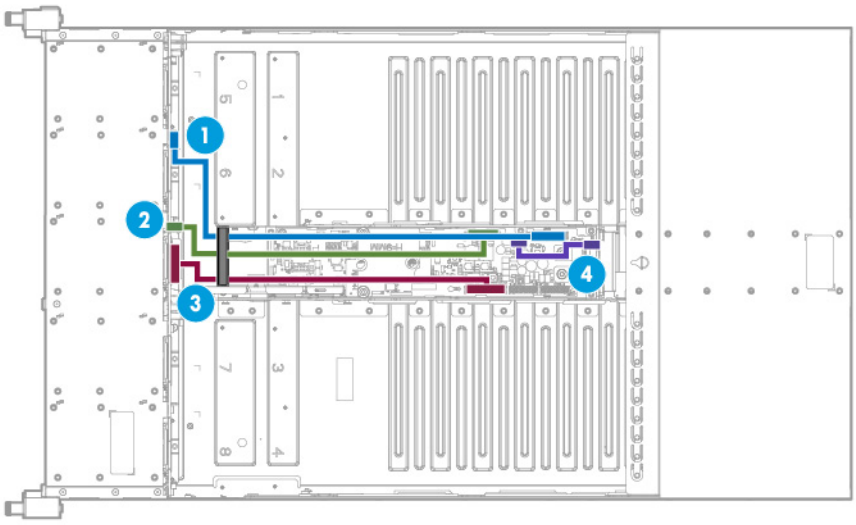
Front I/O cabling



Item	Description
1	Left front I/O cable
2	Right front I/O cable

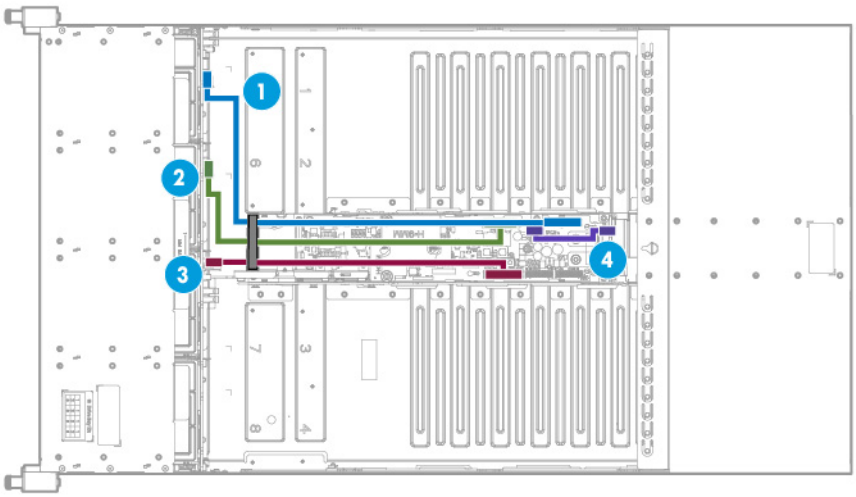
Drive backplane power cabling

HP Apollo r2600 Chassis



Item	Description
1	Power cable for Node 1 and Node 2
2	Power cable for drives
3	Power cable for Node 3 and Node 4
4	PDB pass-through cable

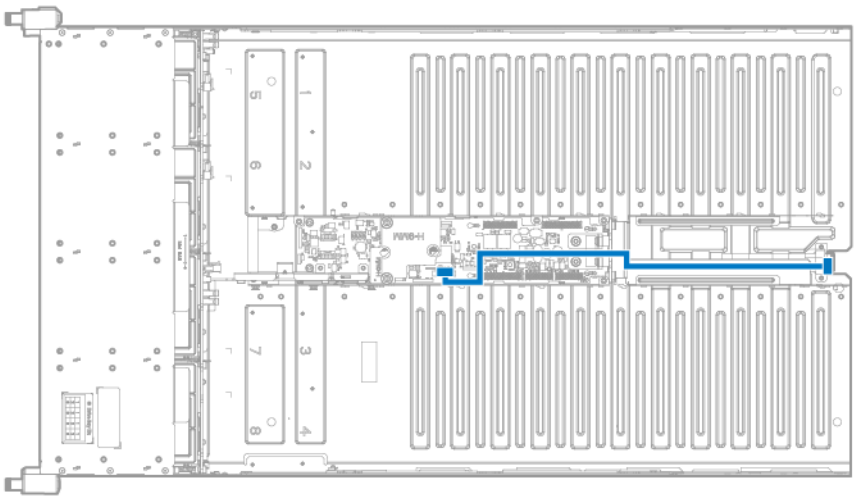
HP Apollo r2200 Chassis



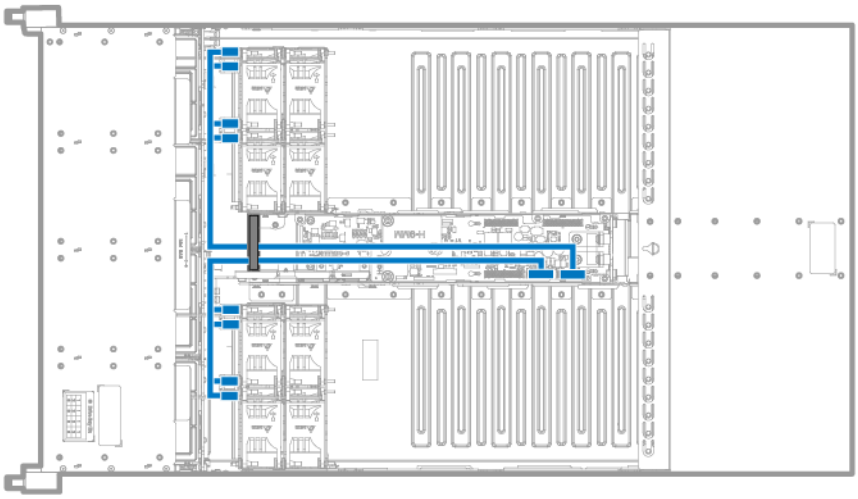
Item	Description
1	Power cable for Node 1 and Node 2

Item	Description
2	Power cable for drives
3	Power cable for Node 3 and Node 4
4	PDB pass-through cable

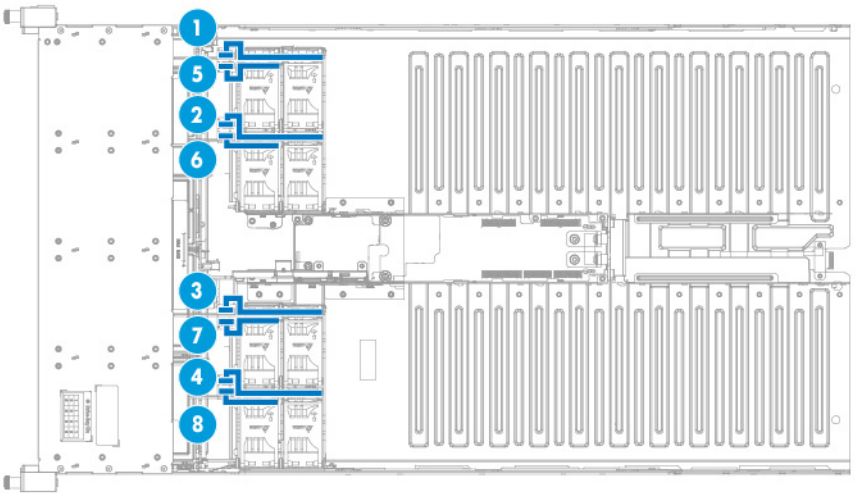
RCM 2.0 cabling



Fan power cabling

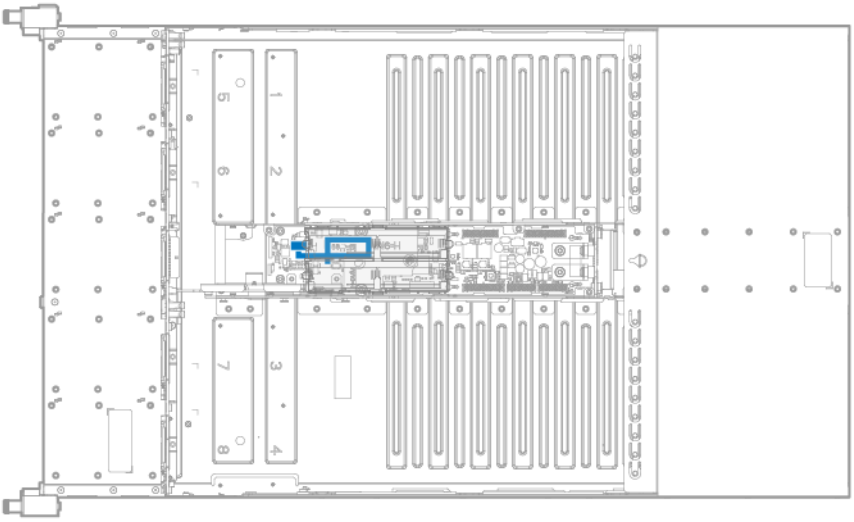


Fan cabling



Item	Description
1	Fan 1 cable
2	Fan 2 cable
3	Fan 3 cable
4	Fan 4 cable
5	Fan 5 cable
6	Fan 6 cable
7	Fan 7 cable
8	Fan 8 cable

HP Smart Storage Battery cabling



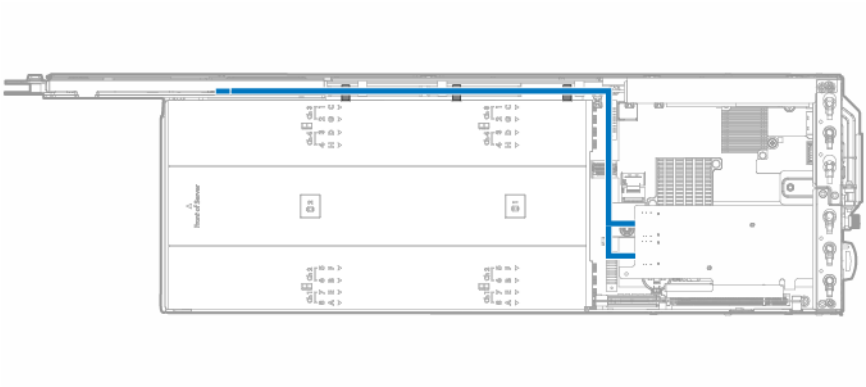
Node cabling

Storage cabling

B140i 1U node SATA cabling

B140i 2U node SATA cabling

Mini-SAS H240 1U node cabling

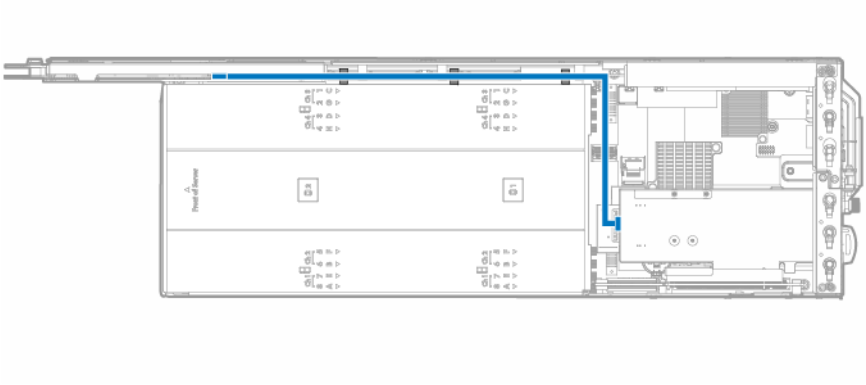


Mini-SAS H240 2U node cabling

Mini-SAS P440 2U node cabling

Mini-SAS P440/P840 cabling

HP P440 Smart Array controller installed in a 1U node

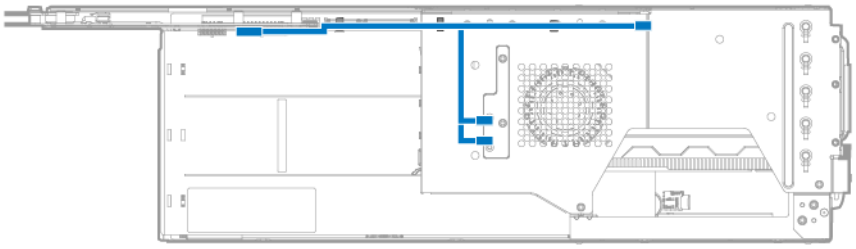


HP P840 Smart Array controller installed in a 2U node

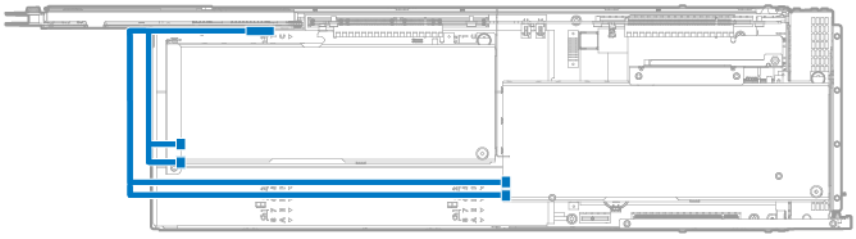
Graphic card/ coprocessor cabling

NOTE: Graphic card/ coprocessor cabling may vary slightly depending on the type of graphic/ coprocessor installed.

Single graphic card/ coprocessor power cabling

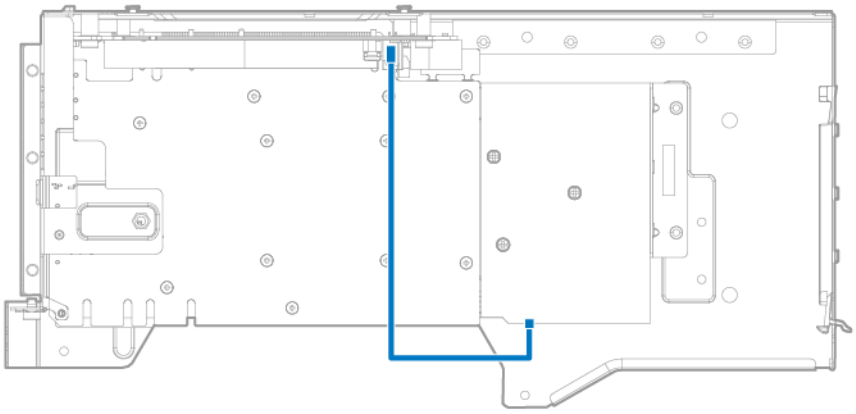


Dual graphic card/ coprocessor power cabling

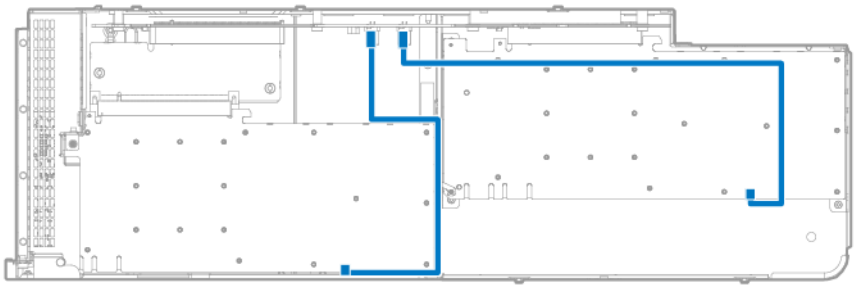


2-pin graphic card adapter cabling (for NVIDIA K40 GPUs only)

FlexibleLOM 2U node riser cage assembly



Three-slot PCI riser cage assembly and three-slot GPU-direct PCI riser cage assembly

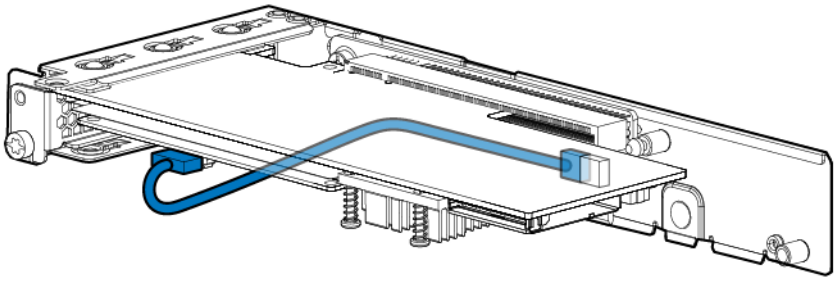


FBWC module cabling

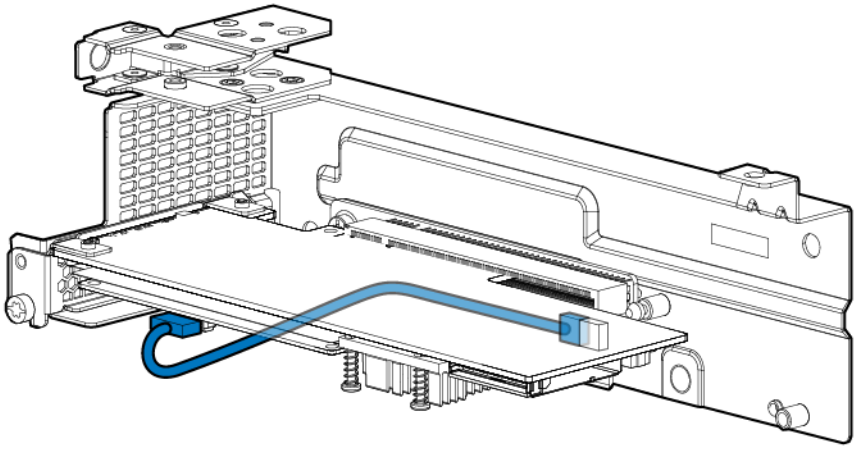
The FBWC solution is a separately purchased option. This node only supports FBWC module installation when an HP Smart Array P-Series controller is installed.

Depending on the controller option installed, the actual storage controller connectors might look different from what is shown in this section.

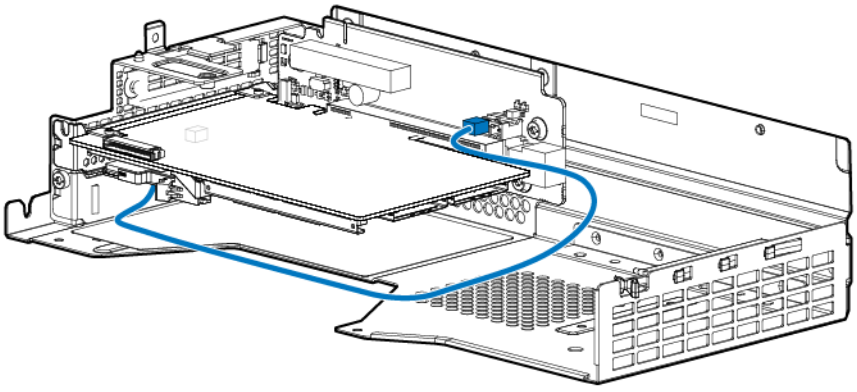
HP P440 Smart Array controller in a single-slot left PCI riser cage assembly



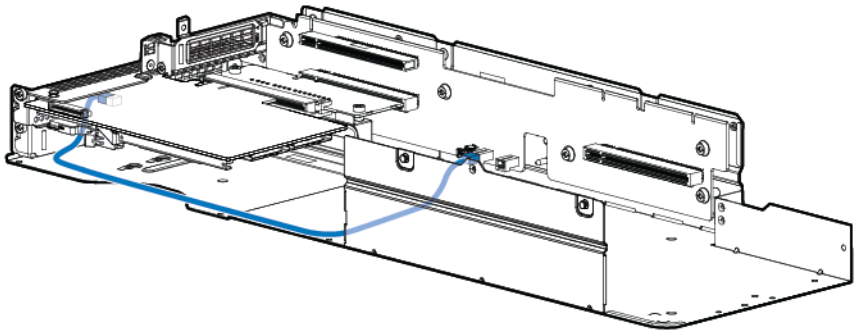
HP P440 Smart Array controller in a single-slot 2U node PCI riser cage assembly



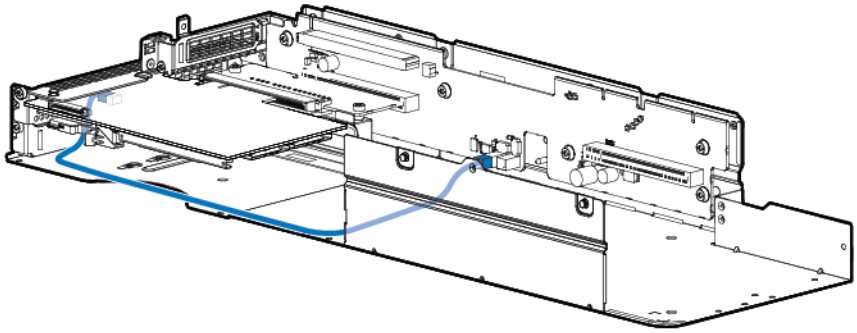
HP P840 Smart Array controller in a FlexibleLOM 2U node riser cage assembly



HP P840 Smart Array controller in a three-slot PCI riser cage assembly



HP P840 Smart Array controller in a three-slot GPU-direct PCI riser cage assembly



Specifications

Environmental specifications

Specification	Value
Temperature range*	—
Operating	10°C to 35°C (50°F to 95°F)
Nonoperating	-30°C to 60°C (-22°F to 140°F)
Relative humidity (noncondensing)	—
Operating	Minimum to be the higher (more moisture) of -12°C (10.4°F) dew point or 8% relative humidity Maximum to be 24°C (75.2°F) dew point or 90% relative humidity
Nonoperating	5% to 95% 38.7°C (101.7°F), maximum wet bulb temperature

* All temperature ratings shown are for sea level. An altitude derating of 1.0°C per 304.8 m (1.8°F per 1000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Maximum rate of change is 20°C per hour (36°F per hour). The upper limit and rate of change might be limited by the type and number of options installed.

For certain approved hardware configurations, the supported system inlet temperature range is extended:

- 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3048 m (10,000 ft).
- 40°C to 45°C (104°F to 113°F) at sea level with an altitude derating of 1.0°C per every 125 m (1.8°F per every 410 ft) above 900 m (2953 ft) to a maximum of 3048 m (10,000 ft).

The approved hardware configurations for this system are listed on the HP website (http://www.hp.com/servers/ASHRAE).

Mechanical specifications

HP Apollo r2200 Chassis (12 LFF)

Specifications	Value
Dimensions	
Height	8.73 cm (3.44 in)
Depth	86.33 cm (33.40 in)
Width	44.80 cm (17.64 in)
Weight (with nodes removed)	

Specifications	Value
Weight (maximum)	25.37 kg (55.94 lb)
Weight (minimum)	11.94 kg (26.37 lb)

HP Apollo r2600 Chassis (24 SFF)

Specifications	Value
Dimensions	
Height	8.73 cm (3.44 in)
Depth	82.27 cm (32.40 in)
Width	44.80 cm (17.64 in)
Weight (with nodes removed)	
Weight (maximum)	23.45 kg (51.70 lb)
Weight (minimum)	9.86 kg (21.74 lb)

HP ProLiant XL170r Gen9 Server Node (1U)

Specifications	Value
Dimensions	
Height	4.13 cm (1.63 in)
Depth	64.15 cm (25.26 in)
Width	17.95 cm (7.07 in)
Weight	
Weight (maximum)	1.73 kg (3.82)
Weight (minimum)	1.67 kg (3.69 lb)

HP ProLiant XL190r Gen9 Server Node (2U)

Specifications	Value
Dimensions	
Height	8.36 cm (3.30 in)
Depth	69.15 cm (27.23 in)
Width	17.95 cm (7.07 in)
Weight	
Weight (maximum)	6.47 kg (14.27)
Weight (minimum)	4.73 kg (10.43 lb)

Power supply specifications

Depending on installed options, the node is configured with one of the following power supplies:

- HP 800W Flex Slot Titanium Hot Plug Power Supply Kit – 96% efficiency
- HP 800W Flex Slot Platinum Hot Plug Power Supply Kit – 94% efficiency
- HP 800W Flex Slot Universal Hot Plug Power Supply Kit – 94% efficiency
- HP 800W Flex Slot -48VDC Hot Plug Power Supply Kit – 94% efficiency

- HP 1400W Flex Slot Platinum Plus Hot Plug Power Supply Kit – 94% efficiency

For detailed power supply specifications, see the QuickSpecs on the HP website (http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html).

Hot-plug power supply calculations

For hot-plug power supply specifications and calculators to determine electrical and heat loading for the server, see the HP website (http://www.hp.com/go/hppoweradvisor).

Acronyms and abbreviations

AMP

Advanced Memory Protection

API

application program interface

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers

BP

backplane

CSR

Customer Self Repair

FAT

file allocation table

FBWC

flash-backed write cache

GPU

graphics processing unit

HBA

host bus adapter

HP SIM

HP Systems Insight Manager

iLO

Integrated Lights-Out

IML

Integrated Management Log

LFF

large form factor

LOM

Lights-Out Management

NMI

nonmaskable interrupt

NVRAM

nonvolatile memory

ODD

Optical Disk Drive

PCIe

Peripheral Component Interconnect Express

PDB

power distribution board

POST

Power-On Self Test

RBSU

ROM-Based Setup Utility

REST

representational state transfer

RPS

redundant power supply

SAS

serial attached SCSI

SATA

serial ATA

SD

Secure Digital

SFF

small form factor

SIM

Systems Insight Manager

SPP

HP Service Pack for ProLiant

TPM

Trusted Platform Module

UEFI

Unified Extensible Firmware Interface

UID

unit identification

USB

universal serial bus

Documentation feedback

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