Optical Transport Network Solution Overview

FiberHome International Technologies Co., Ltd.
About FiberHome Technologies

- **Company Profile**
  - Established: 1974
  - Headquarter: Wuhan, China
  - Employee: 11,000
  - Stockholder: SASAC (100%)

- **Business Summary**
  - Product & Service
    - Optical Networks
    - Wireless Communication Solutions
    - Data communication and services
  - Over 25% market share in telecom backbone and is deployed in every major telecom network in China
  - Achieved 36% CAGR revenue growth from 2005
Organization Structure

FiberHome Technologies Group

- Fixed Network
  - FiberHome Telecommunication Technologies Co., Ltd.
  - FiberHome Networks Co., Ltd.
- Wireless Network
  - Hongxin Communication Technologies Co., Ltd.
  - FiberHome Mobile Communication Inc.
- Optical Devices
  - Wuhan Telecommunication Devices Co., Ltd.
  - Acelink Technologies Co., Ltd.

FiberHome International Technologies Co., Ltd.

www.fiberhomegroup.com
Continuous Innovations in Optical Technologies

1976

- 1st Optic fiber in China

1996

- 1st DWDM System in China

1997

- 1st 2.5 Gb/s SDH in China

1999

- 1st 10 Gb/s SDH in China

2000

- 1st MSTP Standards (ITU-T X.86)

2001

- 1st 1.6Tb/s DWDM in China

2002

- 1st 40 Gb/s DWDM in China

2003

- 1st 40 Gb/s DWDM in World

2004

- 1st PON System in China

2005

- 1st FTTH Project in China

2006

- 1st FTTH Solution Provider in China

2007

- 1st Optic-Cable manufacture base in Asia
- PCVD+OVD hybrid process technologies implemented

2008

- 1st 1550nm DFB LD in China
- 2.5Gbps optical transmitter/receiver
- 10Gbps optical transmitter/receiver
- 40Gbps PIN/TIA module
- GPON/EPON OLT transceiver
Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
Market Requirements in Transport Network

- Backbone/Regional Network
  - Triple play, specially IPTV, requires bandwidth increase twice or more
- Metro Network
  - The supporting of both packet and TDM is provided for network convergence
  - Flexible and reliable implementation reduces customer’s CAPEX and OPEX
- Access Network
  - Cost-effective multi-services access for voice, video and internet applications
Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
Total Optical Transport Network

**FONST** Series
- 40G ULH DWDM
- 3.2T/1.6T Capacity
- OTN-based DWDM

**FonsWeaver** series
- Intelligent SDH-based ASON

**FONST** series
- OTN with ROADM

**CiTRANS** series
- SDH-based MSTP
- T-MPLS/PBT PTN

**IBAS** series
- SDH-based MSTP

**Backbone**
- ULH WDM
- DWDM/OXC
- ULH WDM

**Metro Core**
- WDM
- ASON

**Metro Edge**
- MSTP
- PTN

**Access**
- Telephone
- Internet
- IPTV
- VPN
- LAN
- SAN
- Mobile

**Individual**
- Residential
- Business
Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
    - FonsWeaver ASON products
    - CiTRANS MSTP products
    - CiTRANS PTN products
    - IBAS MSTP products
FONST Product Family

**FONST 1600**
- Traditional DWDM with 1600 Gbps capacity
- Up to 160 wavelengths supported
- OADM features
- National backbone/Ultra Long-haul Transport

**FONST 3000**
- OTN-based WDM with 3200 Gbps Capacity
- Advanced 40G OTU interface supported
- ROADM
- National backbone/Ultra Long-haul Transport
FONST 1600 Product Overview

- All-service, multi-bit rates and multi-protocol access capability
  - Provides fully transparent interfaces from 155 Mbps to 10 Gbps, including GbE and 10GbE, FC, ATM, SDH and OTH-based interfaces
  - 48 wavelengths add/drop from single shelf

- High-capacity and reliable system performance
  - Delivering up to 1600 Gbps capacity
  - Maximum 80 C-band wavelengths plus 80 L-band wavelengths available
  - Allow transmission reach 6000km between regeneration sites
  - Layered monitoring and protection schemes

- Flexible modular design and scalable deployment
  - OTH-based switching and ROADM capability supported for rapid service deployment
  - In-service growth for future smooth scalability
  - Network planning, engineering, configuration and deployment are simplified and automated

- Other features:
  - 160 × 10Gbps capacity
  - Wavelengths in C-band and L-band available with 50GHz grid
  - 25Mbps out-of-banding OSC
  - Sub-wavelength Multiplexing (T-MUX)
Key Feature - Flexible Deployment

**OTM: Optical Terminal Multiplexer**
- OTU: Optical Translator Unit
- OMU: Optical Multiplex Unit
- ODU: Optical De-multiplex Unit
- OSC: Optical Supervisory Channel
- EMU: Element Management Unit
- OBA: Optical Booster Amplifier
- OPA: Optical Pre-Amplifier

**OLA: Optical Line Amplifier**
- OSC: Optical Supervisory Channel
- EMU: Element Management Unit
- OBA: Optical Booster Amplifier
- OPA: Optical Pre-Amplifier

**OADM: Optical Add-Drop Multiplexer**
- OTU: Optical Translator Unit
- OAD: Optical Add Drop
- OSC: Optical Supervisory Channel
- EMU: Element Management Unit
- OBA: Optical Booster Amplifier
- OPA: Optical Pre-Amplifier

(Figure showing the components and connections of OTM, OLA, OADM, and Fiber Routing Unit.)
FONST: Next-Generation DWDM

- Multi-services over DWDM wavelengths
  - IP/Ethernet over DWDM
  - SDH/ATM over DWDM
  - Fiber Channel over DWDM

- Flexible networking and protection
  - Point-to-point, linear add-drop, ring add-drop
  - BLSR/UPSR/OSNCP protections
  - OTN plus ROADM features supported

- High-capacity Transmission
  - Maximum 3200 Gb/s line rate
  - Up to 40Gb/s tributary rate
  - 160 wavelengths multiplexing
  - Ultra-long-haul transmission
  - Modular architecture that scales incrementally
OTN Core Technologies:

- Transport Layer:
  - Standard G.709 Interface
  - ROADM
  - OTH E-XC
- Control Plane

- Separation of Client & Transport
- Separation of Transport Layer into 3 individual planes
- Transport Layer adopts layered architecture
FONST 3000 Overview

- Intelligentized solution to convergence layer or kernel layer of inter-province, intra-province trunk, LAN and MAN.
- Superior expansibility: 192chs@10G, 96chs@40G
- Service Type: STM-n, GE, 10Ge, 40GE, SAN, Video and etc
- Standardized OTN architecture
  - G.709 interface
  - ODUk cross-connection
  - WSS-based ROADM technology
  - GMPLS-based control panel
- Advanced modulation formats such as sDPSK, RZ-DQPSK, DP-QPSK for 40G line rate
- Stable 10G/40G hybrid transmission capability
- Automatic optical power adjustment & equalization
- Automatic CD & PMD compensation technologies
- 96-wavelength tunable OTU with SFP/XFP
- Temperature-controlled, speed-adjustable intelligent fan units
Key Feature - Sub-wavelength Multiplexing

- **Sub-wavelength multiplexing**
  - Put multiple services from users onto a single wavelength
  - Wavelength capacity could be 10Gbps or 2.5 Gbps

- **Multiplexing Types**
  - 8 GbE onto 10Gbps wavelength
  - 4 STM-16 onto 10Gbps wavelength
  - 2 GbE onto 2.5Gbps wavelength
  - 8 STM-1 plus 2 STM-4 onto 2.5 Gbps wavelength

- **Benefits**
  - IP/Ethernet over DWDM directly
  - Small footprint and power consumption
  - Low CAPEX and OPEX
- Integration of WDM & SDH-like technologies
- Realization: separate client ports & line ports
- Characteristics:
  - Large cross granularity: GE/OTU1/OTU2/OTU3
  - Increase efficiency: various cross granularities
  - SDH-like protection schemes
  - Reduce OPEX: only client side card changes when service changes
  - Reduce OTU types
Cross-connect Capability-ROADM

FONST 3000 is capable of hybrid cross-connects of optical layer wavelength services and electrical layer sub-wavelength service

Advantages:
Simplify the network and streamlining planning and management
Remotely reconfigure any wavelengths, thereby reducing time-to-service
Significant Opex and Capex reductions and faster time to revenue
FiberHome supports 96 channel X 10G/40G X 8 Dimension
Perfect Protective Capability

Network availability

- Protection
  - Equipment: PWR, EMU, XCU, Fan
  - Electrical: OChP
  - Optical: ODUkP, OLP, OMSP, OChP
    - 1+1 Ring
    - m:n Ring

Enhanced network availability

- First failure
- Second failure
- Fourth failure

First failure
- Second failure
- Loss
- Fourth failure
Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
FonsWeaver: Intelligent Optical Multiservice Switch

- Multi-services Transport Platform
  - TDM: add and drop multiplexer
  - Carrier Ethernet: Transparent and layer2 switching transport
- Plug-and-play Control Plane Unit
  - Fast end-to-end service provisioning
  - Network traffic engineering
  - Automated inventory management
  - ITU-T ASON, IETF GMPLS, OIF UNI/NNI
- High-capacity and flexible networking
  - Wide range of interfaces from E1 to STM-256
  - Up to 1280 Gbps switching fabric capability
  - Plug-and-use meshed network nodes supported
- Carrier-class QoS and Reliability
  - SDH-based protection (<50ms)
  - GMPLS-based mesh restoration (few seconds)
  - Five 9’s system availability
FonsWeaver Product Family

**FonsWeaver 960**
- 40G MSTP with up to 1280 Gbps switching fabric
- National backbone/Metro core network

**FonsWeaver 780A**
- 40G MSTP with up to 720/640 Gbps switching fabric
- National backbone/Metro core network

**FonsWeaver 780B**
- 10G MSTP with 160/80 Gbps switching fabric
- Metro core/aggregation network
FonsWeaver 780A_Super STM-256 ASON System

- **High-scalability STM-256 Transport**
  - Line rate from 155Mbps to 40Gbps provided
  - Truly multiple service provision platform
  - World-leading centralized switching fabric

- **Flexible networking and applications**
  - Fully compatible with SDH network topologies and further mesh network
  - Automatic neighbor discovery and networking optimization
  - Customized service level agreements

- **Carrier-class QoS and reliability**
  - SDH-based protection(<50ms)
  - GMPLS-based restoration for network failures
  - Redundant key modules and 1:N protection for Tributaries
  - Five 9’s system availability

- **Advanced and emerging technologies**
  - ASON/GMPLS control plane complied with ITU,IETF and OIF standard
  - Generic Framing Procedure (GFP)
  - Link Capacity Adjustment Scheme (LCAS)
  - Virtual Concatenation at VC12/VC3/VC4 level
  - Integrated Ethernet layer2 aggregation
  - Small footprint, low power consumption

- **Dimensions and Connectivity**
  - 1069mm × 491mm × 474mm (H × W × D)
  - Max 48 traffic slots and 2 HOXC slots
  - 720G/640G HOCC
  - 4 × 20G LOCC
FonsWeaver 780B_Flexible STM-64 ASON System

- **High-scalability STM-64 Transport**
  - Line rate from 155Mbps to 10Gbps provided
  - Truly multiple service provision platform
  - World-leading centralized switching fabric
  - Maximum 504 E1 from single shelf

- **Flexible networking and applications**
  - Fully compatible with SDH network topologies and further mesh network
  - Automatic neighbor discovery and networking optimization
  - Customized service level agreements

- **Carrier-class QoS and reliability**
  - SDH-based protection(<50ms)
  - GMPLS-based restoration for network failures
  - Redundant key modules and 1:N protection for Tributaries
  - Five 9’s system availability

- **Advanced and emerging technologies**
  - ASON/GMPLS control plane complied with ITU, IETF and OIF standard
  - Generic Framing Procedure (GFP)
  - Link Capacity Adjustment Scheme (LCAS)
  - Virtual Concatenation at VC12/VC3/VC4 level
  - Integrated Ethernet layer2 aggregation
  - Small footprint, low power consumption

- **Technical Specifications**
  - 723mm×491mm×472.3mm (H×W×D)
  - Max 18 traffic slots and 2 HOXC slots
  - 160G/80G HOCC
  - 20G/10G LOCC
Key Feature—Highly Intelligence with Control Plane

Features
- Automatic Resc & TopIg Discovery
- End-to-end Servie Prov, Traffic Engineering
- Dynamic Restoration (Mesh Network)
- Differential Service (SLA)

GMPLS Signaling and Routing protocols

ASON Module

Network Management System

GMPLS-RSVP-TE
GMPLS-OSPF-TE
GMPLS-LMP

System Control & Management
Line card
Trib. card

Data Plane

Management Plane

Control Plane
Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
CiTRANS MSTP Product Family

- **CiTRANS 550B**
  - NG-SDH, STM-16 ADM
  - Metro aggregation network

- **CiTRANS 550F**
  - NG-SDH, STM-16 ADM
  - Metro aggregation/access network
CiTRANS 550B Product Overview

- Typical STM-16 SDH Transport
  - STM-1 to STM-16 SDH bit rates
  - VC12/VC3/VC4 Cross connect
  - 1008 E1 directly from single shelf

- Multi-service Transmission Capabilities
  - TDM interfaces & bandwidth management
  - Ethernet transparent transport and aggregation
  - Integrated ATM MUX

- Network Topologies and Protection
  - Point to point, linear and ring add/drop, mesh
  - 1+1 MSP, 1:N MSP, SNCP, DNI, 2F/4F MS-SPRing
  - E1 and STM-1e interface 1:N protection with extension card

- Advanced and Emerging Data Technologies
  - Virtual concatenation at VC12/VC3/VC4 level
  - GFP & LCAS supported
  - Layer2 switching features

CiTRANS 550B

- 1279mm × 530mm × 265mm (H × W × D)
- Max 19 traffic slots and 2 HOXC slots
- 128 × 128 VC4 HOCC
- 2016 × 2016 VC12 LOCC
CiTRANS 550B Slot Distribution

- 9 universal slots for tributary cards
  - 9 slots for E1 electrical cards
  - 8 slots for FE and STM-1 cards
  - 4 slots for E3/T3 cards
- 10 universal slots for line cards
  - 6 slots for STM-16 cards
  - 4 slots for STM-4 and STM-1 cards
  - 10 slots for GE and ATM cards
- 8 common control slots
  - Redundant Timing card (CKU)
  - Redundant Cross-connect (TUX,AUX)
  - Network Management (NMA)
  - Communicate and Control (EMU)
  - Engineering Orderwire (EOW)
  - Overhead Processor (OHT)
- Front Mount Electrical Connections
  - 16 universal slots for E1 electrical signals connection
  - 3 fixed slots for monitoring, clock and power
<table>
<thead>
<tr>
<th>Interface Card</th>
<th>Ports Per Card</th>
<th>Max Ports Per Shelf</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM-16</td>
<td>1 port per card</td>
<td>6 STM-16</td>
</tr>
<tr>
<td>STM-4</td>
<td>2 ports per card</td>
<td>12 STM-4</td>
</tr>
<tr>
<td>STM-1 Optical</td>
<td>2/4 ports per card</td>
<td>32 STM-1 Optical</td>
</tr>
<tr>
<td>STM-1 Electrical</td>
<td>4/8 ports per card</td>
<td>32 STM-1 Electrical</td>
</tr>
<tr>
<td>E3/T3</td>
<td>3 ports per card</td>
<td>24 E3/T3</td>
</tr>
<tr>
<td>E1/T1</td>
<td>63 ports per card</td>
<td>1008 E1</td>
</tr>
<tr>
<td>GE</td>
<td>2 ports per card</td>
<td>20 GE</td>
</tr>
<tr>
<td>10/100M FE</td>
<td>8 ports per card</td>
<td>96 10/100M FE</td>
</tr>
<tr>
<td>ATM 155M</td>
<td>4 ports per card</td>
<td>40 ATM 155M</td>
</tr>
</tbody>
</table>
CiTRANS 550F Product Overview

- **Supercharged STM-16 SDH Transport**
  - STM-1 to STM-16 SDH bit rates
  - VC12/VC3/VC4 Cross connect
  - 504 E1 directly from STM-16

- **Multi-service Transmission Capabilities**
  - TDM interfaces & bandwidth management
  - Ethernet transparent transport and aggregation

- **Network Topologies and Protection**
  - Point to point, linear and ring add/drop, mesh
  - 1+1 MSP, 1:N MSP, SNCP, DNI, 2F/4F MS-SPRing
  - E1,E3/T3 and FE interface 1:N protection with extension card

- **Advanced and Emerging Data Technologies**
  - Virtual concatenation at VC12/VC3/VC4 level
  - GFP and LCAS supported
  - Layer2 switching features

- **Dimensions**
  - 847mm × 530mm × 265mm (H × W × D)
  - Max 14 traffic slots and 2 XC slots
  - 128 × 128 VC4 HOCC
  - 4032 × 4032 VC12 LOCC
CiTRANS 550F Slot Distribution

- **8 universal slots for tributary cards**
  - E1, E3/T3 electrical cards
  - Ethernet FE cards

- **6 universal slots for line cards**
  - STM-1 electrical cards
  - STM-N optical cards
  - Ethernet GE cards

- **3 common control slots**
  - Redundant Timing & XC (XCU)
  - Communicate and Control (EMU)

- **Front Mount Electrical Connections**
  - 16 universal slots for electrical signals connection
  - 2 fixed slots for power supply
  - 1 fixed slot for clock IN/OUT
# CiTRANS 550F Access Capacity

<table>
<thead>
<tr>
<th>Interface Card</th>
<th>Ports Per Card</th>
<th>Max Ports Per Shelf</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM-16</td>
<td>1 port per card</td>
<td>4 STM-16</td>
</tr>
<tr>
<td>STM-4</td>
<td>2 ports per card</td>
<td>8 STM-4</td>
</tr>
<tr>
<td>STM-1</td>
<td>2/4 ports per card</td>
<td>26 STM-1 Optical</td>
</tr>
<tr>
<td>STM-1 Electrical</td>
<td>4 ports per card</td>
<td>16 STM-1 Electrical</td>
</tr>
<tr>
<td>E3/T3</td>
<td>3 ports per card</td>
<td>24 E3/T3</td>
</tr>
<tr>
<td>E1</td>
<td>63 ports per card</td>
<td>504 E1</td>
</tr>
<tr>
<td>GE</td>
<td>1 port per card</td>
<td>6 GE</td>
</tr>
<tr>
<td>10/100M FE</td>
<td>8 ports per card</td>
<td>112 10/100M FE</td>
</tr>
</tbody>
</table>
Agenda

- Market Requirement

- **FiberHome Optical Network Solution**
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
CiTRANS: Next Generation Metro ADM

- Truly multi-services supported
  - TDM: Add-drop multiplexer
  - ATM: Transparent and switch
  - Carrier Ethernet: Transparent and aggregation
- Carrier-class QoS and reliability
  - SDH-based protection (<50ms)
  - Five 9’s system availability
  - High scalability with up to 10Gb/s line rate
- Based on cutting-edge HW and SW technologies
  - Virtual Concatenation
  - Link Capacity Adjustment Scheme
  - Generic Framing Procedure
  - RPR and MPLS modules embedded
  - Small footprint and low power consumption
  - Rich features, high cost-effective and performance
PTN

- PTN—Packet Transport Network
- PTN is a packet-based network, carrying Ethernet services and compatible with TDM, ATM, FC services etc.
- The key difference between PTN and MSTP is PTN adopts packet crossing core
- PTN is intelligent optical transmission network, and its structure is as follows:
### PTN Product Series (MPLS-TP/PBT)

<table>
<thead>
<tr>
<th>Model</th>
<th>XC Capacity</th>
<th>Service Slots/Slots</th>
<th>Application Scenarios</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>CiTRANS 660</td>
<td>160G~320G</td>
<td>24/32</td>
<td>Metro Core, Aggregative node</td>
<td>923mm(H) × 496mm(W) × 248mm(D)</td>
</tr>
<tr>
<td>CiTRANS 640</td>
<td>20G~90G</td>
<td>8/12</td>
<td>Edge Aggregation, Key Access Node</td>
<td>173mm(H) × 440mm(W) × 245mm(D)</td>
</tr>
<tr>
<td>CiTRANS 620</td>
<td>5G~20G</td>
<td>1/1</td>
<td>Edge Access Node</td>
<td>44mm(H) × 440mm(W) × 380mm(D)</td>
</tr>
</tbody>
</table>
CiTRANS 660 Overview

- **Seamless Traffic Migration**
  - Circuit Emulation for transporting voice and legacy services over packet transport network
  - TDM: E1, STM-1/4/16
  - Ethernet: FE, GE, 10GE
  - Compatible with FiberHome’s OTN cards
  - Carrier Ethernet: E-Line and E-LAN supported
  - Support Hierarchical QoS

- **High-capacity and flexible networking**
  - Wide range of interfaces supported from E1 to 10GbE
  - 160 Gbps switching fabric capability
  - Plug-and-use meshed network nodes supported

- **Universal switching architecture**
  - High-efficient statistical multiplexing supported
  - Non-stop forwarding (not affected by traffic congestion)

- **Carrier-grade Reliability**
  - Packet Transport features, MPLS-TP with OAM and Protection Switching
  - 1+1 module design for management & power
  - Five 9’s system availability
CiTRANS 640 Overview

- Seamless Traffic Migration
  - Ethernet: FE, GE, 10GE
  - TDM: E1, STM-1/4/16
  - Compatible with FiberHome’s OTN cards
  - Carrier Ethernet: E-Line and E-LAN supported
  - Support Hierarchical QoS

- Flexible networking
  - Wide range of interfaces supported from E1 to 10GbE
  - Plug-and-use meshed network nodes supported

- Universal switching architecture
  - High-efficient statistical multiplexing supported
  - Non-stop forwarding (not affected by traffic congestion)

- Carrier-grade Reliability
  - Packet Transport features, MPLS-TP with OAM and Protection Switching
  - -48 DC and 220V AC are available
  - Five 9’s system availability
CiTRANS 620 Overview

- **Multiservice Access Box**
  - Ethernet: FE, GE
  - TDM: E1
  - 20 Gbps switching fabric capability
  - High-efficient statistical multiplexing supported
  - Support Hierarchical QoS

- **Remote management and flexible networking**
  - Managed by OTNM 2000/2100
  - GMPLS-based Control plane supported
  - Plug-and-use meshed network nodes supported

- **Carrier-grade Reliability**
  - Packet Transport features, MPLS-TP with OAM and Protection Switching
  - -48 DC and 220V AC are available
  - Five 9’s system availability

CiTRANS 620

- 1U High
- ETSI 19’ installation
- Max 4GE, 8FE and 16E1 provided
- Design for BTS/Node B access and VPN CE
CiTRANS: Enabling Converged Optical Transport

SDH ADMs
- PDH E1/E3 interfaces

Traditional SDH 1995 1999

NG-SDH
- ITU-T defined Standards: GFP, VCAT, LCAS;
- P2P Ethernet transport;

Multi-Service Transport Platform

3rd SDH ADM
- RPR/MPLS functionalities;
- MEF Services: E-Line & E-LAN

Packet-Aware Transport on SDH

PTN
- Transport MPLS/MPLS TP
- PseudoWire Emulation
- Ethernet OAM

Packetized Transport on Fibre

Seamless Migration from TDM to IP

Agenda

- Market Requirement

- FiberHome Optical Network Solution
  - FONST DWDM/OTN Products
  - FonsWeaver ASON products
  - CiTRANS MSTP products
  - CiTRANS PTN products
  - IBAS MSTP products
IBAS: Metro Access Multiplexer

- Cost-efficient multi-service access
  - TDM leased line:
    - E1/E3/T3/E4 leased line
  - Carrier Ethernet:
    - Ethernet private line service
    - Ethernet LAN service

- Carrier-class QoS and reliability
  - SDH-based protection (<50ms)
  - Five 9’s system availability
  - High scalability with up to 2.5Gb/s line rate

- Pay as you deployed
  - Flexible network application
    - SDH TM/ADM
    - Customer Premises Equipment
  - Small footprint and low power consumption
    - Multi-service box with 1U/2U/3U height
  - Wall-mounted or desktop design
IBAS Product Family

- IBAS 180A
  - STM-1/4 MSTP
  - Metro access network

- IBAS 110A
  - Compact STM-4 MSTP
  - Metro access network and CPE

- IBAS 110B
  - Compact STM-1 MSTP
  - Customer premise equipment
IBAS 180A System Overview

- **STM-4 Transport**
  - STM-4 bit rates
  - VC12/VC3/VC4 Cross connect

- **Multi-service Capabilities and Transmission**
  - TDM interfaces plus bandwidth management
  - Ethernet transparent and layer2 switching transport

- **Network Topologies and Protection**
  - Point to point, linear add/drop, ring
  - 1+1 MSP, 1:N MSP, SNCP, 2F MS-SPR

- **Advanced Technologies**
  - Virtual concatenation at VC12 level
  - GFP and LCAS supported
  - Modular architecture for future extension

### Interface types

<table>
<thead>
<tr>
<th>Type</th>
<th>Max ports per shelf</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM-1 optical</td>
<td>8 STM-1 O</td>
</tr>
<tr>
<td>STM-1 electrical</td>
<td>4 STM-1 E</td>
</tr>
<tr>
<td>E4</td>
<td>4 E4</td>
</tr>
<tr>
<td>E3/DS3</td>
<td>12 E3</td>
</tr>
<tr>
<td>E1</td>
<td>63E1</td>
</tr>
<tr>
<td>FE(100M)</td>
<td>16 FE</td>
</tr>
</tbody>
</table>
IBAS 110A Product Overview

- **Mini-design STM-4 Transport**
  - STM-1 to STM-4 bit rates
  - VC12/VC3/VC4 Cross connect

- **Multi-service Capabilities and Transmission**
  - TDM interfaces plus bandwidth management
  - Ethernet transparent and layer2 switching transport

- **Network Topologies and Protection**
  - Point to point, linear add/drop, ring
  - 1+1 MSP, 1:N MSP, SNCP, 2F MS-SPR

- **Advanced Technologies**
  - Virtual concatenation at VC12 level
  - GFP and LCAS supported
  - Modular architecture for future extension

- 88 mm × 480mm × 356 mm (H × W × D)
- AC or DC power supply modules
- Wall-mountable or stackable in ETSI standard 19’ rack
- 16 × 16 VC4 HOCC
- 1008 × 1008 VC12 LOCC
- Power consumption: 40W
IBAS 110B Product Overview

- **STM-1 multi-service access CPE**
  - TDM and Ethernet service access
  - VC12 Cross connect
  - Integrated system architecture
    - NNI: 2 × STM-1
    - UNI: 4 × FE plus 8 × E1

- **Network Topologies and Protection**
  - Point to point, linear add/drop, ring
  - 1+1 MSP, 1:1 MSP, SNCP

- **Cost-efficient transmission**
  - Enable transport voice and data traffic over single SDH link
  - Provide economical solution to serve small/medium-sized customers
  - Presents a flexible choice of optical and tributary interfaces

- **IBAS 110B**
  - 44 mm × 480 mm × 256 mm (H × W × D)
  - AC or DC power supply modules
  - Wall-mountable, desk application or stackable in ETSI standard 19’ rack
  - Power consumption: 15W
THANK YOU

FiberHome Technologies
Iran Office