

September 2025

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.

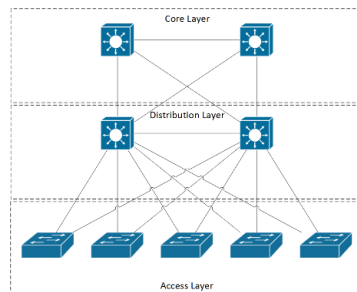
How to Use this Reference Architecture

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

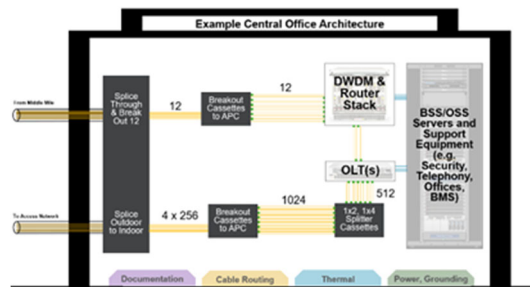
Getting Started: Work with your engineering design team and electronics vendors to determine power requirements.



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Step 3: Plan Connectivity Needs

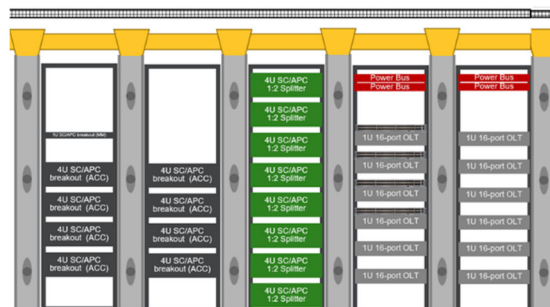
- Define physical plant to meet logical architecture
- Define interconnect points for ongoing administration and infrastructure testing
- Identify number of fibers landing in the central office
- Plan transition splice from OSP into ISP
- Plan cassettes and enclosures for cable breakout
- Plan space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

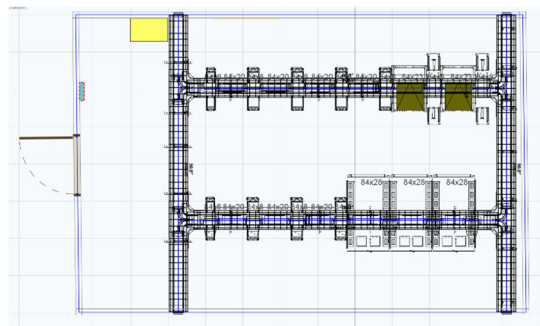
- Determine rack space needs for power, optics, routing, compute, and connectivity
- Choose between stand-alone optical distribution frame or standard racks for optical breakout and connectivity
- Add cabinets/racks for any compute requirements
- Add room for horizontal and vertical cable management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

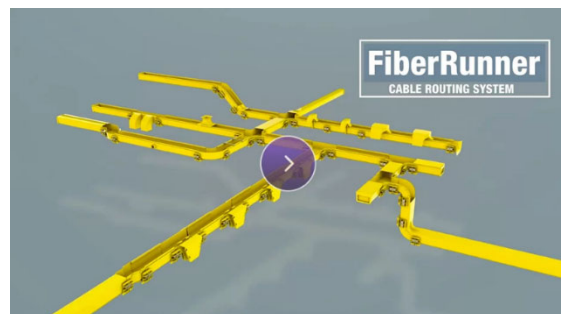
- Position needed racks and cabinets plus spares into available space, account for clearances required by local code
- Be sure to include space for cable managers for both short-term requirements and long-term growth expectations
- If space is limited, rework steps 3 and 4 to identify opportunities to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

