

# Frequently Asked Questions

## N-SERIES TERAFRAME GEN 3 NETWORK CABINET



**Q: Why does Chatsworth Products, Inc. (CPI) offer a cabinet specifically for network switches?**

A: Modular network switches used in data centers and computer rooms have special airflow requirements that are unique from those of most server equipment. In order to deploy network switches into a hot/cold aisle environment alongside server equipment or within a contained environment, the cabinet design must address the unique airflow requirements of the switch to keep hot and cold air isolated.

Additionally, cabinets that support network switches must have robust cable management and ideally will have extra space along both sides of the cabinet for managing network cables. N-Series TeraFrame® Gen3 Network Cabinet meets both requirements. It is designed specifically to house network switches within a data center that is adopting industry best practices for airflow management.

**Q: How does the N-Series TeraFrame Gen 3 Network Cabinet address industry best practices for airflow management in the data center?**

A: Industry best practices for airflow management in the data center seek to separate hot and cold air. This allows room temperatures to be

reliably raised, leading to more efficiency for air handlers, and ultimately more free cooling hours using economizers. Most server equipment is designed for front-to-rear airflow, making it relatively easy to isolate hot air by adopting a hot and cold aisle containment strategy. For best practices, you must also seal the space within cabinets, so that cold air must pass through equipment, and so that hot exhaust air cannot bypass or recycle to the front of the cabinet and then back through equipment. In server cabinets, this is accomplished with the addition of an Air Dam around equipment, a bottom panel under equipment, and Snap-In Filler Panels in any open rack-mount space. Basically, baffles are used to seal the space around, under and in between equipment, forming a complete front/rear barrier within the cabinet. Cold air goes through equipment, and hot air exits the rear of the cabinet into the contained aisle or an overhead vertical exhaust duct. However, network switches often require side airflow or a mix of front-to-rear and side airflow. Traditionally, this has been addressed with a side-mounted duct that is sized to match the switch. The duct would capture hot exhaust air and guide it to the back of the cabinet. This approach leaves gaps along the sides of the cabinet where hot air could bypass the containment strategy. To resolve this, CPI redesigned N-Series, replacing exhaust ducts sized to match specific switch models with a single, vertical side intake duct along the inlet side of the switch. The inside of the cabinet is now divided by a vertical barrier that separates hot and cold air within the cabinet. Moreover, this design is extremely flexible, adapted during installation to match the switch by cutting the appropriate opening in the vertical side intake duct at the switch's inlet. This means one cabinet solution can be specified for any model switch. You no longer need to know which switch is being deployed in order to specify the cabinet. The new N-Series TeraFrame Gen 3 Network Cabinet lets you specify the cabinet into server rows to support middle-of-row or end-of-row switching and contains hot air in network areas.

**Q: How does N-Series TeraFrame Gen 3 Cabinet control airflow to keep hot and cold air separated within the cabinet?**

A: N-Series TeraFrame Gen 3 Cabinet can be ordered in four basic airflow configurations to support front-to-rear airflow, side-to-rear airflow, front-to-top airflow and side-to-top airflow. Each configuration is explained in detail with the following questions and answers.



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**Q: How does N-Series TeraFrame Gen 3 Cabinet control front-to-rear airflow to keep hot and cold air separated within the cabinet?**

A: When configured for front-to-rear airflow, N-Series includes a front air dam kit and bottom panel with perforated front and rear doors. Open rack-mount spaces (U) are sealed with Snap-In Filler Panels, which must be ordered separately. Once equipment is installed in the cabinet and all open rack-mount spaces are sealed, the air dam and bottom panel form a barrier that wraps around the equipment. The cold air enters the front door and must pass through equipment to exit the cabinet. Hot air is isolated at the rear of the cabinet and exits the rear door. This configuration is similar to the standard configuration used in the typical server cabinet; however, N-Series has dual slide supports, which create a dedicated space along both sides of the equipment mounting rails for cabling more locations for attaching cable management accessories.

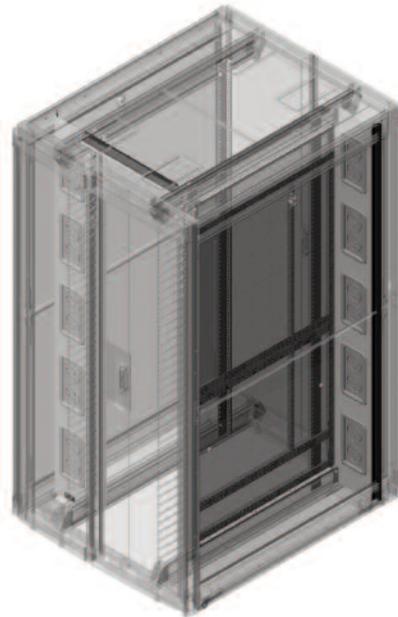


N-Series TeraFrame Gen 3 Cabinet configured for front-to-rear airflow

**Q: How does N-Series TeraFrame Gen 3 Cabinet control side-to-rear airflow to keep hot and cold air separated within the cabinet?**

A: When configured for side-to-rear airflow, N-Series includes a vertical side intake duct and bottom panel with perforated front and rear doors. Open rack-mount spaces (U) are sealed with Snap-In Filler Panels, which must be ordered separately. Once equipment is installed in the cabinet and all open rack-mount spaces are sealed, the side intake duct and bottom panel form a barrier that wraps around the equipment. The side

intake duct is cut to allow cold air to access the side air intake on the switch. The cold air enters the front door, and must pass through equipment to exit the cabinet. Hot air is isolated at the rear of the cabinet and exits the rear door. The N-Series provides a better solution with the side intake duct because it separates the front and rear of the cabinet completely, allowing isolation of hot and cold air within the cabinet, as well as complete integration with server cabinets in contained aisles.



N-Series TeraFrame Gen 3 Cabinet configured for side-to-rear airflow

**Q: How is the side intake duct used in the N-Series TeraFrame Gen 3 Cabinet better than traditional switch-specific exhaust ducts?**

A. There are many industry solutions that address individual switches with a side-mounted exhaust duct. The N-Series provides a better solution with the side intake duct because it separates the front and rear of the cabinet completely, allowing isolation of hot and cold air within the cabinet, as well as complete integration with server cabinets in contained aisles. Additionally, the duct design is contained within a common cabinet architecture, regardless of airflow pattern. You specify the cabinet footprint to match other cabinets in the row and then the airflow pattern. N-Series TeraFrame Gen 3 Network Cabinets match the size and style of F-Series TeraFrame Gen 3 (Server) Cabinets and can be bayed side-by-side with F-Series, allowing you to place a network cabinet within a server cabinet row. The intake duct can be included with the cabinet or added later, can be reconfigured, removed, adjusted or replaced as needs change or equipment is updated.



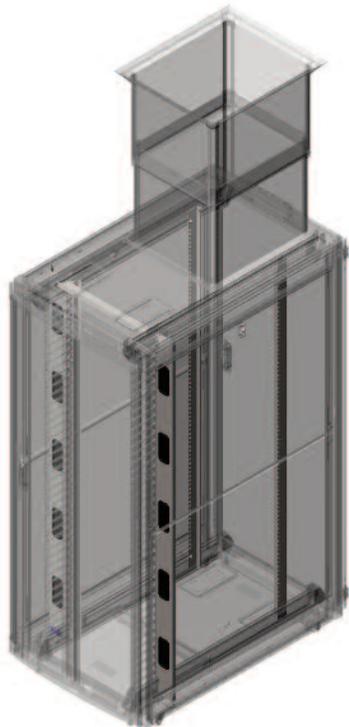
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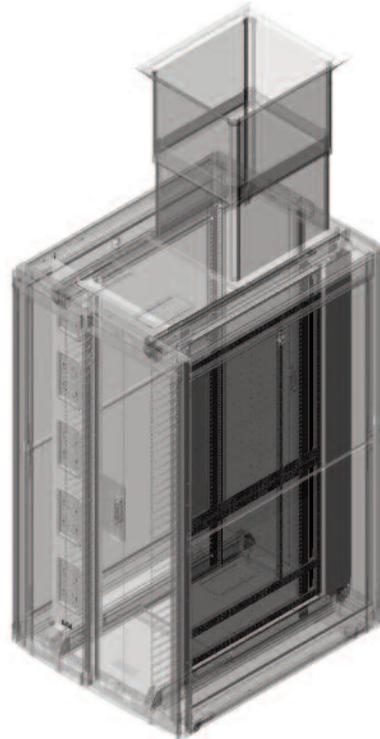
Finally, the design allows the duct to be field fit to match any switch, you do not need to know the exact switch to order a cabinet with the duct pre-installed. You only need to know if the switch requires side or front-to-rear airflow.

**Q: How does N-Series TeraFrame Gen 3 Cabinet control front-to-top airflow to keep hot and cold air separated within the cabinet?**

A: When configured for front-to-top airflow, N-Series includes a front air dam kit and bottom panel and a vertical exhaust duct on the top of the cabinet with perforated front and solid rear doors. Open rack-mount spaces (U) are sealed with Snap-In Filler Panels, which must be ordered separately. Once equipment is installed in the cabinet and all open rack-mount spaces are sealed, the air dam and bottom panel form a barrier that wraps around the equipment. The cold air enters the front door and must pass through equipment to exit the cabinet. Hot air is isolated at the rear of the cabinet and exits the top of the cabinet through the vertical exhaust duct. This configuration is similar to the standard configuration used in the typical server cabinet with top exhaust; however, N-Series has dual slide supports, which create a dedicated space along both sides of the equipment mounting rails for cabling, as well as more locations for attaching cable management accessories.



N-Series TeraFrame Gen 3 Cabinet configured for front-to-top airflow



N-Series TeraFrame Gen 3 Cabinet configured for side-to-top airflow

**Q: How does N-Series TeraFrame Gen 3 Cabinet control side-to-top airflow to keep hot and cold air separated within the cabinet?**

A: When configured for side-to-top airflow, N-Series includes a side intake duct and bottom panel and a vertical exhaust duct on the top of the cabinet with perforated front and solid rear doors with perforated insert. Open rack-mount spaces (U) are sealed with Snap-In Filler Panels, which must be ordered separately. Once equipment is installed in the cabinet and all open rack-mount spaces are sealed, the side intake duct and bottom panel form a barrier that wraps around the equipment. The side intake duct is cut to allow cold air to access the side air intake on the switch. The cold air enters the front door and the rear door, and must pass through equipment to exit the cabinet. Hot air is isolated at the rear of the cabinet and exits the top of the cabinet through the vertical exhaust duct. Note that there is no hot aisle in a vertical exhaust duct configuration. Hot air is exhausted through the top-mounted vertical exhaust duct, and the air at the front and rear of the cabinet is cold. This configuration allows supplemental cold airflow from the rear of the cabinet for more even distribution of airflow to the switch. The unique side intake duct and rear door design isolates hot



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exhaust air inside the cabinet and exhausts it through the Vertical Exhaust Duct, allowing additional cold air to be drawn from the rear side of the cabinet. There are many industry solutions that address individual switches with a side-mounted exhaust duct. The N-Series provides a better solution with the side intake duct because it separates the front and rear of the cabinet completely, allowing isolation of hot and cold air within the cabinet, as well as complete integration with server cabinets in contained aisles.

**Q: How do I configure N-Series TeraFrame Gen 3 Cabinet for network switches that require side airflow?**

A: Select an N-Series TeraFrame Gen 3 Cabinet that includes the Side Intake Duct Air Manager. Choose perforated front and rear doors and a standard top for hot aisle/cold aisle applications or aisle containment applications. Choose perforated front door, solid rear door with perforated insert and vertical exhaust duct for ducted exhaust applications. You will need to seal any open rack-mount spaces in the cabinet with Snap-In Filler Panels, which are ordered separately.

**Q: How do I configure N-Series TeraFrame Gen 3 Cabinet for network switches that require front-to-rear airflow?**

A: Select an N-Series TeraFrame Gen 3 Cabinet that includes the Front Air Dams Air Manager. Choose perforated front and rear doors and a standard top for hot aisle/cold aisle applications or aisle containment applications. Choose perforated front door, solid rear door and vertical exhaust duct for ducted exhaust applications. You will need to seal any open rack-mount spaces in the cabinet with Snap-In Filler Panels, which are ordered separately.

**Q: How does N-Series TeraFrame Gen 3 Cabinet manage cables?**

A: The N-Series TeraFrame Gen 3 Cabinet has space along both sides of the equipment mounting area for storing and managing cables. Brush-sealed or grommet-covered cable openings are located directly above and below these spaces, so cables can enter and exit the cabinet easily, while maintaining strict airflow management. Additionally, both sides of each space have supports that allow you to mount and adjust accessory vertical cable managers (ordered separately) to support cable bundles. Finally, plastic, T-shaped cable guides are mounted at the front of the cabinet on the equipment mounting rails to organize patch cords by rack-mount space. Most modular network switches have network cards that align with rack-mount spaces. The guides help organize patch cords.

**Q: How do I dress cables to optimize switch performance?**

A: It is very important to organize patch cords so that they do not block airflow into the switch. With switches that use front-to-rear airflow, patch cords can exit both sides of the switch and are managed along the sides of the cabinet. For switches that have side airflow, patch cords must be managed so that they do not block inlet airflow along the right side of the switch. Patch cords must be routed to the left side or up and down and then over using rack-mount horizontal cable managers, so that inlet airflow is not blocked. Another consideration is access to hot swappable switch modules, like the fan trays. Be sure not to block fan trays or other modules with cable connections. Consider using additional horizontal managers and jumper trays (ordered separately) to route cables from one side of the cabinet to the other to avoid blocking airflow.

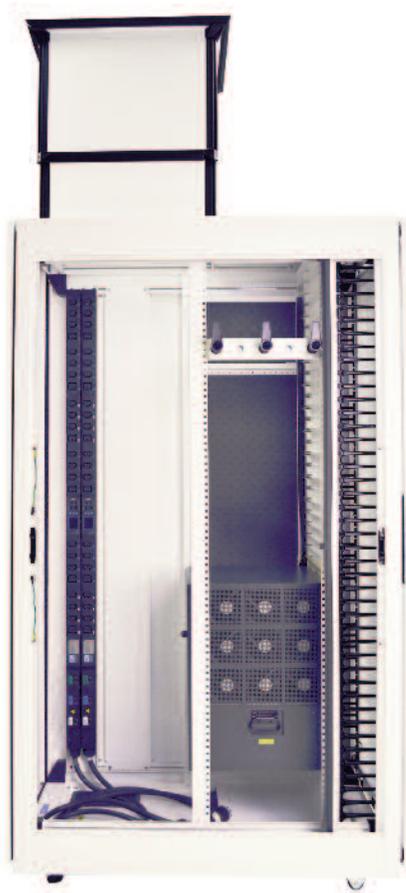


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### **Q: How do you deliver power to equipment in an N-Series TeraFrame Network Cabinet?**

A: CPI eConnect® PDUs can be mounted vertically near the front or rear corners of the cabinet to provide power connections for equipment. You will need to order a vertical PDU mounting bracket accessory separately. Alternately, CPI offers several rack-mount PDUs or UPSes.



### **Q: Can you deploy two switches into an N-Series TeraFrame Gen 3 Cabinet?**

A: Yes, you can deploy two switches into a single N-Series TeraFrame Gen 3 Cabinet as long as there is sufficient space within the cabinet. Additionally, the combined weight of the switches, cabling and accessories supported by the cabinet must not exceed the static load of the cabinet.

### **Q: Can you deploy two switches into an N-Series TeraFrame Gen 3 Cabinet if the switches are different sizes?**

A: Yes, you can deploy two switches into a single N-Series TeraFrame Gen 3 Cabinet if they are different sizes, as long as the cabinet has sufficient space and load bearing capacity. If both switches require side airflow, the intake duct can be cut to match each switch. No special or additional airflow duct is required.

### **Q: Can you deploy a switch at the bottom of the N-Series TeraFrame Gen 3 Cabinet and patch panels at the top of the cabinet and maintain hot and cold air separation within the cabinet?**

A: Yes, that is the exact intent of the intake duct design approach. It allows you to have a mix of front airflow, side airflow and patch panel equipment, while maintaining strict front-to-rear airflow management.

### **Q: Can I use N-Series TeraFrame Gen 3 Cabinet to store both network and server equipment?**

A: Yes, that is another benefit of the intake duct design approach. It allows you to have a mix of front airflow, side airflow and patch panel equipment, while maintaining strict front-to-rear airflow management.

### **Q: Can N-Series TeraFrame Gen 3 Cabinet be used with F-Series TeraFrame Gen 3 Cabinet?**

A: Yes, N-Series TeraFrame Gen 3 Cabinet and F-Series TeraFrame Gen 3 Cabinet can be used side-by-side and can be bayed together to form a row of cabinets. This allows N-Series, a network cabinet, to be placed anywhere along a row of F-Series, server cabinets. This flexibility allows middle-of-row or end-of-row switch deployment with a uniform size and aesthetic.