PANDUIT®

Technology Brief

August 2024

Broadband Central Office Reference Architecture

Plan your central office with standards-based architectures

About the Central Office

Panduit and the Panduit ONE network of engineering and construction partners understand and appreciate the importance of a well-planned central office. That is why we certify and train to rigorous standards and stand behind the deployment of our systems with 25-year installed system warranties. That is also why we developed this reference architecture: to give you a starting point on your next project.

The central office, also referred to as the head end or data center of a service provider's network, is the nerve center of the network and is critical to delivering reliable internet services to your subscribers. A well-planned central office will support the reliability your customers expect from your network. It will also allow you to seize opportunities to grow and leverage your investments in new ways.

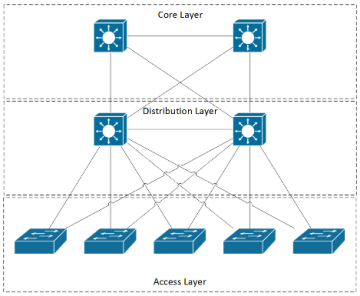
How to Use this Reference Architecture

The purpose of this reference architecture is to provide a real-life example with ideas for how to plan your next central office. This central office design is based on numerous examples of central offices built by fiber broadband providers, including municipalities and utilities across North America. Use this reference architecture to plan your own central office using the following steps:

Step 1: Define Logical Architecture

- Determine the number of subscribers to be supported
- Determine upstream bandwidth needs
- Choose optical line terminal and optics
- Identify router technology
- Determine fiber split architecture and whether any splits will reside in the central office

Getting Started: Work with your engineering design team and optics vendors to define logical architecture.



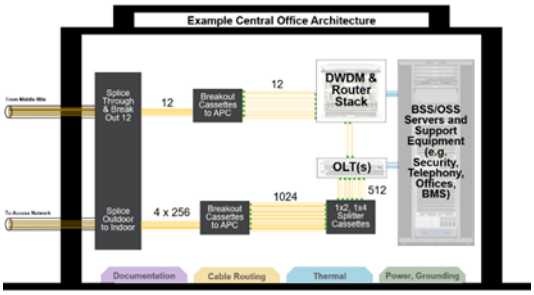
Step 2: Determine Power Requirements

- Identify short-term power needs and growth
- Determine failover power and UPS requirements
- Select AC or DC power sources

Getting Started: Work with your engineering design team and electronics vendors to determine power requirements.

Step 3: Plan Connectivity Needs

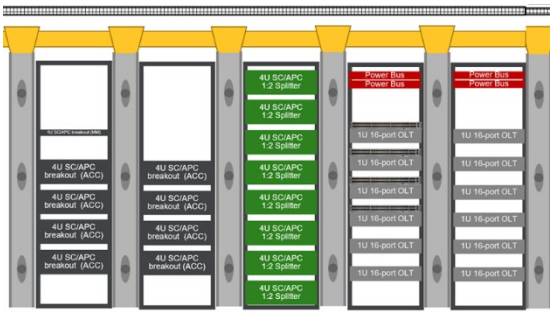
- Define physical plant to meet logical architecture
- Define interconnect points for ongoing administration and infrastructure testing
- Identify number of fibers landing in the central office
- Plan transition splice from OSP into ISP
- Plan cassettes and enclosures for cable breakout
- Plan space for value added cassettes including splitters and WDM



Getting Started: Reference the Central Office Logical Architecture to help determine connectivity for your central office.

Step 4: Plan Rack Space Needs

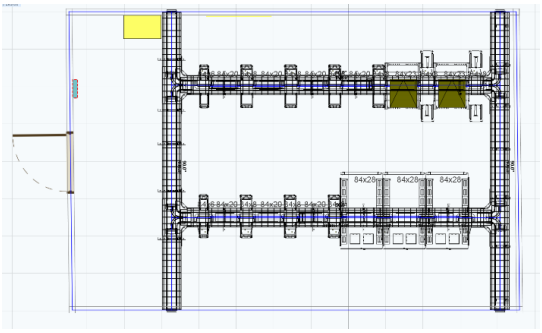
- Determine rack space needs for power, optics, routing, compute, and connectivity
- Choose between stand-alone optical distribution frame or standard racks for optical breakout and connectivity
- Add cabinets/racks for any compute requirements
- Add room for horizontal and vertical cable management
- Allocate space for future growth expectations



Getting Started: Leverage the Central Office Rack Layout to determine needs and design your rack layout.

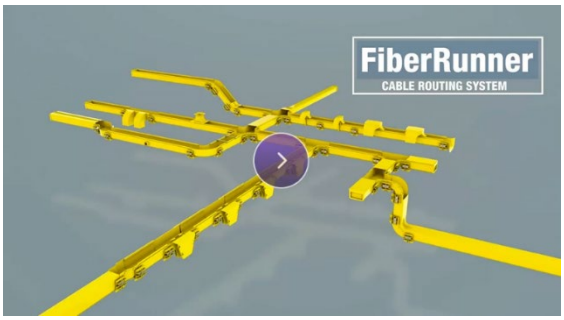
Step 5: Lay Out Room

- Position needed racks and cabinets plus spares into available space, account for clearances required by local code
- Be sure to include space for cable managers for both short-term requirements and long-term growth expectations
- If space is limited, rework steps 3 and 4 to identify opportunities to reduce space



Getting Started: Leverage the Central Office Room Layout to design your room layout to accommodate your infrastructure.

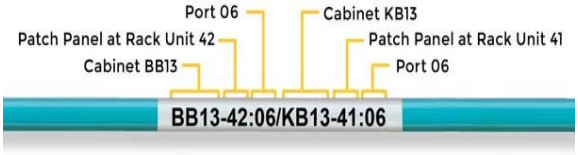
Step 6: Lay Out Cabling Pathways



- Identify routing needs between entrance splice, breakout, and various networking equipment; be sure to account for future growth
- Identify diverse routes for all critical connectivity
- Lay out pathways for fiber and copper cabling above the equipment racks and cabinets, and between rows of equipment

Getting Started: Leverage the Central Office Room Layout to design your pathways infrastructure.

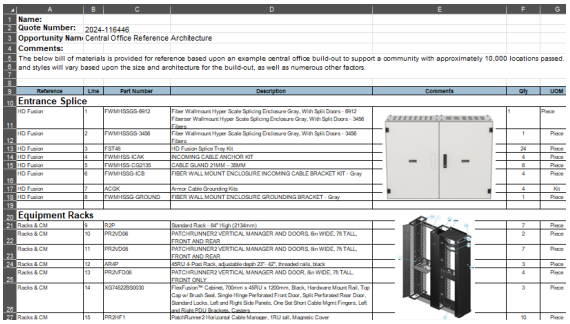
Step 7: Determine Labeling and identification



- Determine labeling for all components
- Determine labeling scheme for all interconnect cables, e.g. per TIA 606
- Establish plan for administrative documentation for all parts of system and network links

Getting Started: Contact a Panduit account representative and technical sales engineer to help define a labeling scheme that fits your needs.

Step 8: Complete specification, scope of work, and assemble a bill of materials (BOM)



Name:
Quote Number: 2024-116446
Opportunity Name: Central Office Reference Architecture
Comments:
The below bill of materials is provided for reference based upon an example central office build-out to support a community with approximately 10,000 locations passed. and styles will vary based upon the size and architecture for the build-out, as well as numerous other factors.

Reference	Line	Part Number	Description	Comments	Qty	UOM
Entrance Splice						
HD Fusion	1	FWMHSSGS-6912	Fiber Wallmount Hyper Scale Splicing Enclosure Gray, With Split Doors - 6912 Fiberstar Wallmount Hyper Scale Splicing Enclosure Gray, With Split Doors - 3456 Fibers		1	Piece
HD Fusion	2	FWMHSSGS-3456	Fiber Wallmount Hyper Scale Splicing Enclosure Gray, With Split Doors - 3456 Fibers		1	Piece
HD Fusion	3	FST48	HD Fusion Splice Tray Kit		24	Piece
HD Fusion	4	FWMHSS-ICAK	INCOMING CABLE ANCHOR KIT		4	Piece
HD Fusion	5	FWMHSS-CG2135	CABLE GLAND 21MM - 35MM		8	Piece
HD Fusion	6	FWMHSSG-ICB	FIBER WALL MOUNT ENCLOSURE INCOMING CABLE BRACKET KIT - Gray		4	Piece
HD Fusion	7	ACGK	Armor Cable Grounding Kits		4	Kit
HD Fusion	8	FWMHSSG-GROUND	FIBER WALL MOUNT ENCLOSURE GROUNDING BRACKET - Gray		1	Piece
Equipment Racks						
Racks & CM	9	R3P	Standard Rack - 84" High (2134mm)		7	Piece
Racks & CM	10	PRVD06	PATCHRUNNER2 VERTICAL MANAGER AND DOORS, 6in WIDE, 7ft TALL, FRONT AND REAR		2	Piece
Racks & CM	11	PRVD08	PATCHRUNNER2 VERTICAL MANAGER AND DOORS, 8in WIDE, 7ft TALL, FRONT AND REAR		7	Piece
Racks & CM	12	AR4P	48RU 4-Post Rack, adjustable depth 27" - 42", threaded rails, black		3	Piece
Racks & CM	13	PRVFD06	PATCHRUNNER2 VERTICAL MANAGER AND DOOR, 6in WIDE, 7ft TALL, FRONT ONLY		4	Piece
Racks & CM	14	XG7452B50030	FiberFusion™ Cabinet, 700mm x 48RU x 1200mm, Black, Hardware Mount Rail, Top Cap w/ Brush Seal, Single Hinge Perforated Front Door, Split Perforated Rear Door, Standard Locks, Left and Right Side Panels, One Set Short Cable Mgmt Fingers, Left and Right PDU Brackets, Casters		3	Piece
Racks & CM	15	PR2HF1	PatchRunner2 Horizontal Cable Manager, 1RU tall, Magnetic Cover		10	Piece

Getting Started: Download and use the Bill of Materials file to build your BOM.

Step 9: Procure and Construct

- Work with authorized distributors and qualified construction partners to procure and construct your central office

Getting Started: Contact a Panduit account representative to help identify authorized distributors and construction partners.

PANDUIT ONE PARTNER PROGRAM

Lean on the Expertise of Panduit

Widely recognized as one of the leading fiber optics vendors in the market, Panduit is poised to help you design and deploy your central office infrastructure. Leverage our Central Office Reference Architecture tools, and the expertise of Panduit and our ecosystem, to design a central office facility that allows you to meet the challenges of a growing broadband market.

We invite you to leverage the tools provided, and to reach out to add a local Panduit account engineer to your team.