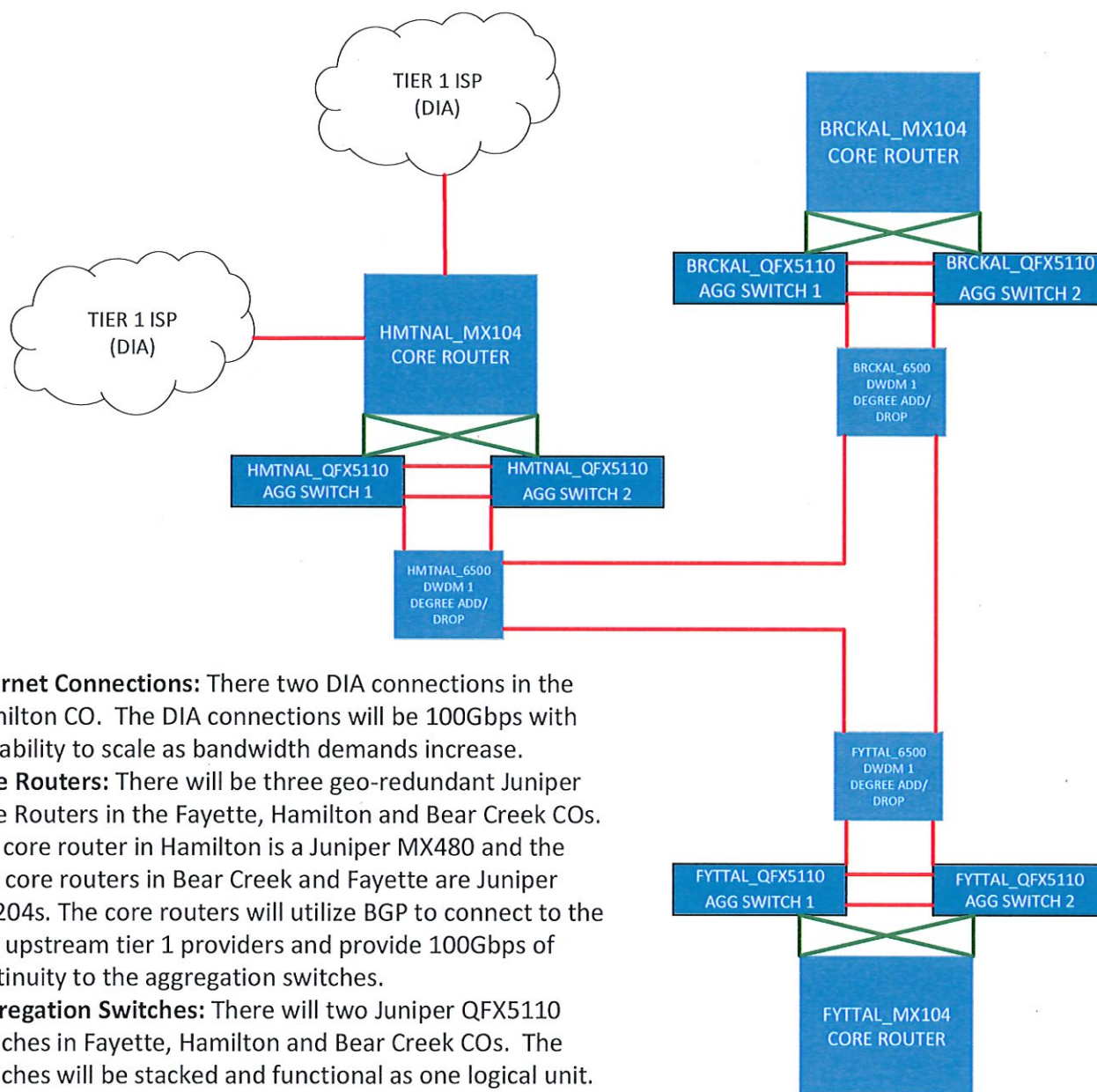


High Level Design for DIA, Core Routing, Aggregation Switching and Transport



Internet Connections: There two DIA connections in the Hamilton CO. The DIA connections will be 100Gbps with the ability to scale as bandwidth demands increase.

Core Routers: There will be three geo-redundant Juniper Core Routers in the Fayette, Hamilton and Bear Creek COs. The core router in Hamilton is a Juniper MX480 and the two core routers in Bear Creek and Fayette are Juniper MX204s. The core routers will utilize BGP to connect to the two upstream tier 1 providers and provide 100Gbps of continuity to the aggregation switches.

Aggregation Switches: There will two Juniper QFX5110 switches in Fayette, Hamilton and Bear Creek COs. The switches will be stacked and functional as one logical unit. The switches will provide 40Gbps active/active LAGs to each ADTRAN TA5000 Access Node for internet continuity. The switches will have 100Gbps interconnections and 100Gbps connections to the transport network.

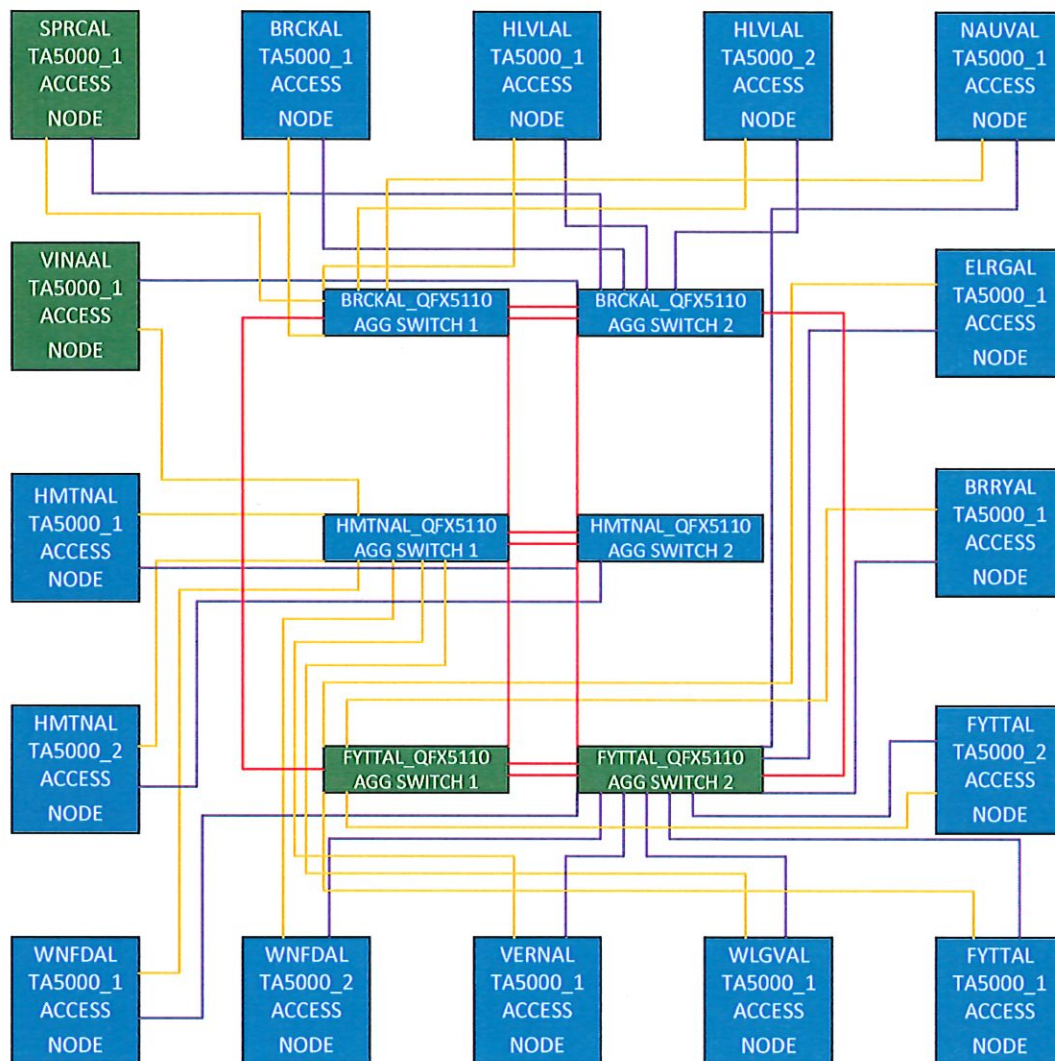
Transport: There will be a ECI Apollo DWDM node in Fayette, Hamilton and Bear Creek with a 100 Gbps Point-to-Point connections between the COs over a diverse fiber path. The transport equipment will also be equipped with 10Gbps transponders/muxponders to provide diverse uplinks for the TA5000 access nodes.



Roy Donald Glenn
02/06/2021

Legend
100Gbps Fiber
10Gbps Fiber

Layer 2 and Access High Level Design



Aggregation Switching: Juniper QFX 5110 Layer 2 aggregation stacks in Fayette, Hamilton, and Bear Creek COs will provide 20Gbps of Layer 2 Ethernet continuity via geo-redundant east and west routes to the Switch Modules of each access node. LAG with LACP will be utilized to provide redundant uplinks to each access node.

Access Nodes: ADTRAN TA5000 nodes equipped with non-blocking Switch Modules and 8-port GPON (ITU-T G.984 Gigabit Passive Optical Network) OLT (Optical Line Terminals) will be utilized to deliver 1Gbps service offerings to residential and commercial subscribers. The ADTRAN TA5000 nodes will be located in environmentally hardened Central Offices or in remote cabinets throughout the footprint of the serving area. A 1x32 passive splitter will be utilized on each GPON port and will be installed in splice locations throughout the serving area and the design accounts for a 20km and 27km optical budget. The GPON port will serve up to 32 customers and has a bandwidth capability of 2.488Gbps down and 1.422Gbps up. The GPON line card uses DBA (dynamic bandwidth allocation) to provide symmetrical 1Gbps service offerings to up to 32 customers.



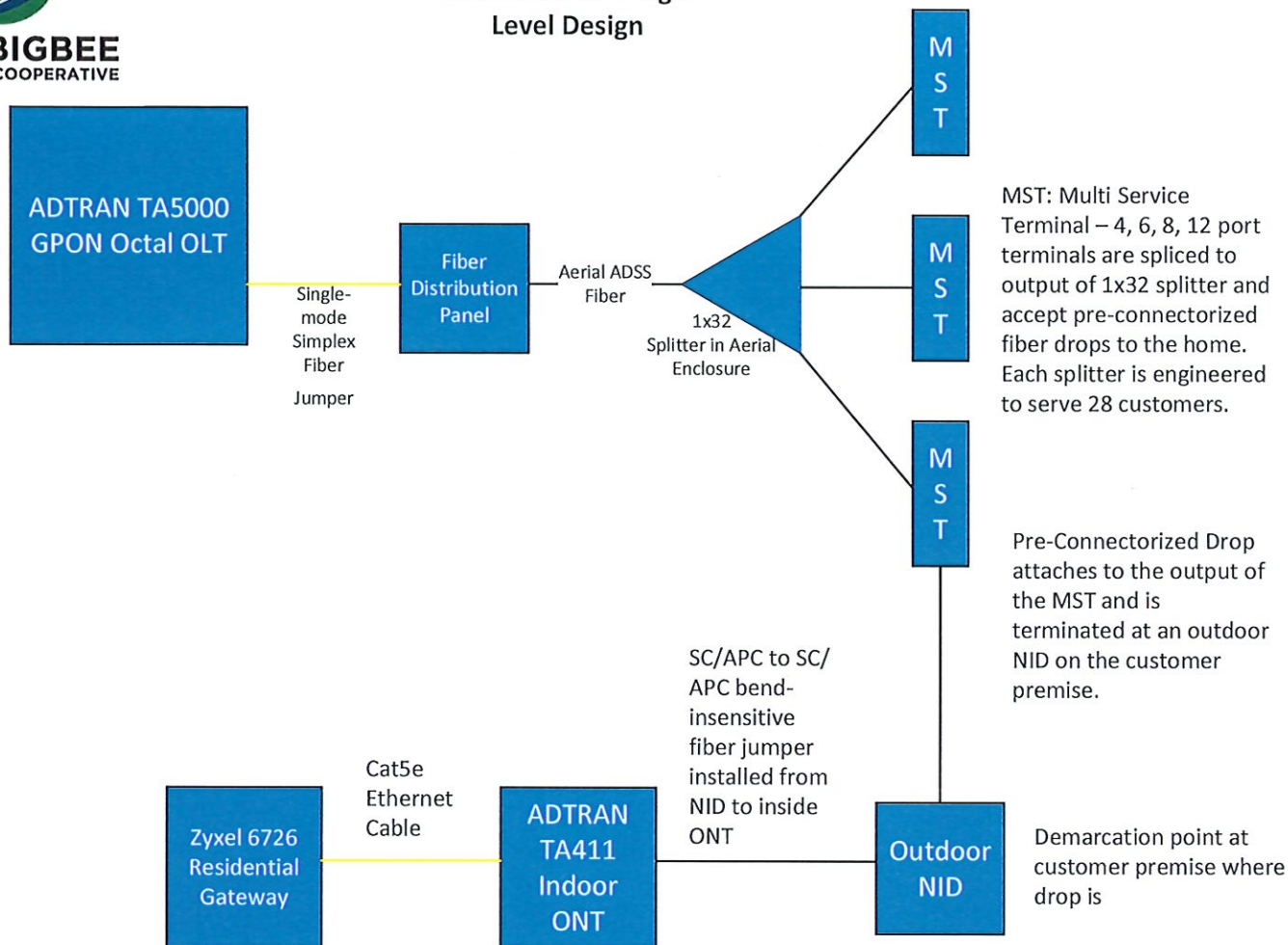
Ray D. Glenn
02/06/2021

LEGEND

- Existing Node
- Proposed Node
- 100Gbps Fiber Connection
- 10Gbps East Fiber Connection
- 10Gbps West Fiber Connection



Access and CPE High-Level Design



Comtrend WR-6726 Residential Gateway: Provides 4 GigE physical connections and utilizes 802.11ac for 2.4 and 5Ghz wireless connectivity. The Residential Gateway utilizes TR-069 for remote monitoring and configuration via an ACS

ADTRAN TA411 ONT: Indoor ONT with 1Gige and 1FXS connection. Used to extend Layer 2 continuity from the OLT to the Residential Gateway



Roy Donald Glenn
02/06/2021