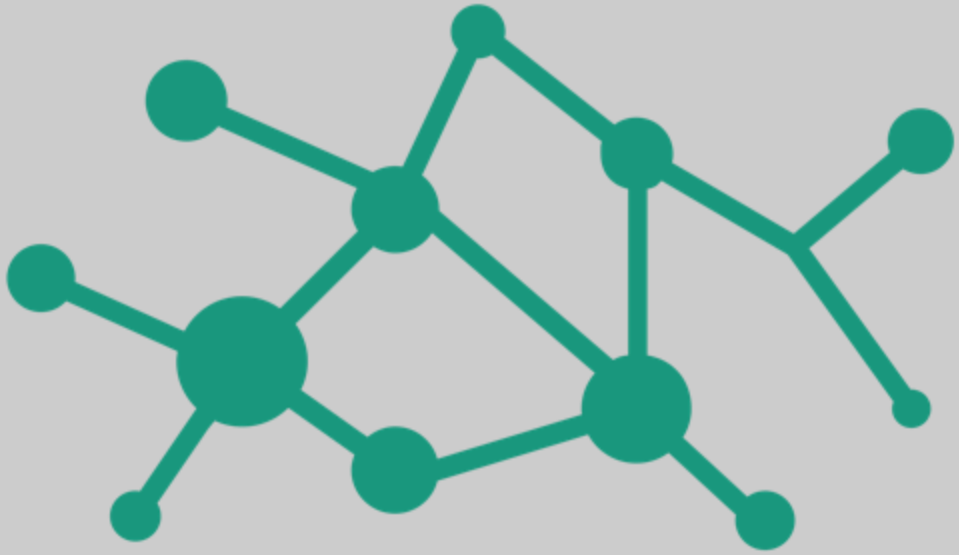
openreach

Optical Spectrum Access

OSA FSP3000 (inc. Filter Connect) and OSA XG210 Filter Connect

Last update: October 2018

Robust design and superior coverage,
backed by experts



Optical Spectrum Access

Overview

The Openreach Optical Spectrum Access (OSA) product is built using the ADVA FSP3000 Dense Wavelength Division Multiplexing (DWDM) and ADVA FSP150CC XG210 platforms.

OSA offers attractive entry-level prices to high bandwidth optical transport networking. A choice of component options and the long route distances of the service enable more scalable and flexible network designs.

We also offer an additional variant that allows you to connect your own DWDM based equipment over any spare ports of the optical filter(s) purchased and deployed as part of our OSA managed service. This feature is Filter Connect.

OSA FSP3000 and OSA FSP3000 Filter Connect offers managed wavelength bandwidths of 2.5Gbps and 10Gbps with a range of speeds and interfaces including Ethernet, OTU, Fibre Channel. A Layer-1 encryption service is also available. OSA XG210 Filter Connect offers up to four 10GE managed wavelengths, timing transport support (Syncronous Ethernet – SyncE and Precision Time Protocol – PTP) and extended temperature equipment ideal for street cabinet locations.

OSA FSP3000, OSA FSP3000 Filter Connect and OSA XG210 Filter Connect are approved to CESG Assured Service (CAS) scheme (Telecoms) CAS(T) which provides assurance that telecommunications systems and services conform to industry good practice aligned to HMG (Her Majesty's Government) standards and requirements. See: https://www.ncsc.gov.uk/commodity-service/openreach-network-services.

Although all touch points, fibre delivery and maintenance remain via Openreach, the OSA equipment solution may be installed, commissioned and supported by our partner ADVA.

OSA is available with a choice of minimum period options as detailed in the Openreach Price List.

OSA is ordered and managed via our eCo-X system with new Filter Connect features only available via CRF option at this time. We're currently working with our customers to develop support for this product on our Equivalence Management Platform (EMP).

The OSA product is subject to the terms and conditions found in the Connectivity Services contract. You cannot use this product to build or extend core networks, or to replicate a core network.

For further information on allowable usage, you should refer to Schedules 1 and 2 of the Connectivity Services Contract available from: https://www.openreach.co.uk/orpg/home/products/ethernetservices/contracts/contracts.do.

The OSA product as outlined in this slide deck is available on a national basis as defined in the Connectivity Services contract. Availability is subject to survey.

OSA FSP3000

Including Filter Connect

Flexible

- A choice of chassis options and a route distance range of up to 103km enables flexible network designs
- Point-to-Point and Hub & Spoke configurations
- Offers up to 32 active wavelengths per system
- Managed wavelengths of 2.5Gbps, 4Gbps or 10Gbps with a range of speeds and interfaces including GigE (1Gbps & 10Gbps), OTU1 & OTU2 and Fibre Channel (4Gbps, 8Gbps & 10Gbps)
- Additional active wavelengths can easily be added to existing installations with the flexibility to mix wavelength types and service interfaces to meet your demands
- Our Filter Connect option offers you the choice to connect your equipment directly to the spare ports on the FSP3000 optical filter and share the fibre path with your active wavelengths

Secure

- Secure uncontended bandwidth over dedicated fibre with Resilience Options 1 and 2 available to offer diverse fibre routing, improving network availability
- A Layer-1 encryption service is available that provides AES256 encryption at the lowest layer possible to offer maximum data security, safeguarding information exchanged on all protocol layers above it
- OSA FSP3000 is approved to CESG Assured Service (CAS) scheme (Telecoms) CAS(T) which provides assurance that telecommunications systems and services conform to industry good practice aligned to HMG (Her Majesty's Government) standards and requirements. https://www.ncsc.gov.uk/commodity-service/openreach-network-services

Robust

- Carrier class electronics offering redundant power supplies and fans with proactive monitoring at either the optical and/or wavelength layer
- Configurable designs based on your requirements to suit the deployment and future scalability
- Optional route level maps
- Ultra-Low Latency (ULL) designs

Cost effective

- Available with a choice of one, three or five year minimum period options
- Volume discounts and various minimum commitment periods available to support your bid or project

ADVA™ Optical Networking

OSA XG210 Filter Connect

Small footprint with SyncE & PTP support

Flexible

- Route distance range of up to 87km with amplification
- Small equipment footprint (1U), excluding filters and amplification
- Extended Temperature option (-20° C to +60° C)
- Optional Synchronous Ethernet (SyncE) with Precision Time Protocol (PTP) support
- Point-to-Point only
- Single Fibre Working option available
- Up to four 10GE active wavelengths per bearer system
- 10GE optical, 1GE optical and 1GE electrical client interfaces
- Directly connect to up to 15 spare channels on the Openreach optical filter
- Additional active wavelengths can easily be added to existing installations

Robust

- Carrier class electronics offering redundant power supplies and fans with proactive monitoring at either the optical and/or wavelength layer
- Configurable designs based on your requirements to suit the deployment and future scalability
- Optional route level maps

Secure

- Secure uncontended bandwidth over dedicated fibre with Resilience Options 2 available to offer diverse fibre routing, improving network availability
- OSA is approved to CESG Assured Service (CAS) scheme (Telecoms) CAS(T) which provides assurance that telecommunications systems and services conform to industry good practice aligned to HMG (Her Majesty's Government) standards and requirements. https://www.ncsc.gov.uk/commodity-service/openreach-network-services

Cost effective

- Simple range of bearer and wavelength options with a choice of three or five year minimum period options

ADVA™ Optical Networking

OSA Filter Connect

FSP3000 & XG210

OSA Filter Connect is an enhancement to the fully managed base product offering that enables you to access the OSA bearer, via spare ports on the filter, with your own DWDM equipment. Openreach must maintain a minimum of one managed wavelength – although you can choose to have multiple managed wavelengths on the service from us – and then all other filter ports are available for your use.

The Filter Connect ready solution provides you the best of both worlds: top-class service from Openreach who will look after the fibre and managed wavelengths: flexibility for you to develop and manage your own services over the spare channels on the optical filter.

OSA FSP3000 Filter Connect

- A choice of chassis options and a route distance range of up to 103km enables flexible network designs
- Enables direct access to the Optical filter on up to 32 ports
- Supports up to 32 2.5Gbps and 10Gbps managed wavelengths with many different protocols.
- Existing FSP3000 point to point installations can be certified for Filter Connect

OSA XG210 Filter Connect

- End-to-end route distance limit is up to 87km, with amplification
- Optional Synchronous Ethernet (SyncE) with Precision Time Protocol (PTP) support, ideal for networks requiring sub-microsecond timing accuracy
- Dual Fibre Working and Single Fibre Working base build options delivering one managed wavelength and an 8-port filter.
- Options to add managed wavelengths (max. 4 total) and increase optical filter (max. 16 ports)
- Enables direct access to the OSA Optical filter on up to 16 ports
- Extended Temperature range support suitable for street cabinet locations that experience a wide range of temperature fluctuations
- Single Fibre Working option, ideal for locations where fibre capacity may be a challenge

OSA FSP3000 overview

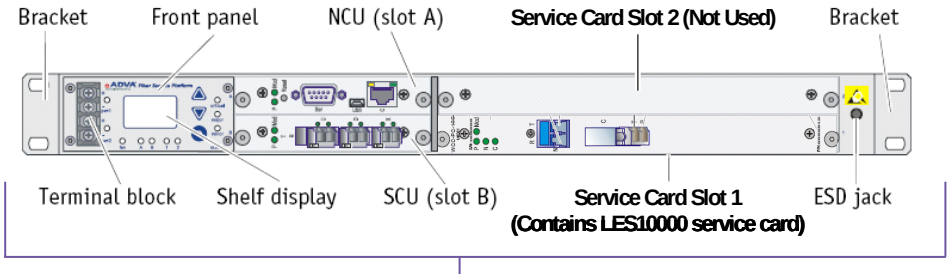
Slimline 1U chassis

1U Single –
with RO2 option available

- 1U high chassis for a single wavelength (all card types) or up to 4 wavelengths (muxponder cards) when combined with a 4CSM
- Compact service option
- Can be upgraded by adding expansion filters and chassis – with a service outage.

1U Standard –
with RO2 option available

- Enables the build of a mini Optical system to cater for up to 8 wavelengths
- Can grow by adding a wavelength card and extra filter modules that may require a service outage and additional chassis.



1U high active chassis (giving two card slots)

1U high passive chassis for filters (giving four card slots)

- 1U chassis offers a choice of configurations and a low entry price product to meet light initial requirements
- Uses less space in the exchange and provides an ideal solution where there is limited space to terminate an Optical service
- Choosing an additional filter pack (standard option) will enable you to grow capacity easily (up to 8 wavelengths) and at your own pace
- Can be used for Point to Point and Hub and Spoke designs.

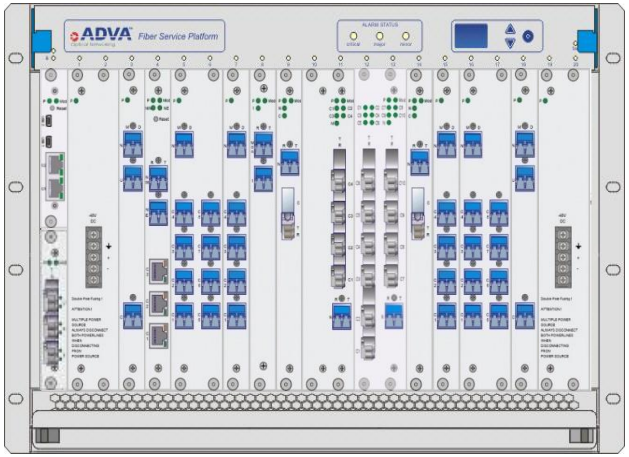
OSA FSP3000 overview

7U high chassis option

7U Chassis – with RO1 and RO2 option available

- A fully featured, high capacity chassis which provides the flexibility to meet an extensive range of needs at a great price
- 16 card slots available for all card types including transponders, filters, protection cards and optical supervisory cards
- 20 channel chassis capacity (less if RO1 used)
- 32 optical channel bearer capacity (in most cases this will require 2 chassis
- Resilient Options RO1* and RO2
- Can be used for Point-to-Point and Hub & Spoke designs.

* RO1 uses a VSM protection module card. This will protect against fibre breaks only and will use one wavelength on the bearer, leaving 31 for customer use.



7HU chassis example

- PSU (redundant)
- SCU
- NCU-II
- OSCM + 1CSM
- EDFA + DCM
- Filters
- Transponders & Muxponders

OSA FSP3000

Card options

Card options	Supplied bandwidth	Maximum bandwidth	Channel Protocols
Multi-port cards			
4Gbps 4 Port 1 x 4Gbps Access wavelength card	4Gbps	4Gbps	GE x 4, 1Gbps FC x 4, 2Gbps FC x 2, 4Gbps FC, 2Gbps Coupling Link
4Gbps 4 Port 1 x 4Gbps TDM Access wavelength card	4Gbps	4Gbps	STM1 x 4, STM4 x 4, 1GE x 4
2.5Gbps 2 port (2:1) 1 x 2.5Gbps Core wavelength card	2.5Gbps	2.5Gbps	STM16, 1G FC x 2, GE x 2, OTU1
2 x 10Gbps Dual Core wavelength card	1 x 10Gbps	2 x 10Gbps	STM64, 10GE WAN, 10GE LAN, 8Gbps FC, OTU2 (10Gps FC not supported)
2 x 10Gbps Dual Access wavelength card (Low latency)	2 x 10Gbps	2 x 10Gbps	STM64, 10GE WAN, 10GE LAN, 4Gb FC, 8G FC, OTU2 (10G FC not supported)
10Gbps 5 Port 1 x 10Gb Enterprise wavelength card (SAN certified)	10Gbps	10Gbps	1Gbps/2Gbps/4Gbps/8Gbps/10Gbps FC, GE, 10GE (LAN PHY only), ISC-3
10Gbps 5 Port 1 x 10Gbps Encrypted Enterprise wavelength card (SAN certified)	10Gbps	10Gbps	1Gbps/2Gbps/4Gbps/8Gbps/10Gbps FC, GE, 10GE (LAN PHY only)
5 x 10Gbps Access wavelength card	20Gbps	50Gbps	10GE (LAN PHY), 8Gbps FC, 8Gbps FICON

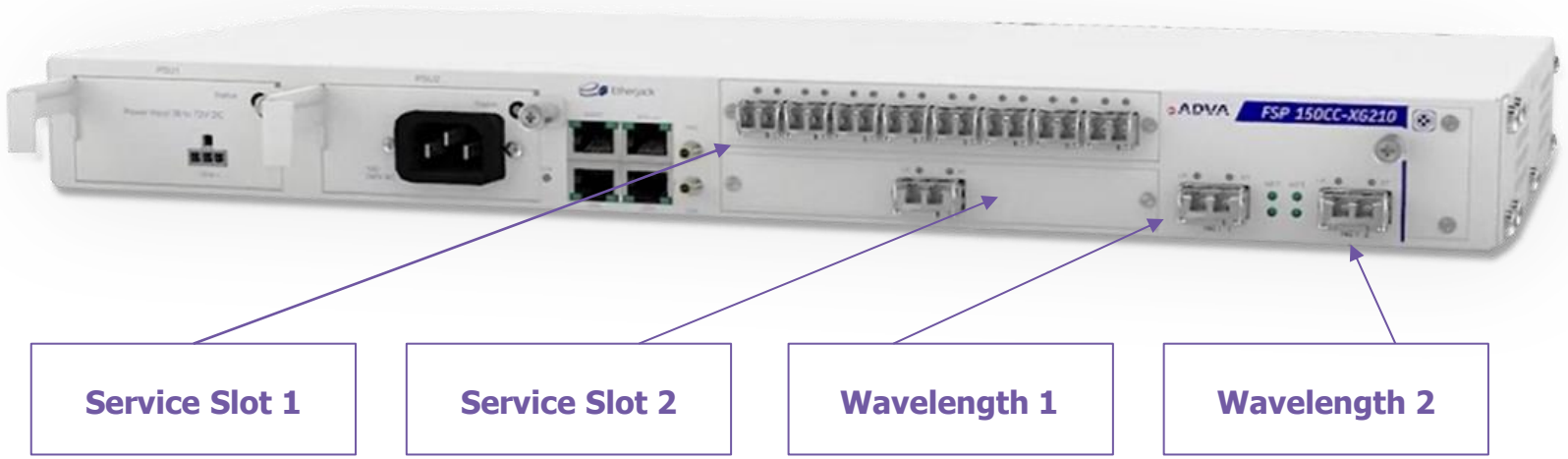
OSA XG210 Filter Connect

1U chassis

- The OSA XG210 Filter Connect has only one chassis type.
- Available as either dual DC-powered or dual AC-powered.
- XG210 is a 1U chassis with two available service slots for managed wavelength cards only.
- A second XG210 can be added to an XG210 Filter Connect bearer to deliver up to four managed bandwidths.

- **A separate 1U passive shelf is supplied as part of the default build to locate the necessary optical filters.**
  - Dual Fibre Working provides an 8-channel filter
  - Single Fibre Working provides a 16-channel filter

- Future development is planned to offer a 16-channel Dual Fibre Working option
- Upon request, a temperature-hardened version of the XG210 NTE can be ordered, although this will limit amplification options if required.
- Amplification, if required, will be installed in an FSP3000 active chassis



OSA Filter Connect

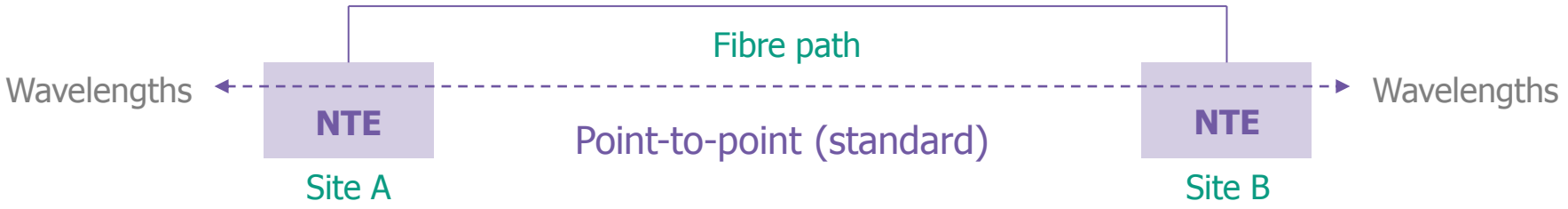
Filter options

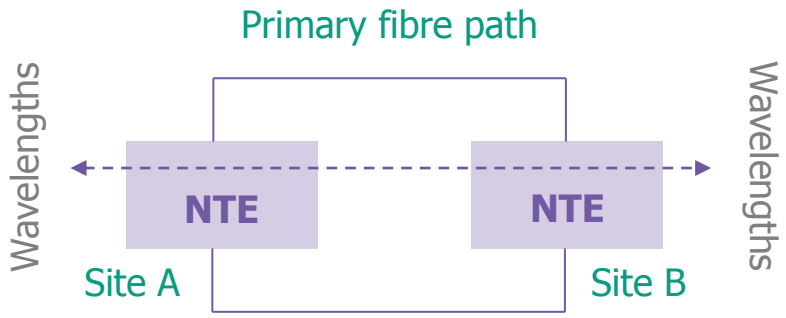
Various Optical filters are available depending on the OSA solution selected.

Filter	Single Fibre Working (SFW) Dual Fibre Working (DFW)	Wavelengths supported	OSA FSP3000	OSA FSP3000 Filter Connect	OSA XG210 Filter Connect	Notes
4CSM	DFW	4	Y	Y	N	Not expandable without service interruption
8CSM	DFW	8	Y	Y	Y	Not expandable without service interruption
16CSM	SFW	16	N	N	Y	Not expandable
8GSM	DFW	Max. 32	Y	Y	N	The 8GSM card takes the bands of four wavelengths from up to eight 4CSM cards and multiplexes these together onto a single fibre containing potentially all 32 wavelengths. It cannot link multiple 8CSM filters.

OSA FSP3000 and XG210 configurations

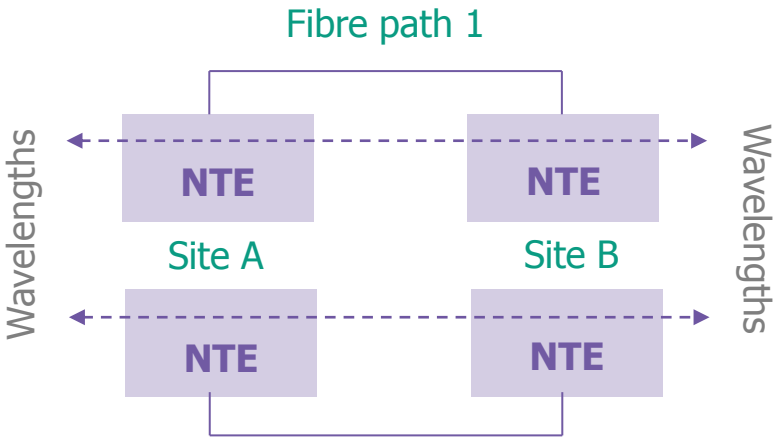
Point to Point





Point-to-point (Resilience option 1)

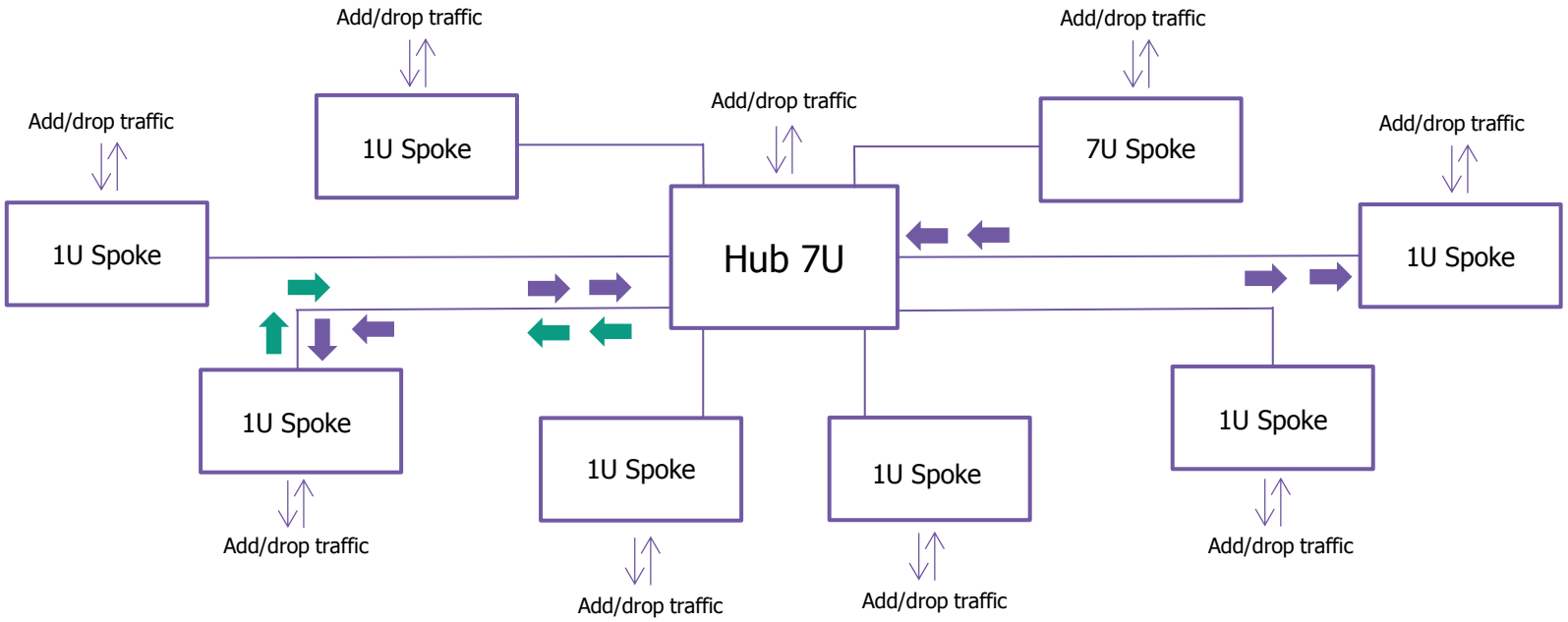
Resilience Option 1 not available for OSA XG210 Filter Connect



Point-to-point (Resilience option 2)

OSA FSP3000 configurations

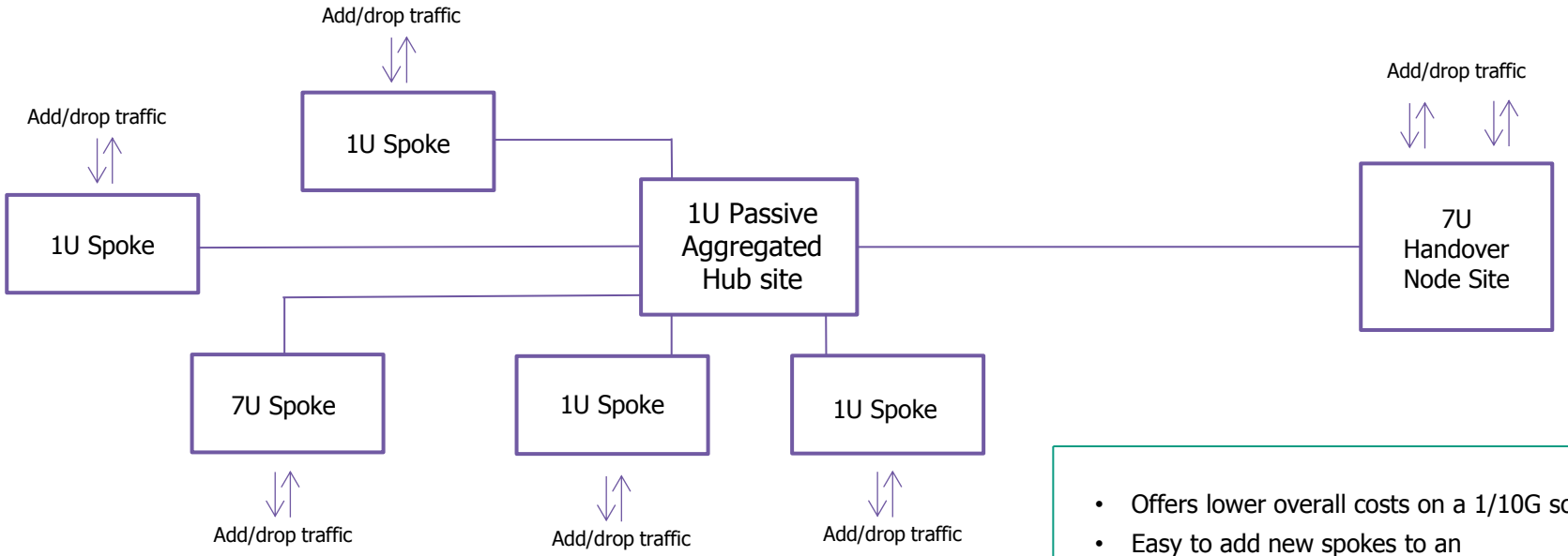
Hub and Spoke



- Available as an alternative to a point to point architecture option
- Cost effective when deploying 3 or more OSA spokes into a hub
- Potential for 50% space reduction (versus P2P) when a Hub is full
- Potential for power consumption reduction (versus P2P)
- Offers lower overall costs on a 1/10G solution
- Easy to add new spokes to an existing structure
- Hubs can be 1U or 7U chassis
- Spokes can be 1U or 7U chassis
- Resilience options available
- Filter Connect not currently supported

OSA FSP3000 configurations

Aggregated Hub and Spoke

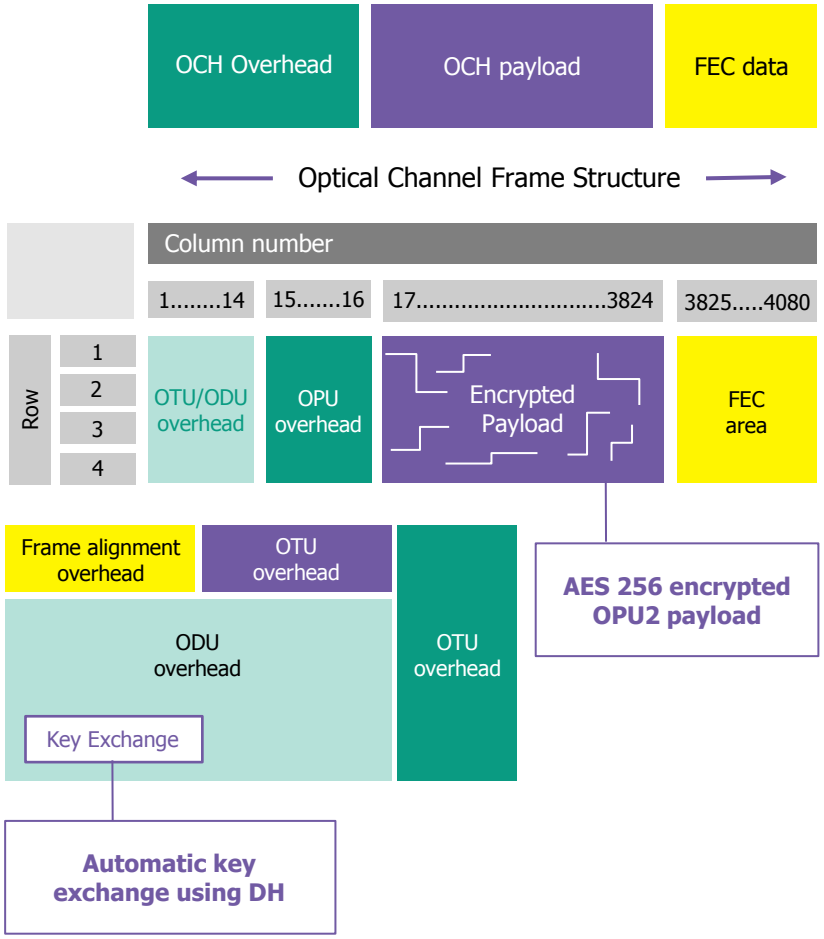


- Available as an alternative to a point to point and Hub & Spoke architecture options
- Cost effective when deploying 3 or more OSA spokes into a hub
- Save on main link charges between the 1U passive aggregated Hub and 7U Handover node.
- Potential for 50% power consumption and space reduction (versus P2P when Hub is full)

- Offers lower overall costs on a 1/10G solution
- Easy to add new spokes to an existing structure
- Handover node hub is a 7U chassis
- Passive aggregated hub is a 1U passive chassis containing an 8GSM (band splitter) card
- Spokes can be 1U or 7U chassis
- Resilience option 2 available
- Filter Connect not supported

OSA FSP3000: a secure solution

- Encrypting your data before transmission adds a vital layer of security against data theft or interception
- The optional FSP3000 Encryption service uses AES256 encryption at OSI Layer-1 for maximum data security, safeguarding information exchanged on all protocol layers above it
  - Advanced Encryption Standard AES256 is the de-facto industry standard for encryption
- The optional FSP3000 Encryption service is a SAN qualified encryption card supporting a range of commonly used protocols including Ethernet, Fibre Channel at Layer-1
- 100% throughput with Ultra-low latency (100ns) is achieved without compromising line capacity even when using larger frame sizes
- Successful implementation of an encryption solution requires hierarchical levels of security that must be established to guarantee secure data transmission
- A dedicated Openreach security team ensure your encrypted services are delivered with maximum data security using Diffie-Hellman (DH) key exchange for secure encryption key generation
  - An initial authentication key is used to protect from "man in the middle" attacks
  - A new encryption key is generated every 1min/10mins for additional security
- Available for new and existing OSA FSP3000 circuits



Our commitment to you

We know that one size does not fit all

We'll always make sure we understand what you need

We'll make sure we offer you the solution that best meets your individual needs

We'll make sure you understand the solution we're offering and we'll help you brief your colleagues

We'll show you how what we're offering helps you save or make money

The delivery date is our promise to you – we'll even try to beat it and often we do

We reserve fibre capacity for you when we quote, so that you know it's available when you place an order

Expert advice that really counts
New to Openreach Optical products?

To ensure your optical network investments work as hard for you as possible we'll help you:

- Make choices that meet your longer term requirements
- Avoid solutions that will restrict your ability to expand
- See through solutions that are cheap at first, but force you to invest again later
- Understand exactly what you'll be risking if you choose a shared infrastructure.

If you're new to Optical solutions, or need our advice, we'll help you understand:

- When it makes sense to switch from multiple circuits
- How to add optical circuits to improve business continuity in your existing network
- How optical solutions can help you save thousands of pounds on space and power.

To get you started we will:

- Explain the process and provide all the advice and guidance you need
- Answer all your questions about working with us
- Provide product information/guidance if needed
- Complete all the details necessary to set you up on our systems.

Our establishment process ensures you are ready and able to order OSS:

- Normally takes between two and six weeks to complete.

Product Information for OSA:

www.openreach.co.uk/orpg/home/products/opticalservices/opticalservices.do

Specific product queries:

For specific product queries please contact your Openreach sales specialist or sales and relationship manager

The Openreach price list is always the most reliable source of up to date pricing information

Optical Spectrum Access

Supplied in association with ADVA Optical Networking

About ADVA

ADVA Optical Networking equipment provides Openreach with unparalleled flexibility in multiplexing, transporting and protecting high-speed data, storage and video applications. It has a long established working relationship with the BT Group and Openreach in particular, and continues to develop joint solutions to address the future market needs around high-speed Ethernet, cloud, storage and infrastructure services.

ADVA™ Optical Networking

www.advaoptical.com

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