A path selection unit selects a network communication path from a plurality of available network communication paths for transmitting data from a hybrid network device to a destination network device. A packet transmit unit determines path connection characteristics associated with the selected network communication path. The packet transmit unit generates a hybrid network packet for transmitting the data to the destination network device based at least in part on the path connection characteristics associated with the selected network communication path. The packet transmit unit transmits the hybrid network packet to the destination network device via the selected network communication path.