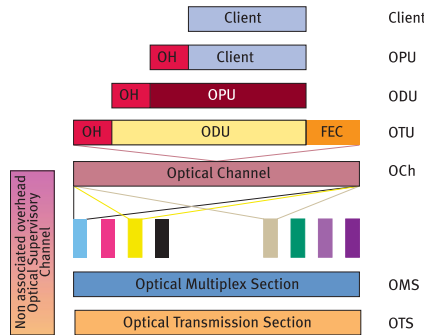


# G.709 – An Overview

## Digital Wrapper, OTN, FEC

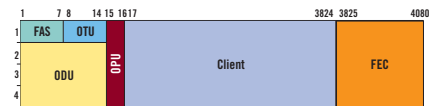


### The optical transport module

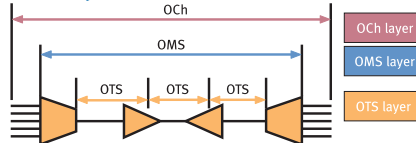


APS/PCC	K1, K2	K1, K2
GCC	D bytes in SOH & LOH	D bytes in RSOH & MSOH
Optical channel payload unit		
PT	C2 (signal label)	C2 (signal label)
AIS	AIS	AIS

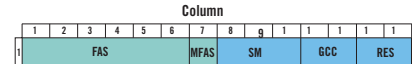
### The optical channel frame



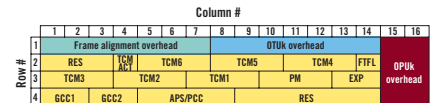
### OTN layer structure



### FAS & OTU



### ODU



### OTN & SONET/SDH analogy

OTN	SONET	SDH
OCh	Path	Path
OMS	Line	Multiplex section
OTS	Section	Regenerator section
Optical channel transport unit		
FAS	A1, A2	A1, A2
MFAS	No direct analogy	No direct analogy
Section monitoring (SM)	(B2)	(B2)
TTI (SAPI, DAPI)	J0, J1, J2	J0, J1, J2
BIP	BIP error	BIP error
BEI	REI	REI
BIAE	No direct analogy	No direct analogy
IAE	No direct analogy	No direct analogy
BDI	RDI	RDI
Optical channel data unit		
Path monitoring (PM)	B3, BIP-2	B3, BIP-2
Tandem Connection Monitoring (TCM)	N1, N2	N1, N2

### OPU

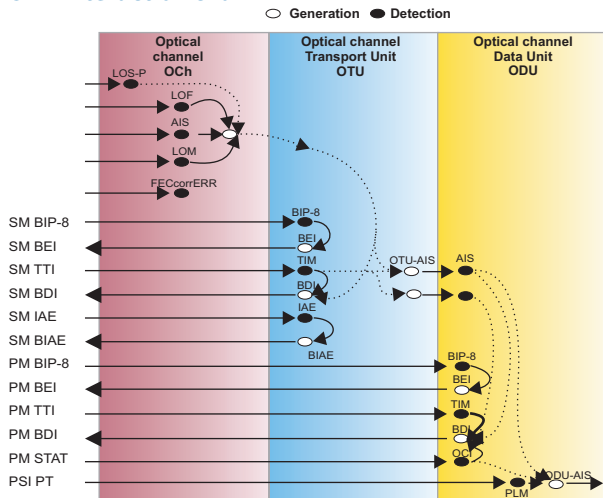
The Payload Structure Identifier (PSI) is a 256 byte multi-frame signal. PSI[0] contains the Payload Type (PT) which identifies the payload type. The OPU also contains overhead bits (e.g. justification bits J0, NJ0, PJ0) associated with the mapping of client signals into the payload.

### Client

Test client, SONET/SDH, ATM, GFP

### FEC

Added bandwidth which allows correction and detection of byte errors in an optical link.

**OTN interaction chain**

**Description**
**Trail trace identifier (TTI)**

The 64 byte multi-frame TTI signal is similar to the J0 byte in SONET/SDH.

**Bit interleaved parity (BIP-8)**

The BIP-8 (8-bit) is computed over the whole OPU and inserted into the BIP-8 SM two frames later.

**Backward defect indication (BDI)**

This single bit conveys information regarding signal failure in the upstream direction.

BDI = 1 indicates OTUk backward defect

BDI = 0 otherwise

**Backward error indication (BEI) and Backward incoming alignment error (BIAE)**

These signals carry information on interleaved bit blocks detected in error in the upstream direction.

**Incoming alignment error (IAE)**

This bit allows the ingress to inform the egress that an alignment error in the incoming signal has been detected.

IAE = 1 with error

IAE = 0 no error

Status (STAT)

These three bits indicate the presence of maintenance signals (AIS, OCI, TCM, IAE).

**RES**

These bytes are reserved for future international standardization. All bytes are set to zero.

**TCM/ACT**

This byte field is used for the activation and deactivation of the TCM fields. At present, these fields are still being studied.

**EXP**

These bytes are reserved for further experimental use.

**General communication channels (GCC1, GCC2)**

These two fields allow communication between two network elements with access to the ODU frame structure.

**Automatic protection switching and protection communication channel (APS/PCC)**

Although APS switching on one or more levels is possible, these four bytes are currently undefined.

Access Point Identifiers (API) are used to specify the *Source Access Point Identifier (SAPI)* and *Destination Access Point Identifier (DAPI)*. APIs contain information regarding the country of origin, network operator and additional administrative details.

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