PANDUIT® infrastructure for a connected world

EDGE COMPUTING

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**Enabling Edge Deployments
with Panduit Infrastructure**

Edge computing moves compute functions closer to where data is generated and analyzed: at the network edge. Edge is an evolution of the network that compliments the cloud, while leveraging a distributed network model. Edge network architectures move compute, storage, and analytics near the point of data generation; proximate to the end uses. This evolution of the network realizes numerous benefits, chief among them reduced latency, improved application performance, and optimized transmission costs.

Organizations of nearly every size and shape, regardless of industry or business model, are aware of Edge as a networking concept. Applications for Edge are far reaching, with deployments escalating in applications that are sensitive to network latency, that require enhanced security, or are bound by regulatory requirements.

The Critical Nature of Infrastructure at the Edge

Locating compute functions where the data is generated and used comes with a unique set of challenges:

- Remote and geographically distributed sites
- Lack of dedicated on-site IT personnel
- Non-traditional IT spaces with limited environmental controls

Dependable network infrastructure helps address these challenges. A blend of enclosures, pre-configured offerings, intelligent solutions, and standards-based cabling and connectivity ensure that Edge networks perform as needed, limiting issues or downtime.

Pre-Configured Solutions

Enclosures that are pre-populated with various components are ready to drop in at remote sites, making installation fast, and consistent across multiple locations. When locations are scattered across the globe, this consistency is a key advantage to being able to install at multiple sites, and then remotely manage the deployments without dedicated on-site IT personnel.

Intelligent Solutions

Building intelligence into the installation is the single biggest factor in remote monitoring, management, and control. Panduit's SmartZone™ Solutions are a powerful tool managing everything from access to power delivery to environmental issues.

SmartZone™ Security
control physical access in non-traditional IT spaces, ensuring that data and equipment is protected

SmartZone™ Power
Remotely monitor and manage power delivery

SmartZone™ Environmental
monitor and respond to extreme temperatures, humidity, and other environmental conditions that can impact network performance

SmartZone™ System Software
collect, filter, and process real-time data from Edge deployments

SmartZone™ Connectivity
intelligent patching solutions simplify remote management

Enclosures

The Edge environment dictates the enclosure needed for the Edge deployment. Standard data center cabinets will be perfect for some highly protected indoor spaces, while enclosures that are rated for harsh environments may be mandated for industrial applications. Whether you're installing in a small closet, under a desk, in a dedicated server room, or on a factory floor, the right enclosure provides protection and security for network assets.

Cabling and Connectivity

Standards-based cabling and connectivity solutions provide peace of mind that the Edge deployment will function as designed. Panduit's complete suite of fiber-optic and copper cabling and connectivity have made us the industry's first choice for robust, reliable structured cabling solutions.

Edge Environments

Each data center application and environment has unique characteristics that demand solutions that address those characteristics, and Edge deployments are no exception. The infrastructure for a highly protected indoor environment will be vastly different than what is needed for a harsh space, for example. With the industry's broadest portfolio of infrastructure solutions, Panduit can help you configure the perfect solution for your specific environment.

Highly Protected Indoor

The Highly Protected Indoor environment is essentially an on-premise data center but may be located in a non-traditional data center space. This environment will have most or all the amenities of a traditional data center space, including power, cooling, connectivity, and physical security, all in a highly protected setting. What it could lack is the trained data center staff to handle every need, so remote monitoring and management is key to a successful deployment.

Examples of this type of Edge deployment include regional data centers, a telco central office, and enterprise on-premise data centers.

The Panduit solution is centered around a traditional data center cabinet, which can be pre-configured to ease installation and simplify multiple deployments around the globe. The highly protected indoor installation will likely be smaller in number, volume and density than a traditional on-premise data center, but use the full portfolio of infrastructure solutions that are typical in a traditional data center.

Solutions for Highly Protected Indoor Edge Deployment

Panduit recommends the following pre-configured offerings as a first step in building an Edge deployment in a highly protected indoor environment. Additional offerings are available if these suggested solutions don't meet your needs. See page 10 for intelligent components, cabling and connectivity, and accessories to complete the Edge deployment.

ED7222B002Z
ES7222B002Y

Part Number	Description
ED7222B002Z	SmartZone™ Integrated Dynamic Server Cabinet 42 RU x 700mm x 1200mm, two side panels, hourglass single hinge perforated front door, Black, VBLOCK lite application bundle, grounding kit, two PDU brackets, temperature sensors (3 front/1 rear) and humidity (1 front), HID handles (125 kHz) and magnetic door sensors.
ES7222B002Y	SmartZone™ Integrated Server Cabinet 42 RU x 700mm x 1200mm, two side panels, fully adjustable front rails, hourglass single hinge perforated front door, Black, VBLOCK lite application bundle, grounding kit, two PDU brackets, temperature sensors (3 front/1 rear) and humidity (1 front), HID handles (125 kHz) and magnetic door sensors.

General Indoor

General Indoor Edge deployments are located in areas that typically have controlled environments (i.e., no extreme temperatures and other environmental conditions) but may not have the level of physical security and cooling capability of a traditional data center. These sites generate data that is analyzed and used locally and may not benefit from the cloud. Commonly, these deployments do not have dedicated on-site IT personnel, so remote monitoring and management is a must, and these applications are typically a smaller footprint than a traditional data center, so the ability to right-size the solution is desirable.

Examples of general indoor Edge deployments include regional medical facilities, bank branches, enterprise branch offices, and schools.

The Panduit solution is centered around a right-sized enclosure, which could be a single data center cabinet or a wall-mount enclosure that can be located in a server room or closet. Intelligent PDUs provide not only power distribution, but also the ability to control access and remotely monitor and manage the site.

Solutions for General Indoor Edge Deployment

Panduit recommends the following pre-configured offerings as a first step in building an Edge deployment in a general indoor environment. Additional offerings are available if these suggested solutions don't meet your needs. See page 10 for intelligent components, cabling and connectivity, and accessories to complete the Edge deployment.

E6212B1

MDC79D

Part Number	Description
E6212B1	Enterprise cabinet, 12 RU, single hinge perforated front and rear doors with keyed swing handles, (2) solid single piece side panels with quarter turn locks, and casters.
MDC79D	Pre-configured micro data center, 42 RU, includes two side panels, network cabling, patch panels, cable management, grounding, casters, shock pallet and ramp.

Harsh Indoor

Harsh Indoor Edge environments are commonly found on factory floors, or perhaps in a warehouse space. More and more applications in manufacturing require lower latency to perform at peak efficiencies, and this is driving the demand for Edge data centers that are co-located near the manufacturing equipment. These applications may require a specialized enclosure that is rated for a harsh environment, as well as connectivity that is engineered for harsh environments. This protects the installation from dust and debris, moisture, vibration, or extreme temperatures. Security may be an issue, because the equipment is not in a secure room, and depending on location, remote management could be a concern as well.

Examples of Harsh Indoor Edge deployments include manufacturing facilities and warehouses.

The Panduit solution is built around a harsh environment enclosure, which could be preconfigured for simple installation. Harsh connectivity ensures performance, and intelligent solutions monitor for access control, power, environmental conditions, and other factors.

Solutions for Harsh Indoor Edge Deployment

Panduit recommends the following pre-configured offerings as a first step in building an Edge deployment in a harsh indoor environment. Additional offerings are available if these suggested solutions don't meet your needs. See page 10 for intelligent components, cabling and connectivity, and accessories to complete the Edge deployment.

MDC82NL

ZDF48-RA

Part Number	Description
MDC82NL	Pre-configured micro data center, NEMA Type 12, 42 U, one solid side panel, one side panel with cutout for 20k BTU AC, network cabling, patch panels, cable management, grounding, and casters.
ZDF48-RA	Pre-configured industrial distribution frame for two access and two distribution switches, UL 508A, UL ype 4/12 or 4/4X/12 and IP66 rated, 26 RU, DIN rail, fiber spools, back panels, ESD ports, power cables, patch panels, cable management, grounding, and casters.

Outdoor

Outdoor Edge environments are as far removed from the atributes of a typical data center as possible. Compute equipment may be placed in an enclosure or a container that acts as the data center, protecting compute equipment from the stressors of an outdoor environment. Outdoor environments must provide protection against temperature and weather extremes, flora and fauna, vandalism and theft, electromagnetic interference, and other factors. Because dedicated on-site IT staff are not likely, physical security is a concern, as is remote monitoring and management.


Examples of Outdoor Edge deployments include mining and agriculture.

Panduit's solution is not as vast for these environments. Harsh environment enclosures and hardened connectivity ensure performance, while intelligent offerings monitor for security and environmental conditions.

Solutions for Outdoor Edge Deployment

Panduit recommends the following pre-configured offerings as a first step in building an Edge deployment in an outdoor environment. Additional offerings are available if these suggested solutions don't meet your needs. See page 10 for intelligent components, cabling and connectivity, and accessories to complete the Edge deployment.

ZDF242430

Z23U-S25

Z22U-S15
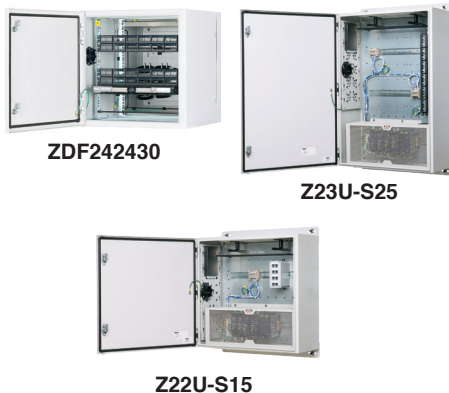
Part Number	Description
ZDF242430	Pre-configured industrial distribution frame, UL 508A, UL Type 4/12 or 4/4X/12, and IP66 rated, 12 RU, DIN rail, fiber spools, back panel, ESD ports, patch panels, cable management, and grounding.
Z23U-S25	Pre-configured universal network zone system, UL 508A, UL Type 4/12 or 4X and IP66 rated, redundant power supplies and two UPSs, pre-wired power circuits, removable pre-engineered back plate with DIN rails, copper and fiber connectivity, cable management.
Z22U-S15	Pre-configured universal network zone system, UL 508A, UL Type 4/12 or 4X and IP66 rated, redundant power supplies and one UPS, pre-wired power circuits, removable pre-engineered back plate with DIN rails, copper and fiber connectivity, cable management.

Edge Infrastructure Solutions

Cabinet Accessories

CMDRHD1
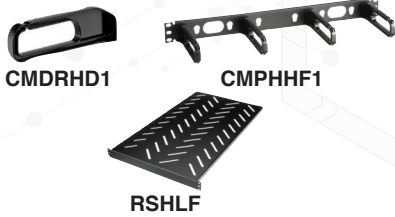
CMPHHF1

RSHLF

Part Number	Description
CMDRHD1	D-ring cable manager.
CMPHHF1	Open access horizontal D-ring cable management panel, 1 RU front access only.
RSHLF	4 post rack shelf, 19" x 30", Black.

Intelligent Power, Accessories, and Connectivity Solutions

P08D09M

P16D22M

P24D07M

P24D23M

P24D24M

P24D34M

P36D08M

P38D25M

P38D28M

LPCA05X

LPCB05X

EA001

EC001

ACE02

ACB01

ACB02

ACB03

PVQ-MIQPS96A

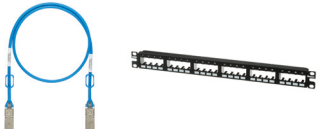| Part Number	Description
P08D09M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 15 A single phase, 120V, (8) 5-20R receptacles, NEMA 5-15P plug and measures 1.713"L x 17.461"W x 7.8"D (43.2mm x 444.5mm x 198.1mm), Black.
P16D22M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 20 A single phase, 120V, (16) 5-20R receptacles, NEMA L5-20P plug and measures 32.165"L x 2.047"W x 2.1"D (817.9mm x 50.8mm x 53.3mm), Black.
P24D07M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 30A single phase, 208V, (20) C13 and (4) C19 receptacles, NEMA L6-30P plug and measures 58.661"L x 2.047"W x 2.1"D (1491mm x 50.8mm x 53.3mm), Black.
P24D23M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 30 A single phase, 120V, (24) 5-20R receptacles, NEMA L5-30P plug and measures 58.661"L x 2.047"W x 2.1"D (1491mm x 50.8mm x 53.3mm), Black.
P24D24M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 20 A single phase, 208V, (20) C13 and (4) C19 receptacles, NEMA L6-20P plug and measures 58.661"L x 2.047"W x 2.1"D (1491mm x 50.8mm x 53.3mm), Black.
P24D34M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 60 A 3-phase, 208V, (12) C13 and (12) C19 receptacles, IEC 60309 3P+E 9h 60A plug and measures 68.898"L x 2.047"W x 2.1"D (1750.1mm x 50.8mm x 53.3mm), Black.
P36D08M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 30 A 3-phase, 208V, (30) C13 and (6) C19 receptacles, NEMA L15-30P plug and measures 68.898"L x 2.047"W x 2.1"D (1750.1mm x 50.8mm x 53.3mm), Black.
P38D25M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 30 A single phase, 208V, (32) C13 and (6) C19 receptacles, NEMA L6-30P plug and measures 68.898"L x 2.047"W x 2.1"D (1750.1mm x 50.8mm x 53.3mm), Black.
P38D28M	SmartZone™ G5 Monitored Input (MI Series) Rack PDU, 30 A 3-phase, 208V, (30) C13, (6) C19 and (2) 5-20R receptacles, NEMA L21-30P plug and measures 68.898"L x 2.047"W x 2.1"D (1750.1mm x 50.8mm x 53.3mm), Black.
LPCA05X	Locking power cord, IEC C14 to IEC C13; 10' length, Red (other colors available).
LPCB05X	Locking power cord, IEC C20 to IEC C19; 10' length, Red (other colors available).
EA001	G5 iPDU temperature sensor.
EC001	G5 iPDU three temperature and humidity sensor (3T+H).
ACE02	SmartZone™ G5 Electronic Swinghandle with low frequency (125 kHz) card reader.
ACB01	SmartZone™ G5 iPDU Access Hub for electronic swinghandle (cold and hot aisle selectable).
ACB02	SmartZone™ G5 iPDU Access Hub Harness cold aisle (front of cabinet) for ACE02.
ACB03	SmartZone™ G5 iPDU Access Hub Harness hot aisle (rear of cabinet) for ACE02.
PVQ-MIQPS96A	Modular intelligent patch panel kit, angled, 96-port; includes four 24-port intelligent angled patch panels, one PanView iQ™ Panel Manager with interface unit, and three PanView iQ™ Expansion Modules with expansion port cables and interface units.

Cabling and Connectivity

PUP6AV04BU-UG
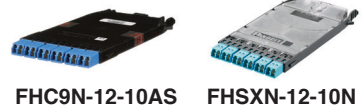
UTP28X10BU

CJ6X88TGBL

PSF1PXA2MBL

PQSFPXA1MBU

CPP24FMWBLY

CPPA24FMWBLY

FLEX1U06

FLEX1UPN06

FHCZO-12-10U

FHC9N-12-10AS

FHSXN-12-10N

FHMP-6-ABL

FHMP-6-BCG

FCE1U

FC2ZO-12-10U
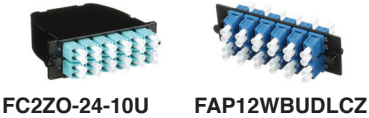
FC2ZO-24-10U

FAP12WBUDLCZ

FC29N-12-10AS

FC29N-24-10AS

FAP12WAQDLCZ

Part Number	Description
PUP6AV04BU-UG	Category 6A copper cable, 4-Pair, 23 AWG, U/UTP, plenum, (CMP), Blue.
UTP28X10BU	Category 6A 28 AWG UTP patch cord, 10 feet, Blue (other colors and lengths available).
CJ6X88TGBL	Mini-Com® Category 6A Jack Module, Category 6A, unshielded, Black, TG style (other colors available).
PSF1PXA2MBL	SFP+ 10Gig direct-attach passive copper cable assembly, 2 meters, Black (other colors and lengths available).
PQSFPXA1MBU	QSFP+ 40Gig™ Copper cable Assembly, 30 AWG, 1 meter, Blue (other colors and lengths available).
CPP24FMWBLY	Mini-Com® Modular Patch Panel, 24-port, flat, flush mount.
CPPA24FMWBLY	Mini-Com® Modular Patch Panel, 24-port, angled, flush mount.
FLEX1U06	HD Flex™ Fiber Enclosure, 1 RU, Black.
FLEX1UPN06	1 RU 6-port HD Flex™ Patch Panel.
FHCZO-12-10U	HD Flex™ Cassette; 1 MPO to 6 duplex LC; OM4 fiber and optimized loss; universal.
FHC9N-12-10AS	HD Flex™ Cassette; 1 MPO to 6 duplex LC; OS2 fiber and standard loss; universal.
FHSXN-12-10N	HD Flex™ LC Splice/FAP Cassette; 6-port duplex LC multimode adapters in Aqua with zirconia sleeves (LC pigtails not included).
FHMP-6-ABL	HD Flex™ MPO FAP; 6-port MPO; Type A adapter (key-up to key-down) Black.
FHMP-6-BCG	HD Flex™ MPO FAP; 6-port MPO; Type B adapter (key-up to key-up) Charcoal Gray.
FCE1U	1 RU rack mount fiber enclosure, up to four cassettes/FAPs/FOSM.
FC2ZO-12-10U	OM4 fiber; optimized low loss; twelve fibers total; LC duplex adapter (Aqua); universal.
FC2ZO-24-10U	OM4 fiber; optimized low loss; 24 fibers total; LC duplex adapter (Aqua); universal.
FAP12WBUDLCZ	LC OS1/OS2 FAP loaded with twelve LC duplex single mode fiber optic adapters (Blue), with zirconia ceramic split sleeves.
FC29N-12-10AS	OS1/OS2 12-fiber total, standard loss, LC duplex adapter (Blue), standard method A.
FC29N-24-10AS	OS1/OS2 24-fiber total, standard loss, LC duplex adapter (Blue), standard method A.
FAP12WAQDLCZ	OM3/OM4 FAP loaded with twelve LC duplex multimode fiber optic adapters (Aqua), with zirconia ceramic split sleeves.

Cabling and Connectivity (continued)

FZTYP7575YAF015

FZUYP7575YAF015

F9TYP5E5EAAF015

F9UYP5E5EAAF015

FZTRP7N7NYNF015

F9TRP5N5NANF015

FZ2ERQ1Q1ONM001

FZ2RPUNUNONF001

F92ERLNLNSNM001

F92RPUNUNONF001

FODPZ24Y
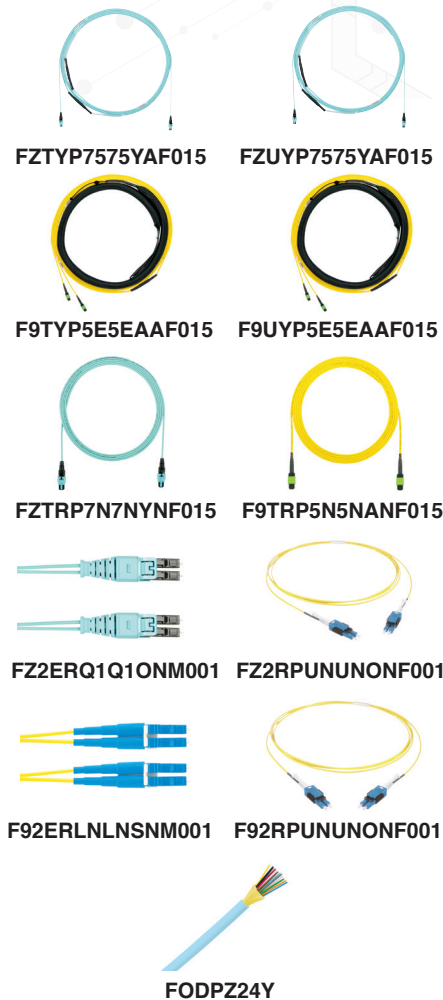
Part Number	Description
FZTYP7575YAF015	OM4, 12-fiber trunk, plenum, PanMPO™ Female to PanMPO™ Female, method B, optimized IL, with pulling eye, 15 feet.
FZUYP7575YAF015	OM4, 24-fiber trunk, plenum, PanMPO™ Female to PanMPO™ Female, method B, optimized IL, with pulling eye 15 feet.
F9TYP5E5EAAF015	Single mode trunk cable assembly, 12-fiber, plenum female MPO to female MPO, pulling eye, 15' length.
F9UYP5E5EAAF015	Single mode trunk cable assembly, 24-fiber, plenum female MPO to female MPO, pulling eye, 15' length.
FZTRP7N7NYNF015	OM4 12-fiber, interconnect plenum PanMPO™ Female to PanMPO™ Female, method B Opt IL, no pulling eye – 15 feet.
F9TRP5N5NANF015	OS2 12-fiber, interconnect plenum MPO female to MPO female, method A Std. IL, no pulling eye – 15 feet.
FZ2ERQ1Q1ONM001	OM4 2-fiber 1.6mm patch cord riser, LC push-pull to LC push-pull optimized IL, 1m length.
FZ2RPUNUNONF001	OM4 2-fiber 2mm PC OFNP LC uniboot/LC uniboot standard polarity optimized IL, 1 foot.
F92ERLNLNSNM001	OS2 2-fiber 1.6mm jacket patch cord riser LC duplex to LC duplex Std. IL, 1m length.
F92RPUNUNONF001	OS2 2-fiber 2mm PC OFNP LC uniboot/LC uniboot standard polarity optimized IL, 1 foot.
FODPZ24Y	50µm OM4 24 fiber indoor distribution cable, plenum (OFNP), 900µm buffered fibers.

PANDUIT®