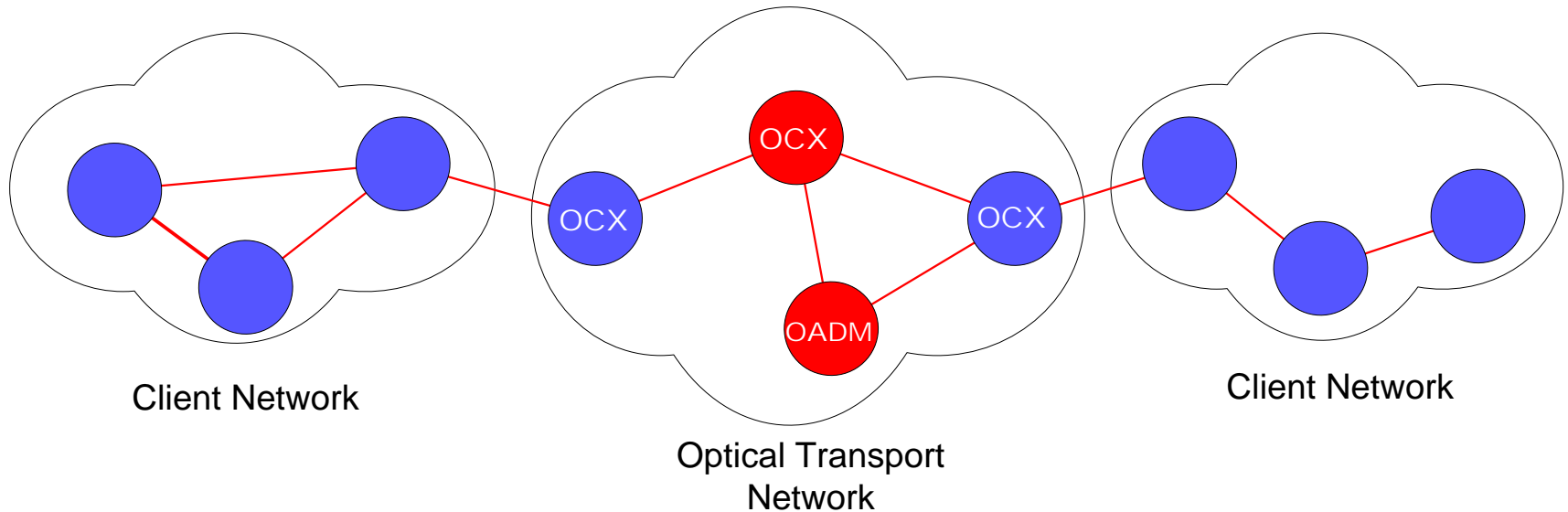


# Evolving Networks – Towards IP over WDM

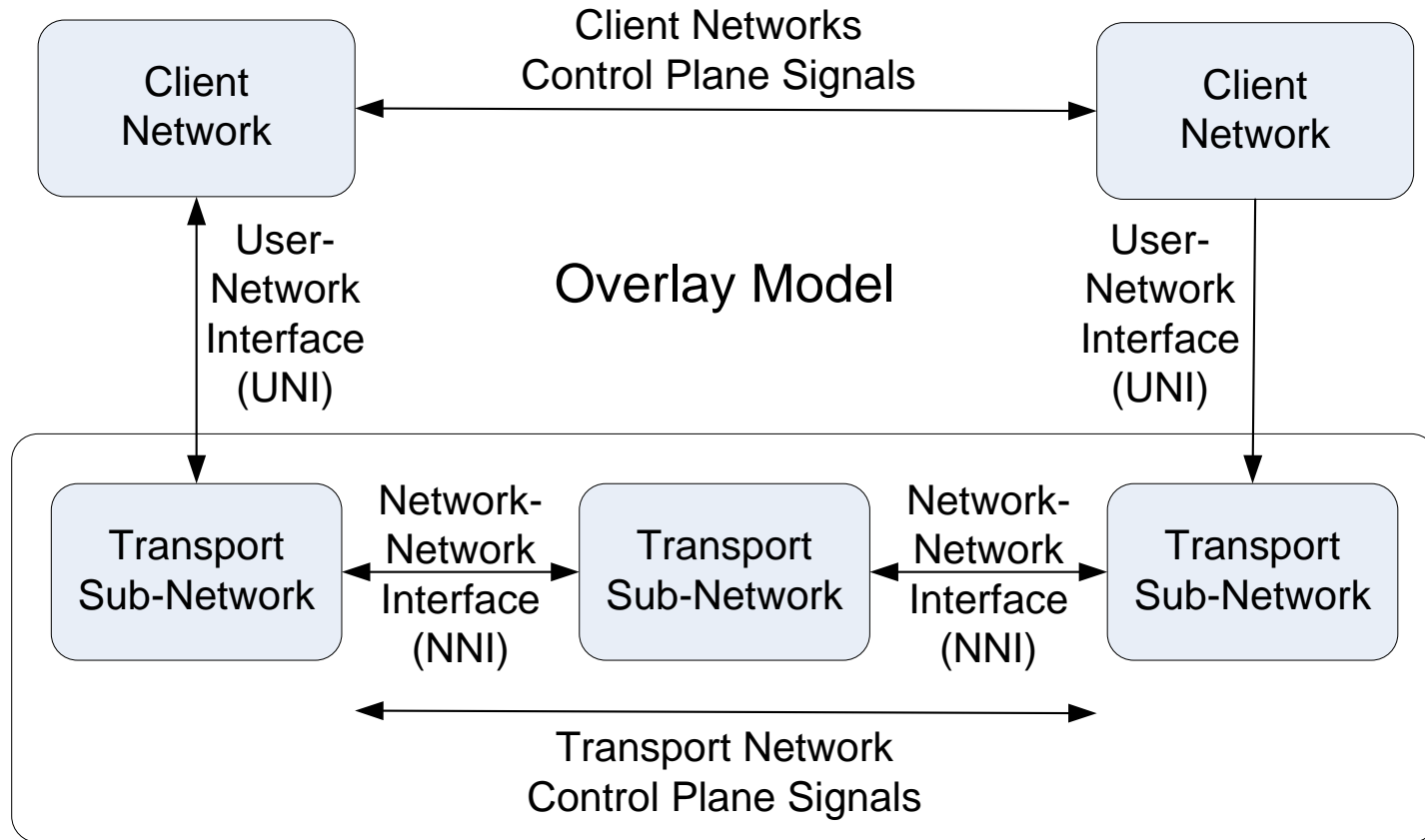
- Optical Transport Networks
- Overlay and Peer Networks
- The ITU Optical Transport Network (OTN) Standard
- Automatically Switched Optical Networks (ASON)
- Generalized Multiprotocol Label Switching GMPLS
- Multiprotocol Label Switching – Transport Profile (MPLS-TP)
- Multi-Service Network Nodes

# Optical Transport Networks



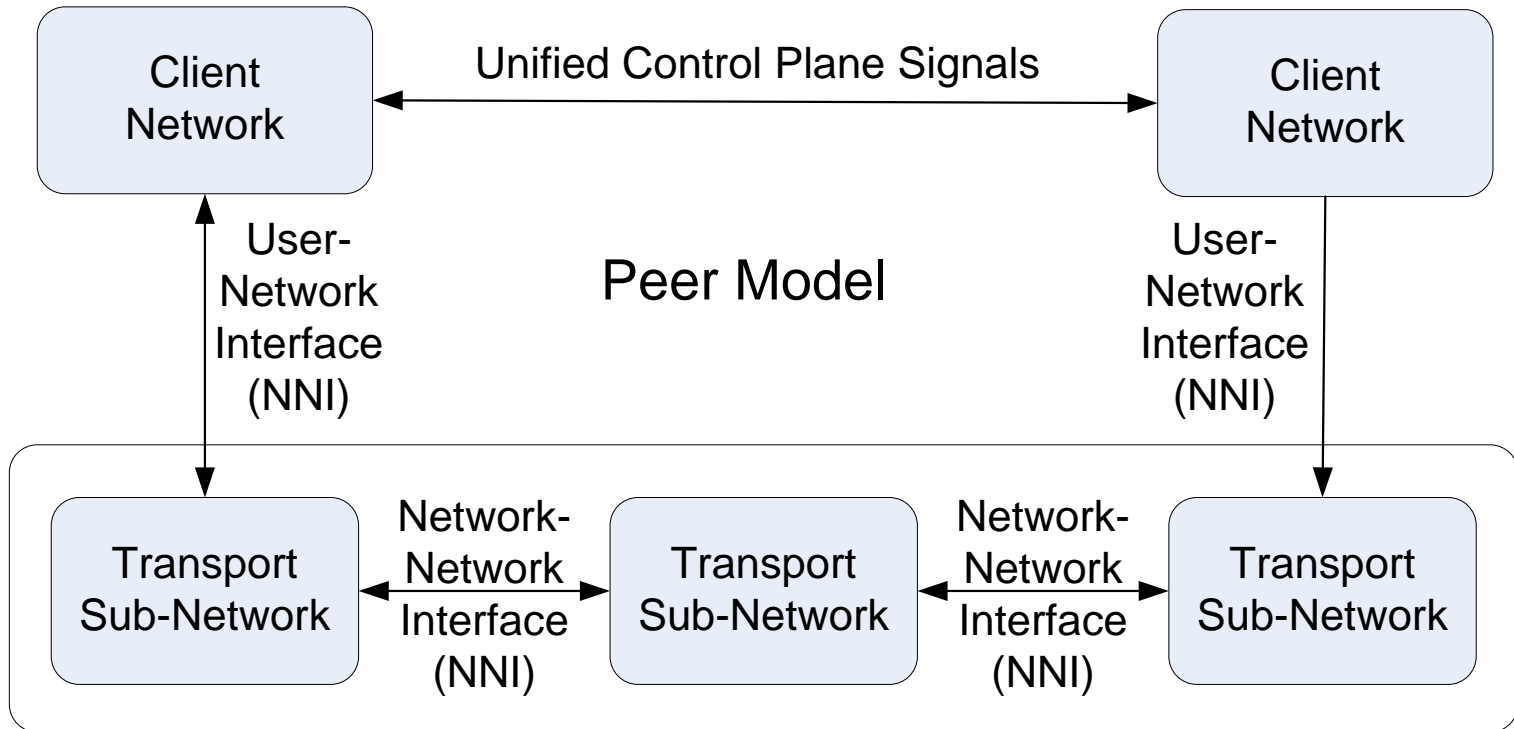
- Optical transport networks contain WDM signals, optical cross-connects for both wavelength and fiber switching, and optical add-drop multiplexers
- Optical transport networks provide data transport services for their client networks

# Overlay Networks



- Overlay networks have separated control planes

# Peer Networks

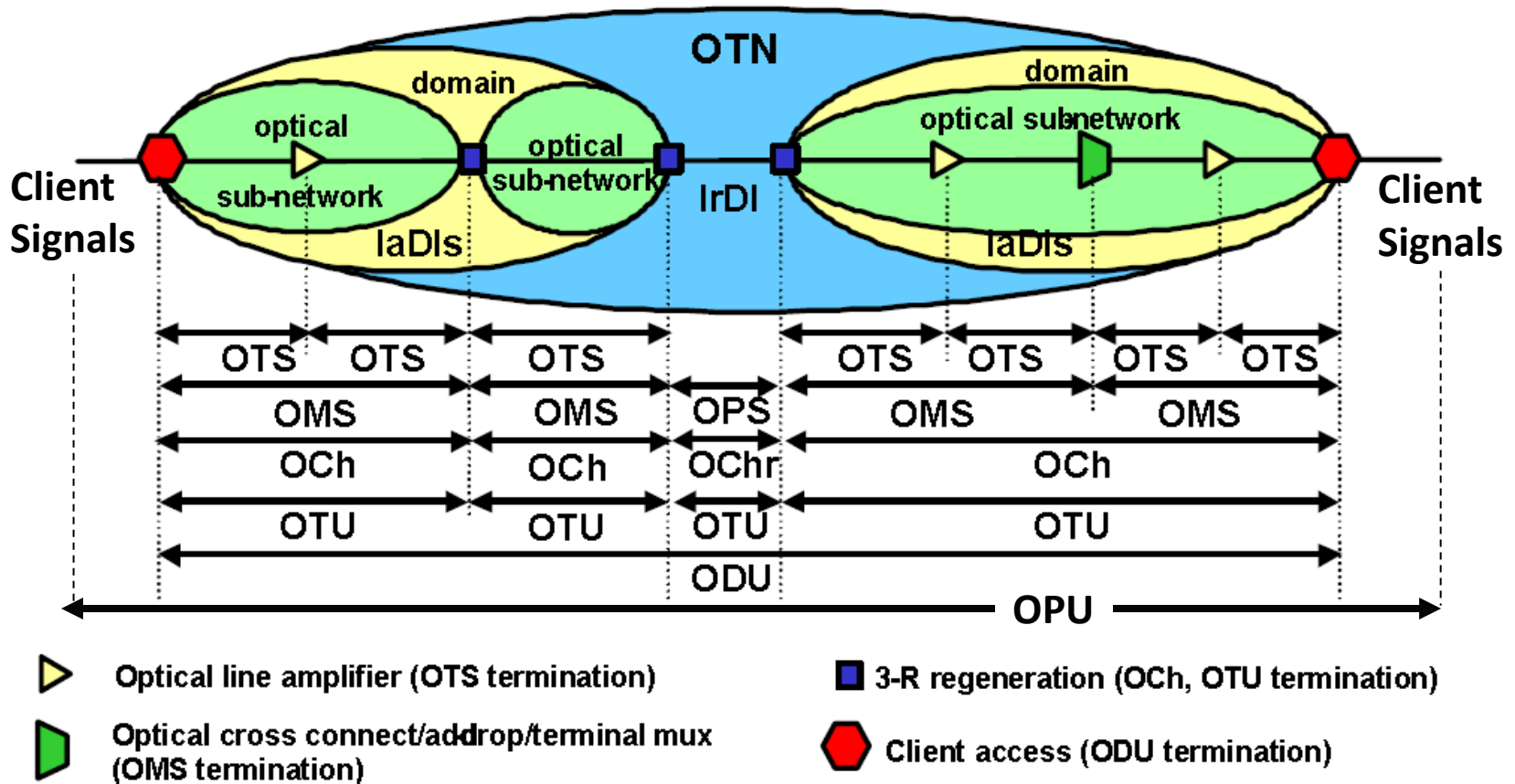


- Peer networks have a single, unified control plane

# Optical Transport Network (OTN) Protocol Standard

- An evolved form of SONET
- Supports the establishment of “light paths” end to end connections on a single WDM wavelength
- Strong forward error correction for error-free transmission in noisy, high-speed, WDM environments
- Designed to carry any client signal “transparently” (e.g. Ethernet , ATM, SONET ...)
- Packets carry information to facilitate handoff between administrative domains (networks controlled by different operators)

# OTN Network Layers



## Optical Layers

OTS = Optical Transmission Section  
 OMS = Optical Multiplexing Section  
 OCh = Optical Channel

## Electrical Layers

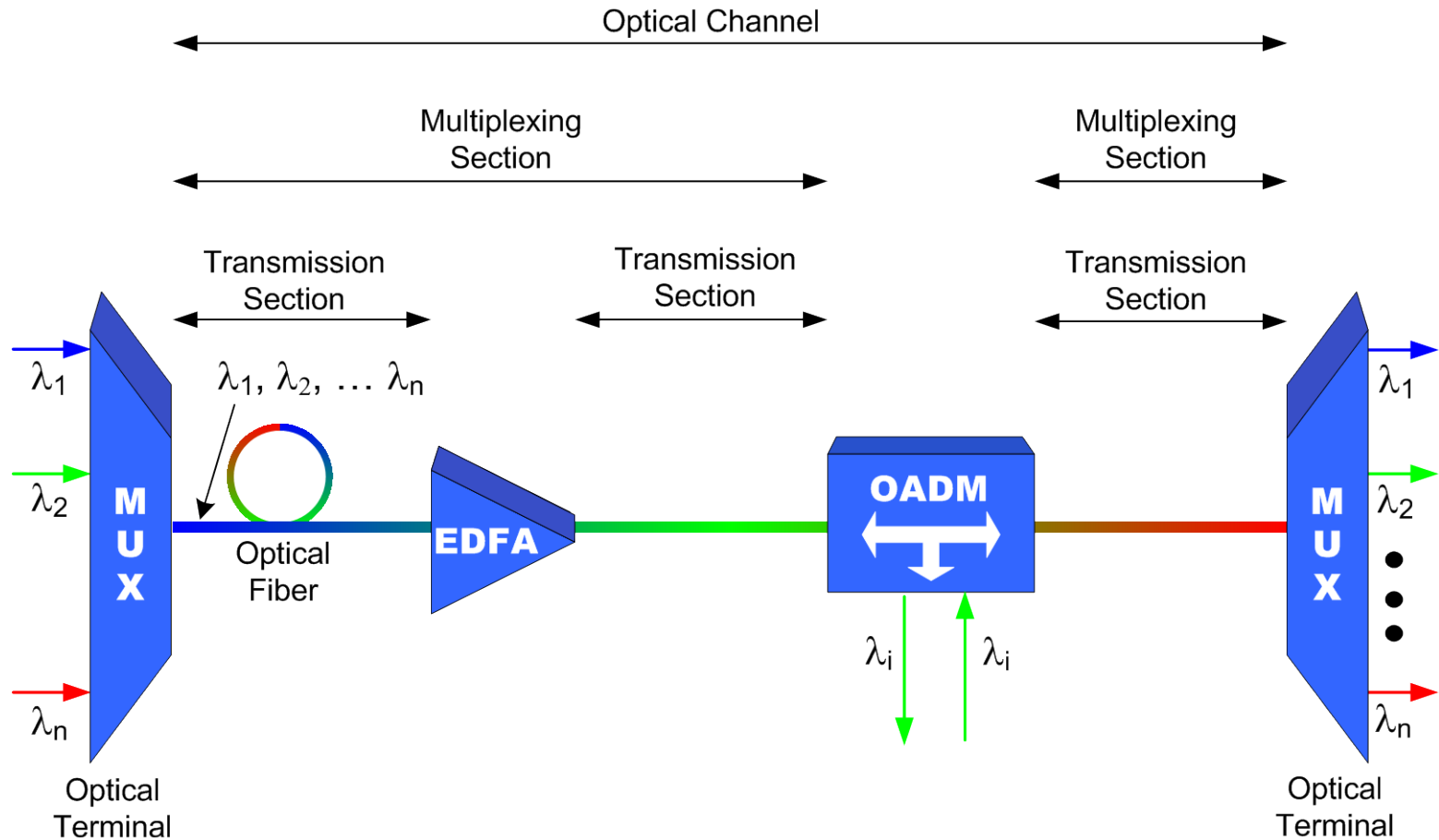
OTU = Optical Channel Transport Unit  
 ODU = Optical Channel Data Unit  
 OPU = Optical Payload Unit

IrDI = Inter-Domain Interface

From ITU's "Optical Transport Network (OTN) Tutorial," Timothy P.

Walker,  
<http://www.itu.int/ITU-T/studygroups/com15/otn/OTNtutorial.pdf>

# OTN Optical Layers



- OTN layers manage the interfaces between the sections or channels they are named after

# OTN Optical Layers

