

# Optical Wave Services (OWS): Technician Detail

## SERVICE DESCRIPTION

IFN Optical Wave Services (OWS) provide high capacity, dedicated connectivity to meet increasing network scalability demands.

IFN OWS is a Layer 1 transport service.

OWS service allows for interconnection utilizing either Ethernet or OTU interfaces.

IFN OWS service transparently passes all traffic and network protocols.

The OWS service provides one Optical Data Connection (ODC) between two customer locations.

The OWS service is offered in various rates and interconnect types.

## TECHNICAL SPECIFICATIONS

**Interconnect Types.** IFN OWS services can be delivered using either an Ethernet interface or Optical Transport Network (OTN) interface of appropriate capacity for the rate of the service. Table 3 displays various rates and appropriate interconnects.

Product	Capitol	Handoff	Media
oTU0	1 Gbps	ODU0	Single-Mode Fiber
eOTU0	1 Gbps	Gigabit Ethernet	RJ45 (10/100/1000)  Multi-mode Fiber (850nm)  Single-mode Fiber (1310nm)
OTU2	10 Gbps	ODU2	Single-mode Fiber (1310nm)
eOTU2	10 Gbps	Ten Gigabit Ethernet	Multi-mode Fiber (850nm)  Single-mode Fiber (1310nm)
OTU4	100 Gbps	ODU4	Single-mode Fiber (100GBASE-LR4)
eOTU4	100 Gbps	Hundred Gigabit Ethernet	Single-mode Fiber (100GBASE-LR4)

Figure 3: Rates and Interconnects

**Traffic Management.** IFN OWS services are limited only by the capacity of the underlying optical facility. There are no additional policers or shapers applied to the services.

**Maximum Frame Size.** Equipment supporting IFN OWS services does not present a limitation for the size of frames moving through the OWS service.

**Ethernet Service Frame Behavior.** All Frames are delivered conditionally through the network.

## FRAME PERFORMANCE METRICS

Frame Performance Metrics apply to Ethernet Service as set forth in Table 4. The definitions of the Frame Performance Metrics are:

- One-way Frame Delay (FD) is defined as the time elapsed (in milliseconds) for a Service Frame entering the ingress UNI until fully transmitted through the egress UNI within IFN's network or With IFN and another service provider
- Frame Delay includes link insertion delays, propagation delays and queuing delays within the Supplier's network

- One-way Frame delay will be approximated from two-way measurement
- One-way Inter-Frame Delay Variation (IFDV) is defined as the variance in frame delay (in milliseconds) between a pair of selected Service Frames by a regional registrar that is registered to their organization.
- Frame Loss Ratio (FLR) is defined as the ratio of Service Frames successfully transmitted through the egress UNI versus Qualified Service Frames entering the ingress UNI.

For these Frame Performance Metrics performance is determined on a Met or Missed calculation.

One-way Performance Metrics	PT0.3	PT1	PT2	PT3	PT4
PT Max Distance (km/miles)	75 km/ 50 miles	250 km/ 150 miles	1200 km/ 750 miles	700 km/ 4350 miles	27500 km/ 17000 miles
One-way Frame Delay - FD (ms)	≤ 6	≤ 20	≤ 75	≤ 115	≤ 250
One-way Inter-Frame Delay Variation - IFDV (ms)	≤ 2.5	≤ 8	≤ 40	≤ 40	≤ 40
One-way Frame Loss Ratio - FLR (percent)	≤ .001% i.e., 10-5	≤ .01% i.e., 10-4	≤ .01% i.e., 10-4	≤ .025% i.e., 2.5x10-4	≤ .05% i.e., 5x10-4

Figure 4: Service Level Agreements (SLAs)

## MONITORING, TECHNICAL SUPPORT, AND MAINTENANCE

**Network Monitoring.** IFN monitors all IFN Services purchased by a customer on a 24x7x365 basis.

**Technical Support.** IFN provides customers a toll-free trouble reporting telephone number to the customer Network Operations Center (NOC) that operates on a 24x7x365 basis. IFN provides technical support for service-related inquiries. Technical support will not offer consulting or advice on issues relating to CPE not provided by IFN.

**Escalation.** Reported troubles are escalated within the IFN NOC to meet the standard restoration interval described in the Service Level Objectives. Troubles are escalated within the IFN NOC as follows:

- Tier 2 after 30 minutes
- Tier 3 after 2.5 hours

**Note:** The Service Operations Manager is notified with an escalation to Tier 3.

**Maintenance.** IFN's standard maintenance window is 12:00 am to 6:00 am Eastern Time, every day of the week. Scheduled maintenance is performed during the maintenance window and will be coordinated between IFN and customer. IFN provides a minimum of forty-eight (48) hour notice for non-service impacting scheduled maintenance. IFN provides notification no less than ten (10) business days prior to starting work for planned maintenance activity. Emergency maintenance is performed as needed.

## SERVICE LEVEL OBJECTIVES

IFN provides Service Level Objectives for the service, including network availability, mean time to respond, and mean time to restore. The service objectives are measured monthly from the IFN point of demarcation.

**Availability.** Availability is a measurement of the percentage of the total time that the service is operational when measured over a 30-day period.

Service is considered “inoperative” when either of the following occurs:

- i. There is a total loss of signal for the service.
- ii. The output signal presented to the customer by IFN does not conform to the Technical Specifications as defined in this document.

**Mean Time to Respond.** Mean Time to Respond is the average time required for the NOC to begin troubleshooting a reported fault. The Mean Time to Respond objective is thirty (30) minutes upon receipt of a fault notification or from the time a trouble ticket is opened with the NOC.

**Mean Time to Restore.** Mean Time to Restore is the average time required to restore service to an operational condition as defined in the Technical Specifications section of this document. The Mean Time to Restore objective is four (4) hours for electronic equipment failure or twelve (12) hours for fiber optic facilities failure from the time a trouble ticket is opened with the NOC.

**Customer Responsibilities.** IFN provides CPE for provisioning its services and the delivery of the UNI. IFN will retain ownership and management responsibility for this CPE. As a result, the CPE must only be used for delivering IFN services. Customers are required to shape their egress traffic to the contracted CIR.

Customers have the following responsibilities related to the installation, support, and maintenance of the Service.

- Provide an operating environment with temperatures not below fifty-five (55) or above eighty-five (85) degrees Fahrenheit. Humidity shall not exceed ninety (90) percent at eighty-five (85) degrees Fahrenheit.
- Provide outside cable entry conduit(s), entry cable ground point, and internal building conduit to allow IFN the ability to rod/rope a fiber optic cable to the point of demarcation.
- Locate and mark all private underground utilities (Water, Electric, etc.) along the path of new underground placement not covered by utility companies.
- Provide a pull rope in any existing duct that IFN is to use and ensure the existing duct is serviceable for IFN use.
- Obtain right-of-way entry easement for IFN facilities and equipment from property owners at each customer location.
- The customer is responsible for the coring of the building’s outside wall and internal walls. Upon request, IFN can perform this activity on an ‘as needed’ basis for an additional one-time fee.
- Provide 110/120 AC power equipment, circuit sizing to be determined, if applicable.
- Provide access to the buildings and point of demarcation at each customer location to allow IFN and its approved Contractors to install fiber for service installation. Provide access to each location for regular (8 am - 5 pm) and emergency (24-hour) service and maintenance of IFN’s equipment and facilities.
- Provide, install, and maintain a device that is capable of routing network traffic between the Service and the customer’s Local Area Network (LAN).
- The customer must provide a point of contact for installation, service activation, and any maintenance activities.