

Solution Summary

Ciena has two open access scalable solution architectures to submit for this project.

The first, Solution A is the 3804 all in one ONT plus residential gateway. Utilizing pluggable PON OLTs, this network will include a 100mbps fiber to the home solution, with no blocking to the core it will support 100% throughput to each customer and no oversubscription. The 3804 will be available Q2 of 2024 and has integrated WiFi capabilities, but does not support 1G services, it prepares for future bandwidth growth with a minimum port speed of 2.5G.

The second option, Solution B is the Ciena 3803 + Plume Super Pod residential gateway. Using pluggable PON OLTs, this network will also include a 100 Mbps fiber to the home solution, with no blocking to the core it will support 100% throughput to each customer and no oversubscription. The 3803 is available today and supports 1G services. The Plume residential gateway comes with a Home Pass application that can provide data analytics, set parental privacy controls, and provide cyber protection for all connected devices.

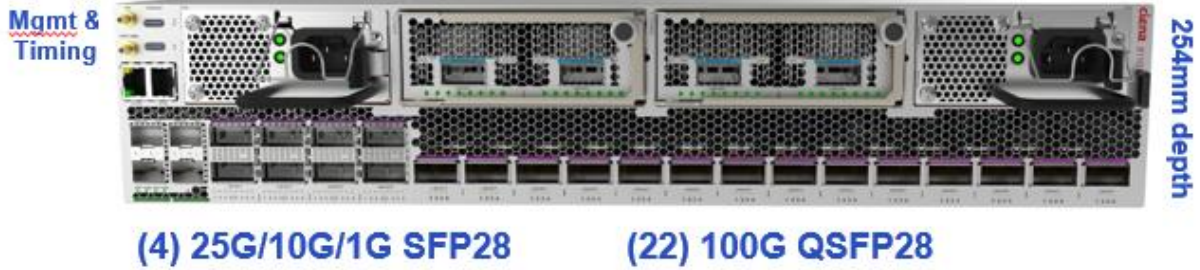
Ciena offers a varied training portfolio, including training credits given for purchases, in person courses, and a library of online content available 24/7 covering Ciena solutions and industry training, implementation, and certifications in Carrier and Optical Networking.

In addition to training credits, Ciena offers Marketing as a Service to our customers at no cost. We hope to work as a long term partner for the City of Superior, and will work to support community broadband adoption and help with marketing campaigns or events.

The network consists of MPLS enabled redundant switches at the Core and Access Hubs which are collocated in this design.

At the Core location, the Ciena 8110 has been chosen.

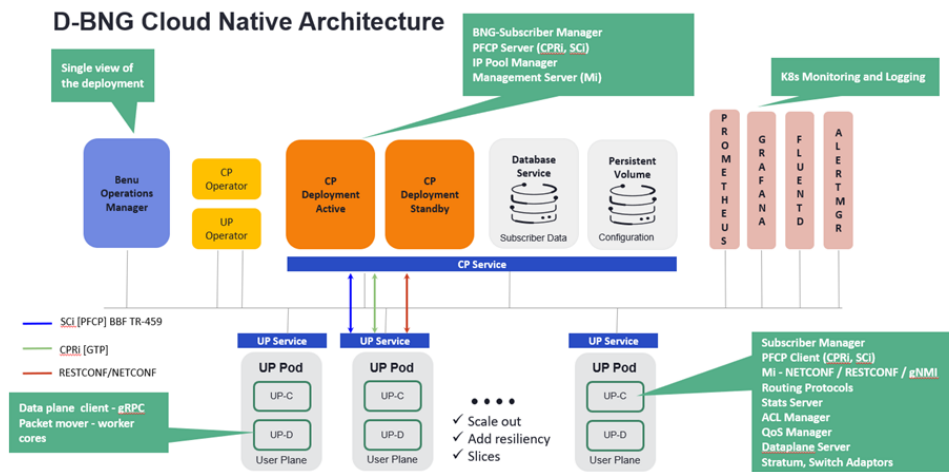
Pluggable dual power (2) 800G NNI Modules



Three of the four 200G QSFP-DD ports shall interface to the access hubs, the fourth is available as data bandwidth increases. Two of the 200g ports shall be link aggregated for a data interconnection between the chassis.

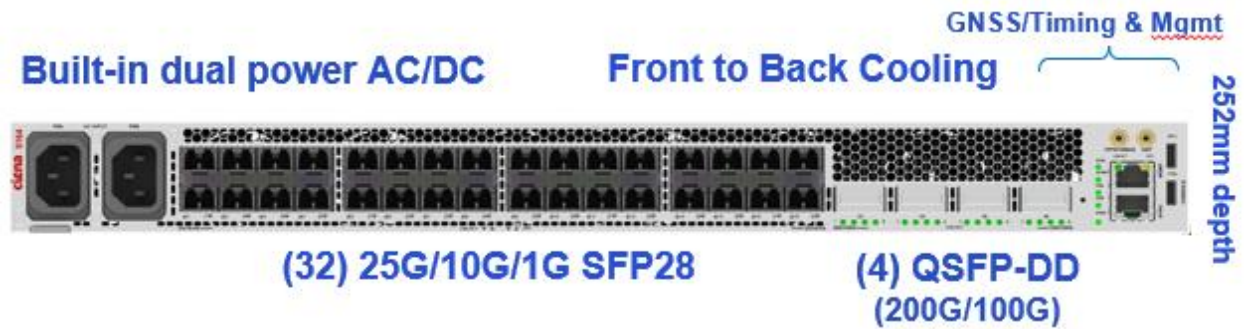
The Ciena virtual Broadband Network Gateway (vBNG) is also added in for subscriber management services. It allows operators to reduce operational costs, comply with regulations and manage revenue.

The vBNG has been spec'd in for two redundant user plane servers and two redundant control plane servers (which are not included, and control plane servers with 60G each). Software licenses sized for 8Mb per subscriber simultaneously (15k subs), 30% CGN bandwidth – initial bandwidth requires 200G user plane servers (~7.5k ea) but hardware should be scaled based on longer term requirements, allowing license addition to scale as the network grows.



Redundant network management has been spec'd via manage, control, plan (MCP), servers not included.

At the Access Hub, the Ciena 5164 has been chosen.



Redundant 200G QSFP-DD ports shall interconnect both the Access Hub to Core and Access Hub to Access Hub switches. Each Access Hub has been designed with five 5164s in mind requiring 5 RU of space. Each Access Hub is capable of providing services to over 5000 subscribers. The 1/10/25G ports can be configured to support XGS PON and direct Ethernet services today. Ciena is building a 25G synchronous PON (25GSPON) that will also plug in to these ports providing additional future proofing. Redundant/Resilient connectivity to anchor sites and wireless sites is expected from separate ports on two 5164s.

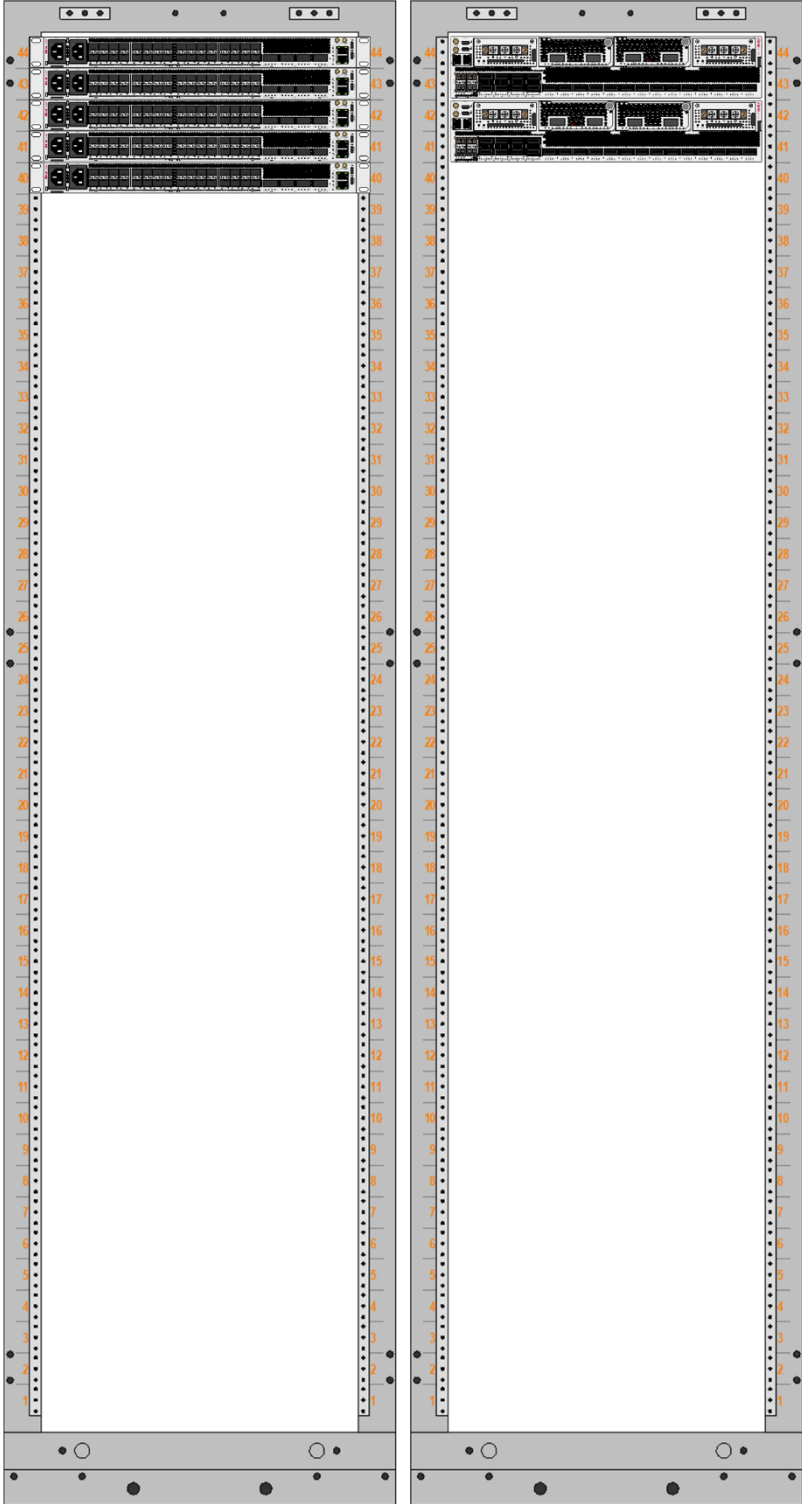
At the residence, the Ciena 3803 or 3804 have been chosen to meet the requirements, however, there are additional ONTs providing additional bandwidth and functionality.



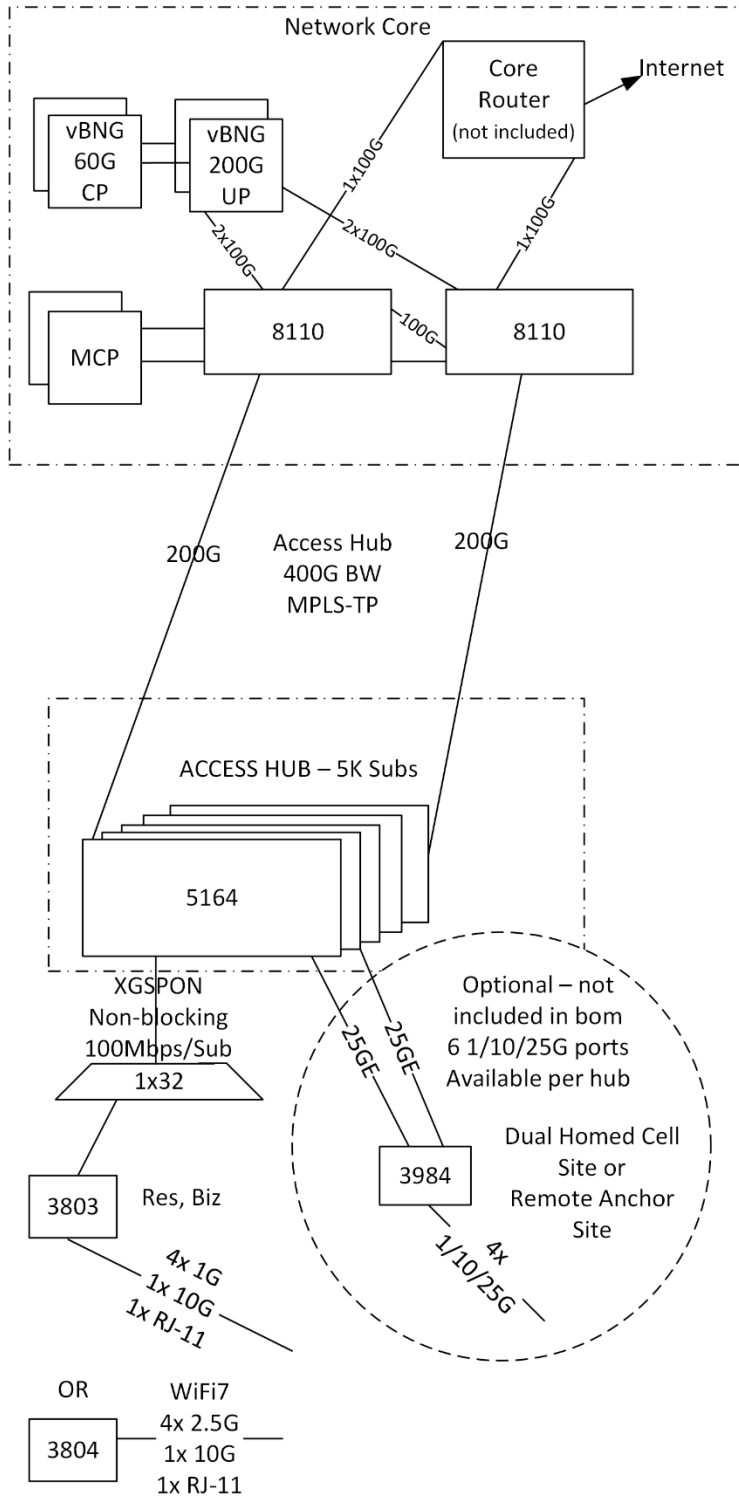
In Solution B, the 3803 provides XGS PON termination to Ethernet at the residence and is capable of speeds from 1Gbps to 10Gbps meeting the 100Mbps requirement and exceeding it. However, this ONT does not have integrated Wi-Fi so the Plume SuperPOD has been chosen as a residential gateway providing customers with Analytics, Privacy Controls, and Parental Controls in an easy to use app. FTTH subscribers are connected using 10 Gig symmetrical XGS PON with a split ratio of 32 residences to 1 OLT port. See quotes attached from Plume.

In Solution A, the 3804 provides XGS PON termination to Ethernet at the residence and is capable of speeds from 2.5Gbps, as well as integrated WiFi capabilities. This solution is quoted for the purpose of this RFI using similar currently available hardware.

Ciena Rack Elevations



Ciena Cost Model



100Mb FTTH Model equipment estimate model

15k wired end subscribers
 32 way split
 3.2Gbps/PON (100Mbps/sub)
 Non-blocking through core – ramp
 BNG & Internet connection with traffic
 Core can be split for geo redundancy
 Access Hub

BOM:

Core Site (QTY 1)
 2 x 8110 w/2xQSFP-DD
 FRU,sec,mpls,base, DC
 8 x 100G AOC
 4 x 25G/10G/1G SR optics – servers etc
 6 x 200G QSFP56 optics (use AOC if Access Hub local to Core)
 MCP (redundant, servers not included)
 vBNG (redundant, servers not included, initial 2 x 200G UP servers, 2 x 60G CP servers)

Access Hub (5k subs)
 5 x 5164 w/,sec,mpls,base, DC
 4 x 200G AOC
 2 x 200G WL5N optics
 157 uOLT (02)
 5000 ONU (3803)
 Non-blocking for all ONUs @ 100Mbps

Installation Standard - 1 Data Service, first OLT/chassis:
 MCP Install Remote 3-Day 2 VM HA Cluster
 Ciena Comprehensive With Build
 SIF required
 Design MPLS-TP 1/5164
 Services L2VPN-VPWS 1/5164
 Qos/Cos – simple rate limiting
 Solution Implement MPLS-TP 1/5164
 Services L2VPN-VPWS 1/5164
 Installation Custom – Submit with vBNG quote