

APC® by Schneider Electric Solutions for Cisco®



The Cisco Unified Computing System is a next-generation data center platform that unites compute, network, storage access, and virtualization into a cohesive system designed to reduce TCO and increase business agility. The system integrates a low-latency, lossless 10GE unified network fabric with enterprise-class, x86-architecture servers. The system is an integrated, scalable, multi-chassis platform in which all resources participate in a unified management domain.

Blade server applications present unique challenges in terms of rack level power distribution, cable management and physical access space requirements for hot-swappable blade components.

This application guide provides recommendations for enclosures, rack power distribution, and cable management to best address the specific physical infrastructure needs of the Cisco UCS 5108 Blade Server Chassis. The recommended solutions in this guide are based on physical verification and testing of an actual Cisco UCS 5108 Blade Server Chassis mounted in APC enclosures.



APC Rack Enclosures and Rack Mount Power Distributions Units (PDUs)

APC Advanced PDUs

- Integrates power management capabilities with other APC products including Symmetra® PX UPS, row and room PDUs, InRow cooling, NetShelter® SX enclosures, and InfraStruXure® Central, Capacity and Change Manager
- Features zero U, low profile design, optimized for high-density rack power solutions to minimize interference between the PDU and hot-swap blade components
- Superior current monitoring protection including active monitoring of 3 phases for upstream panel breaker and on-board input breakers

APC Full Featured Enclosures

- APC NetShelter® SX enclosures offer the most standard, out-of-box features to ease installation and speed deployment
- Single enclosure design is flexible enough to accommodate various networking and server applications.
- Sizes Available: 42U & 48U heights, 600mm (24") & 750mm (30") widths, and 1070mm (42") & 1200mm (47.2") depths.



APC is a world leader in data center infrastructure - cooling, UPS, power distribution, racks and management.



Power Requirements for Cisco UCS 5108

The UCS 5108 Blade Server Chassis includes four, single phase, hot-swappable redundant power supplies with IEC C20 Inlet connections.



Source "A"
(2) C20
Connectors

Source "B"
(2) C20
Connectors

In a typical power configuration, two IEC C20 inlets on the UCS 5108 are connected to each power source.

The total power consumption per chassis for typical enterprise applications is 2.0 – 2.5 kW; while a typical peak power consumption is 2.8 – 3.0 kW. In order to allow for loss of one power source, each power source should be sized and provisioned for approximately 3.0kW per chassis loading scenario as indicated below.

Rack Enclosures with up to two UCS 6100 Series Fabric Internconnects AND	"A" Power Source Total Req'd Receptacles (per Source/Rack PDU)	"B" Power Source Total Req'd Receptacles (per Source/Rack PDU)	Total Power Provision Recommendation*
(1) UCS 5108 Chassis	(2) C19, (2) C13	(2) C19, (2) C13	3.5 kW
(2) UCS 5108 Chassis	(4) C19, (2) C13	(4) C19, (2) C13	6.5 kW
(3) UCS 5108 Chassis	(6) C19, (2) C13	(6) C19, (2) C13	9.5 kW
(4) UCS 5108 Chassis	(8) C19, (2) C13	(8) C19, (2) C13	12.5 kW
(5) UCS 5108 Chassis	(10) C19, (2) C13	(10) C19, (2) C13	15.5 kW
(6) UCS 5108 Chassis	(12) C19, (2) C13	(12) C19, (2) C13	18.5 kW

* Each Rack Power Distribution Unit should be provisioned to this Total Power Provision Recommendation in order to account for potential source redundancy loss; Total Power Provision recommendations include power for up to two UCS 6100 Series Fabric Interconnects

Note: High performance computing applications with extremely heavy loading conditions have been tested and measured to draw a peak power consumption of 3.2kW per chassis. Under these conditions, users should provision 3.2kW per chassis.

Rack PDU Selection Tables

Steps to select the correct rack PDU to match site/application requirements:

1. **Select your region;** choose North America or International (for any location outside North America)
2. **If North America, select 3-phase power system (208V 3-phase or 415V 3-phase)**
3. **Select the desired number of UCS 5108 chassis per rack**

Table Results Indicate:

- Recommended total amps (single phase output) required to power the selected number of UCS 5108 chassis plus up to two UCS 6100 Series Fabric Interconnects
- Recommended branch circuit type and size
- Recommended APC rack PDU (metered rack PDUs are recommended to actively monitor and provide alarm warnings to protect critical power circuits from accidental overloads)
- Total rack PDU rated output (total max single phase amps output)

North America Solutions

STEP 2 ---->	208V 3-phase			415V 3-phase
STEP 3 ---->	Number of UCS 5108 Blade Chassis per Enclosure			
	1 to 3	2 to 5	6	1 to 3
Max Power Required (kW)*	9.5	15.5	18.5	9.5
Max Amps Required (1ph output)*	45.7	74.5	88.9	39.6
Recommended Branch Circuit	50A, 3-phase	60A, 3-phase	(2x) 50A, 3-ph	20A, 3-phase
Rack PDU Model	(1)AP7898	(1)AP7866 or (1)AP7866A	(2)AP7567A	(1)AP7557NA
Total Rack PDU Rating (single phase amps)	60A (12.5kW)	77.9A (16.2kW)	138.6A (28.8kW)	48A (11.5kW)

* Total power and amps required includes power provision for up to two UCS 6100 Series Fabric Interconnects

International Solutions (230/400V 3-phase Power)

STEP 2 ---->	400V 3-phase	
STEP 3 ---->	Number of UCS 5108 Blade Chassis per Enclosure	
	1 to 3	4 to 6
Max Power Required (kW)*	9.5	18.5
Max Amps Required (1ph output)*	41.3	80.4
Recommended Branch Circuit	16A, 3-phase	32A, 3-phase
Rack PDU Model	(1)AP7857	(1)AP7856 <u>or</u> (1)AP7856A
Total Rack PDU Rating (single phase amps)	48A (11kW)	96A (22kW)

* Total power and amps required includes power provision for up to two UCS 6100 Series Fabric Interconnects

Rack Enclosure Recommendation

The clearance access space required to access the hot swap blade chassis modules require special consideration in the selection and configuration of a proper rack enclosure to match the space requirements for access, power distribution, and data cabling. The specific selection of a properly sized rack enclosure depends upon your site specific data, cabling and rack power positioning preferences.

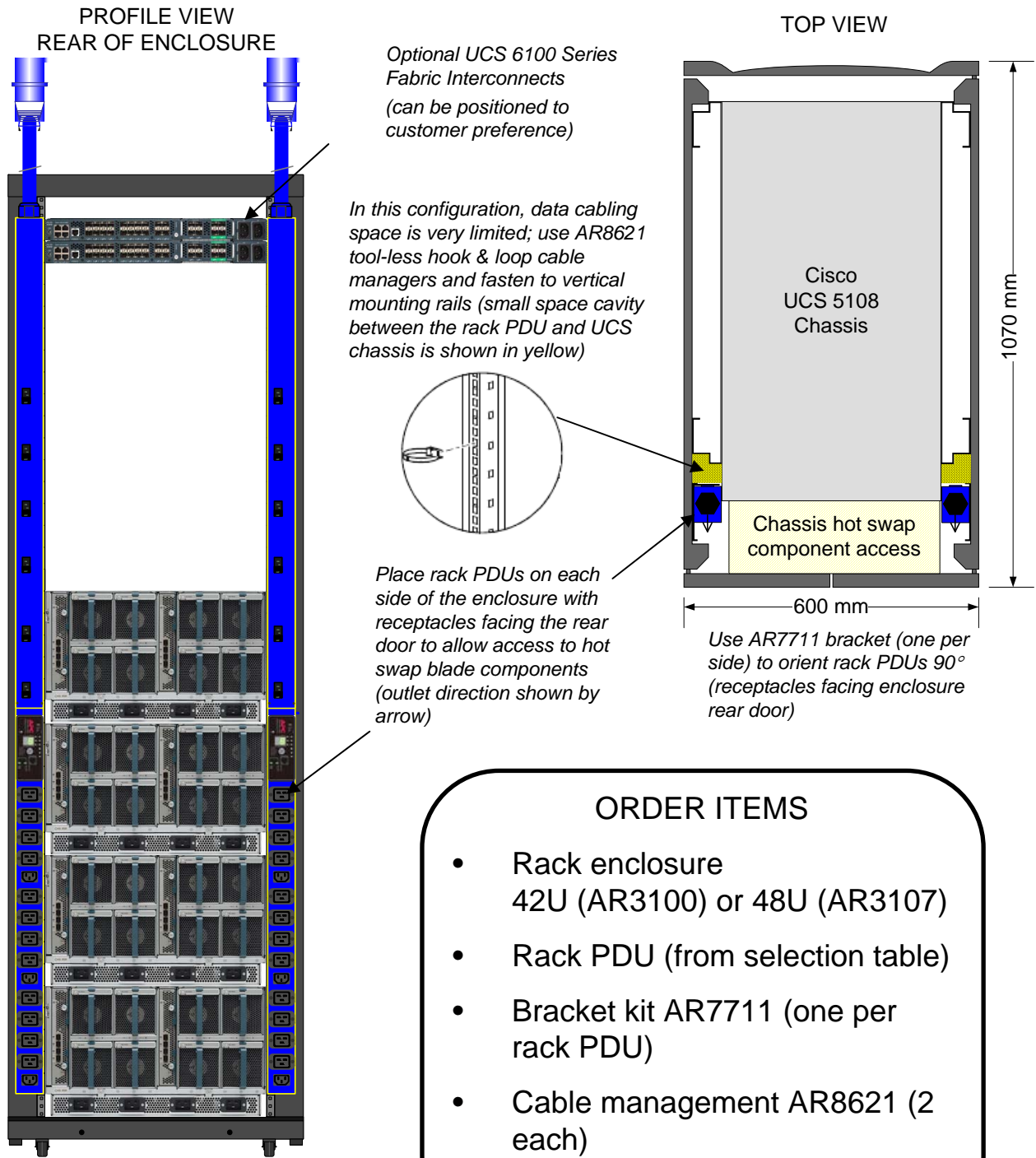
Steps to select the correct enclosure to match site/application requirements:

1. **Choose Region and Density:** Select the number of chassis expected per enclosure
2. **Choose enclosure width:** Wider enclosures offer the best use of cable management space and access to blade modules, however site specific limitations may require standard 600mm width enclosure
3. **Choose enclosure depth:** Deeper enclosures are an alternative to wider enclosures for increased cable management and PDU space
4. **Choose the Configuration:** Reference the diagrams in this document for configuration recommendations and planning considerations
5. **Choose Enclosure and Cable Management** from the reference diagrams

Step 1	Step 2	Step 3	Step 4
Choose Region & Density	Choose Enclosure Width	Choose Enclosure Depth	Verify Configuration (as shown in diagrams)
North America (1 to 5 chassis)	600mm wide (24 in)	1070mm deep (~42 in)	Diagram A (note limited available space)
		1200mm deep (~47 in)	Diagram B1 or B2
	750mm wide (30 in)	1070mm deep (~42 in)	Diagram C1 or C2
		1200mm deep (~47 in)	Diagram C1 or C2
North America (6 chassis)	600mm wide (24 in)	1200mm deep (~47 in)	Diagram D
	750mm wide (30 in)	1070mm deep (~42 in)	Diagram E
		1200mm deep (~47 in)	Diagram E
International (1 to 6 chassis)	600mm wide (24 in)	1070mm deep (~42 in)	Diagram A (note limited available space)
		1200mm deep (~47 in)	Diagram B1 or B2
	750mm wide (30 in)	1070mm deep (~42 in)	Diagram C1 or C2
		1200mm deep (~47 in)	Diagram C1 or C2

Diagram "A"

600mm wide x 1070mm deep



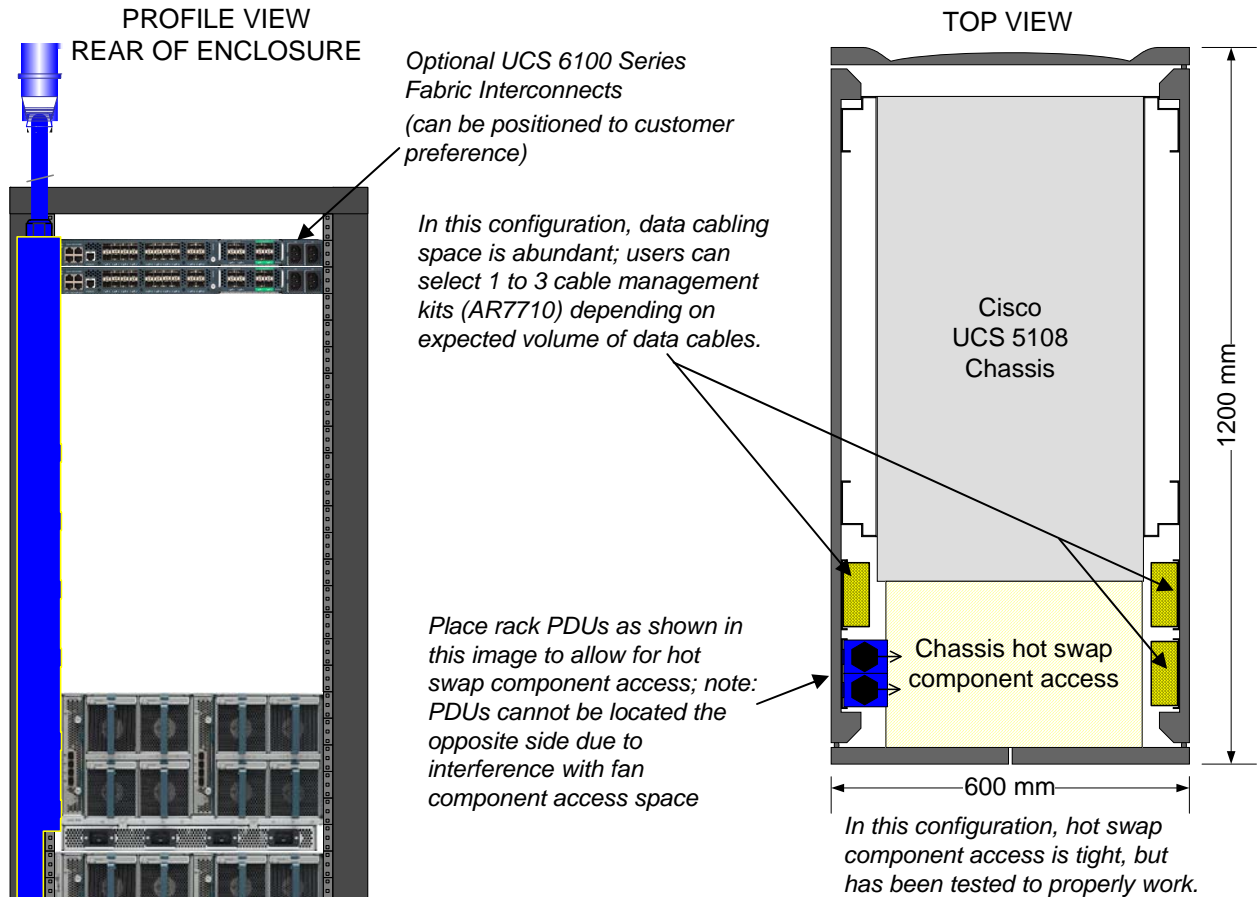
AP7866 rack PDU shown in illustration; however, configuration would be common for any PDU selection and number of UCS 5108 blade server chassis

ORDER ITEMS

- Rack enclosure 42U (AR3100) or 48U (AR3107)
- Rack PDU (from selection table)
- Bracket kit AR7711 (one per rack PDU)
- Cable management AR8621 (2 each)
- Power cords (C19 to C20 type)

Diagram "B1"

600mm wide x 1200mm deep



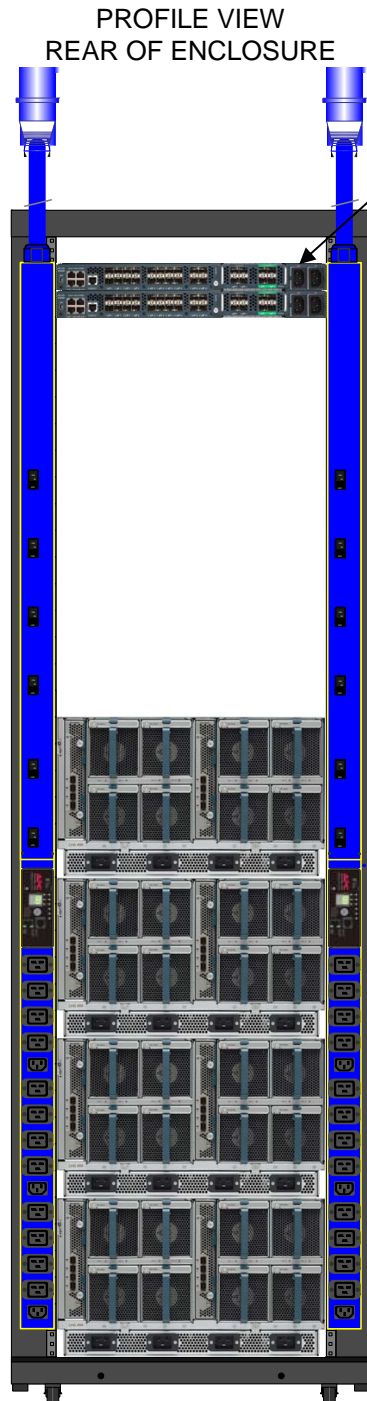
AP7866 rack PDU shown in illustration; however, configuration would be common for any PDU selection and number of UCS 5108 blade server chassis

ORDER ITEMS

- Rack enclosure
42U (AR3300) or 48U (AR3307)
- Rack PDU (from selection table)
- Cable Management kit(s)
AR7710 (order 1 to 3 units)
- Power cords (C19 to C20 type)

Diagram “B2”

600mm wide x 1200mm deep

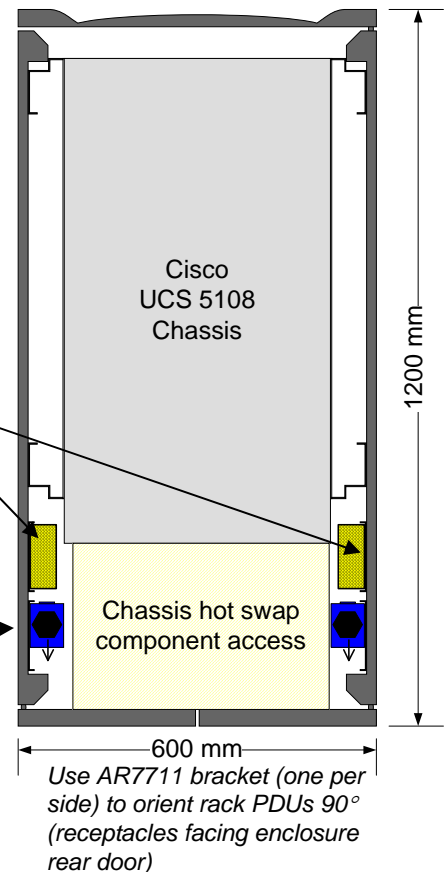


*Optional UCS 6100 Series
Fabric Interconnects
(can be positioned to customer
preference)*

*In this configuration, data cabling
space is abundant; users can
select 1 or 2 cable management
kits (AR7710) depending on
expected volume of data cables.*

*Place rack PDUs on each side
of the enclosure with
receptacles facing the rear door
to allow access to hot swap
blade components (outlet
direction shown by arrow)*

TOP VIEW



ORDER ITEMS

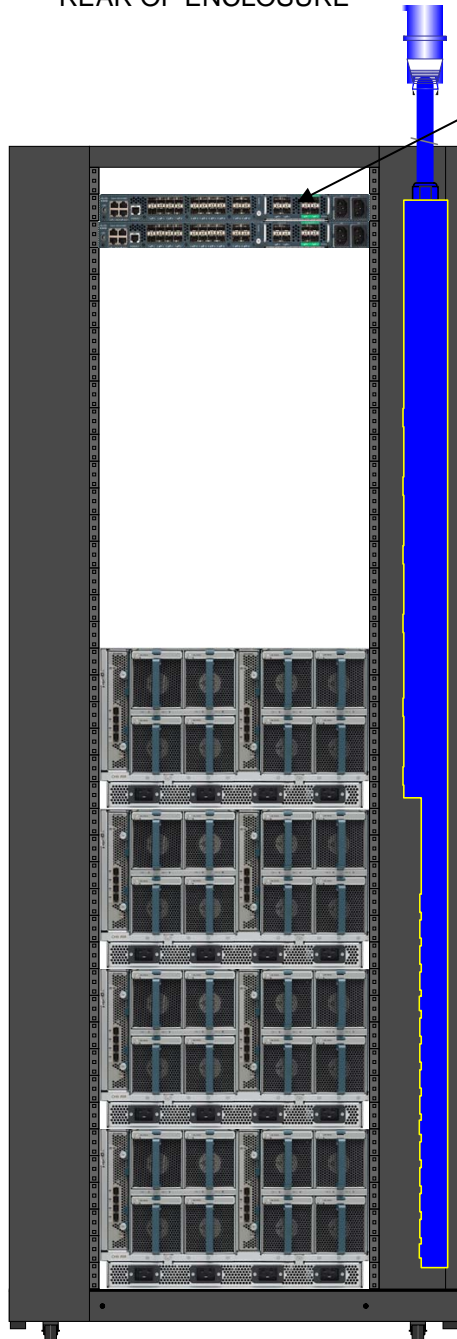
- Rack enclosure
42U (AR3300) or 48U (AR3307)
- Rack PDU (from selection table)
- Bracket kit AR771 (one per rack
PDU)
- Cable Management kit(s)
AR7710 (order 1 to 3 units)
- Power cords (C19 to C20 type)

*AP7866 rack PDU shown in
illustration; however,
configuration would be common
for any PDU selection and
number of UCS 5108 blade
server chassis*

Diagram “C1”

750mm wide x 1070mm and 1200mm deep

PROFILE VIEW
REAR OF ENCLOSURE



*Optional UCS 6100
Series Fabric
Interconnects
(can be positioned to
customer preference)*

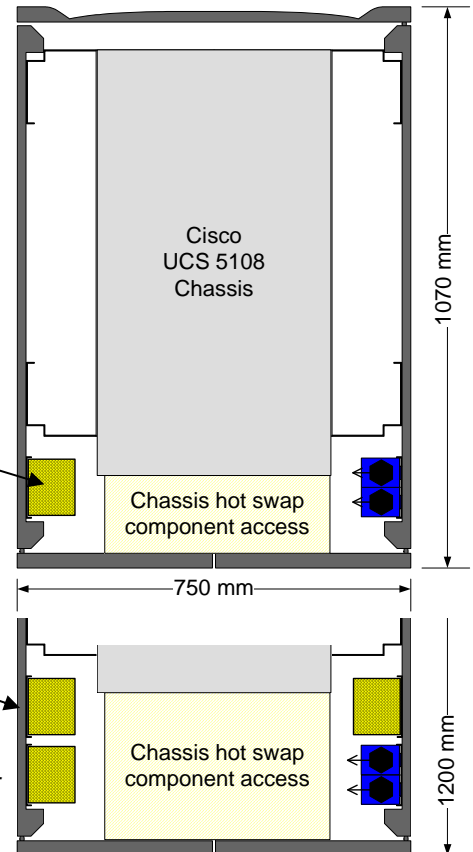
*Data cabling can be
managed by use of
either (1) AR7710 or
(2) AR8442 (for more
capacity)*

*Rack PDUs can be
placed on either side of
rack enclosure*

*1200mm enclosure has
additional space for
access and cable
management (can use
additional AR8442 kits or
AR7710 kits)*

*AP7866 rack PDU shown in
illustration; however, configuration
would be common for any PDU
selection and number of UCS 5108
blade server chassis*

TOP VIEW

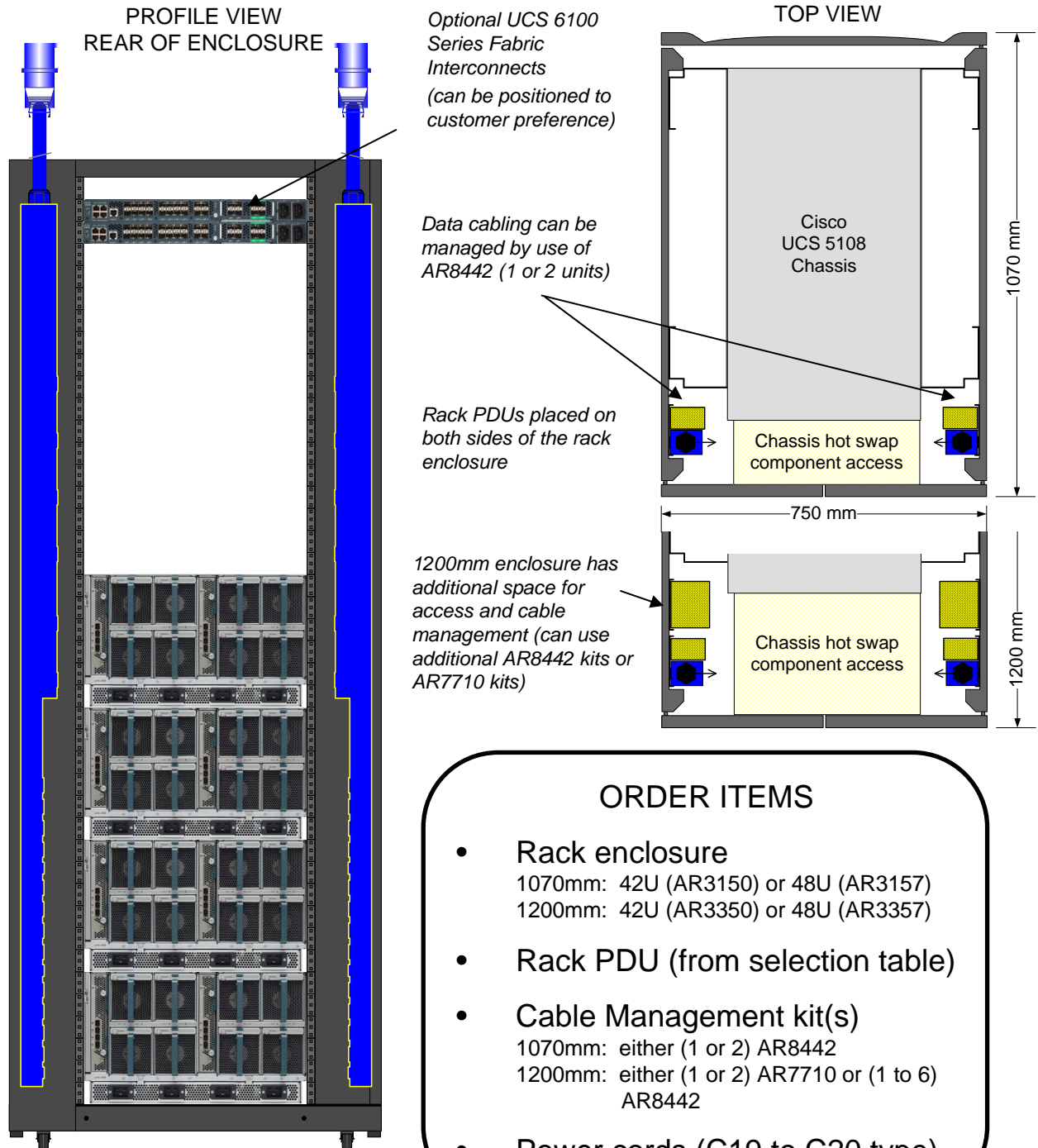


ORDER ITEMS

- **Rack enclosure**
1070mm: 42U (AR3150) or 48U (AR3157)
1200mm: 42U (AR3350) or 48U (AR3357)
- **Rack PDU (from selection table)**
- **Cable Management kit(s)**
1070mm: either (1 or 2) AR8442 or (1) AR7710
1200mm: either (1 to 3) AR7710 or (1 to 6) AR8442
- **Power cords (C19 to C20 type)**

Diagram “C2”

750mm wide x 1070mm and 1200mm deep



AP7866 rack PDU shown in illustration; however, configuration would be common for any PDU selection and number of UCS 5108 blade server chassis

ORDER ITEMS

- Rack enclosure
1070mm: 42U (AR3150) or 48U (AR3157)
1200mm: 42U (AR3350) or 48U (AR3357)
- Rack PDU (from selection table)
- Cable Management kit(s)
1070mm: either (1 or 2) AR8442
1200mm: either (1 or 2) AR7710 or (1 to 6) AR8442
- Power cords (C19 to C20 type)

Diagram "D"

600mm wide x 1200mm deep

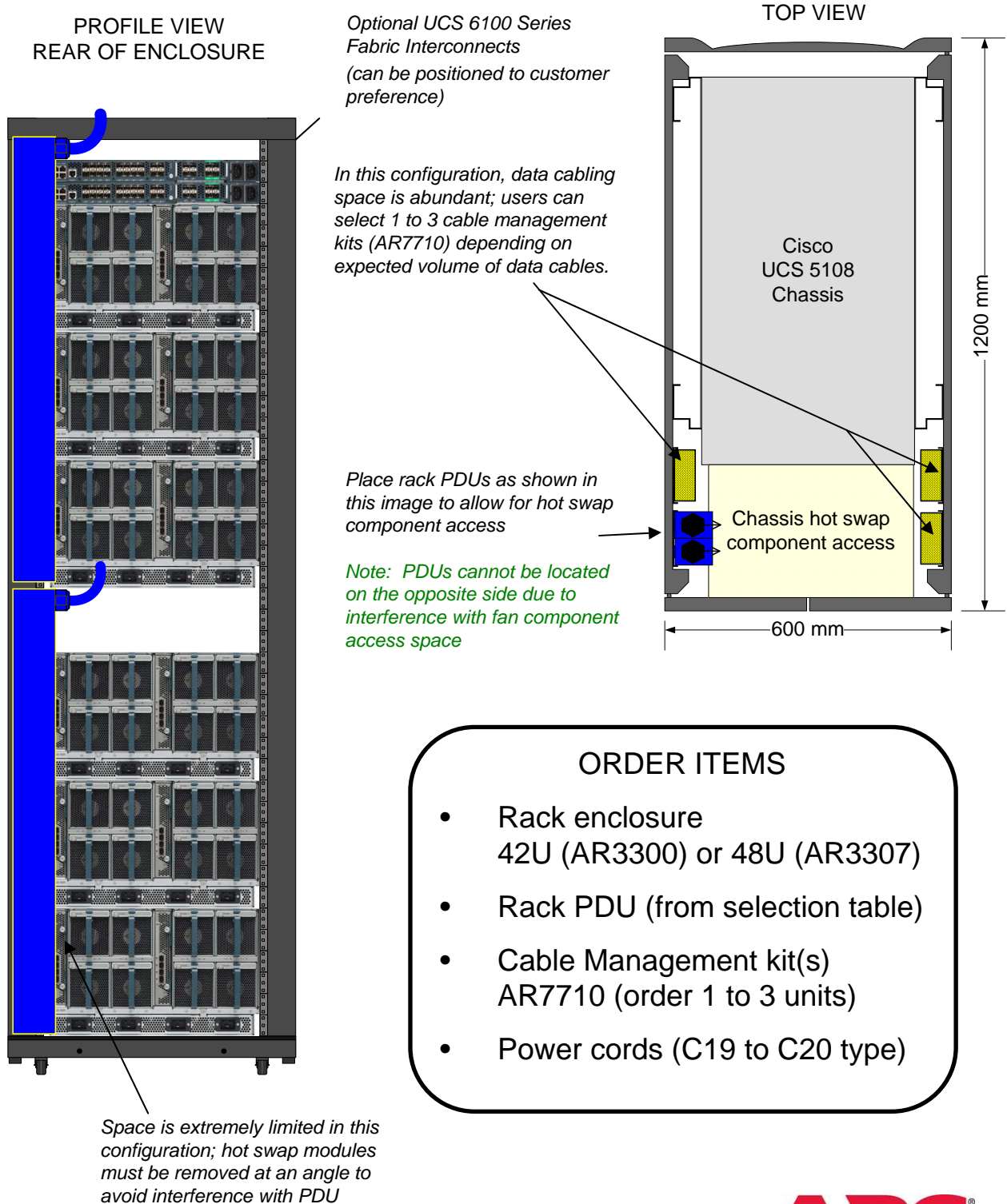
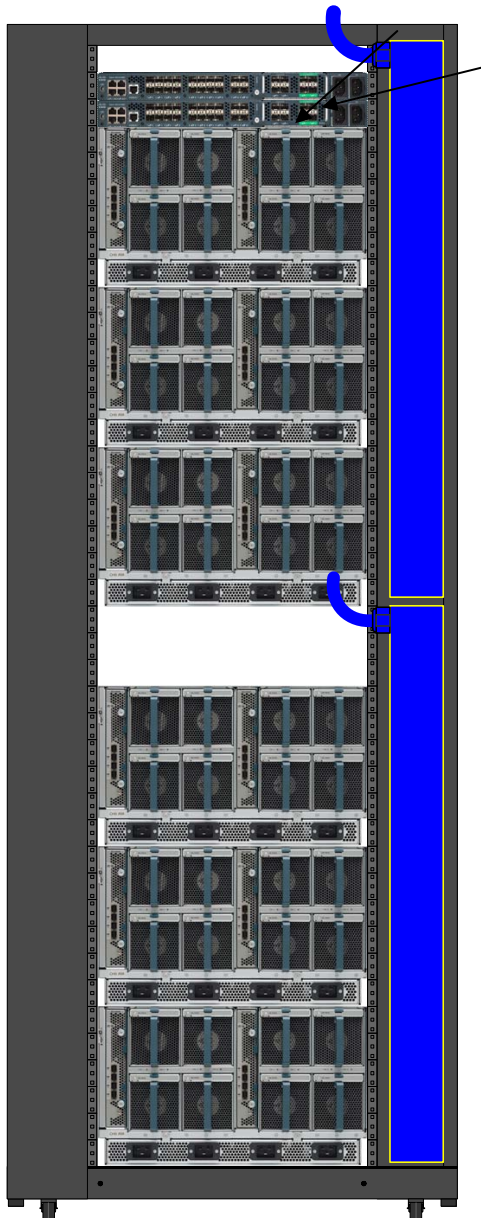


Diagram "E"

750mm wide x 1070mm and 1200mm deep

PROFILE VIEW
REAR OF ENCLOSURE



*PDUs are ½ enclosure height;
place 4 units on the same rack side
to reduce interference from
incoming power cords*

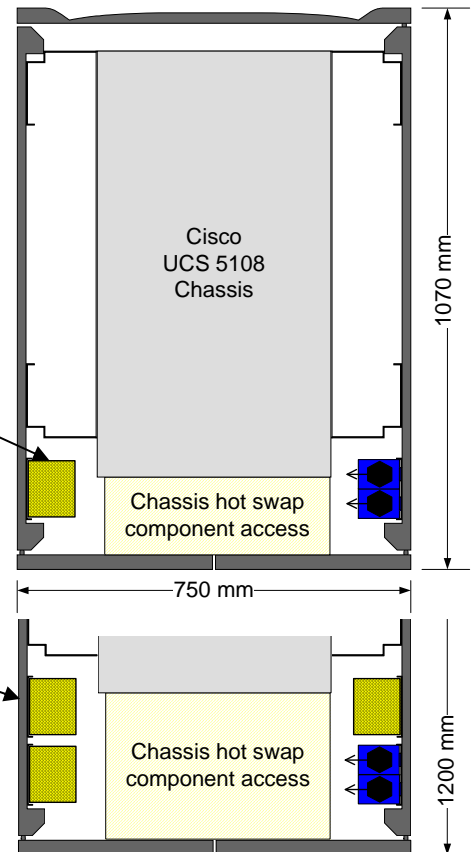
*Optional UCS 6100
Series Fabric
Interconnects
(can be positioned to
customer preference)*

*Data cabling can be
managed by use of
either (1) AR7710 or
(2) AR8442 (for more
capacity)*

*Rack PDUs can be
placed on either side of
rack enclosure*

*1200mm enclosure has
additional space for
access and cable
management (can use
additional AR8442 kits or
AR7710 kits)*

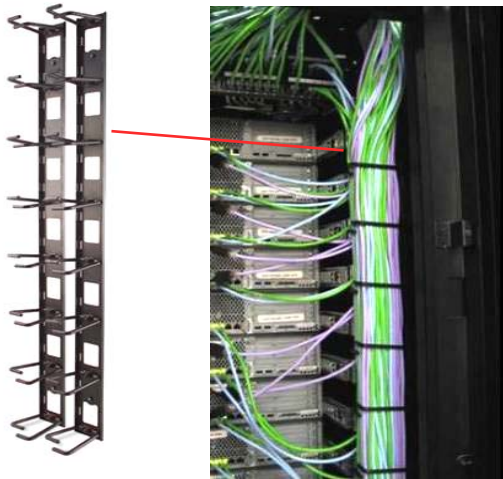
TOP VIEW



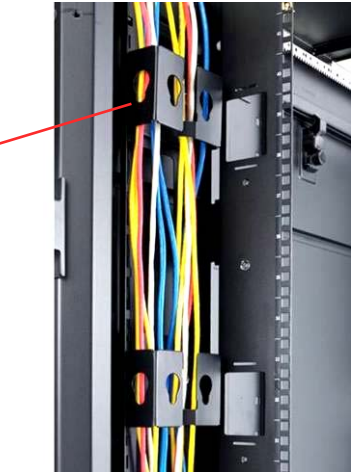
ORDER ITEMS

- Rack enclosure
1070mm: 42U (AR3150) or 48U (AR3157)
1200mm: 42U (AR3350) or 48U (AR3357)
- Rack PDU (from selection table)
- Cable Management kit(s)
1070mm: either (1 or 2) AR8442
1200mm: either (1 to 3) AR7710 or (1 to 6) AR8442
- Power cords (C19 to C20 type)

Cable Management Accessories



AR8442
Toolless Vertical Cable Organizer



AR7710
Toolless, Low-Profile
Vertical Cable Organizer



AR8443A & AR8444
Fiber Spool Kits



AR7580
High Density Cable Manager
(for wide racks)



AR7711
Zero U Accessory Bracket



AR8621
Toolless Hook and Loop
Cable Managers

For more information visit:
www.apc.com or
www.thedcofthefuture.com

Call APC at: 800-272-2722

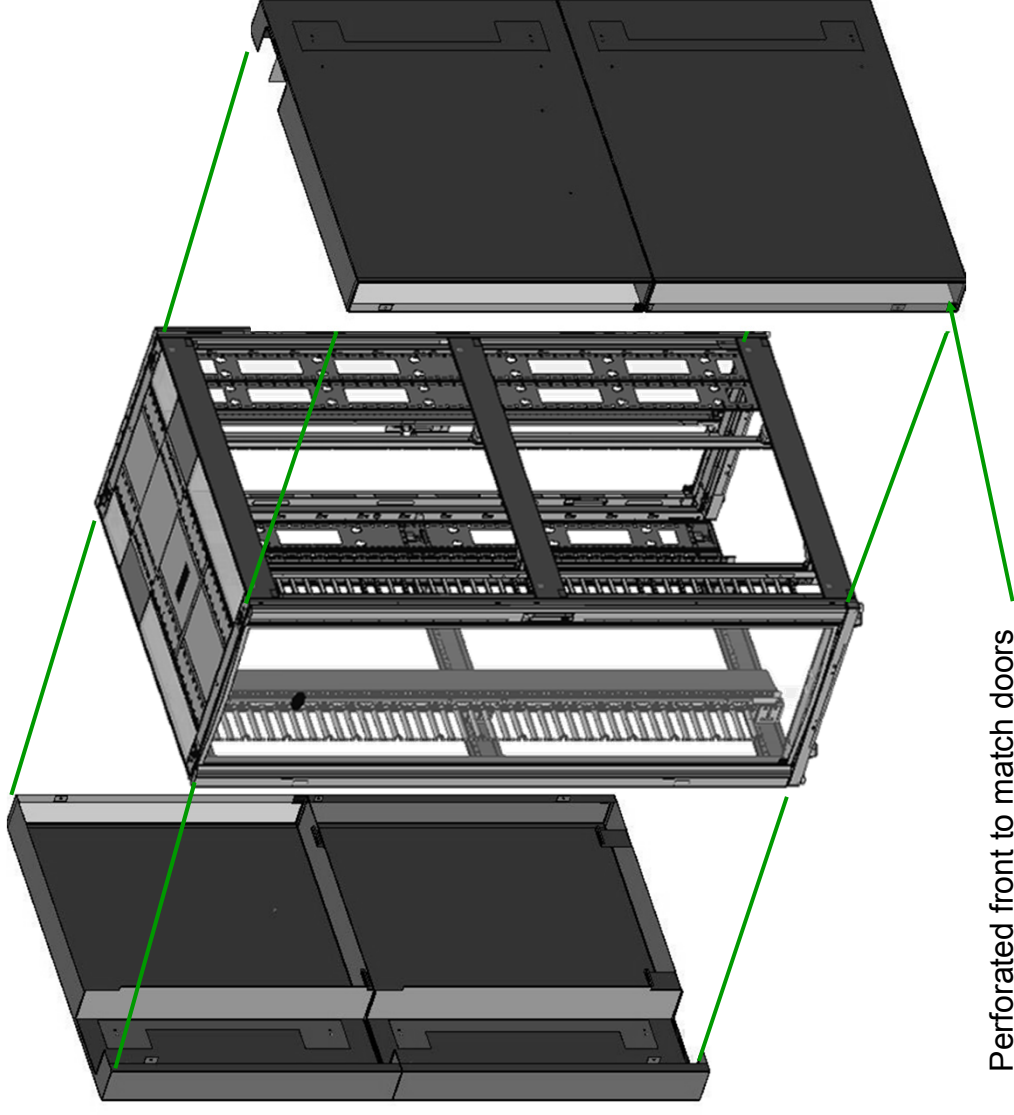
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NetShelter Nexus 7018 Solution

External Expansion Ducts for Side Airflow

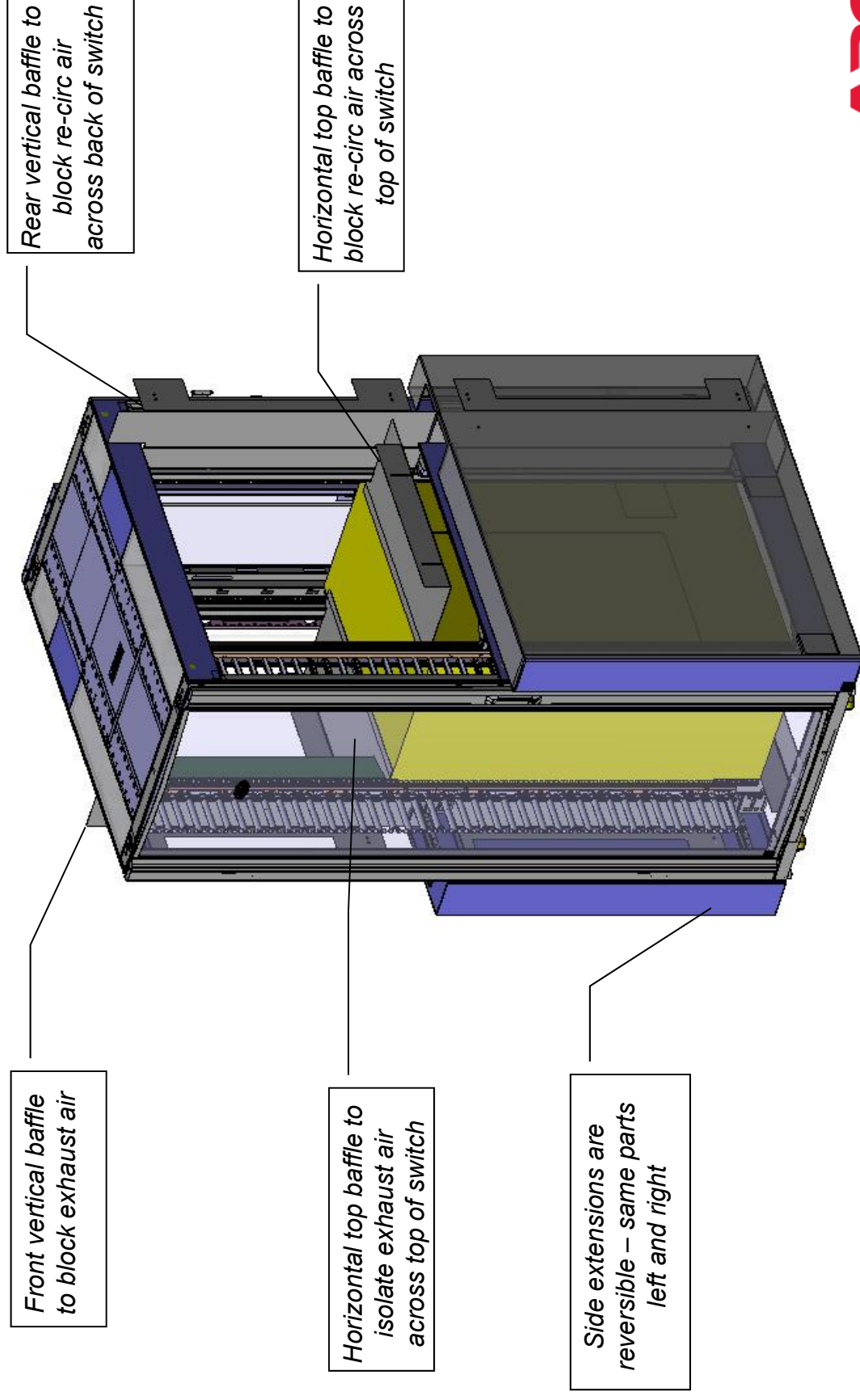
- Nexus 7018 switch clearance requirements to support side-to-side airflow result in a 40" wide enclosure
- **APC AR3350 Enclosure : 42U x 30"W x 47"D**
 - Add 2 AR7580 vertical cable managers
 - Optional AR7716 networking roof available for large bundles of cable routing overhead
- **5" wide side external expansion ducts**
 - Part number for kit: QRACK-QSVO46270
 - Reversible - mounted on right side as intake, mounted on left side as exhaust
 - Product is currently under evaluation by Cisco
- AR3340 deep networking enclosure available in fall 2010 with integrated vertical cable managers, pre-set rails for Nexus, and networking roof.



Perforated front to match doors

NetShelter Nexus 7018 Solution

External Expansion Ducts for Side Airflow



APC Solutions for Cisco® Catalyst 6500 and MDS 9500



APC NetShelter® Networking Enclosures maintain the NetShelter SX design while offering improved networking application support and a superior solution for side airflow Cisco networking switches



Cisco Catalyst 6509/6513 Specifications:

- Height: 14U/21U
- Typical max data ports CAT 6A: 288 to 528
- Power Options: Power supplies available from 2500 to 8700 watts

Cisco MDS 9506/9509/9513 Specifications:

- Height: 7U/14U/21U
- Typical max data ports fiber: 192/336/ 528
- Typical Power Draw: 1000/1600/2600 watts

APC NetShelter® SX Enclosure Recommendations:

- **AR3140** – NetShelter SX 42U 750mm x 1070mm Deep Networking Enclosure with Sides
 - 750mm (30in) models to accommodate cable management
 - Optional 1200mm (47.25in) deep enclosures will provide more cable and Rack PDU access space (AR3340, AR3347)
- **AR7715** – Side Airflow Duct Kit
 - Two 2U duct kits mounted within the AR3140
 - Supports up to 1200 CFM

Included in the Side Airflow Duct Kit:

- (2) 2U ducts: (1) top and (1) bottom
- (2) zero-U mounting brackets to replace brackets provided with Cisco switch
- Rear baffle to block hot air from entering switch intake
- Foam strips for sealing intake area



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