

ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL

Facultad de Ingeniería Eléctrica y Computación

"DISEÑO DE UN CENTRO DE PROCESAMIENTO DE DATOS, DE APROXIMADAMENTE 300 M^2, PARA CERTIFICACIÓN TIER IV"

INFORME DE MATERIA DE GRADUACIÓN

Previa a la obtención del Título de:

LICENCIADO EN REDES Y SISTEMAS OPERATIVOS DE RED

Presentado por:

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AGRADECIMIENTO

Agradezco a Dios por todas sus bendiciones, a mis padres por haberme apoyado siempre, a mi hermana por sus consejos, a mi enamorada por su apoyo en cada parte del proceso, y al Ing. Robert Andrade por su guía durante todo el proceso.

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Erwin Iván Bravo Macías



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RESUMEN

En la actualidad las empresas dedicadas a ofrecer servicios, manejan grandes cantidades de información (bases de datos de clientes, datos privados de negocio, etc.) o realizan transacciones y estos servicios se realizan vía internet, por lo que estas empresas necesitan una mayor velocidad en la transmisión de los datos, seguridad y disponibilidad al acceder a sus datos.

Enfocaremos el diseño del centro de procesamiento de datos para que sea tolerante a fallos, que permita planificar actividades de mantenimiento sin que ningún servicio crítico se vea afectado. Para cumplir con la certificación TIER IV nuestro centro de procesamiento de datos debe ofrecer una disponibilidad mínima del 99.995%.

Este Informe tiene como finalidad elaborar el diseño de un centro de datos en un área de trescientos metros cuadrados usando tecnología de punta y que cumpla la certificación TIER IV, para prestar servicios de almacenamiento de datos, respaldo de información y alojamiento web.

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ABREVIATURAS Y SIMBOLOGÍA

BTU	Unidad térmica británica
CPD	Centro de procesamiento de datos
CRAC	Acondicionador de aire para cuarto de computación
DC	Centro de datos
DCIM	Administrador de infraestructura del centro de procesamiento de datos
EoR	Final de la fila
FO	Fibra óptica
Gbps	Gigabits por segundo
HTTP	Protocolo seguro de transferencia de hipertexto
Hz	Hercios
Kg	Kilogramos
Kw	Kilovatios
Lbs	Libras
M	Metros
NOC	Centro de control de la red
NVR	Grabador de video en red
Ohms	Ohmios
PDU	Unidad de distribución de poder
ToR	Parte superior del gabinete
UPS	Fuente de suministro eléctrico
W	Vatios

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CAPÍTULO 1

ANTECEDENTES

1.1.Ubicación

Dependiendo de la vulnerabilidad de las zonas en Guayaquil se ha determinado que el centro de datos estaría situado en la Zona Industrial de Mapasingue (vía a Daule).



Figura 1.1: Ubicación geográfica del CPD.

La ventaja de usar esta ubicación es que se encontraría ubicado en una zona de fácil acceso, ya que contaríamos con 2 vías de acceso (como se muestra en la imagen), así como también rutas alternativas en caso de eventualidades. Otra ventaja es que por la ubicación los proveedores tendrían mayor facilidad de acceso en caso de reportarse problemas con sus servicios.



Figura 1.2: Vías de acceso al CPD.

Aparte de las vías principales existen varias vías secundarias o alternas que se podrían usar en caso de ser necesarias.

Estudios meteorológicos realizados (últimos 67 años) sobre la zona donde estará ubicado el centro de procesamiento de datos nos muestran los siguientes datos:

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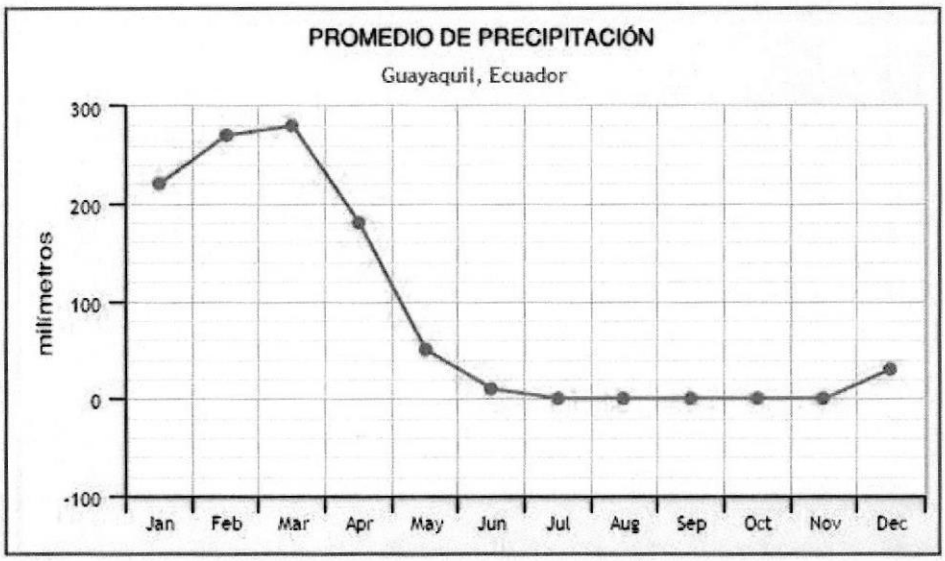


Figura 1.3: Estudio meteorológico de la zona donde se ubicará el CPD.

El promedio de precipitaciones sobre la ciudad es de menos de 300 mm al año en su punto máximo, y de valores cercanos a 0 mm en su punto mínimo, por lo que no presenta una amenaza directa para el funcionamiento normal del centro de procesamiento de datos que deseamos implementar.[1]

De la misma forma, la zona donde estaría ubicado el centro de procesamiento de datos está a 12 m sobre el nivel del mar, por lo cual no sufriría por inundaciones que se puedan dar en la ciudad.

Según los datos del Instituto Geofísico de la Escuela Politécnica Nacional, la ciudad de Guayaquil se encuentra ubicada en una zona que no ha sido

afectada por movimientos sísmicos fuertes en las últimas décadas, por lo que no representaría un riesgo latente. [2]

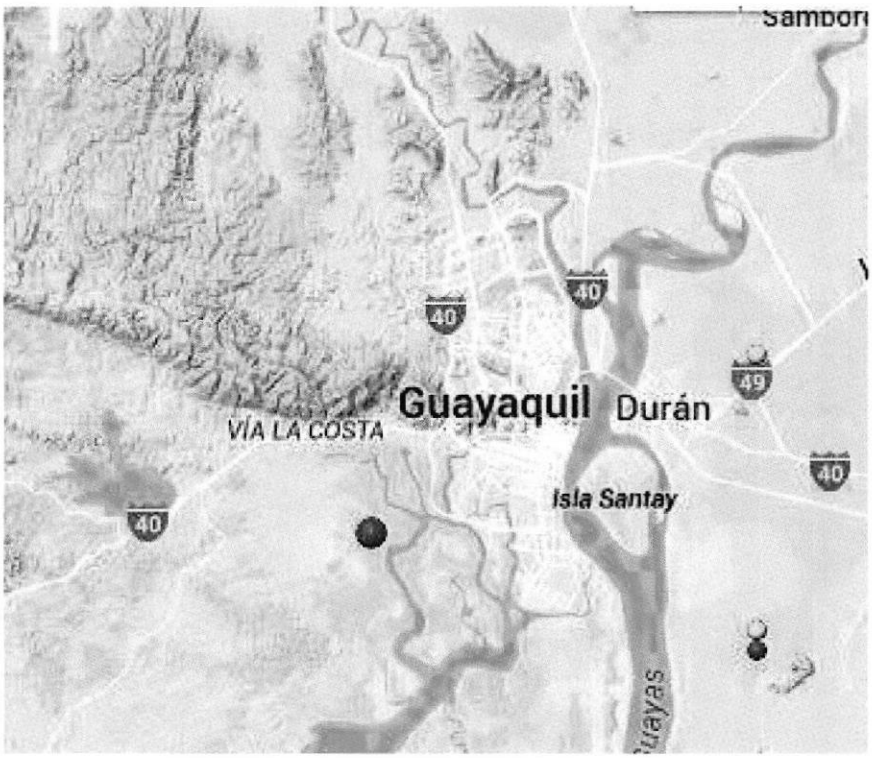


Figura 1.4: Mapa que indica las zonas que no han sido afectadas por movimientos sísmicos en Guayaquil, obtenidos del Instituto Geofísico de la Escuela Politécnica Nacional.

CAPÍTULO 2

DISEÑO DEL CENTRO DE DATOS

2.1.Requerimientos

Enfocaremos el diseño del centro de procesamiento de datos para que sea tolerante a fallos, para que permita planificar actividades de mantenimiento sin que ningún servicio crítico se vea afectado. Para cumplir con la certificación TIER IV nuestro centro de procesamiento de datos debe ofrecer una disponibilidad mínima del 99.995%.

Contará con múltiples componentes de respaldo (UPS, baterías, etc.) y rutas de redundancia, muchas de estas siempre activas. Soporta en el peor de los casos un incidente no planificado. Todos los equipos tendrán redundancia de datos y cableado eléctrico en circuitos separados.

Cumplirá con los estándares y normas para del sistema eléctrico, sistema de video vigilancia, sistema de control de acceso, sistema de intrusión, sistema contra-incendio y de cableado estructurado del centro de datos.

El centro de procesamiento de datos estará ubicado en la ciudad de Guayaquil en un sector de fácil acceso, y con varias rutas alternativas en caso de eventualidades.

2.2.Nivel de redundancia

TIER IV: 2(n+1)

Cuenta con múltiples componentes y rutas de redundancia, muchas de estas siempre activas. Soporta en el peor de los casos un incidente no planificado. Todos los equipos tienen redundancia de datos y cableado eléctrico en circuitos separados.

Mayor protección para incidentes naturales como terremotos, huracanes o inundaciones. En el mejor de los casos tendrá una disponibilidad del 99,995%, ya que el tiempo de corte que debería ser por una prueba planeada de la alarma contra incendios o un corte de emergencia de energía, no duraría más de unos cuantos minutos al año.

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2.3.Dimensiones

Estará diseñado en un espacio de 300 metros cuadrados (20.4 m x 15 m) y con un techo ubicado a una altura de 4 metros (casi 2 metros por encima del extremo superior del gabinete), cumpliendo con la norma ICREA-STD-131-2009 que especifica una distancia mínima de 60 cm entre el extremo superior del gabinete y el techo del centro de datos.

2.4.Obra civil

Construcción

Para la construcción de la estructura del centro de procesamiento de datos seguiremos las recomendaciones y lineamientos del ICREA-STD-131-2009.

La edificación debe cumplir con un estándar de resistencia al fuego de Tipo I – Edificaciones Resistentes al Fuego (NFPA 220).

Los edificios resistentes al fuego pueden utilizarse para muchos propósitos diferentes, tales como oficinas, centros comerciales, o viviendas residenciales. El requisito estructural crítico para edificios de Tipo I es que todas las paredes, pisos, techos y elementos de soporte

deben ser de materiales no combustibles. Además, cualquier material no combustible que esté sujeto a estrés por altas temperaturas (por ejemplo el acero) debe ser protegido del calor para evitar la falla. Los elementos estructurales como muros de carga, columnas, vigas, pilares y pisos deben estar construidos de conformidad con las normas elaboradas como resultado de las pruebas de resistencia al fuego normalizado. Clasificaciones de resistencia al fuego van desde tan poco como dos horas para muros de carga interiores y cuatro horas para vigas, pilares y demás estructuras de soporte. [3]

Para las operaciones de supresión de fuego, la ventaja de las edificaciones de Tipo I es que el colapso estructural es poco probable. En varios casos, las edificaciones de tipo I se han quemado bien pasada la hora estándar para resistencia al fuego, pero no se han derrumbado, a pesar de que los edificios sufrieron deterioro estructural.

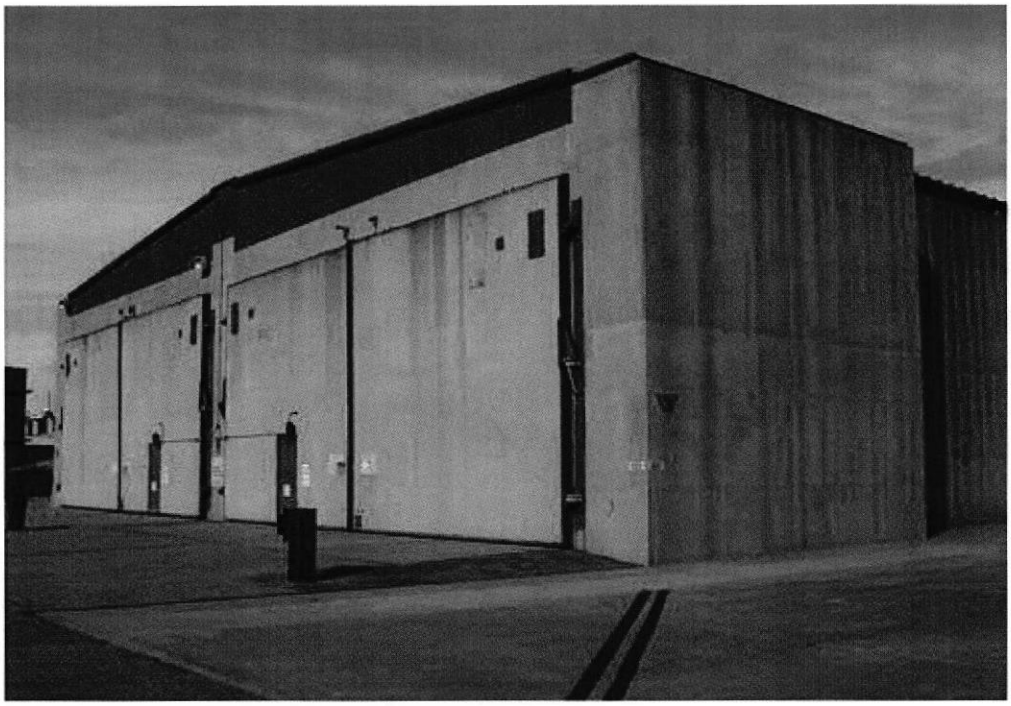


Figura 2.1: Aspecto relacionado en la estructura de la construcción del CPD.

Las edificaciones de Tipo I se construyen con estructuras de hormigón y acero revestido con un material resistente al fuego, lo más a menudo es una mezcla de concreto, y están diseñados para mantener el fuego durante un gran período de tiempo contenido en el sitio donde se originó. Del mismo modo, la estructura (tanto techo como muros) deben ser resistentes a ataques y sabotajes con Nivel 4 de protección, tal como lo indica la norma del ICREA-STD-131-2009. [4]

Piso falso

Se instalará una superficie de piso falso que cubre el centro de procesamiento de datos. Para evitar cualquier tipo de interferencia los cables de energía eléctrica recorrerán el cuarto de equipos por debajo del piso falso mediante bandejas sujetadas a los soportes de éste para que los cables no estén al ras del suelo.

El piso falso está constituido por baldosas independientes y removibles de 60 cm por 60 cm, en aluminio o carbonato de calcio, y recubiertas de un revestimiento plástico. Las baldosas reposarán sobre soportes de altura regulable. Estos soportes se colocan sobre el concreto de base que debe presentar una superficie lisa y estar provisto de pintura de recubrimiento de color rojo ladrillo a base de resinas epóxicas tal como indica la norma del ICREA-STD-131-2009.

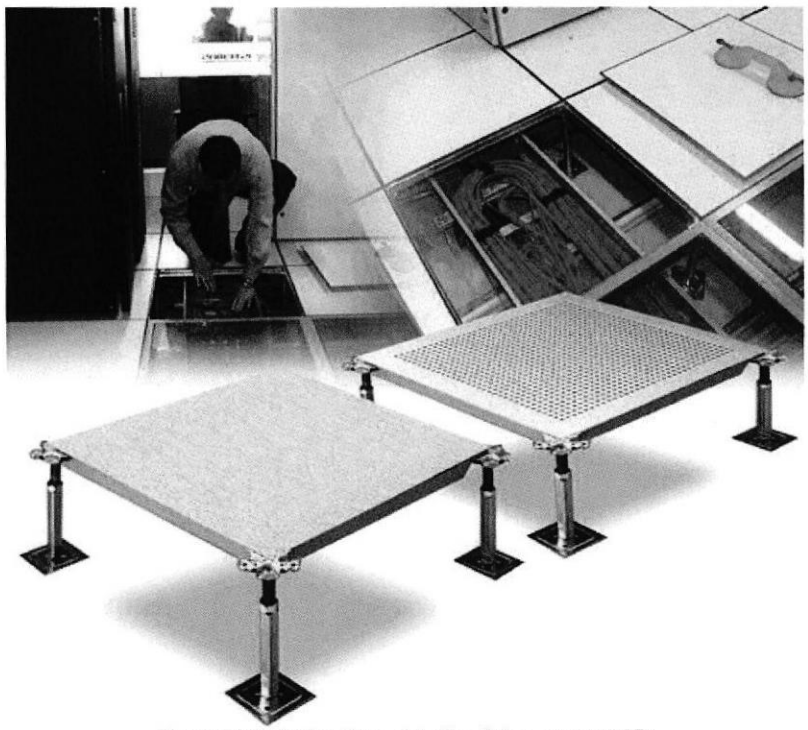


Figura 2.2: Estructura del piso falso en el CPD.

La altura del piso falso tiene una gran influencia en la eficiencia de la circulación de aire de las unidades de aire acondicionado. El piso falso estará colocado a una altura de 60 cm tal como lo indica la norma del ICREA-STD-131-2009.

La carga de algunos equipos en sus puntos de apoyo pueden ser de hasta 455 kg (1000 lbs), por lo que le piso falso debe ser capaz de soportar cargas concentradas de 455 kg en cualquier punto con una máxima deflexión de 2mm. Cada baldosa estará revestida de un material semi aislante, cuyas características eléctricas y resistividad asegura el aislamiento de cargas estáticas y la protección de las personas. La parte

metálica que recubre la parte inferior de las baldosas, además de permitir un primer aislamiento en caso de incendio, junto con los soportes, deben unirse eléctricamente a tierra, cuya resistencia eléctrica debe estar entre 1.5×10^5 y 2×10^{10} Ohms, constituyendo un blindaje antiestático.

Usualmente el piso falso contiene el cableado, tuberías y aire frío. Se requiere de un área libre de obstrucción para un adecuado suministro de aire frío a todo el centro de datos. De la misma forma las placas perforadas de piso deben ser colocadas únicamente en posiciones, donde el aire frío es realmente requerido para enfriar equipos, por lo que estarán ubicadas una tras otra a lo largo de los pasillos fríos del centro de datos.

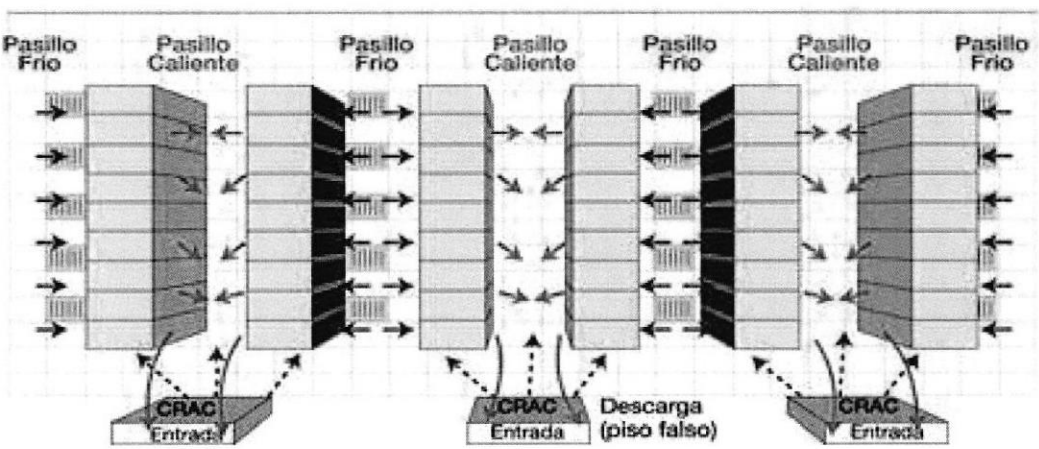


Figura 2.3: Pasillo frio y pasillo caliente en el CPD.

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2.5.Gabinetes y equipos

En el diseño de nuestro centro de procesamiento de datos se podrá utilizar los siguientes equipos de redes y almacenamiento de datos así como los gabinetes que contendrán estos equipos.

Gabinetes

El gabinete, que utilizaremos en todas las topologías de nuestro centro de procesamiento de datos, es el siguiente:

Sistema de gabinetes SeismicFrame® Serie Z4

Proporciona un refuerzo adicional requerido en zonas de terremotos para reducir el riesgo de daños en el equipo debido a eventos sísmicos.

Resguardan y protegen servidores esenciales de computadoras, almacenamiento de datos y equipos de red en salas de computación, salas de equipos y otras instalaciones ubicadas en zonas sísmicamente activas. [5]

Las características incluyen:

- Listado UL 2416 para una carga útil de equipos de 3000 lb (1360 kg) estática (no sísmica) y características de conexión y puesta a tierra integradas

- Múltiples opciones de tamaño, incluyendo gabinetes de 1200 m de profundidad para apoyar equipos más profundos, como switches de redes modulares y aplicaciones de servidores de alta densidad
- Los rieles de montaje de los equipos de profundidad ajustable cumplen con los requisitos de montaje
- Amplia variedad de accesorios de administración térmica y de cables
- Puntos de sujeción superior pre perforados para el montaje y el refuerzo del paso aéreo
- Incluye roldanas de transporte para mover el gabinete y colocarlo en su lugar durante la instalación inicial
- La instalación simplificada solo requiere anclaje al piso, lo que elimina la necesidad de costosos cálculos de ingeniería para refuerzos exteriores
- Los puntos de anclaje primarios y secundarios proporcionan flexibilidad en el anclaje del gabinete al suelo
- Diseñado para soportar la tensión sísmica de un terremoto de magnitud 8.3

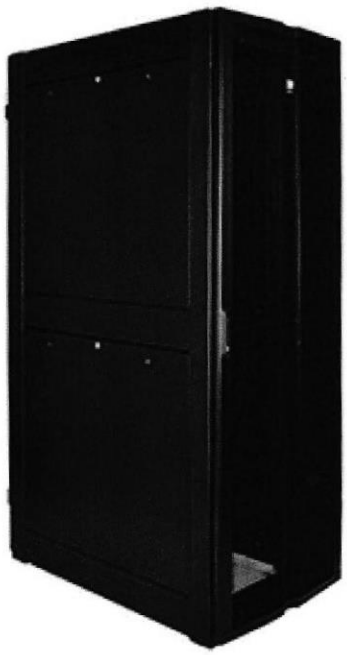


Figura 2.4: Gabinete que se utilizará en el CPD.

Equipos:

Switch Cisco Nexus de la serie 9000

La serie 9000 de Cisco Nexus proporciona la base de Infraestructura centrada en aplicaciones (ACI) de Cisco. Los switches ofrecen gran escalabilidad y rendimiento, y una eficiencia energética excepcional en un factor de forma compacto. Estos switches son ideales para implementaciones de agregación y de capa de acceso en redes empresariales, de proveedores de servicios y en la nube. [6]

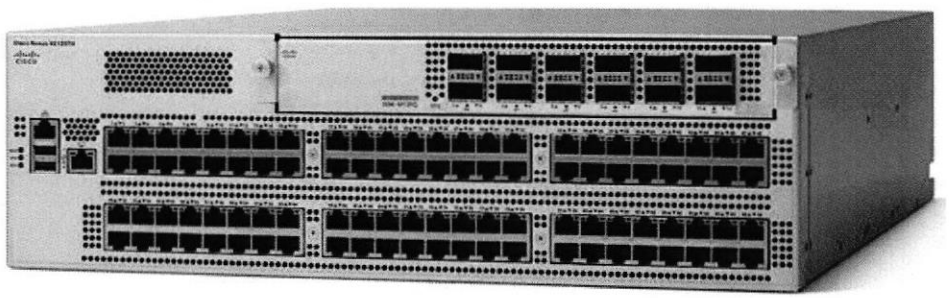


Figura 2.5: Switch Cisco Nexus Serie 9000.

Características y funcionalidades:

Los switches de la serie 9000 ofrecen configuraciones de 10/40/100 Gigabit Ethernet, tanto modulares como fijas, y se han diseñado para operar en uno de dos modos:

- El modo Cisco NX-OS para compatibilidad y coherencia con el portafolio actual de Cisco Nexus
- El modo ACI para aprovechar al máximo los servicios controlados por políticas y las características de automatización de infraestructura de la aplicación ACI

Soporte para ACI

- Diseñado para admitir el centro de datos de próxima generación de Cisco basado en una estrategia centrada en aplicaciones
- Diseñado para ofrecer implementación, simplicidad, agilidad y flexibilidad de aplicaciones

Capacidad de programación

- API inteligente para administrar el switch mediante llamadas de procedimientos remotos (JavaScript ObjectNotation o XML) sobre HTTP o HTTPS
- Acceso a Linux Shell y entorno de contenedor para personalizar la administración y la supervisión

Escalabilidad

- Un desempeño sin bloqueo de hasta 30 Tbps con una latencia inferior a cinco microsegundos
- Hasta 1152 puertos Ethernet de 10 Gbps, o 288 de 40 Gbps, sin bloqueo de capa 2 y capa 3
- Soporte para gateway VXLAN, puentes y routing a velocidad de cable

Alta disponibilidad

- Plenas capacidades de actualización de software en servicio (ISSU) de Cisco y parches sin ninguna interrupción en el funcionamiento
- Una combinación de circuitos integrados específicos para aplicaciones (ASIC), tanto de Cisco como de terceros, para mayor confiabilidad y rendimiento

Eficiencia energética

- Diseño de chasis sin plano medio para optimizar la circulación de aire y reducir los requisitos de energía
- Diseño optimizado con menos circuitos ASIC para un menor consumo energético
- Fuentes de alimentación eficientes con clasificación 80 Plus Platinum

Switches Cisco Nexus de la serie 7000

Para los centros de datos, la serie 7000 de Cisco Nexus ofrece una solución de extremo a extremo en una sola plataforma para el núcleo de datos, agregación y conectividad de servidor de extremo de la fila y parte superior del bastidor de alta densidad. Para implementaciones de núcleo de campus, proporciona una solución escalable, con gran capacidad de recuperación y de alto rendimiento. [7]

La plataforma Cisco Nexus de la serie 7000 se ejecuta en el software Cisco NX-OS. Se diseñó específicamente para las implementaciones más críticas en el centro de datos y el campus.

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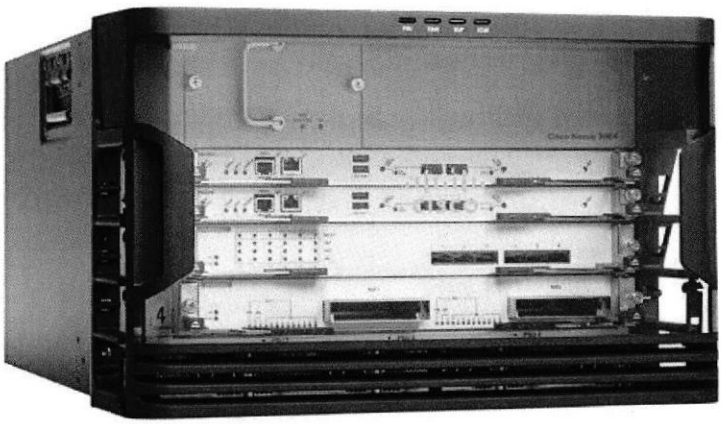


Figura 2.6: Switch Cisco Nexus Serie 7000.

Características y capacidades:

La serie 7000 de Cisco Nexus se diseñó con tres principios en mente:

- **Infraestructura escalable**: las capacidades de virtualización, alimentación y enfriamiento eficientes, alta densidad y alto rendimiento permiten el crecimiento de la infraestructura del centro de datos.
- **Continuidad operativa**: el diseño de Cisco Nexus integra hardware, características del software NX-OS y administración para permitir entornos con cero tiempos de inactividad.
- **Flexibilidad de transporte**: usted puede adoptar de manera progresiva y económica las más recientes innovaciones y tecnologías de red, tales como:

- Virtualización de transporte superpuesto de Cisco (Overlay Transport Virtualization, OTV)
- Cisco FabricPath
- Fibre Channel over Ethernet (FCoE)
- Cisco Locator/ID Separation Protocol (LISP)
- Cisco IOS Multiprotocol Label Switching (MPLS)

Switches Cisco Nexus de la serie 3000

El switch Cisco Nexus 3000 extiende el sistema Cisco Unified Fabric para el centro de datos. Es un switch altamente programable, estos switches de puerto fijo ofrecen una gestión simplificada, una visibilidad de red mejorada, y monitorización avanzada, todo esto respaldado por un consistente NX-OS.

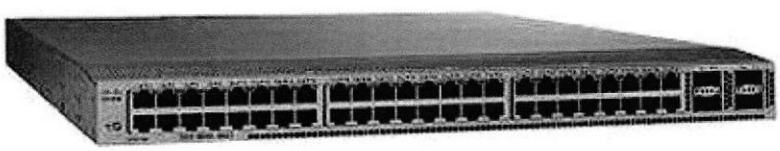


Figura 2.7: Switch Cisco Nexus Serie 3000.

Características y capacidades:

Los switches Cisco Nexus 3000 ofrecen 1/10 Gigabit Ethernet (GE) a velocidad de cable de Capa 2 y 3 de conmutación para topologías (ToR) top-of-gabinete en centros de datos.

Conmutación de Latencia Ultra Baja

El switch Nexus 3064 ofrece:

- Velocidad de capa 2 y capa 3 de conmutación de latencia ultra baja en todos los 64 puertos
- Diseño Phyless en todos los puertos para optimizar la latencia
- Rendimiento de 1.2 terabits por segundo (Tbps) y 950 millones de paquetes por segundo (Mpps)
- Soporta velocidades de 1/10/40 Gbps y 100 Mbps para máxima flexibilidad en capa física
- Bajo consumo energético, de aproximadamente 2 Watts por puerto de 10 Gigabit

CAPÍTULO 3

DISEÑO DEL CABLEADO

3.1.Estrella

Nuestro diseño contará con una topología estrella en el núcleo. Al final de cada fila de gabinetes, ubicaremos nuestro switch "final de la fila", el cual se conectará directamente al switch de núcleo. Las conexiones que se usarán hasta nuestro núcleo serán todas de fibra óptica.

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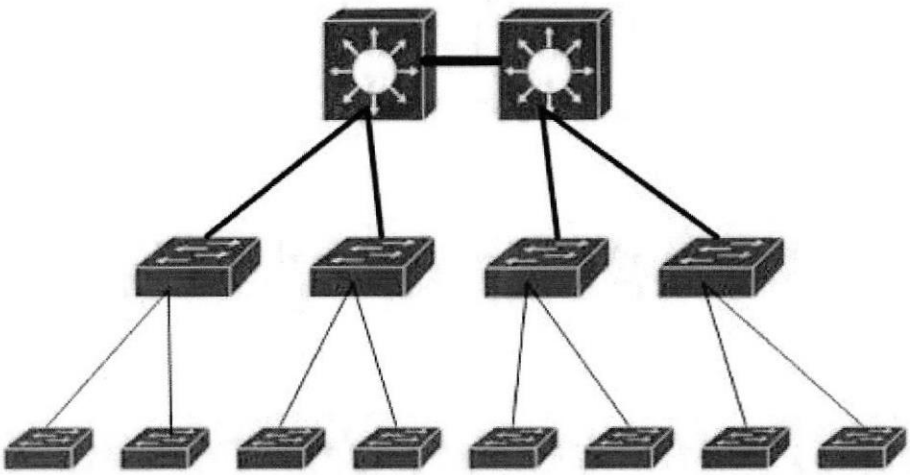


Figura 3.1: Diagrama de topología estrella.

3.2.Parte superior del gabinete

El diseño de nuestro centro de datos contara con una topología "parte superior del gabinete" para la administración independiente de los equipos en cada gabinete. El cableado dentro de cada gabinete seria de cobre hacia el equipo "parte superior del gabinete" con la tecnología 3 conexión que integra equipos de redes y servidores.

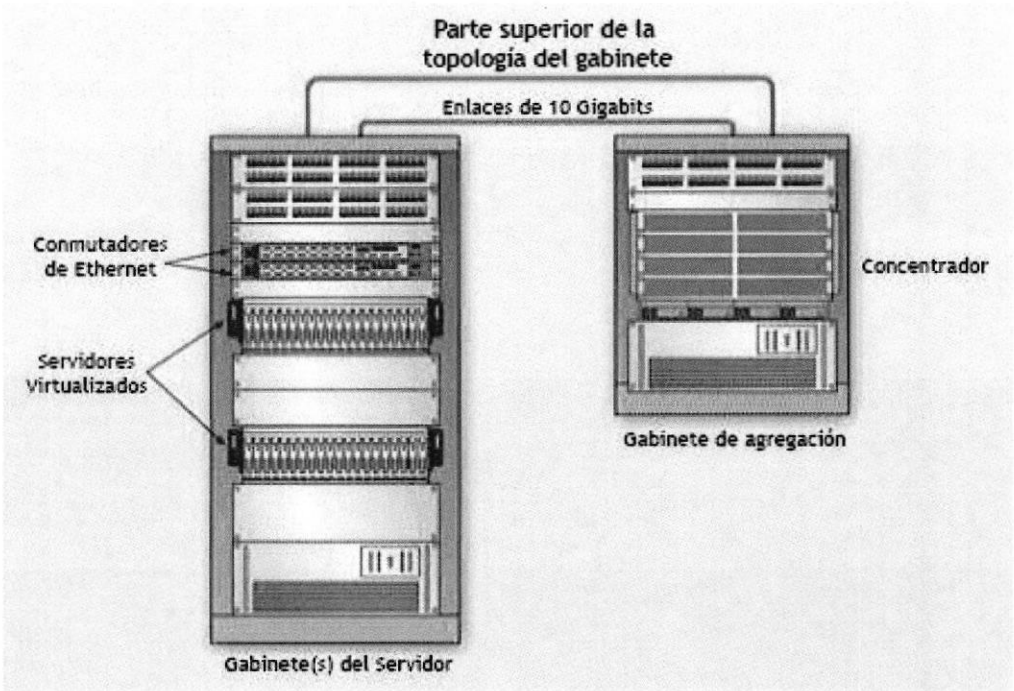


Figura 3.2: Diagrama de topología "parte superior del gabinete".

3.3.Final de la fila

El diseño de nuestro centro de datos contará con una topología “final de la fila” para la administración de cada fila de gabinetes. Estos equipos de comunicación estarán conectados al núcleo mediante cableado de fibra óptica.

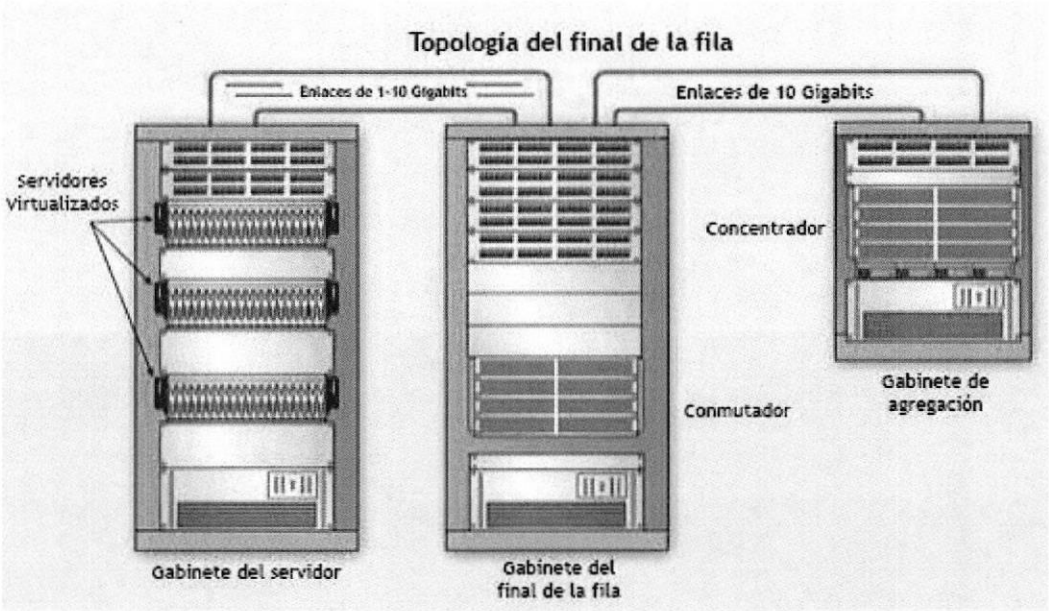


Figura 3.3: Diagrama de topología "final de la fila".

3.4.Direccionamiento IPv4

En el diseño de nuestro centro de procesamiento de datos constará con la siguiente tabla de direccionamiento según departamentos que la constituyen, este cálculo fue realizado en base a la información sobre el número de puertos de los equipos que tenemos en los gabinetes que son de capa de acceso, distribución y núcleo.

En la siguiente tabla detallamos el direccionamiento IPv4 que deberá implementarse en el centro de procesamiento de datos:

Tabla 1: Direccionamiento IPv4

TABLA DE DIRECCIONAMIENTO IPV4			
IP PRIVADA	172.16.0.0		16
ÁREA	**HOSTS**	**RED**	**MÁSCARA**
Datos (Usuarios)	1500	172.16.0.0	20
Administración	100	172.16.8.0	25
Servidores	100	172.16.8.128	25
Sistemas de Control	100	172.16.9.0	25
Invitado	50	172.16.9.64	26
Otros	50	172.16.9.128	26
Total	1900		

3.5.Canalización de fibra óptica y cobre

Para la canalización del cableado de fibra óptica utilizaremos el sistema RaceWay de HUBER+SUHNER, el cual ofrece una trayectoria rápida, segura y confiable para cables de fibra óptica entre varios puntos de distribución en la red.

- Posee un límite de radio de curvatura mínimo y consistente de 30 mm para ofrecer estabilidad de largo plazo en la transmisión de señales sin pérdida de luz causada por la tensión del cable.
- Una gran variedad de derivaciones en T, codos, cruces, bajadas, etc.
- Varios tamaños disponibles hasta 300 mm.
- Fijado y extracción sencilla de las piezas (no se requieren herramientas especiales).

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- Material sin halógeno, retardador de llama (UL94 V-0) y resistente a rayos UV.

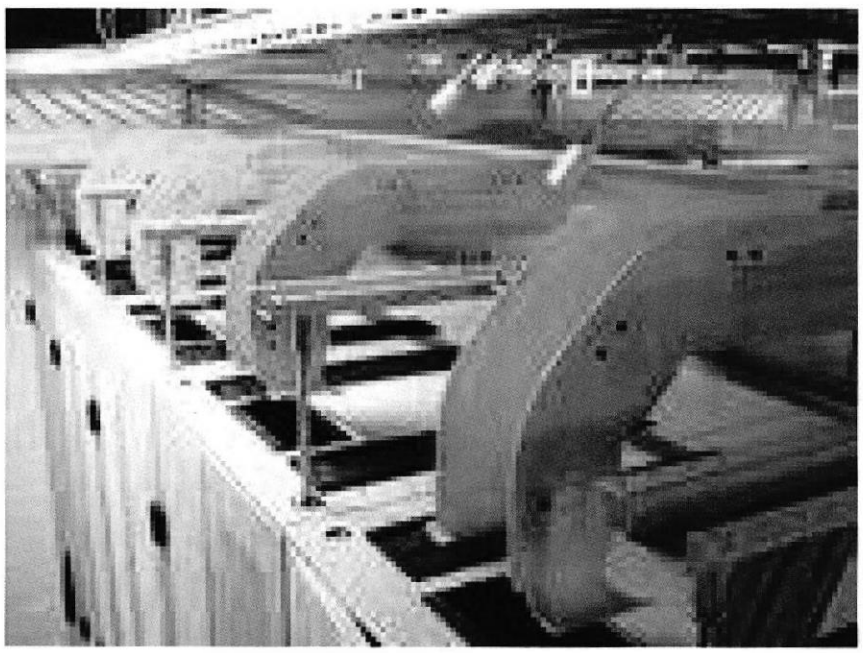


Figura 3.4: Estructura de la canalización de fibra óptica.

CAPÍTULO 4

SISTEMAS DE CONTROL

4.1.Sistema de energía eléctrica

Acometida principal

Para nuestro centro de procesamiento de datos, la Empresa Eléctrica de Guayaquil nos suministrará el servicio eléctrico de media tensión en una conexión trifásica a 13800 voltios.

Debido a que en la ciudad de Guayaquil no existe otra empresa proveedora de energía eléctrica, nuestro plan de contingencia será recibir 2 acometidas de diferentes subestaciones.

Tomando en cuenta la carga de nuestro centro de procesamiento de datos es necesario la adquisición e instalación de transformadores, los

cuales deben tener una capacidad de por lo menos 500 KVA cada uno, e irán configurados individualmente para cada acometida entrante.

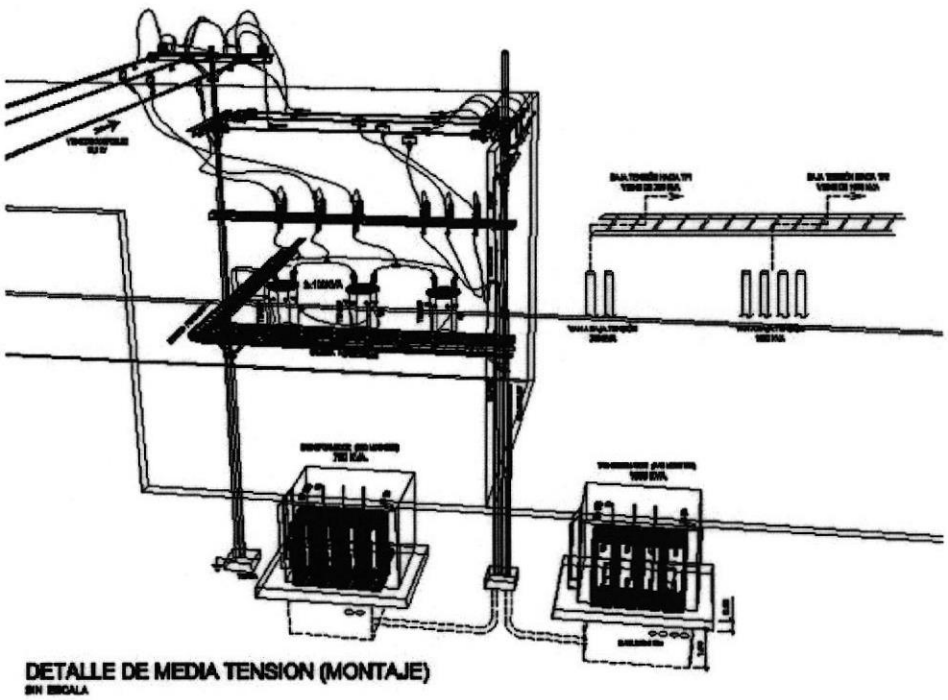


Figura 4.1: Acometida eléctrica.

Cálculo de corrientes en el centro de procesamiento de datos

Calcular el valor de las corrientes en los gabinetes es un proceso necesario para poder determinar el tipo de breakers necesarios para usar en el tablero de distribución.

Este tablero de distribución debe controlar el paso de la energía desde los UPS hasta los PDU's y posteriormente a los equipos de TI, por lo que tienen que ser los adecuados de acuerdo a la corriente en el circuito.

A continuación mostramos una tabla con el cálculo de las corrientes en cada gabinete:

Tabla 2: Corrientes de cada tipo de gabinete

Cantidad	Gabinete	Corriente Efectiva	Corriente Pico	Corriente Pico Total
66	De servicios	22,95 A	32 A	2143 A
6	"final de la fila"	19,93 A	28 A	169 A
1	Núcleo	59,1 A	84 A	84 A
				2396 A

Cada gabinete será considerado como un circuito, por lo que necesitará un breaker con la capacidad necesaria. El cálculo del amperaje del cable para cada circuito (breaker), se realiza en base a un cálculo del 30% de aumento de consumo de energía eléctrica.

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La siguiente tabla resume el tipo de breaker necesario para cada tipo de gabinete:

Tabla 3: Tipos de breaker para cada gabinete

Tipo de gabinete	Corriente pico	Amperaje de breaker
De servicios	32 Amp	40 Amp
"final de la fila"	28 Amp	30 Amp
Núcleo	84 Amp	100 Amp

Tablero de distribución

De acuerdo con la norma del ICREA-STD-131-2009 y los requerimientos para obtener la certificación TIER IV, deben existir 2 tableros eléctricos que alimenten a los equipos de TI del centro de procesamiento de datos (redundancia). El primer tablero debe ser alimentado por el UPS principal con su respaldo y el segundo por el UPS secundario con su respaldo.

Estos tableros deben ser ubicados fuera del área de los equipos de TI en un ambiente controlado y debe poseer la seguridad necesaria para evitar que personas no capacitadas intervengan.

4.2.Sistema de puesta a tierra

El sistema de puesta a tierra para el cuarto de gabinetes será implementado instalando un sistema de malla, el cual estará conectado a la red de puesta a tierra del centro de procesamiento de datos.

Todos los gabinetes irán conectados directamente a la malla, ubicada debajo del piso falso, tal como se muestra en la figura a continuación:

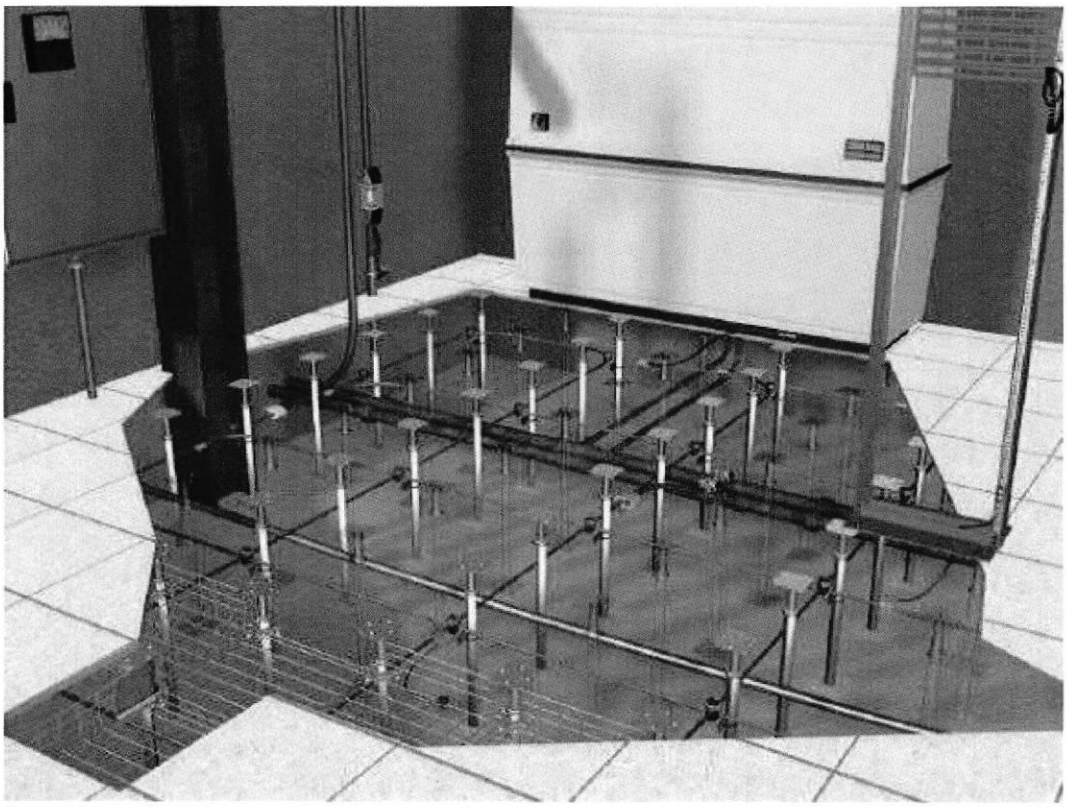


Figura 4.2: Sistema de puesta a tierra en el CPD.

Todos los gabinetes que usaremos en nuestro centro de procesamiento de datos cuentan con una barra de tierra, a la cual irán conectados todos los equipos del gabinete. Desde esta barra saldrá un conductor de cobre hacia la malla, tal como se muestra en la siguiente figura:

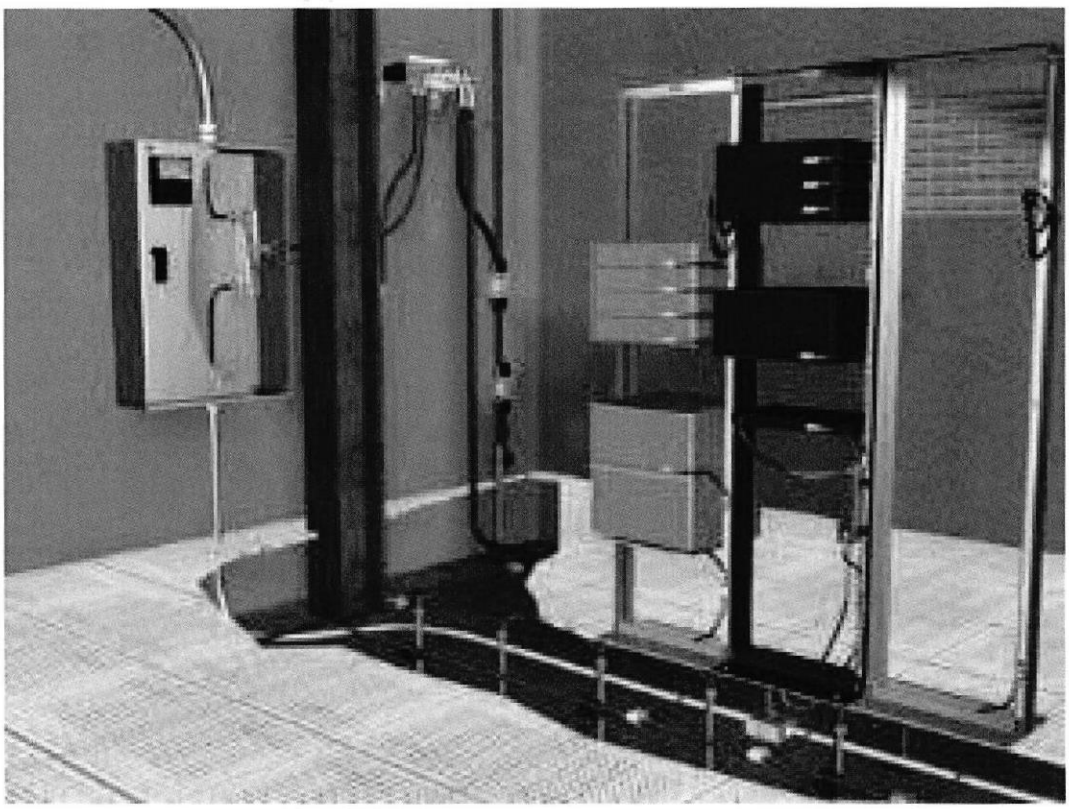


Figura 4.3: Gabinetes con sistema de puesta a tierra.

4.3.Sistema de energía regulada

El sistema de energía regulada está conformado por los UPS. Estos deben ser capaces de abastecer de energía eléctrica a los equipos de TI en el centro de procesamiento de datos en caso de que exista un corte de energía. A su vez se debe encargar de alimentar con energía eléctrica limpia a las PDU's de cada gabinete.

Según las normas del ICREA-STD-131-2009 y para cumplir con los requerimientos para obtener la certificación TIER IV, la configuración de los UPS debe ser de 2(N+1), de tal forma que existan 2 UPS capaces de abastecer individualmente a los equipos de TI en el centro de procesamiento de datos y otros 2 UPS de las mismas características como componentes redundantes.

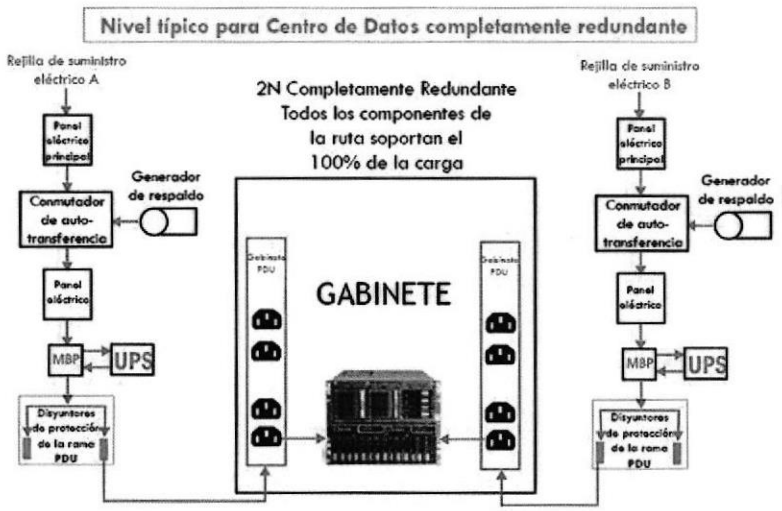


Figura 4.4: Diagrama de sistema de energía regulada.

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La capacidad de los UPS está medida por el total de carga de los equipos de TI en el centro de procesamiento de datos. Esa carga debe representar el 60% de la capacidad total del UPS, por lo que la capacidad del UPS debe ser un 40% mayor que la carga de equipos de TI.

A continuación detallamos las cargas de los equipos en todos los gabinetes:

Tabla 4: Cargas de los equipos en los gabinetes

CANTIDAD DE GABINETES	TIPO DE GABINETE	CARGA DE GABINETES
66	De servicios	333.29 KVA
6	"final de la fila"	26.31 KVA
1	Core	13 KVA
CARGA TOTAL DE EQUIPOS		**372.6 KVA**

De acuerdo a la carga de los equipos de TI en el centro de procesamiento de datos podemos calcular que, siendo los 372.6 KVA el 60% de la capacidad del UPS, los UPS que necesitaremos deberán soportar una carga de 621 KVA como mínimo. En total necesitaremos 4 equipos de esa capacidad para cumplir con las normas del ICREA-STD-131-2009 y con los requerimientos para la certificación TIER IV.

Como modelo de referencia usaremos un UPS de marca EATON modelo 9395, el cual está diseñado para centros de procesamiento de datos, brindando alta capacidad y versatilidad para así disminuir los tiempos de baja del sistema en caso de cortes del suministro de energía.

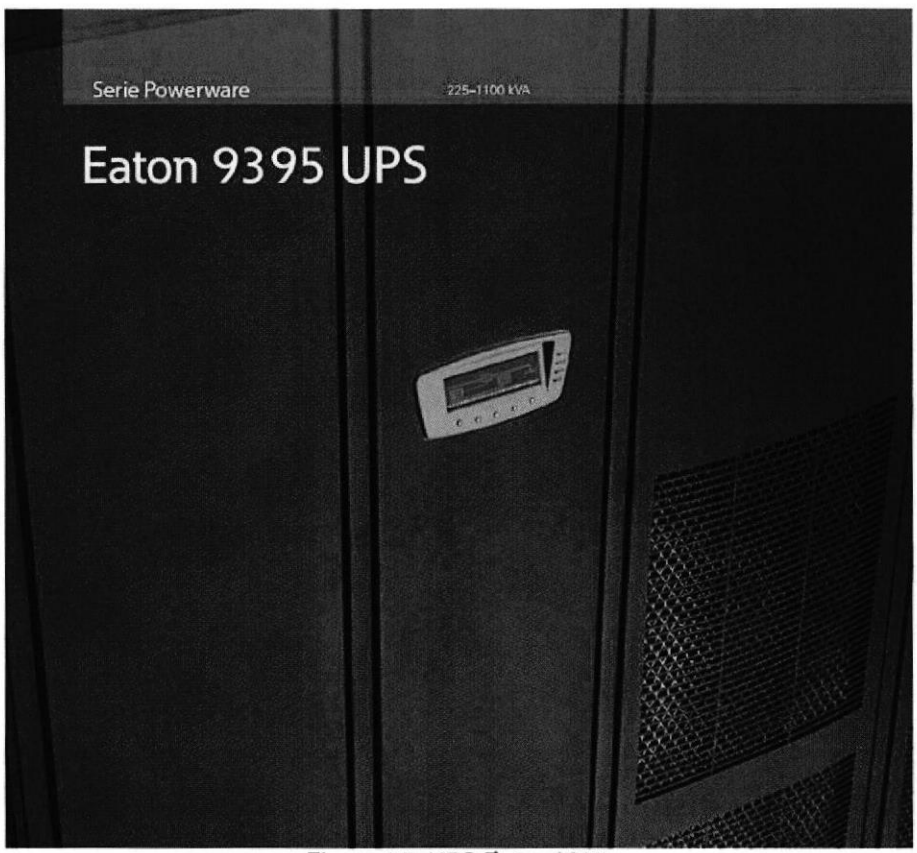


Figura 4.5: UPS Eaton 9395.

4.4.Sistema de generación eléctrica de apoyo

El sistema de generación eléctrica de apoyo para el centro de procesamiento de datos está compuesto por generadores eléctricos con motores de combustión interna alimentados a diésel.

Según lo establece la norma, la carga total del centro de procesamiento de datos debe ser cubierta por el generador eléctrico. Esta carga debe representar el 70% de la capacidad total de generación del equipo.

De la misma forma, para cumplir con el requerimiento para poder obtener la certificación TIER IV deben existir 2 generadores con la misma capacidad, de los cuáles, en caso de un corte de energía, solamente uno entre en funcionamiento, mientras que el otro queda de respaldo.

A continuación mostramos una tabla con la carga total del centro de procesamiento de datos:

Tabla 5: Carga total del CPD

Detalle	Consumo
Gabinetes	372.6 KVA
Luminarias	3.6 KVA
Luces de Emergencia	0.05 KVA
Sistema de Control de Acceso	0.036 KVA
Sistema Contra Incendios	0.66 KVA
Sistema de Climatización	25.9 KVA
CARGA TOTAL	**402.9 KVA**

De acuerdo a la carga total del centro de procesamiento de datos podemos calcular que, siendo los 402.9 KVA el 70% de la capacidad total del generador eléctrico, ambos generadores deberán tener la capacidad de proporcionar individualmente una carga de 575.57 KVA como mínimo.

Asimismo, la norma nos indica que cada generador debe poder alimentar a todo el centro de procesamiento de datos por un lapso de 2 horas, y a su vez debe contar con una reserva de combustible para una autonomía mínima de 72 horas.

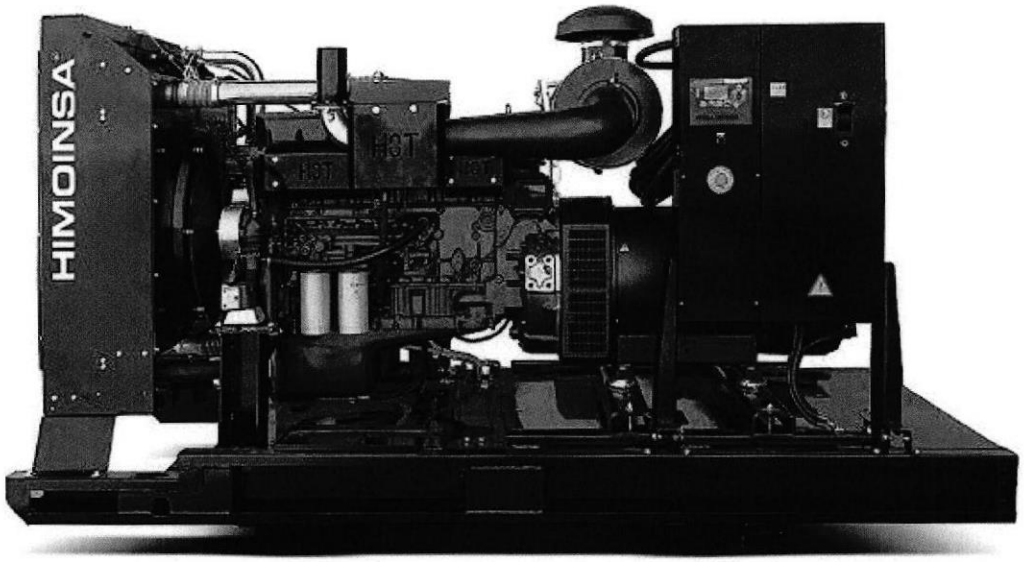


Figura 4.6: Equipo de generación eléctrica de apoyo.

4.5.Sistema de energía de respaldo

Para el sistema de energía de respaldo utilizaremos baterías de marca Power-Sonic de la serie PG, que es diseñada para centros de procesamiento de datos.



Figura 4.7: Sistema de energía de respaldo (Baterías).

4.6.Sistema de climatización

Para el sistema de climatización usaremos sistemas de acondicionadores de aire de precisión, los cuales están diseñados específicamente para centros de procesamiento de datos, cumpliendo con las normas especificadas por el ICREA-STD-131-2009.

Según las normas internacionales, y para cumplir con los requerimientos para obtener la certificación TIER IV, el nivel de redundancia para la instalación y funcionamiento de los equipos de climatización debe ser de 2(N+1).

Es recomendable utilizar un sistema de condensadores de tipo doble, es decir, con un sistema de enfriamiento por gas y por agua fría trabajando de forma simultánea. Este sistema de enfriamiento doble es una ventaja debido a que facilita el trabajo de los compresores y disminuye el consumo de energía eléctrica. Este sistema se detalla a continuación:

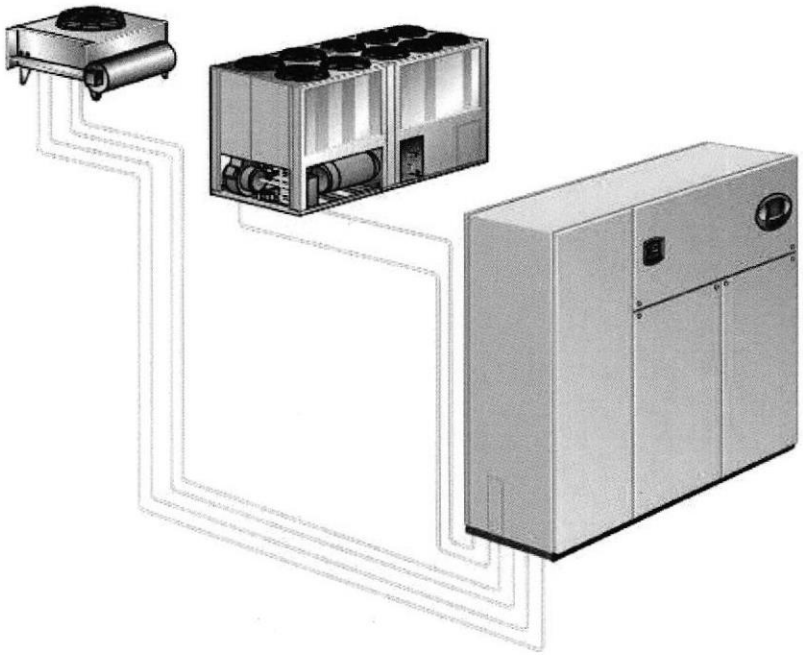


Figura 4.8: Diagrama de sistema de climatización.

Para la climatización de nuestro centro de procesamiento de datos es necesario la instalación de un sistema de acondicionadores de aire de precisión con una capacidad de 783345.2 BTU/Hr.

La cantidad de BTU/Hr de capacidad para el sistema de climatización fue calculado usando la tabla mostrada en el Anexo 2.

Los evaporadores estarán ubicados al final de cada pasillo frío, y su configuración será con la tobera para el flujo del aire hacia debajo del piso

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falso, para que circule y salga por las placas de piso perforado ubicadas en los pasillos fríos, tal como se muestra en la figura a continuación:

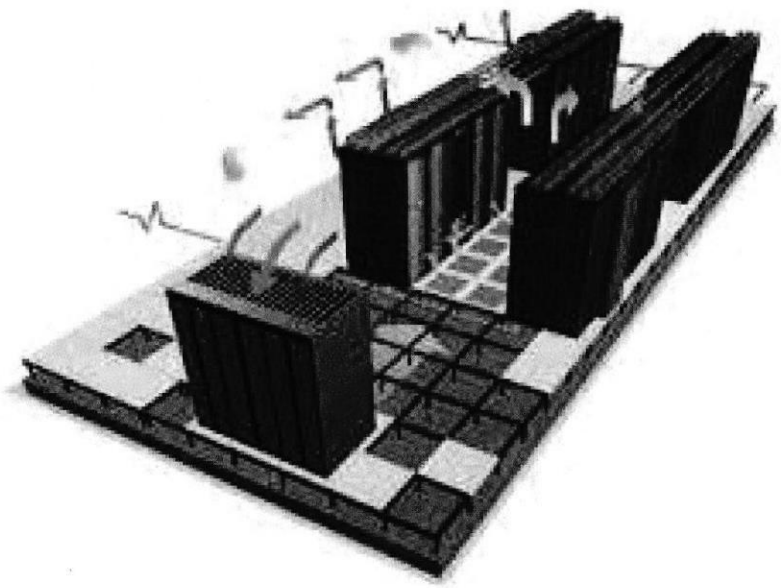


Figura 4.9: Evaporadoras dentro del CPD.

Para establecer la redundancia en el sistema de climatización será necesaria la instalación de 2 veces la cantidad de condensadoras con el doble de la capacidad requerida y 2 veces la cantidad de evaporadoras, de tal manera que en caso de que ocurra algún inconveniente con el sistema, siempre exista un respaldo activo que cubra la demanda del centro de procesamiento de datos.

Como equipo de referencia utilizaremos equipos de climatización del fabricante LIEBERT, debido a que sus equipos cumplen con todas las normas y especificaciones técnicas necesarias.

4.7.Sistema de cableado estructurado

Cableado entre equipos "parte superior del gabinete", "final de la fila" y Núcleo

- Bandeja de cobre (Cat6A) con 32 puertos con velocidad 10 Gbps, en los gabinetes que están destinados para ofrecer servicios en el centro de procesamiento de datos.
- La conexión entre los equipos de los gabinete hacia el equipo top of gabinete será de cobre (Cat6A) con velocidad de 10 Gbps.
- La conexión entre el equipo ToR y EoR será de cobre (Cat6A) con velocidades de 10 a 40 Gbps.
- En el gabinete EoR habrán bandejas de cobre disponibles para 1152 puertos de 10 Gigabit Ethernet o 288 de 40 Gigabit Ethernet.
- La conexión de los EoR hacia el gabinete que contiene el equipo de Core del centro de datos, será de fibra óptica (OM3 y OM4), con velocidad en la transmisión de datos de 10 a 40 Gbps.
- En el gabinete donde está situado el equipo de Core del centro de procesamiento de datos serán de fibra óptica (OM3 Y OM4) y de

cobre (Cat6A). Con velocidades de 40 Gbps hacia los EoR y Proveedores de servicios del Centro de datos, las conexiones de cobre (Cat6A) de 10 Gbps serán para los equipos de servicios del centro que están en el Núcleo (DVR, Server) del procesamiento de datos.

En el diseño de nuestro centro de procesamiento de datos, el cableado estructurado del mismo estará basado en el estándar americano ANSI/TIA – 568 – C, que cumple con los requerimientos de velocidad, distancia y escalabilidad, presentes en nuestro centro de procesamiento de datos. Utilizando este estándar de cableado estructurado cumpliremos con las características y requerimientos para obtener la certificación de TIER IV.

A continuación mostramos con un poco más de detalle en una tabla la cantidad de cable que usaremos para la conexión de nuestros equipos de comunicación:

Tabla 6: Descripción de tipos de cables a utilizar

	Tipo de Cable	Conector	Topología de Conexión	Distancia y Redundancia	Velocidad
Gabinete (Servicio)	Cobre Ethernet Cat. 6A	RJ-45	2 – conn	3m entre los gabinetes. 1m entre los equipos del gabinete.	10Gbps

Tabla 7: Descripción de tipos de cable a utilizar

ToR - EoR	Tipo de cable	Conector	Redundancia	Distancia	Velocidad
Fila 1 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m) Gab. 9 (5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	1/10/40 Gbps
Fila 2 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m) Gab. 9 (5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	1/10/40 Gbps
Fila 3 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m)	1/10/40 Gbps

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				Gab. 9 (5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	
Fila 4 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m) Gab. 9 (5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	1/10/40 Gbps
Fila 5 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m) Gab. 9(5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	1/10/40 Gbps
Fila 6 (11 Gabinetes de servicio)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patchcord por conexión de gabinetes entre topologías	Gab. 1 (11,6m) Gab. 2 (10,8m) Gab. 3 (10m) Gab. 4 (9,2m) Gab. 5 (8,4m) Gab. 6 (7,6m) Gab. 7 (6,8m) Gab. 8 (6m) Gab. 9 (5,2m) Gab. 10 (4,4m) Gab. 11 (3,6m)	1/10/40 Gbps

Tabla 8: Descripción de tipos de cable a utilizar

EoR – NÚCLEO	Cable	Conector	Redundancia	Distancia	Velocidad
Fila 1 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR1(10,5m)	10/40/100 Gbps
Fila 2 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR2(8m)	10/40/100 Gbps
Fila 3 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR2(5,5m)	10/40/100 Gbps
Fila 4 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR4(5,5m)	10/40/100 Gbps
Fila 5 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR2(8m)	10/40/100 Gbps
Fila 6 (EoR)	Fibra óptica multimodo om3/om4	Mtp/Mpo	2 patch cord por conexión de gabinetes entre topologías	EoR1(10,5m)	10/40/100 Gbps

4.8.Sistema de seguridad y control de acceso

Puerta de acceso

El centro de procesamiento de datos contará con una entrada para controlar el acceso al cuarto de gabinetes. Se colocará una puerta metálica de seguridad para el acceso, la cual será cortafuegos y poseerá una barra anti pánico, permitiendo una evacuación adecuada en caso de emergencias.

La puerta debe ser resistente al fuego conforme a la norma NFPA 75. Deberá tener como mínimo 1.20m de ancho por 2.13m de alto, según lo indican las normas y requerimientos para la certificación TIER IV. Debe ser elaborada en 2 planchas de acero de 2 mm de espesor, en su interior se utilizará una plancha de fibra de vidrio de 2.5 cm de espesor, marco de triple ángulo que produce un cierre hermético, sello anti fuego de la puerta, manija de aluminio y barra antipático con cerradura.

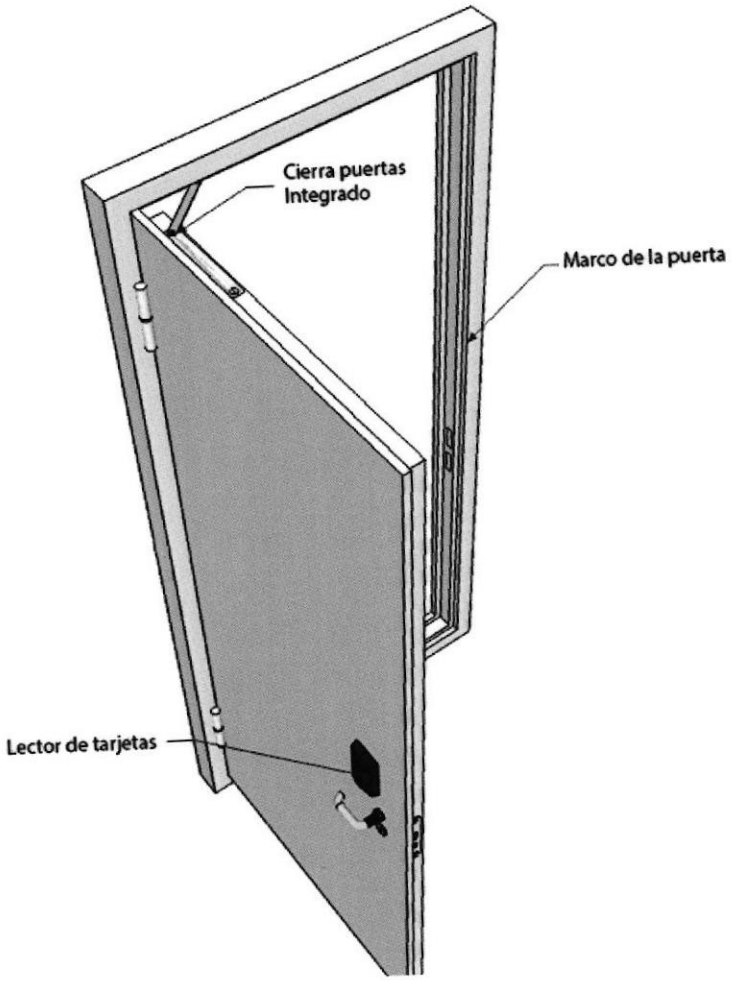


Figura 4.10: Puerta de acceso al CPD.

Control de esclusa

Previo al acceso al centro de procesamiento de datos ubicaremos una zona de seguridad con control de acceso por medio de una tarjeta magnética. En esa zona, cada persona tratando de acceder deberá identificarse, presentar la autorización necesaria y llenar una bitácora de forma física.

En la esclusa ubicaremos un detector de metales y una mesa para control físico para evitar que ingresen materiales peligrosos al cuarto de equipos del centro de procesamiento de datos.

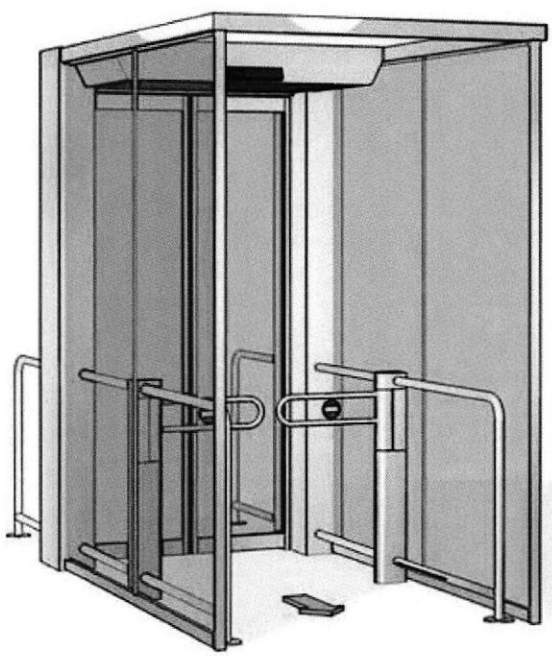


Figura 4.11: Esclusa en el CPD.

Puerta de emergencia

Instalaremos una puerta de salida de emergencia de abatimiento hacia el exterior del centro de datos. La puerta de emergencia deberá estar ubicada del lado opuesto a la entrada del centro de datos, según lo especifica la norma del ICREA-STD-131-2009.

La puerta será doble, con un ancho de 240 cm y una altura de 213 cm, elaborada en 2 planchas de acero de 2 mm de espesor, en su interior se utilizará una plancha de fibra de vidrio de 2.5 cm de espesor, marco de triple ángulo que produzca un cierre hermético, sello anti fuego de la puerta, manija de aluminio y doble barra antipático con cerradura. La puerta debe ser resistente al fuego conforme a la norma NFPA 75.



Figura 4.12: Puerta de emergencia en CPD.

Control de acceso

Para controlar el acceso al centro de procesamiento de datos utilizaremos un sistema de identificación biométrica de alta confiabilidad y de velocidad de identificación.

El dispositivo INFINISCAN soporta comunicación TCP/IP para mantener la comunicación entre el lector y la computadora. Soporta transferencia de datos en tiempo real.



Figura 4.13: Sistema de identificación biométrica.

4.9.Sistema de iluminación

El sistema de iluminación recomendado para el uso en centros de procesamientos de datos está basado en la tecnología LED. La mayor ventaja que ofrece esta tecnología es la de un mayor ahorro de energía vs la capacidad de iluminación.

Según la norma del ICREA-STD-131-2009 la iluminación al interior del centro de procesamiento de datos debe ser de 450 lux, en sistemas de alta eficiencia, alto factor de potencia y bajos niveles de emisión electromagnética.

En nuestro centro de procesamiento de datos utilizaremos 16 lámparas de pasillo con 4 módulos LED por lámpara, las cuales cumplen con las normas y especificaciones del ICREA-STD-131-2009. Para disminuir la iluminación innecesaria, utilizaremos un sistema de sensores en los pasillos del centro de procesamiento de datos, para que de esta manera se enciendan las lámparas que sean necesarias en los pasillos que trabajen los operadores.

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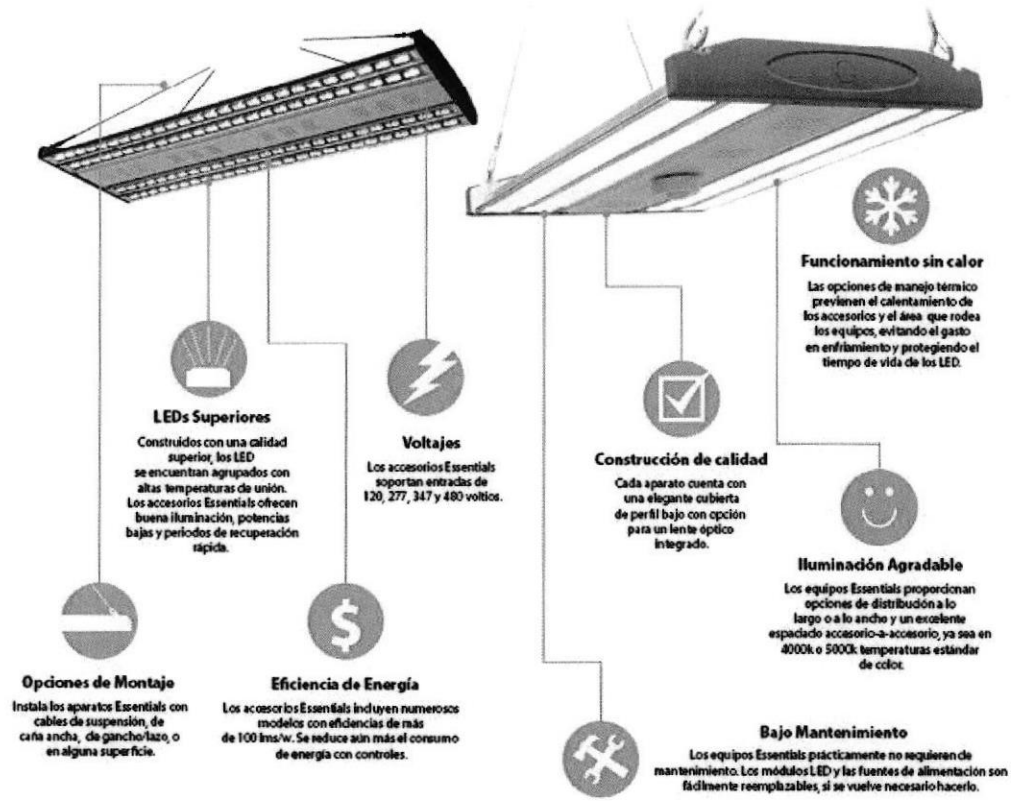


Figura 4.14: Sistema de iluminación.

4.10.Sistema de video vigilancia

Cámaras

Para el sistema de video vigilancia usaremos una distribución de 6 cámaras de tipo ojo de pez de forma que cubran el 100% del área del centro de datos.

La cámara que más nos conviene es la SAMSUNG SNF-8010, la cual a una altura de 4 metros cubre un área con un radio de más de 5 metros.



SNF-8010

Figura 4.15: Sistema de video vigilancia (Cámara).

Esta cámara está diseñada con el fin de adaptarse a nuestras necesidades de monitoreo de seguridad, ya que ofrece muchas opciones de configuración de video y múltiples pantallas, detección de movimiento que es ajustable a diferentes resoluciones y cuadros por segundo. Del mismo modo incluye la particularidad de detección de

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manipulación tomando como acciones el envío de alertas vía correo electrónico cuando la captura de video ha sido interceptada, es decir que si un intruso intenta dañar, remover la cámara o pintar el lente, automáticamente una notificación será enviada.

Incorpora además la característica de la creación de hasta 32 máscaras de privacidad, que consisten en proteger puntos específicos (como objetos o áreas) que están dentro del rango de visión de la cámara que no desees queden expuestos.

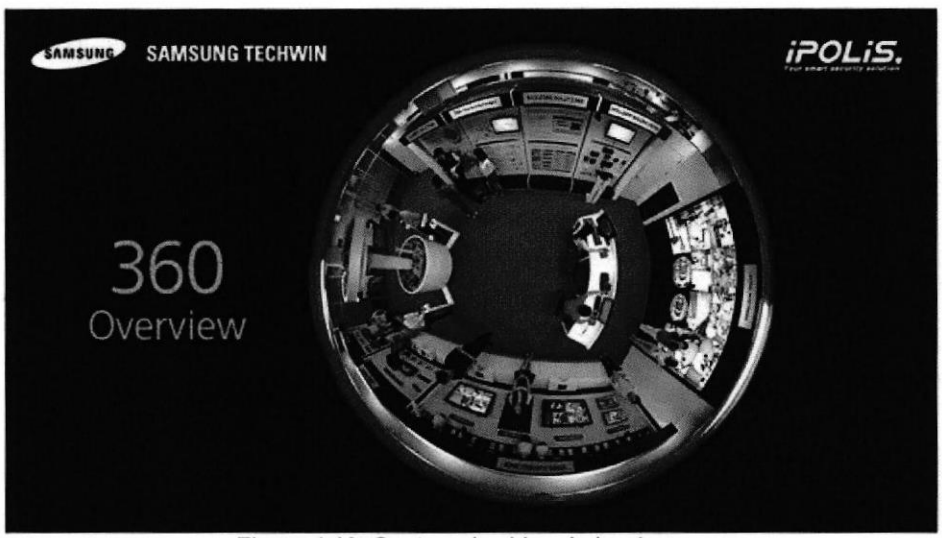


Figura 4.16: Captura de video de la cámara.



Figura 4.17: Captura de video de la cámara.

Grabador de video en red

Para la grabación de los videos de seguridad del centro de procesamiento de datos usaremos un NVR de marca SAMSUNG modelo 1670D.



Figura 4.18: Sistema de video vigilancia (DVR).

El modelo 1670D es un grabador de red de gran calidad y altas prestaciones que admite flujo de datos de red hasta 16 cámaras. Estos NVR incluyen la función de grabación en tiempo real a 30 fps, con resolución 4CIF y admite varios códec para H.264, MPEG-4, MJPEG con el fin de poder seleccionar el códec apropiado que se adapte a nuestras necesidades. El equipo contará con un disco duro de 1 Tb para almacenar las grabaciones. También, cuenta con grabador de DVD y puertos USB para poder realizar copias de seguridad con total facilidad.

4.11.Sistema de alarmas

En nuestro centro de procesamiento de datos se utilizaran los siguientes equipos para sistema de alarmas, que estarán conectados, enviaran y recibirán información, directamente del panel inteligente de nuestro sistema contra incendio.

FSM-8

La unidad de procesamiento FSM-8 es una solución basada en DVR para las llamas, el humo y la detección de intrusiones.

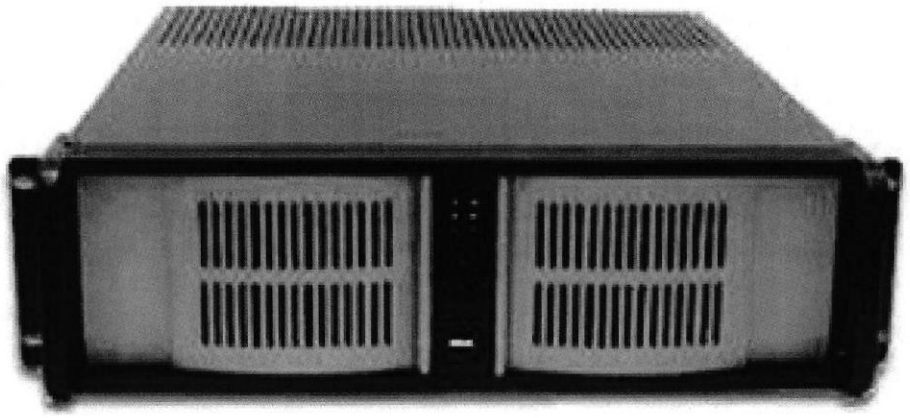


Figura 4.19: Sistema de alarmas (FSM-8).

FAAST

Compatible y complementaria a cada uno de los sistemas de alarma de incendios y de extinción de incendios de Fike. [8]

Esta tecnología utiliza un detector de humo avanzado e inteligente que atrae activamente el aire en su sensor a través de una red de tuberías.



Figura 4.20: Detector de humo Fike.

Luces de emergencia

Nuestro centro de datos contará con las siguientes luces de emergencia para indicarnos la ruta de evacuación en el momento de presentarse una eventualidad dentro del centro de datos.

Las luces de emergencia Hagroy, brindan mejor iluminación y eficiencia en el consumo de energía, ya que las luces son LED, la nueva tecnología en luces reduce el impacto ambiental y amplía la vida útil del equipo. [9]

- Más de 12 horas de duración (Autónoma)
- Luz led de larga vida: Vida útil de 60000 a 80000 horas
- Batería Genérica
- Bajo consumo de energía (Iluminación de 70W / Consumo de 7W)
- Led's 100% reciclables (No atenta contra el medio ambiente)

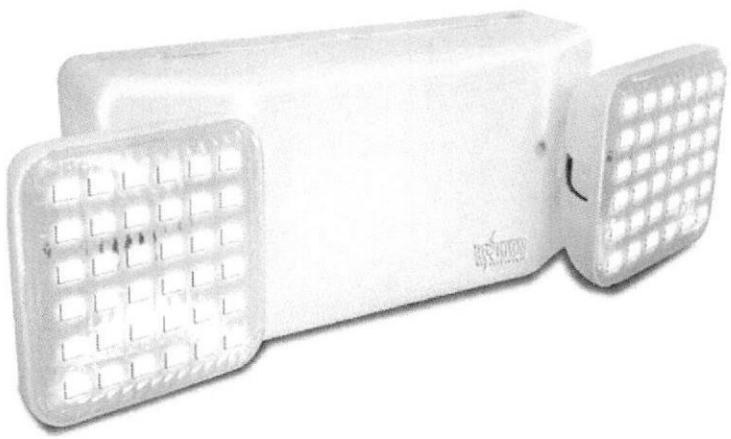


Figura 4.21: Luces de emergencia.

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4.12.Sistema contra incendios

Los modernos sistemas de gas son más amigables a los equipos y, si el fuego se detiene antes de que pueda causar algún daño grave, el centro de procesamiento de datos podría seguir con sus actividades normalmente.

Los sistemas de gas son eficaces, pero son también de poca duración. Una vez que el gas se descarga, no hay una segunda oportunidad, mientras que un sistema de agua puede continuar hasta que el fuego se haya extinguido.

El sistema de gas recomendado para nuestro centro de procesamiento de datos será el FM200, que utiliza gas heptafluoropropano que se dispersa rápidamente alrededor del sitio. Su acción consiste literalmente en la eliminación de la energía térmica del fuego en la medida en que la reacción de combustión no puede ser sostenida. Con este sistema existe la posibilidad de que el centro de datos estará funcionando en pocos minutos después del incendio.

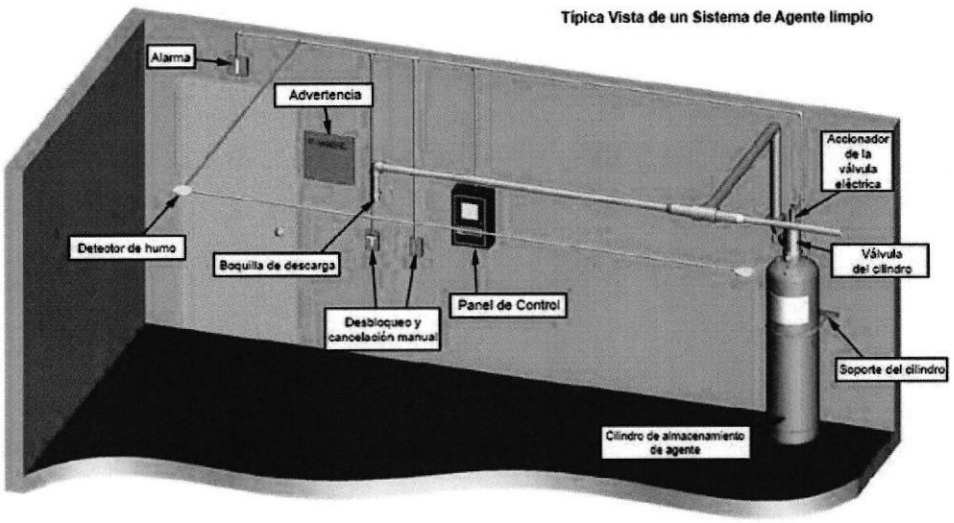


Figura 4.22: Sistema contra incendios.

El sistema de Detección de incendios deberá incluir detectores iónicos, detectores fotoeléctricos, módulo de control, sirenas, luces estroboscópicas, palanca de aborto y acción, 2 tanques con el gas FM200 y 3 toberas.

Panel inteligente

Para controlar todo el sistema contra incendios usaremos un panel inteligente fabricado por la empresa FIKE. El producto se llama Cheetah XI. [10]

Entre sus características se destaca su velocidad de respuesta: activación en menos de un cuarto de segundo, gracias a que elimina la interferencia y el "polling delay"; la información es llevada simultáneamente desde los

sensores inteligentes hasta el panel de supresión y otros dispositivos del sistema en una comunicación directa.

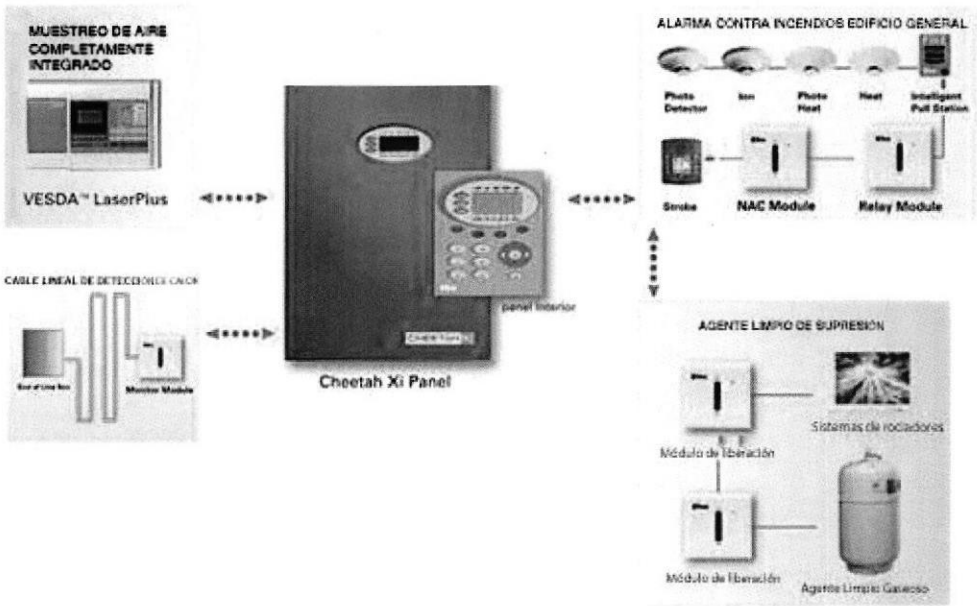


Figura 4.23: Sistema de control inteligente Fike, para el sistema contra incendios.

Características Técnicas Generales

- Protocolo digital de comunicación peer-to-peer con inteligencia en los dispositivos de campo
- Hasta 254 zonas para trazar los dispositivos a distancias funciones
- Apoya 254 dispositivos por loop (SLC), cualquier combinación de sensores o módulos

- Función de descarga provee tres tipos de detección: zona cruzada, zona secuencial y detector individual, y 6 tipos de aborto
- Integración total con VESDA
- Capacidad de hasta 4.000 pies (1.200 Mts) de cableado entre paneles de la red
- Capacidad de soportar alambrado estilo 4, 6 o 7
- 6.0 amp fuente de potencia. Expandible a 12
- Cuatro niveles de protección de contraseña
- Circuitos NAC que proveen sincronización múltiple para tonos auditivos
- (2) Loops (SLC) estándar, expandibles a (4) loops (SLC), capacidad máxima del loop de 12.000 pies (3.650 mts)

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4.13.Sistema de administración de infraestructura y monitoreo

Nuestro centro de procesamiento de datos contará con un sistema de administración e integración para los sistemas de control, este sistema no ayudará a monitorear, supervisar y controlar los sistemas de control instalados. Una de las ventajas es que este sistema es compatible con todos los demás sistemas a implementar en nuestro centro de procesamiento de datos, por lo que haría de su administración una labor más eficiente. [11]

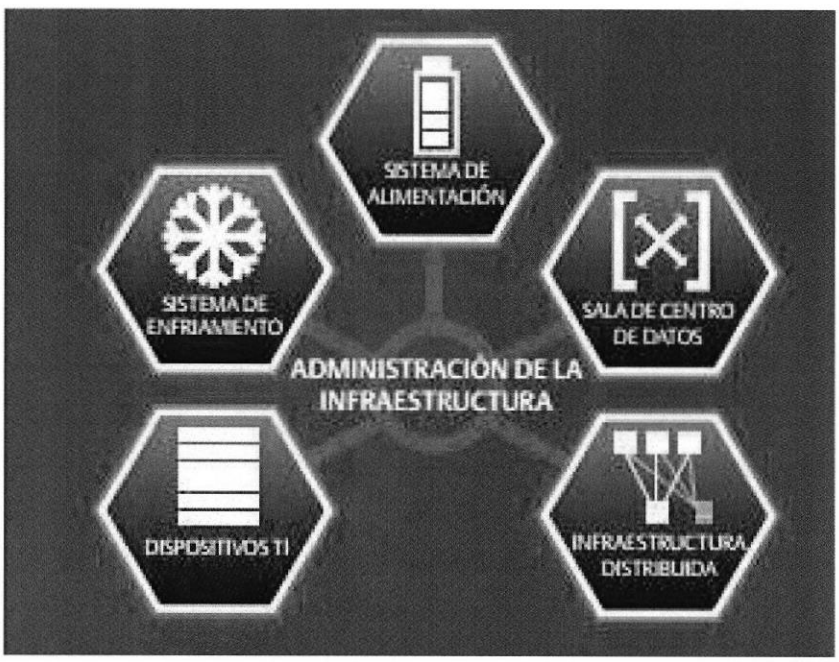


Figura 4.24: DCIM.

Al implementar la combinación correcta de soluciones de hardware y software para administrar la infraestructura del centro de datos, se podrá:

- Reducir los costos diarios y el tiempo de operación y administración del centro de procesamiento de datos.
- Tomar mejores decisiones de administración al brindar la información correcta a las personas indicadas en el momento adecuado.
- Hacer mejor uso de los recursos de la infraestructura y TI para optimizar el desempeño del centro de procesamiento de datos y mejorar la disponibilidad del sistema.
- Identificar activamente problemas antes de que se vuelvan serios.
- Obtener una perspectiva del desempeño de los activos/sistemas para mejorar los procesos, aumentar la productividad y maximizar los recursos operacionales.

CONCLUSIONES

1. Debido a que en la ciudad de Guayaquil solamente tenemos un proveedor de energía eléctrica, las acometidas serán de 2 sub estaciones diferentes que lleguen al centro de procesamiento de datos con tensión media.
2. El costo de implementación y de mantenimiento de un centro de procesamiento de datos TIER IV es muy alto, debido a los tipos de equipos que se usan y a la redundancia que deben tener.
3. Es muy importante que al momento de empezar la obra civil se instalen las mallas de cobre para poder hacer las conexiones a tierra para los equipos del centro de procesamiento de datos.

RECOMENDACIONES

1. El parámetro de medición de luz dentro del centro de procesamiento de datos podrá ser evaluado una vez que este entre en operaciones. El medidor de este factor será el Luxómetro.
2. Una vez que el centro de datos entre en operación se medirá la potencia real mediante el software de administración del centro de procesamiento de datos (DCIM).
3. El cálculo del valor real del PUE, se mide y se registra inmediatamente el centro de procesamiento de datos este operativo, este valor será reflejado por el software de administración (DCIM).
4. Los valores (precios en dólares) de transformadores y generadores de energía eléctrica para nuestro centro de procesamiento de datos, estarán estimados en otro proyecto de instalación de energía eléctrica.

BIBLIOGRAFÍA

Precipitaciones en Guayaquil

[1] Instituto Oceanográfico de la Armada, Precipitaciones diarias en Guayaquil, http://www.inocar.mil.ec/web/index.php/precipitacion-en-guayaquil, fecha de consulta enero 2015

Sismos en Guayaquil

[2] Instituto Geofísico, Mapa de sismos, http://www.igepn.edu.ec/sismos, fecha de consulta enero 2015

Normas y tipos de construcción

[3] Firefighternation, Understanding Building Construction Types, http://www.firefighternation.com/article/truck-co-operations/understanding-building-construction-types, fecha de consulta enero 2015

Construcción

[4] University of Missouri, Center for Distance and Independent Study, https://services.online.missouri.edu/exec/data/courses2/9045/lesson01/lesson01.asp, fecha de consulta enero 2015

Gabinete Z4 SeismicFrame

[5] CHATSWORTH PRODUCTS, Z4-SERIES SEISMICFRAME® CABINET SYSTEM, http://www.chatsworth.com/products/cabinet-and-enclosure-systems/z4-seismicframe/, fecha de consulta diciembre 2014

Cisco Nexus 9000

[6] CISCO, Conmutadores Cisco Nexus 9000, http://www.cisco.com/web/LA/assets/C45-729418-00_Nexus_9000_AAG_v6a.pdf, fecha de consulta noviembre 2014

Cisco Nexus 7000

[7] CISCO, Cisco Nexus 7000 Series Switches, http://www.cisco.com/c/en/us/products/collateral/switches/nexus-7000-10-slot-switch/Data_Sheet_C78-437762.pdf, fecha de consulta diciembre 2014

Sistema de alarma FAAST

[8] Fike, Integrated Voice Messaging, http://pdf.directindustry.com/pdf/fike/voice-evacuation/30491-349175.html#open, fecha de consulta diciembre 2014

Luces de emergencia

[9] Hagroy Electronic, Luz de emergencia led, http://www.hagroy.com/es/producto/luz-de-emergencia-led, fecha de consulta enero 2015

Sistemas de alarmas FIKE

[10] Fike, Cheetah-Xi, http://pdf.directindustry.com/pdf/fike/cheetah-xi-brochure/30491-85384.html#open, fecha de consulta diciembre 2014

Sistema DCIM

[11] EMERSON, Data Center Infrastructure Manager, http://www.emersonnetworkpower.com/es-CALA/Products/Monitoring/ForSmallDataCenter/BatteryMonitoring/Documents/SL-32005_R02_12_final_web.pdf, fecha de consulta enero 2015

GLOSARIO DE TÉRMINOS

TIER: Nivel de fiabilidad en un centro de datos.

ICREA: "International Computer Room Experts Association" es una asociación Internacional sin fines de lucro formada por ingenieros especializados en el diseño, construcción, operación, administración, mantenimiento, adquisición, instalación y auditoría de centros de cómputo.

NFPA: La National Fire Protection Association (NFPA) es la fuente de códigos y normas que gobiernan la industria de protección contra incendios y seguridad humana.

Switch: Es el dispositivo digital lógico de interconexión de equipos que opera en la capa de enlace de datos del modelo OSI.

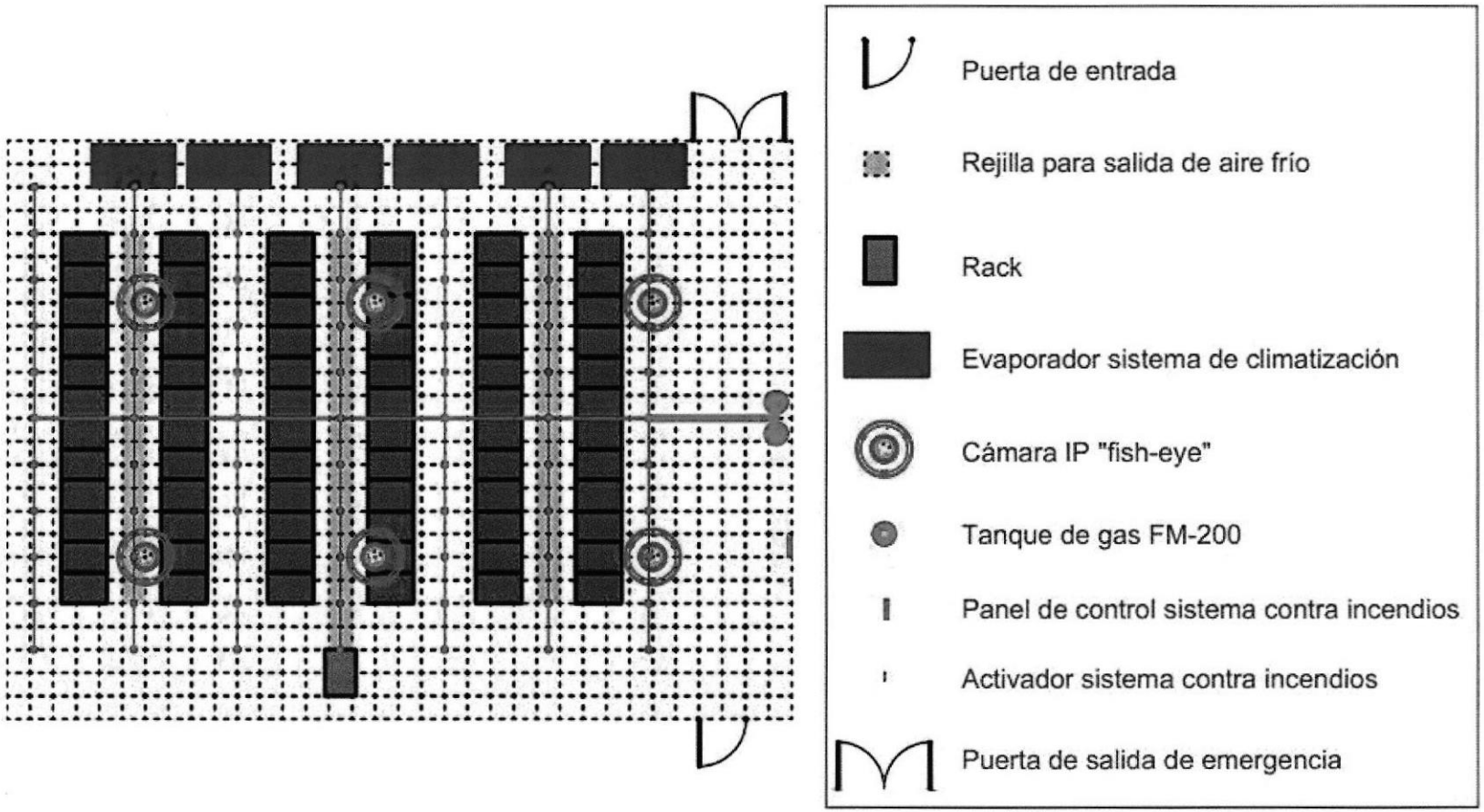
Breaker: Es un aparato capaz de interrumpir o abrir un circuito eléctrico cuando la intensidad de la corriente eléctrica que por él circula excede de un determinado valor, o en el que se ha producido un cortocircuito, con el objetivo de evitar daños a los equipos eléctricos.

Luxómetro: Instrumento que permite medir la iluminancia de un ambiente.

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ANEXOS

ANEXO 1



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ANEXO 2

Descripción	Detalle	BTU/Hr
Área	300 m^2	64700
# de personas	10	6000
Consumo de equipos	188525.45 Watts	641432
Exposición al sol	+ 10%	71213.2
TOTAL		**783345.2**

ANEXO 3

GABINETE DE SERVICIOS	
Equipos	**Consumo Máximo**
Cisco Nexus 3064-T	2376 VA
KVM	34.8 VA
EnclosureBlades	1305 VA
Enclosure Discos	1334 VA
TOTAL	**5049.8 VA**

"FINAL DE LA FILA"	
Equipos	**Consumo Máximo**
Cisco Nexus 9500	4350 VA
KVM	34.8 VA
TOTAL	**4384.8 VA**

CORE	
Equipos	**Consumo Máximo**
Cisco Nexus 7000	12000 VA
KVM	34.8 VA
Servidor DCIM	507.5 VA
Cisco Catalyst 2960 PoE	460 VA
TOTAL	**13002.3 VA**

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ANEXO 4

Detalle	Consumo
Gabinetes	372597.9 VA
Luminarias	3632 VA
Luces de Emergencia	50 VA
Sistema de Control de Acceso	36 VA
Sistema Contra Incendios	660 VA
Sistema de Climatización	125875.2 VA

ANEXO 5

Z4-SERIES SEISMICFRAME® CABINET SYSTEM

KEY FEATURES

- Industry-leading 1500 lb (680 kg) seismic equipment load to support more equipment in your cabinet
- OSHPD OPM-0112-13 provides pre-approved, code-compliant seismic designs of supports and attachments for the cabinet when used in health facilities in California.
- UL Listed 2416 for a 3000 lb (1360 kg) static (non-seismic) equipment payload and integrated grounding and bonding features
- Multiple size options, including 1200 mm D cabinets to support deeper equipment, like modular network switches and high-density server applications
- Adjustable-depth equipment mounting rails match equipment mounting requirements
- Wide range of thermal and cable management accessories
- Pre-drilled top attachment points for mounting overhead pathway and bracing
- Includes transport casters for moving the cabinet into place during initial installation
- Simplified installation only requires floor anchorage eliminating the requirement for costly engineering calculations for external bracing
- Primary and secondary anchorage points provide flexibility in anchoring the cabinet to the floor

APPLICATIONS

- Secure and protect critical computer server, data storage and network equipment in computer rooms, equipment rooms and other facilities that are located in seismically active areas

USE WITH

- Air Dam
- Ring Cable Manager
- Cable Lashing Bracket
- Full Height Dual PDU Bracket

RELATED ACCESSORIES

- Snap-In Filler Panels
- eConnect® PDUs

Industry-Leading Seismic Load

1500 lb (680 kg) seismic equipment load plus 100 lb (45 kg) top load

Infinitely Adjustable Rails

Provide increased flexibility and more unobstructed interior space for accessories



UL LISTED

Load-Tested GR-63 Zone 4

California OSHPD OPM-0112-13

The Z4-Series SeismicFrame® Cabinet System by Chatsworth Products (CPI) is an engineered solution specifically designed to store critical rack-mount server, data storage and network equipment in computer rooms, equipment rooms and other communications facilities that are located in active seismic areas.

Featuring an industry-leading 1500 lb (680 kg) equipment load, the Z4-Series SeismicFrame can also support an additional 100 lb (45 kg) top load for cabling. The Z4-Series SeismicFrame Cabinet was tested by a Telecommunications Carrier Group and ISO 17025 certified Independent Testing Laboratory (ITL) to meet the Telcordia Technologies GR-63-CORE, Issue 4, April 2012, Sections 4.4 per Zone 4 requirements. This seismic test was originally developed by the telecommunications industry to define general requirements for central office equipment with a focus on preventing system downtime. GR-63-CORE seismic testing includes a series of physical shaker table tests, during which a loaded cabinet is placed through simulated earthquake conditions. Zone 4 testing includes the most severe test conditions in which the cabinet must perform with limited movement and survive the test without permanent structural or mechanical damage ensuring the internal equipment is not damaged.

Additionally, the Z4-Series SeismicFrame Cabinet also holds a California Office of Statewide Health Planning and Development, Pre-Approval of Manufacturer's Certification (OSHPD OPM-0112-13). The OPM is a set of pre-approved, code-complaint seismic designs of supports and attachments for the cabinet that can be incorporated into construction documents for health facilities in California.

The Z4-Series SeismicFrame Cabinet is available in two heights, two widths and two depths with a solid top panel, side panels and perforated front and rear doors. It is also available as a frame only solution without doors or panels. The cabinet is UL Listed for a 3000 lb (1360 kg) static (non-seismic) load, has integrated grounding and bonding features, factory-installed transport casters for easy movement and recessed leveling feet to simplify installation.

Add thermal and cable management accessories to optimize system performance in accordance with industry best practices. Thermal management accessories manage airflow through the cabinet, keeping hot and cold air separated within the cabinet, allowing the cabinet to be fully integrated into an aisle containment strategy. Cable management accessories keep network and power cables neatly organized and physically separated. See inside for product details. Contact CPI Technical Support for configuration assistance.

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CHATSWORTH PRODUCTS

SPECIFICATIONS

- Zone 4 Seismic Rating; the seismic equipment load was independently verified with shaker table tests per GR-63 requirements
- Freestanding equipment cabinet provides front and rear support for 19"W (482.6 mm) EIA rack-mount equipment and shelves
- For indoor use only, in environmentally controlled areas, not harsh environments
- Includes:
  - Welded and bolted steel four-post frame
  - Equipment mounting rails, two pairs
  - Grounding/bonding system and ground lug
  - Recessed leveling feet with hex top for simple field leveling
  - Removable transport casters
  - Baying kit
  - Equipment mounting hardware, (50) M6 cage nuts and screws
- Equipment space:
  - See Height, Width and Depth tables under Ordering Information/Dimensions
- Doors/lock kits:
  - Perforated front door
  - Double perforated rear door
  - Perforated area is 78% open
  - Front door opens to 135° when bayed or not bayed
  - Rear door opens to 180° when bayed or not bayed
  - Hinge pins allow easy removal during maintenance
  - Reversible to open from the right or left, must move hinges/latch
  - Interchangeable front or rear, must move hinges/latches
  - Swing handle with keyed or combination/keyed locks
  - Front door has a single-point latch
  - Rear door has a three-point latch
- Side panels
  - Order with cabinet or as service part
  - Solid, two-piece panels (half height, full depth)
  - Individual top/bottom panels
  - Bolted attachment, two points per panel
  - Keyed lock, one per panel, matches door
  - Bay cabinets with panels installed or removed
- Top panel:
  - One-piece, solid panel with four large grommets over cable openings, one per corner
  - Grommets are plastic, snap on, seal cable openings and can be cut to pass cables
  - Unsealed openings are 4.5"W x 9.0"D (114 mm x 228 mm), wide enough for large PDU plugs
  - Bolt holes for attaching 12"W (300 mm), 18"W (460 mm) and 24"W (610 mm) Cable Runway (ladder rack) along both sides of the top panel, holes are sealed with snap on caps
- Equipment support:
  - Two pairs of mounting rails in the cabinet
  - Adjustable depth, rails slide front-to-back, marks on frame for easy vertical alignment
  - 1-3/4"H (44.45 mm) U spacing, marked and numbered on all rails
  - 19"W, EIA-310-E Universal 5/8"-5/8"-1/2" (15.9 mm – 15.9 mm – 12.7 mm) vertical hole spacing
  - Square-punched holes accept cage nuts
  - Includes 50 each M6 cage nuts and screws
- Load capacity
  - 1500 lb (680 kg) internal seismic equipment load
  - 100 lb (45 kg) additional cabinet rooftop load (Tested to Telcordia Technologies GR-63-CORE, Issue 4, April 2012, Sections 4.4, per Zone 4 requirements)
  - 3000 lb (1360 kg) static load (Tested to UL 2416, Issue 2, July 2013 Section 11.1.4, 4x rating load test)
- Grounding/Bonding:
  - Mounting rails, top panel, side panels and doors are electrically bonded to the cabinet frame
  - Prepared location for ground lug at the top and bottom of the frame
  - A grounding lug is included to attach the frame to ground
- Certifications:
  - EIA-310-E compliant
  - UL Listed 2416, NWIN, File #E227626
- Certifications:
  - TCG NEBS Compliant, Telcordia Technologies, GR-63-CORE, Issue 4, April 2012, Sections 4.4, per Zone 4 requirements
  - OSHPD OPM-0112-13, California, Office of Statewide Health Planning and Development (OSHPD), Preapproval of Manufacturer's Certification (OPM)
- Material:
  - Steel frame, slides, rails and panels
  - Plastic grommets/seals
- Construction:
  - Welded/bolted frame
  - Mounting rails bolt to frame
- Finish:
  - Epoxy-polyester hybrid powder coat paint on frame, rails, panels in Black or Glacier White
  - Grommets/seals, door handles/hinges are black
- Installation:
  - Attach cabinet frame directly to the concrete floor using four Hilti HSL-3 M12/50 heavy duty expansion anchors (Hilti Item #371782, ordered separately), one per corner

Installation Products

Installation products include equipment mounting hardware, concrete floor anchors and expanding adhesive foam sealing tape. Be sure to secure your cabinets to the floor with seismic anchors, and seal openings in panels and the raised floor.



39150-001

Part Number	Description	Shipping Weight lb (kg)
Leveling Feet Height Adjustment Tool		
39150-001	5 mm Hex Ball Driver Tool, 12"L (300 mm)	1 (0.5)
Equipment Mounting Hardware		
12637-001	Cage Nuts, Screws, M6, 25 Pack, Gold	1 (0.5)
12638-001	Cage Nuts, Screws, #10-32, 25 Pack, Zinc	1 (0.5)
12639-001	Cage Nuts, Screws, #12-24, 25 Pack, Black	1 (0.5)
AisleLok™ Acrycell™ Sealing Tape		
13876-000	.5" Tape, 32.8'L (10 m), 5 Rolls, Black	3 (1.4)
13876-001	1" Tape, 18.4'L (5.6 m), 5 Rolls, Black	5 (2.3)
13876-002	2" Tape, 8.5'L (2.6 m), 5 Rolls, Black	7 (3.2)

Note: Recommended Floor Anchors are Hilti, Heavy Duty Expansion Anchor, HSL-3, M12/50, Item #371782, 4 required per cabinet, order from Hilti.



ORDERING INFORMATION

Z4-Series SeismicFrame Cabinet is available in three basic configurations: a full cabinet with or without side panels; a cabinet with no doors with or without side panels or a frame only with no doors or panel work. Use the part number configurators below to select a Z4-Series SeismicFrame Cabinet. Choose Height, Width, Depth, Front Door, Locks and Sides based on your requirements.

Z4	-	H	W	D	-	R	FD	RD	L	-	C	TP	SP

Z4-Series SeismicFrame Cabinets – Frame with Top Panels and Doors, Side Panels are optional

	1. Height				2. Width			3. Depth			-	4. Rails	5. Front Door	6. Rear Door	7. Latch	-	8. Color	9. Top Panel	10. Side Panels
	U	in.	mm.		in.	mm.		in.	mm.		Description	Description	Description	Description		Description	Description	Description
Z4-	1	40	78.7	1999	1	23.6	600	N	41.3	1050	1 Square-Punched 2-Pair	0 None	3 Double, Perf	C Two-Point, Keyed		C Black	1 Standard	0 None
	2	43	83.9	2132	2	31.5	800	U	47.3	1200		1 Single, Perf		E Two-Point, Keyed/ Combination Lock		E Glacier White		2 Solid, 2 each

Z4-12U-113C-C12 shown



Z4-Series SeismicFrame Cabinets – Frame with Top Panel, no Doors, Side Panels are optional

	1. Height				2. Width			3. Depth			-	4. Rails	5. Front Door	6. Rear Door	7. Latch	-	8. Color	9. Top Panel	10. Side Panels
	U	in.	mm.		in.	mm.		in.	mm.		Description	Description	Description	Description		Description	Description	Description
Z4-	1	40	78.7	1999	1	23.6	600	N	41.3	1050	1 Square-Punched 2-Pair	0 None	0 None	0 None		C Black	1 Standard	0 None
	2	43	83.9	2132	2	31.5	800	U	47.3	1200						E Glacier White		2 Solid, 2 each

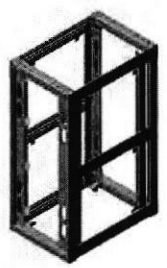
Z4-12U-1000-C10 shown



Z4-Series SeismicFrame Cabinets – Frame Only, No Top Panel, Doors or Side Panels

	1. Height				2. Width			3. Depth			-	4. Rails	5. Front Door	6. Rear Door	7. Latch	-	8. Color	9. Top Panel	10. Side Panels
	U	in.	mm.		in.	mm.		in.	mm.		Description	Description	Description	Description		Description	Description	Description
Z4-	1	40	78.7	1999	1	23.6	600	N	41.3	1050	1 Square-Punched 2-Pair	0 None	0 None	0 None		C Black	0 None	0 None
	2	43	83.9	2132	2	31.5	800	U	47.3	1200						E Glacier White		

Z4-12U-1000-C00 shown



Notes:

1. *There are eight possible frame sizes.*
2. *Use the first matrix to order a complete cabinet with top, doors and sides; use the second matrix to order a cabinet with no doors; use the last matrix to order a Frame Only with no top, doors or sides.*
3. *You must include a top panel, when ordering a cabinet with doors.*
4. *You can order a cabinet with or without side panels.*
5. *You can order a cabinet with or without a front door.*
6. *Choose latch/lock style: keyed or combination/keyed. Every door must have a latch. The (0) option should only be selected if there are no doors. Doors have a swing handle on the exterior. The combination lock uses a 3-digit combination entered on 3-dials that are integrated into the swing handle or a key. The combination lock can be reprogrammed in the field.*
7. *The front door has a single-point latch; the rear door has a two-point latch.*

DIMENSION TABLES

Height Dimensions - in (mm)			
Rack Mount Spaces (U)	**Overall with Casters**	**Frame Only No Casters**	**Front Opening**
40	78.7 (1999)	77.4 (1965)	70.4 (1789)
43	83.9 (2132)	82.6 (2099)	75.7 (1922)

Casters are factory installed on the cabinet, used to move the cabinet into position, and then removed before installation. The cabinet frame attaches directly to the floor.

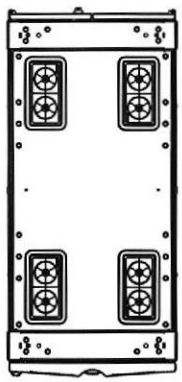
Depth Dimensions - in (mm)			
Nominal Depth	**Overall with Doors**	**Frame Only No Doors**	**Maximum Rail Depth**
1050	45.1 (1146)	41.3 (1050)	35.8 (911)
1200	51.1 (1296)	47.2 (1200)	41.7 (1061)

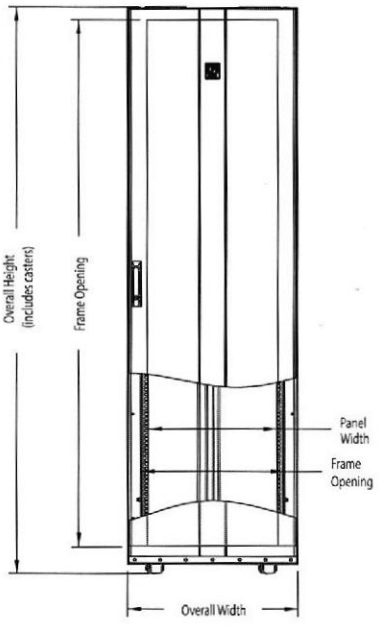
Front Door is approximately 2.2"D (56 mm) and Rear Door is approximately 1.7"D (43 mm) with hinges/latches. Minimum rail depth is 10.2" (258 mm). The front rail is 6.7" (170 mm) deep, the rear rail is 3.5" (89 mm) deep. Rail Depth is reduced when vertical accessories are placed in corners.

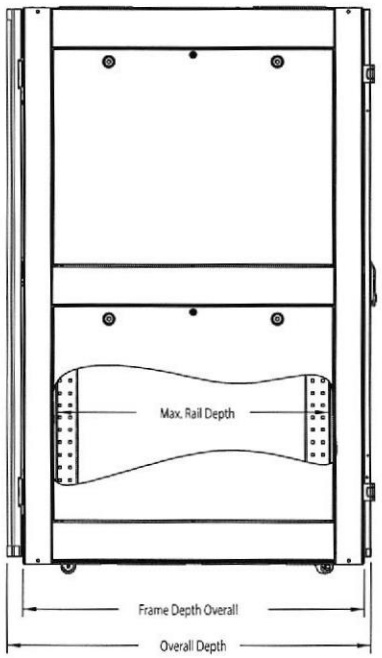
Width Dimensions - in (mm)			
Nominal Width	**Overall with Side Panels**	**Front Opening**	**Rack-Mount Panel Width**
600	23.6 (600)	19.6 (498)	19 (482.6)
800	31.5 (800)	27.5 (698)	19 (482.6)

Mounting Rail clearance is 17.8" (452 mm), mounting hole spacing is 18.3" (465 mm).

DIMENSIONAL DRAWINGS:







Service Parts

Service parts include mounting rails, top panel, side panels, doors and door lock kits, and are used as replacement parts or to upgrade cabinets as applications change. The Z4-Series SeismicFrame Service Parts Cut Sheet is available for download at www.chatsworth.com, or contact CPI Technical Support at 800-834-4969 or techsupport@chatsworth.com for assistance.

CIB - ESPOL

ACCESSORIES

Thermal Management Accessories

Thermal Management accessories enhance Thermal performance and play a critical role in controlling airflow inside the cabinet.



Snap-In Filler Panels

Snap-In Filler Panels block airflow in-between equipment by sealing unused rack-mount spaces (U) in the cabinet. Use with Air Dam to separate cold and hot air within the cabinet.

- Easy, tool-less attachment and removal on square-punched mounting rails
- Fills entire U space to form a tight seal between panels and equipment
- Material: Plastic
- Finish: Black or Glacier White
- Available in 1U and 2U heights, individual or bulk packs, color-matched to cabinet

Part Number			Height (U)	Shipping Weight lb (kg)
Each (1)	Pack (6)	Pack (50)		
34537-X00	34537-X01	34537-X02	1U	14 (6.4)
34538-X00	34538-X01	34538-X02	2U	21 (9.5)

X=color; 0=Black, E=Glacier White. Shipping Weights are for 50 pack.



Air Dam

Air Dam blocks airflow around the sides and top of the equipment mounting space, so cold air passes through equipment, and hot air does not recirculate around equipment.

- Use with Snap-In Filler Panels and Equipment Rail Grommet Kit
- Attaches to and adjusts with mounting rails
- Requires a minimum rail setback of 2.3" (58 mm) from the front of the cabinet frame
- Flexible seal against top and side panels
- Includes: top, bottom and side baffles; installation hardware
- Material: Steel baffles, plastic seals
- Finish: Black or Glacier White; seals are Black
- Select part number to match the width, usable height and color of the cabinet

Part Number		Height (U)	Shipping Weight lb (kg)
23.6"W (600 mm)	31.5"W (800 mm)		
14435-X00	14435-X02	40	14 (6.4)
14435-X01	14435-X03	43	21 (9.5)

X=color; C=Black, E=Glacier White. Shipping Weights are for 800 mm kits.



Label Holder Kit

Label Holder Kit includes 24 each, 1"H x 4"W (25 mm x 100 mm) label holders that can be attached to the front or sides of cabinets and hold labels for identifying the cabinet.

- Plastic, L-shaped, adhesive backed label holder for easy attachment to the cabinet
- Tough, heat resistant material and adhesive for long life
- Each kit includes 24 label holders
- 1"H x 4"W (25 mm x 100 mm) surface for labels; labels not included
- Material: Rigid PVC plastic, UL94-V0, Finish: Black

Part Number	Description	Shipping Weight lb (kg)
39151-001	Label Holder Kit, Pack of 24, Black	1 (0.5)



Cable Port Brush Kit

Cable Port Brush Kit is a pair of snap on brush covers that can be used to replace the plastic grommets included with the top panel to form a better seal for cable openings.

- Easy addition and removal of cables through brush opening
- Brushes form a tight seal around cables to minimize air leakage through cable openings
- Split, two-piece, snap on design for easy installation around cable bundles
- Includes: (2) brush covers
- Material: Plastic housing, nylon brushes

Part Number	Description	Shipping Weight lb (kg)
25190-001	Brush Covers, Pack of 2	2 (0.9)

Color is Black.



Equipment Rail Grommet Kit

Set of plastic grommets that cover cable openings in the equipment mounting rails in the wider cabinets to block airflow around equipment.

- Grommets are plastic, snap on, seal cable openings and can be cut to pass cables
- Includes: (8) grommets
- Material: Plastic

Part Number	Description	Shipping Weight lb (kg)
39133-001	Equipment Rail Grommet Kit, Pack of 8	2 (0.9)

Color is Black. Use with 31.5"W (800 mm) cabinets.



Baying Seal Kit

Baying Seal Kit is only used with 23.6"W (600 mm) cabinets when the cabinets are bayed to align with 24"W (610 mm) floor tiles. The Baying Seal Kit fills the small gaps left between cabinets.

- Flexible plastic insert that blocks airflow between cabinets
- Includes: side baffles, cut to length
- Material: Plastic
- Finish: Black only
- Select part number to match the usable height of the cabinet

Part Number	Height (U)	Shipping Weight lb (kg)
39137-700	40	5 (2.3)
39137-703	43	5 (2.3)



Seal Kit

Cover unused holes in the frame for hinges and installation brackets to prevent bypass airflow.

- Pre-cut, plastic, color-matched, adhesive backed labels for easy attachment to the cabinet
- Tough, heat resistant material and adhesive for long life
- Each kit includes 12 sheets; each sheet includes 21 round labels and six rectangular labels
- Round labels are .75" (19 mm) diameter. Rectangular labels are 1.3" x 2.2" (34 mm x 55 mm).
- Material: Thermoplastic polycarbonate film
- Finish: Black or Glacier White
- Select to match the color of the cabinet

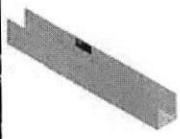
Part Number	Height (U)	Shipping Weight lb (kg)
39076-X00	Seal Kit	1 (0.5)

X=color: C=Black, E=Glacier White.

ACCESSORIES

Cable Management Accessories

Keep network, KVM and power cables separate and organized using the following cable management accessories.



Front-to-Rear Cable Manager

Front-to-Rear Cable Manager attaches to the back of equipment mounting rails creating a front-to-rear pathway between the front and rear mounting rails for cables.

- For use on 31.5"W (800 mm) cabinets
- Mounting locations behind cable openings on each rail
- Attaches to mounting rails and extends from 17.5" (445 mm) to 30.5" (775 mm) to match rail depth
- Creates a 3.0"H (76 mm) by 2.5"W (64 mm) front-to-rear pathway for cables
- Includes: cable manager, installation hardware
- Material: Steel panels
- Finish: Black or Glacier White
- Select part number to match the color of the cabinet

Part Number - Width		Rail Depth Range in (mm)	Shipping Weight lb (kg)
23.6"W (600 mm)	31.5"W (800 mm)		
N/A	14485-X00	17.5 – 30.5 (445 - 775)	6 (2.7)

X=color: C=Black, E=Glacier White.



Cable Lashing Bracket

Cable Lashing Bracket creates a simple, separate vertical pathway for a small bundle of cables and has multiple slots for CPI Saf-T-Grip® Straps or tie wraps to secure cables to the bracket.

- Attaches to the frame in a fixed location, independent of the equipment mounting rails
- Use multiple to increase capacity
- Bracket is 1.6"W (41 mm)
- Includes: brackets, installation hardware; order Saf-T-Grips or cable ties separately
- Material: Steel
- Finish: Black or Glacier White
- Select part number to match the usable height and color of the cabinet

Part Number	Height (U)	Shipping Weight lb (kg)
14465-X00	40	3 (1.4)
14465-X01	43	3 (1.4)

X=color: C=Black, E=Glacier White.



Ring Cable Manager

Ring Cable Manager is independent of the equipment mounting rails, creating a separate vertical pathway for cables and includes plastic cable rings to organize cables.

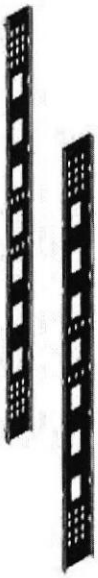
- Attaches to the frame in a fixed location, independent of the equipment mounting rails
- Rings have an opening on the front for easy addition or removal of cables
- Includes: brackets, rings, installation hardware
- Material: Steel brackets, plastic rings
- Finish: Black or Glacier White; rings are Black
- Select part number to match the width, usable height and color of the cabinet

Part Number – Width		Height (U)	Shipping Weight lb (kg)
23.6"W (600 mm)	31.5"W (800 mm)		
14440-X00	14445-X00	40	13 (5.9)
14440-X01	14445-X01	43	13 (5.9)

X=color; C=Black, E=Glacier White. Shipping Weights are for 800 mm managers.

Inside Dimensions, Usable Internal Cable Area, Rail Setback				
Cabinet Width	Width in (mm)	Depth in (mm)	Cable Area in^2 (mm^2)	Rail Setback in (mm)
23.6 (600)	.9 (29)	3.3 (84)	2.9 (1870)	9.5 (240)
31.5 (800)	4.2 (107)	3.5 (89)	14.7 (9480)	9.7 (246)

Note: Rail setback is the minimum distance required between the front edge of the cabinet frame and the front edge of the equipment mounting rail.



Full Height Dual PDU Bracket

Full Height Dual PDU Bracket supports two vertical PDUs side-by-side and has multiple slots for CPI Saf-T-Grip® Straps or tie wraps to secure cords to the bracket.

- Attaches to the frame in a fixed location, independent of the equipment mounting rails
- Available in two widths: Dual and Wide
- Dual bracket is 4.8"W (121 mm) and supports two PDUs up to 2.2"W (51 mm) side-by-side
- Wide bracket is 5.8"W (147 mm) and supports two PDUs up to 2.7"W (69 mm) side-by-side
- Wide bracket is required to mount two 6-breaker eConnect PDUs (series P/Ns PX-3XXXX) side-by-side; eConnect PDUs (series P/Ns PX-3XXXX) will only fit in the 43U cabinet.
- Tool-less mounting on 28" (711 mm), 61.25" (1556 mm) or 64.75" (1645 mm) centers
- Includes: brackets, installation hardware; order Saf-T-Grips or cable ties separately
- Material: Steel
- Finish: Black or Glacier White
- Select part number to match PDU size, usable height and color of the cabinet

Part Number		Height (U)	Shipping Weight lb (kg)
Dual	Wide		
14480-X00	14481-X00	40	12 (5.4)
14480-X01	14481-X01	43	11 (5.0)

X=color: C=Black, E=Glacier White. Shipping weights are for Wide managers. eConnect PDUs (P/Ns PX-3XXXX) will not fit inside a 40U cabinet.

CHATSWORTH PRODUCTS

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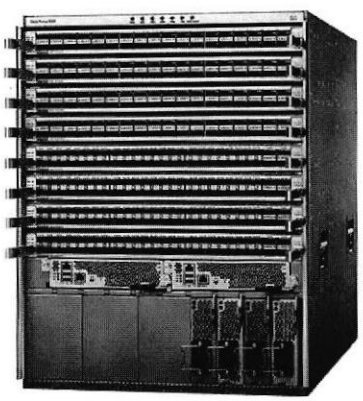
Switches Cisco Nexus 9500

Descripción general del producto

Organizaciones de todo el mundo reconocen que los cambios en los entornos de las aplicaciones demandan nuevas prestaciones de la infraestructura de TI de la que se dispone. Las cargas de trabajo de las aplicaciones se implementan en una mezcla de infraestructura de almacenamiento y servidores virtualizados y no virtualizados, lo que requiere una infraestructura de red que ofrezca una conectividad, seguridad y visibilidad uniformes en toda una variedad de entornos de Cloud Computing sin software específico y virtualizados:

- Las instancias de las aplicaciones se crean de forma dinámica. Como consecuencia, el aprovisionamiento, la modificación y la eliminación de conectividad de redes de aplicaciones también deben ser dinámicos.
- Las unidades empresariales exigen implementaciones de aplicaciones más veloces. Los departamentos de TI deben proporcionar una infraestructura de TI compartida para dar respuesta a las necesidades de time to market y aumentar el retorno de la inversión (ROI).
- Las organizaciones implementan una combinación de aplicaciones comerciales listas para usar, de código abierto y personalizadas, por lo que los departamentos de TI deben administrar la seguridad y la calidad de servicio (QoS) de entornos de varios arrendatarios.
- Con el tiempo, las aplicaciones han ido sufriendo una transición a un modelo menos monolítico, escalable y de varios nodos. La infraestructura de TI compatible con este modelo debe poder ampliarse al ritmo de la empresa y ser compatible con conectividad de 10 y 40 Gigabit Ethernet.

Figura 1. Switch Nexus de Cisco serie 9508



Entre los switches Nexus® de Cisco serie 9000 se incluyen switches tanto modulares como de puerto fijo diseñados para superar estos retos con una infraestructura centrada en aplicaciones flexible, ágil y de bajo coste.

El switch Cisco Nexus 9508 (figura 1) es el primer switch modular basado en chasis de la plataforma Cisco Nexus 9500. El Cisco Nexus 9508 es un switch modular, de 8 ranuras, de 13 unidades en rack (13RU), Ethernet de capa 2 y 3 sin bloqueo y con capacidad de Fiber Channel sobre Ethernet (FCoE). El switch, que dispone de más de 30 terabits por segundo (Tbps) de ancho de banda de placa base, admite interfaces de 1, 10, 40 y (en el futuro) 100 Gigabit Ethernet mediante una amplia selección de tarjetas de línea modulares. Además, se puede configurar con hasta 1152 puertos de 10 Gigabit Ethernet o 288 de 40 Gigabit Ethernet y proporciona suficiente capacidad para implementaciones de capa de agregación y de acceso.

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Cisco proporciona dos modos de funcionamiento para Cisco Nexus serie 9000. Las organizaciones pueden usar el software de Cisco® NX-OS para implementar Cisco Nexus serie 9000 en entornos de switch Cisco Nexus estándares. También pueden usar la infraestructura de hardware preparada para infraestructura centrada en aplicaciones (ACI) con el fin de sacar el máximo partido de un enfoque de administración de sistemas automatizado basado en políticas.

Características y ventajas del switch Cisco Nexus 9508

El Cisco Nexus 9508 es un chasis modular compatible con hasta ocho tarjetas de línea, dos módulos de supervisor, dos controladores de chasis, tres bandejas de ventilador, seis módulos de fabric y ocho fuentes de alimentación. El switch admite amplias funciones de capa 2 y 3 en puertos de 1, 10 y 40 Gigabit Ethernet sin bloqueo. La plataforma Cisco Nexus 9500 está habilitada para FCoE y preparada para interfaces de 100 Gigabit Ethernet a medida que se encuentran disponibles (tabla 1).

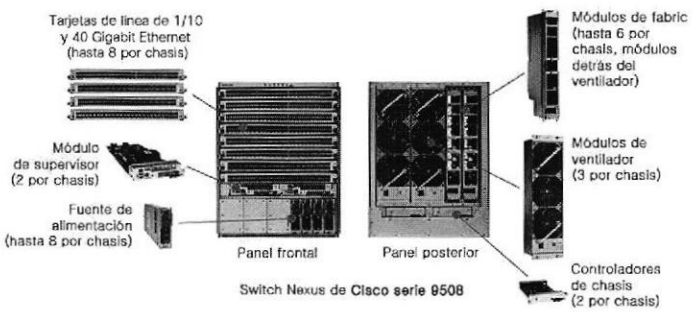
Tabla 1. Características y ventajas del switch Cisco Nexus 9508

Capacidad	Ventaja
Alto rendimiento predecible	El switch ofrece un rendimiento de 30 Tbps sin bloqueo con una latencia inferior a 5 microsegundos, lo que permite a los clientes de los Data Centers crear un fabric de red sólido ampliable desde solo 200 puertos de servidor de 10 Gigabit Ethernet hasta más de 200 000 puertos de servidor de 10 Gigabit Ethernet.
Configuración de alta densidad de 1 y 10 Gigabit Ethernet sin bloqueo	La plataforma Cisco Nexus 9500 ayuda a las organizaciones a realizar la transición de los diseños de acceso a servidor de switches Catalyst® de Cisco serie 6500 de 1 Gigabit Ethernet a diseños de acceso a servidor de 10 Gigabit Ethernet con la misma densidad de puertos.
Configuración de alta densidad de 10 y 40 Gigabit Ethernet sin bloqueo	Cisco Nexus serie 9000 ayuda a las organizaciones a realizar la transición de infraestructuras de 1 y 10 Gigabit Ethernet a infraestructuras de 10 y 40 Gigabit Ethernet para lidiar con la mayor demanda de ancho de banda de entornos de aplicaciones multinodo escalables.
Cables ópticos avanzados	Cisco ofrece un transceptor QSFP+ de 40 Gigabit Ethernet bidireccional conectable que permite a los clientes usar el cableado de Data Center de 10 Gigabit Ethernet existente para admitir la conectividad de 40 Gigabit Ethernet. Esta tecnología facilita la adopción de 40 Gigabit Ethernet sin ningún coste por la actualización de infraestructura de cableado.
Solución muy disponible, escalable y sólida	Todos los componentes principales son redundantes, incluidos los supervisores, controladores de sistema, fuentes de alimentación y bandejas de ventilador. Las tarjetas de línea de switch usan una mezcla de circuitos integrados para aplicaciones específicas (ASIC) de Cisco y minoristas para producir un diseño de complejidad y coste reducidos. Toda la memoria del búfer está integrada en los ASIC de reenvío, lo que elimina la necesidad de un gran número de módulos de memoria externa. Todos los transceptores se pueden conectar para ser compatibles con la mayor cantidad posible de tiempo medio entre fallos (MTBF) para el switch.
Chasis diseñado para 2 o 3 generaciones futuras de tarjetas de línea	El diseño de chasis flexible y eficaz dispone de un 100% de espacio para futuras ampliaciones con capacidad para admitir más ancho de banda y refrigerado, así como el doble del número de fuentes de alimentación necesarias para admitir la máxima configuración disponible a día de hoy.
Eficiencia energética	La plataforma Cisco Nexus 9500 es el primer chasis de switches diseñado sin plano medio. Las tarjetas de línea y los módulos de fabric se conectan directamente. Este diseño ofrece un flujo de aire óptimo de la parte frontal a la trasera y ayuda al switch a funcionar con menos energía. Además, todas las fuentes de alimentación de Cisco Nexus serie 9000 reciben una clasificación de 80 Plus Platinum. El consumo energético típico por puerto de 10 Gigabit Ethernet es inferior a 3,5 vatios (W). El consumo energético típico por puerto de 40 Gigabit Ethernet es inferior a 14 W.

Componentes de switch Cisco Nexus serie 9508

Cisco Nexus 9508 se ha creado usando los componentes que se ilustran en la figura 2 y se describen en las siguientes secciones.

Figura 2. Componentes de la plataforma Cisco 9500

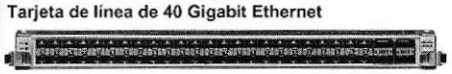


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Tarjetas de línea de la plataforma Cisco Nexus 9500

Cisco Nexus 9508 es compatible con diversas tarjetas de línea, que se pueden configurar en cualquier combinación (tabla 2).

Tabla 2. Las tres tarjetas de línea se pueden configurar en cualquier combinación

Tarjeta de línea de 40 Gigabit Ethernet 	• Tarjeta de línea de 36 puertos de 40 Gigabit Ethernet QSFP+. • Sin bloqueos. • Diseñado para su uso en una función de switch de agregación. • No se puede actualizar al modo ACI.
Tarjeta de línea de capa de acceso de 1 y 10 Gigabit Ethernet y capa de agregación de 10 y 40 Gigabit Ethernet. 	• Tarjeta de línea de 48 puertos de 1 y 10 Gigabit Ethernet SFP+ con 4 puertos de 40 Gigabit Ethernet QSFP+. • Diseñado para su uso con Fabric Extenders Nexus de Cisco serie 2000 y para la agregación mixta de 10 y 40 Gigabit Ethernet. • Compatible con cable de cobre conectado directo de 10 Gigabit Ethernet y transceptores ópticos. • Ofrece 4 puertos QFSP+ que proporcionan acceso de servidor de 40 Gigabit Ethernet, y capacidad de enlace descendente y enlace ascendente. • Se puede utilizar en configuraciones de hoja ACI.
Tarjeta de línea de capa de acceso de 1 y 10 Gigabit Ethernet y capa de agregación de 10 y 40 Gigabit Ethernet. 	• Tarjeta de línea con 48 puertos de 1 y 10GBASE-T más 4 puertos de 40 Gigabit Ethernet QSFP+. • Diseñado para entornos de final de la fila (EoR) y mitad de la fila (MoR). • Compatible con conectividad de cableado de cobre de 100 Megabit Ethernet, 1 Gigabit Ethernet y 10GBASE-T para acceso de servidor. • Ofrece 4 puertos QFSP+ que proporcionan acceso de servidor de 40 Gigabit Ethernet, y capacidad de enlace descendente y enlace ascendente. • Se puede utilizar en configuraciones de hoja ACI.

Módulos de fabric de la plataforma Cisco Nexus 9500

La plataforma Cisco Nexus 9500 usa de forma interna un diseño de fabric Clos que interconecta las tarjetas de línea con módulos de fabric montados en la parte trasera. Cisco Nexus 9508 es compatible con hasta seis módulos de fabric, cada uno de los cuales proporciona una capacidad de reenvío de paquetes a una velocidad de línea de 5,12 Tbps. Todas las tarjetas de fabric están conectadas directamente con todas las tarjetas de línea. Con un equilibrado de carga en las tarjetas de fabric, la arquitectura logra una distribución óptima del ancho de banda en el chasis. Los clientes solo necesitan tres módulos de fabric al usar las tarjetas de línea preparadas para ACI. Cuando los clientes usen la tarjeta de línea de 36 puertos de 40 Gigabit Ethernet sin bloqueos, se requerirán seis tarjetas de fabric.

Módulo de supervisor de plataforma de Cisco Nexus 9500

Un par de módulos de supervisor redundantes administran todas las operaciones del switch mediante un modelo activo-en espera sincronizado con el estado. Cada módulo de supervisor incluye una CPU de cuatro núcleos, 16 GB de RAM y una unidad de estado sólido de 64 GB (SSD) para la información de los análisis y la puesta en marcha. El supervisor acepta un reloj externo y admite la administración mediante diversos puertos, incluidos dos puertos USB, una consola serie y un puerto de red de 10, 100 o 1000 Mbps.

Controlador del sistema de la plataforma Cisco Nexus 9500

Un par de controladores de sistema redundantes descargan las funciones de administración del chasis de los módulos de supervisor. Se encarga de administrar las fuentes de alimentación y las bandejas de ventilador, y es un punto central del canal fuera de banda Gigabit Ethernet (EOBC) entre los supervisores, módulos de fabric y tarjetas de línea.

Fuente de alimentación de la plataforma Cisco Nexus 9500

Cisco Nexus 9508 admite hasta ocho fuentes de alimentación intercambiables en caliente y accesibles desde el panel frontal. Un chasis completamente cargado puede funcionar con dos fuentes de alimentación de 3000 W CA. Se admiten los modos de redundancia N+1 y N+N. La fuente de alimentación de 3000 W CA tiene la clasificación de 80 Plus Platinum; ofrece más del 90% de eficiencia en las cargas de trabajo típicas.

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Las cuatro ranuras para fuentes de alimentación adicionales no son necesarias con las tarjetas de línea existentes, pero ofrecen espacio para admitir tarjetas de línea de mayor ancho de banda en el futuro.

Bandejas de ventilador de la plataforma Cisco Nexus 9500

Tres bandejas de ventilador intercambiables en caliente permiten la refrigeración de la parte frontal a la trasera. Cada bandeja de ventilador cubre dos módulos de fabric y se puede extraer para acceder a ellos.

Ejemplos de implementación

Cisco Nexus 9508 es una plataforma de switching de Data Center que puede funcionar como switch de capa de acceso de EoR implementado con o sin la tecnología Cisco Fabric Extender, como switch de capa de agregación en una arquitectura de redes jerárquica tradicional y como switch de hoja o columna en una arquitectura con escalada horizontal de columna y hoja.

Switch de capa de acceso End-of-Row (fin de fila)

Cisco Nexus 9508 se puede configurar como switch de capa de acceso de EoR (figura 2). Se puede conectar casi con cualquier servidor blade o en rack mediante conexiones de 100 Megabit Ethernet, 1 Gigabit Ethernet y 10 Gigabit Ethernet, entre los que se incluyen las siguientes:

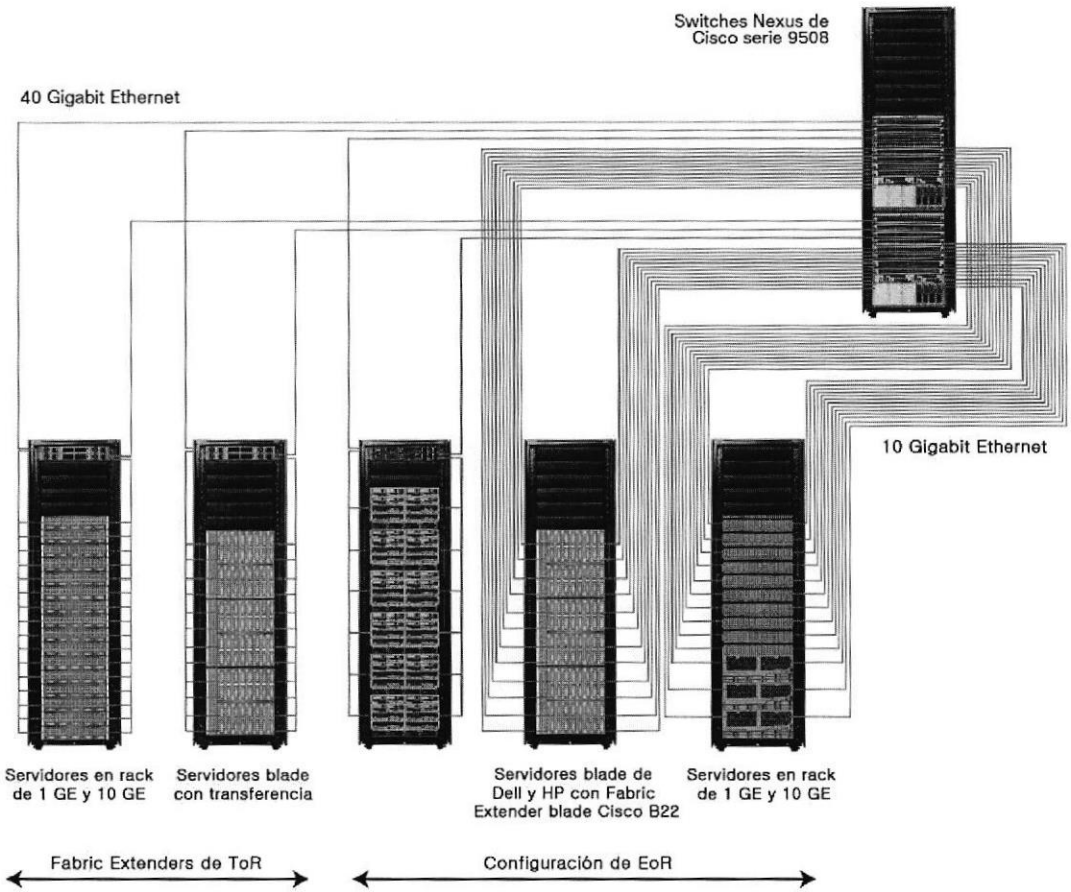
- Servidores en rack Cisco Unified Computing System™ (Cisco UCS®) independientes y de terceros
- Chasis de servidor blade de terceros con switches incluidos en el chasis o dispositivos de transferencia
- Cisco UCS

El switch proporciona una ruta de actualización sencilla desde Cisco Catalyst serie 6500, al aportar las funciones, la fiabilidad, la escalabilidad y la disponibilidad de las plataformas de software Cisco NX-OS a las configuraciones de EoR existentes. Dispone de capacidad para admitir conectividad con cableado de cobre de 100 Megabit Ethernet, 1 Gigabit Ethernet y 10 Gigabit Ethernet, y permite la transición de un rack o servidor de 1 a 10 Gigabit Ethernet por vez.

Cada Cisco Nexus 9508, equipado con ocho tarjetas de línea de 48 puertos de 1 y 10GBASE-T, puede mantener hasta 384 servidores, con treinta y dos enlaces ascendentes de 40 Gigabit Ethernet disponibles para acceso de servidor o enlaces ascendentes al nivel de agregación.

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Figura 3. Cisco Nexus 9508 como switch de capa de acceso de EoR con o sin la tecnología Cisco Fabric Extender

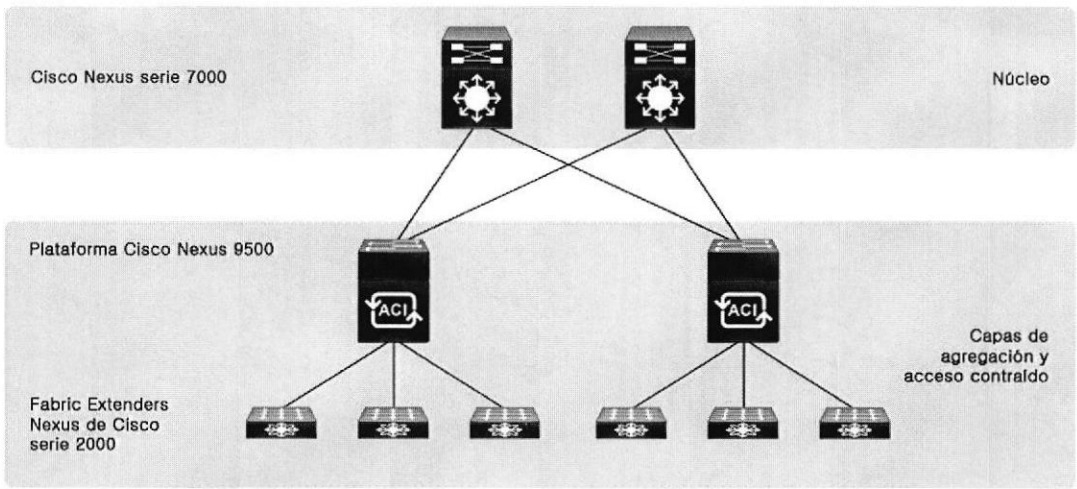


Capas de agregación y acceso contraído

En la figura 4 se muestra cómo la plataforma Cisco Nexus 9500 puede combinarse con Fabric Extenders Nexus de Cisco serie 2000 para establecer un switch de capa de acceso de administración centralizada pero con distribución física que ofrezca funciones de agregación y de acceso. Aunque cada Fabric Extender reside físicamente en la parte superior de cada rack o en cada chasis de servidor blade, cada dispositivo se trata como una tarjeta de línea remota del chasis de la plataforma Cisco Nexus 9500, lo que aporta una enorme escalabilidad mediante la sobresuscripción de ancho de banda flexible, pero con un solo punto de administración.

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Figura 4. Capas de agregación y acceso contraído con Fabric Extenders de Cisco



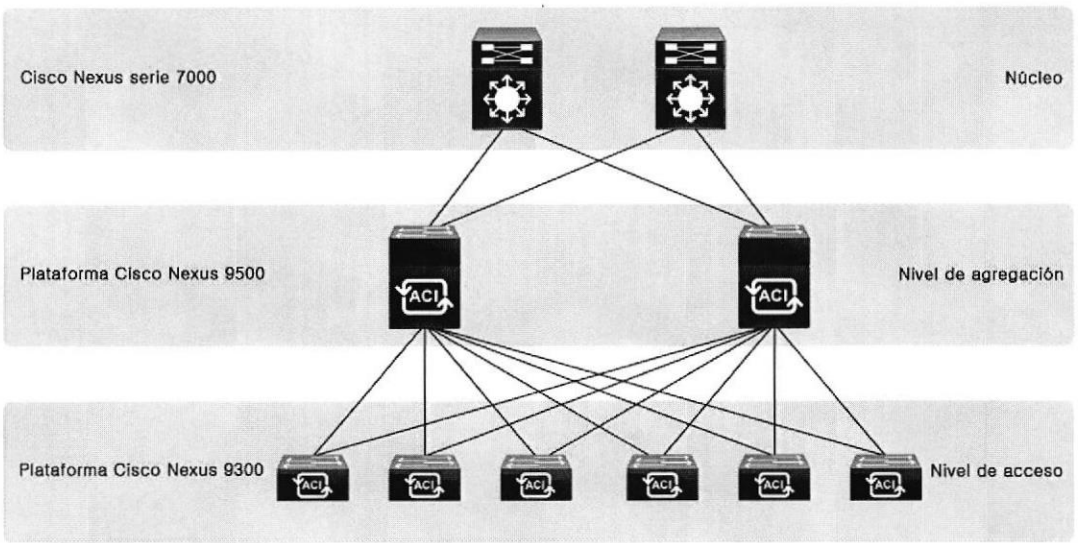
Switch de capa de agregación

Cisco Nexus 9508 puede actuar como switch de capa de agregación en las arquitecturas jerárquicas tradicionales (figura 5). Dado que las plataformas Cisco Nexus 9500 pueden alojar interfaces de 10, 40 y (en el futuro) 100 Gigabit Ethernet, las organizaciones disponen de una flexibilidad inmensa para crear nuevas infraestructuras basadas en el switch, así como la capacidad de usar el switch como sustitución de introducción con más funciones y ancho de banda, todo ello con el cableado óptico y de cobre existente:

- Enlaces ascendentes: la conectividad de capa de switching básico de 40 y (en el futuro) 100 Gigabit Ethernet, así como la ruta de migración que ofrece la plataforma Cisco Nexus 9500 prepara las redes de Data Centers para su crecimiento en cuanto a capacidad en el futuro.
- Enlaces descendentes: la conectividad de 10 Gigabit Ethernet con los switches de Cisco y terceros permite que el switch use la infraestructura existente y se integre con switches de capa de acceso de parte superior de la fila (ToR), EoR, o MoR. La capacidad de 40 Gigabit Ethernet equipara la plataforma Cisco Nexus 9500 en la capa de agregación con los puertos de enlace ascendente de 40 Gigabit Ethernet de los switches de la plataforma Cisco Nexus 9300 con puertos de acceso fijos. LLa capacidad de usar conectividad de 40 Gbps en pares de fibra existentes simplifica tremendamente el paso a un mayor ancho de banda por rack sin el coste y la complejidad de actualizar la planta de cableado del Data Center.

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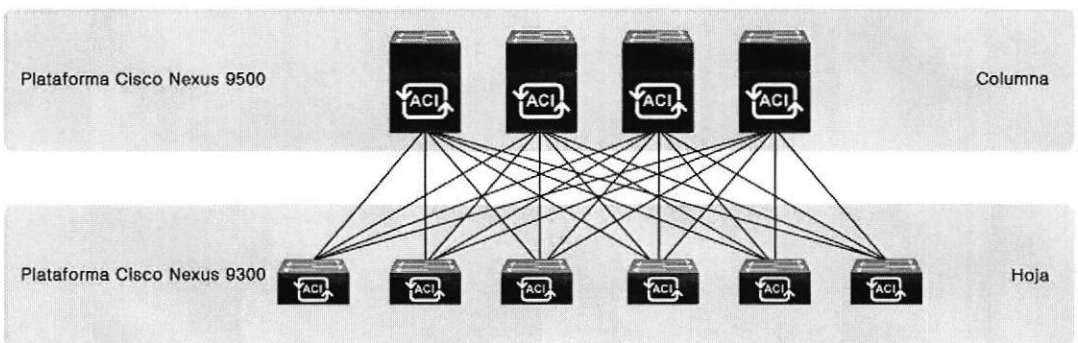
Figura 5. Cisco Nexus 9508 como switch de capa de agregación



Arquitectura de columna y hoja

Cisco Nexus 9508 puede funcionar por igual como hoja o columna en estas arquitecturas (figura 6). Las capacidades de la capa 3 que establecen las plataformas Cisco Nexus 9500 y 9300 permiten que ambas se usen con routing de múltiples rutas de igual coste (ECMP) para acelerar el flujo de tráfico y reducir el tiempo de reconvergencia en caso de error. El grado de redundancia en una arquitectura de hoja y columna proporciona mayor disponibilidad con un elevado nivel de flexibilidad en la ubicación de la carga de trabajo.

Figura 6. Cisco Nexus 9508 en una arquitectura de hoja y columna



Descripción general del software Cisco NX-OS

Cisco NX-OS es un sistema operativo específico para Data Centers diseñado, desde su base, con el fin de proporcionar rendimiento, resistencia, escalabilidad, capacidad de gestión y capacidad de programación. Cisco NX-OS ofrece un sólido y completo conjunto de funciones que cumple los exigentes requisitos de virtualización y automatización de los Data Centers actuales y futuros.

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Cisco Nexus serie 9000 utiliza una versión mejorada del software Cisco NX-OS con una sola imagen binaria compatible con todos los switches de la serie, lo que simplifica la administración de imágenes. El sistema operativo es modular con un proceso dedicado para cada protocolo de routing, un diseño que aísla los fallos y aumenta la disponibilidad. En caso de que se produzca un error de proceso, este podrá reiniciarse sin perder el estado. El sistema operativo es compatible con Actualización de software en funcionamiento (ISSU), la aplicación de parches en frío y en caliente, y los diagnósticos online. En caso de que se produzca un error en el modo de supervisor, el software admite la conmutación stateful con disponibilidad continua.

Entre las principales funciones de switches se incluyen las siguientes:

- La función Power-On Auto Provisioning (POAP) automatiza el proceso de actualización de imágenes de software y de instalación de archivos de configuración en los switches Cisco Nexus que se están implementando en la red por primera vez.
- La interfaz de programación de aplicaciones inteligente (NX-API) ofrece a los operadores una forma de administrar el switch mediante llamadas a procedimiento remoto (RPC; JavaScript Object Notation [JSON] o XML) sobre la infraestructura de HTTP o HTTPS.
- El acceso al shell de Linux permite que el switch se configure mediante los scripts de shell de Linux, lo que ayuda a automatizar la configuración de switches múltiples y a garantizar la coherencia entre ellos.
- La ISSU completa y la aplicación de parches permite que Cisco NX-OS se actualice y se le apliquen parches sin interrupciones en el funcionamiento de los switches.
- La compatibilidad con la superposición a velocidad de línea proporciona puentes de Virtual Extensible LAN (VXLAN) y routing a velocidad de línea completa, lo que facilita y acelera la comunicación entre los servidores virtuales y físicos, así como entre varios Data Centers en un entorno de instalaciones.

Características y ventajas de Cisco NX-OS

El paquete de software de Cisco Nexus serie 9000 proporciona flexibilidad y un completo conjunto de funciones, al tiempo que mantiene la coherencia con los switches de acceso Cisco Nexus. El software del sistema predeterminado cuenta con un completo conjunto de funciones de administración y seguridad de capa 2, además de un conjunto de funciones de capa 3 de nivel básico. Para activar las funciones de routing multidifusión IP y unidifusión IP de capa 3, debe instalar licencias adicionales. En la tabla 3 se enumeran las licencias y los paquetes de software disponibles para habilitar las funciones avanzadas.

Tabla 3. Licencias y paquetes de software

Embalaje	Con base de chasis	Número de pieza	Características compatibles
Licencia de capa 3 mejorada de Cisco Nexus 9500	Chasis	N95-LAN1K9	Funciones de capa 3 mejoradas, que incluyen OSPF completo, Protocolo de routing de gateway interior mejorado (EIGRP) y protocolo de gateway fronterizo (BGP)
Licencia de Cisco Data Center Network Manager (DCNM)	Chasis	DCNM-LAN-N95-K9	Licencia de Cisco DCNM para la plataforma Cisco Nexus 9500

Requisitos de software

Cisco Nexus 9508 es compatible con el software Cisco NX-OS, versión 6.1 y posterior. Cisco NX-OS interactúa con cualquier sistema operativo de red, incluido el software Cisco IOS®, que cumple los estándares de red mencionados en esta hoja de datos.

Cisco Nexus serie 9000 ejecuta Cisco NX-OS en un kernel de Linux de 64 bits (versión 3.4.10) con una sola imagen binaria compatible con los switches modulares (plataforma Cisco Nexus 9500) y de puerto fijo (plataforma Cisco Nexus 9300). La imagen de software está basada en el software Cisco NX-OS, versión 6.1(2). La imagen única incorpora tanto el kernel de Linux como Cisco NX-OS de modo que el switch se puede arrancar mediante un proceso de inicio de Linux estándar.

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Especificaciones

En la tabla 4 se enumeran las especificaciones del Cisco Nexus 9508. (Consulte las notas de la versión del software para obtener información de compatibilidad de funciones).

Tabla 4. Especificaciones del producto: rendimiento y escalabilidad

Elemento	Plataforma Cisco Nexus 9500
Número máximo de rutas Longest Prefix Match (LPM)	128 000
Número máximo de entradas de host de IP	88 000
Número máximo de entradas de dirección de MAC	160 000
Número de rutas multidifusión	• 8000 a 32 000 (sin canal de puerto virtual [vPC]) • 4000 a 32 000 (con vPC)
Número de grupos de detección de Interior Gateway Management Protocol (IGMP)	• 8000 a 32 000 (sin canal de puerto virtual [vPC]) • 4000 a 32 000 (con vPC)
Número máximo de Cisco Nexus 2000 Series Fabric Extenders por switch	32
Número de entradas de lista de control de acceso (ACL)	• De 5000 a 60 000 entradas • De 1500 a 18 000 entradas
Número máximo de VLAN	4096
Número máximo de instancias de reenvío y routing virtuales (VRF)	1000
Número máximo de enlaces en un PortChannel	32
Número máximo de rutas ECMP	64
Número máximo de PortChannel	528
Número de sesiones activas de Analizador de puerto conmutado (SPAN)	4 a 32
Número máximo de instancias de Árbol de extensión rápida por VLAN (PVRST)	507
Número máximo de grupos de protocolo de router con espera en caliente (HSRP)	490
Número máximo de instancias de árbol de extensión múltiple (MST)	64
Número máximo de destinos de punto terminal de túnel de VXLAN (VTEP)	256
Número máximo de servidores físicos VXLAN (combinaciones del puerto VLAN)	10 000

Características

En esta sección se resumen las funciones de la plataforma Cisco Nexus 9500.

Funciones de capa 2
VLAN • 4096 • Reasignación de intervalo reservado VLAN privadas (PVLAN)* • Puertos aislados y puertos promiscuos • PVLAN en PortChannel y vPC PVLAN: Fabric Extenders* • Puertos aislados vPC Protocolo de árbol de extensión • Árbol de extensión rápido IEEE 802.1w (PVST+ rápido) • Árbol de extensión múltiple IEEE 802.1s (MST) • Puerto extremo y puerto troncal extremo • Extensiones: protección de Bridge Protocol Data Unit (BPDU), filtrado de BPDU, garantía de puente, protección de bucle y protección de raíz Protocolo troncal de VLAN (VTP), versiones 1 y 2 (v1 y v2): modo transparente Direcciones MAC: estáticas • Unidifusión y multidifusión

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Control de flujo IEEE 802.3x

Protocolo de descubrimiento de la capa de enlace (LLDP) IEEE 802.1AB

Unidad de transmisión máxima (MTU) de interfaz configurable por el usuario y tramas gigantes

Detección cruzada de interfaces dependientes de medios automática (auto-MDIX)

Detección de enlaces unidireccionales (UDLD)

Funciones de capa 3

IPv4

- Rutas estáticas
- BGP, EIGRP, OSPFv2 y sistema intermedio a sistema intermedio (IS-IS)
- VRF-Lite y filtrado de rutas VRF
- HSRP v1 y v2
- Protocolo de redundancia de router virtual (VRRP, del inglés Virtual Router Redundancy Protocol)
- Detección de reenvío bidireccional (BFD)
- Transmisión de protocolo de configuración dinámica de host (DHCP)

IPv6

- Rutas estáticas
- BGP y OSPFv3
- VRF-Lite y filtrado de rutas VRF
- HSRPv6
- VRRPv3
- Transmisión DHCP

Mejoras de BGP

- **disable-peer-as-check**: las rutas obtenidas de un nodo en un sistema autónomo (**as**) se anunciarán a otro nodo del mismo sistema autónomo.
- **allow-as in**: permitir que las rutas que tengan sus propios sistemas autónomos en la ruta del sistema autónomo (**as-path**) se instalen en la base de información de routing de BGP (BRIB).
- **best-as-path-relax**: permitir que las rutas recibidas de distintos sistemas autónomos se administren como múltiples rutas si sus longitudes de **as-path** son las mismas y se cumplen otras condiciones de múltiples rutas.
- **best-as-path-relax**: permitir que las rutas recibidas de distintos sistemas autónomos se administren como múltiples rutas si sus longitudes de **as-path** son las mismas y se cumplen otras condiciones de múltiples rutas.
- **transport connection-mode passive**: permitir solo una configuración de conexión pasiva.
- **remove private-as enhancements [no | default]: remove-private-as [all] [replace-as].**
- Autenticación MD5 para vecinos basados en prefijo: permitir la autenticación para vecinos basados en prefijo.
- Siguiente salto de E-BGP no se ha cambiado.
- La ruta IPv6 se actualiza mediante IPv4 de igual a igual.
- E-BGP escala a 1000 iguales con BFD.

ECMP de 64 vías

Direcciones MAC configurables por el usuario (16) en interfaces enrutadas

Características de multidifusión

IGMPv1, v2 y v3

Snooping de IGMP

Multidifusión independiente de protocolo (PIM), modo disperso (PIM-SM) y multidifusión de cualquier origen (ASM)

Protocolo de routing de difusión limitada (RP de difusión limitada)

Protocolo de transmisión de fuente multidifusión (MSDP)

Funciones de disponibilidad

Única imagen binaria en los switches Nexus 9300 y Nexus 9500

Aislamiento de errores por proceso

ISSU

Aplicación de parches en procesos

Reinicio de proceso sin estado

Conmutación stateful de supervisor

Inserción y extracción online (OIR) de módulos sin interrupción del tráfico

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Funciones de supervisión integral
Diagnósticos Cisco Generic Online Diagnostics (GOLD) • Comprobaciones de estado, mínimo, completo, omisión y a demanda Registro de errores incorporado (OBFL) Cisco Embedded Event Manager (EEM): organizador, monitor y gestor de eventos Análisis y captura integradas de paquetes con Wireshark SSD predeterminado (supervisor de chasis y ToR) para el registro y la recopilación de datos SPAN • Origen y destino en el switch ERSPAN • Origen en el switch y Fabric Extender • Filtrado de ACL de entrada
Funciones de compatibilidad con la virtualización
Gateway VXLAN* Puentes VXLAN* Routing VXLAN*
Funciones de seguridad
ACL de entrada y salida con campos de capa 2, 3 y 4 • ACL extendidos, direcciones MAC, ACL de puerto (PACL), VLAN ACL (VACL) y ACL enrutada (RACL) • Delimitación ACL flexible Contadores de ACL Control de tormentas • Difusión, multidifusión y unidifusión desconocida Vigilancia del plano de control (CoPP) configurable por el usuario Autenticación, autorización y contabilidad (AAA, por sus siglas en inglés) • Protocolo de autenticación por desafío mutuo (CHAP), protocolo de autenticación por contraseña (PAP), MS-CHAP (Microsoft) y MS-CHAPv2 • Capacidad de deshabilitar el control de acceso basado en roles (RBAC) y usar la autenticación de servidores AAA • Integración de RBAC para sustituir los niveles de privilegio • Inicio de sesión • Parámetros de prueba • Compatibilidad con contextos de VRF • Compatible con LDAP RADIUS RBAC TACACS+
Tipos de interfaces
Puerto de switch de capa 2 • Acceso y troncales (lista de VLAN y VLAN nativas etiquetadas y no etiquetadas) Capa 3 enrutada Interfaz de bucle invertido Interfaz virtual de switch (SVI) PortChannel • Modo estático • LACP IEEE 802.3ad • Equilibrio de carga • Ping de enlace de miembro • Número mínimo de enlace Puerto de Fabric Extender

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Características de QoS
Hasta 4 colas por puerto
Interfaz de línea de comandos de QoS modular (CLI; MQC)
Clasificación basada en ACL
Formación de colas • Prioridad estricta y Fabric Extender de prioridad estricta • Turnos rotatorios ponderados (WRR) y Fabric Extender de WRR
Marcas y clasificación • Punto de código de servicios diferenciados (DSCP) en el switch • Clase de servicio (CoS) • Preservación de CoS para acceso directo a memoria remota (RDMA) en Ethernet mejorada convergente (RoCEE)
Uso de políticas • Entrada
Notificación de congestión explícita (ECN)
Detección temprana aleatoria ponderada (WRED)
Control de flujo de prioridad (PFC) que admite hasta 3 clases de PFC
Funciones de administración de dispositivos
POAP
Capacidad de revertir la configuración
Administrador de sesiones de configuración
Cliente FTP, SFTP y TFTP
Protocolo de hora de red (NTP) • Cliente, igual, servidor, ACL y autenticación
Cliente de copia remota (RCP) y copia segura (SCP)
Control remoto (RMON)
Cisco Smart Call Home
Protocolo simple de administración de red (SNMP) v1, v2 y v3
Syslog
Terminal virtual (vty)
XML (Netconf)
Secure Shell (SSH) v2 (cliente y servidor)
Telnet (cliente y servidor)
Puerto USB
Puerto de administración de 100/1000 Gbps
Puerto de consola serie RS-232
Compatible con copy <file> start
LED de ubicación (baliza) para tarjetas de línea (chasis) y módulos de enlace ascendente (ToR)
Compatible con Cisco DCNM LAN y la infraestructura Cisco Prime™
Compatible con el complemento de redes de Cisco para OpenStack
Funciones de capacidad de programación y ampliación
Herramientas de Linux • Acceso al shell de Bash • Acceso a shell de Broadcom
Shell de Python
NX-API
Cliente Extensible Messaging and Presence Protocol (XMPP)*
Cumplimiento de estándares
Protocolo de árbol de extensión y puentes IEEE 802.1D
QoS/CoS IEEE 802.1p
Etiquetado IEEE 802.1Q sobre VLAN
Árbol de extensión rápido IEEE 802.1w
Protocolo de árbol de extensión múltiple IEEE 802.1s
Protocolo de descubrimiento de la capa de enlace IEEE 802.1AB
Agregación de enlaces con LACP IEEE 802.3ad
Control de flujo IEEE 802.3x

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IEEE 802.3ab: 1000BASE-T
Gigabit Ethernet IEEE 802.3z
10 Gigabit Ethernet IEEE 802.3ae
40 Gigabit Ethernet IEEE 802.3ae
RFC 2460 IPv6
RFC 2461 Neighbor Discovery para IPv6
RFC 2462 IPv6 Configuración automática de dirección sin estado
RFC 2463 ICMPv6
MIB de SNMP
Equivalente de software Cisco NX-OS versión 6.2

Fuente de alimentación

En la tabla 5 se enumeran las propiedades de las fuentes de alimentación del Cisco Nexus 9508.

Tabla 5. Propiedades de las fuentes de alimentación

Propiedades de las fuentes de alimentación de CA	Cisco Nexus 9508
Alimentación	3000 W CA
Voltaje de entrada	De 200 a 240 V CA
Frecuencia	De 50 a 60 Hz
Eficiencia	90% o superior (carga de 20% a 100%)
Conformidad con RoHS	Sí
Intercambiable en caliente	Sí
Fuente de alimentación de flujo de aire de la parte frontal a la parte trasera	Sí

Entorno

En la tabla 6 se enumeran las propiedades medioambientales de Cisco Nexus 9508.

Tabla 6. Propiedades medioambientales

Propiedad	Cisco Nexus 9508
Dimensiones físicas (Al. x An. x Pr.)	22,7 x 17,5 x 30,0 pulg. (57,78 x 44,5 x 76,2 cm)
Temperatura de funcionamiento	De 32 a 104 °F (de 0 a 40 °C)
Temperatura sin funcionar (almacenamiento)	De -40 a 70 °C (de -40 a 158 °F)
Humedad	Del 5% al 95% (sin condensación)
Altitud	De 0 a 13 123 pies (de 0 a 4000 m)

Peso y alimentación típica

En la tabla 7 se muestra el peso y el consumo de alimentación típico de Cisco Nexus 9508.

Tabla 7. Peso y consumo energético

Componente	Peso	Alimentación típica	Alimentación máxima
Chasis de Cisco Nexus 9508 sin fuentes de alimentación, bandejas de ventilador, módulos de fabric, supervisor, controladores de sistemas ni tarjetas de línea	150 lb (68,2 kg)	N/D	N/D
Fuente de alimentación de Cisco Nexus de 3000 W de (8 como máximo)	6,16 lb (2,8 kg)	N/D	N/D
Bandejas de ventilador (3 como máximo)	8,25 lb (3,7 kg)	176 W	250 W
Módulos de fabric (6 como máximo)	9,59 lb (4,4 kg)	176 W	250 W
Supervisores (2 como máximo)	4,84 lb (2,2 kg)	69 W	80 W
Controladores de sistemas (2 como máximo)	1,91 lb (0,9 kg)	13 W	25 W

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Componente	Peso	Alimentación típica	Alimentación máxima
Cisco Nexus X9636PQ: tarjeta de línea de 36 puertos de 40 Gigabit Ethernet QSFP+	11,48 lb (5,2 kg)	260 W	400 W
Cisco Nexus X9564TX: tarjeta de línea de 48 puertos de 1/10GBASE-T y 4 puertos de 40 Gigabit Ethernet QSFP+	12,58 lb (5,7 kg)	450 W	550 W
Cisco Nexus X9564PX: tarjeta de línea de 48 puertos de 10 Gigabit Ethernet SFP+ y 4 puertos de 40 Gigabit Ethernet QSFP+	11,48 lb (5,2 kg)	300 W	430 W

Cumplimiento de estándares normativos

En la tabla 8 se resume el cumplimiento de estándares normativos de la plataforma Cisco Nexus 9500.

Tabla 8. Cumplimiento de estándares normativos: seguridad y EMC

Especificación	Descripción
Cumplimiento de las normas	Los productos deben cumplir con las directivas 2004/108/EC y 2006/95/EC de la marca CE.
Seguridad	• UL 60950-1, segunda edición • CAN/CSA-C22.2 n.º 60950-1, segunda edición • EN 60950-1, segunda edición • IEC 60950-1, segunda edición • AS/NZS 60950-1 • GB4943
EMC: emisiones	• 47CFR parte 15 (CFR 47) clase A • AS/NZS CISPR22 clase A • CISPR22 clase A • EN55022 clase A • ICES003 clase A • VCCI clase A • EN61000-3-2 • EN61000-3-3 • KN22 clase A • CNS13438 clase A
EMC: inmunidad	• EN55024 • CISPR24 • EN300386 • Serie KN 61000-4
RoHS	El producto cumple la normativa RoHS 6, excepto en lo relativo a las bolas de las soldaduras ball grid array (BGA) de plomo y los conectores de presilla de plomo.

Información para realizar pedidos

En la tabla 9 se presenta información para realizar pedidos de la plataforma Cisco Nexus 9500. Puede solicitar los Fabric Extenders de la plataforma Cisco Nexus 2200 por separado o junto con la plataforma Cisco Nexus 9500.

Tabla 9. Información para realizar pedidos

Número de pieza	Descripción del producto
Hardware	
N9K-C9508-B1	Paquetes de chasis de Nexus 9508 con 1 sup, 3 fuentes de alimentación, 2 SC, 3 bandejas de ventilador y 3 módulos de fabric
N9K-C9508-B2	Paquetes de chasis de Nexus 9508 con 1 sup, 3 fuentes de alimentación, 2 SC, 3 bandejas de ventilador y 6 módulos de fabric
N9K-C9508	Chasis de Nexus 9508 con 8 ranuras de tarjeta de línea
N9K-X9564TX	Tarjeta de línea de hoja de ACI Nexus 9500, tarjeta de línea de 48 puertos de 1/10G-T más 4 puertos QSFP (sin bloqueos)
N9K-X9564PX	Tarjeta de línea de hoja de ACI Nexus 9500, tarjeta de línea de 48 puertos de 1/10G SFP+ más 4 puertos QSFP (sin bloqueos)
N9K-X9636PQ	Tarjeta de línea de Nexus 9500, tarjeta de línea de agregación de 36 puertos de 40G QSFP (sin bloqueos)

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Número de pieza	Descripción del producto
N9K-SUP-A	Nexus 9500 Supervisor
N9K-SC-A	Controlador de sistemas de Nexus 9500
N9K-C9508-FM	Módulo de fabric para el chasis de Nexus 9508
N9K-PAC-3000W-B	Fuente de alimentación de Nexus 9500 de 3000 W CA, entrada de aire frío
N9K-C9508-FAN	Chasis de bandeja de ventilador para Nexus 9508
Software	
N95-LAN1K9	Capa 3 mejorada, incluye OSPF, EIGRP, BGP y VXLAN
DCNM-LAN-N95-K9	Licencia de DCNM para Nexus serie 9500
Cables y cables ópticos	
QSFP-40G-SR-BD	Módulo QSFP 40GBASE-SR-BD, conector LC (fibra multimodo [MMF] a 100 m OM3)
QSFP-40G-SR4	Módulo QSFP 40GBASE-SR4, conector MPO (fibra multimodo [MMF] a 100 m OM3)
QSFP-40G-CSR4	Módulo QSFP 40GBASE-CSR4 ampliado, conector MPO (fibra multimodo [MMF] a 300 m OM3)
QSFP-4x10G-AC7M	Cable multiconector de conexión directa Cisco 40GBASE-CR4 QSFP+ para 4 10GBASE-CU SFP+, 7 metros, activo
QSFP-4x10G-AC10M	Cable multiconector de conexión directa Cisco 40GBASE-CR4 QSFP+ para 4 10GBASE-CU SFP+, 10 metros, activo
QSFP-H40G-CU1M	Cable de cobre de conexión directa Cisco 40GBASE-CR4 QSFP+, 1 metro, pasivo
QSFP-H40G-CU3M	Cable de cobre de conexión directa Cisco 40GBASE-CR4 QSFP+, 3 metros, pasivo
QSFP-H40G-CU5M	Cable de cobre de conexión directa Cisco 40GBASE-CR4 QSFP+, 5 metros, pasivo
QSFP-H40G-ACU7M	Cable de cobre de conexión directa Cisco 40GBASE-CR4 QSFP+, 7 metros, activo
QSFP-H40G-ACU10M	Cable de cobre de conexión directa Cisco 40GBASE-CR4 QSFP+, 10 metros, activo
SFP-10G-SR	Módulo 10GBASE-SR SFP+
SFP-10G-LR	Módulo 10GBASE-LR SFP+
SFP-H10GB-CU1M	Cable de 1 metro 10GBASE-CU SFP+
SFP-H10GB-CU3M	Cable de 3 metros 10GBASE-CU SFP+
SFP-H10GB-CU5M	Cable de 5 metros 10GBASE-CU SFP+
SFP-H10GB-ACU7M	Montaje de cable twinaxial activo, 7 m
SFP-H10GB-ACU10M	Montaje de cable twinaxial activo, 10 m
GLC-T	1000BASE-T SFP
GLC-SX-MM	Transceptor SX de conector LC, GE SFP
GLC-LH-SM	Transceptor LX/LH de conector LC, GE SFP
Cables de alimentación	
CAB-AC-16A-AUS	Cable de alimentación, 250 V CA, 16 A, Australia C19
CAB-AC-2500W-EU	Cable de alimentación, 250 V CA 16 A, Europa
CAB-AC-2500W-INT	Cable de alimentación, 250 V CA 16 A, INTL
CAB-AC-2500W-ISRL	Cable de alimentación, 250 V CA 16 A, Israel
CAB-AC-2500W-US1	Cable de alimentación, 250 V CA 16 A, enchufe 6-20 NEMA de blade directo, EE. UU.
CAB-AC-C6K-TWLK	Cable de alimentación, 250 V CA 16 A, enchufe L6-20 NEMA de bloqueo trenzado, EE. UU.
CAB-AC16A-CH	Cable de alimentación de 16 A CA para China
CAB-ACS-16	Cable de alimentación de CA (Suiza) 16 A
CAB-C19-CBN	Cable de alimentación del puente de armario, 250 V CA 16A, conectores C20-C19
CAB-L520P-C19-US	L5-20 NEMA a IEC-C19 6 pies, EE. UU.
Accesorios	
N9K-C9500-RMK=	Kit de montaje en rack para Nexus 9500
N9K-C9500-ACK=	Kit de accesorios de Nexus 9500

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CIB - ESPOL
ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL ESPOL

Garantía

La plataforma Cisco Nexus 9500 cuenta con garantía de hardware limitada de 1 año. La garantía incluye la sustitución de hardware con una respuesta de 10 días desde la recepción de una autorización para la devolución de materiales (RMA).

Servicio y asistencia

Cisco ofrece una amplia serie de servicios para ayudarle a implantar y optimizar la plataforma Cisco Nexus 9500 en su Data Center. Las ofertas de los innovadores servicios de Cisco se proporcionan a través de una combinación exclusiva de personas, procesos, herramientas y partners, y se centran en aumentar la eficacia operativa y mejorar la red de Data Center. Los servicios avanzados de Cisco utilizan un enfoque basado en la arquitectura que ayuda a alinear la infraestructura de Data Center con las metas empresariales y proporciona valor a largo plazo. El servicio Cisco SMARTnet® ayuda a solucionar problemas graves gracias al acceso directo en cualquier momento a los expertos en redes de Cisco y a sus reconocidos recursos. Con este servicio, puede aprovechar la capacidad del servicio Cisco Smart Call Home, que ofrece diagnósticos proactivos y alertas en tiempo real sobre la plataforma Cisco Nexus 9500. Las ofertas de servicios de Cisco, aplicables a la totalidad del ciclo de vida de la red, contribuyen a aumentar la protección de la inversión, a optimizar las operaciones en red, a posibilitar las operaciones de migración y a reforzar sus conocimientos en TI.

Para obtener más información

Para obtener más información sobre Cisco Nexus serie 9000, visite http://www.cisco.com/go/nexus9000.

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Cisco Nexus 3064-X, 3064-T, and 3064-32T Switches

Product Overview

The Cisco Nexus® 3064-X, 3064-T, and 3064-32T Switches are high-performance, high-density Ethernet switches that are part of the Cisco Nexus 3000 Series Switches portfolio. These compact one-rack-unit (1RU) form-factor 10 Gigabit Ethernet switches provide line-rate Layer 2 and 3 switching. They run the industry-leading Cisco® NX-OS Software operating system, providing customers with comprehensive features and functions that are widely deployed globally. They support both forward and reverse airflow schemes with AC and DC power inputs. The Cisco Nexus 3064 switches are well suited for data centers that require cost-effective, power-efficient, line-rate Layer 2 and 3 top-of-rack (ToR) switches.

Three Cisco Nexus 3064 switches are available:

- Cisco Nexus 3064-X (Figure 1): This 10-Gbps Enhanced Small Form-Factor Pluggable (SFP+)-based top-of-rack switch has 48 SFP+ ports and 4 Quad SFP+ (QSFP+) ports. Each SFP+ port can operate in 100-Mbps, 1-Gbps, or 10-Gbps mode, and each QSFP+ port can operate in native 40-Gbps or 4 x 10-Gbps mode. This switch is a true phy-less switch that is optimized for low latency and low power consumption.
- Cisco Nexus 3064-T (Figure 2): This 10GBASE-T switch has 48 10GBASE-T RJ-45 ports and 4 QSFP+ ports. This switch is well suited for customers who want to reuse existing copper cabling while migrating from 1-Gbps to 10-Gbps servers.
- Cisco Nexus 3064-32T (Figure 2): This switch is the Cisco Nexus 3064-T with 32 10GBASE-T ports and 4 QSFP+ ports enabled. The ports are enabled through software licensing. This switch provides a cost-effective solution for customers who require up to 32 10GBASE-T ports per rack. This switch comes with a 32-10GBASE-T port license preinstalled. To enable the remaining 16 10GBASE-T ports, the customer installs the 16-port upgrade license.

Figure 1. Cisco Nexus 3064-X Switch

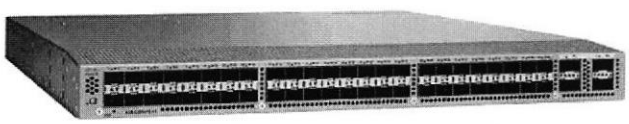
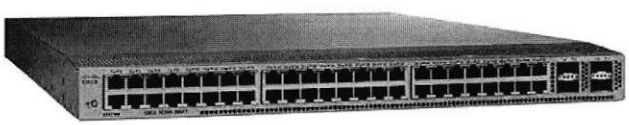


Figure 2. Cisco Nexus 3064-T and 3064-32T Switch



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Main Benefits

The Cisco Nexus 3064 switches provide the following main benefits:

- Wire-rate Layer 2 and 3 switching on all ports
  - The Cisco Nexus 3064 switches provide Layer 2 and 3 switching of up to 1.2 terabits per second (Tbps) and more than 950 million packets per second (mpps) in a compact 1RU form factor.
- Ultra-low latency
  - The Cisco Nexus 3064 switches deliver ultra-low nominal latency that allows customers to implement high-performance infrastructure for high-frequency trading (HFT) workloads.
- Purpose-built on Cisco NX-OS operating system with comprehensive, proven innovations
  - Virtual PortChannel (vPC) provides Layer 2 multipathing through the elimination of Spanning Tree Protocol and enables fully utilized bisectional bandwidth and simplified Layer 2 logical topologies without the need to change the existing management and deployment models.
  - PowerOn Auto Provisioning (POAP) enables touchless bootup and configuration of the switch, drastically reducing provisioning time.
  - Cisco Embedded Event Manager (EEM) and Python scripting enable automation and remote operations in the data center.
  - Advanced buffer monitoring reports real-time buffer use per port and per queue, which allows organizations to monitor traffic bursts and application traffic patterns.
  - The 64-way equal-cost multipath (ECMP) routing enables Layer 3 fat tree designs and allows organizations to prevent network bottlenecks, increase resiliency, and add capacity with little network disruption.
  - EtherAnalyzer is a built-in packet analyzer for monitoring and troubleshooting control-plane traffic and is based on the popular Wireshark open source network protocol analyzer.
  - Precision Time Protocol (PTP; IEEE 1588) provides accurate clock synchronization and improved data correlation with network captures and system events.
  - Full Layer 3 unicast and multicast routing protocol suites are supported, including Border Gateway Protocol (BGP), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Routing Information Protocol Version 2 (RIPv2), Protocol Independent Multicast sparse mode (PIM-SM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP).
- Network traffic monitoring with Cisco Nexus Data Broker
  - Build simple, scalable and cost-effective network tap or Cisco Switched Port Analyzer (SPAN) aggregation for network traffic monitoring and analysis.

Configuration

- Cisco Nexus 3064-X
  - 48 fixed 10 Gigabit Ethernet SFP+ ports (can operate at 100-Mbps, 1-Gbps, and 10-Gbps speeds)
  - Four fixed QSFP+ ports (each QSFP+ port can support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet)
- Cisco Nexus 3064-T
  - 48 fixed 10GBASE-T ports (can operate at 100-Mbps, 1-Gbps, and 10-Gbps speeds)
  - Four fixed QSFP+ ports (each QSFP+ port can support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet)

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- Cisco Nexus 3064-32T
  - 32 fixed 10GBASE-T ports (can operate at 100-Mbps, 1-Gbps, and 10-Gbps speeds)
  - Four fixed QSFP+ ports (each QSFP+ port can support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet)
  - Upgrade to 48 fixed 10GBASE-T and 4 QSFP+ ports by installing a 16-port upgrade license
- Locator LED
- Dual redundant[1] power supplies
- Fan tray with redundant fans
- Two 10/100/1000-Mbps management ports
- One RS-232 serial console port
- One USB port
- Locator LED button

Support for both forward (port-side exhaust) and reversed (port-side intake) airflow schemes is available.

Transceiver and Cabling Options

The Cisco Nexus 3064 switches support a wide variety of 1, 10, and 40 Gigabit Ethernet connectivity options. 1 and 10 Gigabit Ethernet connectivity is achieved in the first 48 ports, and 40 Gigabit Ethernet connectivity is achieved using QSFP+ transceivers in the last 4 ports.

QSFP+ technology allows smooth transition from 10 to 40 Gigabit Ethernet infrastructures in data centers. The Cisco Nexus 3064 switches support connectivity over copper and fiber cables, providing excellent physical-layer flexibility. For low-cost cabling, copper-based 40-Gbps Twinax cables can be used, and for longer cable reaches, short-reach optical transceivers are excellent.

Connectivity can be established from the QSFP ports to an upstream 10 Gigabit Ethernet switch using a splitter cable that has a QSFP transceiver on one end and four SFP+ transceivers on the other end. Similar capability can be achieved using optical transceivers by procuring third-party fiber splitters. Table 1 lists the QSFP transceiver types supported.

Table 1. Cisco Nexus 3064 QSFP Transceiver Support Matrix

Part Number	Description
QSFP-4X10G-AC10M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 10m, active
QSFP-4X10G-AC7M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 7m, active
QSFP-4SFP10G-CU5M	QSFP to 4xSFP10G passive copper splitter cable, 5m
QSFP-4SFP10G-CU3M	QSFP to 4xSFP10G passive copper splitter cable, 3m
QSFP-4SFP10G-CU1M	QSFP to 4xSFP10G passive copper splitter cable, 1m
QSFP-H40G-ACU10M	Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 10m, active
QSFP-H40G-ACU7M	Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 7m, active
QSFP-H40G-CU5M	40GBASE-CR4 passive copper cable, 5m
QSFP-H40G-CU3M	40GBASE-CR4 passive copper cable, 3m
QSFP-H40G-CU1M	40GBASE-CR4 passive copper cable, 1m
QSFP-40G-SR4	40GBASE-SR4 QSFP transceiver module with MPO connector

[1] Cisco Nexus 3064-T and 3064-32T DC power supplies operate in combined mode only.

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Part Number	Description
QSFP-40G-CSR4	Cisco 40GBASE-CSR4 transceiver module, MPO, 300m
QSFP-40GE-LR4	QSFP 40GBASE-LR4 QSFP+ module for SMF

For in-rack or adjacent-rack cabling, the Cisco Nexus 3064-X supports SFP+ direct-attach 10 Gigabit Ethernet copper, an innovative solution that integrates transceivers with Twinax cables into an energy-efficient and low-cost solution. For longer cable runs, multimode and single-mode optical SFP+ transceivers are supported. Table 2 lists the supported 10 Gigabit Ethernet transceiver options.

Table 2. Cisco Nexus 3064-X 10 Gigabit Ethernet Transceiver Support Matrix

Part Number	Description
SFP-10G-SR	10GBASE-SR SFP+ module (multimode fiber [MMF])
SFP-10G-LR	10GBASE-LR SFP+ module (single-mode fiber [SMF])
SFP-10G-ER	Cisco 10GBASE-ER SFP+ module for SMF
SFP-10G-ZR	Cisco 10GBASE-ZR SFP+ module for SMF*
DWDM-SFP10G-*	10GBASE-DWDM Modules (multiple varieties)
SFP-H10GB-CU1M	10GBASE-CU SFP+ cable 1m (Twinax cable)
SFP-H10GB-CU3M	10GBASE-CU SFP+ cable 3m (Twinax cable)
SFP-H10GB-CU5M	10GBASE-CU SFP+ cable 5m (Twinax cable)
SFP-H10GB-ACU7M	Active Twinax cable assembly, 7m
SFP-H10GB-ACU10M	Active Twinax cable assembly, 10m
SFP-10G-AOC1M	10GBASE-AOC SFP+ cable 1m
SFP-10G-AOC2M	10GBASE-AOC SFP+ cable 2m
SFP-10G-AOC3M	10GBASE-AOC SFP+ cable 3m
SFP-10G-AOC5M	10GBASE-AOC SFP+ cable 5m
SFP-10G-AOC7M	10GBASE-AOC SFP+ cable 7m
SFP-10G-AOC10M	10GBASE-AOC SFP+ cable 10m

The Cisco Nexus 3064-X is compatible with existing Gigabit Ethernet infrastructures. The 10 Gigabit Ethernet interfaces can operate in either Gigabit Ethernet or 100-Mbps mode. Table 3 lists the Gigabit Ethernet SFP transceivers that are supported. 100-Mbps connectivity can be achieved by using copper-based SFP transceivers (SFP-GE-T and GLC-T).

Table 3. Cisco Nexus 3064 Gigabit Ethernet Transceiver Support Matrix

Part Number	Description
SFP-GE-T	1000BASE-T NEBS 3 ESD
GLC-T	1000BASE-T SFP
GLC-SX-MM	GE SFP, LC connector SX transceiver (MMF)
GLC-LH-SM	GE SFP, LC connector LX/LH transceiver (SMF)
GLC-SX-MMD	1000BASE-SX short wavelength; with DOM
GLC-LH-SMD	1000BASE-LX/LH long-wavelength; with DOM
GLC-EX-SMD	1000BASE-EX long-wavelength; with DOM
GLC-ZX-SMD	1000BASE-ZX extended distance; with DOM
GLC-BX-U	1000BASE-BX10-U upstream bidirectional single fiber; with DOM
GLC-BX-D	1000BASE-BX10-D downstream bidirectional single fiber; with DOM

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For more information about the transceiver types, see http://www.cisco.com/en/US/products/hw/modules/ps5455/prod_module_series_home.html.

The Cisco Nexus 3064-T and 3064-32T support IEEE 802.3an standard cables and transceivers to provide 10-Gbps connections over unshielded or shielded twisted-pair cables, over distances of up to 330 feet (100 meters). It provides a cost-effective and highly scalable 10 Gigabit Ethernet implementation over structured copper cabling infrastructure that is widely used in data centers.

Cisco NX-OS Software Overview

Cisco NX-OS is a data center-class operating system built with modularity, resiliency, and serviceability at its foundation. Cisco NX-OS helps ensure continuous availability and sets the standard for mission-critical data center environments. The self-healing and highly modular design of Cisco NX-OS makes zero-impact operations a reality and provides exceptional operation flexibility.

Focused on the requirements of the data center, Cisco NX-OS provides a robust and comprehensive feature set that meets the networking requirements of present and future data centers. With an XML interface and a command-line interface (CLI) like that of Cisco IOS® Software, Cisco NX-OS provides state-of-the-art implementations of relevant networking standards as well as a variety of true data center-class Cisco innovations.

Cisco NX-OS Software Benefits

Table 4 summarizes the benefits that Cisco NX-OS Software offers.

Table 4. Benefits of Cisco NX-OS Software

Feature	Benefit
Common software throughout the data center: Cisco NX-OS runs on all Cisco data center switch platforms (Cisco Nexus 7000, 5000, 4000, 2000, and 1000V Series).	• Simplification of data center operating environment • End-to-end Cisco Nexus and Cisco NX-OS fabric • No retraining necessary for data center engineering and operations teams
Software compatibility: Cisco NX-OS intercoperates with Cisco products running any variant of Cisco IOS Software and also with any networking OS that conforms to the networking standards listed as supported in this data sheet.	• Transparent operation with existing network infrastructure • Open standards • No compatibility concerns
Modular software design: Cisco NX-OS is designed to support distributed multithreaded processing. Cisco NX-OS modular processes are instantiated on demand, each in a separate protected memory space. Thus, processes are started and system resources allocated only when a feature is enabled. The modular processes are governed by a real-time preemptive scheduler that helps ensure timely processing of critical functions.	• Robust software • Fault tolerance • Increased scalability • Increased network availability
Troubleshooting and diagnostics: Cisco NX-OS is built with unique serviceability functions to allow network operators to take early action based on network trends and events, enhancing network planning and improving network operations center (NOC) and vendor response times. Cisco Smart Call Home and Cisco Online Health Management System (OHMS) are some of the features that enhance the serviceability of Cisco NX-OS.	• Quick problem isolation and resolution • Continuous system monitoring and proactive notifications • Improved productivity of operations teams
Ease of management: Cisco NX-OS provides a programmatic XML interface based on the NETCONF industry standard. The Cisco NX-OS XML interface provides a consistent API for devices. Cisco NX-OS also provides support for Simple Network Management Protocol (SNMP) Versions 1, 2, and 3 MIBs.	• Rapid development and creation of tools for enhanced management • Comprehensive SNMP MIB support for efficient remote monitoring
Using the Cisco Nexus Data Broker software and Cisco Plug-in for OpenFlow agent, the Cisco Nexus 3064 switches can be used to build a scalable, cost-effective, and programmable tap or SPAN aggregation infrastructure. This approach replaces the traditional purpose-built matrix switches with these switches. You can interconnect these switches to build a multilayer topology for tap or SPAN aggregation infrastructure.	• Scalable and cost effective • Robust traffic filtering capabilities • Traffic aggregation from multiple input ports across different switches • Traffic replication and forwarding to multiple monitoring tools

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Feature	Benefit
Role-based access control (RBAC): With RBAC, Cisco NX-OS enables administrators to limit access to switch operations by assigning roles to users. Administrators can customize access and restrict it to the users who require it.	• Effective access control mechanism based on user roles • Improved network device security • Reduction in network problems arising from human error

Cisco NX-OS Software Packages for Cisco Nexus 3064 Switches

The software packages for the Cisco Nexus 3064 switches offer flexibility and comprehensive features while being consistent with the Cisco Nexus access switches. The default system software has a comprehensive Layer 2 feature set with extensive security and management features and a basic Layer 3 feature set. To enable advanced Layer 3 IP routing functions, an additional license must be installed, as described in Table 5. See Table 7 later in this document for a complete list of software features.

Table 5. Software Licensing for Cisco Nexus 3064 Switches

Software Package	Features Supported
System default: Base license (N3K-BAS1K9); included, with no additional purchase necessary)	• Comprehensive Layer 2 feature set: VLAN, IEEE 802.1Q Trunking, vPC, LACP, Unidirectional Link Detection UDLD (standard and aggressive), MSTP, RSTP, Spanning Tree guards, and Transparent VLAN Trunk Protocol (VTP) • Security: Authentication, authorization, and accounting (AAA); access control lists (ACLs), Dynamic Host Configuration Protocol (DHCP) snooping, storm control, private VLAN (PVLAN), and configurable Control-Plane Policing (CoPP) • Management features: Cisco Data Center Network Manager (DCNM) support, console, Secure Shell Version 2 (SSHv2) access, Cisco Discovery Protocol, SNMP, and syslog • Layer 3 IP routing: inter-VLAN routing (IVR), static routes, RIPv2, ACLs, OSPFv2 (limited to 256 routes), EIGRP stub, Hot Standby Router Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), and Unicast Reverse-Path Forwarding (uRPF) • Multicast: PIM SM, SSM, and MSDP
LAN Enterprise license (N3K-LAN1K9); requires Base license	• Advanced Layer 3 IP routing: OSPFv2, EIGRP, BGP, and Virtual Route Forwarding lite (VRF-lite)
Cisco Nexus Data Broker license (NDB-FX-SWT-K9)	• License for using the tap and SPAN aggregation functions with Cisco Nexus Data Broker; only the Base license is needed for this feature

Cisco Data Center Network Manager

The Cisco Nexus 3064 switches are supported in Cisco DCNM. Cisco DCNM is designed for the Cisco Nexus hardware platforms, which are enabled for Cisco NX-OS. Cisco DCNM is a Cisco management solution that increases overall data center infrastructure uptime and reliability, improving business continuity. Focused on the management requirements of the data center network, Cisco DCNM provides a robust framework and comprehensive feature set that can meet the routing, switching, and storage administration needs of present and future data centers. Cisco DCNM automates the provisioning process, proactively monitors the LAN by detecting performance degradation, secures the network, and simplifies the diagnosis of dysfunctional network elements.

Cisco Nexus Data Broker

The Cisco Nexus 3064 switches with Cisco Nexus Data Broker can be used to build a scalable and cost-effective traffic monitoring infrastructure using network taps and SPAN. This approach replaces the traditional purpose-built matrix switches with one or more OpenFlow-enabled Cisco Nexus switches. You can interconnect these switches to build a scalable tap or SPAN aggregation infrastructure. You also can combine tap and SPAN sources to bring the copy of the production traffic to this tap or SPAN aggregation infrastructure. In addition, you can distribute these sources and traffic monitoring and analysis tools across multiple Cisco Nexus switches. For more details about the Cisco Nexus Data Broker visit http://www.cisco.com/go/nexusdatabroker.

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Product Specifications

Table 6 lists the specifications for the Cisco Nexus 3064 switches, Table 7 lists software features, and Table 8 lists management standards and support.

Table 6. Specifications

Description	Specification	
Physical	• 1RU fixed form factor • Cisco Nexus 3064-X: 64 10 Gigabit Ethernet ports (48 SFP+ and 4 QSFP+) ◦ 48 SFP ports support 1 and 10 Gigabit Ethernet ◦ 4 QSFP ports support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet each • Cisco Nexus 3064-T: 64 x 10 Gigabit Ethernet ports (48 10GBASE-T and 4 QSFP+) ◦ 48 RJ-45 ports support 100 Mbps and 1 and 10 Gigabit Ethernet ◦ 4 QSFP ports support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet each • Cisco Nexus 3064-32T: 48 x 10 Gigabit Ethernet ports (32 10GBASE-T and 4 QSFP+) ◦ 32 RJ-45 ports support 100 Mbps and 1 and 10 Gigabit Ethernet ◦ 4 QSFP ports support 4 x 10 Gigabit Ethernet or 40 Gigabit Ethernet each • 2 redundant power supplies • 1 fan tray with redundant fans • 1 I/O module with management, console, and USB flash memory ports	
Performance	• 1.28-Tbps switching capacity • Forwarding rate of 950 mpps • Line-rate traffic throughput (both Layer 2 and 3) on all ports • Configurable maximum transmission units (MTUs) of up to 9216 bytes (jumbo frames)	
Hardware tables and scalability	MAC addresses	128,000
	Number of VLANS	4096
	Spanning-tree instances	• Rapid Spanning Tree Protocol (RSTP): 512 • Multiple Spanning Tree (MST) Protocol: 64
	ACL entries	• 2000 ingress • 1000 egress
	Routing table	• 16,000 prefixes and 16,000 host entries* • 8000 multicast routes*
	Number of EtherChannels	64 (with vPC)
	Number of ports per EtherChannel	32
	Buffers	9 MB shared
	Boot flash memory	2 GB
Power	Number of power supplies	2 • Cisco Nexus 3064-X: Redundant for AC and DC power • Cisco 3064-T and 3064-32T: Redundant for AC power
	Power supply types	• AC (forward and reversed airflow) • DC (forward and reversed airflow)
	Typical operating power	• Cisco Nexus 3064-X ◦ 143 watts (W; 64p with Twinax at 100% load; 2 power supply units [PSUs]) ◦ 177W (64p with SR optics at 100% load; 2 PSUs) • Cisco Nexus 3064-T ◦ 362W (48p with 3m cables; 4 SR4 at 100% load)
	Maximum power	• Cisco Nexus 3064-X: 199W • Cisco Nexus 3064-T
	AC PSUs • Input voltage • Frequency	 • 100 to 240 VAC • 50 to 60 Hz

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Description	Specification	
	• Efficiency	• 89 to 91% at 220V
	DC PSUs • Input voltage • Maximum current • Efficiency	 • -40 to -72 VDC • 33A • 85 to 88%
	Typical heat dissipation	• Cisco Nexus 3064-X ◦ 488 BTU/hr (64p with Twinax at 100% load; 2 PSUs) ◦ 605 BTU/hr (64p with SR optics at 100% load; 2 PSUs) • Cisco Nexus 3064-T ◦ 1235 BTU/hr (48p with 3m cables; 4 SR4 at 100% load)
	Maximum heat dissipation	• Cisco Nexus 3064-X: 683 BTU/hr • Cisco Nexus 3064-T: 1553 BTU/hr
Cooling	Forward and reversed airflow schemes: • Forward airflow: Port-side exhaust (air enters through fan-tray and power supplies and exits through ports) • Reversed airflow: Port-side intake (air enters through ports and exits through fan-tray and power supplies) Single fan tray with redundant fans Hot swappable (must swap within 1 min)	
Sound	Measured sound power (maximum) • Fan speed: 40% duty cycle • Fan speed: 60% duty cycle • Fan speed: 100% duty cycle	 • 59.7 dBA • 66.4 dBA • 71.0 dBA
Environment	Dimensions (height x width x depth)	• Cisco Nexus 3064-X: 1.72 x 17.3 x 19.7 in. (4.4 x 43.9 x 50.5 cm) • Cisco Nexus 3064-T and 3064-32T: 1.72 x 17.3 x 22.45 in.(4.4 x 43.9 x 57.0 cm)
	Weight	• Cisco Nexus 3064-X: 20.5 lb (9.3 kg) • Cisco Nexus 3064-T and 3064-32T: 20.8 lb (9.5 kg)
	Operating temperature	32 to 104°F (0 to 40°C)
	Storage temperature	-40 to 158°F (-40 to 70°C)
	Operating relative humidity	• 10 to 85% noncondensing • Up to 5 days at maximum (85%) humidity • Recommend ASHRAE data center environment
	Storage relative humidity	5 to 95% noncondensing
	Altitude	0 to 10,000 ft (0 to 3000m)

* Please refer to the Cisco Nexus 3000 Series Verified Scalability Guide for scalability numbers validated on specific software releases: http://www.cisco.com/en/US/products/ps11541/products_installation_and_configuration_guides_list.html.

Table 7. Software Features

Description	Specification
Layer 2	• Layer 2 switch ports and VLAN trunks • IEEE 802.1Q VLAN encapsulation • Support for up to 4096 VLANs • Rapid Per-VLAN Spanning Tree Plus (PVRST+) (IEEE 802.1w compatible) • Multiple Spanning Tree Protocol (MSTP) (IEEE 802.1s): 64 instances • Spanning Tree PortFast • Spanning Tree Root Guard • Spanning Tree Bridge Assurance • Cisco EtherChannel technology (up to 32 ports per EtherChannel) • Link Aggregation Control Protocol (LACP): IEEE 802.3ad • Advanced PortChannel hashing based on Layer 2, 3, and 4 information

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Description	Specification
	• vPC • Jumbo frames on all ports (up to 9216 bytes) • Storm control (unicast, multicast, and broadcast) • Private VLANs
Layer 3	• Layer 3 interfaces: Routed ports on interfaces, switch virtual interfaces (SVIs), PortChannels, and subinterfaces (total: 1024) • 64-way ECMP • 2000 ingress and 1000 egress ACL entries • IPv6 routing: Static, OSPFv3, and BGPv6 • Routing protocols: Static, RIPv2, EIGRP, OSPF, and BGP • Bidirectional Flow Detection (BFD) for BGP, OSPF and ipv4 Static routes • HSRP and VRRP • ACL: Routed ACL with Layer 3 and 4 options to match ingress and egress ACLs • VRF: VRF-lite (IP VPN), VRF-aware unicast (BGP, OSPF, and RIP), and VRF-aware multicast • Unicast Reverse-Path Forwarding (uRPF) with ACL; strict and loose modes • Jumbo frame support (up to 9216 bytes) • Generic Routing Encapsulation (GRE) tunneling
Multicast	Multicast: PIMv2, PIM-SM, and SSM Bootstrap router (BSR), Auto-RP, and Static RP Multicast Source Discovery Protocol (MSDP) and Anycast RP Internet Group Management Protocol (IGMP) Versions 2 and 3
Quality of Service (QoS)	Layer 2 IEEE 802.1p (class of service [CoS]) 8 hardware queues per port Per-port QoS configuration CoS trust Port-based CoS assignment Modular QoS CLI (MQC) compliance ACL-based QoS classification (Layers 2, 3, and 4) MQC CoS marking Differentiated services code point (DSCP) marking Weighted Random Early Detection (WRED) CoS-based egress queuing Egress strict-priority queuing Egress port-based scheduling: Weighted Round-Robin (WRR) Explicit Congestion Notification (ECN) Configurable ECN (Marking) per port
Security	• Ingress ACLs (standard and extended) on Ethernet • Standard and extended Layer 3 to 4 ACLs include IPv4, Internet Control Message Protocol (ICMP), TCP, and User Datagram Protocol (UDP) • VLAN-based ACLs (VACLs) • Port-based ACLs (PACLs) • Named ACLs • ACLs on virtual terminals (vtys) • DHCP snooping with Option 82 • Port number in DHCP Option 82 • DHCP relay • Dynamic Address Resolution Protocol (ARP) inspection • Configurable CoPP
Cisco Nexus Data Broker	• Topology support for tap and SPAN aggregation • Support for QinQ to tag input source tap and SPAN ports • Traffic load balancing to multiple monitoring tools • Traffic filtering based on Layer 1 through Layer 4 header information • Traffic replication and forwarding to multiple monitoring tools • Robust RBAC • Northbound Representational State Transfer (REST) API for all programmability support

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Description	Specification
Management	• POAP • Python scripting • Cisco EEM • Switch management using 10/100/1000-Mbps management or console ports • CLI-based console to provide detailed out-of-band management • In-band switch management • Locator and beacon LEDs • Configuration rollback • SSHv2 • Secure Copy (SCP) server • Telnet • AAA • AAA with RBAC • RADIUS • TACACS+ • Syslog • Syslog generation on system resources (for example, FIB tables) • Embedded packet analyzer • SNMP v1, v2, and v3 • Enhanced SNMP MIB support • XML (NETCONF) support • Remote monitoring (RMON) • Advanced Encryption Standard (AES) for management traffic • Unified username and passwords across CLI and SNMP • Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) • Digital certificates for management between switch and RADIUS server • Cisco Discovery Protocol Versions 1 and 2 • RBAC • Switched Port Analyzer (SPAN) on physical layer, PortChannel, and VLAN • Tunable Buffer Allocation for SPAN • Encapsulated Remote SPAN (ERSPAN) • Ingress and egress packet counters per interface • PTP (IEEE 1588) boundary clock • Network Time Protocol (NTP) • Cisco OHMS • Comprehensive bootup diagnostic tests • Cisco Call Home • Cisco DCNM • Advanced buffer utilization monitoring • sFlow

Table 8. Management and Standards Support

Description	Specification	
MIB Support	Generic MIBs • SNMPv2-SMI • CISCO-SMI • SNMPv2-TM • SNMPv2-TC • IANA-ADDRESS-FAMILY-NUMBERS-MIB • IANAifType-MIB • IANAiprouteprotocol-MIB • HCNUM-TC • CISCO-TC • SNMPv2-MIB • SNMP-COMMUNITY-MIB	Monitoring MIBs • NOTIFICATION-LOG-MIB • CISCO-SYSLOG-EXT-MIB • CISCO-PROCESS-MIB • RMON-MIB • CISCO-RMON-CONFIG-MIB • CISCO-HC-ALARM-MIB Security MIBs • CISCO-AAA-SERVER-MIB • CISCO-AAA-SERVER-EXT-MIB • CISCO-COMMON-ROLES-MIB • CISCO-COMMON-MGMT-MIB

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Description	Specification
	• SNMP-FRAMEWORK-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMP-VIEW-BASED-ACM-MIB • CISCO-SNMP-VACM-EXT-MIB • MAU-MIB Ethernet MIBs • CISCO-VLAN-MEMBERSHIP-MIB • LLDP-MIB • IP-MULTICAST-MIB Configuration MIBs • ENTITY-MIB • IF-MIB • CISCO-ENTITY-EXT-MIB • CISCO-ENTITY-FRU-CONTROL-MIB • CISCO-ENTITY-SENSOR-MIB • CISCO-SYSTEM-MIB • CISCO-SYSTEM-EXT-MIB • CISCO-IP-IF-MIB • CISCO-IF-EXTENSION-MIB • CISCO-NTP-MIB • CISCO-VTP-MIB • CISCO-IMAGE-MIB • CISCO-IMAGE-UPGRADE-MIB • CISCO-SECURE-SHELL-MIB Miscellaneous MIBs • CISCO-LICENSE-MGR-MIB • CISCO-FEATURE-CONTROL-MIB • CISCO-CDP-MIB • CISCO-RF-MIB Layer 3 and Routing MIBs • UDP-MIB • TCP-MIB • OSPF-MIB • BGP4-MIB • CISCO-HSRP-MIB
Standards	• IEEE 802.1D: Spanning Tree Protocol • IEEE 802.1p: CoS Prioritization • IEEE 802.1Q: VLAN Tagging • IEEE 802.1s: Multiple VLAN Instances of Spanning Tree Protocol • IEEE 802.1w: Rapid Reconfiguration of Spanning Tree Protocol • IEEE 802.3z: Gigabit Ethernet • IEEE 802.3ad: Link Aggregation Control Protocol (LACP) • IEEE 802.3ae: 10 Gigabit Ethernet (Cisco Nexus 3064-X) • IEEE 802.3ba: 40 Gigabit Ethernet • IEEE 802.3an:10GBASE-T (Cisco Nexus 3064-T and 3064-32T • IEEE 802.1ab: LLDP • IEEE 1588-2008: Precision Time Protocol (Boundary Clock)
RFC	BGP • RFC 1997: BGP Communities Attribute • RFC 2385: Protection of BGP Sessions with the TCP MD5 Signature Option • RFC 2439: BGP Route Flap Damping • RFC 2519: A Framework for Inter-Domain Route Aggregation • RFC 2545: Use of BGPv4 Multiprotocol Extensions • RFC 2858: Multiprotocol Extensions for BGPv4 • RFC 3065: Autonomous System Confederations for BGP • RFC 3392: Capabilities Advertisement with BGPv4 • RFC 4271: BGPv4 • RFC 4273: BGPv4 MIB: Definitions of Managed Objects for BGPv4 • RFC 4456: BGP Route Reflection • RFC 4486: Subcodes for BGP Cease Notification Message • RFC 4724: Graceful Restart Mechanism for BGP • RFC 4893: BGP Support for Four-Octet AS Number Space OSPF • RFC 2328: OSPF Version 2 • 8431RFC 3101: OSPF Not-So-Stubby-Area (NSSA) Option • RFC 3137: OSPF Stub Router Advertisement

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Description	Specification
	• RFC 3509: Alternative Implementations of OSPF Area Border Routers • RFC 3623: Graceful OSPF Restart • RFC 4750: OSPF Version 2 MIB RIP • RFC 1724: RIPv2 MIB Extension • RFC 2082: RIPv2 MD5 Authentication • RFC 2453: RIP Version 2 • IP Services • RFC 768: User Datagram Protocol (UDP) • RFC 783: Trivial File Transfer Protocol (TFTP) • RFC 791: IP • RFC 792: Internet Control Message Protocol (ICMP) • RFC 793: TCP • RFC 826: ARP • RFC 854: Telnet • RFC 959: FTP • RFC 1027: Proxy ARP • RFC 1305: Network Time Protocol (NTP) Version 3 • RFC 1519: Classless Interdomain Routing (CIDR) • RFC 1542: BootP Relay • RFC 1591: Domain Name System (DNS) Client • RFC 1812: IPv4 Routers • RFC 2131: DHCP Helper • RFC 2338: VRRP IP Multicast • RFC 2236: Internet Group Management Protocol, version 2 • RFC 3376: Internet Group Management Protocol, Version 3 • RFC 3446: Anycast Rendezvous Point Mechanism Using PIM and MSDP • RFC 3569: An Overview of SSM • RFC 3618: Multicast Source Discovery Protocol (MSDP) • RFC 4601: Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised) • RFC 4607: Source-Specific Multicast for IP • RFC 4610: Anycast-RP using PIM • RFC 5132: IP Multicast MIB

Software Requirements

Cisco Nexus 3000 Series Switches are supported by Cisco NX-OS Software Release 5.0 and later. Cisco NX-OS interoperates with any networking OS, including Cisco IOS Software, that conforms to the networking standards mentioned in this data sheet.

Regulatory Standards Compliance

Table 9 summarizes regulatory standards compliance for the Cisco Nexus 3000 Series.

Table 9. Regulatory Standards Compliance: Safety and EMC

Specification	Description
Regulatory compliance	• Products should comply with CE Markings per directives 2004/108/EC and 2006/95/EC
Safety	• UL 60950-1 Second Edition • CAN/CSA-C22.2 No. 60950-1 Second Edition • EN 60950-1 Second Edition • IEC 60950-1 Second Edition • AS/NZS 60950-1 • GB4943

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Specification	Description
EMC: Emissions	• 47CFR Part 15 (CFR 47) Class A • AS/NZS CISPR22 Class A • CISPR22 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN61000-3-2 • EN61000-3-3 • KN22 Class A • CNS13438 Class A
EMC: Immunity	• EN55024 • CISPR24 • EN300386 • KN24
RoHS	RoHS 5 compliant except for lead press-fit connectors

Ordering Information

Table 10 provides ordering information for the Cisco Nexus 3064 switches.

Table 10. Ordering Information

Part Number	Description
Chassis	
N3K-C3064PQ-10GX	Nexus 3064-X, 48 SFP+ and 4 QSFP+ ports, with enhanced scale, low latency
N3K-C3064TQ-10GT	Nexus 3064-T, 48 10GBase-T and 4 QSFP+ ports
N3K-C3064TQ-32T	Nexus 3064-32T, 32 10GBase-T and 4 QSFP+ ports
N3K-C3064-FAN	Nexus 3064 Fan Module, Forward airflow (port side exhaust)
N3K-C3064-FAN-B	Nexus 3064 Fan Module, Reversed airflow (port side intake)
N2200-PAC-400W	N2K/3K 400W AC Power Supply, Forward airflow (port side exhaust)
N2200-PAC-400W-B	N2K/3K 400W AC Power Supply, Reversed airflow (port side intake)
NXA-PAC-500W	Nexus 3064-T 500W AC PSU, Forward airflow (port side exhaust)
NXA-PAC-500W-B	Nexus 3064-T 500W AC PSU, Reverse airflow (port side intake)
N2200-PDC-400W	N2K/3K 400W DC Power Supply, Forward airflow (port side exhaust)
N3K-PDC-350W-B	N3K Series 350W DC Power Supply, Reversed airflow (port side intake)
Software Licenses	
N3K-BAS1K9	Nexus 3000 Layer 3 Base License
N3K-LAN1K9	Nexus 3000 Layer 3 LAN Enterprise License (Requires N3K-BAS1K9 License)
NDB-FX-SWT-K9	License for Tap/SPAN aggregation using Cisco Nexus Data Broker
N3064T-32T-LIC	Factory installed 32 Port license for N3064-32T
N3064T-16T-UPG=	16 Port Upgrade License for N3064-32T
Spares	
N3K-C3064-FAN=	Nexus 3064 Fan Module, Forward airflow (port side exhaust), Spare
N3K-C3064-FAN-B=	Nexus 3064 Fan Module, Reversed airflow (port side intake), Spare
N2000-PAC-400W=	N2K/3K 400W AC Power Supply, Forward airflow (port side exhaust), Spare
N2000-PAC-400W-B=	N2K/3K 400W AC Power Supply, Reversed airflow (port side intake), Spare
NXA-PAC-500W=	Nexus 3064-T 500W AC PSU, Forward airflow (port side exhaust), Spare
NXA-PAC-500W-B=	Nexus 3064-T 500W AC PSU, Reverse airflow (port side intake), Spare
N2200-PDC-400W=	N2K/3K 400W DC Power Supply, Forward airflow (port side exhaust), Spare

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CIB - ESPOL

Part Number	Description
N3K-PDC-350W-B=	N3K Series 350W DC Power Supply, Reversed airflow (port side intake), Spare
N3K-C3064-ACC-KIT=	Nexus 3064PQ Accessory Kit
Bundles	
N3K-C3064-X-FA-L3	Nexus 3064-X, Forward Airflow (port side exhaust), AC P/S, Base and LAN Enterprise License Bundle
N3K-C3064-X-BA-L3	Nexus 3064-X, Reversed Airflow (port side intake), AC P/S, Base and LAN Enterprise License Bundle
N3K-C3064-X-FD-L3	Nexus 3064-X, Forward Airflow (port side exhaust), DC P/S, Base and LAN Enterprise License Bundle
N3K-C3064-X-BD-L3	Nexus 3064-X, Reversed Airflow (port side intake), DC P/S, Base and LAN Enterprise License Bundle
N3K-C3064-T-FA-L3	Nexus 3064-T, Forward Airflow (port side exhaust), AC P/S, Base and LAN Enterprise License Bundle
N3K-C3064-T-BA-L3	Nexus 3064-T, Reversed Airflow (port side intake), AC P/S, Base and LAN Enterprise License Bundle
Cables and Optics	
QSFP-40G-SR4(=)	40GBASE-SR4 QSFP Transceiver Module with MPO Connector
QSFP-40G-CSR4(=)	QSFP 4x10GBASE-SR Transceiver Module, MPO, 300M
QSFP-H40G-CU1M(=)	40GBASE-CR4 Passive Copper Cable, 1m
QSFP-H40G-CU3M(=)	40GBASE-CR4 Passive Copper Cable, 3m
QSFP-H40G-CU5M(=)	40GBASE-CR4 Passive Copper Cable, 5m
QSFP-4SFP10G-CU1M(=)	QSFP to 4xSFP10G Passive Copper Splitter Cable, 1m
QSFP-4SFP10G-CU3M(=)	QSFP to 4xSFP10G Passive Copper Splitter Cable, 3m
QSFP-4SFP10G-CU5M(=)	QSFP to 4xSFP10G Passive Copper Splitter Cable, 5m
SFP-10G-SR(=)	10GBASE-SR SFP+ Module
SFP-10G-LR(=)	10GBASE-LR SFP+ Module
SFP-10G-ER(=)	Cisco 10GBASE-ER SFP+ Module for SMF
SFP-10G-ZR(=)	Cisco 10GBASE-ZR SFP+ Module for SMF
SFP-H10GB-CU1M(=)	10GBASE-CU SFP+ Cable 1 Meter
SFP-H10GB-CU3M(=)	10GBASE-CU SFP+ Cable 3 Meter
SFP-H10GB-CU5M(=)	10GBASE-CU SFP+ Cable 5 Meter
SFP-H10GB-ACU7M(=)	Active Twinax Cable Assembly, 7m
SFP-H10GB-ACU10M(=)	Active Twinax Cable Assembly, 10m
SFP-GE-T(=)	1000BASE-T NEBS 3 ESD
GLC-T(=)	1000BASE-T SFP
GLC-SX-MM(=)	GE SFP, LC Connector SX Transceiver
GLC-LH-SM(=)	GE SFP, LC Connector LX/LH Transceiver

Warranty

The Cisco Nexus 3000 Series Switches have a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a return materials authorization (RMA).

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Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 3000 Series in your data center. The innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operation efficiency and improve your data center network. Cisco Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco SMARTnet® Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 3000 Series Switches. Spanning the entire network lifecycle, Cisco Services helps increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

For More Information

For more information, please visit http://www.cisco.com/go/nexus3000. For information about the Cisco Nexus Data Broker, please visit http://www.cisco.com/go/nexusdatabroker.

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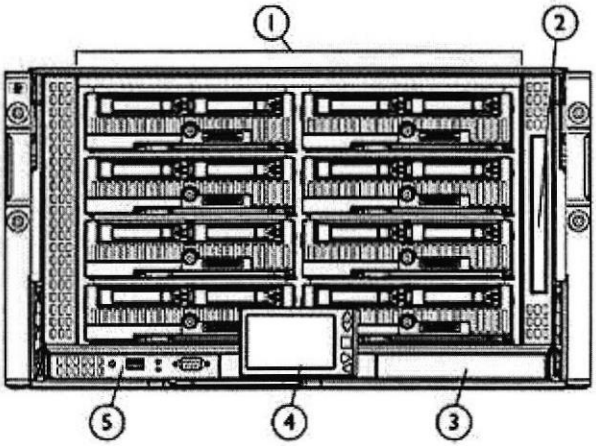
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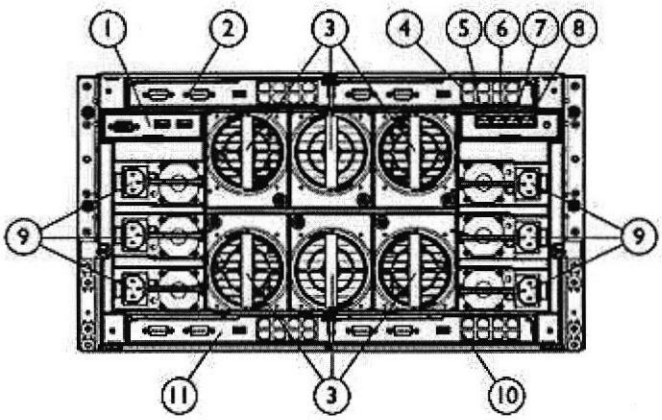
Overview

HP BladeSystem c3000 Enclosure



HP BladeSystem c3000 Enclosure - Front View

1. Device Bays 1 thru 8
2. Enclosure DVD Drive
3. Standby Onboard Administrator
4. Insight Display
5. Active Onboard Administrator



HP BladeSystem c3000 Enclosure - Rear View

1. Local KVM interface
2. Interconnect Bay 1
3. Active Cool 100 Fans and Fan Bays
4. Interconnect Bay 2
5. Enclosure Up-link and Service Port
6. Enclosure Down-link
7. iLO/Onboard Administrator Port
8. iLO/Onboard Administrator Port 2
9. Power Supplies
10. Interconnect Bay 4
11. Interconnect Bay 3

What's New

Support for the HP ProLiant BL460c Gen9 Server Blade

HP BladeSystem c-Class Overview

HP BladeSystem c-Class c3000 Enclosure

A HP BladeSystem solutions start with an either a c7000 or c3000 enclosure. For the c3000 enclosure, key enclosure components include hot-plug power supplies, hot-plug HP Active Cool 100 Fans, and an optional redundant BladeSystem Onboard Administrator module. Once the enclosure and its key components have been selected, the following components can be added: interconnect modules, HP ProLiant and Integrity server blades, expansion blades, and optional HP OneView or Insight Control for BladeSystem management software. For information on these options please visit: http://www.hp.com/go/bladesystem.

NOTE: HP BladeSystem c3000 and c7000 Enclosures support G1 through Gen9 ProLiant and Integrity server blades, subject to support requirements of the Onboard Administrator. Certain HP ProLiant server blades and options may require a specific version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For further information, please see the HP Service Pack for ProLiant (SPP) website and the HP Support Center document "HP ProLiant Server Blades - Compatibility with HP BladeSystem c7000 and c3000 Enclosures and Firmware".

A BladeSystem c3000 Enclosure holds up to 8 server blades and up to 4 expansion blades (not exceeding 8 total blades) plus redundant network and storage interconnects. It includes a shared, multi-terabit high-speed midplane for wire-once connectivity of server blades to network and shared storage. Power is delivered through a pooled power backplane that ensures the full capacity of the power supplies is available to all blades.

Each c3000 enclosure is built with the following functions:

- Up to 8 half-height server blades, 4 full-height server blades, and/or 4 expansion blades per enclosure (not exceeding 8 total blades).
  NOTE: For information on mixing half-height server blades, full-height server blades, and expansion blades, please see the section titled "Server Blade, Expansion Blade, and Fan Population Guidelines" later in this document.
- Up to 2 redundant I/O interconnect fabrics (Ethernet, Fibre Channel, iSCSI, SAS, etc.) supported simultaneously within the enclosure.
- A single-phase power subsystem for flexibility in connecting to datacenter power, UPSs, or low-line (100VAC to 110VAC) wall outlets.
  NOTE: Caution: when connecting directly to wall outlets, customers should determine the maximum amperage of the wall outlet circuit to prevent power overload.
- Choice of AC or DC power supplies.
- PARSEC enclosure design - Parallel, redundant and scalable cooling and airflow design.
- Up to six (6) hot-plug HP Active Cool 100 Fans.
- Redundant hot-plug cooling, redundant hot-plug power supplies, redundant connections, redundant interconnect modules, and optional redundant BladeSystem Onboard Administrator management module.

An Onboard Administrator management module is built in to the enclosure with the following functions:

- Robust, multiple enclosure setup and control.
- Reports asset and inventory information for the devices in the enclosure.
- Reports thermal and power information, including real-time actual power usage per server and per enclosure.
- Front-mounted Insight Display for easy management at the deployment site.
- Integrated access to all server blade iLOs from a single cable.
- Provides integrated access to interconnect bay device management ports from the single Onboard Administrator cable.

HP BladeSystem c-Class Overview

- Single sign-on capability for all devices in the enclosure.
- Role-based security locally and/or with LDAP directory services.
- Provides a wizard-based initial setup process for easy configuration.
- An optional DVD drive for local software deployment, and HP SmartStart deployment
- An optional local KVM interface for connection to KVM switches.

A BladeSystem c3000 enclosure provides the following benefits:

- With local and remote hardware management integrated across the solution, one full enclosure can be managed as easily as one server.
- Management and network interconnects extend scalability beyond a single enclosure, allowing resources to be pooled and shared across multiple enclosures.
- Accommodates multiple server and network designs in one enclosure.
- Lower costs per server in comparison to rack-mounted servers
- Lower power consumption in comparison to rack-mounted servers.
- Reduced and simplified cabling in comparison to rack-mounted servers.
- Investment protection supporting G1 through Gen9 server blades.

HP ProLiant & Integrity Server Blades	Delivering best-in-class performance, choice and reliability on AMD Opteron™, Intel® Xeon® and Intel® Itanium® processors for Windows, Linux, Solaris, OpenVMS, or HP-UX based servers; the HP portfolio of server blades supports a variety of application requirements for scale-out architectures. HP offers one-, two-, four- and eight -processor server blades, with the widest range of performance, and form factors. For information please visit: http://www.hp.com/go/bladesystem.
HP D2200sb Storage Blade	**Direct attached storage** The D2220sb Storage Blade delivers direct attached storage for c-Class Gen8 and greater server blades, with support for up to twelve hot plug small form factor (SFF) SAS or SATA Midline hard disk drives or SAS/SATA SSDs. The enclosure backplane provides a PCI Express connection to an adjacent c-Class server blade and enables high performance storage access without any additional cables. The D2220sb Storage Blade features an onboard Smart Array P420i controller with 2GB flash-backed write cache, for increased performance and data protection. Up to four D2220sb storage devices can be supported in a single BladeSystem c3000 Enclosure for up to 57.6 TB of capacity. **Two ways to create shared storage with the D2220sb** Use HP StoreVirtual VSA software to turn the D2220sb into an iSCSI SAN for use by all servers in the enclosure and any server on the network. HP VSA software is installed in a virtual machine on a VMware ESX host server adjacent to the D2220sb. HP StoreVirtual VSA turns the D2220sb into a scalable and robust iSCSI SAN, featuring storage clustering for scalability, network RAID for storage failover, thin provisioning, snapshots, remote replication, and cloning. Expand capacity within the same enclosure or to other BladeSystem enclosures by adding additional D2220sb Storage Blades and HP VSA licenses. A cost effective bundle of the D2220sb Storage Blade and a HP StoreVirtual VSA license makes purchasing convenient. If storage needs increase, add HP P4300 or P4500 systems externally and manage everything via a single pane of glass. The HP StoreEasy 3830 and 3840 Gateway Storage Blades are flexible storage server solutions for BladeSystem environments. Combine the StoreEasy 3830 or 3840 with the D2220sb Storage Blade to enable file serving and iSCSI shared storage inside the BladeSystem enclosure. **NOTE:** The D2220sb requires a c3000 enclosure configuration with 6 fans For more information, please visit: http://h18004.www1.hp.com/products/quickspecs/14507_na/14507_na.html

HP BladeSystem c-Class Overview

HP Ultrium Tape Blades

Tape blades are ideal for HP BladeSystem c-Class customers who need a data protection solution but are not connected into a storage area network (SAN). They provide direct attach data protection for the adjacent server and network backup protection for all other data within the enclosure. The HP tape blades are the industry's first bladed tape drives and are developed exclusively for the BladeSystem c-Class enclosures.

For more information, please visit:
http://h18000.www1.hp.com/products/quickspecs/12729_na/12729_na.html

HP BladeSystem c-Class Interconnect Options

HP offers one of the broadest selections of interconnect fabric options in the industry to provide network, SAN/network attached storage (NAS), and cluster connectivity. HP BladeSystem interconnects provide:

- HP Virtual Connect devices, designed to reduce networking costs and simplify network configuration and provisioning.
- Seamless integration of Ethernet, FC, iSCSI, and SAS fabrics: Standard-based switch options include Cisco, Brocade, and HP products that integrate within your existing standards.
- Built-in redundancy: rear-mounting interconnect modules designed for redundant interconnections between server blades and switches.
- Cable reduction: Interconnect switches provide up to 32-to-1 network cable reductions per server blade enclosure

HP BladeSystem c-Class Interconnect and Mezzanine Components:
http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html
http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging and custom packaging. HP products supported through Factory Express include: a wide array of servers and storage: HP Integrity, HP ProLiant & HP ProLiant & Integrity Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express

HP Simple Configurator

SCE is a guided self-service tool to help sales and non-technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator

HP Insight Management software

Insight Management

Managing the growing number of servers can be complex and expensive for your organization. IT managers need to address changing business needs with tools that meet the challenges of managing today's complex Datacenters.

HP Insight Management lowers the cost of running your HP ProLiant servers by providing you with best-in-class management tools, including HP Insight Control, HP Virtual Connect Enterprise Manager (VCEM), and HP Matrix Operating Environment. Insight Management increases your

productivity and reduces your operating costs to get you higher value from your HP ProLiant servers.

Electronic download of Insight Management Media
Insight Management software media is available for free download (not including license entitlement certificates) at this website: http://www.hp.com/go/insightupdates.

Software media available for download includes:

- HP Insight Control
- HP Insight Control for Microsoft® System Center
- HP Insight Control for VMware vCenter Server
- HP Virtual Connect Enterprise Manager (VCEM)
- HP Matrix Operating Environment

Customers will receive an Insight Control or Matrix Operating Environment license entitlement certificate via physical shipment or email. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s).

One year of 24x7 Software Technical Support and Updates are included with your purchased licenses.

HP provides a complete range of installation and support services to ensure the successful deployment and operations of your server infrastructure. For more information about support services and licensing options, see the following website: http://www.hp.com/go/insightsoftware

Insight Software Media Kit (DVDs)
Physical media (DVDs) are also available for purchase from HP or from your authorized reseller (PN 436222-B21)

Service Pack for ProLiant (SPP)

Customers should use the HP Service Pack for ProLiant to update firmware, drivers, and related utilities:

- Main SPP page: www.hp.com/go/spp
- SPP download page: www.hp.com/go/spp/download

HP Integrated Lights-Out (iLO)

HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: www.hp.com/go/iLO.

HP Insight Control

HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see http://www.hp.com/go/insightcontrol.

	HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: http://www.hp.com/services/insight
HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). For more information, see http://www.hp.com/go/matrixoe.

HP Power Advisor

The HP Power Advisor is a tool provided by Hewlett-Packard to assist in the estimation of power consumption and proper selection of components including power supplies at a system, rack, and multi-rack level. A variety of additional features are also provided including a condensed bill of materials, a cost of owner ship calculator, and a power report. The HP Power Advisor allows for the mixing of rack, blade, and other products in a single environment.

HP highly recommends using the HP Power Advisor tool to ensure the number of power supply options you have selected can fully support your BladeSystem configuration and to review maximum system power ratings for facilities planning purposes.

HP Power Advisor is available at: http://www.hp.com/go/hppoweradvisor

Warranty

Warranty - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements.

- Enclosure: Three-year parts and labor, on-site limited global warranty. Certain restrictions and exclusions apply
- Enclosure options: Fans, Power Supplies, BladeSystem Onboard Administrator, 1 Year parts only or enclosure warranty
- HP BladeSystem Interconnects: 1 Year parts and labor, on-site regardless of the warranty period for the system in which they are installed
- HP Storage Fibre Channel switches have a maximum warranty period of one (1) year regardless of the warranty period for the system in which they are installed
- Hard drives have either a one year or three year warranty; refer to specific hard drive QuickSpecs for details.

Service and Support

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem
Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

Protect your business beyond warranty with HP Care Pack Services
HP Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs.

HP Foundation Care services offer scalable reactive support-packages for HP servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response. HP Datacenter Care provides highly flexible environmental support to address unique customer business needs.

Choose recommended services for your c3000 BladeSystem enclosure or contact your HP sales representative or authorized HP ServiceOne partner for additional HP Care Pack services information

Recommended HP Care Pack Services for your HP product

Optimized Care

3-Year HP 6 hour Call to Repair Response, Proactive Care
Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000 enclosure
Provides for hardware installation (c-Class ProLiant and Integrity server blades, storage blades, Ethernet Interconnects and Virtual Connect) and software installation and startup of a BladeSystem c3000 Infrastructure in a single enclosure including deployment of OS on all blades or deployment of OS (two blades) and HP Insight Control, plus Server Deployment (formerly RDP).
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network
Provides for the configuration and testing of BladeSystem Ethernet interconnect switches and Virtual Connect to facilitate proper implementation of network protocols and access to advanced features.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf

Standard Care

3-Year HP 24x7 4 hour response, Proactive Care Service
This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP's vast global resources.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000 enclosure
Provides for hardware installation (c-Class ProLiant and Integrity server blades, storage blades, Ethernet Interconnects and Virtual Connect) and software installation and startup of a BladeSystem c3000 Infrastructure in a single enclosure including deployment of OS on all blades or deployment of OS on two blades and HP Insight Control, plus Server Deployment (formerly RDP).
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network
HP Provides for the configuration and testing of BladeSystem Ethernet interconnect switches to

Service and Support

facilitate proper implementation of network protocols and access to advanced features. http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf

Related Services

HP Proactive Care Personalized Support - Environmental Option
The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HP Proactive Care Support.

HP Proactive Select Service
Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf

Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc

Insight Online/Insight Remote Support

HP Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HP solution. Learn more about Insight Remote Support http://www.hp.com/go/insightremotesupport and Insight Online http://www.hp.com/go/insightonline

NOTE: Insight Remote Support is a prerequisite for Proactive Care. All blades within a single HP BladeSystem enclosure must be at the same service level.

HP Support Center

Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc

HP's Support Center Mobile App allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement.

NOTE: HP Support Center Mobile App is subject to local availability.

Parts and Materials

HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction

For more information

To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized ServiceOne partner. Or visit: www.hp.com/services/bladesystem

Pre-Configured Models

HP BladeSystem c-Class Server Blade Enclosures

NOTE: HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.
NOTE: If you desire a custom configuration, please see the "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

HP BLc3000 Platinum Enclosure with 4 AC Power Supplies 6 Fans ROHS 8 Insight Control Licenses **NOTE:** Includes 4 1200W AC Common Slot Platinum Plus Hot Plug Power Supplies, 6 Active Cool 100 Fans, DVD drive, Rail Kit, Onboard Administrator DDR2 module, 4 6ft C13 to C14 PDU power cords, 7 bay blanks, and 8 Insight Control Licenses.	696908-B21
HP BLc3000 Platinum Enclosure with 4 AC Power Supplies 6 Fans ROHS Trial Insight Control License **NOTE:** Includes 4 1200W AC Common Slot Platinum Plus Hot Plug Power Supplies, 6 Active Cool 100 Fans, DVD drive, Rail Kit, Onboard Administrator DDR2 module, 4 6ft C13 to C14 PDU power cords, 7 bay blanks, and 8 Insight Control Trial Licenses.	696909-B21

CIB - ESPOL

Smart Buys

HP ProLiant c3000 3xBL460c Gen8 E5-2650v2 2P Encl/S-Buy 794098-S01	**Enclosure**	HP BladeSystem c3000 Platinum Enclosure 4 Platinum Power Supplies and 6 Fans; up to 8 half height devices supported
	Server Blades	(3) HP ProLiant BL460c Gen8 E5-2650v2 2P Blades, each with (2) HP 146GB 6G SAS 15K rpm SFF SC Enterprise Hard Drives and Microsoft Windows Server 2012 R2 With Hyper V
	Storage Blade	(1) HP D2220sb PCIe and StoreVirtual VSA Bundle with (3) HP 300GB 6G SAS 10K rpm SFF SC Enterprise Hard Drives
	Switches	(2) HP 6120XG Blade Switches
	Interconnects	(3) HP Ethernet 10Gb 2-port 560M Adapters
	Enclosure Management	Onboard Administrator with optional Insight Control
	Physical Size	6U
	Enclosure Management	Onboard Administrator with optional Insight Control
	Software	8 Insight Control Trial Licenses
	Warranty	**Enclosure:** Three-year parts and labor, on-site limited global warranty. Certain restrictions and exclusions apply **Enclosure options**: Fans, Power Supplies, BladeSystem Onboard Administrator, 1 Year parts only or enclosure warranty **HP BladeSystem Interconnects:** 1 Year parts and labor, on-site regardless of the warranty period for the system in which they are installed Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support **HP Storage Fibre Channel switches** have a maximum warranty period of one (1) year regardless of the warranty period for the system in which they are installed **D2220sb** has three-year parts only limited global warranty (3-0-0). Certain restrictions and exclusions apply.

Configuration Information Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends contacting your local sales representative for information on Factory Integrated Model product offerings and requirements.

For a configuration of the HP BladeSystem, please do the following:

Step 1: Select desired model, configuration, and quantity of HP ProLiant server and expansion blades per enclosure (required)

NOTE: Each HP BladeSystem c-Class Server Blade Enclosure holds up to 8 half-height server blades, 4 full-height server blades, and/or 4 expansion blades per enclosure (not exceeding 8 total blades).
NOTE: HP BladeSystem c3000 and c7000 Enclosures support G1 through Gen9 ProLiant and Integrity server blades and Integrity server blades in the same enclosure, subject to support requirements of the Onboard Administrator. Certain HP ProLiant server blades and options may require a specific version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For further information, please see the HP Service Pack for ProLiant (SPP) website and the HP Support Center document "HP ProLiant Server Blades - Compatibility with HP BladeSystem c7000 and c3000 Enclosures and Firmware".
NOTE: For server and expansion blade (storage, tape, and PCI Expansion) information, please visit: http://www.hp.com/go/bladesystem.

Step 2: Determine the HP BladeSystem c3000 Enclosure(s) and choose required options (One of the following from each list unless otherwise noted)

Select the base server blade enclosure configuration

HP BladeSystem c3000 c-Class Server Blade Enclosures

NOTE: The enclosures listed below include 6 HP Active Cool 100 Fans, a DVD drive, rack rails, and a single DDR2 Onboard Administrator module.
NOTE: The power supply kits, power cables, interconnects, etc. are added per the steps below.
NOTE: The enclosures listed below include the required blanking panels (device bay, interconnect module, fan, power, and redundant OA module blanking panels) as required per the ordered configuration. If the configuration is modified at a later date, additional blanking panels (ordered separately) may be required.
NOTE: All c-Class enclosures support HP ProLiant, Integrity and blades in either mixed or homogenous configurations, subject to support requirements of the Onboard Administrator. The AH257C enclosure is suggested for configurations primarily used with Integrity blades.

HP BLc3000 Platinum Configure-to-order Enclosure with 6 Fans ROHS Trial Insight Control License	696910-B21
HP Integrity BLc3000 CTO Enclosure	AH257C

Select the type and quantity of power supply kits

HP c3000 Enclosure Power Supplies

NOTE: Please choose AC or DC power supplies.
NOTE: Each enclosure must include only one type of power supply. Mixing of power supplies is not supported, except during hot swaps to different level or higher efficient power supplies. The Onboard Administrator will exhibit a mismatch error due to mixed power supplies until all power supplies are matched.
NOTE: The HP AC Common Slot Platinum Plus Power Suppl y PN 656364-B21meets the 80 PLUS Platinum power 94% efficiency requirement. The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 PLUS independently tests power supply efficiency and publically posts the results on 80Plus.org. DC power supplies are not eligible for 80 PLUS testing; efficiency is per HP internal testing.
NOTE: HP highly recommends using the HP Power Advisor tool to ensure the number of power supply options you have selected can fully support your BladeSystem

	configuration and to review maximum system power ratings for facilities planning purposes. HP Power Advisor is available at: http://www.hp.com/go/hppoweradvisor. **NOTE:** For a full enclosure, you can either order 4 or more power supplies to support an N+1 redundant configuration or 6 power supplies to support a N+N redundant configuration.	
	HP 1200W Common Slot Platinum Plus Hot Plug Power Supply Kit **NOTE:** Platinum power supplies are required to enable power discovery services. **NOTE:** Includes a 6ft C13 to C14 PDU power cord.	656364-B21
	HP 1200W Common Slot -48VDC Hot Plug Power Supply Kit **NOTE:** DC power supplies contain a -48V DC power cord designed for in-rack DC power rectifiers. **NOTE:** When this DC power supply (437573-B21) is ordered as a factory integrated enclosure option, standard AC supplies are not included in the order shipment. When this DC power supply is ordered with an enclosure, but not factory integrated, standard AC power supplies are included in the order shipment and DC power supplies are shipped separately.	437573-B21

Step 3: Select optional enclosure options

HP Redundant Onboard Administrator	HP BLc3000 Dual DDR2 Onboard Administrator **NOTE:** Certain HP ProLiant server blades and options require the latest version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For information on the latest firmware versions, please see the Blades Firmware Maintenance website at: http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html.	488100-B21
HP c3000 KVM Modules and Adapters	HP BLc3000 KVM Option **NOTE:** For use with in-rack KVM switches.	437575-B21
HP Optional Power Cords	HP C20 - C13 WW 250V 15Amp 2.0m Jumper Cord **NOTE:** For use with PDUs accepting C20 power cords. **NOTE:** Order 1 for each power supply.	AF590A
	HP C13 - Nema 6-15P US 250V 15A JP 3.6m Power Cord	A0N33A

Step 4: Select one to four interconnects.

The following is a list of various HP BladeSystem c-Class interconnect modules (Virtual Connect, Ethernet, Fibre Channel, and SAS interconnects). A pair of interconnects must be ordered if redundancy is required. For detailed interconnect options consult the specific interconnect QuickSpecs: http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html.
NOTE: Options for specific c-Class interconnects are NOT included in the list below. Consult the individual interconnect QuickSpecs to obtain part numbers for interconnect options such as cables, SFPs, etc.
NOTE: Interconnect Bay 1 must contain one of the "Ethernet" interconnect modules.

HP BladeSystem c-Class Ethernet Interconnects	HP Virtual Connect Flex-10/10D Module for c-Class BladeSystem	638526-B21
	HP Virtual Connect Flex-10 10Gb Ethernet Module for c-Class BladeSystem	455880-B21
	HP 6125G/XG Ethernet Blade Switch	658250-B21
	HP 6125G Ethernet Blade Switch	658247-B21
	HP 6120G/XG Ethernet Blade Switch	498358-B21
	HP 6120XG Blade Switch	516733-B21
	HP 1GB Ethernet Pass-Thru Module for c-Class BladeSystem	406740-B21
	HP 10GbE Ethernet Pass-Thru Module for c-Class BladeSystem	538113-B21
	Cisco Catalyst 1/10GbE 3120X Blade Switch	451439-B21
	Cisco Catalyst 1GbE 3120G Blade Switch	451438-B21
	Cisco Catalyst Blade Switch 3020 for HP c-Class BladeSystem	410916-B21
	HP Cisco B22HP Fabric Extender for BladeSystem c-Class	641146-B21

Configuration Information Factory Integrated Models

	HP Cisco B22HP Fabric Extender with 16 FET for BladeSystem c-Class **NOTE:** The Cisco Fabric Extender for HP BladeSystem with 16 FET - (PN 657787-B21), comes packaged with 16 Cisco Fabric Extender Transceivers. These Cisco transceivers can be used to connect the Fabric Extender with a parent Nexus 5000 over optical cable up to 100 meters using OM3 grade fiber.	657787-B21
	HP GbE2c Layer 2/3 Ethernet Blade Switch **NOTE:** HP Virtual Connect FlexFabric 10Gb/24-port Module for c-Class BladeSystem (P/N 571956-B21) is not compatible with the c3000 enclosure	438030-B21
HP SAS Switch	HP 6Gb SAS Switch Single Pack for HP BladeSystem c-Class	BK763A
	HP 6Gb SAS Switch Dual Pack for HP BladeSystem c-Class **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/13960_na/13960_na.html **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/13170_na/13170_na.html	BK764A
HP BladeSystem c-Class FC SAN Interconnects	HP Virtual Connect 8Gb 24-port Fibre Channel Module for c-Class BladeSystem	466482-B21
	HP Virtual Connect 8Gb 20-port Fibre Channel Module for c-Class BladeSystem	572018-B21
	HP 4GB Fibre Channel Pass-thru Module for c-Class BladeSystem	403626-B21
	Brocade 8/12c SAN Switch for BladeSystem c-Class	AJ820B
	Brocade 8/24c SAN Switch for BladeSystem c-Class	AJ821B
	Brocade 8/24c Power Pack+ SAN Switch for BladeSystem c-Class	AJ822B
	Cisco MDS 8/12c Fabric Switch for HP BladeSystem c-Class	AW563A
	Cisco MDS 8/24c Fabric Switch for HP BladeSystem c-Class	AW564A
	HP MDS 8/12c Fabric Switch 12-port Upgrade LTU **NOTE:** Licensed per switch.	TA804A
	HP StoreFabric Data Center Network Manager BladeSystem LTU **NOTE:** Installed on DCNM Server, each license can be assigned to only one switch.	TC367A
	HP MDS Enterprise Package for BladeSystem c-Class LTU **NOTE:** Licensed per switch.	TC317A

Step 5: Select rack power distribution for installing the enclosure into a rack.

NOTE: A pair of PDUs must be ordered for AC Feed redundancy. If AC redundancy is not required, a single PDU or UPS may be acceptable.

HP Monitored Power Distribution Unit	HP 8.6kVA 24A Single Input Three Phase NA/JP Monitored Power Distribution Unit	AF504A
	HP Two C13 PDU Extension Bar	AF500A

Step 6: Select wall outlet power cords (For connection to standard wall outlets)

NOTE: Select one wall outlet power cord for each power supply when plugging the power supplies into a wall outlet.
NOTE: Wall Outlet power cords should only be used with low-line (100VAC to 110VAC) power sources. If high-line power outlets are required, safety regulations require the use of a PDU or a UPS between the c3000 enclosures power supplies and wall outlets.
NOTE: A standard 6ft PDU power cord (C13 to C14) is included with each AC power supply, so these wall outlet power cords are not required if you plan to plug the power supplies into a PDU or UPS.
NOTE: Order the appropriate power cord for your countries standard electrical outlets.

HP Power Cords	HP C13 - Nema 5-15P US/CA 110V 10Amp 1.83m Power Cord **NOTE:** HP Power cord (6 ft) 1.83 meter 10A C-13-UL domestic power cord, for grounded USA 110V wall outlets.	AF556A

Configuration Information Factory Integrated Models

HP C13 - JIS C8303 JP 100V 12Amp 2.0m Power Cord **NOTE:** HP Power cord 2 meter C13 Japan low-line power cord, for Japanese 100V wall outlets.	AF572A
HP C20 - C13 WW 250V 15Amp 2.0m Jumper Cord **NOTE:** For use with PDUs accepting C20 power cords.	AF590A

NOTE: For additional power cable information, please visit:
http://h18000.www1.hp.com/products/servers/proliantstorage/power-protection/options/power-cable.html

Related Options

HP c3000 Enclosure Options	HP c-Class BladeSystem Miscellaneous Blanks Option Kit **NOTE:** Contains 1 each of c3000/c7000 Active Cool Fan blank, c3000/c7000 interconnect module blank, c7000 Onboard Administrator blank, c3000 local KVM blank, c3000 power supply blank, c7000 power supply blank, c3000 DVD blank, and a c3000 mini-divider. **NOTE:** This kit should only be ordered to replace lost or damaged blanks.	412148-B21
	HP c-Class BladeSystem Bay Blank with Coupler Option **NOTE:** This is option contains one half-height device blank and a coupler that can be used for the c3000 and c7000 enclosures. **NOTE:** Order quantity of one 412150-B21 for filling a half-height bay; the coupler is not used. **NOTE:** Order quantity of two 412150-B21 for filling a full-height bay. One coupler is installed between the two half-height blanks to be connected together to create a full-height blank. **NOTE:** This kit should only be ordered to replace lost or damaged blanks.	412150-B21
HP c3000 Rack Brackets	HP BLc3000 10000 Series Rack Shipping Bracket Option **NOTE:** Required when shipping a c3000 enclosure in a HP 10000 series rack. Please order 1 kit per enclosure.	461384-B21
HP Onboard Administrator	HP BLc3000 DDR2 Onboard Administrator Rotate LCD Kit **NOTE:** HP ProLiant G8 server blades and certain options require the latest version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For information on the latest firmware versions, please see the Blades Firmware Maintenance website at: http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html. **NOTE:** For field upgrades of previous generation enclosures only. **NOTE:** This Redundant Onboard Administrator module supports either single mode, or dual/redundant mode Onboard Administrators.	590863-B21
	HP BLc3000 Dual DDR2 Onboard Administrator **NOTE:** Second Onboard Administrator Module for the DDR2 OA module. **NOTE:** Support for second Order Administrator Module for c3000 Enclosure. **NOTE:** This module fits into an HP c3000 DDR2 Onboard Administrator.	488100-B21
HP c-Class Power Supply	**NOTE:** Please choose AC or DC power supplies. **NOTE:** Each enclosure must include only one type of power supply. Mixing of power supplies is not supported, except during hot swaps to different level or higher efficient power supplies. The Onboard Administrator will exhibit a mismatch error due to mixed power supplies until all power supplies are matched. **NOTE:** The HP AC Common Slot Platinum Plus Power Supply PN 656364-B21 meets the 80 PLUS Platinum power 94% efficiency requirement. The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 PLUS independently tests power supply efficiency and publically posts the results on 80Plus.org. DC power supplies are not eligible for 80 PLUS testing; efficiency is per HP internal testing. **NOTE:** HP highly recommends using the HP Power Advisor tool to ensure the number of power supply options you have selected can fully support your BladeSystem configuration and to review maximum system power ratings for facilities planning purposes. HP Power Advisor is available at: http://www.hp.com/go/hppoweradvisor. **NOTE:** For a full enclosure, you can either order 4 or more power supplies to support an N+1 redundant configuration or 6 power supplies to support an N+N redundant configuration.	

Related Options

	HP 1200W Common Slot Platinum Plus Hot Plug Power Supply Kit **NOTE:** Platinum power supplies are required to enable power discovery services **NOTE:** Includes a 6ft C13 to C14 PDU power cord.	656364-B21
	HP 1200W Common Slot -48VDC Hot Plug Power Supply Kit **NOTE:** DC power supplies contain a -48V DC power cord designed for in rack DC power rectifiers. **NOTE:** When this DC power supply (437573-B21) is ordered as a factory integrated enclosure option, standard AC supplies are not included in the order shipment. When this DC power supply is ordered with an enclosure, but not factory integrated, standard AC power supplies are included in the order shipment and DC power supplies are shipped separately.	437573-B21
HP c3000 KVM Module and Adapters	HP BLc3000 KVM Option **NOTE:** For use with in-rack KVM switches	437575-B21
HP BladeSystem c-Class Network Interconnects	**NOTE:** For detailed interconnect options, consult the specific interconnect QuickSpecs: http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html. **NOTE:** Options to specific c-Class interconnects are NOT included in the list below. Consult the individual interconnect QuickSpecs to obtain part numbers for interconnect options such as cables, SFPs, etc. **NOTE:** Interconnect Bay 1 must contain one of the Ethernet capable interconnect modules. **NOTE:** The HP BladeSystem c-Class interconnects ship as single units unless otherwise noted. Interconnects must be ordered in quantities of two for redundancy support.	
	HP 6125G Ethernet Blade Switch	658247-B21
	HP 6125G/XG Ethernet Blade Switch	658250-B21
	HP 6120XG Blade Switch	516733-B21
	HP 1GB Ethernet Pass-Thru Module for c-Class BladeSystem **NOTE:** The Ethernet Pass-Thru Module is shipped as a single unit and should be ordered in quantities of two.	406740-B21
	Cisco Catalyst 1/10GbE 3120X Blade Switch	451439-B21
	Cisco Catalyst 1GbE 3120G Blade Switch	451438-B21
HP BladeSystem c-Class FC SAN Interconnects	**NOTE:** For detailed interconnect options, consult the specific interconnect QuickSpecs: http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html. **NOTE:** Options to specific c-Class interconnects are NOT included in the list below. Consult the individual interconnect QuickSpecs to obtain part numbers for interconnect options such as cables, SFPs, etc. **NOTE:** Interconnect Bay 1 must contain one of the Ethernet capable interconnect modules. **NOTE:** The HP BladeSystem c-Class interconnects ship as single units unless otherwise noted. Interconnects must be ordered in quantities of two for redundancy support.	
	HP Virtual Connect 8Gb 24-port Fibre Channel Module for c-Class BladeSystem	466482-B21
	HP Virtual Connect 8Gb 20-port Fibre Channel Module for c-Class BladeSystem	572018-B21
	HP 4GB Fibre Channel Pass-thru Module for c-Class BladeSystem	403626-B21
	Brocade 8/12c SAN Switch for BladeSystem c-Class	AJ820B
	Brocade 8/24c SAN Switch for BladeSystem c-Class	AJ821B
	Brocade 8/24c Power Pack+ SAN Switch for BladeSystem c-Class	AJ822B
	Cisco MDS 8/12c Fabric Switch for HP BladeSystem c-Class	AW563A
	Cisco MDS 8/24c Fabric Switch for HP BladeSystem c-Class	AW564A

Related Options

	Brocade 8/16Gb Embedded FC Switch 12-port Upgrade LTU	T5517A
	Cisco MDS 9124e Switch for BladeSystem c-Class 12-port Upgrade LTU	T5169A
Cisco MDS Fabric Switch for HP BladeSystem c-Class	Cisco MDS 8/12c Fabric Switch for HP BladeSystem c-Class	AW563A
	Cisco MDS 8/24c Fabric Switch for HP BladeSystem c-Class	AW564A
	HP MDS Fabric Manager Server Enterprise Package for BladeSystem c-Class LTU	TC318A
	Brocade 8 and 16 Gb SAN Switch for HP BladeSystem c-Class 12-port Upgrade LTU	T5517A
	Cisco MDS 9124e Switch for BladeSystem c-Class 12-port Upgrade LTU	T5169A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/13821_na/13821_na.html	
HP Insight Software	**HP Insight Control**	
	HP Insight Control for BladeSystem including 1yr 24x7 Support Enclosure 8 Svr FIO Electronic License	C6N32ABE
	HP Insight Control for BladeSystem including 1yr 24x7 Support Enclosure 16Svr FIO Electronic License	C6N33ABE
	HP Insight Control Server Provisioning Media Kit **NOTE:** HP Insight Control 7.2 introduces Insight Control server provisioning, a new capability ideal for multi-server OS and firmware provisioning to ProLiant and BladeSystem servers. Insight Control server provisioning is included and licensed as part of HP Insight Control. A media kit, "HP Insight Control server provisioning USB media kit" (# BD883A), including a USB, is available for customers who require a physical copy of the media loaded with Insight Control server provisioning software. Please note that this media kit is separate and in addition to the "HP Insight Management DVD media kit" (#C6N31A).	BD883A
	HP Insight Management Media Kit **NOTE:** HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates. **NOTE:** Licenses ship without media. The Insight Control Media Kit can be ordered separately, or can be downloaded at: http://www.hp.com/go/insightupdates. **NOTE:** The "for bundling with an enclosure" license kits can only be ordered together with a BladeSystem c3000 or c7000 enclosure on the same order. **NOTE:** Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service. **NOTE:** For additional License Kits, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_na/12631_na.html	C6N31A
HP iLO Advanced for BladeSystem License	HP iLO Advanced for BladeSystem including 1yr 24x7 Support Eight Server License	512489-B21
HP Virtual Connect Enterprise Manager	HP Virtual Connect Enterprise Manager including 1yr 24x7 Support Single c3000 Enclosure Lic **NOTE:** This license allows 1 BL-c3000 enclosure to be managed with VCEM. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service. **NOTE:** For additional License Kits, please visit: http://h18000.www1.hp.com/products/quickspecs/12860_na/12860_na.html	459867-B21
HP c-Class Storage	HP D2200sb PCIe Storage Blade	AP880A

Related Options

Blades	**NOTE:** Please see the HP D2200sb Storage Blade QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/13714_na/13714_na.html	
	HP D2220sb PCIe and StoreVirtual VSA Bundle **NOTE:** Includes the D2220sb Storage Blade and a single HP StoreVirtual VSA license. VSA software is installed in a virtual machine on a VMware ESX/ESXi & Microsoft Hyper-V host server adjacent to the D2220sb. **NOTE:** Includes 3yr NBD Parts-Only Warranty Service for D2220sb hardware. **NOTE:** Includes 3yr 9x5 remote technical support for HP StoreVirtual VSA software and free updates. **NOTE:** HP StoreVirtual VSA is supported on VMware ESX/ESXi & Microsoft Hyper-V.	QW914A
	HP D2220sb PCIe w/(12) 900 GB 6G SAS HDD Bundle **NOTE:** Includes 3yr NBD Parts-Only Warranty Service for D2220sb hardware	QW915A
	HP D2220sb Build-to-order Storage Blade **NOTE:** Includes 3yr NBD Parts-Only Warranty Service	QW917A
	HP D2220sb Configure-to-order Storage Blade **NOTE:** Includes 3yr NBD Parts-Only Warranty Service	QW918A
	NOTE: The D2220sb requires a c7000 Enclosure configuration with 10 fans. **NOTE:** Please see the HP D2220sb Storage Blade QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14507_na/14507_na.html.	
	HP BL c-Class PCI Express Mezzanine Pass Thru Option Kit **NOTE:** The HP PCI Express Mezzanine Pass-Thru Card (P/N 431643-B21) is required to support an expansion blade with the ProLiant BL620c G7 Server Blade. Up to two expansion blades are supported per server mix and match (Ultrium Tape, D2220sb/D2220sb PCIe Storage, and/or PCI Expansion Blades). See the "Expansion blade" section later in this document for more information.	431643-B21
	HP StoreEasy 3830 Gateway Storage Blade	B7E01A
	HP StoreEasy 3840 Gateway Storage Blade	E7X08A
HP Ultrium Tape Blades	HP StoreEver LTO-5 Ultrium SB3000c Tape Blade	BS580B
	HP StoreEver LTO-4 Ultrium SB1760c Tape Blade	AQ697B
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12729_na/12729_na.html	
	HP BL c-Class PCI Express Mezzanine Pass Thru Option Kit **NOTE:** The HP PCI Express Mezzanine Pass-Thru Card (P/N 431643-B21) is required to support an expansion blade with the ProLiant BL620c G7 Server Blade. Up to two expansion blades are supported per server mix and match (Ultrium Tape, D2220sb/D2220sb PCIe Storage, and/or PCI Expansion Blades). See the "Expansion blade" section later in this document for more information.	431643-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12587_na/12587_na.html	
HP Expansion Blade	HP BLc PCI Expansion Blade **NOTE:** Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12753_na/12753_na.html	448018-B21
	HP BL c-Class PCI Express Mezzanine Pass Thru Option Kit **NOTE:** The HP PCI Express Mezzanine Pass-Thru Card (P/N 431643-B21) is required to support an expansion blade with the ProLiant BL620c G7 Server Blade. Up to two expansion blades are supported per server mix and match (Ultrium Tape, D2220sb/D2220sb PCIe Storage, and/or PCI Expansion Blades). See the "Expansion	431643-B21

Related Options

	blade" section later in this document for more information.	
HP Power Distribution Units	**NOTE:** A pair of PDUs must be ordered for AC feed redundancy. **NOTE:** Additional HP Power Distribution Units are available than those listed below. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower. **Monitored PDU** **HP Monitored Power Distribution Unit: Full Rack Version**	
	HP 8.6kVA 24A Single Input Three Phase NA/JP Monitored Power Distribution Unit	AF504A
	HP 8.3kVA 40A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF506A
	HP Monitored Power Distribution Unit: Half Rack Version	
	HP 4.9kVA 24A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF914A
	NOTE: Please see the following QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12118_na/12118_na.html	
	Modular PDUs	
	NOTE: Please see the following QuickSpecs for additional options including shorter jumper cables and country specific power cords: http://h18000.www1.hp.com/products/quickspecs/11041_na/11041_na.html	
	HP Two C13 PDU Extension Bar	AF500A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/pdu	
	NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.	
HP Intelligent Power Distribution Units (iPDU)	**NOTE:** A pair of PDUs must be ordered for AC feed redundancy. **NOTE:** Additional HP Power Distribution Units are available than those listed below. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower. **iPDU Core Units**	
	HP 4.9kVA 24A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF520A
	HP 8.6kVA 24A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF522A
	iPDU Extension Bars	
	HP 5xC13 Intelligent PDU Extension Bar G2 Kit	AF547A
	HP 5xC13 Outlets Power and UID LEDs Pair Standard Extension Bar	AF528A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13650_na/13650_na.html	
HP Uninterruptible Power Systems	**NOTE:** A pair of PDUs must be ordered for AC feed redundancy. **NOTE:** Additional HP Power Distribution Units are available than those listed below. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower. **HP Rack-mountable UPS**	
	HP R1500 G3 Uninterruptible Power Supply (UPS)	
	HP R/T3000 G2 2U L530 Low Voltage NA/JP Uninterruptible Power System	AF466A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14059_na/14059_na.html	
	HP R/T3000 G2 Uninterruptible Power System (UPS)	
	HP R/T3000 G2 2U L620 High Voltage NA/JP Uninterruptible Power System	AF467A
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/14058_na/14058_na.html	

Related Options

	R5000 Uninterruptible Power System (UPS)	
	HP R5KVA 3U L630 High Voltage NA/JP Uninterruptible Power System	AF460A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14109_na/14109_na.html	
	R7000 Uninterruptible Power System (UPS)	
	HP R7KVA 4U 50A High Voltage NA/JP Uninterruptible Power System	AF462A
	HP R5KVA and R7KVA 3U Extended Runtime Module	AF464A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14110_na/14110_na.html	
HP Basic Power Distribution Units	**NOTE:** Additional HP Power Distribution Units are available than those listed below. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower.	
	HP 1.9kVA 120 Volt 12 Outlet NA/JP Basic Power Distribution Unit	
	HP 1.9kVA 120 Volt 12 Outlet NA/JP Basic Power Distribution Unit	H5M54A
	HP 2.8kVA 120 Volt 18 Outlet NA/JP Basic Power Distribution Unit	H5M55A
	HP 3.6kVA 200-240 Volt 12 Outlet WW Basic Power Distribution Unit	H5M56A
	HP 3.6kVA 200-240 Volt 20 Outlet WW Basic Power Distribution Unit	H5M57A
	HP 4.9kVA 208 Volt 20 Outlet NA/JP Basic Power Distribution Unit	H5M58A
	HP 4.9kVA 208 Volt 30 Outlet NA/JP Basic Power Distribution Unit	H5M59A
	HP 8.3kVA 208 Volt 36 Outlet NA/JP Basic Power Distribution Unit	H5M60A
	HP 8.6kVA 208 Volt Three Phase 18 Outlet NA/JP Basic Power Distribution Unit	H5M61A
	HP 8.6kVA 208 Volt Three Phase 30 Outlet NA/JP Basic Power Distribution Unit	H5M62A
	HP 5.7kVA 208 Volt Three Phase 27 Outlet NA/JP Dual Voltage Basic Power Distribution Unit	H5M63A
	HP 8.6kVA 208 Volt Three Phase 30 Outlet NA/JP Dual Voltage Basic Power Distribution Unit	H5M64A
	HP 11kVA 400 Volt Three Phase 42 Outlet NA Basic Power Distribution Unit	H5M67A
	HP Hardwired 200-240 Volt 36 Outlet WW Basic Power Distribution Unit	H5M75A
	HP 13.2kVA 480 Volt Three Phase 15 Outlet NA Basic Power Distribution Unit	H3X07A
	HP 19.9kVA 480 Volt Three Phase 30 Outlet NA Basic Power Distribution Unit	H3X08A
	HP 277 Volt options for H3X07A and H3X08A	
	HP 800VA - 277V Input / 230V Output NA Rack Mount Transformer	H3X09A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14557_na/14557_na.html	
	NOTE: Additional HP Power Distribution Units are available. For a complete list of all HP PDUs and additional information please visit: www.hp.com/go/rackandpower.	
HP Power Cords	HP C20 - C13 WW 250V 15Amp 2.0m Jumper Cord	AF590A
	NOTE: For use with PDUs that accept C20 power cords.	
	NOTE: For additional power cable information, please visit: http://h18000.www1.hp.com/products/servers/proliantstorage/power-protection/options/power-cable.html.	
HP Rack Series (Graphite Metallic)	**HP Intelligent Series Rack**	
	HP 642 1075mm Pallet Intelligent Series Rack	BW903A
	HP 642 1075mm Shock Intelligent Series Rack	BW904A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information at:	

Related Options

	http://h18000.www1.hp.com/products/quickspecs/14223_na/14223_na.html **NOTE:** For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower	
HP Rack Options	**Keyboards and Monitors**	
	HP USB BFR with PVC Free US Keyboard/Mouse Kit	631341-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13972_na/13972_na.html	
	HP TFT7600 G2 KVM Console Rackmount Keyboard US Monitor	AZ870A
	HP TFT7600 G2 KVM Console Rackmount Keyboard US TAA Monitor	AZ885A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18006.www1.hp.com/products/quickspecs/13731_na/13731_na.html	
	NOTE: For additional information regarding Rack Options, please see the following URL: http://www.hp.com/go/rackandpower	
	HP Server Console Switch G2 with Virtual Media & CAC	
	HP 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software	AF618A
	HP 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software	AF619A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13475_na/13475_na.html	
	HP IP Console Switch G2 with Virtual Media & CAC	
	HP 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software	AF620A
	HP 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software	AF621A
	HP 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software	AF622A
	HP KVM CAT5 1-pack USB Interface Adapter	336047-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13474_na/13474_na.html	
	HP KVM Switches	
	HP BladeSystem c-Class KVM Interface Adapter	AF605A
	HP Server Console 0x2x8 Port Analog Switch	AF616A
	HP Server Console 0x2x16 Port Analog Switch	AF617A
	HP TAA 0x2x16xKVM Server Console G2 Switch	AF626A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11834_na/11834_na.html	
	HP 1x4 USB/PS2 KVM Console Switch	AF611A
	HP 1x4 KVM Console 6ft USB Cable	AF613A
	NOTE: required for supporting USB peripherals.	
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12662_na/12662_na.html	
	NOTE For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm	
	Rack Options	
	HP 11K G2 Rack Tie Down Kit	AF076A
	NOTE: For additional information regarding Rack Options, please see the following URL: http://www.hp.com/go/rackandpower.	

Related Options

HP Care Pack Services

NOTE: Some options, such as Fibre Channel switches for the HP c-Class BladeSystem, are not covered under the c3000 enclosure Care Packs and carry separate Care Packs. Care Pack service level support for these options should always be uplifted to match existing storage or server service level.

Please view the option QuickSpecs or contact your HP sales representative or HP authorized ServiceOne partner for Care Pack information.

Proactive Care Services	
HP 3 year 4 hour 24x7 c3000 Enclosure Proactive Care Service	U3C42E
HP 3 year 6 hour Call To Repair 24x7 c3000 Enclosure Proactive Care Service	U3C45E
HP 3 year 4 hour 24x7 c3000 Enclosure with Insight Control Proactive Care Service	U3P19E
HP 3 year 6 hour Call To Repair 24x7 c3000 Enclosure with Insight Control Proactive Care Service	U3P22E
HP Proactive Care Personalized Support (Environmental Option)	
HP 3 year ISS ProactiveCare Personalized Support	U6W98E
Support Plus 24	
HP 3 year Support Plus 24 Insight Control BladeSystem c3000 Service	UF540E
Installation & Start-up Services	
HP Installation c3000 Enclosure and Server Blade Service	UH749E
HP Startup BladeSystem c3000 Infrastructure Service	UF817E
HP Startup BladeSystem c3000 + Operating System Service	UF818E
HP Startup BladeSystem c3000 Enclosed Network Service	UF814E
HP Hardware Install c-Class Enclosure and Server Blade Service	UE494E

Additional HP Care Pack services can be found at:
http://www.hp.com/go/cpc

Power Specifications

HP 1200W Common Slot Platinum Hot Plug Power Supply Kit							
Part Number	656364-B21						
Input Voltage Range (V rms)	100-240						
Frequency Range (Nominal) (Hz)	50 / 60						
Nominal Input Voltage (Vrms)	**100**	**120**	**200**	**208**	**220**	**230**	**240**
Maximum Rated Output Wattage	800	900	1200	1200	1200	1200	1200
Nominal Input Current (A rms)	9.1	8.4	6.7	6.4	6.1	5.8	5.5
Maximum Rated Input Wattage Rating (Watts)	897	999	1321	1319	1317	1315	1314
Maximum Rated VA (Volt-Amp)	909	1012	1338	1337	1334	1332	1331
Efficiency (%)	89.2	90.1	90.9	91.0	91.1	91.2	91.3
Power Factor	0.998						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	3061	3408	4506	4501	4493	4487	4483

HP 1200W Common Slot Silver Hot Plug Power Supply Kit							
Part Number	500172-B21						
Input Voltage Range (V rms)	100-240						
Frequency Range (Nominal) (Hz)	50 / 60						
Nominal Input Voltage (Vrms)	**100**	**120**	**200**	**208**	**220**	**230**	**240**
Maximum Rated Output Wattage	800	900	1200	1200	1200	1200	1200
Nominal Input Current (A rms)	9.7	9.0	7.0	6.8	6.4	6.1	5.9
Maximum Rated Input Wattage Rating (Watts)	930	1034	1348	1348	1348	1348	1348
Maximum Rated VA (Volt-Amp)	970	1079	1406	1406	1406	1406	1406
Efficiency (%)	86	87	89	89	89	89	89
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	3174	3530	4600	4600	4600	4600	4600

HP 1200W Common Slot -48VDC Hot Plug Power Supply Kit							
Part Number	437573-B21						
Input Voltage Range (V rms)	36-72						
Frequency Range (Nominal) (Hz)	DC						
Nominal Input Voltage (Vrms)	**100**	**120**	**200**	**208**	**220**	**230**	**240**
Maximum Rated Output Wattage	800	900	1200	1200	1200	1200	1200
Nominal Input Current (A rms)	9.7	9.0	7.0	6.8	6.4	6.1	5.9
Maximum Rated Input Wattage Rating (Watts)	930	1034	1348	1348	1348	1348	1348
Maximum Rated VA (Volt-Amp)	970	1079	1406	1406	1406	1406	1406
Efficiency (%)	86	87	89	89	89	89	89
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						

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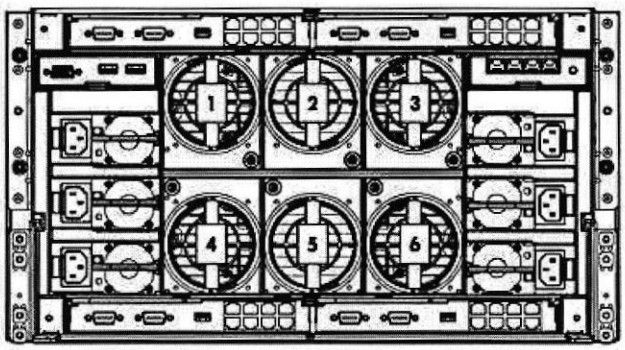
Power Specifications

Maximum British Thermal Unit Rating (BTU-Hr)	3174	3530	4600	4600	4600	4600	4600

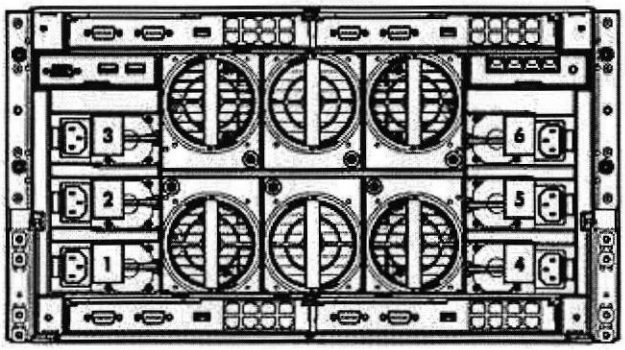
NOTE: HP highly recommends using the HP Power Advisor tool to ensure the number of power supply options you have selected can fully support your BladeSystem configuration and to review maximum system power ratings for facilities planning purposes. HP Power Advisor is available at: http://www.hp.com/go/hppoweradvisor.

Server Blade, Expansion Blade, and Fan Population Guidelines

Fan & power supply bay numbering



Rack power supply bay numbering



Fan bay numbering

Power supplies and fans must be placed in the following bays

Number of Fans	**Fan Bays Used**
4	2,4,5, 6
6	All bays filled
Number of Power Supplies (for PS Redundant or non-redundant mode)	**Power Supply Bays Used**
2	1 & 2
3	1, 2, & 3
4	1, 2, 3, & 4
5	1 through 5
6	All bays
Number of Power Supplies (for AC Redundant mode)	**Place Power Supplies in Bays:**
2	1 & 4
4	1, 2, 4, & 5
6	All bays filled

NOTE: With four fans, the enclosure will support only 4 half-height server blades in the bottom half of the enclosure device bays. With six fans, all 8 server bays may be filled.

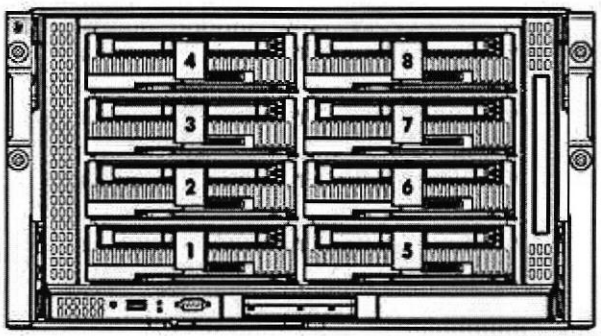
NOTE: For correct operation, fans and server blades must be installed in the correct bays. The Onboard Administrator will ensure that fans and blades are correctly placed before allowing the system to power on.

The c3000 enclosure is divided into 2 zones by the horizontal support metalwork. The lower zone (zone 1) includes bays 1, 2, 5, and 6. The upper zone (zone 2) contains bays 3, 4, 7, and 8. Within each zone a removable bay divider is used to support half-height devices. To install a full-height blade in either zone this bay divider must be removed.

NOTE: Please read the RTF card (included with each c3000 enclosure) and the "HP BladeSystem c3000 Setup and Installation Guide" for more information on the use, installation, and removal of bay dividers.

Half-height server blade bay numbering

Server Blade, Expansion Blade, and Fan Population Guidelines

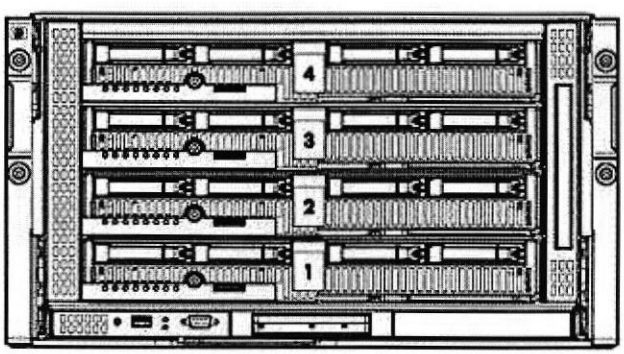


HP BladeSystem c3000 Enclosure – Racks

1. Device Bay 1
2. Device Bay 2
3. Device Bay 3
4. Device Bay 4
5. Device Bay 5
6. Device Bay 6
7. Device Bay 7
8. Device Bay 8

NOTE: Half-height server blades should be populated from the bottom half of the enclosure, in the following order (bays 1, 5, 2, 6, 3, 7, 4, & 8)

Full-height server blade bay numbering



HP BladeSystem c3000 Enclosure – Racks

1. Device Bay 1
2. Device Bay 2
3. Device Bay 3
4. Device Bay 4

NOTE: Full-height servers should be populated from the bottom to the top (bays 1 through 4). With four fans, only the bottom 2 bays can be used. With six fans, all bays can be used.

Full-height and half-height server blade mixed configurations

Each enclosure zone can support up to 1 full-height, double wide server blade, up to 2 full-height, single-wide server blades, or up

Server Blade, Expansion Blade, and Fan Population Guidelines

to 4 half-height server blades. Additionally, zone 2 supports a mix of 1 full-height, single-wide server blade and up to 2 half-height server blades. A mixture of blades sizes is not supported in zone 1.

An overview of the mixed server blade population rule best practices are summarized below. For detailed expansion blade rules and guidelines, please see the documentation that ships with the enclosure and server blade.

1. One full-height, single-wide server and up two half-height servers may be mixed in zone 2 (the upper zone); mixing is not allowed in zone 1 (the lower zone).
2. The full-height, single wide server must be installed in the lower bays 3 and 7 and half-height server(s) directly above in bays 4 and 8.
3. Half-height server blades should be installed in the order of bays 4 then 8.
4. Before installing any full-height server blades, remove the bay divider that is used to support half-height devices.
5. A mini-divider is installed between bays 4 and 8. A mini-divider is shipped with each c3000 enclosure.

NOTE: Please read the RTF card (included with each c3000 enclosure) and the "HP BladeSystem c3000 Setup and Installation Guide" for more information on the use, installation, and removal of bay dividers and the mini-divider for mixed configurations.
NOTE: Expansion blades can be installed in zone 2 along with both full-height, single-wide and half-height blades. For more information, please see the "Expansion blades" section later in this document.

Expansion blades

Expansion blades consist of storage blades, tape blades, and the PCI Expansion Blade. Up to 4 expansion blades are supported per HP BladeSystem c-Class c3000 Enclosure. Expansion blades may be installed in the same zone as half-height and full-height, single-wide server blades. Expansion blades are not supported with full-height, double-wide server blades. An expansion blade is installed directly above a server blade, also known as a partner server blade. An overview of the expansion blade population rule best practices are summarized below. For detailed expansion blade rules and guidelines, please see the documentation that ships with the enclosure and expansion blade.

Expansion blade population best practices for half-height server blades:

1. One half-height partner server blade supports one expansion blade.
2. Identify the partner server blade to be installed with the expansion blade. The two blades always occupy a pair of slots as follows: 1 & 2, 3 & 4, 5 & 6, and 7 & 8.
3. Each c3000 zone contains a removable divider (also known as a device bay shelf) that is used to support half-height devices. This divider is remains installed whether the half-height devices are server or expansion blades.

Expansion blade population best practices for full-height, single-wide server blades:

1. A full-height, single-wide server blade may be mixed with half-height expansion blades in zone 2 (the upper zone) of the c3000 enclosure; mixing is not allowed in zone 1 (the lower zone).
2. The full-height, single-wide partner server blade must be installed in the lower bays 3 and 7 and half-height devices directly above in bays 4 and 8.
3. The full-height, single-wide server partner blade supports one or two expansion blades in bays 4 and 8.
4. Before installing any full-height, single-wide server blades, remove the bay divider that is used to support half-height devices.
5. A mini-divider is installed between bays 4 and 8. A mini-divider is shipped with each c3000 enclosure.
6. If installing only one expansion blade, install the expansion blade in bay 8. The remaining half-height bay (bay 4) may be populated with either a half-height device bay blank of a half-height server blade; the half-height server blade may not be partnered with the expansion blade.
7. If installing two expansion blades, the expansion blades may be two storage blades, two tape blades, two PCI Expansion Blades, or a mixture of any two.
8. Expansion blades are not supported with full-height, double-wide server blades.

NOTE: Please read the RTF card (included with each c3000 enclosure) and the "HP BladeSystem c3000 Setup and Installation Guide" for more information on using bay dividers and the mini-divider for mixed configurations.

Server Blade, Expansion Blade, and Fan Population Guidelines

NOTE: For detailed expansion blade rules and guidelines, please see the documentation that ships with the enclosure and expansion blade.

Technical Specifications

Enclosure Unit	**Dimensions** (H x W x D) (with bezel)	10.4 x 19.1 x 32.977 in (265 x 485 x 835 mm)	
	Weight (approximate)	Maximum (one enclosure with 8 blades and 4 interconnects installed)	300 lb (136 kg)
		Minimum (one enclosure without blades and interconnects)	130 lb (59 kg)
	Input Requirements (per AC power supply)	Rated Line Voltage	90 – 132 VAC 180 – 264 VAC
		Rated Input Current	9.3 A (at 100 VAC) 9.7 A (at 120VAC) 7.8 A (at 200 VAC) 7.2 A (at 208 VAC) 6.8 A (at 220 VAC) 6.2 A (at 240 VAC)
		Rated Input Frequency	47 to 63 Hz
	BTU Rating	Maximum per power supply	2728 BTU/hr (at 100 VAC) 3069 BTU/hr (at 120VAC) 4092 BTU/hr (at 200 to 240 VAC)
	Power Specifications	To review typical system power ratings use the Power Calculator which is available via the online tool located at URL: www.hp.com/go/bladesystem/powercalculator	
	Power Supply Output (per power supply)	Rated Steady-State Power	800 W (at 100 VAC) 900 W (at 120 VAC) 1200 W (at 200 to 240 VAC)
		Maximum Peak Power	880 W (at 100 VAC) 990 W (at 120 VAC) 1350 W (at 200 to 240 VAC)
	System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
		Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
	Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457

Technical Specifications

			m/min (1500 ft/min).
		Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
	Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
		Idle	depends on server configuration & mix of server blades
		Operating	varies by CPU utilization, server configuration, and mix of server blades
Option Kits	**Power Supply Dimensions**	Size	Height: 1.515 in (38.48 mm) Width: 3.4 in (86.36 mm) Depth: 7.5 in (190.5 mm)
		Weight	2.5 lbs (1.13 kg)
	Fan Option Shipping Dimensions	Size	Height: 8.75 in (223 mm) Width: 9.75 in (248 mm) Depth: 15.88 in (403 mm)
		Weight	4.0 lbs (1.8 kg)
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.	

Summary of Changes

Date	Version History	Action	Description of Change:
07-Nov-2014	From Version 60 to 61	Changed	Overview, Pre-configured Models and Configuration Information Factory Integrated Models sections were updated Smart Buy sku updated
09-Sep-2014	From Version 59 to 60	Changed	What's new, Configuration Information Factory Integrated Models, Related Options sections were updated
		Added	Sku Added: 696910-B21
		Removed	Obsolete skus were removed: • AF603A • TC318A • AF508A • 498358-B21
01-Aug-2014	From Version 58 to 59	Changed	Changes were made in Smart Buy section (Enclosure and Warranty). Sub-sections were added in Smart Buy (Physical Size, Enclosure Management and Software).
11-Jul-2014	From Version 57 to 58	Changed	Smart Buys were added.
10-Jun-2014	From Version 56 to 57	Changed	Changes made throughout the QuickSpec.
18-Feb-2014	From Version 55 to 56	Changed	Configuration Information and Related Options were revised.
10-Dec-2013	From Version 54 to 55	Changed	Changes were made throughout the QuickSpec.
22-Nov-2013	From Version 53 to 54	Removed	Removed the What's New Section Removed part number from the Related Options/ HP c Class Power Supply Section
13-Sep-2013	From Version 52 to 53	Changed	Configuration Information Factory Integrated Models and Related Options were revised.
15-Mar-2013	From Version 51 to 52	Changed	Overview: Updated What's New section Models: Updated HP BladeSystem c-Class Server Blade Enclosures HP BladeSystem c-Class Overview: Updated HP ProLiant & Integity Server Blades and HP D2200sb Storage Blade. Configuration Information Factory Integrated Models: Updated Step 2. Related Options: Updated HP Onboard Administrator, HP c-class Power Supply, HP Insight Software and HP Storage Blade. Power Specifications: HP 1200W Common Slot Platinum Hot Plug Power Supply Kit and Note to section.

Summary of Changes

		Removed	Removed "Platinum" reference throughout QS. Removed NOTE from Technical Specifications section.
01-Mar-2013	From Version 50 to 51	Removed	Related Options: Removed TC276AAE and TC277AAE from HP Insight Software section.
19-Feb-2013	From Version 49 to 50	Changed	Changes made throughout the QS to reflect the title changes to HP BladeSystem c3000 Platinum Enclosure. Models section was updated. Service and Support section was completely revised. Other changes made in the Configuration Information and Related Options.
14-Dec-2012	From Version 48 to 49	Added	Configuration Information Factory Integrated Models: added models Related Options: added parts in HP Rack Series
24-Sep-2012	From Version 47 to 48	Changed	Changes made throughout the QuickSpec.
31-Aug-2012	From Version 46 to 47	Changed	Changes made throughout the QuickSpec.
14-May-2010	From Version 45 to 46	Changed	Changes made in the Related Options section.
26-Mar-2012	From Version 44 to 45	Changed	Changes made throughout the QuickSpec.
06-Mar-2012	From Version 42 to 44	Added	Added a reference to Gen8.
14-Nov-2011	From Version 41 to 42	Changed	HP Insight management software, Optimized, Standard and Basic Care Packages and HP c-Class Power Supply were revised.
29-Sep-2011	From Version 40 to 41	Changed	Revisions made in the Configuration Information and Related Options sections.
26-Sep-2011	From Version 39 to 40	Changed	Power Supplies, HP BladeSystem c-Class Interconnects, HP Ultrium Tape Blades and HP Care Pack Services were revised What's New was added to the Overview
30-Aug-2011	From Version 38 to 39	Changed	Standard and Basic Care Packages were updated in Service and Support Changes were made throughout Configuration Information Factory Integrated Models and Related Options
12-Aug-2011	From Version 37 to 38	Changed	Link corrections were made in the Related Options section.
24-Jun-2011	From Version 36 to 37	Changed	Changes made throughout the QuickSpec. Including the removal of ProCurve & StorageWorks.
03-Jun-2011	From Version 35 to 36	Changed	Changes made to North America and Canada only.
29-Apr-2011	From Version 34 to 35	Changed	The Service and Support section was completely revised and other changes made throughout the QuickSpec.
11-Feb-2011	From Version 33 to 34	Changed	Mixed Configuration - Full Height and Half Height Population was revised HP R5500 UPS Tower Conversion Kit was removed from HP Uninterruptible Power Systems - Rack HP c3000 Enclosure Options was removed from Related Options
14-Jan-2011	From Version 32 to 33	Changed	HP BladeSystem c-Class Interconnect and Mezzanine Components URLs were modified in HP BladeSystem c-Class

Summary of Changes

			Interconnects Options HP Uninterruptible Power Systems product descriptions were revised These fans are for the HP BladeSystem c3000 CTO Enclosure note was removed from HP c-Class Active Cool Fan in Step 2 HP PCI Express Mezzanine pass-thru card for HP BladeSystem was removed from HP c-Class Storage Blades
10-Jan-2011	From Version 31 to 32	Changed	HP StorageWorks D2200sb Storage Blade was added and HP StorageWorks SB40c Storage Blade was removed HP Insight Control for BladeSystem Licenses, HP Uninterruptible Power Systems - Rack, HP Insight Software and HP Virtual Connect Enterprise Manager product descriptions were revised HP Virtual Connect FlexFabric 10Gb/24-port Module for c-Class BladeSystem is not compatible with the c3000 enclosure note was added to HP BladeSystem c-Class Ethernet Interconnects
15-Nov-2010	From Version 30 to 31	Changed	Product descriptions were revised throughout, Brocade SAN Switch for HP BladeSystem c-Class was added and HP StorageWorks Network Storage Servers was removed.
08-Oct-2010	From Version 29 to 30	Changed	HP Tape Backup and HP Care Pack Services were revised Service and Support was added HP TFT7600 G2 KVM Console Rackmount Keyboard Monitors were added to Keyboards and Monitors
		Removed	HP BladeSystem c3000 Enclosure Tower was removed What's New was removed from the Overview HP c3000 Enclosure DVD Drive was removed HP 4Gb Virtual Connect Fibre Channel Module for c-Class BladeSystem was removed from Step 3 HP Insight Control, Single-Server License including 1 year of 24x7 Technical Support and Update was removed from HP Insight Software HP Disk Backup was removed from Related Options
02-Jul-2010	From Version 28 to 29	Added	Mixing of the Active Cool 100 and Active Cool 200 in a c3000 enclosure is not supported note was added to HP c-Class Active Cool Fans.
		Removed	Part numbers 508669-B21, AF600A and AF602A were removed and 2x16 Console Switch with Virtual Media was removed from HP KVM Switch Options.
21-Jun-2010	From Version 27 to 28	Changed	HP Rack 10000 G2 Series and HP Rack Options were

Summary of Changes

			completely revised HP Insight Control for Linux was added to HP Insight Software
		Removed	HP 1Gb Virtual Connect Ethernet Module for c-Class BladeSystem, HP 10Gb Ethernet BL-c Switch and 10GbE Dual Port Mezzanine Adapter for HP BladeSystem c-Class were removed from HP BladeSystem c-Class Ethernet Interconnects HP Brocade 4/12 SAN Switch, HP Brocade 4/24 SAN Switch Power Pack and HP Brocade 4/24 SAN Switch were removed from HP BladeSystem c-Class FC SAN Interconnects 4x1x16 IP Console Switch with Virtual Media and HP USB KVM Cable with audio, 6-2-pack were removed from HP KVM Switch Options
28-Apr-2010	From Version 26 to 27	Removed	Removed part number AH351B from a Note in Step 2A of the Configuration Information section.
12-Mar-2010	From Version 25 to 26	Changed	NOTE was added to HP 1200W -48V DC Common Slot Power Supply and all references to 2 x 1 x 16 IP Console Switch with Virtual Media, part number AF601A, were removed.
16-Feb-2010	From Version 24 to 25	Changed	Changes were made throughout the Configuration Information Factory Integrated Models and Related Options sections.
25-Nov-2009	From Version 23 to 24	Changed	Minor edits were made within the QuickSpec.
16-Nov-2009	From Version 22 to 23	Changed	Changes were made throughout the QuickSpec.
02-Oct-2009	From Version 21 to 22	Changed	Changes made throughout the QuickSpec except for the Models and Technical Specifications sections.
25-Sep-2009	From Version 20 to 21	Changed	Changes made to the North America and Canada versions only.
28-Aug-2009	From Version 19 to 20	Changed	Changes made to the North America and Canada versions only.
17-Jul-2009	From Version 18 to 19	Changed	Revisions were made in the HP BladeSystem c-Class Overview and Related Options sections.
12-Jun-2009	From Version 17 to 18	Added	Rack Rails to NOTE for HP BladeSystem c3000 CTO Enclosure-Rack in Step 2 of the Configuration Information - Factory Integrated Models section HP StorageWorks D2D2504i Backup System to Data Protection in the Related Options section
		Changed	Updated the Keyboards and Monitors in the Related Options section HP BLc3000 Rack Rails was removed from Other Enclosure Options in Step 2A of the Configuration Information - Factory Integrated Models section
27-Apr-2009	From Version 16 to 17	Added	HP ProLiant Onboard Administrator to the HP BladeSystem c-Class Overview section Active Cool 100 Fan throughout the QuickSpec
		Changed	NOTE for HP iLO Advanced Pack for BladeSystem or iLO Advanced and purchase information NOTE for HP Insight Control Suite (ICE) in the HP BladeSystem c-Class Overview section and a NOTE was added to HP Insight Control suite in

Summary of Changes

			the Related Options section Replaced "ProLiant" with "Insight" for HP Insight Essentials Foundation Pack in Core Infrastructure Management in the HP BladeSystem c-Class Overview section Revised Onboard Administrator for Tower Model and removed Power Supplies from Step 2 of the Configuration Information Factory Integrated Models section Revised Additional c3000 Power Supplies and HP Insight Control suite for BladeSystem Licenses and added Redundant Onboard Administrator to Step 2a of the Configuration Information Factory Integrated Models section Updates were made throughout the Models section and to the NOTES section of the Configuration Information Factory Integrated Models section Completely revised HP StorageWorks Ultrium Tape Blades, HP Insight Control suite (ICE) and Server Management Stand Alone Software Products in the HP BladeSystem c-Class Overview and Related Options sections and Data Protection in the Related Options section Revisions were made throughout Step 2 and Step 2A in the Configuration Information Factory Integrated Models section and to Service and Support Offerings in the Related Options section Removed 10642 G2 (42U) Rack Cabinet from HP Rack 10000 G2 Series, 10642 Rear Extension Kit from Rack Options for Rack 10000 G2 Series and HP Modular Cooling from the Related Options section
26-Jan-2009	From Version 15 to 16	Changed	Changes made throughout the entire QuickSpec.
17-Nov-2008	From Version 14 to 15	Changed	Changes were made to the following sections: Overview What's New At A Glance HP BladeSystem c-Class Overview HP BladeSystem Overview HP SB40c Storage Blade HP StorageWorks Tape Blades HP BladeSystem c-Class Interconnect Enclosure HP Insight Control Environment for BladeSystem Management Suite Server Management Stand Alone Software HP Enterprise Configurator Configuration Information Factory Integrated Models Step 2A: Select additional optional enclosure options Step 3: Select additional (one to four) interconnects Related Options Other c3000 enclosure options HP BladeSystem c-Class Ethernet Interconnects

CIB - ESPOL

Summary of Changes

			HP BladeSystem c-Class FC SAN Interconnects
30-Oct-2008	From Version 13 to 14	Removed	Removed model number 409513-B22 from the Related Options section.
15-Sep-2008	From Version 12 to 13	Changed	Changes were made to the following sections: Overview What's New At A Glance HP BladeSystem c-Class Overview HP BladeSystem Overview HP BladeSystem c-Class c3000 Enclosure HP Insight Control Environment for BladeSystem Management Suite Configuration Information Factory Integrated Models Step 2: Determine quantity of HP BladeSystem c-3000 Enclosures to purchase and choose Required Options Step 2A: Select additional optional enclosure options Step 3: Select additional (one to four) interconnects Step 4: Select rack power distribution for installing the enclosure into a rack. Related Options c3000 Enclosure Options HP BladeSystem c-Class c3000 Enclosure Other c3000 enclosure options HP BladeSystem c-Class FC SAN Interconnects HP Monitored Power Distribution Unit
14-Jul-2008	From Version 11 to 12	Added	Additions made to the Overview, HP BladeSystem c-Class Overview, Configuration Information and Related Options sections: HP 8/12 and 8/24 SAN Switch c-Class BladeSystem Power Cord, C20 C13, 15A, Universal Jumper, 2m HP D2D Backup Systems
		Changed	Change was made to MSA1000 in Factory Express Portfolio in the HP BladeSystem c-Class Overview section and to Data Protection in the Related Options section HP Insight Control Environment for BladeSystem Management Suite Server Management Stand Alone Software Product NOTES section for HP NC512m Dual Port 10GbE Multifunction BL-c Adapter in HP BladeSystem c-Class Ethernet Connects Headings for HP Modular Power Distribution Unit and Uninterruptible Power System in Step 4 of the Configuration Information Factory Integrated Models section Monitors and Keyboards and HP KVM Switch Options in the Related Options section
11-Apr-2008	From Version 10 to 11	Changed	Changes made to the North America and Canada QuickSpecs only.

Summary of Changes

31-Mar-2008	From Version 9 to 10	Added	Cisco Catalyst Blade Switch 3120X, Part #451439-B21 and Cisco Catalyst Blade Switch 3120G, Part #451438-B21, were added to the Configuration Information and Related Options sections and BL460c Smart Buy Server Blade, Part #461273-001, was added to the Smart Buys section.
		Changed	Changes were made in the Overview, HP BladeSystem c-Class Overview, Configuration Information and Related Options sections.
14-Mar-2008	From Version 8 to 9	Changed	Changes made to the North America and Canada QuickSpecs only.
03-Mar-2008	From Version 7 to 8	Changed	Changes made to the North America and Canada QuickSpecs only.
11-Feb-2008	From Version 6 to 7	Changed	Changes were made throughout the QuickSpec.
18-Jan-2007	From Version 5 to 6	Changed	Changes made to the North America and Canada QuickSpecs only.
14-Jan-2008	From Version 4 to 5	Added	The HP BladeSystem c3000 Enclosure - Tower Model option was added.
		Changed	Changes were made throughout the QuickSpec to reflect the addition of the tower option.
02-Nov-2007	From Version 3 to 4	Changed	Changes made to the At A Glance section.
05-Oct-2007	From Version 2 to 3	Changed	Changes made to the Service and Support Offerings section of Related Options.
01-Oct-2007	From Version 1 to 2	Changed	Changes made to the North America and Canada QuickSpecs only.

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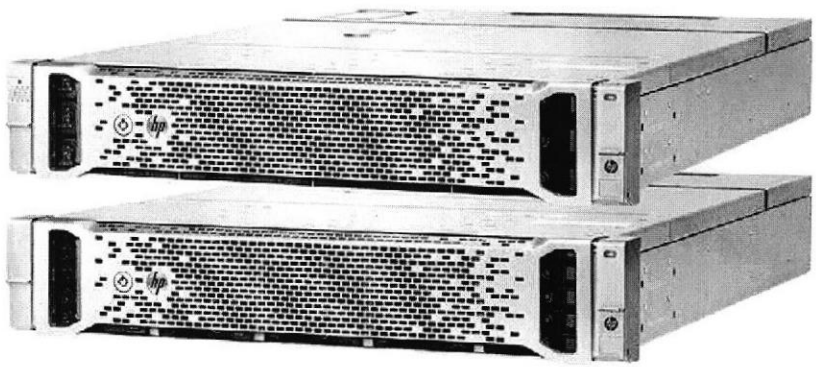
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Data sheet

HP D3000 Disk Enclosures



Manage your growing storage needs by deploying the next generation 12 Gb SAS low-cost, high-capacity external storage enclosures with up to 384 TB SATA or 240 TB SAS.

Has your business exceeded your storage capacity?

Manage your small and midrange business' growing storage needs by deploying the HP D3000 Disk Enclosures, the next generation 12 Gb SAS low-cost, high-capacity, tiered external storage system. The HP D3000 Disk Enclosures are ideal for your small application environments, remote offices, and departmental locations. The new 12 Gb SAS enclosures—large form factor (LFF) D3600 Disk Enclosure with 12 drive bays and small form factor (SFF) D3700 Disk Enclosure with 25 drive bays—offer flexible, modular solutions to simplify capacity expansion of HP ProLiant and BladeSystem server environments and MSA arrays (SFF only) to external storage without having to make the full move to SAN or NAS. This allows you to buy what is needed today and purchase additional capacity as your data storage needs grow.

HP Disk Enclosure D3000 supports HP SmartDrive carrier. Buy and maintain common set of HP ProLiant drives for Gen8 ProLiant servers. Total support can grow up to 96 LFF or 200 SFF drives.

Key features and benefits

Affordable storage for capacity demands

- HP D3000 Enclosures 12 Gb SAS enables a higher/faster data transfer rate: doubling the current transfer rate of 6 Gb solutions, adding crucial bandwidth.
- The modular platform provides investment protection by allowing you to purchase based on your current need and plan for the future without hidden management charges.
- Increase your data speed with enterprise-class dual-port SAS drives as the need and budget dictates.
- Provides a higher level of redundancy and reliability, thereby reducing single points of failure within the storage network.

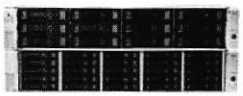
Flexible and scalable with room to grow

- The HP D3000 Enclosures give you the flexibility to mix and match SAS, SATA, and Solid State drives (SSDs) in the same enclosure, and extend the benefit of tiered storage to direct attach customers.
- Designed to give you room to grow as your storage demands increase, the D3600 LFF can grow up to 96 drives. You can also add up to eight D3600 LFF enclosures that can be connected together from a single controller port.
- With the D3700 SFF you can add up to 200 drives or up to eight SFF enclosures can be connected together from a single controller port.
- With a Gen8 Smart Array Controller you can mix D3600 and the D3700 enclosures for expansion, up to four D3600 and four D3700 (4 x LFF and 4 x SFF) allowing for expansion up to 148 drives.
- On the D3700 you can get SSD support for up to 25 drives per Smart Array Controller.

Easy to manage

- The HP D3000 Enclosures support the HP SmartDrive carrier, enabling single set of common drives for Gen8 ProLiant servers and D3000 Enclosures.
- The HP D3000 Enclosures uses familiar HP ProLiant management tools including HP Systems Insight Manager and the HP Array Configuration Utility (ACU) software.
- The HP D3000 Enclosures are compatible with selected HP Smart Array SAS Controllers and host bus adapters (HBAs).
- Little IT expertise required to manage the enclosures.

Technical specifications



HP D3000 Disk Enclosures

Drive description	96 LFF SAS/SATA or 200 SFF SAS/SATA/SSD Maximum, depending on model
Drive type (HP SmartDrives)	300 GB 6G 15K LFF Dual-port ENT SAS 450 GB 6G 15K LFF Dual-port ENT SAS 600 GB 6G 15K LFF Dual-port ENT SAS 300 GB 6G 10K SFF Dual-port ENT SAS 450 GB 6G 10K SFF Dual-port ENT SAS 600 GB 6G 10K SFF Dual-port ENT SAS 900 GB 6G 10K SFF Dual-port ENT SAS 1.2 TB 6G 10K SFF Dual-port ENT SAS 146 GB 6G 15K SFF Dual-port ENT SAS 300 GB 6G 15K SFF Dual-port ENT SAS 1 TB 6G 7.2K LFF Dual-port MDL SAS 2 TB 6G 7.2K LFF Dual-port MDL SAS 3 TB 6G 7.2K LFF Dual-port MDL SAS 4 TB 6G 7.2K LFF Dual-port MDL SAS 500 GB 6G 7.2K SFF Dual-port MDL SAS 1 TB 6G 7.2K SFF Dual-port MDL SAS 2 TB 6G 7.2K LFF MDL SATA 3 TB 6G 7.2K LFF MDL SATA 200 GB 6G Mainstream Endurance SFF SATA SSD 400 GB 6G Mainstream Endurance SFF SATA SSD 800 GB 6G Mainstream Endurance SFF SATA SSD 4 TB 6G 7.2K LFF MDL SATA 200 GB MLC SAS SSD 400 GB MLC SAS SSD 800 GB MLC SAS SSD 200 GB 12G Mainstream Endurance SFF SAS SSD 400 GB 12G Mainstream Endurance SFF SAS SSD 800 GB 12G Mainstream Endurance SFF SAS SSD 400 GB 12G High Endurance SFF ENT Perf SAS SSD 200 GB 12G High Endurance SFF ENT Perf SAS SSD

Technical specifications (Continued)

Capacity	384 TB maximum Depending on drive capacity and form factor
Storage expansion options	D3600/D3700—support up to eight enclosures cascading off single x 4 SAS port
Host interface	12 Gb/s SAS
HP BladeSystem supported	Gen8 BladeSystem
Storage controllers	HP Smart Array P421 HP Smart Array P431 HP Smart Array P822 HP Smart Array P721m HP Smart Array P731m Supported
SAN backup support	No
Storage mirroring support	No
Systems Insight Manager support	No
Compatible operating systems	Microsoft® Windows® 2003 Microsoft Windows 2008 Microsoft Windows 2012 R2 Microsoft Windows Hyper-V Red Hat® Linux SUSE Linux VMware
Form factor	2U
Warranty (parts/labor/onsite)	3/0/0

HP Services

Choose from a rich portfolio of services to make the most of HP Storage, so you can move with confidence to take full advantage of the broadest, most advanced portfolio in the industry.

Discover, plan, and design—understand your options and build it right from day one:

- HP Storage Efficiency Analysis
- HP Storage Impact Analysis
- HP Modernization Service

Deploy and integrate—increase uptime and decrease risk as you free up your resources:

- HP MSA/P2000 Family Disk Array Installation and Startup Service
- Basic hardware installation only for D6000 Modular Disk System
- HP Proactive Select (Storage Array High Availability Technical Assessment, SAN Supportability assessment, Firmware Update Implementation)
- HP Storage Data Migration
- HP Enhanced Implementation Service for SANs
- P Cluster Extension Solution Implementation Service
- HP Storage Virtual Volume Design and Implementation Service
- HP Enterprise NAS Upgrade Service

Resources

QuickSpecs

HP Factory Express provides customization and deployment services along with your storage and server purchases. You can customize hardware to your exact specifications in the factory—helping speed deployment. **hp.com/go/factoryexpress**

Gain the skills you need with ExpertOne training and certification from HP. With HP Converged Storage training, you will accelerate your technology transition, improve operational performance, and get the best return on your HP investment. Our training is available when and where you need it, through flexible delivery options and a global training capability. **hp.com/learn/storage**

Customize your IT lifecycle management, from acquisition of new IT, management of existing assets, and removal of unneeded equipment. **hp.com/go/hpfinancialservices**

Operate and support—meet service-level agreements (SLAs) with the right support level. Choose from three levels of operate and support care:

- **Optimized Care**—Delivers the highest levels of performance and stability through deployment and proactive management practices

  Support: HP Proactive Care 24x7—Plus, 20 credits for the first year

  Additional options: HP Proactive Care Personalized Support (once per Proactive Care support new environment), an additional day of HP Personalized Support, and 10 additional HP Proactive Select credits per year

- **Standard Care**—Maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support

  Support: HP Proactive Care 24x7—Plus, 10 credits for the first year

  Additional options: HP Proactive Care Personalized Support (once per each new Proactive Care support environment), HP Personalized Support Additional Day, and an additional 10 HP Proactive Select credits per year

- **Basic Care**—Minimum recommended support

  Support: HP Foundation Care 24x7

If none of our support recommendations meet your needs, we can tailor a service solution for your unique support requirements. Only HP brings together deep expertise, proactive and business critical support and a strong partner network—plus, a full set of infrastructure services designed to power a Converged Infrastructure.

For more information, visit hp.com/services/storage.

Learn more at
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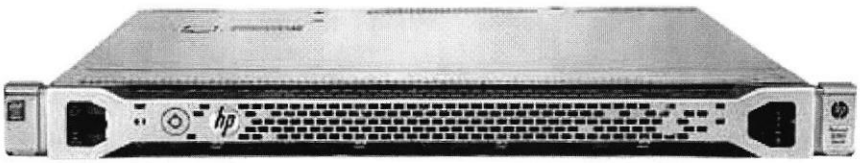
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4AA5-1216ENW, March 2014

Hoja de datos

Servidor HP ProLiant DL360 Gen9

Rendimiento de alta densidad para computación de cargas de trabajo múltiples en el centro de datos



- **Poder de computación de alto rendimiento, denso y flexible:** hasta 24 ranuras DIMM HP DDR4 HP SmartMemory, con inteligencia integrada para mejorar el rendimiento, reducir el tiempo de inactividad y los costos de energía, mejorando el rendimiento hasta en un 14 %.[2]
- **Eficacia energética líder del sector para reducir el consumo:** soporta los estándares mejorados de temperatura ambiente ASHRAE A3 y A4, ayudándole a reducir los gastos de refrigeración.
- **Gestión ágil de la infraestructura para acelerar la prestación de servicios de TI:** convergiendo gestión para simplicidad de automatización en servidores, almacenamiento y redes con HP OneView.[3]

Arquitectura y diseño de sistemas optimizados de forma única

Concebido para un rendimiento denso
Mundialmente conocido por apoyar necesidades de computación genéricas de alta densidad, el servidor HP ProLiant DL360 no ha hecho otra cosa que mejorar. La versión Gen9 de esta plataforma de servidor líder del sector[1] ofrece rendimiento superior con la mejor memoria y capacidad de ampliación de E/S, todo ello en un diseño denso de bastidor 1U de 2 zócalos.

Continuando con su legado de fiabilidad, facilidad de servicio y disponibilidad permanente, el servidor ProLiant DL360 Gen9 es la opción ideal para:

- **Cargas de trabajo de servidor con limitaciones espaciales:** como las empleadas por las PYMES y los proveedores de servicios
- **Cargas de trabajo dinámicas:** como la computación de alto rendimiento, las bases de datos y las nubes privadas y públicas virtualizadas; todas estas cargas de trabajo requieren un equilibrio de primera entre rendimiento, eficacia energética y densidad
- **Aplicaciones intensivas en cuanto a computación:** como Big Data, análisis, descubrimiento sísmico y mucho más
- **Aplicaciones transaccionales y de baja latencia:** como las empleadas en el sector de los servicios financieros

Mayor rendimiento, compatibilidad ampliada

Diseñado con el rendimiento como prioridad, el servidor HP ProLiant DL360 Gen9 aprovecha los últimos procesadores Intel® Xeon® E5-2600 v3 para ofrecer hasta un 70 % más de rendimiento.[4]

Puede gestionar su servidor HP ProLiant DL360 Gen9 en cualquier entorno de TI automatizando las tareas de gestión del ciclo de vida de los servidores más esenciales: implementar, actualizar, supervisar y mantener. Y para admitir un entorno de TI heterogéneo, el servidor DL360 Gen9 es compatible con los sistemas operativos Microsoft® Windows® y Linux®, además de entornos de virtualización VMware® y Citrix®.

[1] WW Quarterly Server Tracker de IDC, mayo de 2014.
[2] Basado en capacidad DIMM similar, comparando un servidor HP frente a un servidor de otros fabricantes con DDR4, julio de 2014.
[3] Está previsto ofrecer compatibilidad de HP OneView con ProLiant Gen9 en servidores DL y BL a finales de 2014.
[4] Pruebas de rendimiento de Intel, comparando mediciones en plataforma con dos E5-2697 v2 (12C, 2.7 GHz), 8x8 GB DDR3-1866, RHEL 6.3 frente a plataforma con E5-2697 v3 (14C, 2.6 GHz, 145 W), 8x8 GB DDR4-2133, RHEL 6.3, abril de 2014.

Especificaciones técnicas

En la tabla siguiente, el texto ***en cursiva y negrita*** designa una característica nueva o mejorada, en comparación con el servidor HP ProLiant DL360p Gen8.

	Servidor HP ProLiant DL360 Gen9
Computación	Hasta 2 procesadores de la serie Intel® Xeon® ***E5-2600 v3***, 4/6/8/10/12/***14***/***16***/***18*** núcleos, PCIe 3.0, hasta 3 ranuras disponibles
Memoria	HP SmartMemory (24) ***DDR4***, hasta 2.133 MHz (768 GB máx.)
Almacenamiento	HP Dynamic Smart Array ***B140i*** estándar ***Elección entre controladores HP Flexible Smart Array o de adaptador de bus de host inteligentes para acceder a rendimiento o prestaciones adicionales***
Caché de escritura con respaldo flash (FBWC)	DDR3-1 de 2 GB a 866 MHz, bus de 72 bits a ***14,9 GB/s sobre P440ar***
Batería	***Batería de almacenamiento inteligente HP DL/ML/SL 96 W***
HP SmartDrives	8 + ***2 SFF***/4 LFF máx., HDD/SSD
Conectividad de red	***4 x integrada de 1 GbE*** + ranura FlexibleLOM
VGA/serie/puertos USB	***Opc. VGA frontal, VGA trasero estándar y serie opcional***, 5 USB 3.0
Compatibilidad con GPU	***Dos de ancho único y activos con 9,5" de largo, hasta 150 W cada uno***
Gestión On Premise (local)	***HP OneView*** y ***HP iLO Advanced***
Gestión On Cloud (en la nube)	HP Insight Online con ***aplicación móvil mejorada***
Gestión On System (en sistema)	***Cambios en HP iLO, HP SUM, Intelligent Provisioning y herramientas de secuencia de comandos; más la nueva herramienta UEFI y para interfaz HP RESTful***
Alimentación y refrigeración	Eficacia del 94 % (Platinum Plus) con ***HP Flexible Slot FF***; ventiladores de conexión en caliente con redundancia N+1 total, ventiladores de alto rendimiento opcionales
Conformidad empresarial	***ASHRAE A3 y A4, menor potencia en desuso***
Servicios de descubrimiento de energía	Compatible
Servicios de descubrimiento de ubicación	***Opcional***
Fondo de chasis/factor de forma	Bastidor (1U), 27,5" (SFF), 29,5" (LFF)
Facilidad de servicio: rieles de fácil instalación	***Estándar***
Garantía	3/03/03

Vea el resumen de las especificaciones en:
hp.com/servers/DL360gen9/qs

hp.com/qref/dl360gen9

Servicios de HP

Deje que HP le guíe hacia el nuevo estilo de TI. HP Technology Services entrega confianza, reduce riesgos y le ayuda a obtener mayor agilidad y estabilidad.

- Nuestros servicios de **asesoramiento** proporcionan consejos y guía para trasladar sus cargas de trabajo a nuevas tecnologías de forma segura.
- Nuestros servicios de implementación e instalación permiten una puesta a punto más rápida y fiable de sus nuevos servidores HP ProLiant Gen9 y nuestra cartera de soporte le permite conectarse y reiniciar su actividad empresarial en muy poco tiempo.
- Le recomendamos **HP Proactive Care** para servidores ProLiant Gen9 a fin de evitar problemas o acelerar su resolución.
- **HP Foundation Care** le permite elegir entre varios niveles de cobertura y tiempos de respuesta para el soporte de hardware y software.
- **HP Datacenter Care** le permite manejar y hacer evolucionar su entorno de TI con menos costos y mayor agilidad, incluyendo nuestro servicio **Flexible Capacity** para adquirir TI sin afectar su presupuesto.
- Nuestra tecnología de soporte le permite acceder a un fondo de conocimientos de millones de dispositivos y miles de expertos, para mantenerse informado y en control, desde cualquier lugar y en cualquier momento.

Más información en
hp.com/servers/DL360gen9

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Comparta con colegas

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4AA5-4085SPL, septiembre de 2014

Data sheet

HP ProLiant BL460c Gen9 Server Blade

The world's leading server blade with advanced compute performance



HP ProLiant BL460c Gen9 Server Blade brings you:

- The right compute
- The right workload
- The right economics every time

Enterprise-class compute for your converged data center

Designed for a wide range of configuration and deployment options, the HP ProLiant BL460c Gen9 Server Blade provides the flexibility to enhance your core IT applications with right-sized storage for the right workload—resulting in lower total cost of ownership (TCO). This performance workhorse adapts to any demanding blades environment, including virtualization, IT and Web infrastructure, collaborative systems, cloud, and high-performance computing. HP OneView, the converged management platform, accelerates IT service delivery through a software-defined approach to manage it all.

More performance
The HP ProLiant BL460c Gen9 Server Blade delivers up to a 70 percent performance increase with the new Intel® Xeon® E5-2600 v3 processors[1] and the enhanced HP DDR4 SmartMemory at speeds up to 2,133 MHz.

More flexibility
New flexible internal storage controller options strike the right balance between performance and price, helping to lower overall TCO.

More storage options
With the BL460c Gen9 Server Blade, you have standard internal USB 3.0, as well as future support for redundant microSD and optional M.2 support for a variety of system boot alternatives.

The Power of One
HP BladeSystem with HP OneView delivers the Power of One—one infrastructure, one management platform. Only the Power of One provides leading infrastructure convergence, the security of federation, and agility through data center automation to transform business economics by accelerating service delivery up to 66X faster while reducing data center costs up to 68 percent.[2] As a single software-defined platform, HP OneView transforms how you manage your infrastructure across servers, storage, and networking in both physical and virtual environments. HP's unique automation simplicity shifts the focus from "how devices run" to "how people work," streamlining your IT operations and improving business agility.

[1] Intel® Performance Benchmark Library
[2] IDC white paper, "Business Value of Blade Infrastructures"



Key features and benefits

Accelerate IT service delivery with agile infrastructure management
By providing a comprehensive set of management offerings, HP can meet your management needs at every stage of the server lifecycle with three types of solutions:

- On-premise management
- On-system management
- On-cloud management

On-premise—HP OneView, our single, software-defined management platform, accelerates IT service delivery through automated configuration and lifecycle management and faster virtual machine provisioning, and it helps accelerate the transition to Infrastructure-as-a-Service (IaaS) and hybrid cloud.

On-system—On-system management provides embedded tools and scripting tools on all HP servers that increase server administrator productivity and simplify the server management experience. On-system management portfolio includes Unified Extensible Firmware Interface (UEFI), HP Intelligent Provisioning, HP iLO, HP Smart Update Manager (HP SUM), Service Pack for ProLiant (SPP), Scripting Tools (Scripting Toolkit for Linux® and Microsoft® Windows®, HP Scripting Tool for Windows PowerShell, and the HP RESTful Interface Tool).

On-cloud—HP Insight Online is a cloud-based infrastructure management and support portal providing fast problem resolution and easy access to the information you need to support your IT environment. You can use the Insight Online dashboard to track device health, service events and support cases, view device configurations, create custom reports, and proactively monitor HP contracts and warranties. You can also use the HP Insight Online dashboard in the HP Support Center Mobile App to stay up to date while on the go.

Increase performance

- The BL460c Gen9 Server Blade offers a performance boost with up to two Intel Xeon E5-2600 v3 Series processers per server blade—up to 18 cores.
- The enhanced HP SmartMemory with DDR4 runs at speeds up to 2,133 MHz while operating at two dual inline memory modules (DIMMs) per channel.

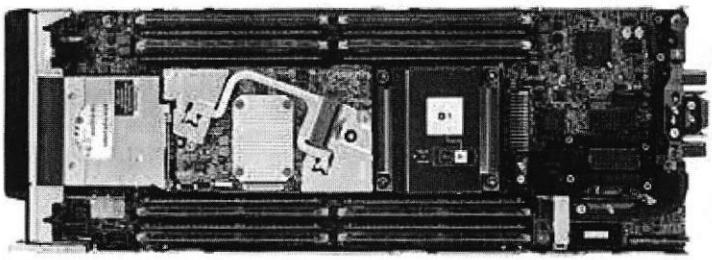
Boost business performance with new storage, application, and I/O enhancements

- The BL460c Gen9 Server Blade includes an HP Dynamic Smart Array B140i as a standard feature—plus your choice of an HP Smart Host Bus Adapter (HBA) H244br or HP Smart Array P244br/1 GB FBWC for performance or additional features. Both offer support for 12 GB SAS speeds for the two internal drives.
- HP DDR4 SmartMemory technology is available only on ProLiant Gen9 servers, offering unmatched quality, performance, and manageability, when compared to industry-standard memory.
- Enhanced memory performance, along with the benefit of reduced power—16 DIMM slots with 2,133 MHz DDR4 and eight slots per processor socket.
- Two x 16 PCIe 3.0 I/O expansion slots can support the highest performing mezzanine option cards now, as well as in the future.
- The FlexibleLOM lets you update technology based on networking demands, helping you customize server networking and scale up to future demands without the need to overhaul existing server hardware. It offers a choice of bandwidth and fabric (Ethernet, FCoE, and InfiniBand), supports wake-on-LAN functionality, and provides a shared HP iLO port for ease of use.

The optional HP Virtual Connect FlexFabric-20/40 F8 Module accelerates server virtualization and delivers converged data center services at the speed of business through the industry's first 20 GB server-to-network converged solution.

- The BL460c Gen9 offers support for 16 GB Fibre Channel HBA.

Technical specifications



Compute	Up to two Intel Xeon E5-2600 v3 Series, 4/6/8/10/12/14 /16 /18 cores
Support drives	Two hot-plug drive bays SATA/SAS/SSD
Storage	Standard HP Dynamic Smart Array B140i with choice of HP Smart HBA H244br or HP Smart Array P244br for performance or additional features
Storage FBWC	1 GB DDR3-1,866 MHz, 72-bit wide bus at 14.9 GB/s on P244br
Storage battery	HP BLc 12 W Smart Storage Battery (Note: Comes standard with any SKU using the HP Smart Array P244br)
Networking	Choice of 2 x 10GbE, FlexFabric 10 GB, FlexFabric 10/20 GB
USB ports/SD/other	1 x USB 3.0 (internal), 1 x microSD, future optional Dual microSD/future optional M.2 support
On-premise management	HP OneView and HP iLO Advanced for BladeSystem (Note: HP OneView support for ProLiant Gen9 in DL and BL servers only. Expected availability December 2014)
On-cloud management	HP Insight Online with enhanced mobile app
On-system management	HP iLO, SPP, HP SUM, Scripting Tools (Scripting Toolkit for Linux and Windows, HP Scripting Tools for Windows PowerShell, and HP RESTful Interface Tool)
Power and cooling	Enclosure-based (94 percent Platinum Plus)
Power and cooling industry compliance	ASHRAE A3 (limited configurations)
Power and cooling discovery services	Enclosure-based
Power and cooling location discovery services	Enclosure-based
System ROM	UEFI or Legacy
Warranty	Three-year parts, three-year labor, three-year onsite

Customize your IT lifecycle management, from acquisition of new IT, management of existing assets, and removal of unneeded equipment.
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HP Factory Express

HP Factory Express provides customization and deployment services along with your storage and server purchases. You can customize hardware to your exact specifications in the factory—helping to speed deployment. hp.com/go/factoryexpress

Customer technical training

Gain the skills you need with ExpertOne training and certification from HP. With HP ProLiant training, you can accelerate your technology transition, improve operational performance, and get the best return on your HP investment. Our training is available when and where you need it through flexible delivery options and a global training capability. hp.com/learn/proliant

HP Services

Let HP help guide you to the New Style of IT. HP Technology Services deliver confidence, reduce risk, and help you realize agility and stability. Our **Consulting** services provide advice and guidance to safely move your workloads to newer technologies. Our implementation and installation services enable faster, reliable startup of your new HP ProLiant Gen9 servers, and our support portfolio allows you to get connected and get back to business. We recommend HP **Proactive Care** for ProLiant servers to prevent issues and resolve problems faster. HP **Foundation Care** provides a choice of coverage levels and response times for hardware and software support. HP **Datacenter Care** enables you to operate and evolve your IT environment with less cost and more agility. This includes our **Flexible Capacity** service to acquire IT without impacting capital budget. Our support technology lets you tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, from any location, at any time. hp.com/services/proliant

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4AA5-4287ENW, September 2014

IP KVM SWITCH
WITH CAT 5/6 PORTS

KEY FEATURES

- Rack-mount IP KVM (keyboard, video, mouse) Switch
- For 19"EIA cabinets, uses only 1U of rack-mount space
- Access 16 or 32 computers through one set of peripherals, a remote console or an IP network
- Multi-platform switch, supports VGA video connection and PS/2 or USB keyboard and mouse connections
- Uses Cat 5/6 UTP cables to make server and remote console connections allowing greater distances between the switch and equipment
- Easy switching between computers with buttons, hotkeys or on-screen display
- Password protected IP access, 15 user accounts, assign administrator or user roles, select models support two simultaneous users
- LEDs indicate computer connections
- Expand by connecting up to eight switches together to access 128 or 256 computers from a single set of peripherals, a remote console or the IP connection
- Also available with an integrated 17" LCD KVM Drawer
- Drawer available in single or dual rail models with US or UK keyboard layouts

APPLICATIONS

- Provides multiuser access to 16 or 32 computers from a single set of rack-mount peripherals, a remote console or an Internet connection with expansion support for up to 256 computers using additional Analog KVM Switches with Cat 5/6 ports

USE WITH

- CPI Cabinet Systems
- CPI 4-Post Rack Systems
- Analog KVM Switches with Cat 5/6 ports

RELATED ACCESSORIES

- Power Distribution Units (PDUs)
- Electronic Locking System (ELS)
- Remote Infrastructure Management (RIM-600) System



17" LCD KVM Drawer and IP Switch with Cat 5/6 Ports

Rack-mount, single laptop style drawer with integrated multi-platform switch. Available in dual rail style.

IP KVM Switch with Cat 5/6 Ports

Available with 16 or 32 Ports.



The IP KVM Switch with Cat 5/6 computer ports provides multiuser access to 16 or 32 computers from local console, a remote console or over the Ethernet using a Java-enabled web browser. The IP KVM Switch is an excellent solution for IT staff that require both local and remote access to equipment. It features a 16-port or 32-port IP switch that can be expanded with up to seven additional switches to connect up to 256 computers through the local and remote console and a single IP address.

The IP KVM Switch with Cat 5/6 ports features multiple user interfaces: the local console, a remote console to connect to another computer located on site, and one or two IP connections accessed through the network using a Java-enabled web browser. Users easily transfer between computers with an intuitive on-screen menu or hotkeys. Expansion switches are also available without IP connections.

The local and remote consoles support eight password protected user accounts for added security. Individual user access can be assigned by port and each port can be named with the computer name, simplifying equipment identification. Additionally, LEDs which indicate port connection status and buttons that allow manual switching between computers are on the front panel or the keyboard tray. Similarly, each IP connection supports one active user and fifteen password protected user accounts with user or administrator roles and keeps an event log for added security.

The 17" LCD KVM Drawer and IP Switch includes a 17" TFT LCD color display, a full size keyboard with number pad and an integrated touchpad. Both US and UK keyboard layouts are available. The display supports a wide range of resolutions to match most PC, MAC, SUN, IBM, HP and Dell computers. A wide viewing angle and good contrast create a crisp, clear image.

Two drawer styles are available: single and dual rail. The single rail model features a laptop-style design where the keyboard and panel are hinged and the LCD panel pivots open. On the dual rail model, the keyboard tray and panel are separate, which allows the LCD panel to be left in the open position when the keyboard tray is closed.

The IP KVM Switch with Cat 5/6 computer ports uses Cat 5/6 UTP cables to connect to servers instead of proprietary signal cables, which means higher port density on the switch and that servers can be located farther away from the switch. A dongle, ordered separately, is used on the computer end to make the keyboard, video and mouse connections.

See reverse for product selection. Contact CPI Technical Support for configuration assistance. The Technical Support Team assists customers and partners to solve IT infrastructure problems in a timely and accurate manner by understanding their requirements and creating practical and suitable CPI Solutions.

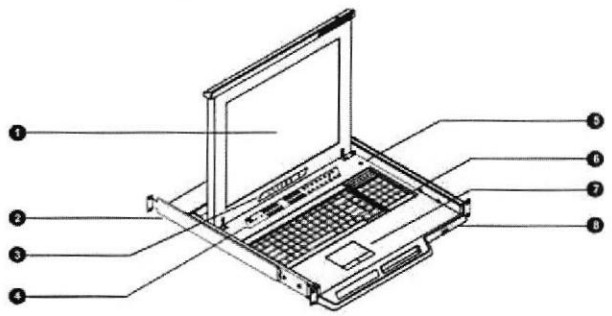
SPECIFICATIONS

- Rack-mount 16-port or 32-port IP KVM (keyboard, video, mouse) Switch with Cat 5/6 ports
- For indoor use only, in environmentally controlled areas; may not be used outdoors, in harsh environments or in air-handling spaces
- Dimensions:
  - Switch: 1U x 19"EIA, 1.73"H x 17.6"W x 7.1"D (44 mm x 446 mm x 180 mm)
  - Single Rail Drawer: 1U x 19"EIA, 1.73"H x 17.4"W x 22.8"D (44 mm x 442 mm x 580 mm)
  - Dual Rail Drawer: 1U x 19"EIA, 1.73"H x 17.4"W x 25.6"D (44 mm x 442 mm x 650 mm)
- KVM Ports:
  - (16) or (32) RJ45 (8P8C) connectors
  - Use Cat6 or Cat5 cable for server connections, up to 132 ft (40 m)
  - Requires VGA-USB dongle (P/N 37208-103) or VGA-PS/2 dongle (P/N 37208-104) to connect computers, ordered separately
- KVM Management:
  - Multilingual OSD: English, French, German, Spanish, Italian, Russian, Simplified Chinese, Japanese
  - Security: Password enable and disable, up to 8 user profiles for port access
  - PC Selection: Front button, OSD menu, hotkey
- IP Console:
  - (1) or (2) RJ45 Ethernet
  - (1) or (2) RJ45 serial
  - (1) or (2) USB
- IP Security:
  - SSL v3, RSA, AES, CSR, http & https internet access
  - Fifteen user profiles (one active user) per IP Console
- Remote Console:
  - (1) RJ45
  - Use Cat6 or Cat5 UTP cable for server connection, up to 500 ft (150 m)
  - Includes remote receiver, Combo KVM Cable for remote computer, and power supply
- KVM Expansion:
  - 16-port models: up to 128 servers by eight level cascade
  - 32-port models: up to 256 servers by eight level cascade
  - Requires Cascade Cable (P/N 37208-165), ordered separately
- KVM Compatibility:
  - Multi-platform: PC, MAC, SUN, IBM, HP and Dell
  - Support: MS Windows 7/2008/2003/2000/XP/ME/98, DOS, Linux, Mac
- KVM Drawer
  - 17" LCD monitor with TFT color display
  - US or UK keyboard layout
  - Integrated touch pad
  - KVM port status LEDs and buttons
- Display specifications:
  - Brightness (cd/m²): 250
  - Color Support: 16.7 M
  - Contrast Ratio (typ.): 1000:1
  - Viewing Angle (H/V): 160° x 160°
  - Display Area (mm): 338 x 270
  - Dot pitch (mm): 0.264
  - Tr Response Tim (ms): 5
  - LCD Panel MTBF (hrs): 50,000
  - VGA Signal Input: Analog RGB, 0.7Vp-p
  - Sync. Type: Separate H/V, Composite, SOG
- Supports Screen Resolutions:
  - 720 x 400, 70 Hz
  - 640 x 480, 60/70/72/75 Hz
  - 800 x 600, 60/70/72/75 Hz
  - 1024 x 768, 60/70/75 Hz
  - 1152 x 864, 60/70/75 Hz
  - 1280 x 1024, 60/70/72/75 Hz
- Electrical:
  - Power Input: Auto-sensing 100 to 240 VAC, 50/60 Hz
  - Power Consumption: Max. 24 Watt, Standby 5 Watt
  - Power Inlet: (1) IEC60320 C-14
- Environmental:
  - Operation: 32-122°F (0-50°C)
  - Storage: 23-140°F (-5-60°C)
  - Operating Relative Humidity: 20%-90%, non-condensing
  - Storage Relative Humidity: 90%, non-condensing
  - Shock: 50G acceleration (11 ms, half-sine wave)
  - Vibration: 58-100Hz / 0.98G (11 ms / cycle)
- Regulation Approval:
  - FCC, CE
- Includes Rack/Cabinet Mounting Brackets:
  - Switch: Requires front only support
  - Single Rail Drawer: maximum front/rear rail depth is 34.5" (876 mm); minimum front/rear rail depth 23.5" (597 mm).
  - Dual Rail Drawer: maximum front/rear rail depth is 35.5" (900 mm); minimum front/rear rail depth 21.5" (546 mm).
- Included Cables:
  - (1) 6'L (1.8 m) IEC60320 C-13 to NEMA 5-15P power cord
- Finish: Black only

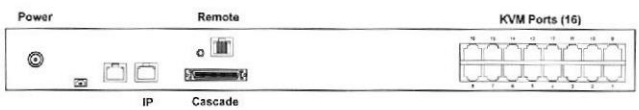
SYSTEM DIAGRAM

17" LCD KVM Drawer and IP Switch, 16-Port and 32-Port

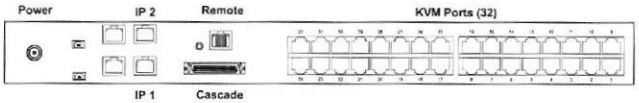
16 Port P/Ns: 37205-361, 37205-362, 37206-361, 37206-362
32 Port P/Ns: 37205-421, 37205-422, 37206-421, 37206-422



1. 17" LCD TFT Display
2. Rack-Mount Rails
3. LCD Adjustment Buttons
4. KVM Switch Buttons
   (only on models with KVM Switch)
5. Micro switch for screen auto power off
6. Keyboard and number pad
7. Touchpad
8. Blue LED, Power On Indicator



Back view – CPI P/N 37205-361, 37205-362, 37206-361, 37206-362 – no local console (drawer is local console), 1 remote console, 1 IP console, 16 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N 37208-165)



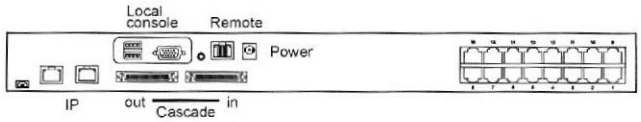
Back view – CPI P/N 37205-421, 37205-422, 37206-421, 37206-422 – no local console (drawer is local console), 1 remote console, 2 IP consoles, 32 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N 37208-165)

SYSTEM DIAGRAM

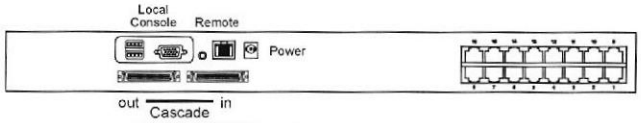
IP KVM Switch, 16-Port



Front view – 37207-360, 37210-260 – LED indicators for connection, local and remote active ports and buttons to manually switch ports

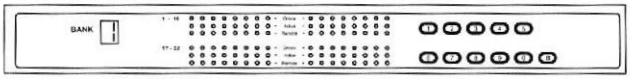


Back view – CPI P/N 37207-360 – 1 local console, 1 remote console, 1 IP console, 16 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N 37208-165)

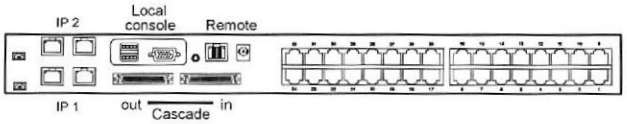


Back view – CPI P/N 37210-260 (Expansion switch) – 1 local console, 1 remote console, No IP console, 16 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N (37208-165).

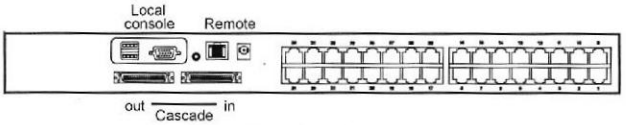
IP KVM Switch, 32-Port



Front view – CPI P/N 37207-420, 37210-220 – LED indicators for connection, local and remote active ports and buttons to manually switch ports



Back view – CPI P/N 37207-420 – 1 local console, 1 remote console, 2 IP consoles, 32 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N 37208-165)

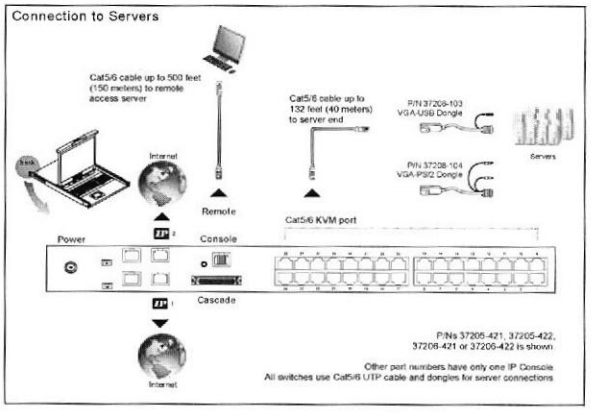


Back view – CPI P/N 37210-220 (Expansion switch) – 1 local console, 1 remote console, no IP console, 32 RJ45 (8P8C) server connections, 1 cascade connection (use Cascade Cable P/N 37208-165).

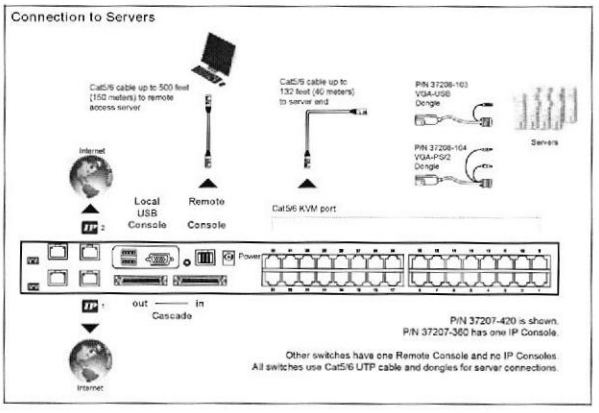
CABLE DIAGRAM

Each server connects with a Cat 5/6 UTP cable. Order one IP KVM Cable Dongle (P/N 37208-103 or 37208-104) per server.
If the switch has a remote console, it includes the receiver (extender) for attaching the remote computer.

17" LCD KVM Drawer and IP Switch

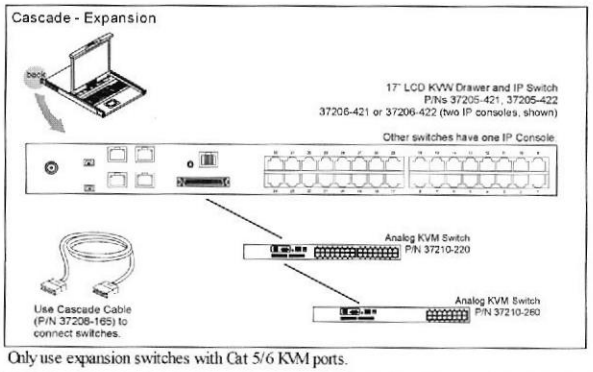


IP KVM Switch



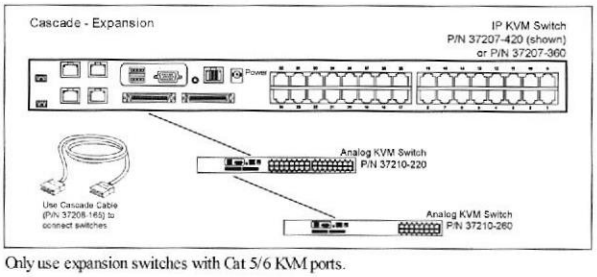
Expansion - Cascade up to seven additional Analog KVM Switches with Cat 5/6 ports (P/N 37210-260 or 37210-220) to connect up to 256 servers through a single set of peripherals, a remote console or the IP connection. Order one Cascade Cable (P/N 37208-165) to connect each switch.

17" LCD KVM Drawer and IP Switch



Only use expansion switches with Cat 5/6 KVM ports.

IP KVM Switch



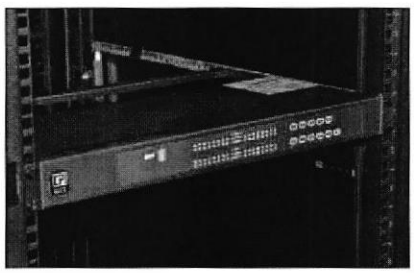
Only use expansion switches with Cat 5/6 KVM ports.

ORDERING INFORMATION

17" LCD KVM Drawer and IP Switch with Cat 5/6 Ports			
Part Number		Description	Shipping Weight lb (kg)
US Keyboard	UK Keyboard		
37205-361	37205-362	Single Rail LCD KVM Drawer and IP KVM Switch, 16 Cat 5/6 ports, 1 Remote, 1 IP Console	42 (19.0)
37205-421	37205-422	Single Rail LCD KVM Drawer and IP KVM Switch, 32 Cat 5/6 ports, 1 Remote, 2 IP Console	42 (19.0)
37206-361	37206-362	Dual Rail LCD KVM Drawer and IP KVM Switch, 16 Cat 5/6 ports, 1 Remote, 1 IP Console	50 (22.7)
37206-421	37206-422	Dual Rail LCD KVM Drawer and IP KVM Switch, 32 Cat 5/6 ports, 1 Remote, 2 IP Console	53 (24.1)
IP KVM Switch with Cat 5/6 Ports			
37207-360		IP KVM Switch, 16 Cat 5/6 ports, 1 Local, 1 Remote, 1 IP Console	9 (4.1)
37207-420		IP KVM Switch, 32 Cat 5/6 ports, 1 Local, 1 Remote, 2 IP Consoles	12 (5.5)
Expansion Switch			
37210-260		Analog KVM Switch, 16 Cat 5/6 ports, 1 Local, 1 Remote, no IP Console	8 (3.6)
37210-220		Analog KVM Switch, 32 Cat 5/6 ports, 1 Local, 1 Remote, no IP Console	12 (5.5)

Note: The US and UK keyboards have the same keys, but the location of some symbol keys (@, ", ~, \, |, #) are different. Additionally, the UK keyboard includes a key for the Pound symbol (£).





ACCESSORIES

IP KVM Cable Dongles

Use IP KVM Cable Dongles to connect computers to the IP KVM Switch Cat 5/6 ports with Cat 5/6 cables (ordered separately). The dongle has an RJ45 (8P8C) connector for the Cat 5/6 cable from the switch on one end and computer video, keyboard and mouse connectors on the other end. Select the dongle to match keyboard and video connection: USB or PS/2.

Part Number	Description	Shipping Weight lb (kg)
37208-103	Cable Dongle, VGA-USB	3 (1.4)
37208-803	Cable Dongle, VGA-USB, Pack of 8	4 (1.8)
37208-603	Cable Dongle, VGA-USB, Pack of 16	7 (3.2)
37208-104	Cable Dongle, VGA-PS/2	3 (1.4)
37208-804	Cable Dongle, VGA-PS/2, Pack of 8	4 (1.8)
37208-604	Cable Dongle, VGA-PS/2, Pack of 16	7 (3.2)



Use the VGA-USB dongle (P/N 37208-103) with server computers that have a VGA video and USB mouse and keyboard connectors. The VGA-USB dongle is also available in a pack of eight (P/N 37208-803) or a pack of 16 (P/N 37208-603).

Use the VGA-PS2 dongle (P/N 37208-104) with server computers that have a VGA video and PS/2 keyboard and mouse connectors. The VGA-PS2 dongle is also available in a pack of eight (P/N 37208-804) or a pack of 16 (P/N 37208-604).

Cascade Cable

Use the Cascade Cable to connect two switches together for expansion. Computers connected to both switches will be viewed through one set of peripherals, the remote console or the IP connection on the first switch.

Part Number	Description	Shipping Weight lb (kg)
37208-165	Cascade Cable, 6'L (1.8 m)	3 (1.4)



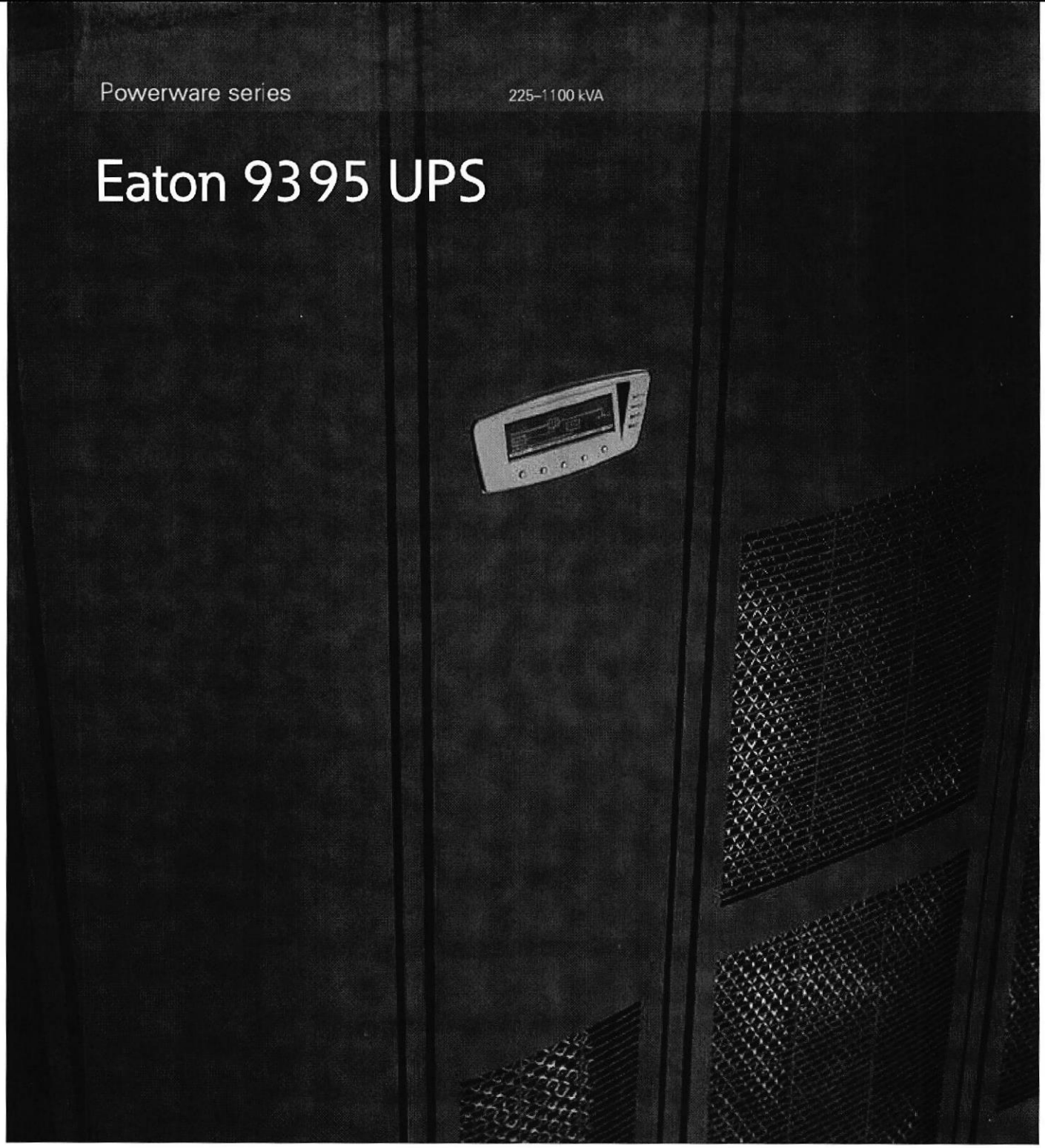
Cascade up to seven additional switches to connect up to 128 or 256 servers through a single set of peripherals, remote terminal and IP address. The IP connections, remote consoles and local consoles on cascaded switches are not used.

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Powerware series

225–1100 kVA

Eaton 9395 UPS



EATON

Powering Business Worldwide

Introduction and overview

With an unprecedented level of power performance, reliability and energy savings, the state-of-the-art Eaton® 9395 UPS has raised the bar in three-phase power protection technology. As IT managers, facility managers and CIOs feel increasing pressure to achieve zero downtime, and to scale the data center to meet ever-changing requirements, the search for the most reliable and efficient power protection system has become even more critical. But that search is now over. For more than 40 years, Eaton has been dedicated to delivering the most technologically advanced products for our customers' mission-critical applications—a commitment exemplified by the new 9395. More than an innovative, cutting-edge UPS, it's a quantum leap in three-phase technology.

The 9395 delivers a wide scope of superior customer-driven benefits unmatched by competitive UPS solutions, including:

Leading sustainability

- Highest efficiency ratings lower utility costs
- Lowest total cost of ownership and lifecycle carbon footprint
- Smallest footprint and weight
- Lowest transportation and installation costs

Stronger power performance

- Lowest input THD enhances compatibility with upstream power systems
- Lowest output THD
- Optimum generator sizing
- PFC power supply compatible

Highest reliability and availability

- Powerware Hot Sync® wireless paralleling
- Superior battery management
- Inherent redundancy
- Scalable architecture adapts to increasing power requirements

Robust manageability

- Superior control and connectivity

Key applications

- Large data centers
- Server farms
- Telecommunication installations
- Internet service providers
- Transportation systems
- Security operations
- Broadcasting and entertainment
- Process control equipment
- Financial systems
- Credit card operations
- Healthcare
- Industrial systems
- Multiple medical imaging units

The reliable solution

When it comes to reliability, the 9395 leaves competitive UPSs in the dust. Providing high availability for your critical systems at all times, the 9395 was designed with numerous technological advancements that create an unprecedented level of reliability while emphasizing serviceability–lowering MTTR and enhancing availability.

Double-conversion design offers the highest protection possible

Unlike some other commercially available UPS technologies, the double-conversion design completely isolates output power from all input power anomalies and delivers 100-percent conditioned, perfect sine-wave output—regulating both voltage and frequency. Even when presented with the most severe power disturbances, power output remains stable. Output voltage THD is held within two percent of nominal specification for linear loads, and within five percent for nonlinear loads—making the 9395 ideal for supporting equipment that is sensitive to a distorted voltage input. Additionally, the 9395 excels at supporting leading power factor loads, which are becoming more prevalent in new or updated data centers. The 9395 handles leading loads, down to 0.9 power factor without derating.

Inherent redundancy option

Surveys focused on efficiency in data centers reveal that UPSs are often under-loaded–frequently at less than 50 percent. To capitalize on this trend and create even greater reliability, you have the option to configure the 9395 with inherent redundancy. Traditional UPS manufacturers cannot deliver this additional availability without adding a more costly second UPS module.

Inherent redundancy option: When at or below 50% capacity, the 9395's uninterruptible power modules (UPMs) automatically act as N+1 redundant systems



Eaton 9395 550 kVA

Powerware Hot Sync technology: The culmination of power reliability and systems availability

In systems with multiple uninterruptible power modules (UPMs), the 9395 leverages the synchronization, load sharing and selective trip capabilities of Eaton's patented Powerware Hot Sync® technology. These capabilities are integral to the ultimate systems availability that is the primary requirement for any parallel UPS configuration.

How does Eaton do it better?

Powerware Hot Sync utilizes a peer to peer control architecture, as opposed to the ubiquitous master/slave controls found in competitive systems. This unique architecture eliminates the need for a single UPM to depend on any outside source for its control. The multiple UPMs simply monitor their own internal metering, and use simple mathematical computations to remain synchronized, share the load equally, and detect and isolate malfunctions. This wireless architecture, eliminates huge bundles of control wiring, hundreds of electrical connections, and removes the need for a failure-prone central control.

Ultimate reliability in the implementation of parallel AC power systems has been proven over the past four decades to be a function of the following two key attributes: System autonomy and simple instrumentation.

The Hot Sync system functions automatically without any dependence on centralized, external control.

Furthermore, because Powerware Hot Sync systems do not require extra circuitry or added complex wiring in order to function in parallel, these designs significantly enhance reliability over other parallel systems that utilize elaborate sync control loop wiring, load share error loop wiring, selective trip detection loops, mechanical relays, multiple specialized PC boards, extra EMI isolation and specialized firmware. The failure of any of these complex controls results in an unstable system. Hot Sync eliminates this complexity, enhancing reliability.

Key design features of Hot Sync systems

- No system-level single point of failure
- Paralleled UPMs operate completely independently. One module cannot affect or interfere with the others – no domino effect scenario
- No added circuitry is required for parallel operation. Any standard UPS can be used in a parallel system without modification
- This patented and proven technology, has been successfully deployed in thousands of systems around the world.

Sync Control technology

Sync Control ensures that the output of two (or more) separate UPSs (single modules or parallel systems) remain in phase with one another so static transfer switches connected between the separate distribution paths may change state seamlessly when necessary.

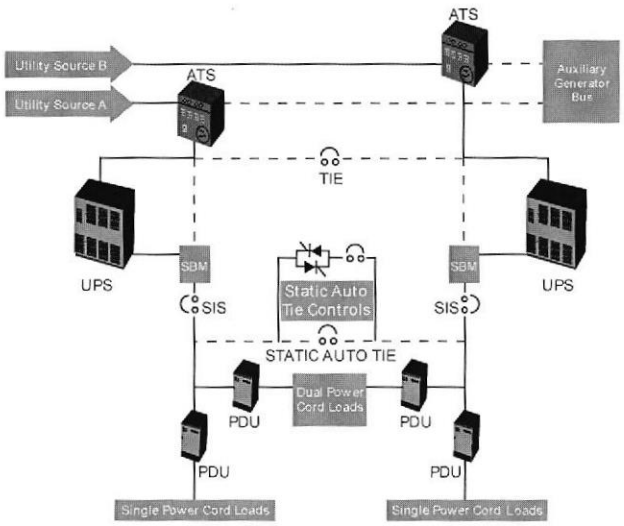
Static Auto Tie

The Static Auto Tie (SAT) system enhances reliability even further so full load transfers can be made autonomously. The SAT system adds a single wrap-around static switch to the tie breaker in the Hot-Tie system, then adds intelligent controls so a power protection system made up of two or more separate UPS systems can **automatically transfer entire** loads in the event of failure of one side of an A/B distribution system. This eliminates the need for numerous downstream static switches and costly wiring.

In the SAT configuration displayed in the diagram below, there is a static auto tie circuit between the outputs of the two UPS modules that automatically transfers the loads from one to the other as necessary. This less complex, dual-path architecture streamlines the distribution system to eliminate series switching elements and reduce the potential downtime of single power cord loads by up to 50 percent. As a result, the SAT architecture offers a number of benefits, including:

- Reduced capital expenses and installation costs
- Eliminates need for traditional downstream static transfer switches
- Increased system reliability and efficiency
- Decreased maintenance requirements
- Reduced raised floor space requirements

Fully Deployed Static Auto Tie Configuration



CIB - ESPOL
ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Batteries: The heart of every UPS

When a utility power outage causes a UPS to switch to battery power, it is imperative that those batteries are healthy, charged and up to the task. Improper battery management is the number one cause of downtime. Many UPS batteries on the market today are constantly trickle-charged—a process that degrades the battery's internal chemical composition over time, reducing potential battery service life by as much as 50 percent. To address this, the 9395 uses a sensing circuit and an innovative three-stage charging technique to significantly extend battery service life and optimize recharge time. In addition, temperature-compensated charging monitors temperature changes, and adjusts the rate of charge to prolong battery life.

Monitor batteries for optimum readiness

Advances in firmware and digital technology enable the 9395 to offer sophisticated battery monitoring and management features that you might expect to find only on expensive add-on systems, including:

- Battery runtime remaining monitor uses system loading and trended battery discharge data plus internal sensing points for voltage and current data to calculate runtime remaining
- Battery circuit test performs a periodic full-load test of the battery string to ensure that there are no open circuits or weak cells that would jeopardize battery performance and system availability

In addition to these integrated monitoring features, we offer one year of secure, remote monitoring to provide 7x24 real-time monitoring of more than 100 UPS and battery alarms with eNotify. This real-time information is critical in helping you make management decisions, from scheduling preventive maintenance to determining the best way to reduce loads during an outage.

By ensuring optimal battery health and availability, battery monitoring features raise the reliability of the Eaton 9395 beyond any other UPS in its class.

1. Refer to the Eaton Electrical Inc. Limited Factory Warranty for three-phase UPS products for specifications, limitations, and terms. Service and support specifications may vary by country.

Service and support enhance performance

Eaton recognizes that superior power reliability requires flawless execution from its services team. Every 9395 includes an on-site startup from a factory-trained field technician to insure proper installation, operation, and customer training. In addition, we include a full year of on-site 7x24 parts and labor warranty and service protection plan coverage at no extra charge. Finally, our experts will remotely diagnose, trend, and proactively spot problems and expedite field technicians with appropriate parts when required during the first year with our advanced eNotify Remote Monitoring Service. Included at no extra charge with every 9395:

- 7x24x365 startup service and customer training
- One-year limited factory warranty[1]
- Service protection plan 7x24 coverage, eight-hour response (upgrade to four- or two-hour where available), parts and labor, unlimited on-site emergency response support
- eNotify Remote Monitoring Service: 7x24 critical alarm notification and monthly reports on UPS and battery health
- 7x24 technical support access



In addition to the warranty and first year of on-site coverage, Eaton offers a wide variety of support agreements for continued preventive and emergency response maintenance. PowerTrust Service Plans include:

- UPS and battery scheduled preventive maintenance
- Parts and labor coverage for electronics and/or batteries
- Factory-trained technicians with genuine Eaton parts and diagnostic tools
- eNotify Remote Monitoring Service
- Available coverage: 7x24, eight/four/two-hour response, or 8x5 next business day response
- 7x24 technical support access

eNotify Remote Monitoring Service

All PowerTrust Service Plans include Eaton's eNotify Remote Monitoring Service, enabling Eaton service technicians to remotely monitor your UPS and batteries using one-way e-mails. With technical experts available to respond immediately and resolve many issues remotely, eNotify features 7x24 real-time monitoring of 100+ UPS and battery alarms.

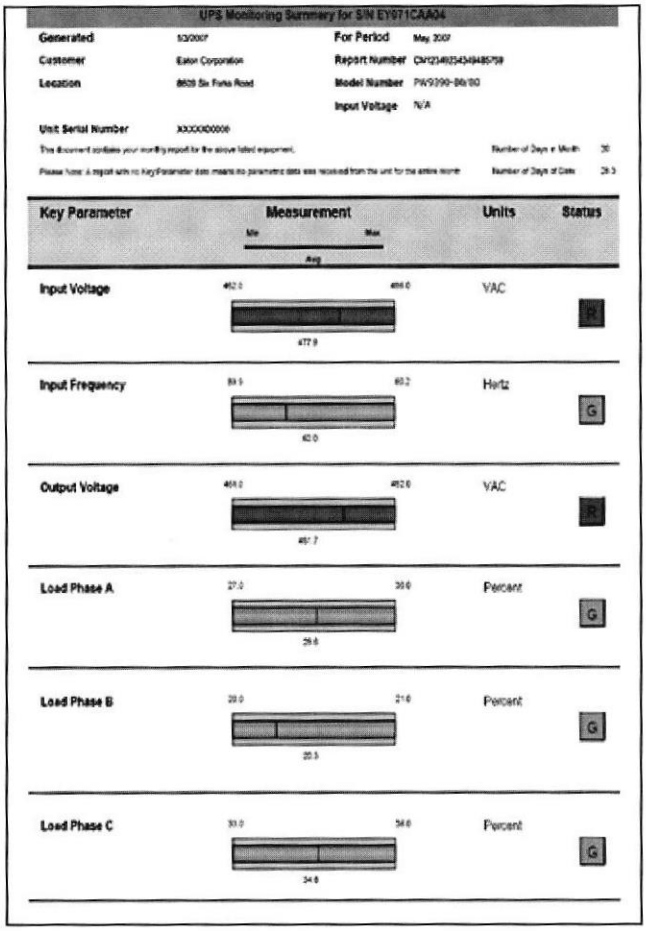
The eNotify service provides you with monthly reports detailing the ongoing health of your 9395 UPS. The Customer Monitoring Report delivers information on your unit's voltages, loads, and external factors such as temperature and humidity. Additionally, the report provides information about the attached batteries and system availability. All of these factors contribute to the Relative Health Index (RHI) score that allows you to compare your unit's health to Eaton's optimum operating levels.

Proactive monitoring is also included. Upon receipt of both status and event e-mails, anomalies are checked for incoming parametric or event data logs. If an anomaly is detected, Eaton analysts further study the data for possible impending failures and take appropriate action. The following critical alarms are provided by eNotify:

- UPS output power will turn off after the configured delay period
- Low battery alarm present
- UPS hardware fault detected
- UPS battery completely discharged
- UPS inverter fault detected
- UPS internally bypassed
- UPS output has been turned off
- UPS shutdown imminent alarm condition exists
- The failure of one or more fuses has been detected
- A relay, contactor, or breaker has failed

The eNotify Remote Monitoring Service provides confidence that Eaton is continually watching your 9395 and will combine its technical resources and field technicians as needed to quickly respond to critical alarms.

The innovative design of the Eaton 9395 delivers the industry's best performance combination of high efficiency, low input current distortion and high power factor.


UPS Monitoring Summary for S/N EY971CAA04

Generated 5/3/2007 For Period May 2007

Customer Eaton Corporation Report Number CR2340534348758

Location 8609 Six Forks Road Model Number PW9390-99/80

Input Voltage N/A

Unit Serial Number XXXXXX0006

This document contains your monthly report for the above listed equipment. Number of Days in Month 30

Please Note: A report with no Key Parameter data means no parametric data was received from the unit for the entire month. Number of Days of Data 29.3

Key Parameter	Measurement (Min / Avg / Max)	Units	Status
Input Voltage	462.0 / 477.9 / 496.0	VAC	R
Input Frequency	59.5 / 60.0 / 60.2	Hertz	G
Output Voltage	469.0 / 481.7 / 492.0	VAC	R
Load Phase A	27.0 / 29.6 / 30.0	Percent	G
Load Phase B	20.0 / 20.5 / 21.0	Percent	G
Load Phase C	33.0 / 34.0 / 34.0	Percent	G

Sent via email to as many as six site contacts, the eNotify monthly Customer Monitoring Report provides a summary of the top 10 performance and environmental parameters, battery events, availability percentage, and comparative status against recommended specification.

Unmatched green power performance

The innovative design of the 9395 delivers the industry's best performance combination of high efficiency, low input current distortion and high power factor. The 9395 operates at greater than 94 percent efficiency, reducing utility costs and extending battery runtimes. Higher system efficiency also results in cooler operating conditions, which reduces facility air conditioning cost, extends the life of UPS components, and increases overall reliability, availability, and performance. A new input circuit design within the 9395 keeps input current THD low and input power factor near unity without compromising overall efficiency. As a result, the UPS allows maximum transfer of power between the power source and the protected load and is exceptionally compatible with multiple power sources, especially auxiliary generators. On the output side, the ultra high-speed switching pulse width modulation (PWM) inverter enables the 9395 to provide its full rated power capability to the load whether the load power factor is 0.9 lagging, unity, or 0.9 leading.

The use of sustainable materials and highly efficient manufacturing technology results in dramatic savings in carbon footprint versus similar UPS products.

Measuring power performance: Efficiency, power factor, and THD

Power performance, which is measured by system efficiency, output power factor, and THD, is the foundation of the Eaton 9395. It is the UPS's robust combination of these three elements that make it stand out as the premier UPS in its class. The table below demonstrates how the 9395 with Energy Saver System compares to competitive UPS models. Most manufacturers must use input filters, which lower their efficiency rating. The 9395, on the other hand, does not require input filters to obtain excellent input THD.

As an example, a large data center (2.2 MVA) would realize the following savings by using a 9395 in Energy Saver System (ESS) compared to traditional N+1 systems:

- Additional energy savings: 2917 MW hours
- Additional carbon savings: 2523 tons
- Annual cost savings: $315,708

EATON 9395 (WITH ESS) ANNUAL POWER SAVINGS VS. THE COMPETITION

Model	kVA rating	Full load annual power savings	Half load power savings	Cooling power savings at half load	Total savings at half load (power and cooling)
Eaton 9395	1100				
vs. Competitor A	1000	$66,300	$35,700	$23,800	$59,500
vs. Competitor B	1000	$20,400	$15,300	$10,200	$25,500

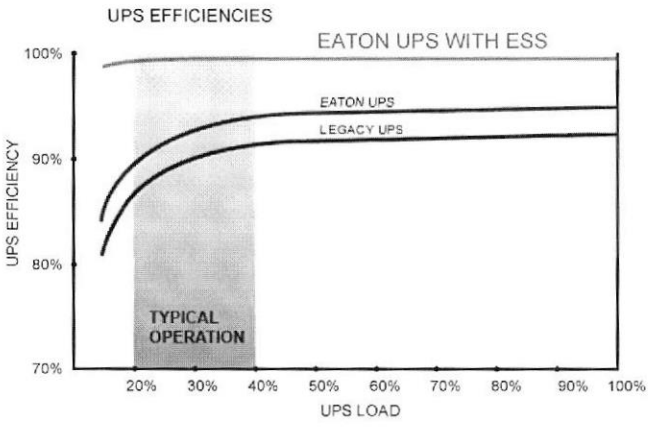
costs calculated at industry average of $.10 per KWH

EATON 9395 POWER DENSITY VS. THE COMPETITION (N+2 SYSTEM)

Model	kVA rating	KW per sq. foot	Annual space cost savings (at $1000 per sq. foot)
Eaton 9395	1100	25.5	
vs. Competitor A	1000	16.6	$15,000
vs. Competitor B	1000	16.9	$20,000

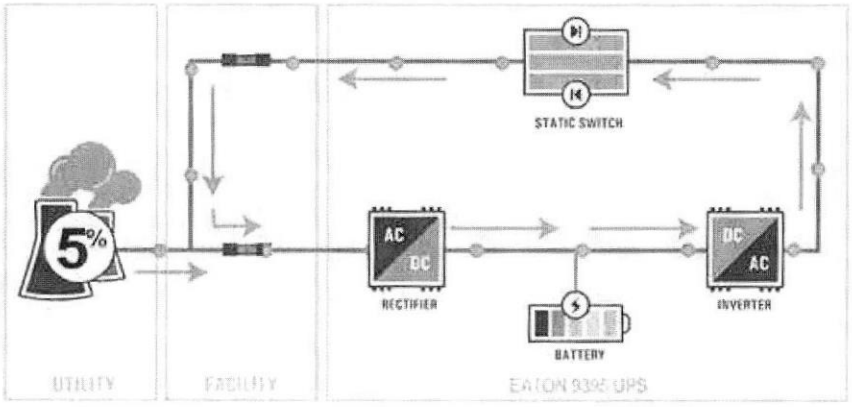
The importance of system efficiency

To demonstrate the importance of total system efficiency in relation to load level, the graph below shows how efficiency generally dips as load level decreases. In general, manufacturers list an optimal efficiency rating at full load. In reality, however, most three-phase UPSs operate in the range of 20—40% load. As a result, it is extremely important to evaluate the efficiency of a UPS at lighter loads as this graph depicts. Energy Saver System operates at 99% efficiency even at low load levels giving end users real energy savings.



Easy Capacity Test

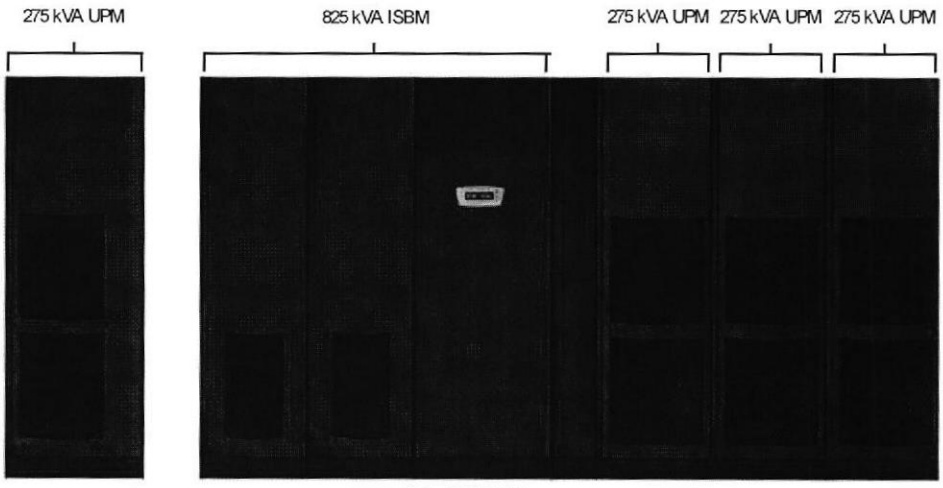
The 9395 has the unique ability test its entire power train under full load stress without the requirement of an external load. With no load connected, the 9395 is able to test all of its power handling components, including the rectifier, inverter, contactors, fuses, power busses, cabling, batteries, bypass (static switch), magnetics, and filter capacitors. The net result of this innovative load test is that there are no load banks to rent, no temporary load connections to make, and no wasted energy. Furthermore, the 9395 has the ability to test the upstream bypass input breaker (BIB), the rectifier input breaker (RIB), and all of the electrical cables between them. This load test feature can take the place of most traditional load bank tests to save you time and money during startup and commissioning. Eaton field technicians are trained to use this load testing capability during a startup service to ensure optimum calibration and, maximum efficiency, and inherent redundancy. As a result, they can produce a report that verifies these tests and overall performance of the UPS. All preventive maintenance visits included with PowerTrust Service Plans for the 9395 include this unique load testing feature to ensure that the UPS is operating optimally. It also validates the performance of an installed UPS and can simulate various operations and power transfers.



Easy Capacity Test Power Flow

Scalable, redundant architecture meets current and future requirements

The 9395 combines the reliability and redundancy of a multi-module UPS into an integrated, pre-wired solution. With a unique, flexible design that provides scalability, the UPS can adapt to future changes in load demands and new requirements for higher reliability without requiring the purchase of an additional UPS. For example, the 9395 UPS enables you to add a 275 kVA UPM in the field for N+1 redundancy or capacity.



Eaton 9395 825 kVA

System Bypass Module: unparalleled **flexibility for your** parallel **UPS system**

Four decades of experience in paralleling large UPS systems is incorporated in this newest System Bypass Module (SBM) from Eaton. For use with multi-module paralleled 9395 systems, the switchgear enclosure encompasses a centralized static switch. It is orderable with either momentary or continuous duty rating, along with system-level circuit breakers for bypass, UPS system output, feedback protection and maintenance, or "wrap-around" bypass functions. Four ratings are available as standard: 1200A, 2000A, 3000A and 4000A. This customizable cabinet features a 10 inch color LCD screen to display status for up to 32 of the UPM modules, and provides an intuitive user operation interface.

The touch sensitive SBM display shows a graphical view of the entire system one-line diagram, with intuitive controls and quick access to key information like battery time remaining, event/alarm history, system metering for kW and kVA, voltage, current, frequency, power factor and phase balance. The SBM also provides terminal connections for system-level building alarm inputs and relay outputs. To enhance flexibility, the system controls/monitoring section may also be deployed in custom or third party switchgear, to ensure that the most reliable monitoring and user-friendly controls are included with alternative power circuit components.

The Eaton SBM incorporates the following hallmarks of Powerware Hot Sync paralleling technology, which has defined Eaton's most mission-critical UPS configurations for decades:

- Multiple UPS synchronization and load sharing accomplished without dependence inter-module wiring networks.
- Peer-to peer architecture which operates the parallel system without the need for master load share or master synchronization controls. The system operates with NO centralized control circuit.
- Control Area Network (CAN) bus architecture to ensure precise load sharing <3% at full system load.
- Designed with no single point failure in powertrain or control.



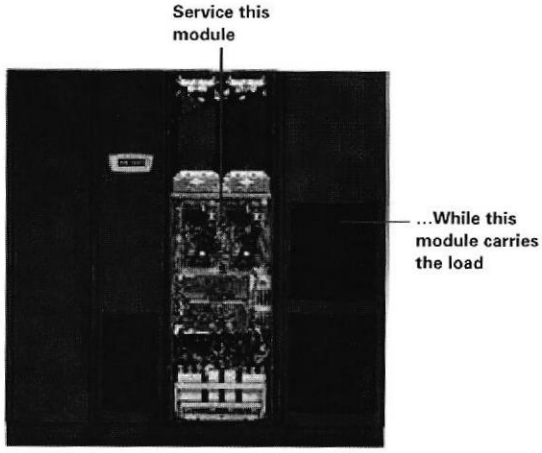
Eaton 10 inch LCD SBM screen

Concurrent maintenance: Higher availability

With 9395 redundant models, Eaton field technicians can completely isolate and service a redundant module while the other module carries the load–without going to bypass for service. The 9395 also features a completely front-accessible design and can be installed against walls or back to back in multi-module configuration. This service-friendly design enhances maximum uptime and availability.

Ease of installation

Traditional multi-module installations require up to three times the footprint for power modules and tie cabinets. In contrast, the 9395 is a completely integrated large system that incorporates multiple power modules and system switchgear on factory pre-wired bases. Since everything is pre-wired, cabling costs and installation time are significantly reduced.



Eaton 9395 550 kVA

825 kVA N+1: Eaton 9395 vs. Competitor

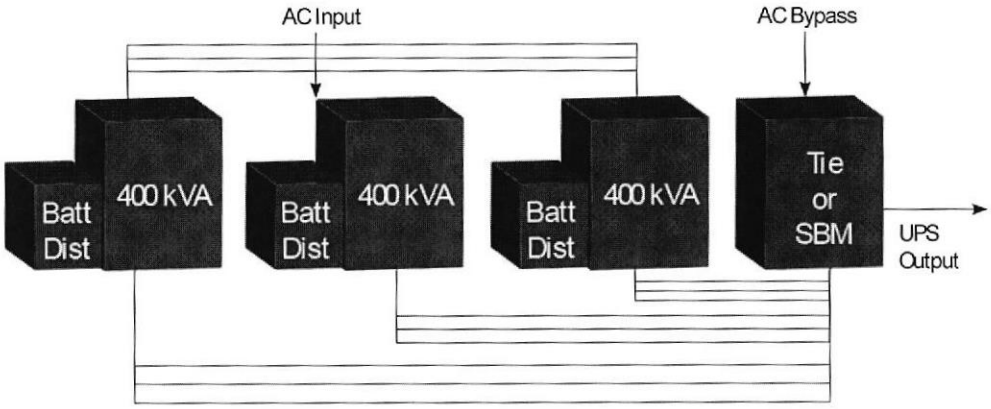
Competitor Solution

125 sq. ft.

19,215 lb system weight*

Extensive site wiring

*Excluding batteries



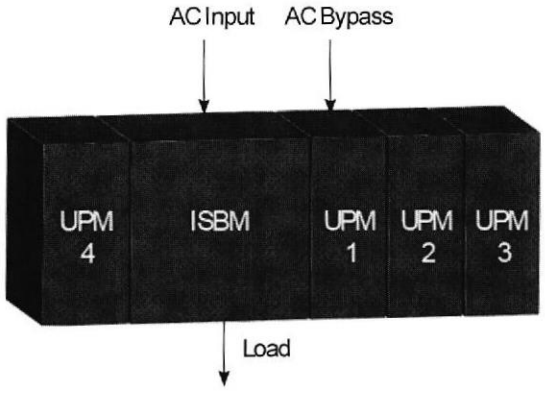
Eaton 9395 Solution

39 sq. ft.

6,365 lb system weight*

Minimal site wiring

*Excluding batteries



Greatly reduced footprint

The 9395 UPS offers the smallest footprint and lowest weight of any UPS in its class—50 to 60 percent less than competitive units. In fact, the 9395 fits a redundant design into the same footprint as a traditional, non-redundant UPS. The 9395's smaller footprint not only reduces your total cost of ownership, but also provides a UPS that is approximately half the weight of legacy and competitive systems. As a result, freight costs are much lower and the smaller size and weight of the UPS make it much easier to handle. In fact, the 9395 fits easily through all doors and can be transported on freight elevators. Unlike some larger and heavier systems, there is no need to dismantle it to fit it on elevators or through doorways, which can cause significant delays and increase costs.

Minimized cabling requirements and expense

In an integrated system such as the 9395, multi-module systems arrive pre-wired with no need to perform costly and time-consuming inter-unit cabling for power and communications between modules and the system bypass unit. Considering the increasing cost for raw materials such as copper, this savings can be significant. Cabling enters the 9395 UPS from either the top or bottom of the cabinet to provide easier and more flexible installation

Reliable Eaton components

The 9395 leverages reliable and proven electrical components manufactured by Eaton such as Cutler-Hammer circuit breakers and contactors.

Eaton's total PowerChain Management solution

Eaton views your power system as a strategic asset—an approach we call PowerChain Management®. Eaton's PowerChain Management solutions can help transform complicated power systems into a single, integrated system easily visible and manageable as a strategic business asset, providing a significant competitive advantage.

If your company is like most, its power system was built over time. As the organization's needs changed, additional equipment was likely piece-mealed into the system, with a circuit breaker added here and a transformer replaced there. The result can be a power system that is a complicated mixture of old and new equipment from several different manufacturers. Because there is no common means of communicating across this varied equipment, gathering data across the enterprise can be quite challenging.

Enhance your business visibility to see the entire picture

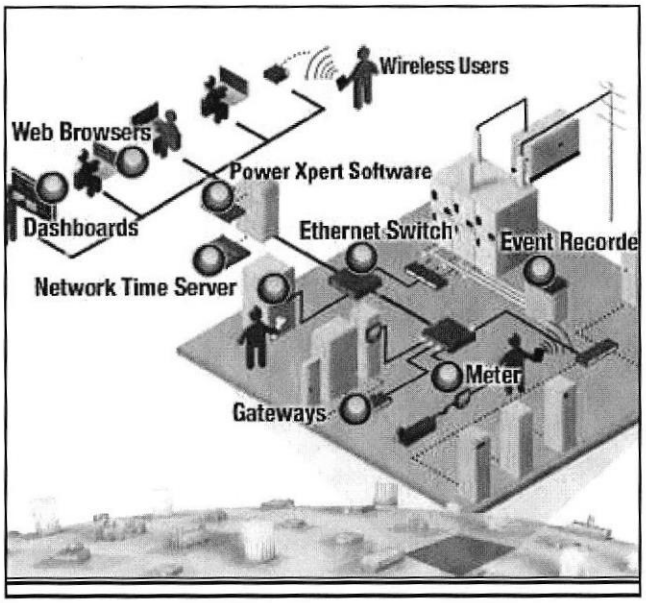
The complexity of gathering data among various devices makes it difficult to get a clear picture of what's happening inside your power system, which decreases your ability to manage your power system effectively. Consequently, business results suffer, because your enterprise depends on its power system.

Eaton's Power Xpert® Architecture, the backbone of our PowerChain Management solutions, enables you to monitor much more than your 9395 UPS; it transforms your power system into an integrated, agile system that delivers real competitive advantages. With the software and hardware components of Power Xpert Architecture, you can monitor, control, and manage your complete power system effectively and efficiently, including PDUs, batteries and other critical equipment. Using a simple, Web-based interface, the varied elements of your power system are integrated into a single view, with the ability to easily monitor the availability and reliability of electrical power, lower energy costs, extend equipment life, and more.

Optimize your power system

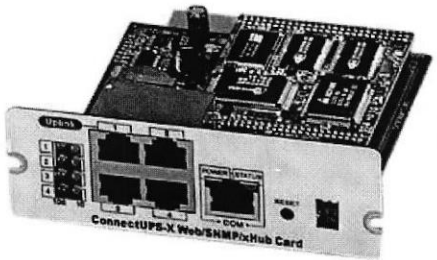
PowerChain Management can also help you manage your power system for peak performance by integrating and optimizing your power assets and ensuring that they align with your business goals.

Once your power system is linked to an Ethernet network via the Power Xpert Architecture, you can connect to and share information with a variety of applications, such as the building management system monitoring your HVAC equipment, or your enterprise accounting system. Power Xpert Architecture's open standards and scalable approach make it easy for your power system to grow and adapt to a rapidly changing environment.



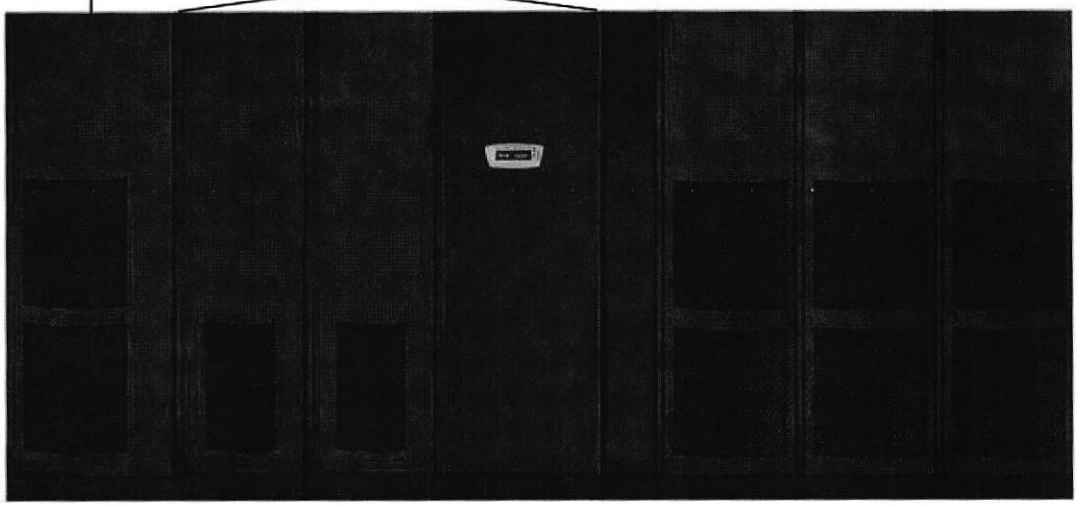
Eaton delivers a new level of confidence

The culmination of 40 years of R&D excellence, the new Eaton 9395 UPS delivers the utmost in confidence—confidence that your organization's critical systems are protected by the most reliable, efficient, and full-featured protection solution available. Eaton will be there with you long term, with premium warranty coverage and expert technical support. **To find out more about the 9395 UPS, visit our Web site at www.powerware.com/9395 or contact us at 1.800.356.5794.**



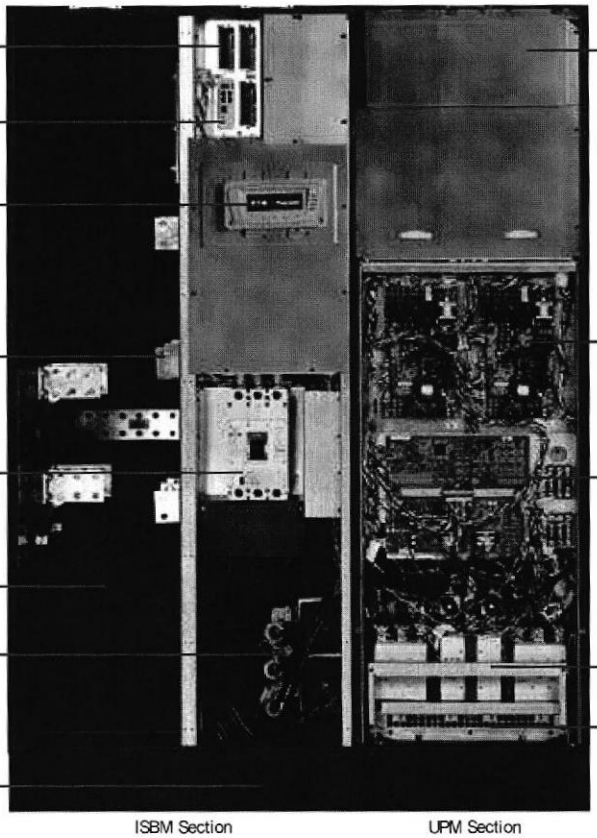
The ConnectUPS-X Web/SNMP Card allows you to connect your 9395 directly to the Ethernet network and the Internet. This unique solution allows you to conveniently monitor and manage your UPS with a standard Web browser. The ConnectUPS Card is also used to take advantage of Eaton's 7x24 eNotify Remote Monitoring Service.

Core components



Eaton 9395 825 kVA N+1 or 1100 kVA capacity

A closer look inside the Eaton 9395



Eaton 9395 550 kVA

Technical specifications[2]

UPS rating (0.9 power factor)

kVA	225	275	450	500	550	650	750	825	1000	1100
kW	202	250	405	450	500	585	675	750	900	1000

General characteristics

Efficiency	>94%
Parallel capability	4 distributed, 32 with SBM
Max modules per size	Up to 3 modules, 550 kVA, up to 4 modules, 825/1100 kVA
Audible noise	<76dBA @ 1 meter
Altitude (max)	2000m at 40°C (104°F)
N+1 redundancy capable	Yes
Field upgradeable	Yes
System bypass module	Included

Input characteristics

Voltage	480V standard; and 400V available
Voltage range	+10% / -15%
Frequency range	45-65 Hz
Power factor	0.99 (minimum)
Input current distortion	<3.5% (no input filter required)
Soft start capability	Yes
Internal backfeed protection	Yes

Output characteristics

Voltage	480V standard; and 400V available
Regulation	±1%
Inverter	PWM with IGBT switching
Voltage THD	<2% (100% linear load); <5% (non-linear load)
Load power factor range	Up to a .9 power factor leading without derating

Battery

Battery types	VRLA, AGM, Gel, Wet Cell
Battery voltage	480V
Temperature compensation	Optional
Charging method	ABM technology or Float, Selectable

Dimensions and weights

225 kVA, 275 kVA	52.4"w x 32.7"d x 73.6"h	1786 lb
225 kVA redundant, 275 kVA redundant	73.7"w x 32.7"d x 73.6"h	2875 lb
450, 500, 550 kVA	73.7"w x 32.7"d x 73.6"h	2977 lb
450, 550 kVA redundant	95.4"w x 32.7"d x 73.6"h	4153 lb
Field upgrade module, 225 or 275 kVA	30"w x 32.7"d x 73.6"h	1176 lb
650, 750, 825 kVA	140.9"w x 32.7"d x 73.7"h	5065 lb
650, 750, 825 kVA +1 redundant	170.2"w x 32.7"d x 73.7"h	6365 lb
1000, 1100 kVA	170.2"w x 32.7"d x 73.7"h	6525 lb

General characteristics

Control panel (LCD)	8 lines x 40 characters
Battery startup	Standard
Frequency conversion	Standard
Multi-language	Standard
Building alarm inputs	5 (galvanic isolated)

Options

External maintenance bypass

Powerware PDU, RPP, and STS

Maintenance bypass module, matching cabinet, 2/3/4 breaker

DC disconnects

65 or 100 kAIC input breakers

Certifications

Safety	UL1778, cUL
EMC	IEC 62040-2, EN50091 Class A (restricted access)

eNotify remote monitoring

7x24 remote monitoring of UPS and battery alarms, daily heartbeat check and monthly report. eNotify requires the ConnectUPS-X Web/SNMP Card and Environmental Monitoring Probe.

Communications

Software compatibility: Power Xpert
Communications cards: Four communication bays standard. The following connectivity options can be installed at any time:
- ConnectUPS-X Web/SNMP Card (included)
- ModBus RTU card
- AS/400 Relay card
- Industrial Relay card
- Powerware HotSync CAN Bridge card
- Environmental Monitoring Probe (included)
- Modem card

Remote inputs/outputs: Five building alarm inputs and one summary alarm contact (5A @ 120V) standard
Remote monitor panel: Eight backlit status indicator lamps plus an audible horn

1. Due to continuing improvements, specifications are subject to change without notice.
2. Please refer to Eaton 9395 technical documents for specific configuration guidelines and features.

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EUROPE/MIDDLE EAST/AFRICA
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United Kingdom: 44.1753.608.700

ASIA PACIFIC
Australia: 61.2.9693.9366
New Zealand: 64.0.3.343.3314
China: 86.21.6361.5599
HK/Korea/Taiwan: 852.2745.6682
India: 91.11.4223.2300
Singapore/SEA: 65.6825.1668

EATON
Powering Business Worldwide

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October 2009

PG-SERIES
LONG LIFE BATTERIES



POWER SONIC
PG-SERIES

FIRMESA

CIB - ESPOL

POWER-SONIC
PG-SERIES

Power-Sonic has more than 39 years of battery industry experience and today our batteries are sold in more than 70 countries world-wide. Since our inception in 1970, our focus has been the design, manufacture and marketing of rechargeable batteries, specifically:

- Sealed lead-acid (SLA), also called valve regulated lead-acid (VRLA) batteries
- Powersport batteries
- Sealed nickel-cadmium (NiCd) and nickel-metal hydride (NiMH) batteries
- NiCd and NiMH configured packs (cell assemblies)
- Battery Chargers

Our products are widely used in an ever broadening range of electronic and industrial applications. Our batteries continue to be used wherever cost effective and reliable DC power is required, be it as the principal power or standby power source.

Our aim is the ongoing improvement of our existing products, coupled with the development of new tailored products, to meet the ever increasing needs for stand alone power. Our advanced engineering techniques and state-of-the-art manufacturing processes ensure that we remain on the cutting edge of battery technology. These skills, coupled with our selection of the finest raw materials, allow us to produce batteries combining superior performance and value.

Providing our customers with reliable, yet economical, products is the cornerstone of our mission.

PG-Series Specifications

Tolerances are +/- 2mm.

Model	Nominal Voltage (V)	Rated Capacity (A.H.)			Length		Width		Height		Ht. Over Terminal		Weight		Standard Terminals
		10-hr.	5-hr.	1-hr.	in.	mm	in	mm	in	mm	in	mm	lbs.	kgs.	
PG-6V210 FR*	6	210.0	180.5	126.0	12.70	323	7.00	178	8.98	228	9.21	234	71.6	32.5	T11
PG-12V28 FR*	12	28.0	25.5	18.6	6.56	167	6.96	177	4.92	125	4.92	125	18.5	8.4	T12
PG-12V35 FR*	12	35.0	32.5	27.0	7.72	196	5.10	130	6.22	158	6.97	177	24.5	11.1	T6
PG-12V42 FR*	12	42.0	36.0	25.2	7.76	197	6.50	165	6.69	170	6.14	156	32.0	14.5	T6
PG-12V55 FR*	12	56.0	47.5	33.0	8.98	228	5.39	137	8.27	210	8.50	216	36.0	16.4	T6
PG-12V65 FR*	12	65.0	56.0	39.0	13.70	348	6.57	167	7.00	178	6.26	159	47.0	21.3	T6
PG-12V75 FR*	12	75.0	64.5	45.0	13.70	348	6.57	167	7.00	178	6.46	164	51.0	23.1	T6
PG-12V75T FR*	12	75.0	64.5	45.0	10.24	260	6.61	168	8.27	210	8.51	216	55.0	24.9	T6
PG-12V92 FR*	12	92.0	79.0	55.2	12.05	306	6.61	168	8.27	210	8.51	216	61.0	27.7	T6
PG-12V103 FR*	12	103.0	88.5	61.8	13.00	330	6.80	173	8.35	212	8.66	220	70.0	31.8	T11
PG-12V120 FR*	12	124.0	106.5	74.4	16.14	410	6.97	177	8.86	225	8.30	211	81.5	37.0	T11
PG-12V140 FR*	12	144.0	120.5	84.0	13.50	345	6.73	171	10.79	274	11.02	280	99.0	44.9	T11
PG-12V150 FR*	12	153.0	131.5	91.8	19.09	485	6.70	170	9.53	242	8.82	224	103.3	46.7	T11
PG-12V200 FR*	12	210.0	180.5	126.0	20.55	522	9.45	240	8.58	218	8.82	224	144.0	65.3	T11

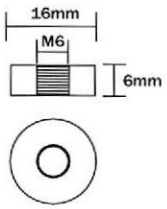
* FR: UL94 V-0 flame retardant case & cover

All data subject to change without notice.

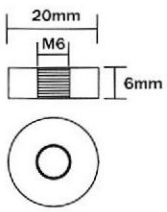
All battery specification sheets and/or our technical manual are available for download at: www.power-sonic.com.

Terminal Configurations

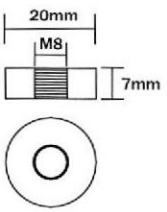
T6 Terminal
Threaded insert - 6mm STUD



T8 Terminal
Threaded insert - 6mm STUD



T11 Terminal
Threaded insert - 8mm STUD



Features

Sealed/Maintenance-Free

Valve-regulated, spill-proof construction allows trouble-free, safe operation in any position. The sealed system eliminates electrolyte checking and refilling. Gases generated during charge are recombined in a unique "oxygen cycle".

Long Service Life

Thick plate design based on sturdy lead-calcium grids and advanced paste technology provide design lives of up to 10 years in standby applications.

AGM Technology

Absorbent Glass Mat technology, in tandem with one-way pressure relief valves, result in efficient gas recombination and safety of operation even in severe over-charge or over discharge situations.

Low Internal Resistance

Superb high-rate discharge and charge characteristics, achieved through advanced separator technology and plate composition, ensure reliable and stable performance critical in UPS and telecom applications.

Low Self-Discharge

High purity lead, in conjunction with lead-calcium alloy grids, account for excellent shelf-life characteristics permitting storage for extended periods of time at 68°F (20°C) or below.

Non-Spillable Design - Ease of Handling

Proven VRLA technology guarantees trouble-free operation and "non-restricted article" status for surface and air transportation under DOT (CFR-49) and IATA (A67) regulations.

Rugged Construction

High-impact resistant ABS plastic (UL94 V-O flame retardant) used for case and cover. High internal compression ratios and innovative inter-cell weld technology impart resistance to shock, vibration, chemicals and heat.

Designed-In Reliability

Cutting-edge manufacturing and process control, combined with strict quality assurance procedures, guarantee consistent and dependable performance.

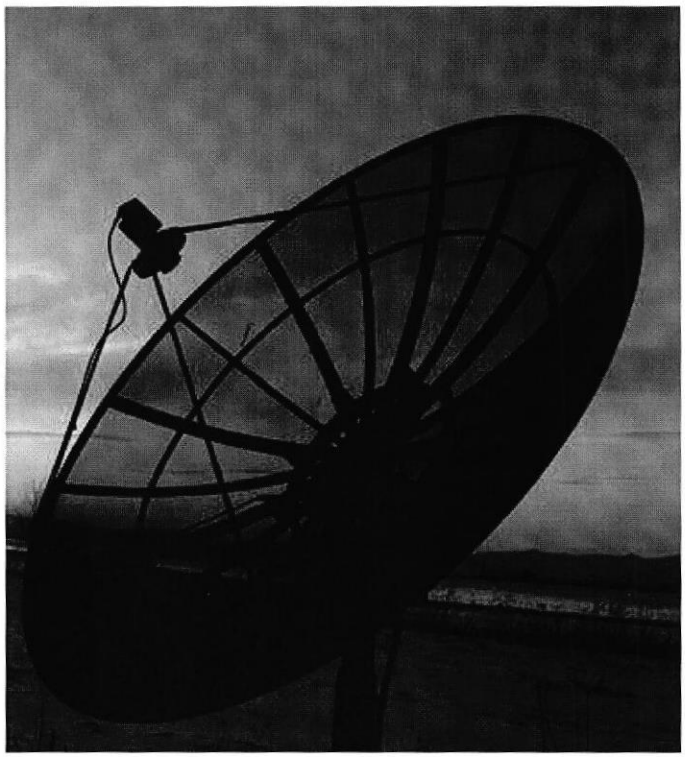
Typical applications for the PG-Series batteries include:

Standby Power

- Communications & Telecom Systems
- UPS - Uninterruptible Power Supplies
- Marine & Power Station Applications
- Back-Up for Security & Lighting Systems
- Access Control Devices
- Elevators

Primary Power

- Remote Monitoring
- Remote Area Power Generation
- Personal Transport Vehicles
- Geophysical Instruments & Power Tools
- Solar-Powered Systems
- Remote Access Devices
- Robotics



Battery Capacity

The capacity of a battery is the total amount of electrical energy available from a fully charged cell. Its value depends on the discharge current, the temperature during discharge, the final (cut-off) voltage and the history of the battery.

Capacity, expressed in ampere-hours (AH), is the product of the current discharged and the length of discharge time. Battery capacity varies according to the discharge rate being used. Capacity increases when discharge current is less than the 10-hr. rate and decreases when the load current is higher.

The rated capacity of a Power-Sonic PG-Series battery is measured by its performance over 10 hours of constant current discharge at 68°F (20°C) to a final (cut-off) voltage of 1.75 volts per cell.

Discharge Current	Final Voltage
0.05C to 0.10C	1.70V/cell
0.10C to 0.30C	1.75V/cell
0.30C to 0.50C	1.70V/cell
0.50C to 2.0C	1.60V/cell
2.00C and above	1.37V/cell

Table 1 : Cut-off Voltage

Proper battery selection for a specific application can be made from the discharge curves shown for each model if the required time and current load are known.

More detailed technical information can be obtained from our Technical Manual, which is available for download from our website at www.power-sonic.com.

POWER-SONIC PG-SERIES

Discharge Characteristics

Battery voltage decreases during discharge. The discharge curves in Figure 1 illustrate this for different discharge rates. "C" is the rated capacity of a battery. The discharge curves may be used for battery selection. It is advisable, however, to review the selection on the basis of graphs of individual data sheets.

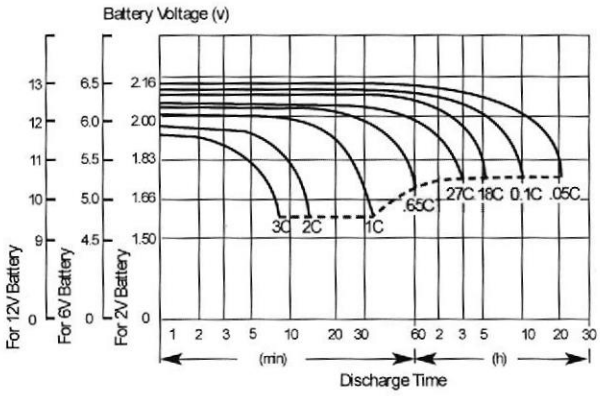


Figure 1: Discharge characteristic curves at various rates 77°F(25°C)

Open Circuit Voltage

Open circuit voltage varies according to ambient temperature and the remaining capacity of the battery. Generally, open circuit voltage is determined by the specific gravity of the electrolyte. Discharging the battery lowers the specific gravity. Consequently, it is possible to determine the approximate remaining capacity of a battery from the terminal voltage. The O.C.V of a Power-Sonic battery is 2.15V/cell when fully charged and 1.95V/cell when fully discharged.

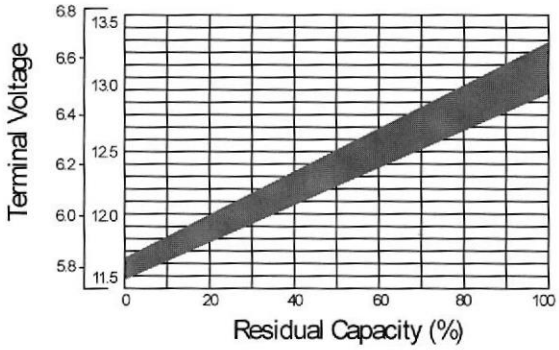


Figure 2: Open-circuit voltage characteristics

Cut-Off Voltage

Cut-off or 'final' discharge voltage is the battery terminal voltage under load, i.e. in a closed circuit, to which the battery is safely discharged to maximize battery life. The appropriate cut-off voltage varies according to the actual discharge current. As a rule of thumb, high amp. loads will tolerate a lower final discharge voltage than low amp. ones with longer run times. See Table 1.

Cyclic Use

The number of charge/discharge cycles depends on the capacity taken from the battery - a function of discharge rate and depth of discharge - operating temperature and the charging method.

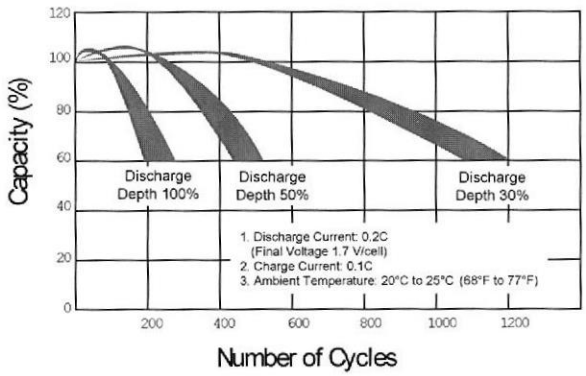


Figure 3: Depth of discharge vs. number of cycles

Figure 3 shows the relationship between depth of discharge and number of cycles, but also the capacity increases during the early cycles.

Standby Use

The float service life, or the life expectancy under continuous charge, depends on the frequency and depth of discharge, the charge voltage and the ambient temperature.

At a float voltage of 2.25-2.30 V/cell and an ambient temperature of 68-77°F (20-25°C), PG-Series 6V & 12V batteries are designed to yield a service life of up to 10 years before the capacity drops to about 60%.

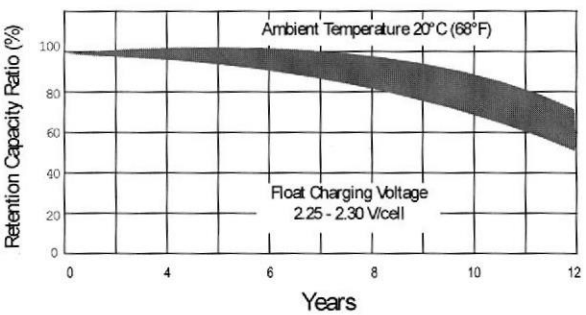


Figure 4: Life characteristics in standby use

The graph in Figure 5 shows life characteristics in float (standby) service for ambient temperatures ranging from 60-130°F (15-55°C).

If prevailing ambient temperatures are well above 68-77°F (20-25°C) the life expectancy of this type of battery in float service depends greatly on temperature compensated charging. The typical temperature coefficient is -3mV/cell/°C. The graph in Figure 5 is based on temperature compensated charging.

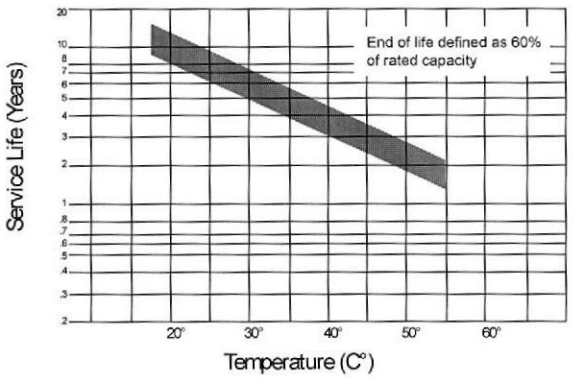


Figure 5: Service life at various ambient temperatures

Effects of Temperature

Actual capacity is a function of ambient temperature and rate of discharge. At 68°F (20°C) rated capacity is 100%. Above this temperature capacity increases, below it capacity decreases as temperature falls.

While raising ambient temperatures increases capacity, it also decreases useful service life. It is estimated that battery life is halved for each 18°F (10°C) above normal room temperature.

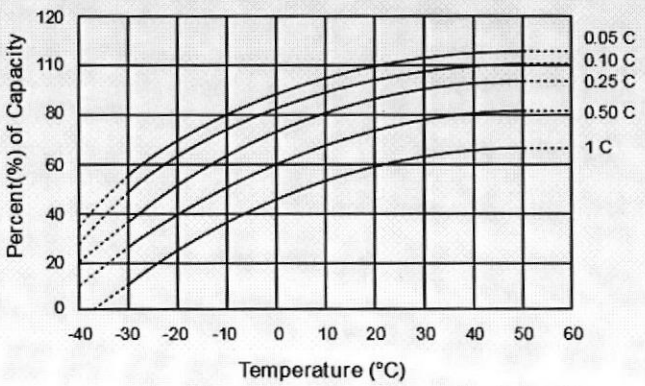
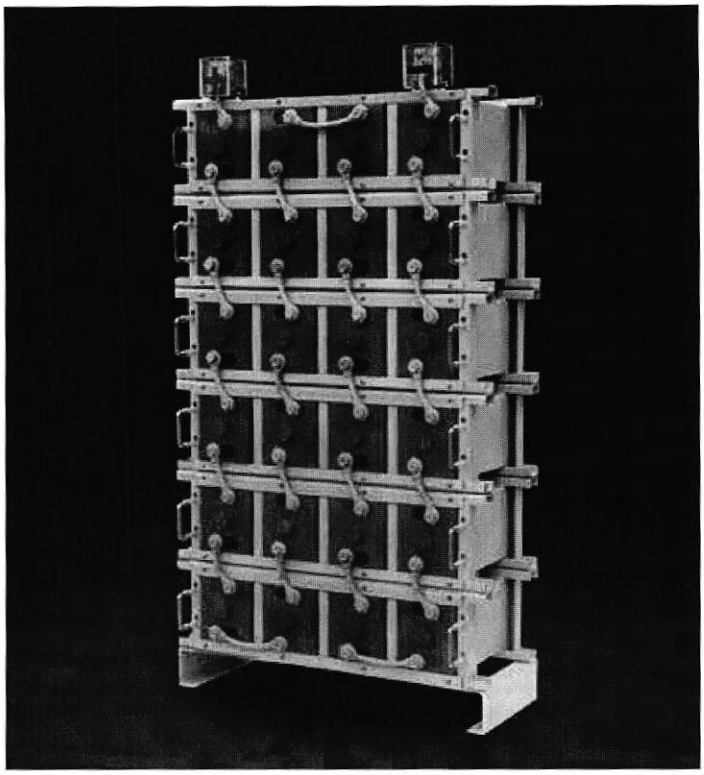


Figure 6: Effects of temperature on capacity



Shelf Life and Storage

Special alloy electrodes and high purity lead impart low self-discharge rates and, consequently, a long shelf life. The rate of self-discharge is approximately 3% per month when batteries are stored at 68°F (20°C). At low temperatures it is nearly negligible, at higher ones self-discharge increases.

To maximize battery life and performance:

- Recharge after each use
- Do not store in a discharged state
- Store at 68°F (20°C) or lower
- Recharge every 6 months if not used

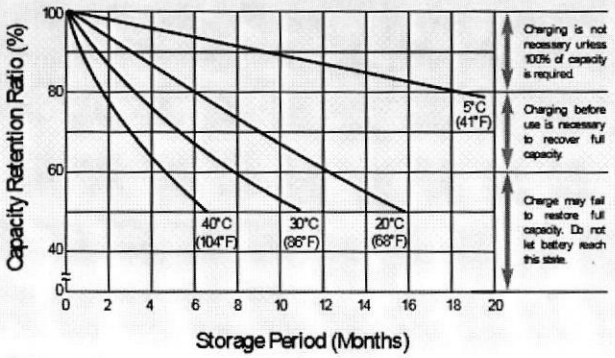


Figure 7: Shelf life and storage

Charging

Dependable performance and long service life depend upon correct charging. Faulty procedures or inadequate charging equipment, result in decreased battery life and/or unsatisfactory performance. The selection of suitable charging circuits and methods is as important as choosing the right battery for the application.

To charge a Power-Sonic battery, a DC voltage higher than the open-circuit voltage of 2.15 is applied to the terminals of the battery. Depending on the state of charge, the cell may temporarily be lower (after discharge) or higher (immediately after charging) than 2.15 V/cell.

Power-Sonic batteries may be charged by using any of the conventional charging techniques. To obtain maximum service life and capacity, along with acceptable recharge time and economy, constant voltage-current limited charging is recommended.

Constant Voltage Charging

Constant voltage - current limited charging is the recommended charging method for Power-Sonic batteries. Care must be taken to adhere to the charge voltage and initial charge current limits.

Constant Current Charging

It is generally not a recommended charge method. It is, however, an effective method for occasional boost-charging of batteries in series after extended storage or prior to a capacity verification. Charge time must be strictly controlled to avoid detrimental over-charge.

Taper Charging

This is the simplest, least expensive charging method. Either quasi-constant voltage or quasi-constant current characteristics can be built into the charger through combination of transformer, diode and resistance. Of the two, constant potential charging is preferable.

Float-Charge Applications

In this set-up the battery and the load are connected in parallel with the rectified power source. A constant voltage - current limited charger is recommended. Proper voltage is 2.25 - 2.30 V/cell at 77°F (25°C). Initial charge current should be limited to 0.3C amps (30% of rated capacity).

Supplemental Boost Charge

Batteries which have been in storage for extended periods of time will lose capacity due to their self-discharge characteristics. To restore full capacity and/or ensure that permanent capacity loss does not occur, a properly timed constant voltage type 'boost' charge is recommended. For storage temperatures of 68-86°F (20-30°C) such top-off charges should be applied every 6 months, at higher ambients, every 3 months. Avoid storage temperatures above 86°F (30°C), wherever possible.

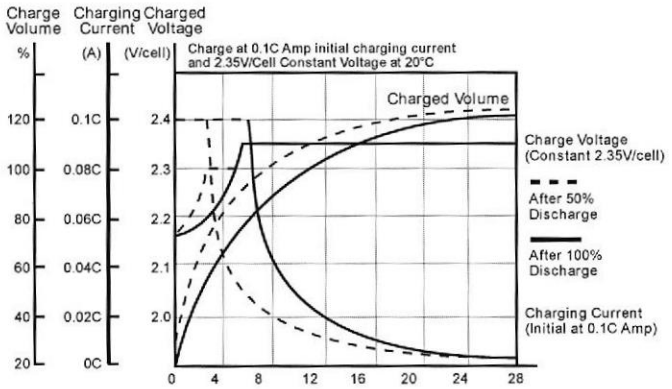


Figure 8: Charging characteristics in stand-by mode

Cyclic Applications

Cyclic use requires a fast charge time and protection against over-charge and over-discharge. Charge voltage should be 2.45 ± 0.05 V/cell at 77°F (25°C). Initial current should be limited to 0.2C.

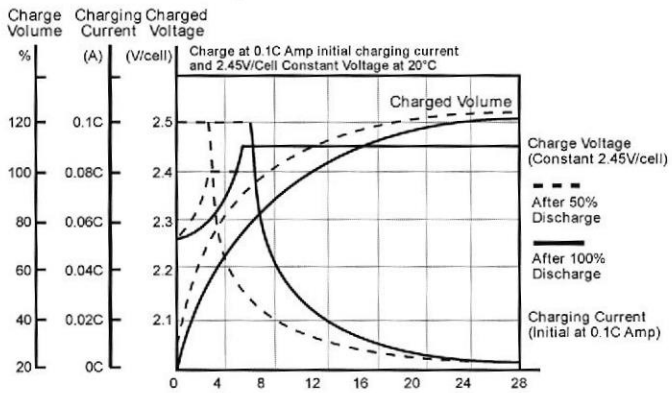


Figure 9: Charging characteristics in cycle charge mode

Temperature Compensation

Power-Sonic batteries perform well both at low and high temperatures. At low temperatures, however, charge efficiency is reduced; at temperatures above 113°F (45°C), charge efficiency increases so rapidly that there is a danger of thermal runaway if temperature compensation is not precise.

The effect of temperature on charge voltage is less critical in float applications than in cyclic use, where relatively high charge currents are applied for the purpose of short recharge times.

Temperature	Cyclic Use (V)	Float Use (V)
-40°F (-40°C)	2.85 - 2.95	2.38 - 2.43
-4°F (-20°C)	2.67 - 2.77	2.34 - 2.39
14°F (-10°C)	2.61 - 2.71	2.32 - 2.37
32°F (0°C)	2.55 - 2.65	2.30 - 2.35
50°F (10°C)	2.49 - 2.59	2.28 - 2.33
68°F (20°C)	2.43 - 2.53	2.26 - 2.31
77°F (25°C)	2.40 - 2.50	2.25 - 2.30
86°F (30°C)	2.37 - 2.47	2.24 - 2.29
104°F (40°C)	2.31 - 2.41	2.22 - 2.27
122°F (50°C)	2.25 - 2.35	2.20 - 2.25

Table 2: Recommended charge voltages for different temperatures.

Temperature effects should definitely be considered when designing or selecting a charging system. Temperature compensation is desirable in the charging circuit, especially when operating outside the range of 41-95°F (5-35°C). The temperature coefficient is -2mV/cell/°C below 68°F (20°C) in float use and -6mV/cell/ °C below 68°F (20°C) in cyclic use. For higher temperatures the charge voltage should be correspondingly decreased.





Quality is always #1

We employ IQC, PQC and ISO 9001 quality management systems to test materials, monitor manufacturing processes and evaluate finished products prior to shipment. All our batteries are 100% tested with advanced computer equipment prior to being released for sale.

Power-Sonic management and staff are committed to providing the best possible service to satisfy our customer's needs, and fulfill our undertaking to deliver top grade products on time and at a competitive price.

MH20845
Certificate of UL

EMC tested
Certificate of CE

Certificate of ISO9001

Our batteries meet international standards including JIS, DIN and IEC and have UL certification.

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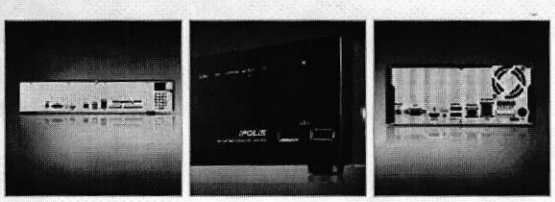
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Convenient Network Recording
16/4CH network recorder





16CH/4CH Network Video Recorder

SRN-1670D/470D

The 1670D/470D is a high-quality, high performance network video recorder supporting up to 16/4 network streams. These NVR feature real-time recording capability at 30fps, CIF resolution and supports H.264/MJPEG dual codec makes to enable selecting proper codec that meets users' need. And also, these supports DVD writer and USB ports so user can do easy backup.

- H.264, MJPEG dual codec
- 4CIF high resolution images at 480fps(N), 400fps(P) in real-time (SRN-1670D)
  4CIF high resolution images at 120fps(N), 100fps(P) in real-time (SRN-470D)
- DVD writer support

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16CH/4CH Network Video Recorder

SRN-1670D/470D

16CH/4CH | H.264 | 480fps(N) 400fps(P) | 120fps(N) 100fps(P) | HDMI 1080p



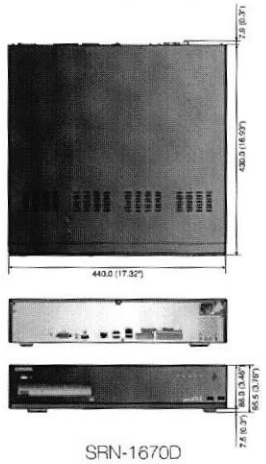
SRN-1670D



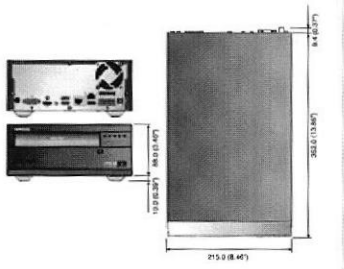
SRN-470D

Dimensions

Unit : mm (inch)



SRN-1670D



SRN-470D

Specifications

		SRN-1670D	SRN-470D
DISPLAY			
N/W Camera	Inputs	Up to 16CH (4CIF 480/400fps)	Up to 4CH (4CIF 120/100fps)
	Resolution	VGA, 4CIF, 1.3M, 2M	
	Protocols	Samsung	
Live	Multi Screen Display	1 / 4 / 6 / 8 / 9 / 13 / 16, Sequence	1 / 4, Sequence
PERFORMANCE			
Operating System	Embedded	Linux	
Recording	Compression	H.264, MJPEG	
	Recording Bit Rate	48Mbps	
	Record Rate / NTSC	Up to 120fps@1.3M, 2M Up to 120fps@1280 x 720 (1M) Up to 480fps@704 x 480 (4CIF)	Up to 120fps@1.3M, 2M Up to 120fps@1280 x 720 (1M) Up to 120fps@704 x 480 (4CIF)
	Record Rate / PAL	Up to 100fps@1.3M, 2M Up to 100fps@1280 x 720 (1M) Up to 400fps@704 x 576 (4CIF)	Up to 100fps@1.3M, 2M Up to 100fps@1280 x 720 (1M) Up to 100fps@704 x 576 (4CIF)
	Mode	Manual, Schedule (Continuous / Event), Event (Pre / Post)	
	Overwrite Modes	Continuous	
	Pre-alarm	Up to 30sec (5, 10, 20, 30sec)	
	Post-alarm	Up to 6hour (5, 10, 20, 30sec, 1, 3, 5, 10, 20min, 1, 2, 3, 4, 5, 6hour)	
Search & Playback	Playback Speed / NTSC	Up to 30fps@1.3M, 2M Up to 60fps@1280 x 720 (1M) Up to 120fps@704 x 480 (4CIF)	Up to 30fps@1.3M, 2M Up to 30fps@1280 x 720 (1M) Up to 120fps@704 x 480 (4CIF)
	Playback Speed / PAL	Up to 25fps@1.3M, 2M Up to 50fps@1280 x 720 (1M) Up to 100fps@704 x 576 (4CIF)	Up to 25fps@1.3M, 2M Up to 25fps@1280 x 720 (1M) Up to 100fps@704 x 576 (4CIF)
	Search Mode	Date/time, Event, Back up (*All search included preview function)	
	Playback Function	Fast forward / backward, Slow forward / backward, Step forward / backward	
Network	Ethernet	Gigabit Ethernet x 2	
	Transmission Speed	Up to 48Mbps, Unlimited (48M) / 2 / 1.5 / 1Mbps / 800 / 600 / 500 / 400 / 300 / 200 / 100 / 50Mbps	
	Bandwidth Control	Automatic	
	Max. Remote Users	Search 3 / Live unicast 10 / Live multicast 20	
	Protocol Support	TCP/IP, DHCP, PPPoE, SMTP, NTP, HTTP, DDNS, RTP, RTSP	
	Monitoring	NET-i viewer, Webviewer	
Storage	Internal HDD	Up to 5 SATA HDDs	Up to 1 SATA HDD
	External HDD	eSATA interface	
	DVD Writer (Back up)	Yes	
	USB (Back up)	3 USB ports	2 USB ports
	File Format (Back up)	BU (NVR player), EXE (Include player)	
Security	Password Protection	1Admin, 10 Group, 20 User per 1 group, User can be assigned authority for function	
	Data Authentication	Watermark	
INTERFACE			
Monitors	VGA	Analogue RGB 1280 x 1024(60Hz) resolution	
	HDMI	720p/1080p(60Hz) resolution	
Audio	Inputs	N/A (Network audio support, up to 16CH)	N/A (Network audio support, up to 4CH)
	Output	RCA x 1	
	Compression	G.711/723/726	
Alarm	Inputs	Terminal 16 inputs, NO/NC	Terminal 4 inputs, NO/NC
	Outputs	Terminal 4 relay outputs, NO/NC	Terminal 2 relay outputs, NO/NC
	Remote Notification	Notification via e-mail	
Connections	Ethernet	2 RJ-45 10/100/1000 Base-T	
	USB	USB 2.0, 3 ports	USB 2.0, 2 ports
	eSATA	2 ports	
	Application Support	Mouse, Remote controller	
Dome Protocols	Supported PTZ Cameras	Samsung network products (Network PTZ)	
GENERAL			
Electrical	Input Voltage / Current	100 ~ 240V AC ±10%, 50/60Hz, Auto ranging	12V DC adaptor, 4A,100 ~ 250V AC, 50/60Hz, 55W
	Power Consumption	Max. 60W (With 1x HDD)	Max. 36W (With 1x HDD)
Environmental	Operating Temperature	+0°C ~ +40°C (+32°F ~ +104°F)	
	Operating Humidity	20% ~ 85% RH	
Mechanical	Dimensions (WxHxD)	440.0 x 88.0 x 430.0mm (17.32" x 3.46" x 16.93")	215.0 x 88.0 x 352.0mm (8.46" x 3.46" x 13.86")
	Weight (2x Hard Disks)	Approx. 7.5Kg (16.53 lb)	Approx.3Kg (6.61 lb)
	Rack Mount Kit	2ea	N/A
Language		Korean, Japanese, Chinese, English, French, German, Spanish, Italian, Russian, Polish, Czech, Turkish, Netherlands, Portuguese,Swedish,Danish, Thailandais, Rumania, Serbia, Croatia, Hungarian, Greek (22 Language)	

eco RoHS compliant

The Eco mark represents Samsung Techwin's will to create environment-friendly products,and indicates that the product satisfies the EU RoHS Directive.

Design and specifications are subject to change without notice.

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I.E-1103

SNF-8010/8010VM

ONVIF

5Megapixel Fisheye Camera



SNF-8010



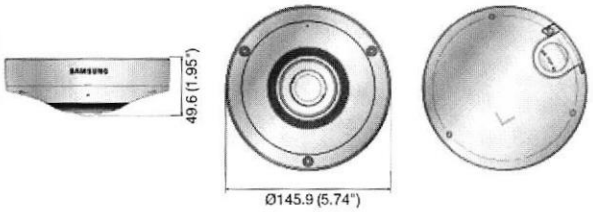
SNF-8010VM

Key Features

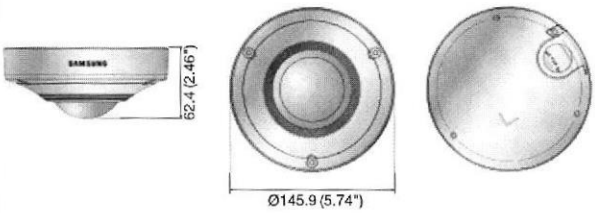
- Max. 5M (2560 x 2048) resolution
- Various viewing composition, 6 dewarping view mode
- On board dewarping, Digital PTZ / Bi-directional audio
- WDR (Contrast Enhanced), MD, AD
- M12 connector (SNF-8010VM)
- IP66, IK10, EN50155, EN61373 certifications (SNF-8010VM)
- micro SD/SDHC/SDXC memory slot, PoE

Dimensions

Unit : mm (inch)



SNF-8010



SNF-8010VM

Accessories (Optional)



SBP-300TM1



SBP-300HM5

		SNF-8010/8010VM
VIDEO		
Imaging Device		1/1.8" 6M CMOS (IMX178)
Total Pixels / Effective Pixels		6megapixel / 5.2M (2,560 x 2,048)
Scanning System		Progressive
Min. Illumination		Color : 0.5Lux (F2.5, 50IRE), 0.2Lux (F2.5, 30IRE) B/W : 0.05Lux (F2.5, 50IRE), 0.02Lux (F2.5, 30IRE)
LENS		
Focal length / Max. Aperture Ratio		1.14mm fixed / F2.5
Angular Field of View		H : 187° / V : 187° / D : 187°
Min. Object Distance / Focus Control		0.3m ~ Infinity / Manual
Lens Type / Mount Type		Fixed lens / Board type (M12)
OPERATIONAL		
Camera Title		Off / On (Displayed up to 15 characters)
Day & Night / Backlight Compensation		True D&N / BLC
Wide Dynamic Range		60dB (SSDR)
Contrast Enhancement		SSDR (Samsung Super Dynamic Range) (Off / On)
Digital Noise Reduction		SSNR (2D+3D noise filter) (Off / On)
Motion Detection		Off / On (4ea rectangle zones)
Privacy Masking		Off / On (32 zones with rectangle)
Gain Control		Off / Low / Middle / High
White Balance		ATW / AWC / Manual / Indoor / Outdoor (Include mecury)
Electronic Shutter Speed		2 ~ 1/12,000sec
Digital Zoom		16x, Digital PTZ (Preset, Group)
Flip / Mirror		Off / On
Intelligent Video Analytics		Tampering, Audio detection
Alarm I/O		Input 1ea / Output 1ea
Alarm Triggers		Motion detection, Tampering, Audio detection, Alarm input, Network disconnection
Alarm Events		File upload via FTP and E-Mail, Notification via E-Mail, TCP and HTTP Local storage (SD/SDHC/SDXC) recording at network disconnected & event (Alarm triggers), External output
Viewing Composition		Camera : 360 source view, Single panorama, Double panorama, Quad view, Single rectangle CMS : 360 source view, Single panorama, Double panorama, Quad view, Single rectangle, 360 source view + 3 rectangle, Single panorama + 2 rectangle
NETWORK		
Ethernet		RJ-45 (10/100BASE-T) : Female type, SNF-8010VM : M12 connector type
Video Compression Format		H.264 (MPEG-4 part 10/AVC), MJPEG
Resolution	Original View	2560 x 2048, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 480, 640 x 480, 320 x 240
	Dewarped View	1. Single rectangle : 800 x 600, 640 x 480, 320 x 240 2. Quad view : 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, 320 x 240 3. Double panorama : 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, 320 x 240 4. Single panaroma : 2048 x 768, 1600 x 600, 1280 x 480, 1024 x 384, 800 x 300, 640 x 240, 320 x 120
Max. Framerate	MJPEG	Source view - 2560 x 2048 : 10fps 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768 : 15fps 800 x 600, 720 x 480, 640 x 480, 320 x 240 : 20fps Single panorama view - 2048 x 768, 1600 x 1200, 1280 x 480, 1024 x 384 : 15fps 800 x 300, 640 x 240, 320 x 120 : 20fps Double panorama view - 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768 : 15fps 800 x 600, 640 x 480, 320 x 240 : 20fps Quad view - 1600 x 1200, 1280 x 960, 1024 x 768 : 15fps 800 x 600, 640 x 480, 320 x 240 : 20fps Single rectangle view - 800 x 600, 640 x 480, 320 x 240 : 20fps
	H.264	Max. 20fps at all resolution
Video Quality Adjustment		H.264 : Target bitrate level control, MJPEG : Quality level control
Bitrate Control Method		H.264 : CBR or VBR, MJPEG : VBR
Streaming Capability		Multiple streaming (Up to 5 profiles)
Audio In		Selectable (Mic in / Line in : SNF-8010/8010VM), Built-in Mic : SNF-8010 Supply voltage : 2.5V DC (4mA), Input impedance : approx 2K ohm
Audio Out		Line out (3.5mm stereo mini jack), Max output level : 1Vrms
Audio Compression Format		G.711 u-law/G.726 selectable, G.726 (ADPCM) 8KHz, G.711 8KHz, G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps
Audio Communication / IP		Bi-directional / IPv4, IPv6
Protocol		TTCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
Security		HTTPS(SSL) login authentication, Digest login authentication IP address filtering, User access log, 802.1x authentication
Streaming Method		Unicast / Multicast
Max. User Access		10 users at unicast mode
Edge Storage		micro SD/SDHC/SDXC (64GB) Motion images recorded in the SDXC/SDHC/SD memory card can be downloaded NAS (Network Attached Storage)
Application Programming Interface		ONVIF profile S, SUNAPI (HTTP API) v2.0, SVNP 1.2
Webpage Language		English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Finnish, Norwegian
Web Viewer		Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7 Supported Browser : Microsoft Internet Explorer (Ver. 8 ~ 11), Mozilla Firefox (Ver. 9 ~ 19), Google Chrome (Ver. 15 ~ 25), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 Only), 5.1.7) *Mac OS X only
Central Management Software		SmartViewer, SSM
ENVIRONMENTAL		
Operating Temperature / Humidity		-10°C ~ +55°C (+14°F ~ +131°F) / Less than 90% RH : SNF-8010 -25°C ~ +55°C (-13°F ~ +131°F) / Less than 90% RH : SNF-8010VM
Storage Temperature / Humidity		-30°C ~ +60°C (-22°F ~ +140°F) / Less than 90% RH
Ingress Protection / Vandal Resistance		IP66 / IK10 (SNF-8010VM)
Standard Certification		UL, CE, FCC, RoHS, Gost, KC (EN-61373, EN-50155 : SNF-8010VM)
ELECTRICAL		
Input Voltage / Current		12V DC ±10%, PoE (IEEE 802.3af class3)
Power Consumption		Max. 8.7W (12V DC), Max. 10.3W (PoE)
MECHANICAL		
Color / Material		Ivory / Aluminum : SNF-8010, Ivory / Aluminum (Clear dome cover) : SNF-8010VM
Demensions (WxH) / Weight		Ø145.9 x 49.6mm (Ø5.74" x 1.95") / 780g (1.72 lb) : SNF-8010 Ø145.9 x 62.4mm (Ø5.74" x 2.46") / 800g (1.76 lb) : SNF-8010VM

* The latest product information / specification can be found at www.samsungsecurity.com

FC | UL | CE | FIRST EDITION 08-2014

INTELLIGENT SUPPRESSION CONTROL SYSTEM

CHEETAH® Xi

UNPRECEDENTED SPEED

ULTIMATE POWER

EXTREME iNTELLIGENCE



Fike®

INTELLIGENT SUPPRESSION CONTROL SYSTEM

CHEETAH® Xi

Fike offers you a revolutionary advancement in fire safety and protection. Our innovative Cheetah Xi system saves lives and valuable assets through its unprecedented speed, intelligence and flexibility.

XTREME PROTECTION —

ASTER RESPONSE,

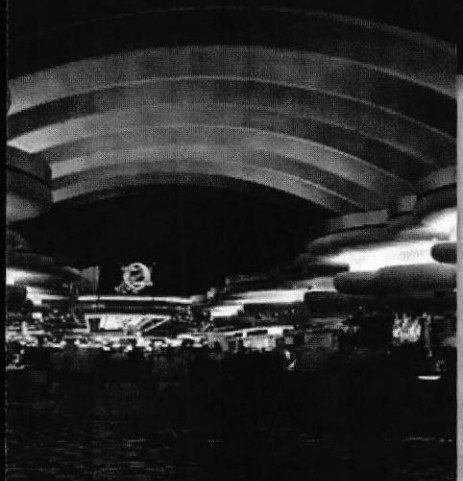
WICE THE CAPACITY,

MORE INTELLIGENCE

HAN EVER.

CHEETAH Xi IS A DIGITAL, PEER-TO-PEER, BI-DIRECTIONAL COMMUNICATION SYSTEM. Our state-of-the-art control system is the right choice for your next installations of Fire Alarm, Clean Agent Suppression, Carbon Dioxide Suppression, Watermist and Sprinkler/Pre-Action:

- 6.0 amp power supply, Expandable to 12 (5.25 amp with CheetahXi 50)
- 80-character LCD with 10 status LEDs to provide instant visual information 3200-event history buffer
- Optional internal point ID DACT
- NAC circuits provide built-in synchronization and multiple output patterns via control modules
- (2) SLCs standard, expandable to (4)
- SLC loop has a maximum length of 12,000'
- Supports 254 devices per SLC, any combination of sensors or modules (CheetahXi 50 supports 50 devices)
- Networkable up to 128 nodes including other Cheetah Xi panels as well as the CyberCat 1016 and 254 Fire Alarm panels
- Positive alarm sequence
- Up to 4,000' of wire between network nodes
- Unique digital peer-to-peer operation with intelligence in the field devices, not just the control panel
- Full integration with FAAST intelligent air sampling products
- Sensors and modules available with built-in isolators for limited isolation or true Style 7 isolation
- Up to 253 zones to map initiating devices to control functions
- Releasing function provides three input types; cross zone, counting zone and single detector, and 6 abort types
- Four levels of password protection with built-in individual user profiles
- Style 4, 6, or 7 wiring capability



SPLIT-SECOND SPEED

WHEN SMOKE AND FIRE THREATEN ASSETS CRITICAL TO THE SUCCESS AND OPERATION OF YOUR BUSINESS, REACTION TIME IS CRUCIAL. In just ten seconds, profound loss can occur. That's why we've designed Cheetah Xi detection and suppression panels to respond faster than the industry requires. With a Cheetah Xi system in your facility, the response time between the initiation of an alarm to the activation of output devices occurs in as little as one-quarter second.

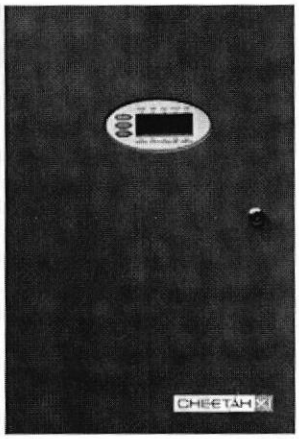
HOW DOES FIKE DELIVER SUCH INCREDIBLE SPEED? Fike's Cheetah Xi system eliminates polling delays and interference. Information is delivered simultaneously from the intelligent sensors to the suppression panel and other devices within the system. This direct communication achieves response times that are lightning fast.

CHEETAH Xi SENSOR FUNCTIONS

- Integral sensitivity testing
- Drift compensation
- Manual sensitivity adjustments
- Day/Night sensitivity adjustments
- Multi-colored LEDs that provide you instant status of devices
- Programmable remote LEDs
- Alarm verification for alarm zones
- Early warning option (summing up to 8 sensors)
- Built-in acclimate feature

Fike®

CHEETAH Xi INTELLIGENCE



Cheetah Xi 1016

Fike's intelligent Cheetah Xi system turns every device into a peer. These peers not only communicate up-to-the-second information to the control panel, they also communicate with each other.

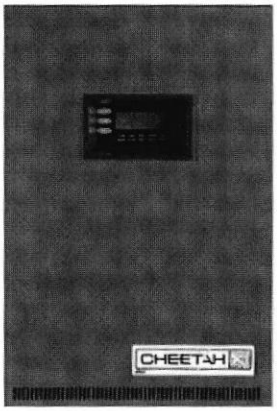
Each device is capable of generating accurate and highly detailed information. Conventional systems give you a general idea of a fire's location — for example, the second floor of your building. Cheetah Xi's intelligent sensors tell you precisely which device is in alarm and specific information on that hazard — for example, a specific location on the second floor.

In addition, Cheetah Xi modules can be programmed or tied in to other systems such as:

- Shutdowns
- Voice Evacuation Systems
- Doors
- Releasing of Clean Agent Suppression, Carbon Dioxide Suppression, Watermist, Foam, and Sprinkler / Pre-Action
- HVAC / Smoke Control
- Dampers
- Elevators
- Security / CCTV / Building Management Awareness

FIRE SUPPRESSION SOLUTIONS THAT FIT **YOUR** NEEDS

The Cheetah Xi gives you the freedom to design the ideal system for your facility. The 1016 system comes standard with two Signaling Line Circuits (expandable to four loops) that support 254 devices each. And you can network up to 128 Cheetah Xi's and/or the Fike CyberCat fire alarm panels, for up to any combination of 130,048 sensors and modules!



Cheetah Xi 50

The Cheetah Xi 50 intelligent fire suppression system, brings all that power and technology to stand-alone or smaller business applications. Flexible, fast and efficient, the Cheetah Xi 50 is the economical choice.

Same Speed. Same Intelligence. Same Great Value.

FLEXIBLE WAYS TO PROGRAM YOUR SYSTEM

Control Panel
- Basic programming / configuration through the keypad
- Auto address feature
- Address intelligent devices
- Address / configure devices via C-Linx® software



InfraRed (IR) Remote Tool
- Communicate bi-directionally with any intelligent device
- Easily address devices
- Access / test hard-to-reach intelligent devices



Handheld Programmer
- Address intelligent devices
- Address / configure devices via C-Linx software
- Handheld training panel for new technicians

CHEETAH Xi PROTECTS ANY OCCUPIED SPACE

Whether you're protecting a new building or retrofitting an existing space, Cheetah Xi has the flexibility to address all your requirements.

- Data Centers
- Telecommunications
- Generator Rooms
- Internet Service Providers
- Mining
- Museums
- Warehouses
- Office Buildings
- Industrial Facilities



INTELLIGENT SUPPRESSION CONTROL SYSTEM

CHEETAH Xi FLEXIBILITY

Cheetah Xi gives you the freedom to design the ideal system for your facility. You can easily control just a few devices or up to 130,048 devices. Plus, you can mix and match sensors and modules in virtually any combination needed for your specific application. With Cheetah Xi, the possibilities are endless.

STAND ALONE SYSTEMS

CHEETAH Xi 1016



- 2 Signaling Line Circuits (SLCs) expandable to 4
- Supports up to 1,016 devices
- Any combination of sensors and modules
- Supports up to 31 Remote Annunciators

CHEETAH Xi 50

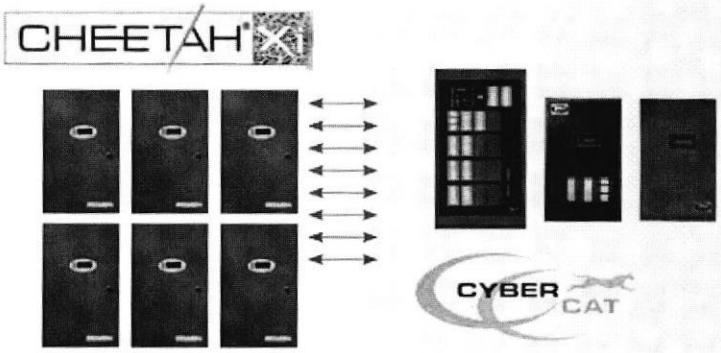


- 1 Signaling Line Circuits (SLC)
- Supports up to 50 devices
- Any combination of sensors and modules
- Supports up to 31 Remote Annunciators

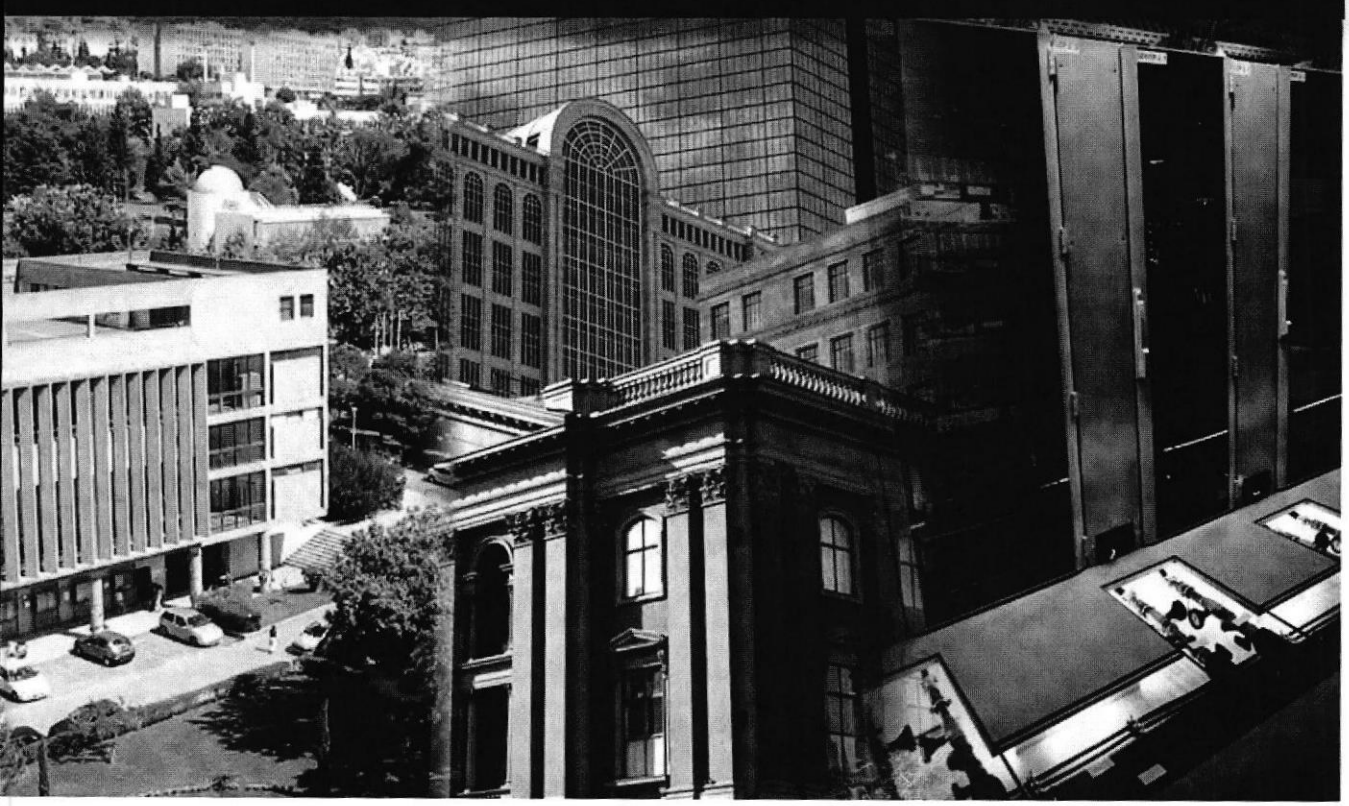
NETWORK SYSTEMS

CHEETAH Xi SYSTEM NETWORK WITH FIKE CYBERCAT® FIRE ALARM PANELS

- Connects up to 128 Cheetah Xi control panels and CyberCat panels in any combination
- Supports 130,048 devices
- Any combination of sensors and modules



EXTREME SAFETY

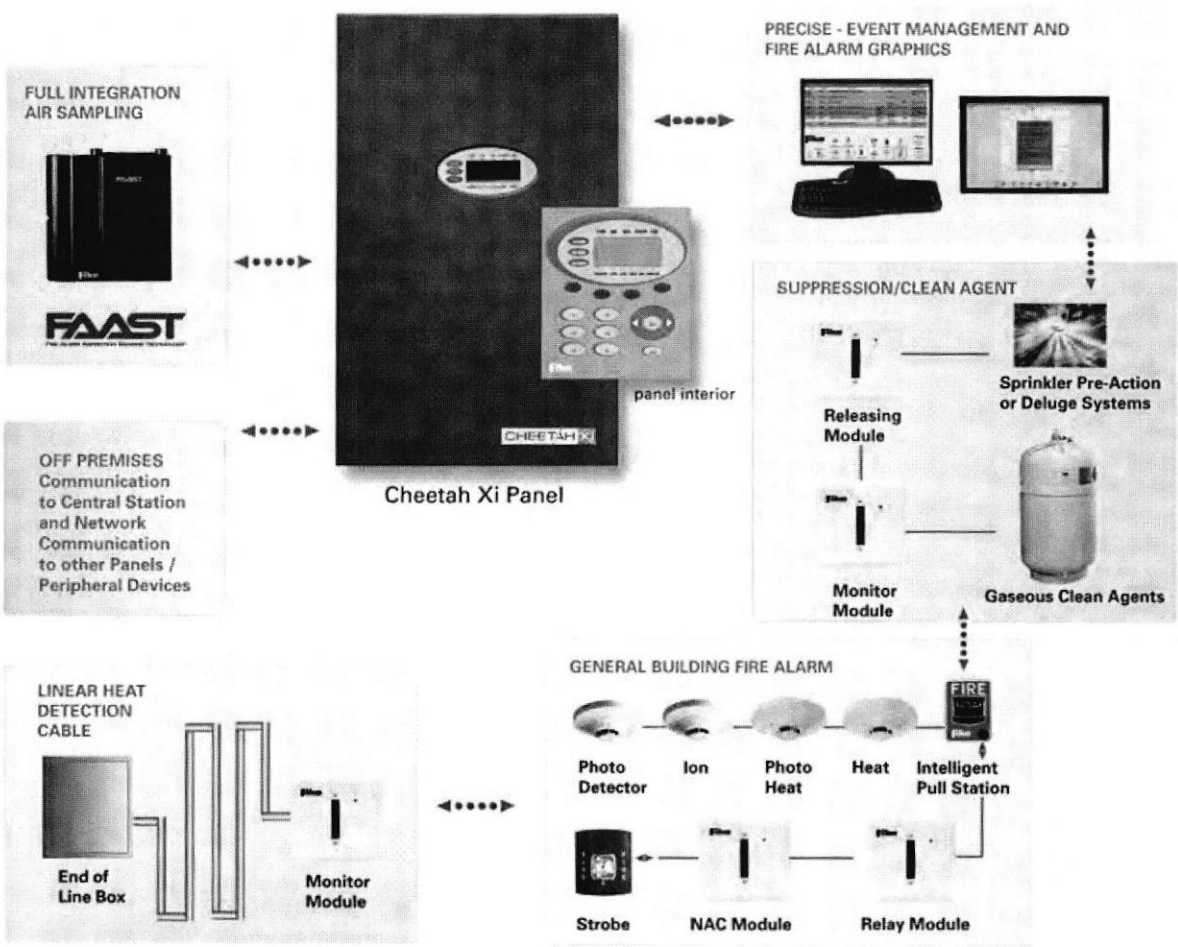


CHEETAH Xi FLEXIBILITY

CHEETAH Xi PERFORMS OPERATIONS WITH SPEED, INTELLIGENCE AND FLEXIBILITY

Our intelligent Cheetah Xi system can be programmed to relay information and perform process management tasks. Fike can help you design the ideal Cheetah Xi system for your facility.

ONE PANEL FITS ALL YOUR NEEDS FOR LIFE SAFETY AND FIRE PROTECTION





INTELLIGENT SUPPRESSION CONTROL SYSTEM

CHEETAH Xi

INTELLIGENT SUPPRESSION CONTROL SYSTEM

FIKE GLOBAL MANUFACTURING, SALES AND SERVICE

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CHEETAH Xi – ONE PANEL FITS ALL YOUR NEEDS FOR LIFE SAFETY AND FIRE PROTECTION



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DATA SHEET

AGENT STORAGE CONTAINERS WITH HFC-227EA



DESCRIPTION

Fike Clean Agent Containers are used in fire extinguishing systems to store the Clean Agent until a fire develops and the agent must be released. The Clean Agent is retained in the container by a Impulse Valve assembly which contains a fast-acting rupture disc. The disc will be ruptured, and the Clean Agent released, through the operation of an actuator by an electric signal that is automatically, manually or pneumatically controlled.

Fike Clean Agent Containers have passed extensive testing by Factory Mutual and Underwriters Laboratory and are used in installations where 3 to 1045 pounds (2.0 to 474 kg) of HFC-227ea agent is required. Clean Agent containers can be filled in 1 pound (0.5 kg) increments to their maximum capacity.

SPECIFICATIONS

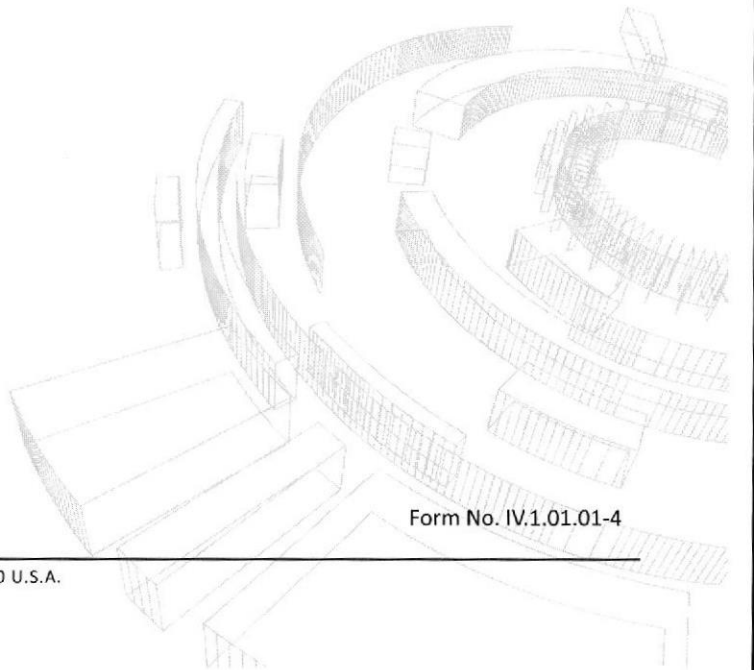
Fill Range:	40 to 70 lbs/ft^3 (630 to 1121 kg/m^3)
Fill Increments:	1.0 lbs (0.5 kg)
Container Super - Pressurization Level:	360 psig at 70°F (24.8 bar at 21°C) after filling with dry nitrogen
Container Storage Temperature Limitation:	32°F (0°C) - minimum, 130°F (54.4°C) - maximum

Note: If container temperatures exceeding 130°F (54.4°C), valve will open automatically, this also fulfills the pressure relief valve requirements in accordance with DOT regulations.

Container Construction:	Carbon Steel Alloys
Paint Options:	Baked enamel finish white (default) or red
Container Ratings:	DOT 4BW500 TC 4BWM534
Actuation Methods:	Electric/Pneumatic/Manual

APPROVALS:

- UL Listed
- ULC Listed
- FM Approved



Form No. IV.1.01.01-4

704 SW 10th Street • P.O. Box 610 • Blue Springs, Missouri 64013-0610 U.S.A.
Phone: 816•229•3405 • www.fike.com

CONTAINER DATA/SPECIFICATIONS

Container		Fill range		Valve Size	Tare Weight	Dimensions (approximate)		Mounting Position
Size	P/N	Minimum	Maximum			Diameter	Height	
Lb. (L)		lbs. (kg)	lbs. (kg)	IN (mm)	lbs. (kg)	IN (mm)	IN (mm)	
5 (2)	70-272	3 (2.0)	5 (2.5)	1 (25)	11 (5.0)	4.2 (102)	16.2 (411.5)	Upright (Valve Up)
10 (4)	70-273	6 (3.0)	10 (4.5)	1 (25)	15 (6.8)	4.2 (102)	27.24 (691.9)	Upright (Valve Up)
20 (8.5)	70-263	12 (5.5)	21 (9.5)	1 (25)	22 (10.0)	7.0 (178)	22.50 (571.5)	Upright - Horizontal
35 (15)	70-264	22 (10.0)	38 (17.0)	1 (25)	32.5 (14.7)	7.0 (178)	33.75 (857.3)	Upright - Horizontal
60 (27)	70-265	39 (18.0)	68 (30.5)	1 (25)	52.5 (23.8)	10.75 (273)	28.13 (714.4)	Upright - Horizontal
100 (44)	70-266	63 (28.5)	108 (49.0)	1 (25)	77 (34.9)	10.75 (273)	39.63 (1006.5)	Upright (Valve Up)
150/150i (61)	70-267	87 (39.5)	150 (68.0)	3 (80)	118/114 (53.5/51.7)	20.0 (508)	24.25 (616.0)	Upright/Inverted
215 (88)	70-268	124 (56.5)	216 (98.0)	3 (80)	146 (66.2)	20.0 (508)	30.13 (765.2)	Upright (Valve Up)
375 (153)	70-269	217 (98.5)	378 (171.5)	3 (80)	213 (96.6)	20.0 (508)	43.38 (1101.7)	Upright (Valve Up)
650 (267)	70-270	378 (171.5)	660 (299.0)	3 (80)	373 (169.2)	24.0 (610)	50.50 (1282.7)	Upright (Valve Up)
1000 (423)	70-271	598 (271.5)	1045 (474.0)	3 (80)	535 (242.7)	24.0 (610)	71.88 (1825.6)	Upright (Valve Up)

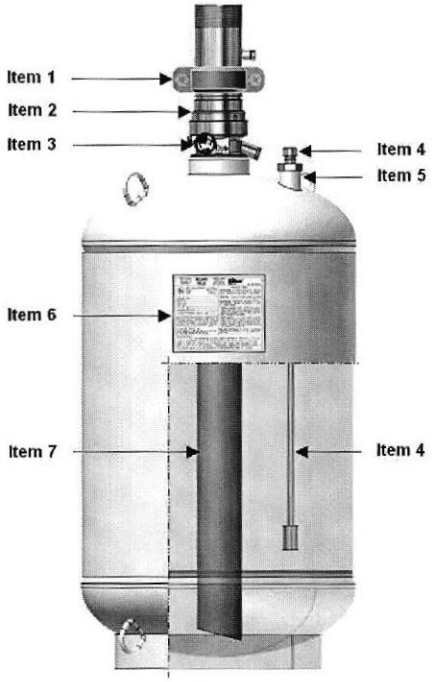
ITEMS SUPPLIED WITH CONTAINER ASSEMBLY

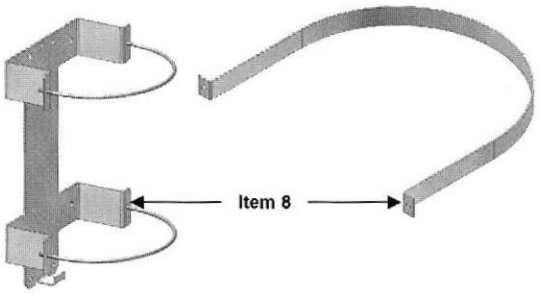
Item Number	Description	Data Sheet
1	Victaulic Coupling & Nipple	IV.1.19.01
2	Impulse Valve	IV.1.14.01
3	Pressure Gauge	IV.1.13.01
4	Liquid Level Indicator (LLi)	C.1.40.01
5	LLi Boss (see note 1)	n/a
6	Nameplate (see note 2)	n/a
7	Siphone Tube (see note 3)	n/a
8	Mounting Straps & Brackets	IV.1.18.01

Notes:
1) 100 thru 1000 lb. (44 thru 423 L) containers are equipped with a LLi Boss.

2) Fike nameplate provides the information that is specific to each container: Assembly and serial number of the container, weight information: tare, gross and agent and installation, operation and safety information. All containers filled either by the factory or by an Approved Initial Fill Station are provided with a name plate bearing the UL & FM markings.

3) Fike Clean Agent containers [except the 150i (Inverted)] are equipped with a siphon tube. The 20, 35 & 60 lb. containers have bent siphon tubes and the 5, 10 and 100 – 1000 lb. containers have straight siphon tubes. All containers with siphon tubes can be mounted upright. The 20, 35 & 60 lb containers can also be mounted horizontally. The 150 container can only be mounted upright and the 150i can only be mounted inverted.



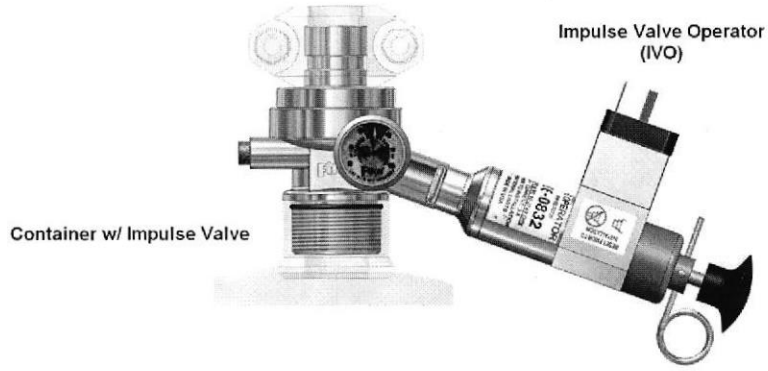


OPTIONAL ITEMS FOR CONTAINER

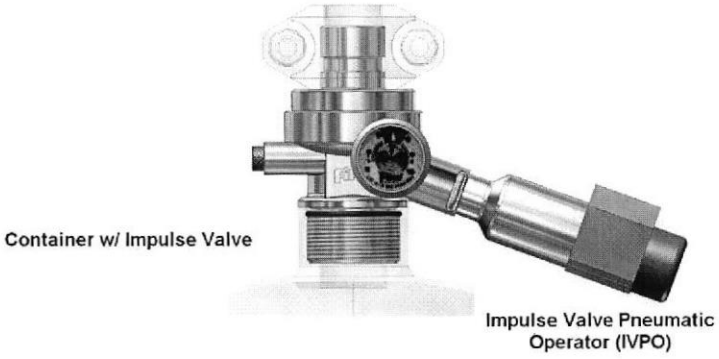
The following container accessory items must be ordered separately.

ACTUATION COMPONENTS

- Electric / Manual Actuation – Impulse Valve Operator (IVO) (For detailed information, refer to the IVO Data Sheet IV.1.09.01)



- Pneumatic Actuation – Impulse Valve Pneumatic Operator (IVPO) (For detailed information, refer to the IVPO Data Sheet IV.1.10.01)



ACTUATION METHODS

Clean Agent containers with an Impulse Valve can be actuated by the following methods:

- Method 1 – Electric Actuation – Single Container System w/ IVO & IRM
- Method 2 – Electric Actuation – Multi-Containers System w / IVO & IRM
- Method 3 – Electric & Pneumatic Actuation – Two Container System w/ IVO & IVPO
- Method 4 – Electric & Pneumatic Actuation – Multi Container System w/ IVO & IVPO

For detailed information on actuation methods, refer to the Impulse Valve Operator (IVO) data sheet IV.1.09.01.

These devices provide the force required to extend a pin that will open the rupture disc, allowing the agent to be released from the container.

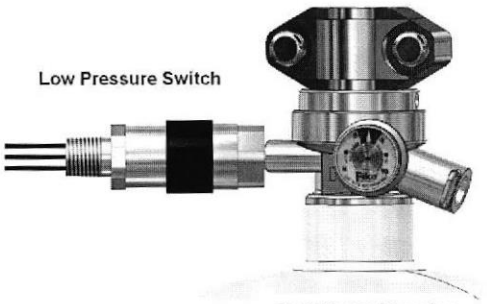
LOW PRESSURE SWITCH

The Low Pressure Switch provides a means to continuously monitoring the container pressure for a low-pressure condition.

If the pressure inside the container drops below 288 psig (1986 kPa), the switch contacts will transfer and invoke a "trouble" indication on the control panel.

The Low Pressure Switch (P/N 02-12533) has a single pole, double-throw switch that can be wired for normally open or normally closed.

For detailed information, refer to the Low Pressure Switch Data Sheet IV.1.13.01.



Container w/ Impulse Valve

INSTALLATION

The system installation must comply with the requirements of this manual; NFPA 2001, latest edition; all applicable local codes, regulations, and standards and the authority having jurisdiction (AHJ).

Warning: DO NOT start system installation until the final design of the total system has been verified using Fike's Engineered Flow Calculation.

Warning: The Actuator shall always be the last component installed on a Fike Clean Agent Fire Suppression system to avoid accidental discharge.

Factors to Consider - Container Location

Mounting Surface: Container brackets must be mounted securely to solid load-bearing surfaces that will support the container load. Some installations may require additional mounting support not supplied by Fike.

Environmental Effects: Container(s) should be located in clean, dry, and relatively vibration-free areas. Avoid aisle ways and other high traffic areas where physical damage or tampering is more likely. Container(s) should never be mounted where the container could potentially be splashed with, or submerged in any liquid. Do not locate containers where they would be subject to physical damage, exposure to corrosive chemicals, or harsh weather conditions.

Temperature Range: Container locations must be between 32 to 130°F (0 to 54.4°C). Temperatures outside of this range may result in the system not supplying the desired quantity of agent or accidental discharge.

Serviceability: In general, the larger the container, the more difficult it will be to remove it from the system for maintenance and service. However, smaller containers that are located in a sub-floor space, under a computer bank, or above the ceiling over the same computer bank can be difficult as well.

Floor Space: Consideration should be given to the space available to install the container(s). For example, a 900 lb. (408 kg) system could be stored in (2) 650 lb. (267 L) containers located on the floor. However, if floor space is a problem, the system could be designed to utilize (6) 150i lb. (61 L) Inverted Containers mounted on the wall(s).

Floor Loading: Floor loading must be considered when selecting a container location. The floor must be able to support the total weight of the Fike container(s) as they are moved into position. Consult raised floor manufacturer for floor loading limitation. The following guidelines are recommended:

- Raised floor loading is a function of the manufacturer's load specification and the positioning of the container(s) on the raised floor grid.

Note: Fike cannot assume responsibility for determining the suitability of a particular raised floor system; the following does provide information to help determine installation requirements.

- When clean agent containers are located on a raised floor, floor integrity must be considered to determine if the type of tile and vertical floor support can handle the increased load. If necessary additional floor supports can be added.

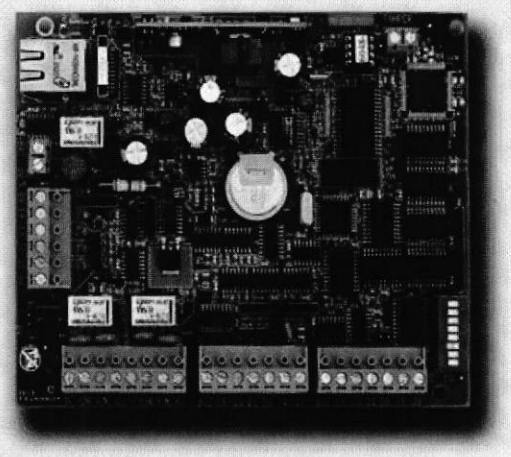
Option: To help distribute the container weight over a greater area, a ¼" steel plate can be placed under the container(s), sized to span multiple floor supports. If container spans multiple floor tiles, add additional floor supports (Minimum of 4 floor supports, 1 per corner, must be used). Excessive floor loading may require relocating the container(s) to a more suitable location. For floor loading information refer to the table on page 6 or to Fike's ECARO-25 Flow Calculation program for container size and actual fill weight being supplied.

Container Size lb. (L)	Total Container Weight lbs. (kg) see note 1	Container Floor Area ft^2 (m^2)	Container Floor Loading lbs/ft^2 (kg/m^2)	Container Floor Area w/ Plate 1/4: x 2' x 2' plate (6.4mm x 0.6m x 0.6m plate) ft^2 (m^2)	Container w/ Plate Floor Loading lbs/ft^2 (kg/m^2) see note 2
1000 (423)	1386 (628)	3.14 (0.29)	508 (2493)	4.0 (0.36)	404 (2037)
650 (267)	913 (41)	3.14 (0.29)	333 (1636)	4.0 (0.36)	267 (1467)
375 (153)	527 (239)	2.18 (0.20)	277 (1368)	4.0 (0.36)	156 (788)
215 (88)	328 (148)	2.18 (0.20)	170 (840)	4.0 (0.36)	98 (495)
150 (61)	283 (128)	2.18 (0.20)	138 (680)	4.0 (0.36)	81 (406)
100 (44)	164 (74)	0.63 (0.06)	294 (1400)	4.0 (0.36)	52 (262)
60 (27)	106 (48)	0.63 (0.06)	190 (908)	4.0 (0.36)	36 (180)
35 (15)	51 (23)	0.27 (0.03)	256 (115)	4.0 (0.36)	23 (114)
20 (8.5)	37 (17)	0.27 (0.03)	156 (72)	4.0 (0.36)	16 (83)
10 (4)	23 (11)	0.10 (0.009)	250 (1278)	4.0 (0.36)	12 (60)
5 (2)	15 (7)	0.10 (0.009)	160 (833)	4.0 (0.36)	10 (49)

Notes:
1) Total container weight is based on container tare weight + maximum fill weight
2) Total container weight + 22.5 lbs (10.2 kg) added for 1/4" x 2' x 2' (6.4mm x 0.6m x 0.6m) plate used to calculate container with plate floor loading

accesor

CENTRAL SMART IP PoE-ACR



PoE TCP / IP On board

DDS Building Security Together

Cardholder	DOORS	READERS	INPUT	OUTPUT	EVENTS	Processor	TCP / IP
160.000 Max.	1	2	4	2	24.000 max.	2	On board

CONTROLADORA IP PoE CONTROL TOTAL POR PUERTA

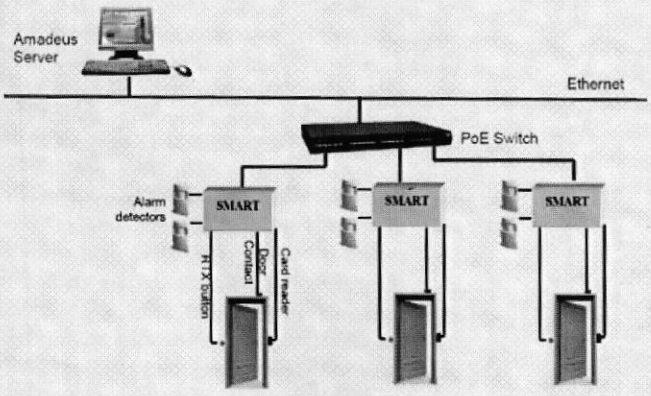
La controladora SMART-PoE es un sistema de control de acceso de 1 puerta diseñada para entornos de alta seguridad. Esta controladora es el nuevo producto de DDS, diseñada tanto para proyectos de tamaño mediano, así como para las instalaciones más sofisticadas multi-sitios.

El primer controlador de este tipo, que coge su alimentación necesaria directamente desde el cable TCP / IP con su fuente de alimentación incorporada 12W PoE estándar. Esta fuente de alimentación también produce la energía suficiente para alimentar hasta 2 lectores de tarjetas, una cerradura de la puerta y la carga de una batería de plomo / ácido 12V/1,2 Ah, que abastecerá a todo el sistema durante los apagones.

La SMART-PoE, con su pequeño tamaño, no requiere ninguna fuente de alimentación externa, ya que se puede instalar muy cerca a la puerta y por lo tanto, permite un gran ahorro de cableado. Además, su ergonomía y su tamaño estándar permiten que la SMART-PoE sea instalada en un carril DIN estándar.

Arquitectura de Instalación muy simple ya que se utiliza un sistema de 1x1(1 Central x 1 Puerta), de tal forma que en cualquier proyecto solo hemos de prever toma Red PoE.

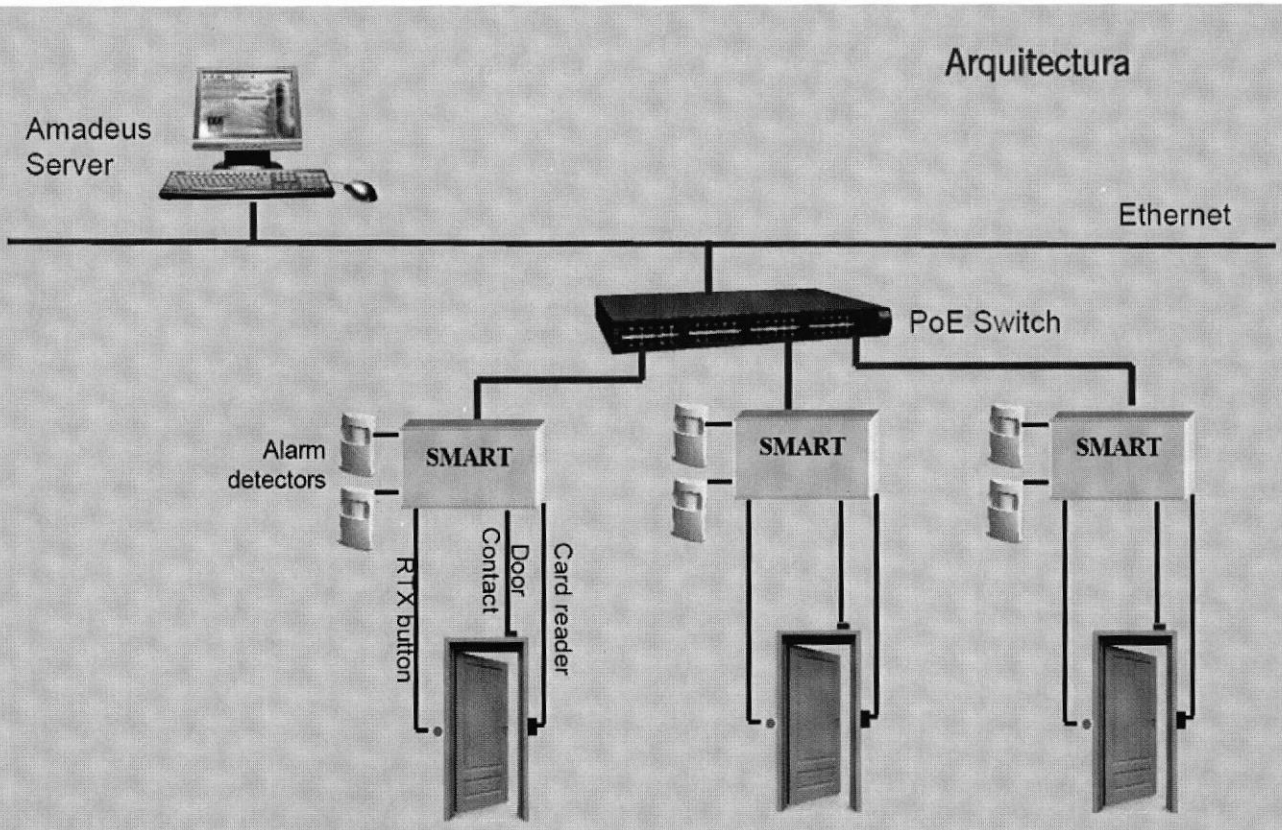
Con capacidad de gestión de 2 lectores de cualquier tecnología, la Smart permite activar la entrada / salida de 1 puerta con capacidad para 44.000 usuarios de tarjetas



(ampliable a 160.000 usuarios de tarjetas con 2M de memoria). Dependiendo de su configuración, puede almacenar hasta 18.000 eventos (ampliable a 24.000 eventos con memoria 2M).

La controladora permite controlar hasta 4 entradas supervisadas (es decir, los estados de las 4 entradas) (para contacto de puerta, Támper y 2 entradas de alarma insumos) y 2 salidas de relés. La SMART está conectada al servidor principal a través de una red TCP / IP. El controlador es compatible con las decisiones autónomas en el ámbito local, como abrir puertas y activar salidas y reflejos, sin intervención del PC. La programación es sencilla y su memoria flash hace que la descarga de firmware sea fácil y rápida.
El uso de las nuevas tecnologías frente a las interferencias electromagnéticas (6 capas de PCB, componentes de protección en entradas / salidas) aumenta aún más la fiabilidad del sistema y de la controladora.
La Smart-PoE se integra fácilmente en aplicaciones externas BMS e instalaciones incluyendo otros controladores DDS.

MODELO	DESCRIPCIÓN
SMART-ACR	De 2K a 160K usuarios, 24K eventos, 2 lectores, 4 entradas, 2 salidas, multi tecnología en lectores, comunicación RS232/485.
SMART IP-ACR	Mismas características que SMART-ACR y comunicación IP en placa base.
SMART IP PoE-ACR	Mismas características que SMART I/P + alimentación PoE
SMART JX-ACR	Mismas características que SMART-ACR + fuente alimentación 3.5A y armario metálico.



Características Técnicas

- 2 lectores / 1 puerta.
- 4 entradas supervisadas.
- Detección automática de batería baja, tamper de seguridad, conexión a lectores y aviso por alimentación PoE baja.
- 2 salidas de relés.
- Conectores extraíbles.
- LED en las entradas / salidas
- TCP + PoE en placa alimenta 12V/700mA (Ej.: dos lectores 12V/100mA + 1 cerradura de 12V/500 mA).
- Velocidad de transmisión desde 4,800 hasta 38,400 baudios
- Cargador incorporado de 12 V / 1,2 Ah de plomo ácido de batería.
- Reloj de tiempo real (RTC).
- Se puede instalar en carril DIN.
- Lectores para varias tecnologías: biometría, tarjetas inteligentes: de proximidad, magnéticas, etc.
- 1 MB de memoria Flash de firmware de aplicación (descargado desde el PC).
- 512K de memoria RAM (ampliable a 2 M) para la base de datos de operación respaldada por la batería de litio.
- Decisiones autónomas en el ámbito local sin degradación del nivel de seguridad.
- Hasta 44.000 titulares de la tarjeta (ampliable a 160.000).
- Hasta 18.000 eventos en búfer (ampliable a 24.000).
- 255 programas diarios, semanales, 127 programas de 180 días de fiesta.
- 255 reflejos (locales y de red).

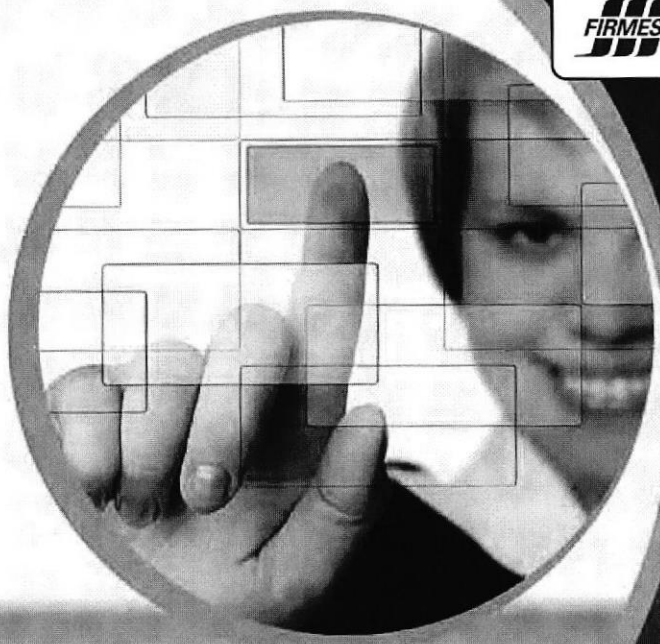
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INFINISCAN™

World class biometric identification system

FIRMESA





High Reliability

Industrial Design

High Identification Speed

Standalone

S07 *Fingerprint Access Control Terminal*

INFINISCAN™ S07 series Fingerprint Door Access Control delivers confidence and convenience by using every user's unique fingerprints and eliminating the use of keys, password or card system for door access.

INFINISCAN™ S07 series is designed to eliminate any high cost for intensive labor and expensive equipments while benefits the users with highest protection you desired. INIFINISCAN™ S07 series act as a user-friendly and reliable fingerprint authenticator to ensure high-level protection that your organization or premises requires.

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Get the SECURITY for your enterprise

FEATURES & BENEFITS

Fingerprint
Fingerprint reader, a tool to scan fingerprint for identity verification. Enrolled fingerprint are stored in the system, without presence of the genuine fingerprint, no access can be acquired.

TCP/IP Method
INFINISCAN™ series S07 installed with TCP/IP as a communicator between reader and computer that supports real-time data transfer for easy and efficient data management.

Smart Recognition Algorithm
Manage one-to-one (1:1) and one-to-many (1:N) verifications of maximum 3,000 templates. Allowing 360° rotation fingerprint placement with capability to read fingerprint in dry or wet conditions to provide quick authentication with high accuracy.

High Performance CPU
Equipped with 32BIT Intel CPU for fast and sufficient process.

Linux O/S
Embedded with advanced Linux Operation System which can operate consecutively for 24 hours with reliable and stable performance.

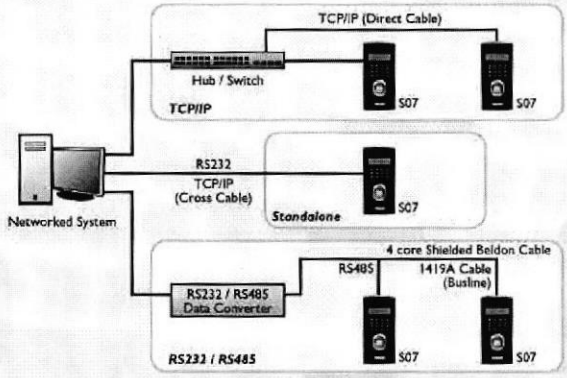
Multiple Languages
INFINISCAN™ S07 series offer a standard software display language in English but also multinational-languages for user to choose from upon your request.

Wiegand Out
INFINISCAN™ S07 equipped with Wiegand Output communication to incorporate with any third party readers or door access controllers for better access control and management.

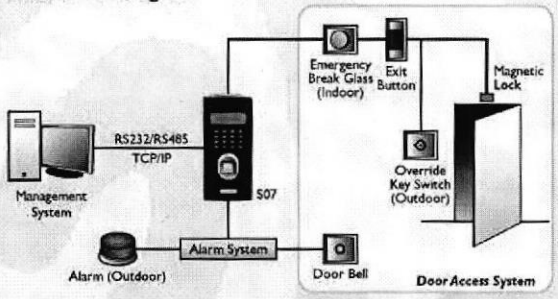
Specification	S07
Display	2 lines, 16 characters each line Graphic Display LCD
LED indicator/Buzzer	2 LED(Red/Green) / 1 Buzzer
Display Language	Standard: English & Chinese Upon Request: Multinational Language
Greeting Voice	N/A
Keypad & button	16 key numeric & Function keypad
Dimension	191.5 x 85 x 35mm
Sensor	
Sensor Type / Resolution	Optical (500 dpi)
Sensing Area	18mm x 22 mm
Storage Capacity	
Fingerprint Templates	500
Transaction	30,000
RF reader	
ID Card: 125 KHZ	Optional
MIFARE: 13.56 MHz	Optional
HID	N/A
Communications	
RS-232/485	YES
TCP/IP	YES
USB Client	N/A
USB Host	N/A
GPRS	Optional
Wiegand	26 bits Output
Access Control	
Alarm Output	NO & NC ALARM
EM lock driving output	Yes
Antipassback	N/A
Operation Environment	
Power Consumption	DC 12V, 3A
Temperature	0 ~ 45
Humidity	20% ~ 80%
Verification	
1:1 (Time)	<0.5 sec
1:N (Time)	<2 sec
FAR	0.0001%
FRR	1%
Standards Compliance	CE, FCC

More Optional Function : Web server, Work code, SMS, Multi-verification, Printer, RIS, 9 digits-code, Time event transfer, Record checking

System Communication



Installation Diagram



For distributors

FIRMESA

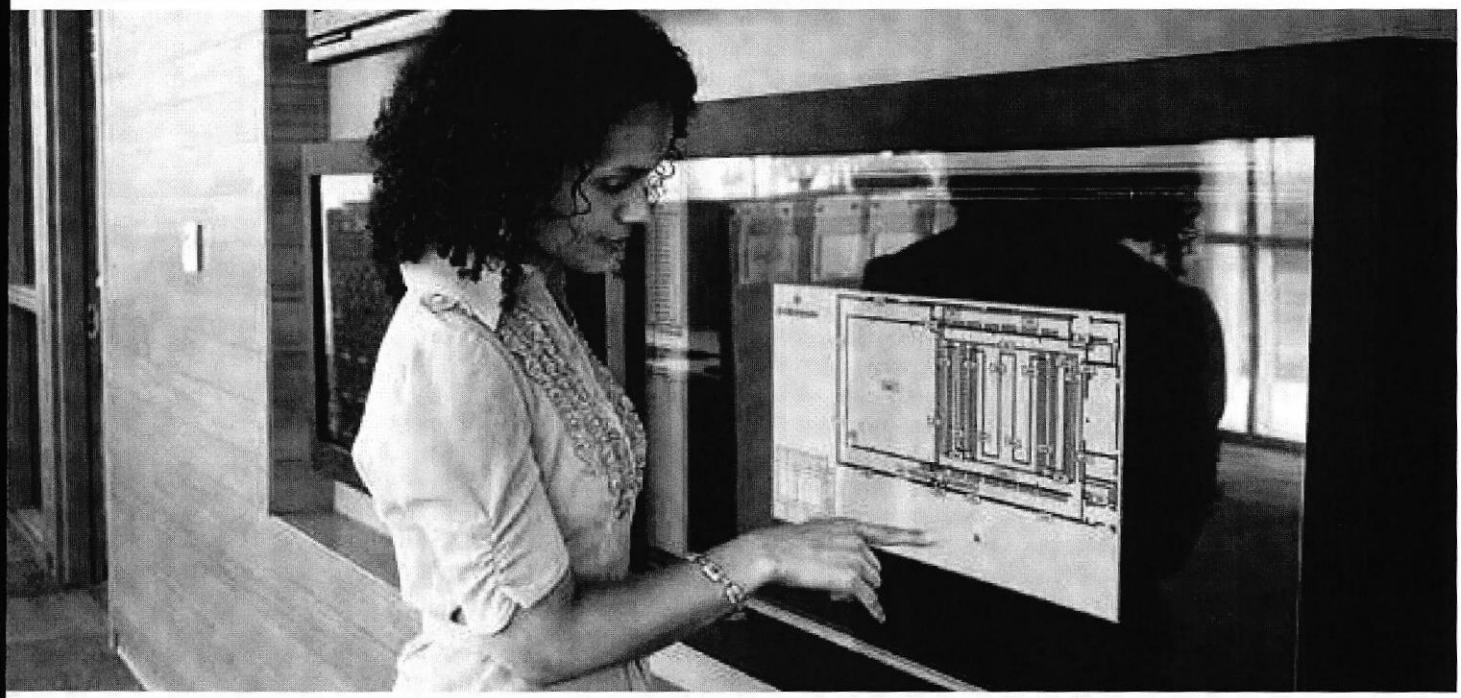
INFINISCAN™ LIMITED
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4 Cho Yuen Street, Yau Tong Bay, Kowloon, Hong Kong.
Tel : (852) 3586 9192 Fax : (852) 2772 7194
E-mail : sales@infiniscan.com Website : http://www.infiniscan.com

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Administración de la infraestructura y monitoreo para *Business-Critical Continuity™*

Data Center Infrastructure Management (DCIM)

Administrar la infraestructura física con mayor eficiencia

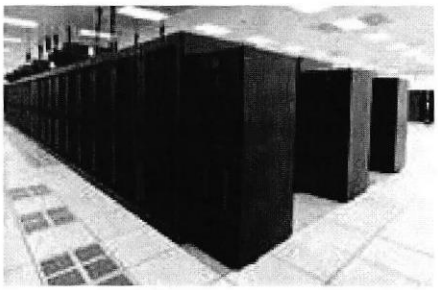


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CIB - ESPOL

DATA CENTER INFRASTRUCTURE MANAGEMENT

Administrar la infraestructura TI y física con mayor eficiencia



Emerson Network Power es el líder de mercado en Data Center Infrastructure Management (DCIM). Es el único proveedor de productos líderes de la industria de todos los componentes necesarios para una administración integral de la infraestructura. El alcance de la capacidad y profundidad de los conocimientos de la industria nos permiten ofrecer una solución holística que mantiene la disponibilidad y estimula la eficiencia en toda la infraestructura del centro de datos.

IMPERATIVO PARA MEJORAR EL DESEMPEÑO Y CONTROLAR LOS COSTOS

Nunca antes ha sido tan difícil administrar un centro de datos. Nunca antes la demanda de servicios, complejidad del entorno y lo fundamental de la disponibilidad han sido tan importantes.

A estos factores se le suma, una presión constante por controlar costos. Es fácil entender por qué las empresas piensan en el cómo administran su centro de datos.



Emerson Network Power constituye la fuente confiable de soluciones innovadoras y experiencia en sistemas eléctricos y de aire acondicionado de precisión, racks y gabinetes integrados, controles y conmutadores de potencia, monitoreo y conectividad. Con nuestras marcas Liebert™, Avocent® y Aperture™, hemos ofrecido beneficios para la administración de la infraestructura por años.

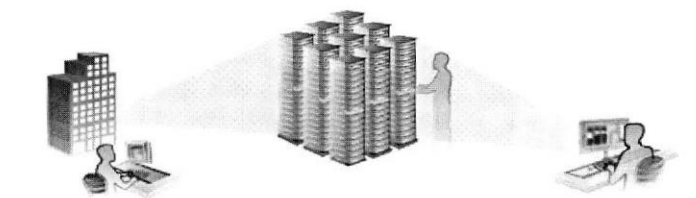
Cambiar la forma en la que se administran los centros de datos, es la prioridad de hoy.

Al simplemente implementar una herramienta que almacena toda la información de configuración y es "la fuente de información" de la organización, junto con instrumentos y monitoreo activo, las compañías pueden revolucionar sus operaciones y recibir un significativo rendimiento de inversión.

Al implementar la combinación correcta de soluciones de hardware y software para administrar la infraestructura del centro de datos, usted puede:

- Reducir los costos diarios y el tiempo de operación y administración del centro de datos.
- Tomar mejores decisiones de administración al brindarle la información correcta a las personas indicadas en el momento adecuado.
- Hacer mejor uso de los recursos de la infraestructura y TI para optimizar el desempeño del centro de datos y mejorar la disponibilidad del sistema.

Los gerentes de los centros de datos necesitan poder visualizar la infraestructura física y de TI



Infraestructura del centro de datos

Administración del edificio | Administración de TI

PUENTE ENTRE LA ADMINISTRACIÓN DE TI Y DE LAS INSTALACIONES

INFRAESTRUCTURA DE TI	INFRAESTRUCTURA FÍSICA
▪ Informática ▪ Almacenamiento ▪ Red	▪ Aire acondicionado de precisión ▪ Electricidad ▪ Espacio



Construya una perspectiva sobre su infraestructura y administre activamente su centro de datos.

Con una solución holística de DCIM, usted puede:

- Identificar activamente problemas antes de que se vuelvan serios.
- Obtener una perspectiva del desempeño de los activos/sistemas para mejorar los procesos, aumentar la productividad y maximizar los recursos operacionales y financieros.
- Modelar la configuración y el estado del centro de datos.
- Incorporar datos reales para optimizar el desempeño y las decisiones.
- Planear e incorporar las necesidades futuras de TI.

"Un sistema de administración de la infraestructura del centro de datos agrupa y administra información sobre los activos del centros de datos, el uso de recursos y el estado operativo. Esta información se distribuye, integra, analiza e implementa de forma que ayude a los gerentes a cumplir los objetivos de los negocios orientados a los servicios y a optimizar el desempeño del centro de datos". – Grupo 451

Las etapas de implementación

Cada paso en el proceso ofrece un rendimiento positivo de inversión para su negocio.

Planeamiento y captura de datos

Paso 1: Sepa lo que tiene

El primer paso en la administración de su infraestructura eficientemente es documentar qué equipo tiene usted, su ubicación y sus dependencias. Las herramientas correctas de software le permitirán rastrear y visualizar la infraestructura en un solo sistema y le ofrecerán información exacta y completa para tomar decisiones.

Una herramienta completa de planeamiento y administración debe incluir:

- Rastreo de las especificaciones técnicas del dispositivo
- Mapeo de la cadena de potencia.
- Modelado de cargas de potencia.
- Conectividad del dispositivo.
- Visualización.
- Informes.
- Administración de cambios.
- Integración de potencia en tiempo real.

Acceso y monitoreo

Paso 2: Instrumentación y acceso

Permitir la comunicación con su equipo es un paso fundamental para administrar el desempeño. Mayor visibilidad y control permiten una evaluación rápida del equipo y acciones correctivas en tiempo real.

Una infraestructura instrumental debe incluir:

- Tarjetas web de UPS.
- Monitores de baterías.
- Controles de servidores.
- Interruptores de teclado, video y mouse.
- Medidores de potencia.
- Detección de fugas.
- Sensores de temperatura.
- Unidades administradas de distribución de energía en rack.
- Control del enfriamiento.
- Controles auxiliares de potencia.

Análisis y diagnóstico

Paso 3: Administración activa

Los datos de las operaciones del entorno del centro de datos mejoran la exactitud del modelo y le permiten tener datos fundamentales al alcance de sus manos para administrar activamente y controlar el desempeño. Los beneficios incluyen aprovechar más los costosos recursos que usted administra y mejorar la eficiencia de los sistemas de electricidad y de enfriamiento y, por lo tanto, ahorrar significativas sumas de dinero para TI.

Recomendación y automatización

Paso 4: El futuro

El incorporar las herramientas mencionadas anteriormente en el funcionamiento del centro de datos y crear reglas para tomar decisiones y hacer análisis le prepara para el futuro. El siguiente paso en la evolución de DCIM es un sistema de control en bucle que incorpora rastreo en tiempo real y controla el equipo.