

Optical Wavelength Service (OWS)

The EIS Optical Wavelength Service (OWS) is a fiber optic based service that provides dedicated, point-to-point, single-fiber data transport at speeds ranging from 1 to 100 Gbps. (NOTE: Some EIS contractors may be able to provide higher speeds.) The OWS contractor always provides the optical devices and fiber connectivity, thus enabling an agency to acquire high broadband transport without the cost of developing, owning and operating the network infrastructure.

The service is based on a technology—Wavelength Division Multiplexing (WDM)—that increases transmission capacity by combining light beams of differing wavelengths, and then transmitting the resulting beam through a single optical fiber. Once the composite signal reaches its destination, it is automatically split into the separate wavelengths, with each wavelength carrying its own set of data.

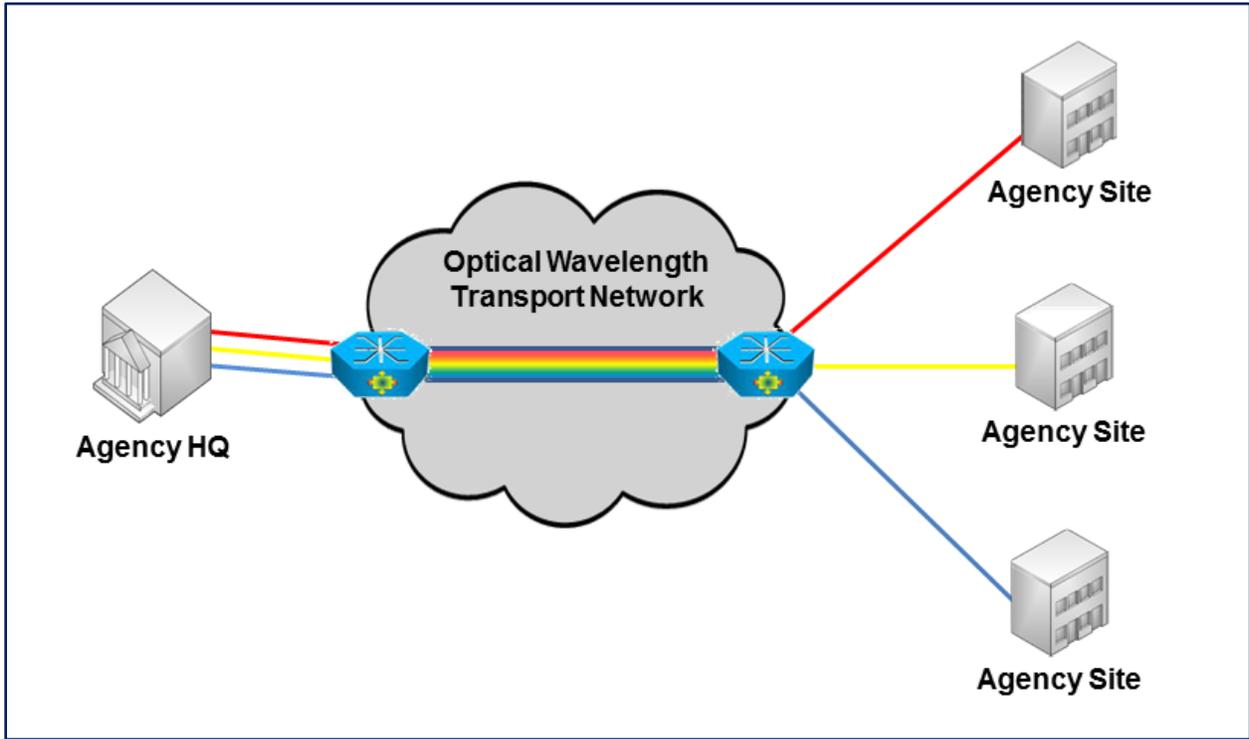
OWS comes in three different variations to meet the needs of a government agency for a dedicated, broadband transport network that interconnects agency offices in different: (1) parts of a metropolitan area (Metro Wavelength Services); (2) regions in the U.S. (Domestic Wavelengths); or (3) countries (Non-domestic Wavelengths).

Category: Data Service

Complementary Services Needed: In order to use OWS, the agency may need the following EIS services or equivalent: Access Arrangements.

Definitions: Please see EIS contract [Section J.12 Glossary of Terms](#) for clarification of technical terms and acronyms.

Figure 1—Optical Wavelength Service



1. Why an Agency Might Select OWS

- OWS provides point-to-point, fully-managed optical wavelength service.
- The service can be used for long-haul (long distance) and Metro Area service connectivity.
- An OWS solution can be deployed with custom routing to meet an agency's unique diversity and disaster recovery requirements.
- OWS provides transport rates ranging from 1 to 100 Gbps¹, making it an effective technology for high-bandwidth demand applications.

2. Examples of How OWS Could be Used

- **Metropolitan Area Network (MAN) and Wide-Area Network (WAN) Setup:** An agency could connect several of its high-bandwidth facilities within a metro area or between regions creating a dedicated optical fiber network.
- **Transport Technology Upgrade:** An agency could migrate a MAN or WAN from an older transport technology to OWS, thus quickly upgrading the network without an investment in new equipment.
- **Transport for High Bandwidth Applications:** Agencies can use OWS to seamlessly carry all of their mission-critical traffic including voice, Internet, data, streaming, video and webcast without any noticeable delay in transmission.
- **Establishment of a Secure, Private Network:** OWS can be used to provide a fully managed, secure, and private network needed to meet agency data center bandwidth demands.
- **Continuity of Operations (COOP):** An agency could use OWS as the basis for its COOP planning to ensure mission essential functions are continued during an emergency.

¹ Some EIS contractors may be able to provide higher speeds. Check individual contracts.

3. Key Technical Specifications

NOTE: This portion of the service guide has been abridged due to space considerations. For full details on OWS technical capabilities, please refer to **Section C.2.1.3.1.4** of the EIS contract.

Table 1—OWS Technical Capabilities

Capability	Description
Non-domestic Wavelengths	Supports international wavelengths that may be part of an end-to-end service or a stand-alone connection. An end-to-end wavelength service drops and picks up traffic from and to locations, as required by an agency: (a) Backhaul services are available where necessary; (b) The basic service is a single point-to-point, bi-directional wavelength connecting two sites. (NOTE: May not be available from all contractors.)
Domestic Wavelengths	Supports wavelengths over the long-haul network. This is applicable for inter-city connectivity within the United States and territories not in the continental US. The basic service is a single point-to-point, bi-directional wavelength connecting two agency sites located in different states.
Metro Wavelength Services	Supports the provisioning of wavelengths over metro networks, and single point-to-point, bi-directional wavelengths connecting two agency sites in the same city.
Transmission Rates	Supports wavelengths at rates of 1 Gbps, 2.5 Gbps, and 10 Gbps. NOTE: The following rates may not be offered by all contractors: Rates at 40 Gbps, 100 Gbps, and additional rates beyond 100 Gbps if and when such transmission rates become available.
Clock Transparency	Supports: <ul style="list-style-type: none"> a) Asynchronous transport, with no applied clocking to the agency's traffic. b) Synchronous Status Messaging (SSM) byte transparency.
Protocol Transparency - Metro	Supports Metro Wavelengths that are rate and protocol independent.
Protocol Transparency – Domestic and Non-Domestic	Supports Domestic and Non-Domestic Wavelengths that are rate and protocol independent. (NOTE: May not be available from all contractors.)
Byte Transparency	<ul style="list-style-type: none"> a) Transparency of Transport Overhead (TOH) bytes b) If the framed wavelengths supported are not fully transparent, then service provider will indicate the level of transparency offered for wavelengths at 2.5 Gbps, 10 Gbps and 40 Gbps. c) Fully transparent wavelengths will be supported at 40 Gbps; applies to Non-Domestic, Domestic, and Metro Wavelengths.
Concatenation	Framed wavelengths are supported by standard and virtual concatenation.

<i>Capability</i>	<i>Description</i>
Channelization	Framed wavelengths are supported by channelized User-to-Network Interfaces (UNIs). (NOTE: May not be available from all contractors.)
Wavelength Delivery	Service delivery point (SDP) hand-off is done using two fibers over two ports when delivering bidirectional wavelength services, with one fiber for each direction. Patch panel and fiber terminations will be based on agency needs.
Access Methods	<ul style="list-style-type: none"> a) If the service provider is unable to provide access on its network, they will indicate what alternatives exist to enable service end-to-end. b) Each end of the wavelength will be delivered using access methods as required by the agency. c) When agency access is provided via the backbone of the Long Haul, Dense Wavelength Division Multiplexing (DWDM) system and is not collocated, the contractor specifies the appropriate reach of the optical interface to be used. If the distance is too long for interfaces such as FICON, Fibre Channel, etc., the contractor would specify the mediation devices or gateways needed to compensate for distance limitations.
Government Furnished Property (GFP) / SRE	<ul style="list-style-type: none"> a) If the government furnished equipment and/or service related equipment (GFP/SRE) and the Metro Wavelength Division Multiplexing (WDM) system are collocated at the agency's office, then connectivity between the two will be established using Short Reach (SR) interfaces (1310 nm) or Very Short Reach (VSR). b) If the GFP/SRE and the Metro WDM systems are not collocated, then the Metro WDM will be located in a telehouse or collocation hotel. In this case, the service provider will interface with the GFP/SRE using the appropriate optical interface that will reach the distance between the agency's office and the collocation site. c) The wavelength service will be able to support different kinds of traffic depending on the type of GFP/SRE (i.e., Fiber Connectivity [FICON], Enterprise System Connection [ESCON], and Fibre Channel for a Storage Area Network [SAN]).
Efficient Transport	The service provider will ensure that a single wavelength is capable of transporting different types of traffic without the need to use a separate physical wavelength to run IP, Ethernet, etc.

Table 2—OWS Features

<i>Feature</i>	<i>Description</i>
Customer Network Management (CNM) – Level 1	This feature only provides monitoring capabilities as follows: Agency personnel will be able to monitor wavelength(s) via alarm messages from the Optical Transport Network into a software user interface via a dashboard or an API from the agency network management system. (NOTE: May not be available from all contractors.)
Customer Network Management (CNM) – Level 2	Management and monitoring capabilities to support alarm messages visibility and execution of control commands that will be sent into the wavelength(s). Operations available will include set up, modification and tearing-down connections. (NOTE: May not be available from all contractors.)
Equipment Protection 1:1 – GFP/SRE	Provides protection to the client interfaces at the SDP, where the protection channel is bridged to the failed working channel
Equipment Protection 1+1 – GFP/SRE	Provides protection to the UNIs at the SDP, where the protection channel is permanently bridged to the working channel. Protection switching is faster than 1:1.
Equipment protection – Network Side	Supports two channels facing the network for full redundancy and equipment protection at the SDPs.
Geographical Diversity Wavelengths	Supports geographically diverse wavelengths to be used by the agency as a hard protection against fiber failures. The configuration and exact diversity requirements, such as single/dual site delivery, single or dual metro hub, should be specified in the task order (TO).
Protected Non-Domestic and OCONUS Wavelength	This feature supports protected Non-Domestic and OCONUS Wavelengths. These will be architected using submarine transmission protocols such as Bidirectional Path Switched Ring (BPSR) or equivalent. Protection switching in the submarine transmission networks is less than 4 seconds for a single failure. (NOTE: May not be available from all contractors.)
Protected CONUS Wavelength	Supports protected CONUS Wavelengths using transmission protocols to provide resiliency. Protection switching in the nationwide transmission networks is less than 300 ms for a single failure. This feature is limited to 2,500 kilometers. (NOTE: May not be available from all contractors.)

<i>Feature</i>	<i>Description</i>
Protected Metro Wavelength	<p>Provides protection on a per-wavelength basis when delivering services in the metro areas, such as Unidirectional Path Switched Ring (UPSR). Restoration time for protected wavelengths in the metro area is less than 60 ms for a single failure. When delivering protected wavelengths in the metro area, the agency and the contractor will agree on whether equipment protection is required facing the GFP/SRE. If so, the contractor provides protection at the SDP, and multiple UNIs will be ordered, the number of which will depend on the protection method selected by the agency. The contractor will supply its own physical UNIs. (NOTE: May not be available from all contractors.)</p>

4. Pricing Basics for OWS

Please visit the [EIS Resources Listing](#) and locate the [Basic EIS Pricing Concepts Guide](#) to gain an understanding of EIS pricing fundamentals.

4.1 Access Arrangements

Appropriate access arrangements must be selected for each endpoint. Please visit the [EIS Resources Listing](#) and locate the [Access Arrangements Guide](#) for more detailed information.

4.2 Service Related Equipment (SRE)

- SRE must be chosen based on equipment required at each location. NOTE: SRE uses catalog-based pricing.
- Request that contractor provide pricing for any SRE that would be required, in addition to the agency’s existing infrastructure, to deliver the service.
- Please visit the [EIS Resources Listing](#) and locate the [Service Related Equipment Service Guide](#) for more detailed information.

4.3 OWS Price Components

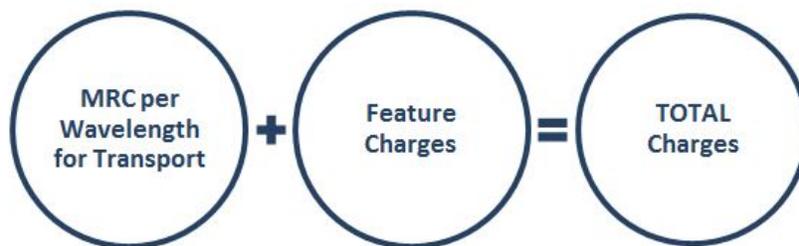
The price structure for OWS consists of the components shown in *Table 3* below.

Table 3—OWS Pricing Components

Component	Charging Unit
MRC for Transport	Wavelength
Feature Charges	Site or Wavelength

Figure 2 below shows how the pricing components in *Table 3* are combined to produce the total cost for the service.

Figure 2—This figure shows how the various pricing components in *Table 3* would be combined to calculate the total OWS charges. NOTE: One or more of these components may not be needed to price a particular service package.



The charges for the different components in *Figure 2* are calculated using details provided in the pricing tables in EIS contract [Section B.2.1.3 Optical Wavelength Service](#). (Please visit the [EIS Resources Listing](#) and locate the [Basic EIS Pricing Concepts Guide](#) for instructions on using the pricing tables to compute the cost of a service.)

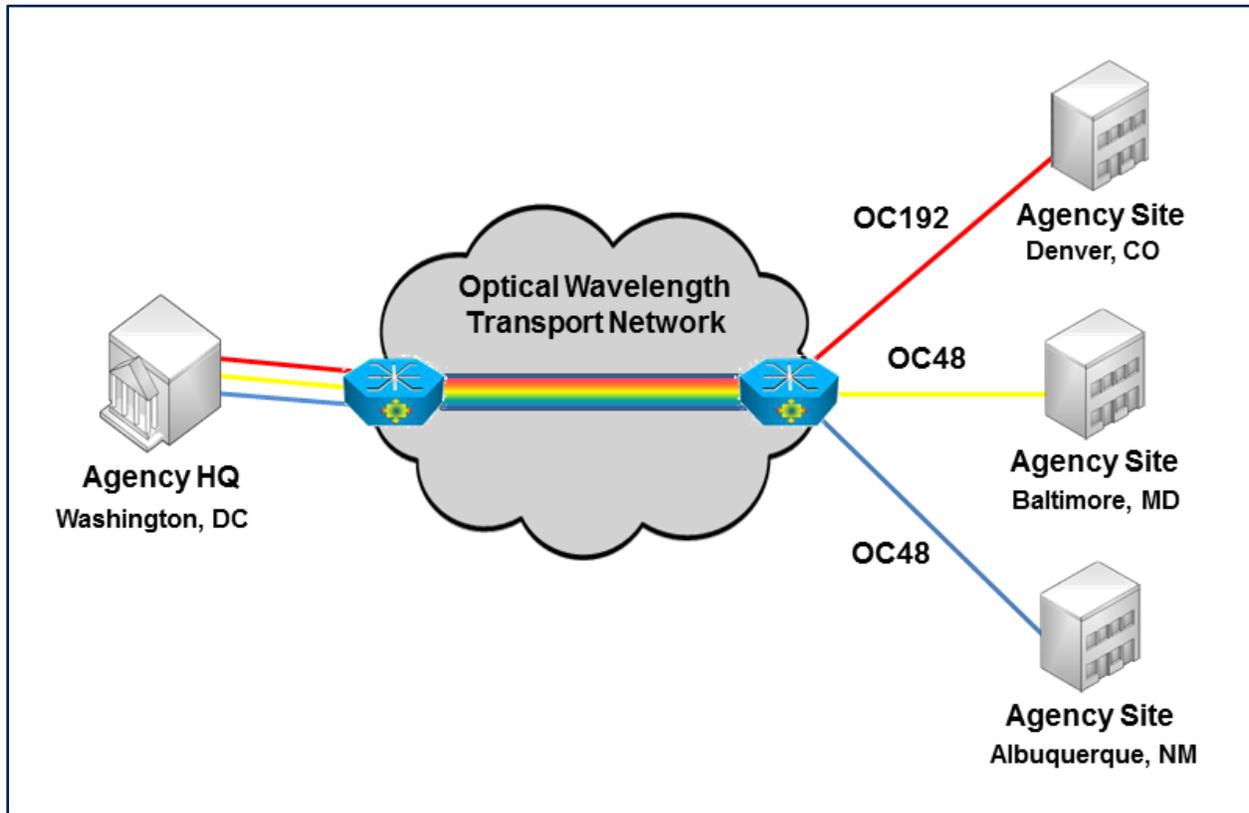
Except for Metro OWS (i.e., transport in a domestic metropolitan area), OWS transport prices depend on mileage, and on whether the terminating locations are CONUS, OCONUS, or non-domestic. The EIS Pricer will automatically calculate the distance between the originating and terminating POPs, and will use the correct price table for the two locations. Metro OWS prices vary only with transport rate, and do not vary between metropolitan areas.

NOTE: A contractor may offer a custom variation of the service to meet an agency's unique requirements. Such a customization would be identified with a Task Order Unique CLIN (TUC), and would include charges that would have to be added to the components in *Figure 2* to determine the total cost of the service.

4.4 OWS Pricing Examples

Example 1: Metro OWS - One OC192 Circuit, Two OC48 Circuits

Figure 3—Metro OWS Pricing Example with One OC-192 Circuit and Two OC-48 Circuits

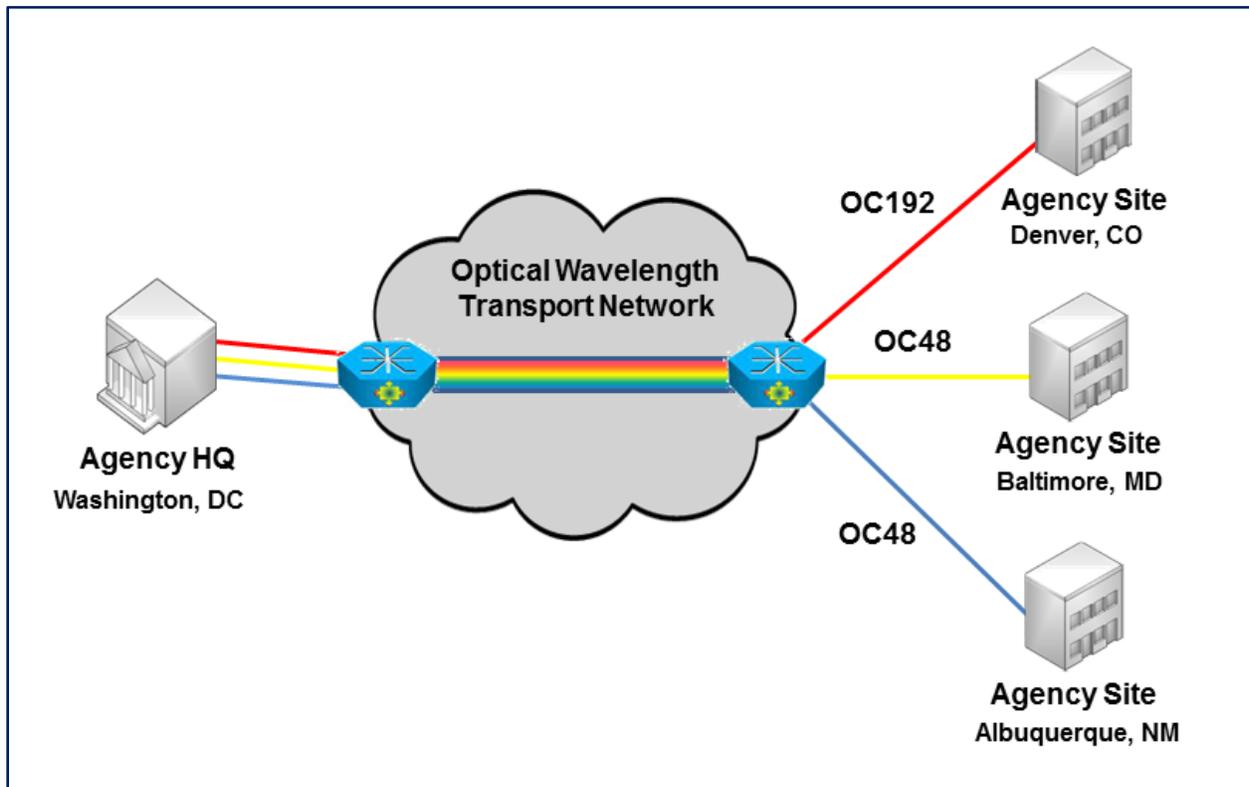


Service CLINs

- Choose CLIN OW00102 “OC48 – 2.5 Gbps – Metro” (see EIS contract table *B.2.1.3.2.5—OWS WDM Transport Pricing Instructions Table*).
- Choose CLIN OW00104 “OC192 – 10 Gbps – Metro” (see EIS contract table *B.2.1.3.2.5—OWS WDM Transport Pricing Instructions Table*).

Example 2: CONUS OWS - One OC192 Circuit, Two OC48 Circuits

Figure 4—CONUS OWS Pricing Example: One OC192 Circuit, Two OC48 Circuits



Service CLINs

- Choose CLIN OW00108 “OC48 – 2.5 Gbps – Domestic Long Haul” (see EIS contract table B.2.1.3.2.5— OWS WDM Transport Pricing Instructions Table). NOTE: The EIS Pricer will automatically calculate the distance and associated cost when given the originating and terminating locations.
- Choose CLIN OW00110 “OC192 – 10 Gbps – Domestic Long Haul” (see EIS contract table B.2.1.3.2.5— OWS WDM Transport Pricing Instructions Table). NOTE: The EIS Pricer will automatically calculate the distance when given the originating and terminating locations.

Service Related Equipment

- Choose CLIN EQ90001 SRE Catalog Item.
- Request that contractor provide SRE pricing based on equipment that would be needed to deliver the service in addition to agency’s existing infrastructure.
- Please visit the [EIS Resources Listing](#) and locate the Service Related Equipment Service Guide for more details.

5. References and Other Sources of Information

- For more technical details and information on OWS, please refer to EIS contract **Section C.2.1.3**; for pricing details, **Section B.2.1.3**.
- For more information on service-related items, please see:
 - EIS contract **Section B.2.10 Service Related Equipment**
 - EIS contract **Section B.2.11 Service Related Labor**
- Please refer to a contractor's individual EIS contract for specifics on the contractor's OWS offerings.
- For additional EIS information and tools, visit the [EIS Resources Listing](#).
- For guidance on transitioning to EIS, please visit [EIS Transition Training](#) where you'll find several brief video training modules.