

HP ProLiant DL360 G7 Server Maintenance and Service Guide



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Intended audience

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

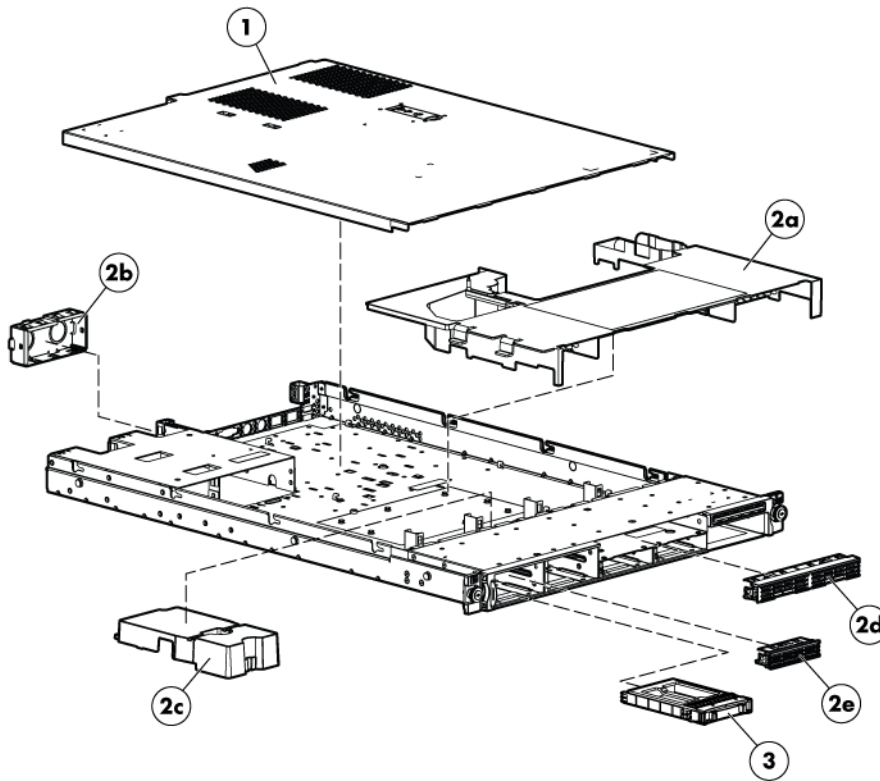
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Illustrated parts catalog

Mechanical components



Item	Description	Spare part number	Customer self repair
1	Access panel	532146-001	Mandatory ¹
2	Hardware and plastics kit	532392-001	Mandatory ¹
	a) Air baffle	—	—
	b) Power supply blank	—	—
	c) Fan blank	—	—
	d) Dual bezel blank	—	—
	e) Hard drive bezel blank (2)	—	—
3	Hard drive blank	392613-001	Mandatory ¹
4	Hard drive cage*	532391-001	Mandatory ¹
	Rack mounting hardware		
5	Rack mounting hardware kit*	533877-001	Mandatory ¹

Item	Description	Spare part number	Customer self repair
6	Cable management arm*	360105-001	Mandatory ¹

*Not shown

¹Mandatory—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.

²Optional—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.

³No—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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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 garanteservice voor het product.

³No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorzwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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。

²Optional: 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。

³No: 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。

¹Mandatory: 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。

²Optional: 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。

³No: 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”。

¹Mandatory: 强制的 — 客户自行维修所使用的零件是强制性的。如果您要求 HP 更换这些零件，HP 将会向您收取此服务所需的外出费用与劳动成本。

²Optional: 選購的 — 客户自行维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。

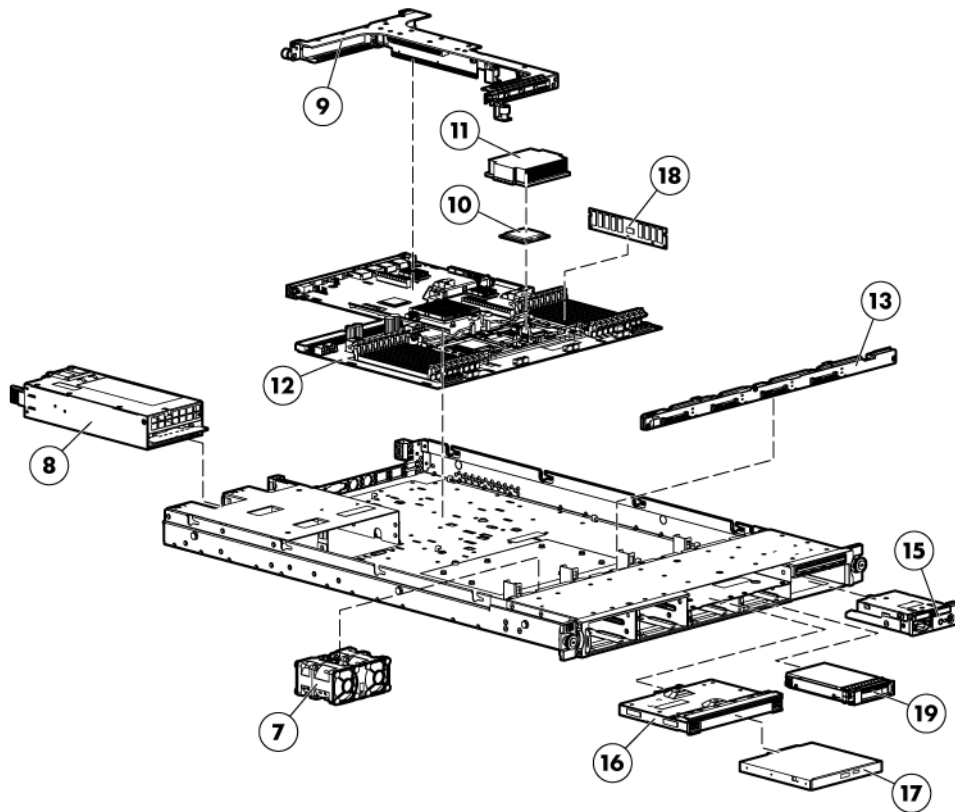
³No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

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.

System components



Item	Description	Spare part number	Customer self repair
7	Fan module	532149-001	Mandatory ¹
8	Hot-plug power supplies	—	—
	a) 460 W, 92%	511777-001	Mandatory ¹
	b) 460 W, 94%*	599381-001	Mandatory ¹
	c) 750 W, 92%*	511778-001	Mandatory ¹
	d) 750 W, 94%*	599383-001	Mandatory ¹
	e) 1200 W, 90%*	498152-001	Mandatory ¹
	f) 1200 W -48V dc*	451816-001	Mandatory ¹
9	PCI riser board assembly	493802-001	Mandatory ¹
10	Processor	—	—
	a) 2.00-GHz Intel® Xeon® processor E5503**	594889-001	Optional ²
	b) 2.13-GHz Intel® Xeon® processor E5506* **	506013-001	Optional ²
	c) 2.40-GHz Intel® Xeon® processor E5620* **	594887-001	Optional ²
	d) 2.13-GHz Intel® Xeon® processor L5630* **	594891-001	Optional ²
	e) 2.53-GHz Intel® Xeon® processor E5630* **	594886-001	Optional ²
	f) 2.26-GHz Intel® Xeon® processor L5640* **	594890-001	Optional ²

Item	Description	Spare part number	Customer self repair
	g) 2.66-GHz Intel® Xeon® processor E5640* **	594885-001	Optional ²
	h) 2.66-GHz Intel® Xeon® processor X5650* **	594884-001	Optional ²
	i) 2.80-GHz Intel® Xeon® processor X5660* **	594883-001	Optional ²
	j) 2.93-GHz Intel® Xeon® processor X5670* **	594882-001	Optional ²
11	Heatsink	—	—
	a) Processor heatsink kit	507672-001	Optional ²
	b) Thermal kit (cleaning pad and thermal grease)*	468290-001	Optional ²
	Boards		
12	System board	602512-001	Optional ²
13	Primary hard drive backplane assembly and cable, bottom	532148-001	Optional ²
14	Optional hard drive backplane assembly and cable, top*	532147-001	Optional ²
15	Systems Insight Display, LED module, and power button assembly, with cable	599380-001	Optional ²
	Media devices		
16	DVD tray	532390-001	Mandatory ¹
17	DVD-ROM drives	—	—
	a) SATA DVD-ROM drive, slimline	481428-001	Mandatory ¹
	b) SATA DVD-RW drive, slimline*	481429-001	Mandatory ¹
	Memory		
18	DIMM	—	—
	a) 1-GB, PC3-10600E, single-rank	501539-001	Mandatory ¹
	b) 2-GB, PC3-10600E, dual-rank*	501540-001	Mandatory ¹
	c) 2-GB, PC3-10600R, dual-rank*	501533-001	Mandatory ¹
	d) 4-GB, PC3-10600R, single-rank*	501534-001	Mandatory ¹
	e) 4-GB, PC3L-10600R, single-rank*	606426-001	Mandatory ¹
	f) 4-GB, PC3-10600E, dual-rank*	501541-001	Mandatory ¹
	g) 4-GB, PC3-8500R, quad-rank*	501535-001	Mandatory ¹
	h) 8-GB, PC3-8500R, dual-rank*	501537-001	Mandatory ¹
	i) 8-GB, PC3-10600R, dual-rank*	501536-001	Mandatory ¹
	j) 8-GB, PC3L-10600R, dual-rank*	606427-001	Mandatory ¹
	k) 16-GB, PC3-8500R, quad-rank*	501538-001	Mandatory ¹
	Hard drives		
19	Hard drives	—	—
	a) 72-GB, SAS, 15,000-rpm*	418398-001	Mandatory ¹
	b) 72-GB, SAS, 15,000-rpm, 6G*	512743-001	Mandatory ¹

Item	Description	Spare part number	Customer self repair
	c) 146-GB, SAS, 10,000-rpm*	418399-001	Mandatory ¹
	d) 146-GB, SAS, 10,000-rpm, 6G*	507283-001	Mandatory ¹
	e) 146-GB, SAS, 15,000-rpm*	504334-001	Mandatory ¹
	f) 146-GB, SAS, 15,000-rpm, 6G*	512744-001	Mandatory ¹
	g) 300-GB, SAS, 10,000-rpm*	493083-001	Mandatory ¹
	h) 300-GB, SAS, 10,000-rpm, 6G*	507284-001	Mandatory ¹
	i) 500-GB, SAS, 7,200-rpm, 6G*	508009-001	Mandatory ¹
	j) 60-GB, SATA, 5,400-rpm*	405419-001	Mandatory ¹
	k) 120-GB, SATA, 5,400-rpm*	459322-001	Mandatory ¹
	l) 250-GB, SATA, 5,400-rpm*	460426-001	Mandatory ¹
	m) 500-GB, SATA, 7,200-rpm*	508035-001	Mandatory ¹
	n) 60-GB, 3G, SATA, SSD, SFF*	572252-001	Mandatory ¹
	o) 120-GB, SATA, SSD, SFF*	572253-001	Mandatory ¹
	Options		
20	PCI riser board options	—	—
	a) PCI-X riser board, x16*	535321-001	Optional ²
	b) PCIe riser board, x8*	493803-001	Optional ²
	c) PCIe riser board, x16*	493802-001	Optional ²
21	Trusted Platform Module*	450168-001	No ³
22	Controller options	—	—
	a) FBWC module, 512-MB*	578882-001	Optional ²
	b) FBWC module, 1-GB*	505908-001	Optional ²
	c) FBWC capacitor pack*	587324-001	Optional ²
	d) BBWC cache module, 256-MB*	462974-001	Optional ²
	e) BBWC cache module, 512-MB*	462975-001	Optional ²
	f) BBWC battery pack*	462976-001	Optional ²
	Miscellaneous		
23	Battery, 3.3-V, lithium*	234556-001	Mandatory ¹
24	AC power cord*	187335-001	Mandatory ¹
	Cables		
25	Cable kit*	532393-001	Mandatory ¹
	a) Hard drive data cable or Mini SAS cable (2)	—	—
	b) Hard drive backplane power cable (2)	—	—
	c) PCI power cable	—	—

Item	Description	Spare part number	Customer self repair
	d) Power button and Systems Insight Display button cable	—	—
	e) SATA DVD-ROM drive cable	—	—
26	Mini SAS to SATA cable, 45.72 cm (18 in)*	631834-001	Mandatory ¹

*Not shown

**All processors in this HP ProLiant server must have the same cache size, speed, number of cores, and rated maximum power consumption.

¹Mandatory—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.

²Optional—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.

³No—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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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 aggiuntive a seconda del tipo di garanzia previsto per il prodotto.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory: 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.

²Optional: 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.

³No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorzwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

¹Mandatory: 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.

²Optional: 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.

³No: 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.

¹Mandatory : 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。

²Optional : 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。

³No : 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。

¹Mandatory: 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。

²Optional: 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。

³No: 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”。

¹Mandatory: 强制的 — 客户自行维修所使用的零件是强制性的。如果您要求 HP 更换这些零件，HP 将会向您收取此服务所需的外出费用与劳动成本。

²Optional: 選購的 — 客户自行维修所使用的零件是選購的。這些零件也設計用於客户自行維修之用。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。

³No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客户保固，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 Torx screwdriver (on page 64) (provided inside the server)
- HP Insight Diagnostics software ("HP Insight Diagnostics" on page 50)

Preparation procedures

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

- Extend the server from the rack (on page 14).
If you are performing service procedures in an HP, Compaq branded, telco, or third-party rack cabinet, you can use the locking feature of the rack rails to support the server and gain access to internal components.
For more information about telco rack solutions, refer to the RackSolutions.com website (<http://www.racksolutions.com/hp>).
- Power down the server (on page 13).
If you must remove a server from a rack or a non-hot-plug component from a server, power down the server.
- Remove the server from the rack (on page 14).
If the rack environment, cabling configuration, or the server location in the rack creates awkward conditions, remove the server from the rack.

Power down the server



WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. 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.



IMPORTANT: If installing a hot-plug device, it is not necessary to power down the server.

1. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.
3. If the server is installed in a rack, press the UID LED button on the front panel. Blue LEDs illuminate on the front and rear panels of the server.
4. Press the Power On/Standby button to place the server in standby mode. When the server activates standby power mode, the system power LED changes to amber.


5. If the server is installed in a rack, locate the server by identifying the illuminated rear UID LED button.
6. Disconnect the power cords.


The system is now without power.

Extend the server from the rack

NOTE: If the optional cable management arm option is installed, you can extend the server without powering down the server or disconnecting peripheral cables and power cords. These steps are only necessary with the standard cable management solution.

1. Power down the server (on page 13).
2. Disconnect all peripheral cables and power cords.
3. Loosen the front panel thumbscrews.
4. Extend the server on the rack rails until the server rail-release latches engage.

 **WARNING:** To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

 **WARNING:** To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

5. After performing the installation or maintenance procedure, slide the server into the rack:
 - a. Slide the server fully into the rack.
 - b. Secure the server by tightening the thumbscrews.
6. Connect the peripheral cables and power cords.

Remove the server from the rack

To remove the server from an HP, Compaq branded, telco, or third-party rack:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Disconnect the cabling and remove the server from the rack. For more information, refer to the documentation that ships with the rack mounting option.
4. Place the server on a sturdy, level surface.

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.



14.06 - 15.97
kg

31.00 - 35.20
lb

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

Before installing a server, be sure that you understand the following warnings and cautions.

-
- ⚠ WARNING:** To reduce the risk of electric shock or damage to the equipment:
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
 - Unplug the power cord from the power supply to disconnect power to the equipment.
 - Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.
-

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

Access panel

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

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Open the locking latch, slide the access panel to the rear of the chassis, and remove the access panel.

If the locking latch is locked use a T-15 Torx screwdriver to unlock the latch.

To replace the component:

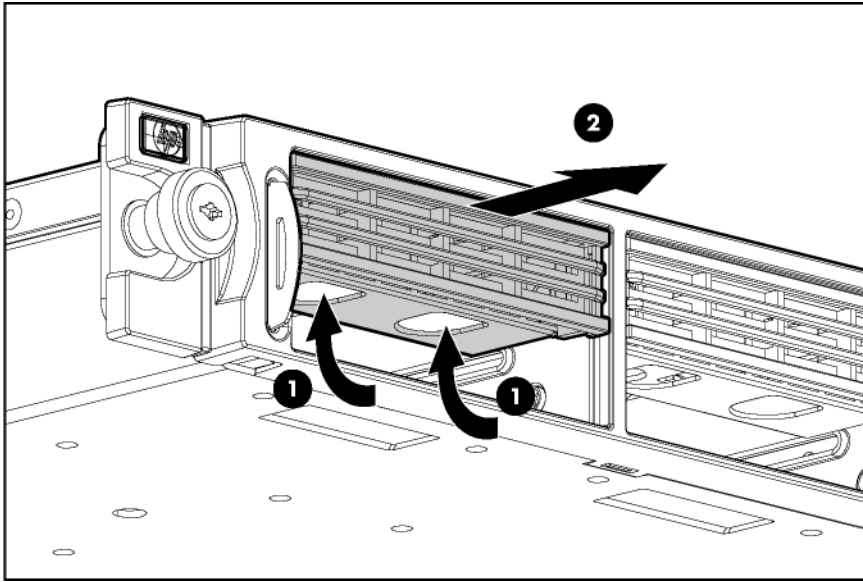
1. Place the access panel on top of the server with the hood latch open. Allow the panel to extend past the rear of the server approximately 1.25 cm (0.5 in).
2. Push down on the hood latch. The access panel slides to a closed position.
3. Use the T-15 Torx screwdriver provided with the server to tighten the security screw on the hood latch.

Hard drive bezel blanks

-
- ⚠ 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. Remove hard drives 1 and 2.
2. Remove the hard drive bezel blank.

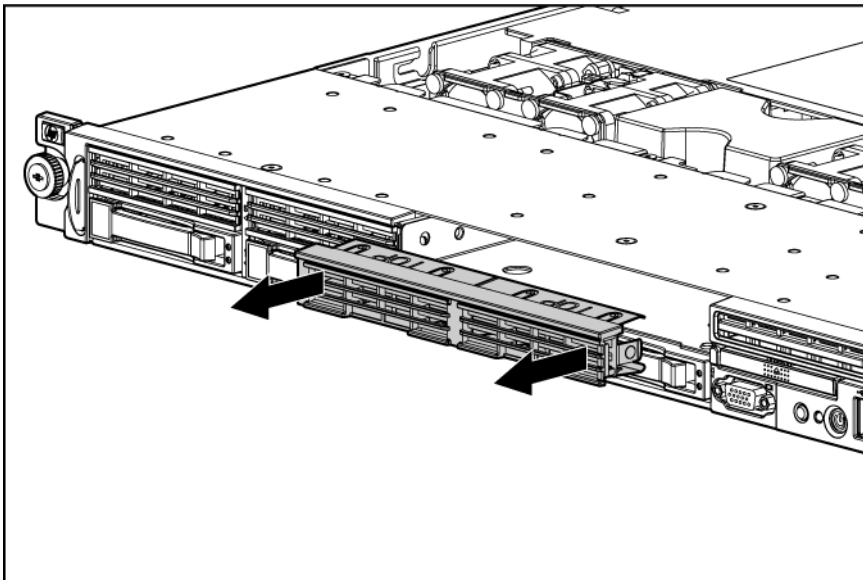


To replace the component, reverse the removal procedure.

Dual bezel blank

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.

Remove the component as indicated.

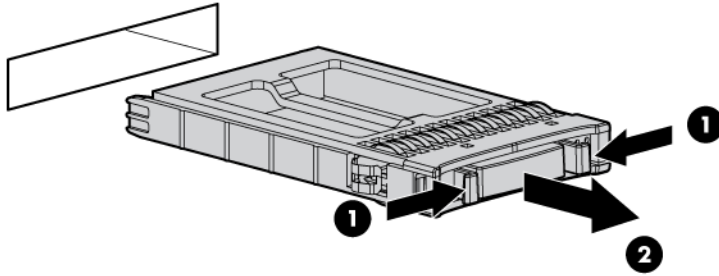


To replace the component, reverse the removal procedure.

Hard drive blank

-
- △ **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.
-

Remove the component as indicated.



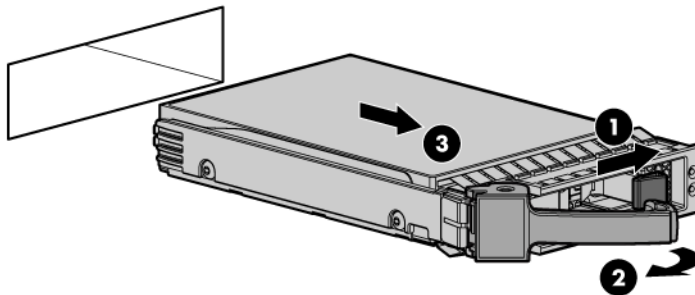
To replace the component, slide the component into the bay until it clicks.

SAS and SATA hard 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:

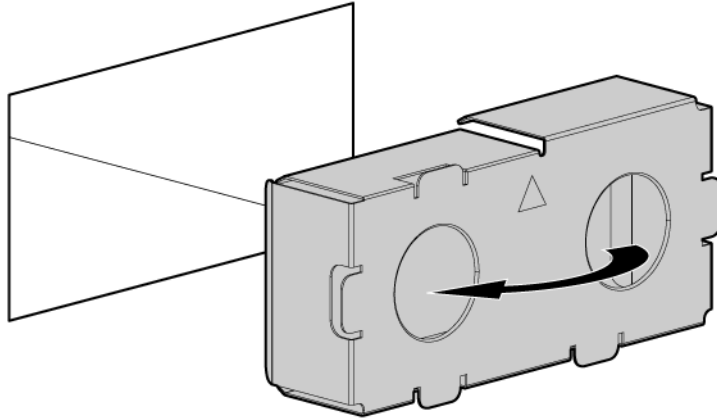
1. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations.
2. Back up all server data on the hard drive.
3. Remove the hard drive.



To replace the component, reverse the removal procedure.

Power supply blank

Remove the component as indicated.



To replace the component, reverse the removal procedure.

Hot-plug power supply



WARNING: To reduce the risk of electric shock, do not disassemble the power supply or attempt to repair it. Replace it only with the specified spare part.



CAUTION: Do not attempt to remove and replace a power supply as a hot-plug procedure unless both bays are populated with power supplies.

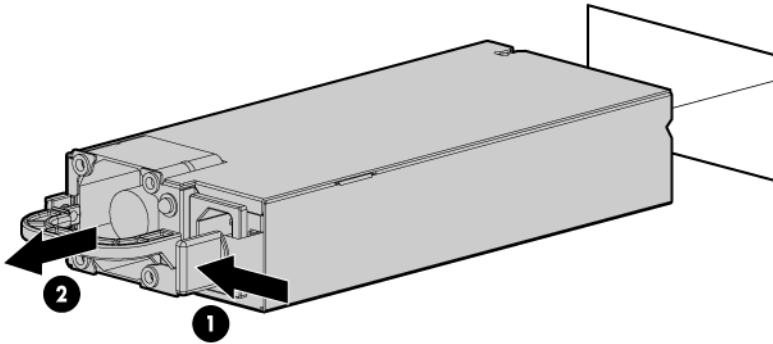


CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the component:

1. Determine how many hot-plug power supplies are installed:
 - If only one hot-plug power supply is installed, power down and remove the power cord from the server ("[Power down the server](#)" on page 13).
 - If more than one hot-plug power supply is installed, continue with the next step.
2. Unfasten the cable management solution to access the power supply bays.
3. Disconnect the power cord from the power source.
4. Disconnect the power cord from the power supply.

5. Remove the hot-plug power supply.



WARNING: To reduce the risk of electric shock or damage to the equipment, do not connect the power cord to the power supply until the power supply is installed.

To replace the component:

1. Slide the hot-plug power supply into the power supply bay.
2. Connect the power cord to the power supply.
3. Install the cable management arm, if removed.
4. Route the power cord through the cable management arm or power cord anchor.

NOTE: If using the power cord anchor, be sure to leave enough slack in the power cord so that the redundant power supply can be removed without disconnecting the power cord from the primary power supply.

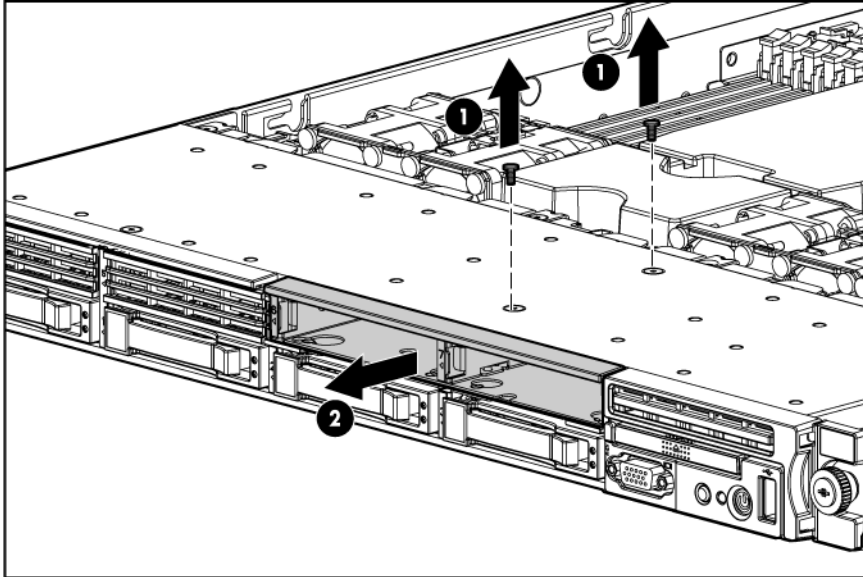
5. Close the cable management arm.
6. Connect the power cord to the power source.
7. Be sure that the power supply LED is green ("[Rear panel LEDs and buttons](#)" on page 56).
8. Be sure that the power supply LED on the SID is green.

Hard drive cage

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove all hard drives ("[SAS and SATA hard drive](#)" on page 18).

4. Remove the hard drive cage.



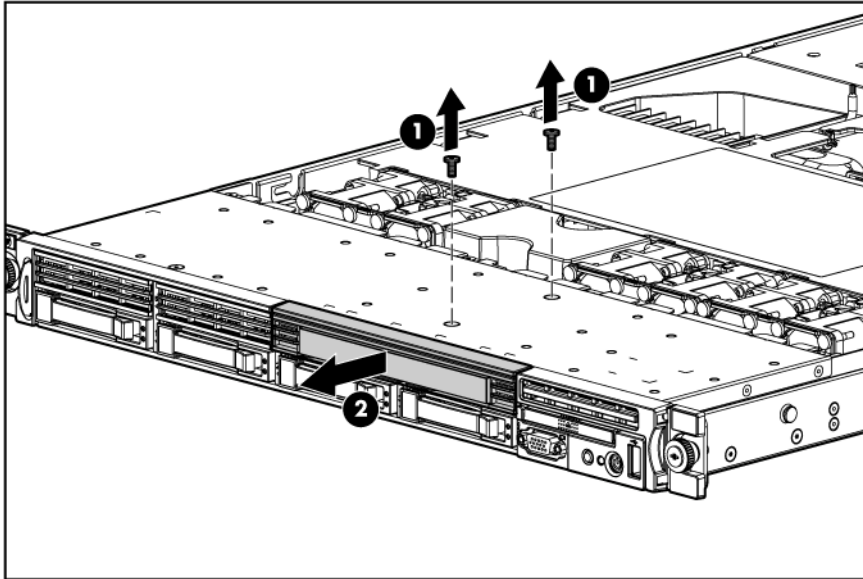
To replace the component, reverse the removal procedure.

DVD tray

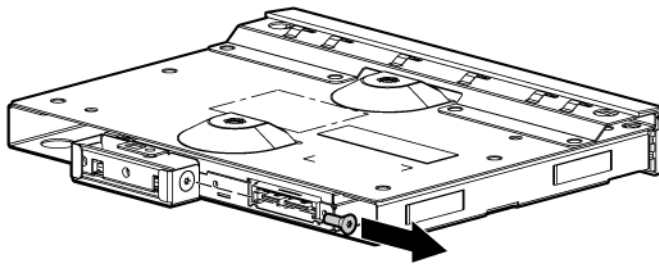
To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
5. Remove the air baffle ("[Air baffle](#)" on page 26).
6. Disconnect the SATA DVD cable from the rear of the DVD tray ("[DVD-ROM and DVD-RW drive cabling](#)" on page 48).

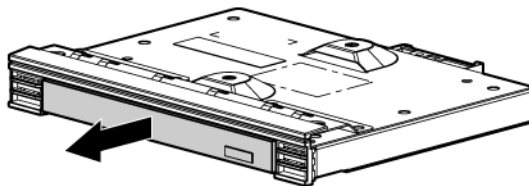
7. Remove the DVD tray.



8. Remove the screw from the rear of the DVD tray.



9. Remove the DVD-ROM or DVD-RW drive from the DVD tray.



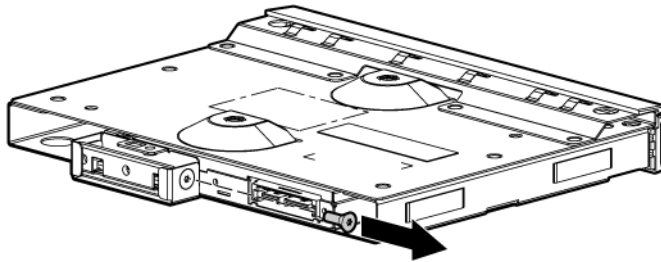
To replace the component, reverse the removal procedure.

DVD-ROM or DVD-RW drive

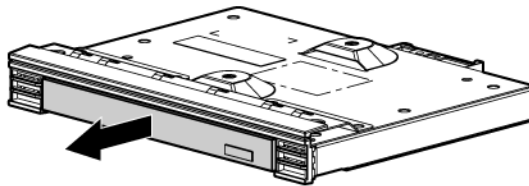
To remove the component:

1. Power down the server (on page 13).

2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Disconnect the SATA DVD cable from the rear of the DVD tray and the system board ("DVD-ROM and DVD-RW drive cabling" on page 48).
7. Remove the DVD tray ("DVD tray" on page 21).
8. Remove the screw from the rear of the DVD tray.



9. Remove the DVD-ROM or DVD-RW drive from the DVD tray.



To replace the component, reverse the removal procedure.

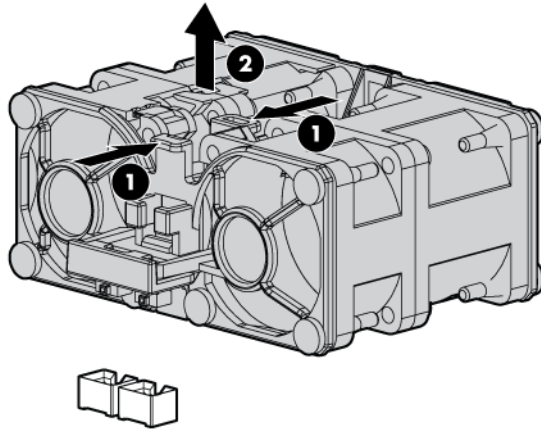
Fan module

The server has four fan modules ("Fan modules" on page 62). Install fan 2 only when processor 2 is installed. When only one processor is installed, always install the fan blank.

To remove a fan module:

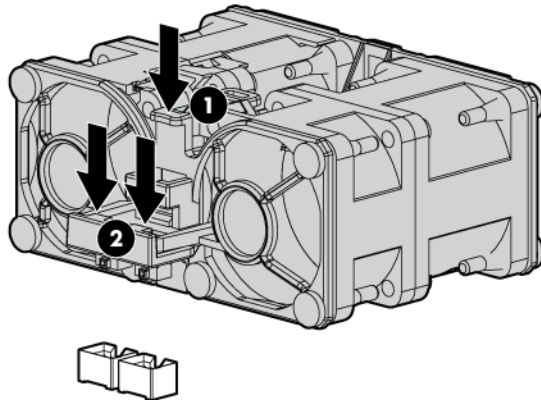
1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).

4. Remove the fan module.



To replace the component:

1. Install the fan module.



2. Install the access panel ("[Access panel](#)" on page 16).
3. Slide the server into the rack.
4. Power up the server.

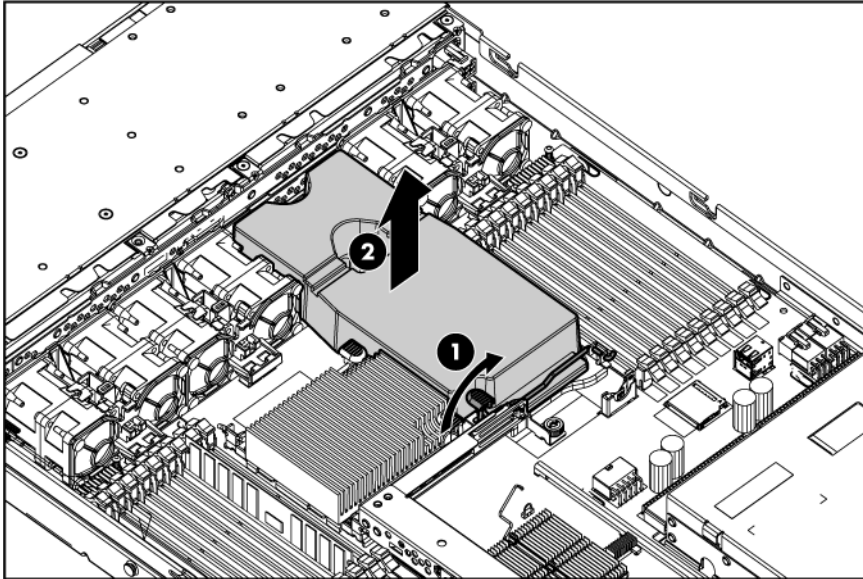
Fan blank

Install fan 2 only when processor 2 is installed. When only one processor is installed, always install the fan blank.

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).

4. Remove the fan blank.



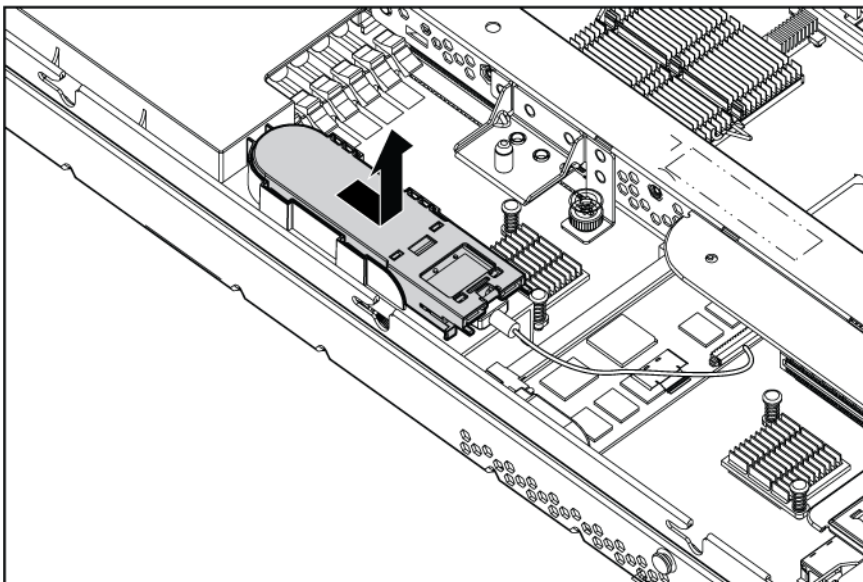
To replace the component, reverse the removal procedure.

BBWC battery pack or FBWC capacitor pack

- △ **CAUTION:** To prevent a server malfunction or damage to the equipment, do not add or remove the battery pack while an array capacity expansion, RAID level migration, or stripe size migration is in progress.

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. Remove the BBWC battery pack or the FBWC capacitor pack.

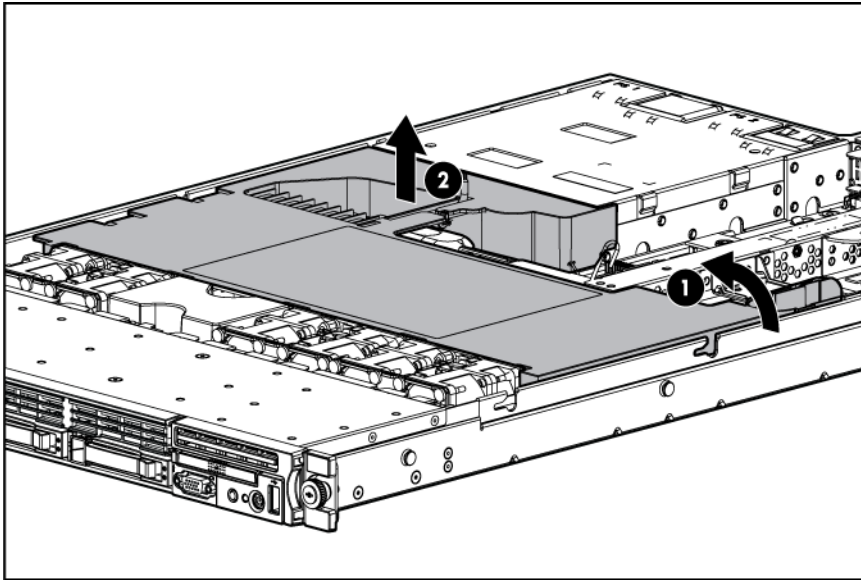


To replace the component, reverse the removal procedure.

Air baffle

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle.



To replace the component, reverse the removal procedure.

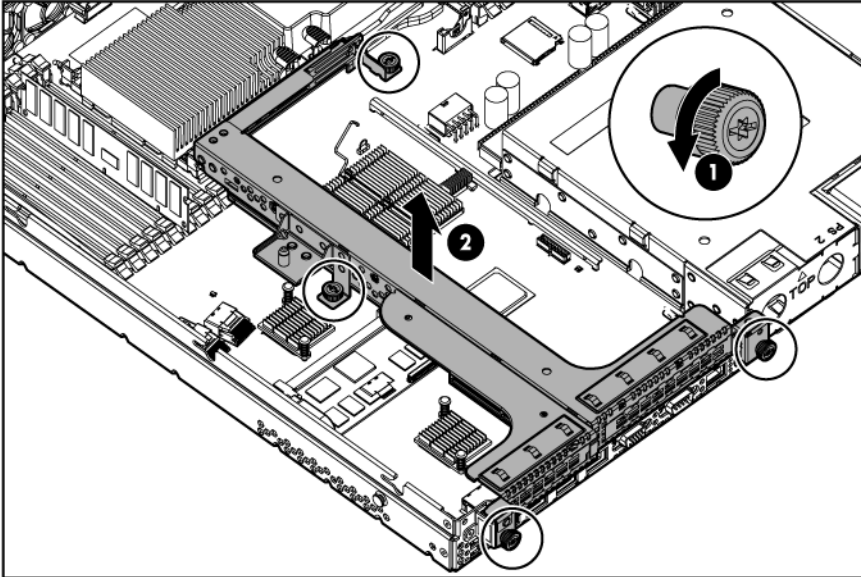
PCI riser board assembly

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 server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Remove the PCI riser board assembly:
 - a. Disconnect external cables connected to any existing expansion boards.
 - b. Loosen the four PCI riser board assembly thumbscrews.

- c. Lift the assembly to unseat the PCI riser boards, and then remove the assembly.



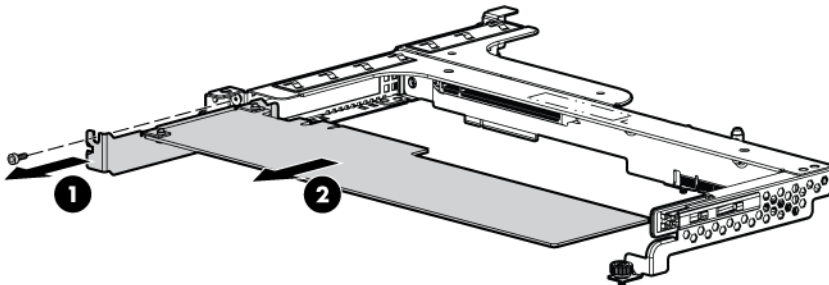
7. Remove all expansion boards ("[Expansion boards](#)" on page 27).

To replace the component, reverse the removal procedure.

Expansion boards

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
5. Remove the air baffle ("[Air baffle](#)" on page 26).
6. Remove the PCI riser board assembly ("[PCI riser board assembly](#)" on page 26).
7. Remove the expansion board.

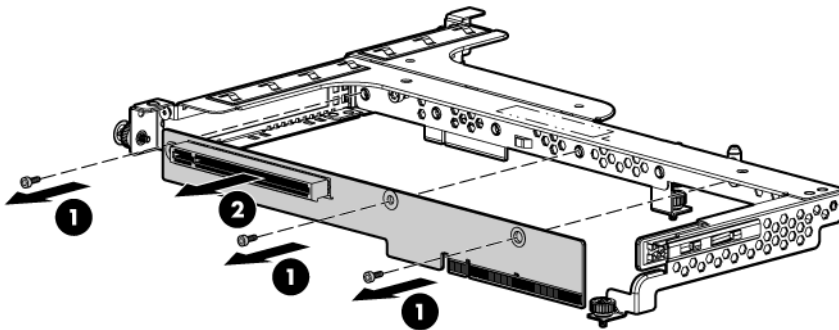


To replace the component, reverse the removal procedure.

PCIe riser board

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Remove the PCI riser board assembly ("PCI riser board assembly" on page 26).
7. Remove all expansion boards ("Expansion boards" on page 27).
8. Remove the full-length PCIe riser board from the riser board assembly.



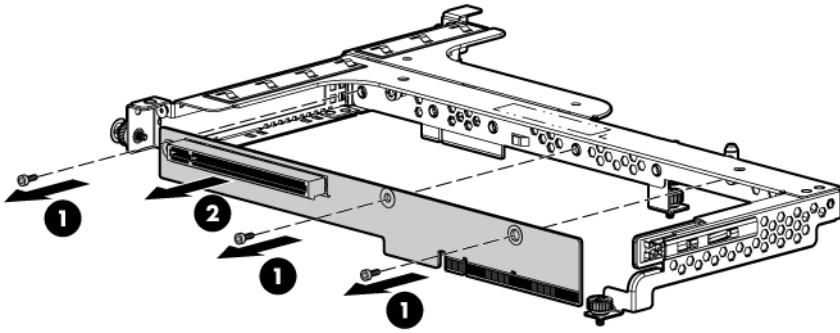
To replace the component, reverse the removal procedure.

PCI-X riser board

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Remove the PCI riser board assembly ("PCI riser board assembly" on page 26).
7. Remove all expansion boards ("Expansion boards" on page 27).

8. Remove the full-length PCI-X riser board from the riser board assembly.

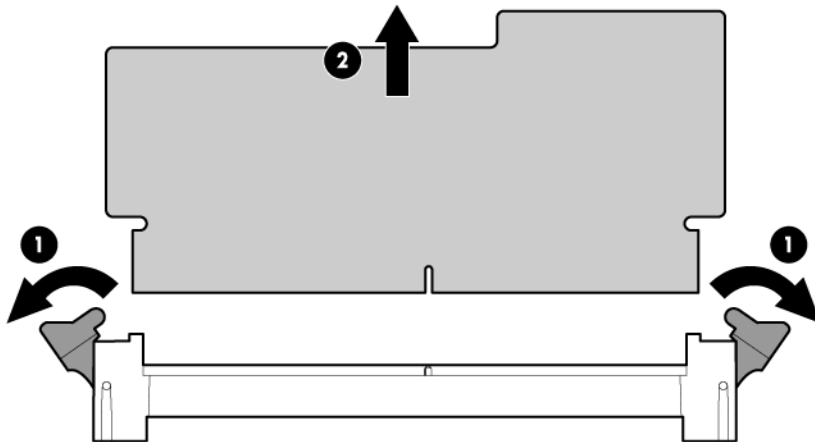


To replace the component, reverse the removal procedure.

Cache module

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Remove the PCI riser board assembly ("PCI riser board assembly" on page 26).
7. Remove the cache module.

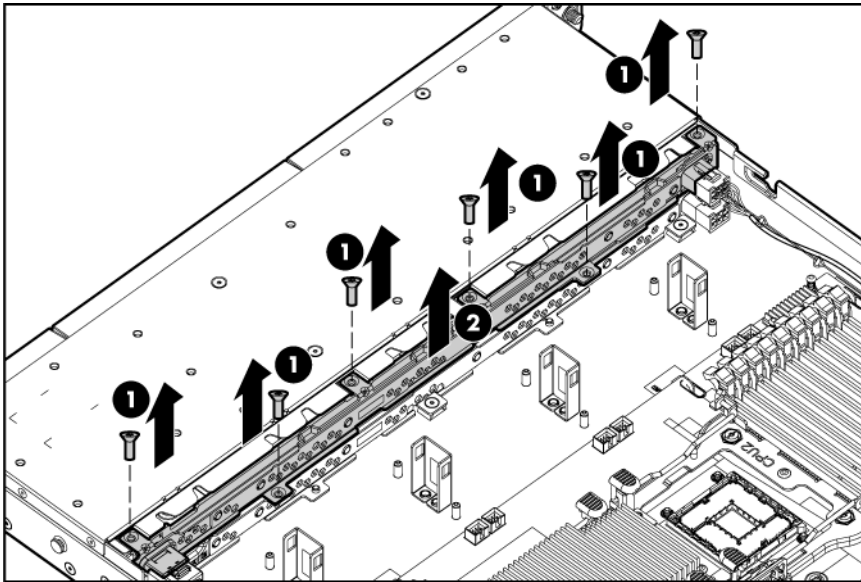


To replace the component, reverse the removal procedure.

Optional hard drive backplane assembly (top)

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. Remove the hard drives from hard drive bays 5, 6, 7, and 8 ("SAS and SATA hard drive" on page 18).
5. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
6. Remove the air baffle ("Air baffle" on page 26).
7. Remove all fan modules ("Fan module" on page 23).
8. Remove the fan blank ("Fan blank" on page 24).
9. Disconnect the hard drive data cable and the hard drive power cable from the optional hard drive backplane and the system board ("Hard drive backplane cabling" on page 46).
10. Remove the optional hard drive backplane.



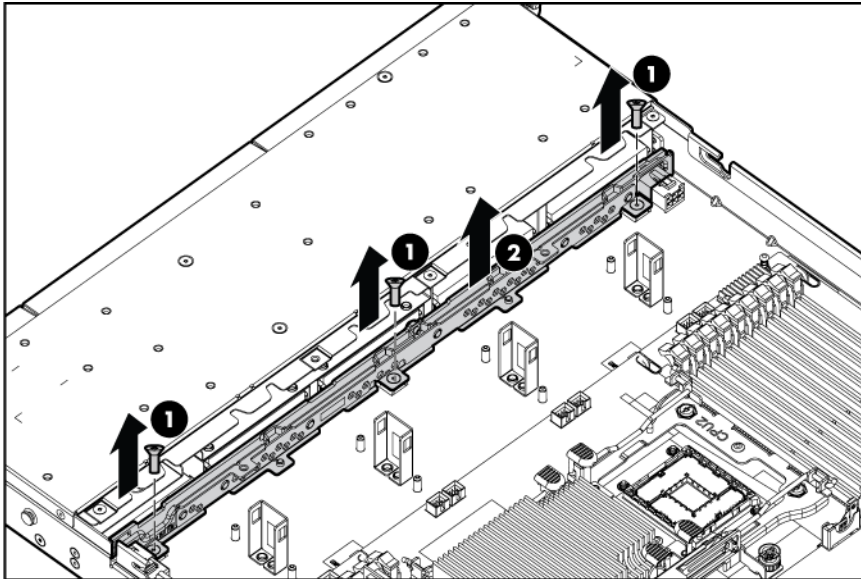
To replace the component, reverse the removal procedure.

Standard hard drive backplane assembly (bottom)

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. Remove all hard drives ("SAS and SATA hard drive" on page 18).
5. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).

6. Remove the air baffle ("[Air baffle](#)" on page 26).
7. Remove all fan modules ("[Fan module](#)" on page 23).
8. Remove the fan blank ("[Fan blank](#)" on page 24).
9. Disconnect the hard drive data cable and the hard drive power cable from the optional hard drive backplane and the system board ("[Hard drive backplane cabling](#)" on page 46).
10. Remove the optional hard drive backplane ("[Optional hard drive backplane assembly \(top\)](#)" on page 30).
11. Disconnect the hard drive data cable and the hard drive power cable from the standard hard drive backplane and the system board ("[Hard drive backplane cabling](#)" on page 46).
12. Remove the hard drive backplane.



To replace the component, reverse the removal procedure.

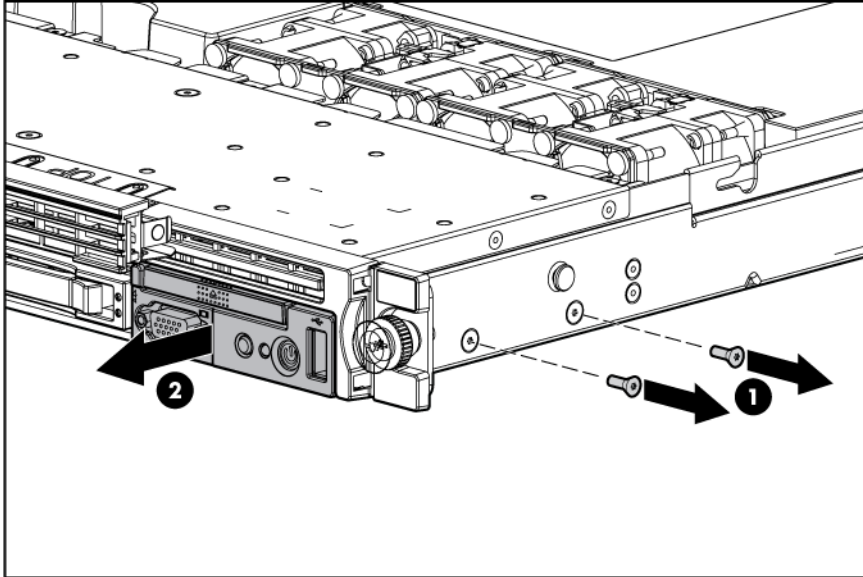
Systems Insight Display, LED, and power button assembly

The Systems Insight Display is an assembly that includes the front panel LEDs, Power On/Standby button, and a cable.

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
5. Remove the air baffle ("[Air baffle](#)" on page 26).
6. Disconnect the Power button and Systems Insight Display cable ("[Power button and Systems Insight Display cabling](#)" on page 48).

7. Remove the HP Systems Insight Display and LED assembly.

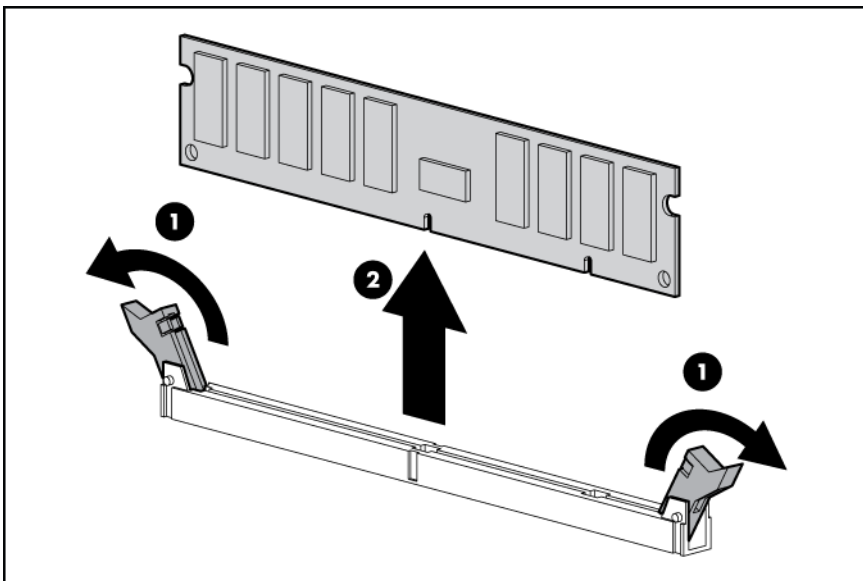


To replace the component, reverse the removal procedure.

DIMMs

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
5. Remove the air baffle ("[Air baffle](#)" on page 26).
6. Remove the DIMM.

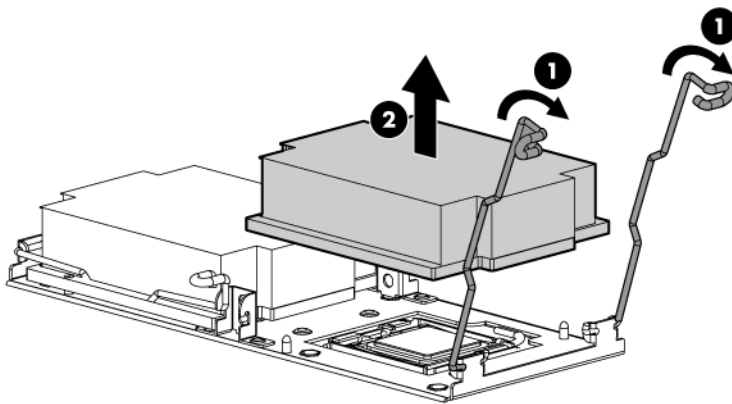


To replace the component, reverse the removal procedure.

Heatsink

To remove the component:

1. Power down the server (on page 13).
2. Extend the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
5. Remove the air baffle ("Air baffle" on page 26).
6. Remove the heatsink.

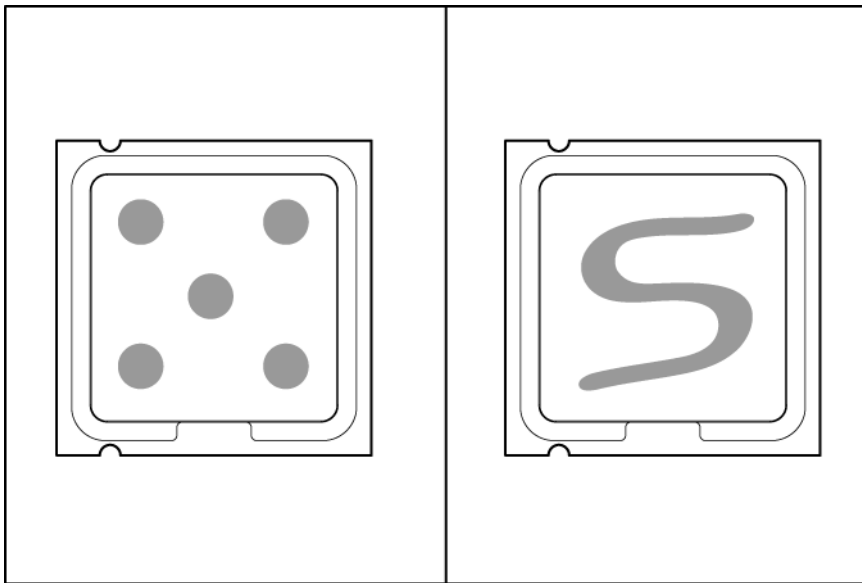


To replace the heatsink:

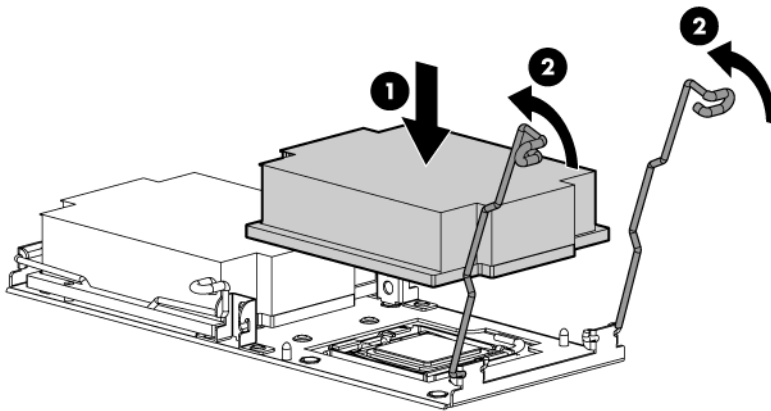
1. Use the alcohol swab to remove all the existing thermal grease from the processor. Allow the alcohol to evaporate before continuing.
2. Apply new grease to the top of the processor in one of the following patterns to ensure even distribution.



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.



3. Install the heatsink.



4. Install the air baffle ("[Air baffle](#)" on page 26).
5. If removed, install the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
6. Install the access panel ("[Access panel](#)" on page 16).
7. Slide the server into the rack.

Processor

The server supports single- and dual-processor operation. Fan 2 is required only when processor 2 is installed in the server. When only one processor is installed, always install the fan blank.



CAUTION: To prevent possible server malfunction, do not mix processors of different speeds or cache sizes. Refer to the label on the processor heatsink for a description of the processor.



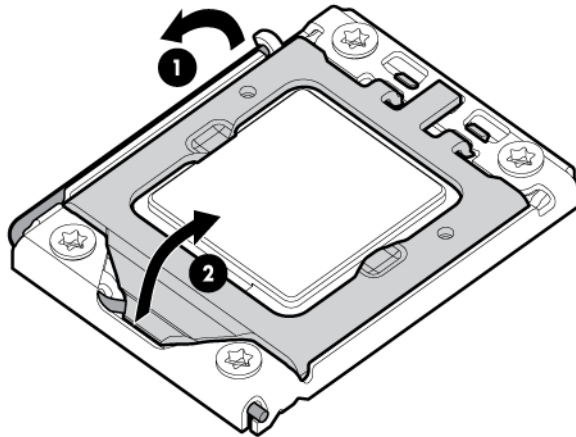
IMPORTANT: Processor socket 1 must be populated at all times or the server does not function.



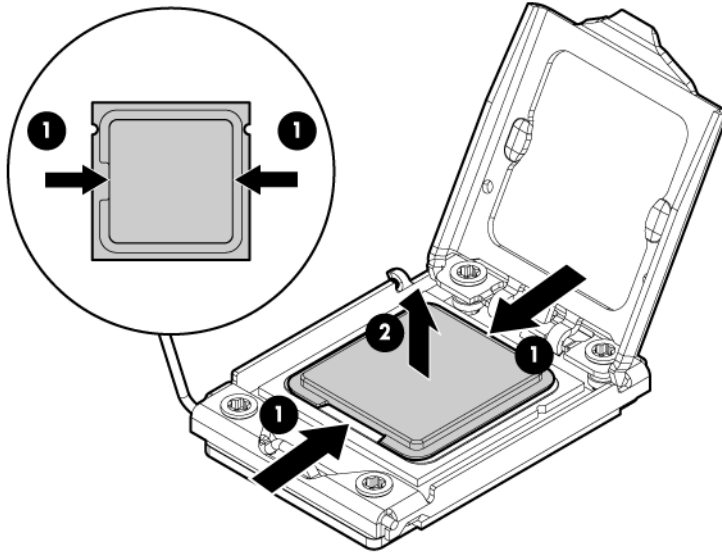
IMPORTANT: If installing a processor with a faster speed, update the system ROM before installing the processor.

To remove a processor:

1. Update the system ROM.
Locate and download the latest ROM version from the HP website (<http://www.hp.com/support>). Follow the instructions on the website to update the system ROM.
2. Power down the server (on page 13).
3. Extend the server from the rack (on page 14).
4. Remove the access panel ("Access panel" on page 16).
5. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
6. Remove the air baffle ("Air baffle" on page 26).
7. Remove the heatsink ("Heatsink" on page 33).
8. Open the processor retaining latch and the processor socket retaining bracket.



- Using your fingers, remove the failed processor.

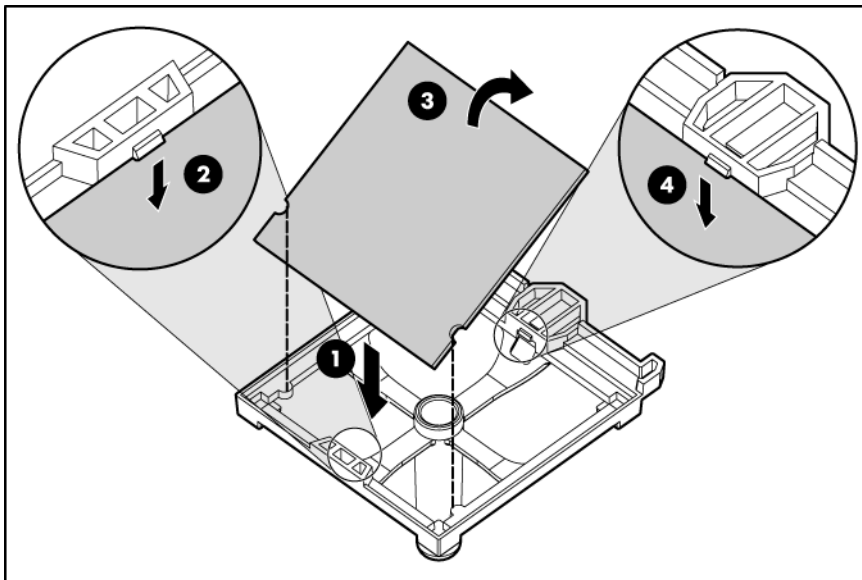


To replace a processor:



IMPORTANT: Be sure the processor remains inside the processor installation tool.

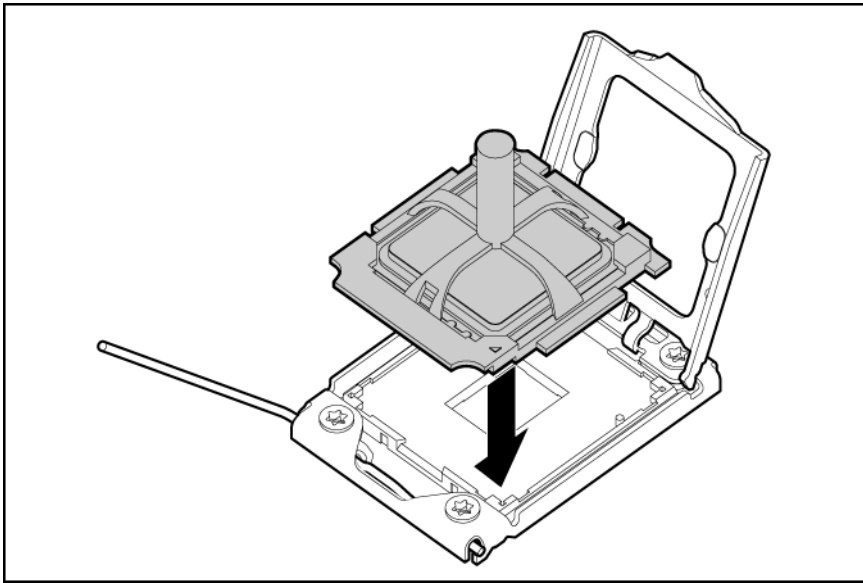
- If the processor has separated from the installation tool, carefully re-insert the processor in the tool.



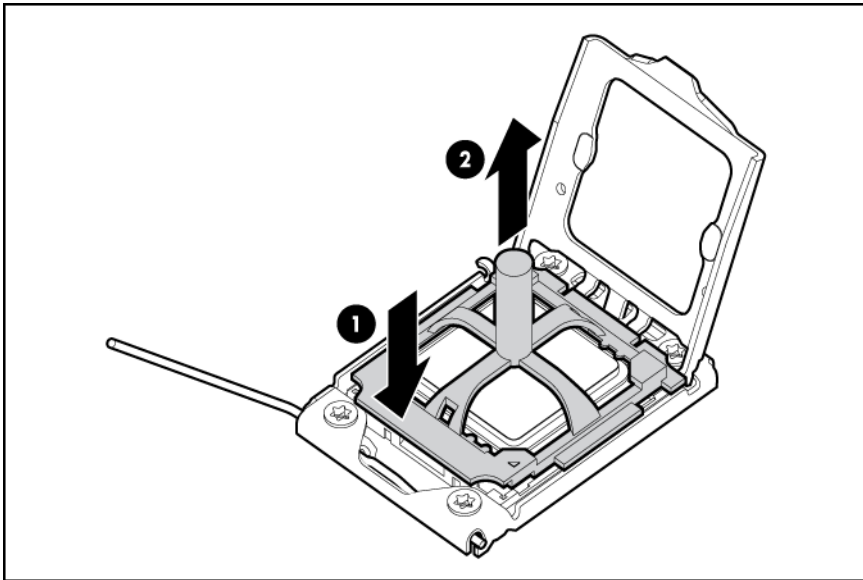
- Align the processor installation tool with the socket and install the spare processor.



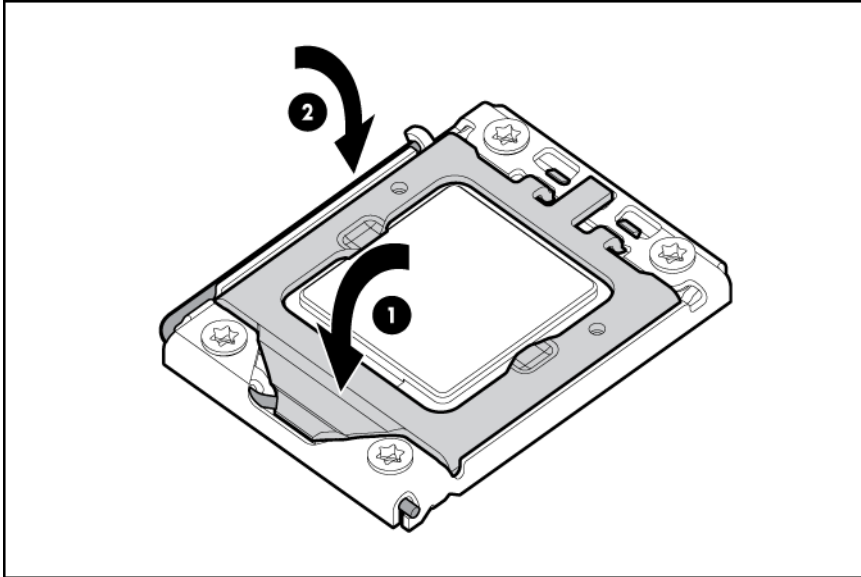
CAUTION: The processor is designed to fit one way into the socket. Use the alignment guides on the processor and socket to properly align the processor with the socket. Refer to the server hood label for specific instructions.



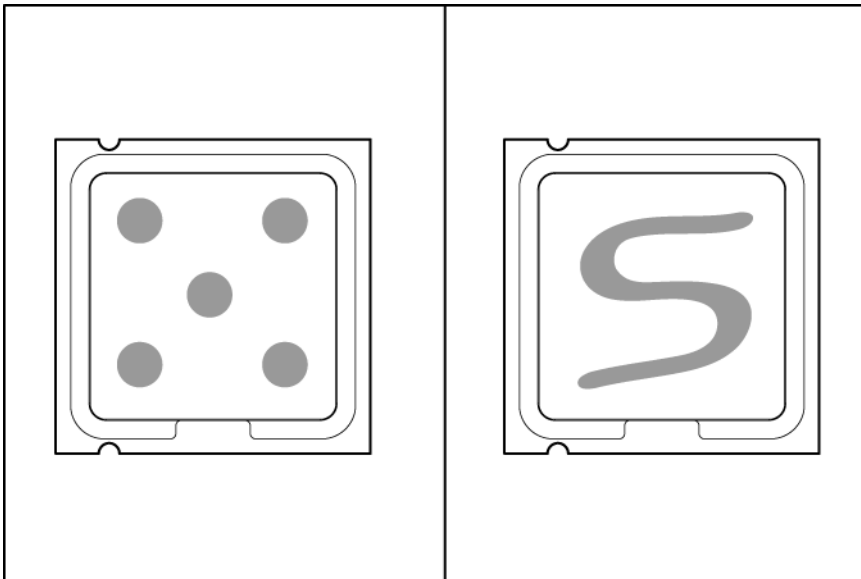
3. Press down firmly until the processor installation tool clicks and separates from the processor, and then remove the processor installation tool.



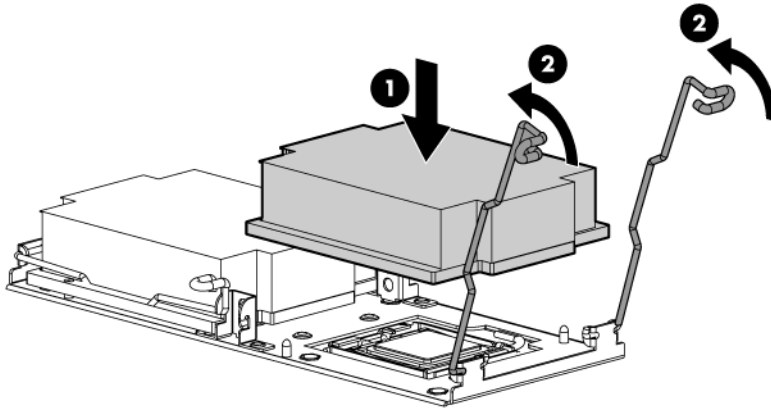
4. Close the processor retaining latch and the processor socket retaining bracket.



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.



8. Install the air baffle ("[Air baffle](#)" on page 26).
9. If removed, install the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
10. Install the access panel ("[Access panel](#)" on page 16).
11. Slide the server into the rack.
12. Power up the server.

System battery

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



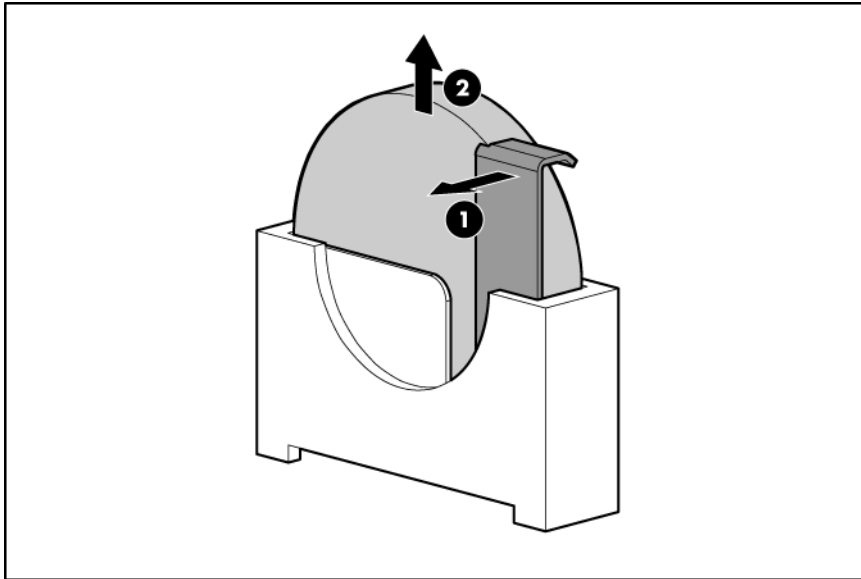
WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- 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 server (on page 13).
2. Extend or remove the server from the rack ("[Extend the server from the rack](#)" on page 14, "[Remove the server from the rack](#)" on page 14).
3. Remove the access panel ("[Access panel](#)" on page 16).
4. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("[BBWC battery pack or FBWC capacitor pack](#)" on page 25).
5. Remove the air baffle ("[Air baffle](#)" on page 26).
6. Locate the battery on the system board ("[System board components](#)" on page 57).

7. 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

To remove the component:

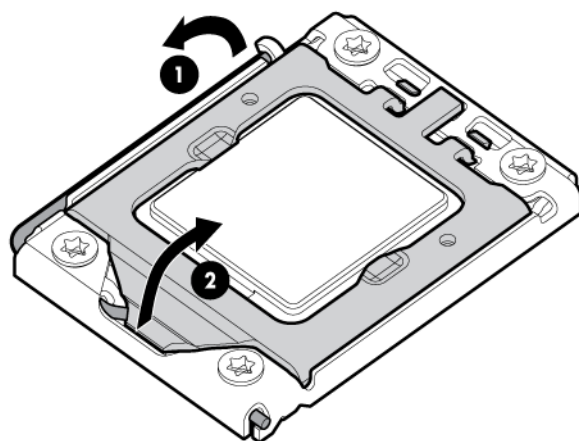
1. Power down the server (on page 13).
2. Remove the server from the rack (on page 14).
3. Remove the access panel ("Access panel" on page 16).
4. Remove all hard drives ("SAS and SATA hard drive" on page 18).
5. Remove all power supplies ("Hot-plug power supply" on page 19).
6. If installed, remove the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
7. Remove the air baffle ("Air baffle" on page 26).



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.

8. Remove the PCI riser board assembly ("PCI riser board assembly" on page 26).
9. Remove all fan modules ("Fan module" on page 23).
10. Remove the fan blank ("Fan blank" on page 24).
11. Disconnect all cables connected to the system board ("System board components" on page 57). For more information, see "Cabling (on page 46)."
12. Remove the cache module ("Cache module" on page 29).

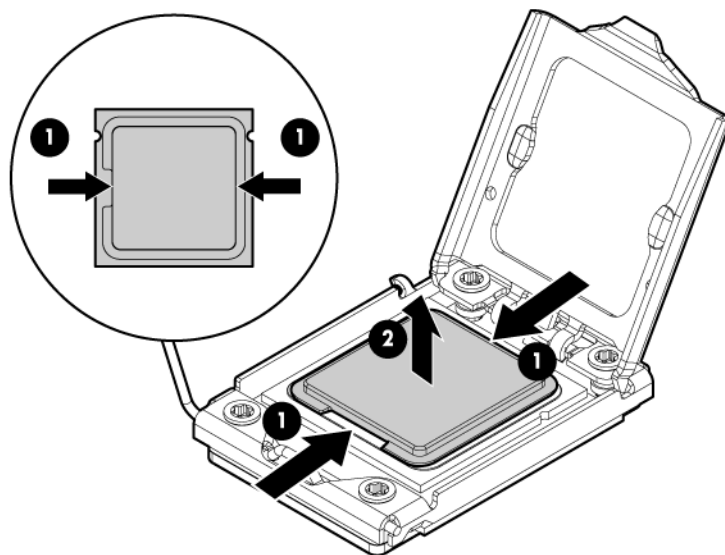
13. Remove the optional hard drive backplane ("Optional hard drive backplane assembly (top)" on page 30).
14. Remove the hard drive backplane ("Standard hard drive backplane assembly (bottom)" on page 30).
15. Remove all DIMMs ("DIMMs" on page 32).
16. Remove the heatsink ("Heatsink" on page 33).
17. Open the processor retaining latch and the processor socket retaining bracket.



△ **CAUTION:** To avoid damage to the processor:

- Handle the processor only by the edges.
- Do not touch the bottom of the processor, especially the contact area.

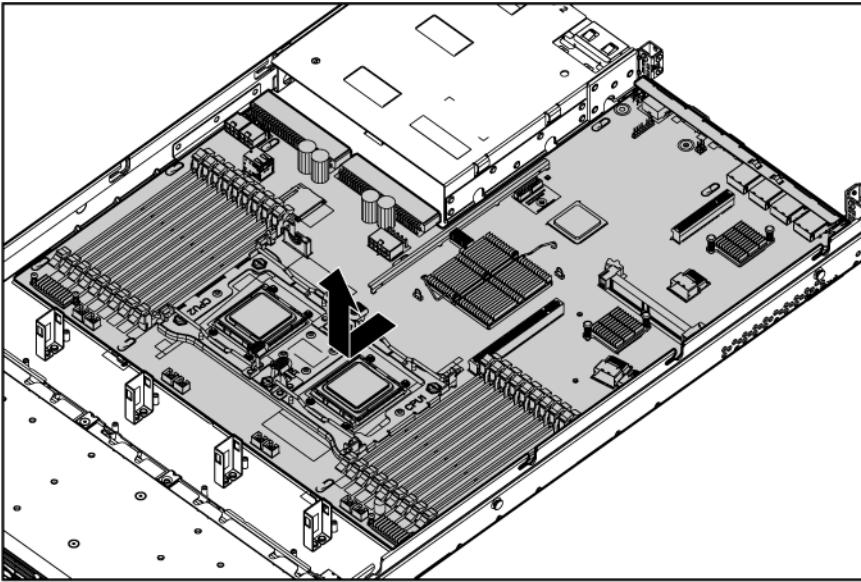
18. Using your fingers, remove the processor from the failed system board.



-
- △ **CAUTION:** To avoid damage to the system board:
- Do not touch the processor socket contacts.
 - Always install the processor socket cover after removing the processor from the socket.
 - Do not tilt or slide the processor when lowering the processor into the socket.
-

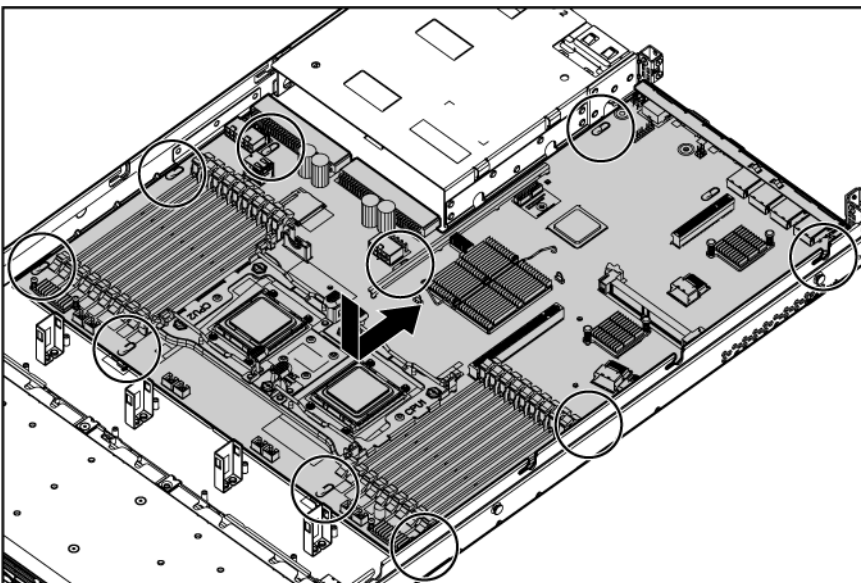
- △ **CAUTION:** To avoid damage to the processor:
- Handle the processor only by the edges.
 - Do not touch the bottom of the processor, especially the contact area.
-

19. Remove the failed system board.



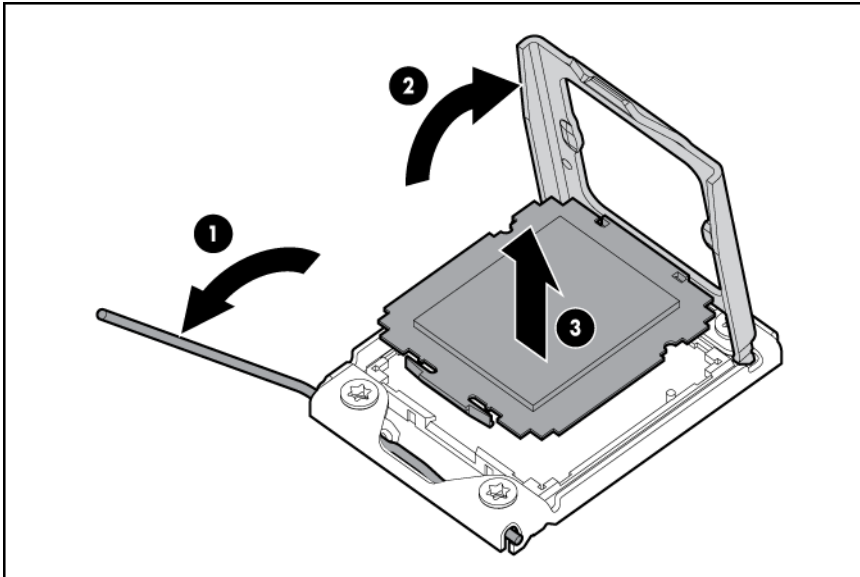
To replace the system board:

1. Align and install the spare system board in the server before installing the processor.



2. Prepare the processor socket on the spare system board:
- a. Open the processor retaining latch and the processor socket retaining bracket.

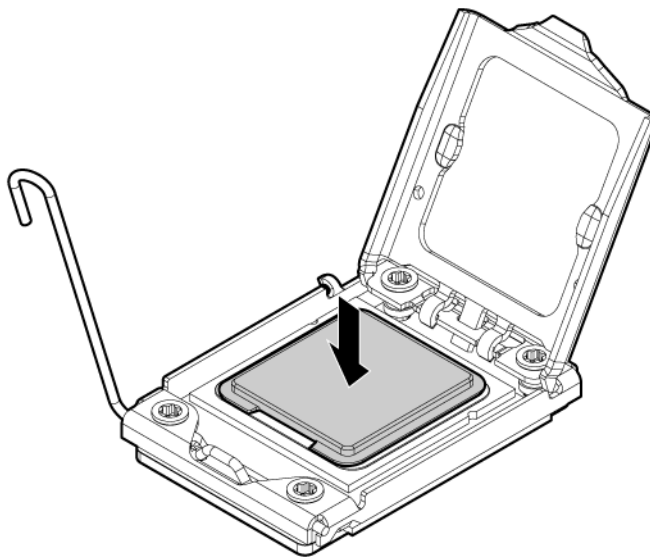
- b. Remove the processor socket protective cover.



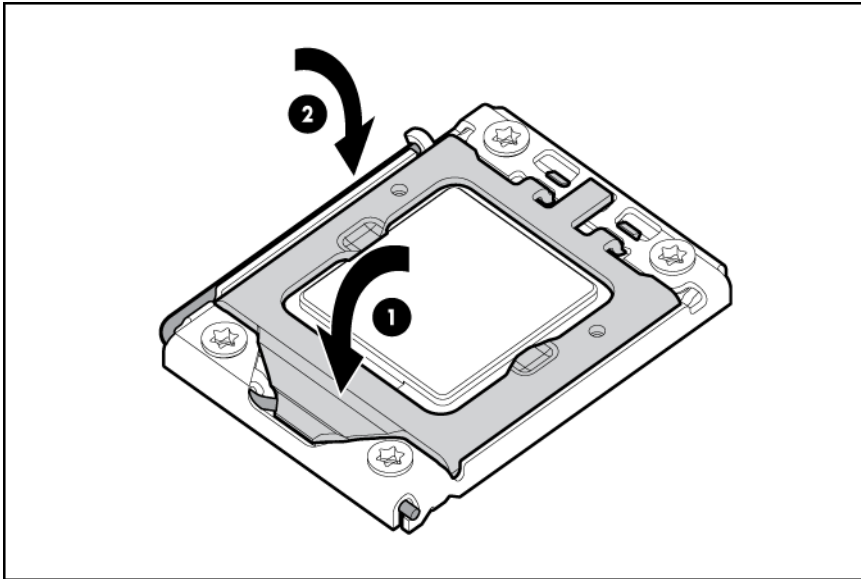
3. Install the processor socket cover onto the processor socket of the failed system board.
4. Install the processor on the spare system board.

△ **CAUTION:** The processor is designed to fit one way into the socket. Use the alignment guides on the processor and socket to properly align the processor with the socket. Refer to the server hood label for specific instructions.

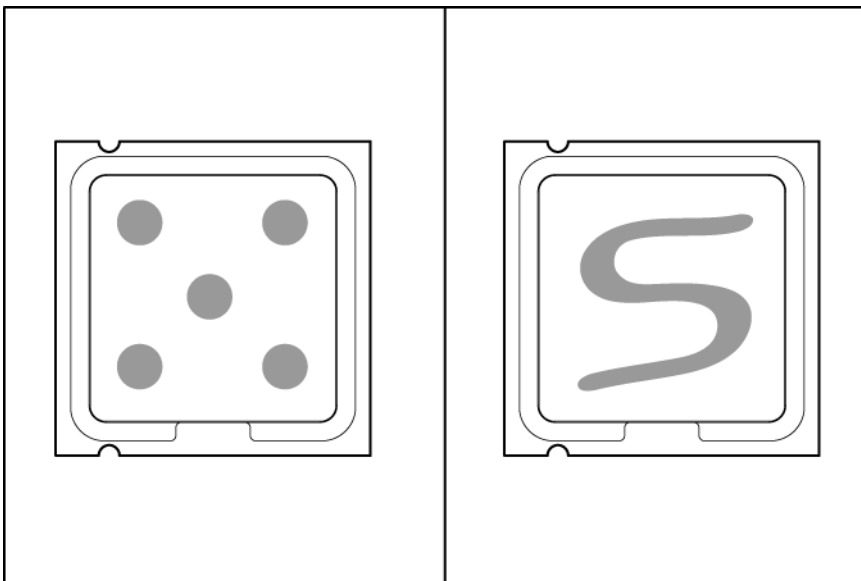
△ **CAUTION:** Always install the processor parallel to the system board to avoid damage to the pins.



5. Close the processor retaining latch and the processor socket retaining bracket.



6. 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.
7. Apply all the grease to the top of the processor in one of the following patterns to ensure even distribution.



8. Install the heatsink ("[Heatsink](#)" on page [33](#)).



IMPORTANT: To ensure proper cooling, be sure the processor air baffle is installed at all times (if applicable).

9. Install all components removed from the failed system board.



IMPORTANT: Install all components with the same configuration that was used on the failed system board.

10. Install the hard drives ("[SAS and SATA hard drive](#)" on page [18](#)).
11. Install all power supplies ("[Hot-plug power supply](#)" on page [19](#)).


12. Install the air baffle ("Air baffle" on page 26).
13. If removed, install the BBWC battery pack or the FBWC capacitor pack ("BBWC battery pack or FBWC capacitor pack" on page 25).
14. Install the access panel ("Access panel" on page 16).
15. Slide the server into the rack.
16. Power up the server.

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

1. During the server 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 warnings appear:
WARNING! WARNING! WARNING! The serial number is loaded into the system during the manufacturing process and should NOT be modified. This option should only be used by qualified service personnel. This value should always match the serial number sticker located on the chassis.
Warning: The serial number should ONLY be modified by qualified 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 personnel. This value should always match the Product ID 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 server 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 ("System board" on page 40). Contact an HP authorized service provider for a replacement system board and TPM board.

Cabling

Cabling overview

This section provides guidelines that help you make informed decisions about cabling the server and hardware options to optimize performance.

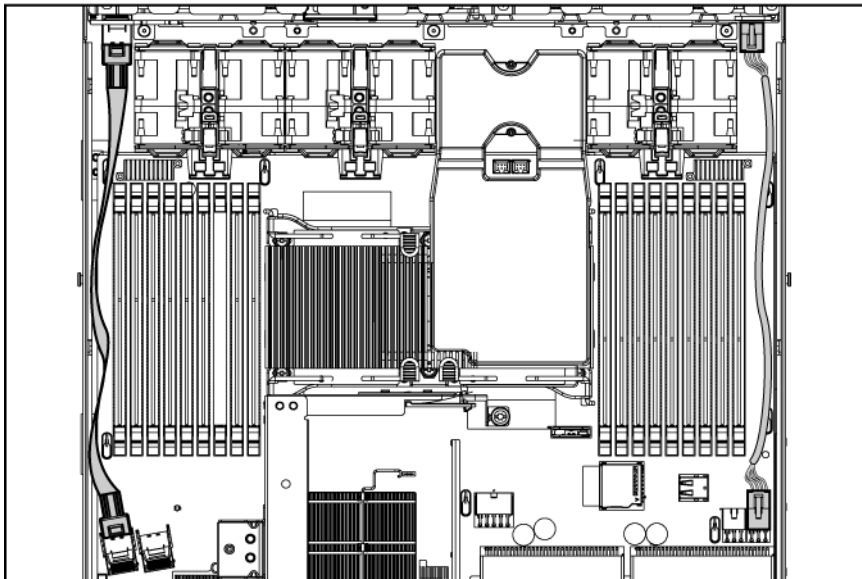
For information on cabling peripheral components, refer to the white paper on high-density deployment at the HP website (<http://www.hp.com/products/servers/platforms>).

- △ **CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

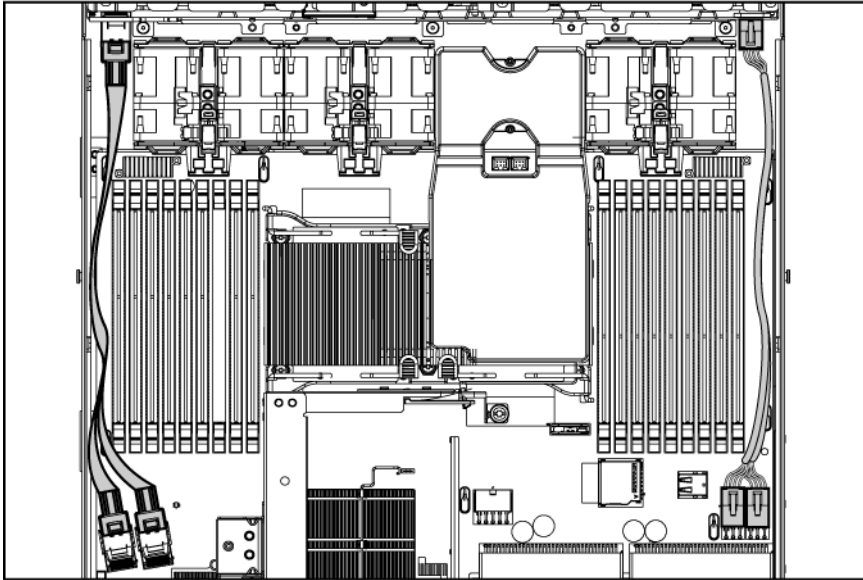
Hard drive backplane cabling

The server ships with one hard drive backplane that supports four hard drives. Installation of the optional, second hard drive backplane enables the server to support eight hard drives.

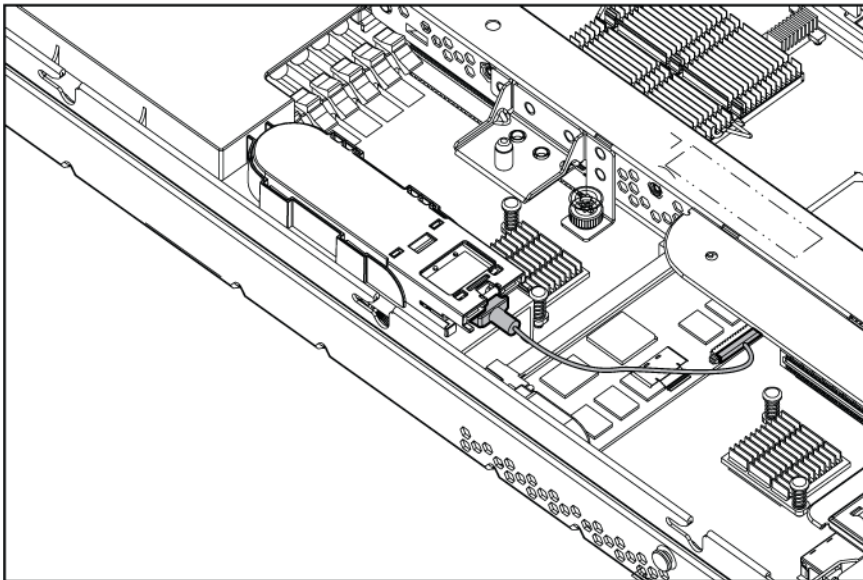
- Hard drive backplane



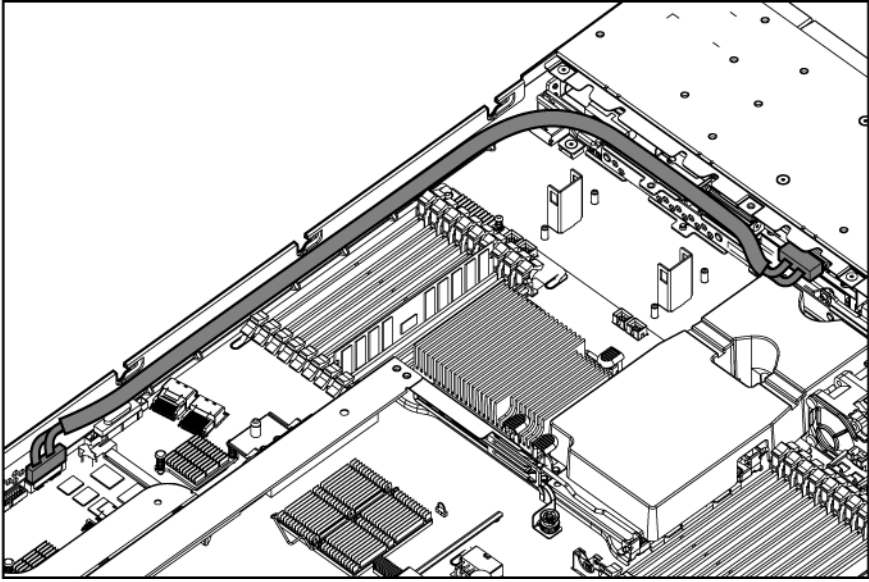
- Optional hard drive backplane



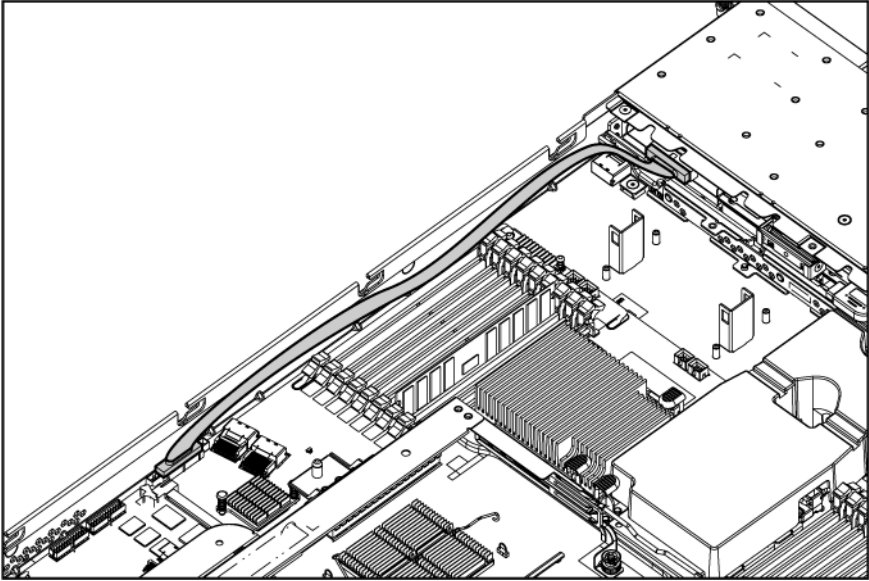
BBWC battery pack or FBWC capacitor pack cabling



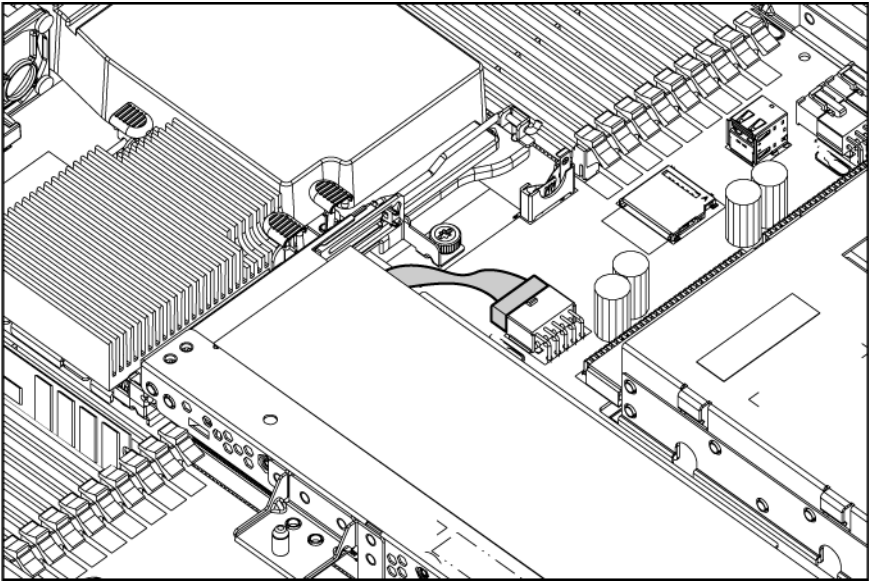
DVD-ROM and DVD-RW drive cabling



Power button and Systems Insight Display cabling



PCI power cabling



Diagnostic tools

Troubleshooting resources

The *HP ProLiant Servers Troubleshooting Guide* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance on ProLiant servers and server blades. This guide includes problem-specific flowcharts to help you navigate complex troubleshooting processes. To view the guide, select a language:

- English (http://www.hp.com/support/ProLiant_TSG_en)
- French (http://www.hp.com/support/ProLiant_TSG_fr)
- Italian (http://www.hp.com/support/ProLiant_TSG_it)
- Spanish (http://www.hp.com/support/ProLiant_TSG_sp)
- German (http://www.hp.com/support/ProLiant_TSG_gr)
- Dutch (http://www.hp.com/support/ProLiant_TSG_nl)
- Japanese (http://www.hp.com/support/ProLiant_TSG_jp)

HP ROM-Based Setup Utility

RBSU is a configuration utility embedded in ProLiant servers that performs a wide range of configuration activities that can include the following:

- Configuring system devices and installed options
- Enabling and disabling system features
- Displaying system information
- Selecting the primary boot controller
- Configuring memory options
- Language selection

For more information on RBSU, see the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (<http://www.hp.com/support/smartstart/documentation>).

HP Insight Diagnostics

HP Insight Diagnostics is a proactive server management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server 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, launch the SmartStart CD.

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

For more information or to download the utility, refer to the HP website (<http://www.hp.com/servers/diags>).

HP Insight Diagnostics survey functionality

HP Insight Diagnostics (on page 50) provides survey functionality that gathers critical hardware and software information on ProLiant servers.

This functionality supports operating systems that may not be supported by the server. For operating systems supported by the server, 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 SmartStart-assisted HP Insight Diagnostics installation, or it can be installed through the HP PSP.

NOTE: The current version of SmartStart provides the memory spare part numbers for the server. To download the latest version, see the HP website (<http://www.hp.com/support>).

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 Survey Utility
- From within operating system-specific IML viewers
 - For NetWare: IML Viewer
 - For Windows®: IML Viewer
 - For Linux: IML Viewer Application
- From within the iLO 3 user interface
- From within HP Insight Diagnostics (on page 50)

For more information, see the Management CD in the HP Insight Foundation suite for ProLiant.

Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the HP SIM console or through RBSU.

HP Insight Remote Support software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service, or HP contractual support agreement. HP Insight Remote Support supplements your monitoring 24 x 7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- **HP Insight Remote Support Standard:** This software supports server and storage devices and is optimized for environments with 1–50 servers. Ideal for customers who can benefit from proactive notification but do not need proactive service delivery and integration with a management platform.
- **HP Insight Remote Support Advanced:** This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

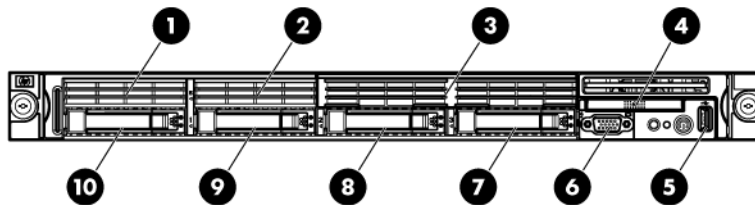
Details for both versions are available on the HP website (<http://www.hp.com/go/insightremotesupport>).

To download the software, go to Software Depot (<http://www.software.hp.com>).

Select **Insight Remote Support** from the menu on the right.

Component identification

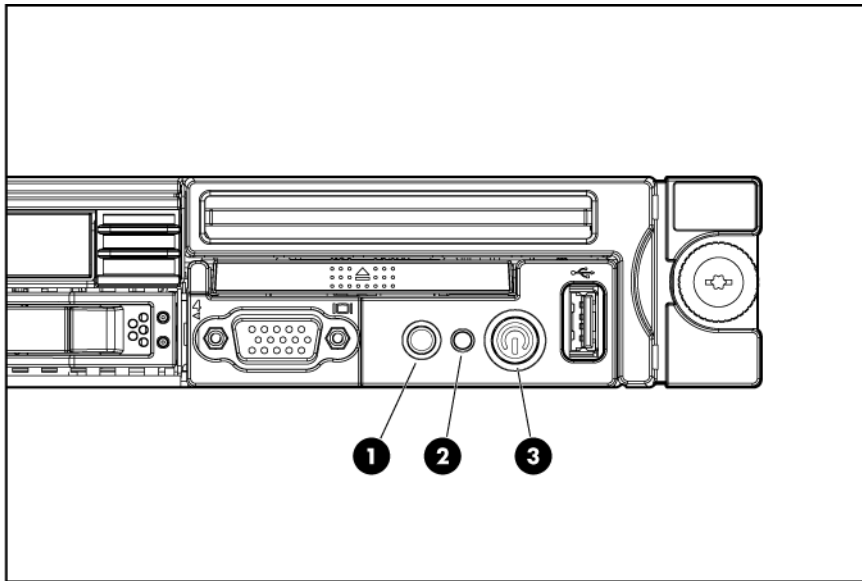
Front panel components



Item	Description
1	Hard drive bay 5 (optional)*
2	Hard drive bay 6 (optional)*
3	DVD tray/hard drive bays 7 and 8 (optional)*
4	HP Systems Insight Display
5	Front USB connector
6	Video connector
7	Hard drive bay 4
8	Hard drive bay 3
9	Hard drive bay 2
10	Hard drive bay 1

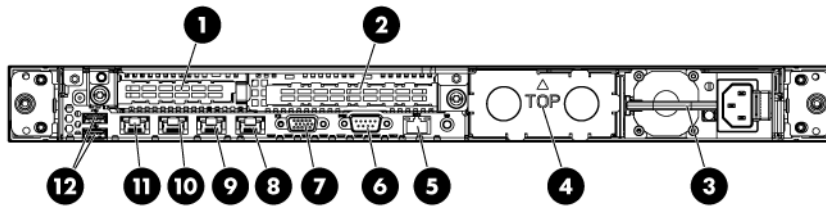
*An optional hard drive backplane is required when the server is configured with eight hard drives.

Front panel LEDs and buttons



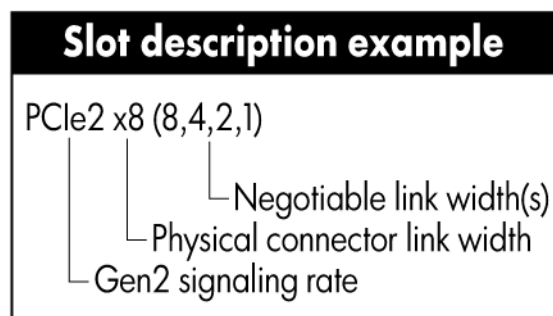
Item	Description	Status
1	UID LED/button	Blue = Identification is activated. Flashing blue = System is being managed remotely. Off = Identification is deactivated.
2	Health LED	Green = System health is normal. Amber = System health is degraded. To identify the component in a degraded state, see "Systems Insight Display LEDs (on page 59)". Red = System health is critical. To identify the component in a critical state, see "Systems Insight Display LEDs (on page 59)". Off = System health is normal (when in standby mode).
3	Power On/Standby button and system power LED	Green = System is on. Amber = System is in standby, but power is still applied. Off = Power cord is not attached, power supply failure has occurred, no power supplies are installed, facility power is not available, or the power button cable is disconnected.

Rear panel components

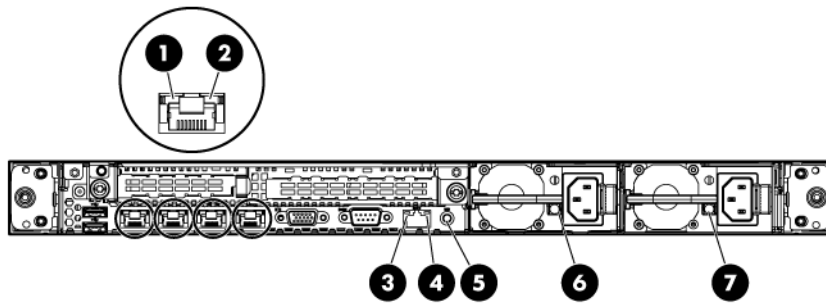


Item	Description
1	Slot 1 PCIe2 x8 (8, 4, 2, 1)
2	Slot 2 PCIe2 x16 (16, 8, 4, 2, 1), 75W +EXT 75W*
3	Power supply bay 1 (populated)
4	Power supply bay 2
5	iLO 3 connector
6	Serial connector
7	Video connector
8	NIC 4 connector
9	NIC 3 connector
10	NIC 2 connector
11	NIC 1 connector
12	USB connectors (2)

*This expansion slot provides 75 W of power to an adapter, with an additional 75 W of power supplied by external power.

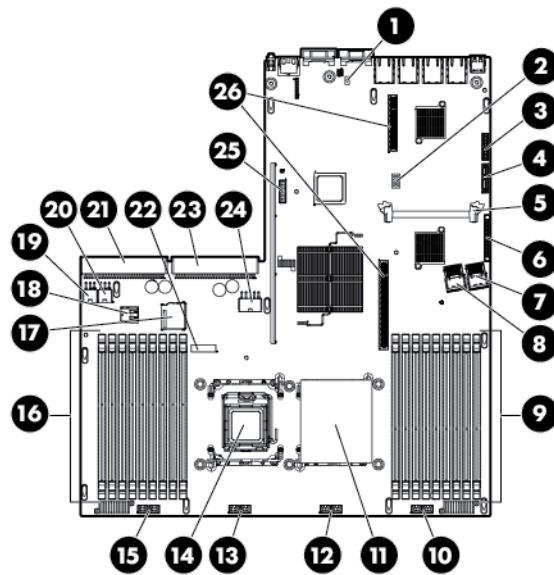


Rear panel LEDs and buttons



Item	Description	Status
1	10/100/1000 NIC activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
2	10/100/1000 NIC link LED	Green = Link exists. Off = No link exists.
3	iLO 3 NIC activity LED	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
4	iLO 3 NIC link LED	Green = Link exists. Off = No link exists.
5	UID button/LED	Blue = Identification is activated. Flashing blue = System is being managed remotely. Off = Identification is deactivated.
6	Power supply 2 LED	Green = Normal Off = One or more of the following conditions exists: <ul style="list-style-type: none"> • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit
7	Power supply 1 LED	Green = Normal Off = One or more of the following conditions exists: <ul style="list-style-type: none"> • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit

System board components

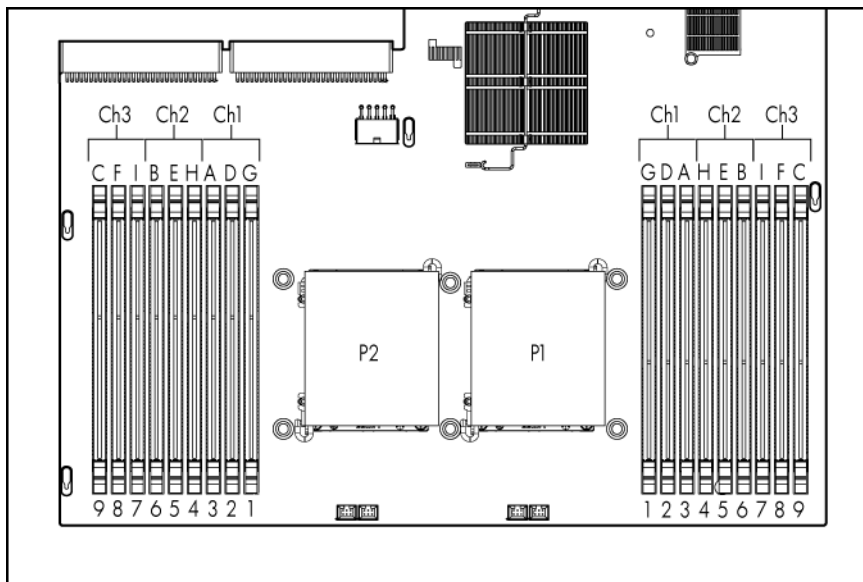


Item	Description
1	NMI jumper
2	System maintenance switch
3	10Gb sideband connector
4	SATA DVD-ROM drive connector
5	SAS cache module connector
6	Power button connector
7	Hard drive data connector 1 (drives 1–4)
8	Hard drive data connector 2 (drives 5–8)
9	Processor 1 DIMM slots (9)
10	Fan module 4 connector
11	Processor socket 1 (populated)
12	Fan module 3 connector
13	Fan module 2 connector
14	Processor socket 2
15	Fan module 1 connector
16	Processor 2 DIMM slots (9)
17	SD card slot
18	Internal USB connector
19	Hard drive power connector 1
20	Hard drive power connector 2
21	Power supply connector 1
22	System battery

Item	Description
23	Power supply connector 2
24	PCI power connector
25	TPM connector
26	PCIe riser board connectors (2)

DIMM slots

DIMM slots are numbered sequentially (1 through 9) for each processor. The supported AMP modes use the letter assignments for population guidelines.



System maintenance switch

Position	Default	Function
S1	Off	Off = iLO 3 security is enabled. On = iLO 3 security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function On = Clear NVRAM
S7	—	Reserved

Position	Default	Function
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved

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.

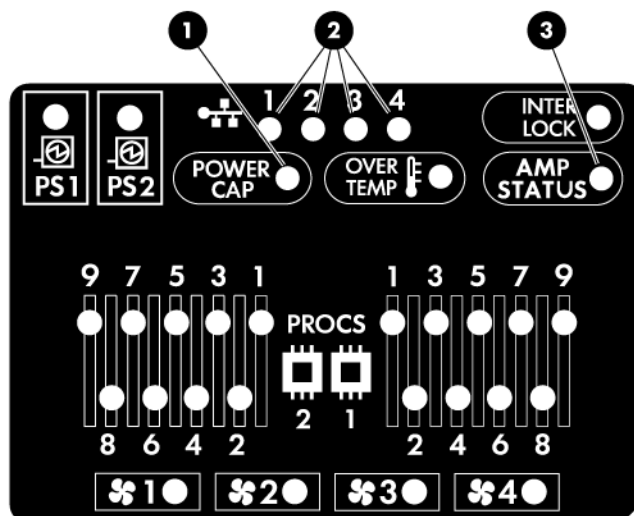
NMI jumper

The NMI jumper allows administrators to perform a memory dump before performing a hard reset. Crash dump analysis is an essential part of eliminating reliability problems, such as hangs or crashes in OSs, device drivers, and applications. Many crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that would support root cause analysis.

Systems running Microsoft® Windows® experience a blue-screen trap when the OS crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by temporarily shorting the NMI header with a jumper. The NMI event enables a hung system to become responsive again.

Systems Insight Display LEDs

The HP Systems Insight Display LEDs represent the system board layout. The display provides status for all internal LEDs and enables diagnosis with the access panel installed. To view the LEDs, access the HP Systems Insight Display.



Item	Description	Status
1	Power cap LED	To determine Power cap status, see "Systems Insight Display LED combinations (on page 60)."
2	NIC LEDs	Green = Network link exists. Flashing green = Network link and activity exist. Off = No link to network exists. If power is off, the front panel LED is not active. For status, see "Rear panel LEDs and buttons (on page 56)."
3	AMP status	Green = AMP mode enabled Amber = Failover Flashing amber = Invalid configuration Off = AMP mode disabled
—	All other LEDs	Amber = Failure Off = Normal For possible failure causes, see "Systems Insight Display LED combinations (on page 60)."

Systems Insight Display LED combinations

When the health LED on the front panel illuminates either amber or red, the server is experiencing a health event. Combinations of illuminated Systems Insight Display LEDs, the system power LED, and the health LED indicate system status.

Systems Insight Display LED and color	Health LED	System power LED	Status
Processor (amber)	Red	Amber	One or more of the following conditions may exist: <ul style="list-style-type: none"> • Processor in socket X has failed. • Processor X is not installed in the socket. • Processor X is unsupported. • ROM detects a failed processor during POST
Processor (amber)	Amber	Green	Processor in socket X is in a pre-failure condition.
DIMM (amber)	Red	Green	One or more DIMMs have failed.
DIMM (amber)	Amber	Green	DIMM in slot X is in a pre-failure condition.
Overtemperature (amber)	Amber	Green	The Health Driver has detected a cautionary temperature level.
Overtemperature (amber)	Red	Amber	The server has detected a hardware critical temperature level.
Interlock (amber)	Red	Green	The PCI riser board assembly is not seated properly.

Systems Insight Display LED and color	Health LED	System power LED	Status
Fan (amber)	Amber	Green	One fan has failed or has been removed.
Fan (amber)	Red	Green	Two or more fans have failed or been removed.
Power supply (amber)	Red	Amber	<ul style="list-style-type: none"> Only one power supply is installed and that power supply is in standby. Power supply fault System board fault
Power supply (amber)	Amber	Green	<ul style="list-style-type: none"> Redundant power supply is installed and only one power supply is functional. AC power cord is not plugged into redundant power supply. Redundant power supply fault Power supply mismatch at POST or power supply mismatch through hot-plug addition.
Power cap (off)	—	Amber	Standby
Power cap (green)	—	Flashing green	Waiting for power
Power cap (flashing amber)	—	Amber	Power cap has been exceeded.
Power cap (green)	—	Green	Power is available.



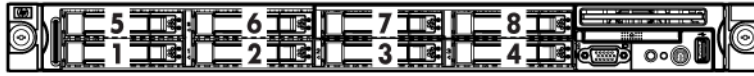
IMPORTANT: If more than one DIMM slot LED is illuminated, further troubleshooting is required. Test each bank of DIMMs by removing all other DIMMs. Isolate the failed DIMM by replacing each DIMM in a bank with a known working DIMM.

SAS and SATA device numbers

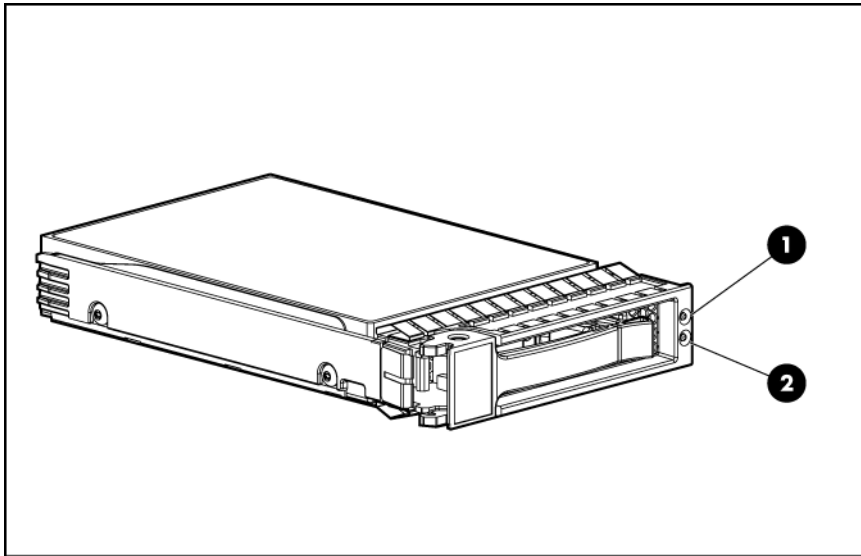
- Four-hard drive configuration



- Eight-hard drive configuration



SAS and SATA hard drive LEDs

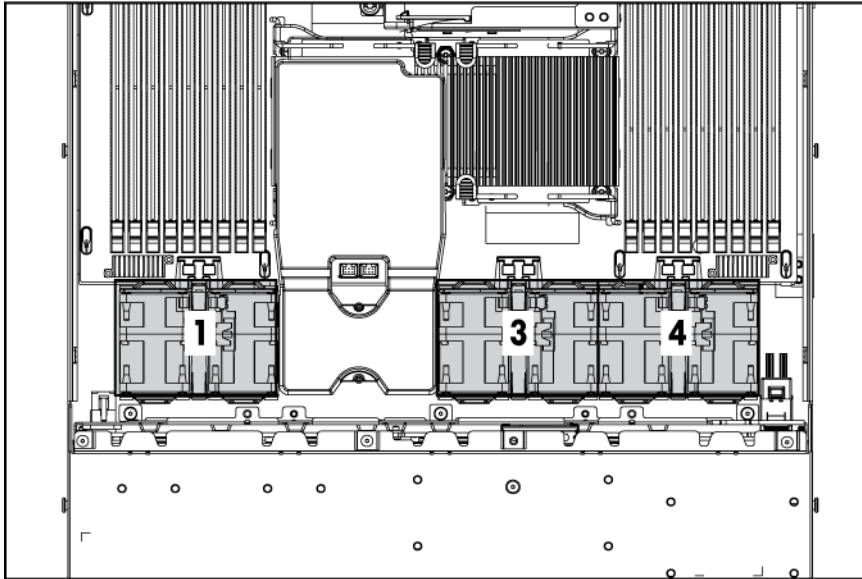


Item	Description
1	Fault/UID LED (amber/blue)
2	Online LED (green)

Fan modules

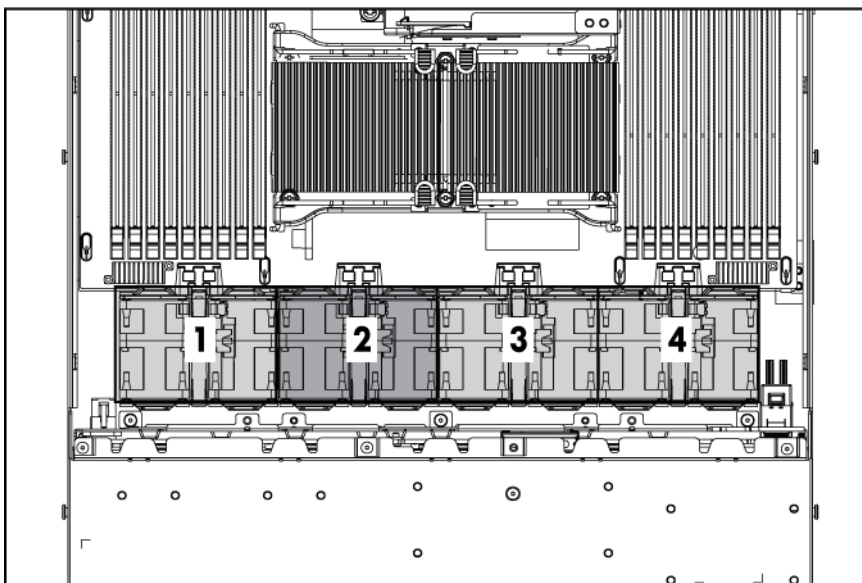
- One-processor configuration

When only one processor is installed, be sure the fan blank is always installed to ensure proper cooling.



- Two-processor configuration

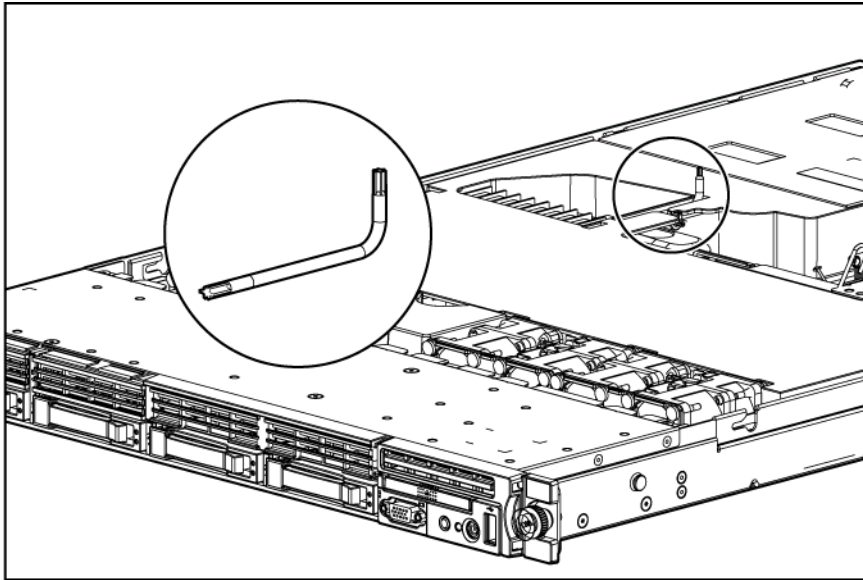
Install fan 2 only when processor 2 is installed. When only one processor is installed, always install the fan blank.



Item	Description
1	Fan module 1
2	Fan module 2
3	Fan module 3
4	Fan module 4

T-10/T-15 Torx screwdriver

The server includes a T-10/T-15 Torx screwdriver that ships on the air baffle. Use the screwdriver to loosen screws or thumbscrews, as needed, during procedures.



Specifications

Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
Relative humidity (noncondensing)**	
Operating	10% to 90%
Non-operating	5% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.

** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 kPa.

Server specifications

Specification	Value
Height	4.32 cm (1.70 in)
Depth	69.53 cm (27.38 in)
Width	42.62 cm (16.78 in)
Weight (maximum: two processors, two power supplies, eight hard drives)	15.97 kg (35.20 lb)
Weight (minimum: one processor, one power supply, no hard drives)	14.51 kg (32.00 lb)
Weight (no drives installed)	14.06 kg (31.00 lb)

Power supply specifications

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

- HP 460 W CS HE Power Supply (92%) specifications (on page [66](#))
- HP 460 W CS Platinum Power Supply (94%) specifications (on page [66](#))
- HP 750 W CS HE Power Supply (92%) specifications (on page [67](#))

- HP 750 W CS Platinum Power Supply (94%) specifications (on page 67)
- HP 1200 W CS HE Power Supply (90%) specifications (on page 68)
- HP 1200 W CS -48Vdc Power Supply specifications (on page 68)

HP 460 W CS HE Power Supply (92%) specifications

Specification	Value
Input requirements	
Rated input voltage	100 to 120 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	5.5 A at 100 VAC 2.6 A at 200 VAC
Rated input power	526 W at 100V AC input 505 W at 200V AC input
BTUs per hour	1794 at 100V AC input 1725 at 200V AC input
Power supply output	
Rated steady-state power	460 W at 100V to 120V AC input 460 W at 200V to 240V AC input
Maximum peak power	460 W at 100V to 120V AC input 460 W at 200V to 240V AC input

HP 460 W CS Platinum Power Supply (94%) specifications

Specification	Value
Input requirements	
Rated input voltage	100 to 120 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	5.3 A at 100 VAC 2.5 A at 200 VAC
Rated input power	512 W at 100V AC input 493 W at 200V AC input
BTUs per hour	1747 at 100V AC input 1683 at 200V AC input
Power supply output	
Rated steady-state power	460 W at 100V to 120V AC input

	460 W at 200V to 240V AC input
Maximum peak power	460 W at 100V to 120V AC input 460 W at 200V to 240V AC input

HP 750 W CS HE Power Supply (92%) specifications

Specification	Value
Input requirements	
Rated input voltage	100 to 120 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	8.9 A at 100 VAC 4.3 A at 200 VAC
Rated input power	857 W at 100V AC input 824 W at 200V AC input
BTUs per hour	2925 at 100V AC input 2812 at 200V AC input
Power supply output	
Rated steady-state power	750 W at 100V to 120V AC input 750 W at 200V to 240V AC input
Maximum peak power	750 W at 100V to 120V AC input 750 W at 200V to 240V AC input

HP 750 W CS Platinum Power Supply (94%) specifications

Specification	Value
Input requirements	
Rated input voltage	100 to 120 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	8.6 A at 100 VAC 4.2 A at 200 VAC
Maximum rated input power	841 W at 100V AC input 809 W at 200V AC input
BTUs per hour	2868 at 100V AC input 2761 at 200V AC input
Power supply output	

Rated steady-state power	750 W at 100V to 120V AC input 750 W at 200V to 240V AC input
Maximum peak power	750 W at 100V to 120V AC input 750 W at 200V to 240V AC input

HP 1200 W CS HE Power Supply (90%) specifications

Specification	Value
Input requirements	
Rated input voltage	100 to 120 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	9.7 A at 100 VAC 7.0 A at 200 VAC
Maximum rated input power	930 W at 100V AC input 1348 W at 200V AC input
BTUs per hour	3174 at 120V AC input 4600 at 200V to 240V AC input
Power supply output	
Rated steady-state power	800 W at 100V AC input 900 W at 120V AC input 1200 W at 200V to 240V AC input
Maximum peak power	800 W at 100V AC input 900 W at 120V AC input 1200 W at 200V to 240V AC input

HP 1200 W CS -48Vdc Power Supply specifications

Specification	Value
Input requirements	
Rated input voltage	-36V to -72V DC -48V DC, nominal input
Rated input frequency	Not applicable
Rated input current	38A at -36V DC 19A at -72V DC 28A at -48V DC, nominal input

Rated input power	1380 W at -36V DC input 1365 W at -72V DC input 1350 W at -48V DC, nominal input
BTUs per hour	4713 at -36V DC input 4662 at -72V DC input 4610 at -48V DC, nominal input
Power supply output	
Rated steady-state power	1200 W
Rated peak power	1200 W

△ **CAUTION:** This equipment is designed to permit the connection of the earthed conductor of the DC supply circuit to the earthing conductor at the equipment. See installation instructions.

△ **CAUTION:** This equipment is designed to permit the connection of the earthed conductor of the DC supply circuit to the earthing conductor at the equipment.

If this connection is made, all of the following must be met:

- This equipment should be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.
 - This equipment should be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the the point of earthing of the DC system. The DC system should be earthed elsewhere.
 - The DC supply source is to be located within the same premises as the equipment.
 - Switching or disconnecting devices should not be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.
-

△ **CAUTION:** To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel, as defined by the NEC and IEC 60950-1, Second Edition, the standard for Safety of Information Technology Equipment.
 - Connect the equipment to a reliably grounded safety extra low voltage (SELV) source. An SELV source is a secondary circuit that is designed so normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).
 - The branch circuit overcurrent protection must be rated 20A.
-

Hot-plug power supply calculations

For hot-plug power supply specifications and calculators to determine electrical and heat loading for the server, refer to the HP Enterprise Configurator website (<http://h30099.www3.hp.com/configurator/>).

Acronyms and abbreviations

ABEND

abnormal end

AMP

Advanced Memory Protection

ASR

Automatic Server Recovery

BBWC

battery-backed write cache

CSR

Customer Self Repair

FBWC

flash-backed write cache

iLO 3

Integrated Lights-Out 3

IML

Integrated Management Log

NMI

non-maskable interrupt

NVRAM

non-volatile memory

PCIe

peripheral component interconnect express

PCI-X

peripheral component interconnect extended

PSP

ProLiant Support Pack

RBSU

ROM-Based Setup Utility

SAS

serial attached SCSI

SATA

serial ATA

SFF

small form-factor

SIM

Systems Insight Manager

SSD

solid-state drive

UID

unit identification

USB

universal serial bus

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