OTP100G OTN/DWDM Optical Trasport Platform

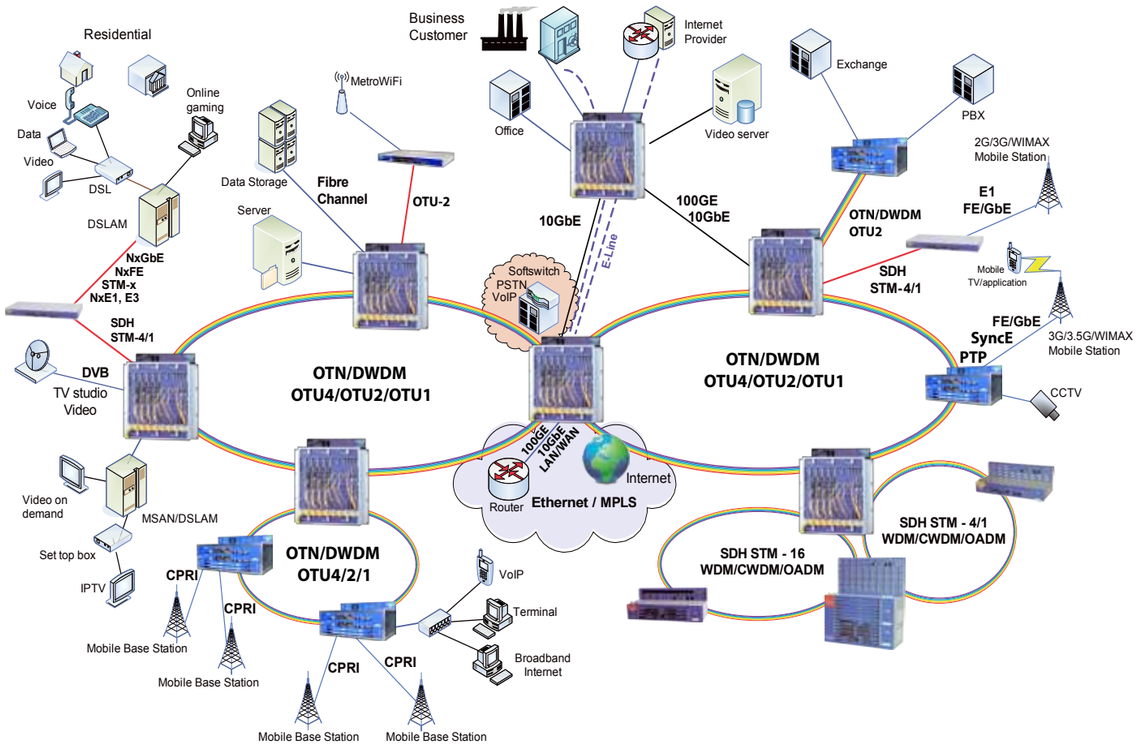
APPLICATIONS IN TRANSPORT NETWORKS

The optical transport platform OTP100G is line of IRITEL's devices for digital signal transmission over optical fibers, based on OTN and DWDM technologies, designed for implementation of local, metropolitan and regional networks of various configurations:

- Point-to-point connections
- Linear add/drop networks
- Ring networks at different hierarchy levels
- For inter-connecting networks based on different technologies
- Mesh networks
- Regeneration systems
- For local switching at ODUk level
- For implementation of passive and active optical networks
- For local switching at optical wavelength level

The OTP100G enables inter-connecting networks based on different technologies: OTN, SDH, Ethernet, SAN (ESCON, FICON, Fibre Channel), video, CPRI, bit-transparent protocol-independent client services, etc.

The OTP100G platform is designed and manufactured with modern modular technology, making it a very flexible solution for building, expanding and upgrading networks. It enables efficient and profitable delivery of telecommunications services.



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OTN/DWDM Optical Transmission Systems

OTP100G OTN/DWDM

Optical Transport Platform up to 8 Tbit/s

- **Multiservice OTN/DWDM Platform**
- **Line Side Coherent Tunable CFP 100G DWDM Transceiver with Integrated CD Compensation**
- **Universal Ports - Plugable Interfaces**
  Any service – Any rate – Any port – Any λ
- **Universal Unit**
  Single Unit Solution => Muxponder, Transponder, ODUk Cross connect, 3R Regeneration
- **Unified Platform for 80 Optical Channels**
  DWDM multiplexers, optical amplifiers, dispersion compensation modules
- **Integrated Optical Transport Solution**

OTN	*SDH/SONET*	*point-to-point*
DWDM	*Ethernet*	*chain*
	Fibre Channel	*ring*
	Video	*mesh*
	CPRI	

- **All You Need Is OTP100G**

IRITEL bright connections

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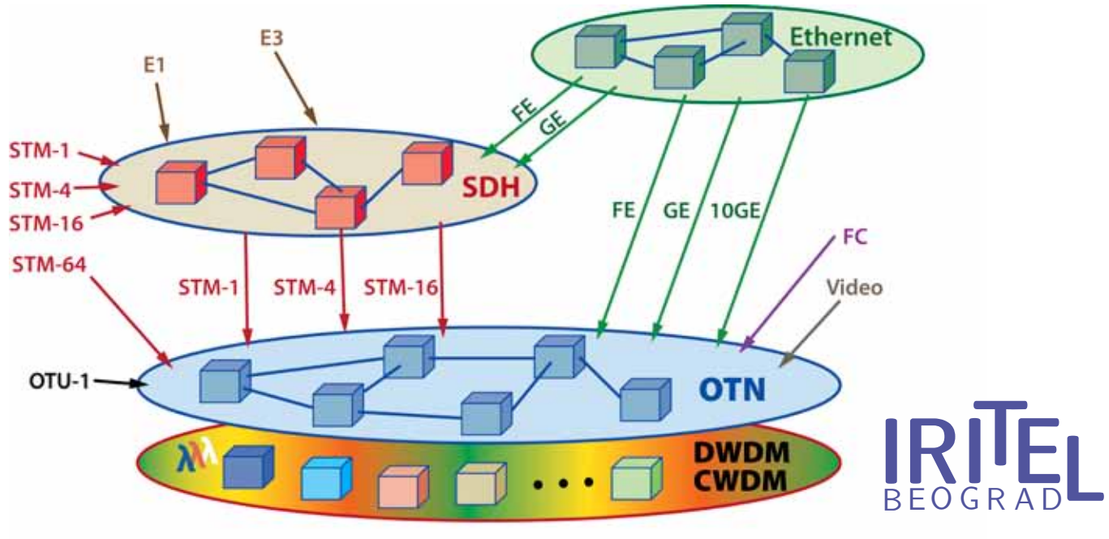
MAIN FEATURES

- 100G client/line interfaces are implemented using CFP modules:
  - **OTN** OTU4
  - **Ethernet** 100GE
- 10G client/line interfaces support ***Any service – Any rate – Any port – Any λ*** using XFP modules:
  - **OTN** OTU2/OTU2e
  - **Ethernet** 10GE LAN, 10GE WAN
  - **SDH** STM-64 **SONET** OC-192
  - **Fibre Channel** 8GFC, 10GFC
  - **CPRI Option 7**
- Client/line interfaces for bitrates up to 5 Gb/s are implemented using SFP modules as ***Any service – Any rate – Any port – Any λ***:
  - **OTN** OTU1
  - **Ethernet** GE, FE
  - **SDH** STM-16/4/1, **SONET** OC-48/12/3
  - **SAN: ESCON, FICON, Fibre Channel** FC-12/25/50/100/200/400
  - **Video** DVB-ASI, SD-SDI, HD-SDI
  - **CPRI Option 1, 2, 3, 4, 5**
  - **Bit-transparen**t protocol-independent client services
- **All SFP, SFP+, XFP and CFP interfaces are universal and software configurable** with fixed (1310nm, 1550nm, CWDM, DWDM) or **tunable** (DWDM) lasers
- Support for client signals mapping into **OTN ODU0, ODUflex, ODU1, ODU2, ODU2e, ODU3, ODU4** structures
- Multistage multiplexing
- Mapping into **ODU1/OPU1 tributary slots** of n x 155.52 Mb/s capacity for efficient mapping of client signals at sub-ODU0 granularity
- OTN client signal mapping procedures
  - **AMP** – *Asynchronous Mapping Procedure*
  - **BMP** – *Bit-synchronous Mapping Procedure*
  - **GMP** – *Generic Mapping Procedure*
  - **GFP** – *Generic Framing Procedure:* Framed and Transparent
- Traffic **grooming** based on client signal requirements by using ODUflex, OTN VCAT (Virtual Concatenation) (OPUk-Xv, k=0, 1, 2), and/or n x 155Mb/s *tributary slots*
- OTN non-blocking **ODUk cross connect** supports arbitrary mix of ODUk traffic for each muxponder/transponder unit, **down to ODU0 granularity**
- **FEC** (*Forward Error Correction*) functionality for detecting and correcting transmission errors, supports: ITU-T G.709 FEC, ITU-T G.975.1 I.4 FEC and ITU-T G.975.1 I.7 FEC, SD-FEC (for coherent DWDM 100G line interfaces)
- **Transparent** transfer of timing information for all client signals
- Synchronization support
  - SyncE
  - PTP1588v2
- **Carrier class traffic protection** is implemented at multiple levels and protocols on optical and electrical levels
- **DWDM multiplexing** supports up to **80 channels** of **C-band wavelengths** (192THz – 196THz) with **50GHz** spacing
- **DWDM filters** with low attenuation **upgrade ports** allow DWDM multiplex configuration in steps of 4, 8 or 40 wavelengths, up to 80 wavelengths
- The system can utilize active and/or passive optical filters. Active multiplexers are implemented using software configurable variable optical attenuators (VOA)
- Use of **EDFA and RAMAN optical amplifiers** extends the maximum length of optical sections
- Module for **chromatic dispersion compensation** is based on **FBG** (Fiber Bragg Gratings)
- Up to 8 degrees **ROADM** connectivity
- **DCN** is implemented using **GCC** and **OSC** channels
- Support for **in-system optical parameters monitoring**
- **External monitoring points** provide access for OSA instrument measurements
- **Performance monitoring**
- **Power supply** DC power supply -48V DC or -60V DC

EMS/NMS Software

- **SUNCE+ Module OTN**
- Based on **client-server architecture**
- **SNMPv3 based**
  Network Management System (**NMS**)
  Element Management System (**EMS**)



BASIC CONFIGURATION

- **OTP100Gs** is compact 1U system

Applications: Implementing OTN networks at different hierarchy levels, inter-connecting networks based on different technologies, regeneration systems and local ODUk cross connect

- **OTP100G-C4** is four-slot subrack (shelf) module

Applications: In building OTN at different hierarchy levels, inter-connecting networks based on different technologies, regeneration systems, local ODUk cross connect and building passive DWDM optical networks with local wavelength switching

- **OTP100G-C15** is 15-slot subrack (shelf) with the basic application in building OTN/DWDM networks with the maximum traffic capacity of the device is **up to 80 wavelengths** per pair of optical fibers, and with several hundreds of client interfaces
- **OTP100G-C14 is** 14-slot subrack (shelf) with the basic application in building OTN/DWDM networks with the maximum traffic capacity of the device is **up to 80 wavelengths** per pair of optical fibers, and with several hundreds of client interfaces. This subrack has possibility for hardware protection of control and monitoring unit.

Applications OTP100G-C14/C15: Implementing all network configurations with all interface types, at different hierarchy levels, inter-connecting networks based on different technologies, regeneration systems, local ODUk cross connect, building DWDM optical networks and local wavelength switching

MECHANICAL DESIGN

OTP100G-C15/C14 subrack: 586.2 mm x 437 mm x 298 mm
OTP100G-C4 subrack: 225 mm x 485.5 mm x 298.6 mm
OTP100Gs system: 44.4 mm x 437 mm x 280 mm

UNITS

- **OT-CMU** unit is the system control-management unit
- **OT10G-3** unit has the following universal software-configurable client/line interfaces: 16 SFP and 3 10G XFP interfaces. **OT10G-3** features muxponder, transponder, cross connect, synchronization and traffic protection functionalities
- **OT10G-4** is a transponder unit with 4 software-configurable client/line XFP interfaces. **OT10G-4** features transponder, cross connect, synchronization and traffic protection functionalities
- **OT10G-8** is high density transponder unit with 8 software-configurable client/line XFP interfaces. **OT10G-8** features transponder, cross connect, synchronization and traffic protection functionalities
- **OT100G-1** is high density muxponder unit with 10 software-configurable client SFP+ interfaces and one line CFP 100G interfaces. **OT100G-1** features muxponder, cross connect, synchronization and traffic protection functionalities
- **OT100G-2** is high density transponder unit with 2 CFP 100G interfaces (one client and one line). **OT100G-2** features transponder, cross connect, synchronization and traffic protection functionalities
- **pDWDM-4Cx** and **pDWDM-8Cx** are passive units for DWDM multiplexing and demultiplexing of 4 or 8 optical signals. The upgrade ports enable capacity increase
- **DWDM-x** are units for DWDM multiplexing and demultiplexing of 4 **(DWDM-4Cx)** or 8 **(DWDM-8Cx)** or 40 **(DWDM-40CM, DWDM-40CD, DWDM-40HM, DWDM-40HD)** optical signals with variable optical attenuator and photo detector for optical signal level adjustment. The upgrade ports enable capacity increase. Using interleaver unit **DWDM-IL** can be created multiplex of 80 wavelengths. **DWDM-IL** is used to combine and separate odd and even wavelengths to create a 50GHz system.
- **OMA-xy** unit performs the function of amplification optical signal using EDFA and RAMAN amplifiers with *Booster*, *Preamplifier* and *Inline* applications
- **DCM-DxDy** unit performs chromatic dispersion compensation based on FBG
- **OTVOA-x** unit has 4 or 8 variable optical attenuators and photo detectors for optical signal level adjustments
- **OPS-x** unit implements of 1+1 on optical level protection of up to 4 or 8 optical signals

CFP INTERFACES

OI.100G-CT coherent *tunable DWDM 50GHz GRID*
OI.100G-4x28 *tunable DWDM 4x28Gb/s 50GHz GRID*
OI.100G-ER4 40km
OI.100G-LR4 10km
OI.100G-SR10 100m

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