Last Mile Convergence
for Business/Residential Connection

Jacky Zhang
SDH Product line, RAISECOM
Agenda

• Corporate overview
• Multi-service Access Platform
• Multi-service STM-1 MUX
• Multi-service PDH MUX
• Multi-service over E1 leased line
• Multi-service over G.SHDSL
• Q & A
Corporate Overview

• Established in 1999
  – Top 10 highest growth tech-company in China, from 2003-2008
  – A leading Telecom Solution Provider in worldwide Market.
  – No.1 Last mile equipment vendor in China
  – Over 45% optical broadband access market share in China
• Complete Last mile Access Solutions
  – E1/T1, E3/DS3 and SONET/SDH infrastructure.
  – GEPON and GPON Solutions.
  – Ethernet over fiber, copper, PDH link Solutions.
  – Analog voice and narrow bandwidth solutions
  – with over 5 million units installed in carrier networks.
• World Class Operations - striving for excellence in technology innovation, R&D, manufacturing, and customer supports.
• Carrier Grade Products - offer “2year, 6year or life-time” warrantee.
Growing Global Presence

RAISECOM FORCE

Sales 207
R&D 385
Management 72
Support 241
Manufacture 197
Total 1103

* 2008 projection
Growing Global List of Customers
Quality Metrics

Quality Assurance:

- Warranty: three-tier program offers 2-year, 6-year, and life-time.
- Average problem rate: <0.3%, based on 3-year statistics for over 1,000,000 pc devices.
- Replacement & repair: <30 days.

Services:

- 24-Hour On-line Technical Assistance.
- 9am – 6pm Full Technical Supports.
- On-Site Tech Supports.
- Remote Performance Analysis Capabilities.
- Professional Training Program and Teaching Facilities.
- Authorized distributors and Certified Engineers.
Our Vision

• World class provider of Last mile access Solutions.
• Converged services over current network infrastructure.
• Any transmission medium at the customer edge.
• Partner with a select group of like minded customers.

Ethernet convergence over AnyNet
Raisecom Multiple Product lines

- Media Converter (Deliver Ethernet over fiber),
- FOM (Deliver E1 and multiple E1s traffic over fiber),
- RCMS (Deliver E1, V.35 and Ethernet service over fiber),
- Inverse multiplexer (Deliver Ethernet service over E1, DS3/E3 link),
- G.SHDSL (delivery E1, V.35, Eth over copper),
- Multi-service access platform (delivery all kinds service via one platform to SDH network or Metro Ethernet work),
- E3/DS3 modem,
- GEPON system,
- Ethernet switches,
- SDH CPE (deliver E1 and Ethernet service over SDH),
- Ethernet to SDH convector (delivery Ethernet over SDH network),
- CWDM system (deliver multi-services over one fiber),
- Video surveillance Modem and system
- Unified SNMP network management platform,
- ...
MSAP

--ideal solution, combine SDH ADM, Last mile CPE in one platform
How did you connect PDH to SDH before OPCOM3500E?
What are we facing?

- Waste cost of cables, connectors, and DDF
- Waste cost of rack space
- Not easy to check and manufacture so many cables
- Not easy to manage PDH multiplexer from SDH ring
- PDH and SDH managements are in different NMS software
- Ethernet access on MSTP cannot reach remote branch on customer’s site
- There is no Ethernet fiber optical ports on my SDH equipments
- How can we aggregate Ethernet traffic by VLAN without Ethernet Switch in SDH ring
- Non-protection in current PDH fiber links
OPCOM3500E in C.O.
Multi-Service Access Platform

Overview

- OPCOM3500E SDH multi-service access platform is aggregation equipment, which is designed for traditional TDM service and broadband IP data service of MAN.
- It can meet carrier and customer’s requirement of different class bandwidth and multi-service access.
- OPCOM3500E-12 and OPCOM3500E-6
OPCOM3500E-12 Features

- Aggregate all kinds of Raisecom TDM and Ethernet CPE to SDH
- Total 4 STM-1 ports or 4 STM-4 ports aggregation unit
- No-block cross connection of $16 \times 16$ VC4 or $1008 \times 1008$ VC12
- VC12 cross connection between all tributary units and aggregation units
- 15 slots, including 2 slots of power supply, 1 slot of management, 2 slots for aggregation units, 10 slots for tributary units
- 2Mbit /2MHz clock input & output
- Service non-stop when NMS card fail or be taken off
Aggregation Units Protection
Tributary Units Protection

MSAP OPCOM3500E

STM-1/STM-4

Port based protection
1+1 PDH fiber link protection in SINGLE tributary module

Board based protection
1+1 PDH fiber link protection in REDUNDANT tributary modules
Transmit Multiple VLANs over Single VCG
OPCOM3500E-6 Features

- Aggregate all kinds of Raisecom TDM and Ethernet CPE to SDH
- 3 unit high 19 inch standard chassis
- No-block cross connection of $8 \times 8$ VC4 or $504 \times 504$ VC12
- 8 slots, including 2 slots of power supply, 1 slot of management and aggregation, 1 slot for GE aggregation units, 4 slots for tributary units
Multi-service STM1 Mux
STM-1 CPE

Overview

- OPCOM3100/3101/3105/3107-155 are carrier-class design SDH CPE.
- High capacity of E1 or Ethernet service at low cost
- Two STM-1 optical interfaces for up link, with options of either two individual path or 1+1 path protection.
- To be used as TM or ADM equipment
- Support point-to-point, chain and ring network topology
OPCOM3105-155 is compact 1U standalone STM-1 ADM and TM

- Provide flexibility E1/V.35/Ethernet services access
- Uplink: two STM-1 optical interfaces, can be configured to 2 independent line or 1+1 mode
- Downlink: fixed 4E1 and 4ETH interfaces and one expansion slot
- Fixed to provide 3 Fast-Ethernet interface (over 1st VCG) with build-in Layer 2 switching function, and 1 independent Ethernet interface (over 2nd VCG)
- Optional 2/4 E1 interface or 2 V.35 interface or 2 10/100M Ethernet interface module for the expansion slot
- 189x189 TU-12 crossover-connection function
- 1+1 lower order path protection, the protect switching time is within 50ms
- The Ethernet supports GFP, LAPS encapsulation, along with VCG/LCAS
OPCOM3107

Construction & Features

- OPCOM3105-155 is compact 1U standalone STM-1 ADM and TM
- Provide flexibility E1/Ethernet services access
- Uplink: two STM-1 optical interfaces, can be configured to 2 independent line or 1+1 mode
- Downlink: fixed 8/16E1 and 4ETH interfaces and one expansion slot
- Fixed to provide 3 Fast-Ethernet interface (over 1st VCG) with build-in Layer 2 switching function, and 1 independent Ethernet interface (over 2nd VCG)
- 189x189 TU-12 crossover-connection function
- 1+1 lower order path protection, the protect switching time is within 50ms
- The Ethernet supports GFP, LAPS encapsulation, along with VCG/LCAS
Multi-service PDH Fiber Mux
Ethernet copper to optical fiber
- Cost-effective copper to fiber media conversion for Fast Ethernet service
- Fiber extension of Carrier Ethernet service
- Optional multimode, single mode or single strand fiber optic cables
- User configurable UTP port auto-negotiation and auto-MDI/MDIX
- User configurable fiber-to-copper fault propagation
- User configurable rate limiting with N*32kbps increment
- Front panel LED indication
- SNMP local and remote management
Raisecom Traditional PDH Fiber Optical Multiplexer

- 1/2/4/8/16*E1 channels over PDH fiber in point to point application
- Optional 75ohm unbalanced and 120ohm balanced E1 interface
- Optional multimode, single mode or single strand fiber optic cables
- Auto-Laser-Shutdown and Dying gasp functions
- The local and remote alarms can be displayed simultaneously.
- Local and remote loop-back configuration
- Aggregation by MSAP OPCOM3500E available
- SNMP local and remote management
Raisecom Multi-Service PDH multiplexer RCMS

RCMS = Media Converter + PDH Mux
Features
RCMS2802 & 2801 series

- Cost-effective wire-speed Fast-Ethernet + 2/4/8 E1 to one link PDH fiber simultaneously, the E1 and Ethernet traffics are isolated by TDM technology
- Pure 100Mbps wire-speed bandwidth for 10/100Base-T Auto-negotiation extension
- Ethernet Bandwidth control (N*32Kbps), rate limiting
- Ethernet maximum transmission unit up to 1784 Bytes
- Transparent E1 transmission for fractional E1 data or unframed E1 data
- Optional N*64Kbps V.35 interface on tributary side, taking the E1 channel
- The local and remote alarms can be displayed simultaneously
- Local and remote loop-back configuration
- Auto-Laser-Shutdown and Dying gasp functions
- Aggregated by MSAP OPCOM3500E available
- For RCMS2802 the modules, SNMP local and remote management within chassis
- For RCMS2801 the standalone equipments, there is LCT (console) management method on the equipment, as well as remote management while working with RCMS2802 module for both sides SNMP management.
Quick View
RCMS2802 & 2801 series

RCMS2802-30FE/60FE(-BL):
1 or 2 E1 + Fast-Ethernet to one fiber link

RCMS2802-120LFE/240LFE(-BL):
4 or 8 E1 + Fast-Ethernet to one fiber link

RCMS2801-60FE-FV35
1 V.35 + 1 E1 + Fast-Ethernet to one fiber link

RCMS2801-240EFE
Flexible 8 channels 2Mbps (E1/V.35) + Fast-Ethernet to one fiber link
New Gigabit Ethernet version
RCMS2802 & 2801 series

RCMS2802-30GE/60GE-BL:
1 or 2 E1 + Gigabit Ethernet to one fiber link

RCMS2802-120LGE/240LGE-BL:
4 or 8 E1 + Gigabit Ethernet to one fiber link

RCMS2802-240GE/480GE-BL:
8 or 16 E1 + Gigabit Ethernet to one fiber link

- Multiplexing 1/2/4/8/16 E1 + pure 1000Mbps Gigabit-Ethernet to one fiber link transmission
- Modular design for flexible installation on both multi-slot chassis at CO, as well as single-slot chassis at CPE site
1+1 Redundant Fiber Link
RCMS2812/2811 series

RCMS2812 series:
➢ Modular 4 / 8 / 16 E1 + Fast-Ethernet to 1+1 APS fiber link

RCMS2811 series:
➢ Standalone 4 / 8 / 16 E1 + Fast-Ethernet to 1+1 APS fiber link
➢ Redundant power supply
OPCOM3500E series:
- Aggregates maximum 40 fiber links RCMS to STM-1/STM-4 SDH ring directly
- Aggregates all the Ethernet service from tributary to one or two GE aggregation uplink in the same platform
- Delete the cost of E1 cables, DDF racks, and Ethernet cables at the aggregation point
- Manage all the SDH ADM and remote PDH CPE in one NMS GUI system
Multi-Service over E1 Leased Line
All in one

- Optical and Electrical interfaces in one
- Transmission and access in one
- Broadband and narrowband in one
- Voice and data in one

One for all

- Fully Satisfying the demands of different customers
- Adapt to future development of the network
- Unified access platform
- Unified NMS providing environment monitoring and line testing functions
- Smooth upgrade
- Developing new services quickly
RC3000-15 & RC3000-6

Features:

- SDH aggregation unit, totally 2×STM-1 uplink
- Access analog and digital circuits from STM-1 or E1 networks
- Electrical and optical E1 interfaces
- Support 128×E1 digital full Cross-connect
- Flexible network topologies: Point-to-Point, Linear Drop/Insert, Star and Mesh
- Multipoint (multi-drop) voice and data interfaces
- Programmable A,B signaling bits (time slot 16; E1 systems) supports all voice switching equipment
- Redundant power supply, DXC board 1+1 protection
- Support hot swap
- Remote Configuration Control and Performance Monitoring
- SNMP agent for in-band and out-of-band network management using Raisecom’s NView NNM software
Application Illustration

- STM-1
- DXC
- GE

Service slots
Service slots
Power
# RC3000-15 & RC3000-6 Interfaces

<table>
<thead>
<tr>
<th>High Speed Interfaces:</th>
<th>Optical E1 PDH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RC3000-15-30×8-OPT(SFP)</td>
</tr>
<tr>
<td></td>
<td>RC3000-15-120×2-OPT</td>
</tr>
<tr>
<td></td>
<td>RC3000-15-P240FE-OPT(1+1)</td>
</tr>
<tr>
<td></td>
<td>STM-1 Optical</td>
</tr>
<tr>
<td></td>
<td>SUB-ESW-2GE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voice Interfaces:</th>
<th>FXO</th>
<th>FXS</th>
<th>Hotline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2/4 W E&amp;M</td>
<td></td>
<td>Magneto Telephone</td>
</tr>
<tr>
<td></td>
<td>R2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supports custom signaling protocols</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Serial/Data Interfaces: | RS232 Asynchronous Data 300 bps ~ 19.2kbps |
|                        | RS485 Asynchronous Data 300 bps ~ 19.2kbps |
|                        | RS422 Asynchronous Data Interface |
|                        | V.35 Synchronous N × 64 Kbps (N=1~31) |
|                        | V.24 synchronous data (64Kbps~256Kbps) |
|                        | 10/100 Base-T Ethernet N × 64 Kbps (N=1~31) |

| Others Interfaces     | G.SHDSL           | V.35 interface |
|                       |                  | E1 interface   |
|                       |                  | Ethernet interface |
Working with OPCOM3500E

- Customized solution to meet business/group users’ diversified requirements.
- Sharpens Operator’s competitive edge.

- Broadband and narrowband Unified maintenance

All services, one transmission
E1/V.35/Eth over G.SHDSL

-Multi-service over twisted-pair copper
One Service over One Pair wire

G.Shdsl
Version
RC1102-E1
RC1102-E1-BL
RC1102-V35
RC1102-FE

G.shdsl.bis
Version
RC1102-E1(B)
RC1102-E1-BL(B)

Chassis
3U chassis
1U chassis

or
G.SHDSL Service in the MSAP

OPCOM3500E-SHDSL-2W×8

Application

Aggregate Multi-service to SDH Network through G.SHDSL copper wire
Thank you!