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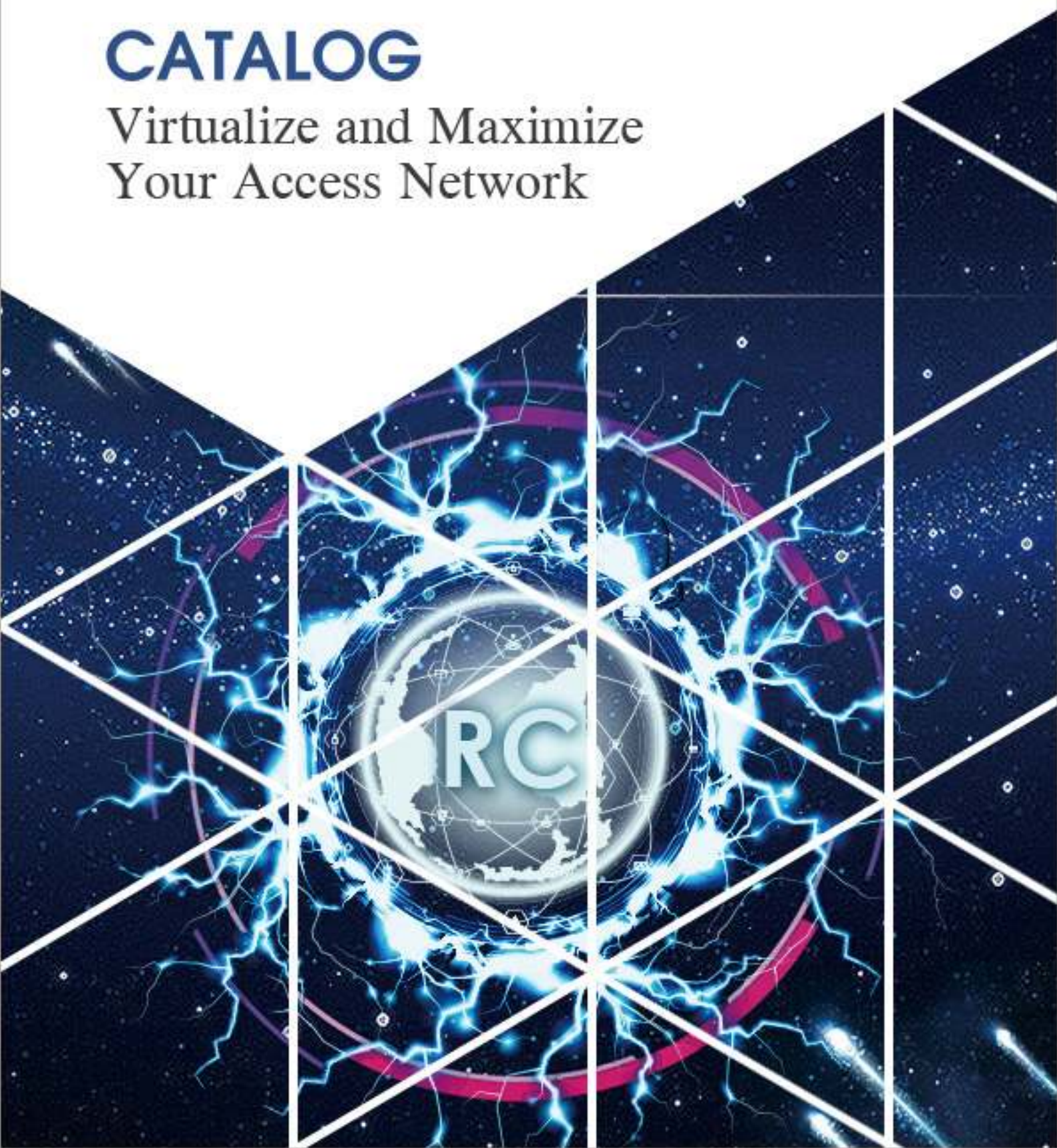
CATALOG

Virtualize and Maximize Your Access Network



About Raisecom

Raisecom is a global leading vendor providing comprehensive access solutions and network devices. Based in Beijing (China) and listed on Shanghai Stock Exchange (603803), Raisecom has consistently achieved strong growth with partners and customers over 80 countries worldwide.

Raisecom has two RnD centers in Beijing and Xi'an, two manufacturing sites in Beijing and Shenzhen, eight international branches and representative offices, and Raisecom Inc. located in Florida, USA. We specialize in tailored solutions for access network, optical network, vertical network, cloud service and IoT network.

Raisecom is ISO9001:2008 certified for RnD, manufacturing, technical support and marketing. Our products are compliant with CE, RoHS, IEEE, IEC, UL, CSA and KEMA standards and regulatory.

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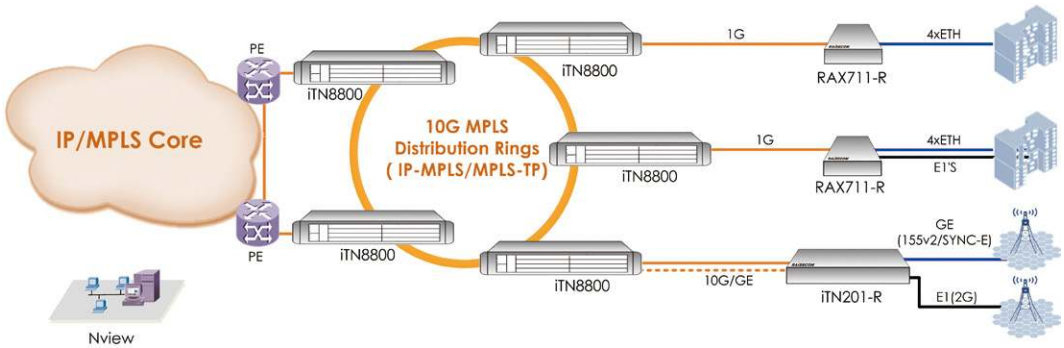
Raisecom telecommunications solutions present a comprehensive range of access solutions and technologies, targeting telecom service providers, large enterprises, financial institutions, government bodies, educational organizations, health centers, and other public establishments, where mission-critical tasks as well as conventional data communication are delivered and processed quickly.

Raisecom solutions enable services with assured bandwidth, guaranteed data security, minimized potential economic loss (due to network failures), and with the ability to deliver end-to-end Carrier-grade services with a reliable and pre-defined SLA. Since Raisecom solutions are part of a higher grade network, the solutions enable highly resilient services with L2/L3 demarcation in a versatile access infrastructure. Access rates range from 2Mbps to sub-100Mbps, and up to 1Gbps and 10Gbps, meeting requests for highly adaptable, versatile, and incremental bandwidth.

Operators nowadays offer a variety of services, while attempting to maximize their infrastructure. Therefore, Raisecom provides flexible combinations of product solutions to assist combining state-of-the-art networking technologies with mobile networking implementation, end-to-end management and solution-enabling maintenance.

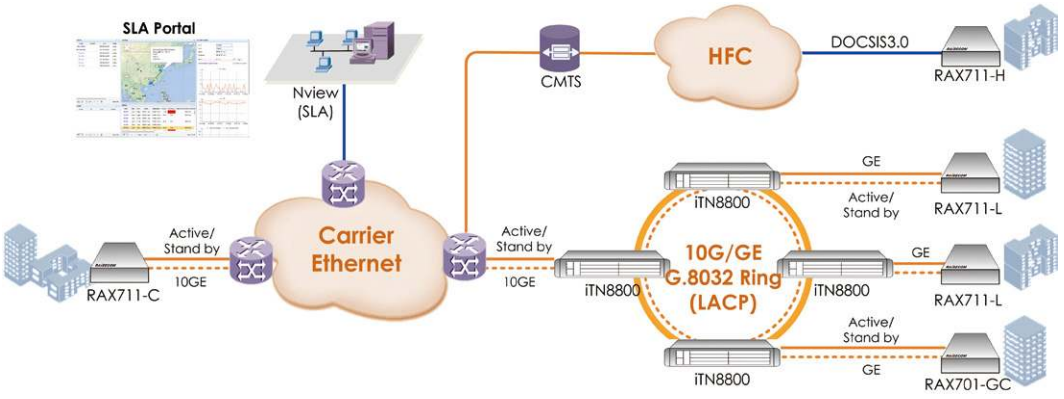
IP/MPLS Access and Pre-Aggregation Solution

• End-to-end service using MPLS technology
• Run L2/L3 VPNs over MPLS from the CPEs, reduce the OPEX by simplifying the network routing and provisioning process
• Service Resiliency – end-to-end service protection, based on MPLS protection starting at the CPE level
• Transparent passing of end user traffic via MPLS VPNs (with no MAC learning)
• Multi Technology (CE/MPLS-TP/IP-MPLS) CPEs and Pre-Agg Device (both IP-MPLS and MPLS-TP stack)
• SLA assurance based on L2/L3 VPNs
• Built in Pseudowire (E1/STM-1/STM-4) and Clocking (Sync-E/1588v2) functionalities
• The solution enables service providers to improve their service responsiveness using state-of-the-art multi-purpose RAX711/iTN201-R CPEs and iTN8800 (high scale cost effective IP-MPLS pre aggregator)



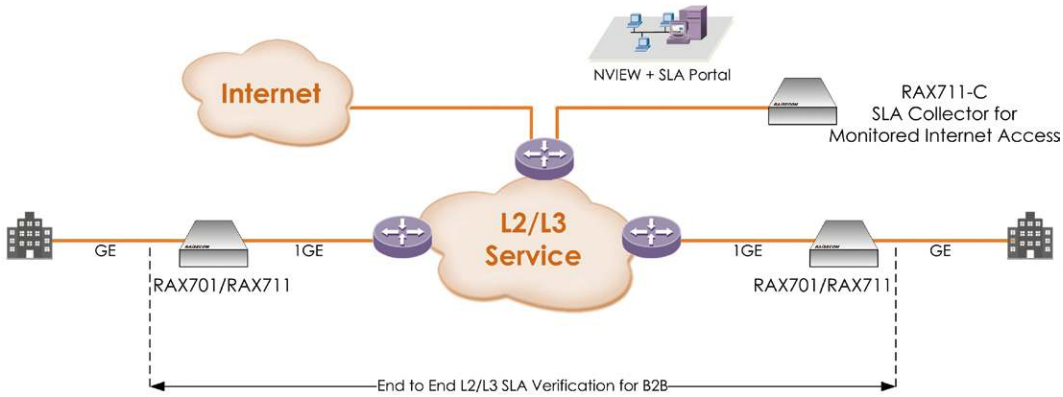
High Performance SLA-based Ethernet Business Services

• MEF CE2.0 based Ethernet and IP enterprise services over Access and Metro Rings
• Premium SLA services with L2/L3 performance monitoring and service activation tests(RFC2544/Y.1564)
• Full protection to assure service reliability based on standard G.8031 and G.8032 linear and ring protection
• Building a complete access solution (10G/GE) for E-Line, E-LAN, E-Tree and E-Access allows service provider to deploy and deliver new services in a short period of time
• Empower MSO with CE2.0 value-added service capability



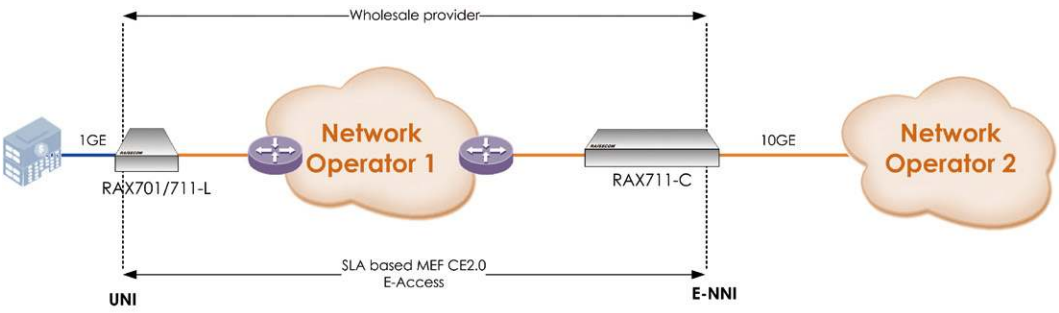
Performance Monitoring for Business VPNs

• Business-grade L2/L3 VPNs services should be continuously monitored to assure SLA and performance
• VPNs performance can be validated by various means, e.g. In-service Y.1564 and TWAMP
• Raisecom's multi-technology demarcation CPEs can enable performance monitoring and be compatible with performance assuring and monitoring vendors' solution from other vendors
• The solutions can collect vast amount of detailed data which can be used for SLA reporting



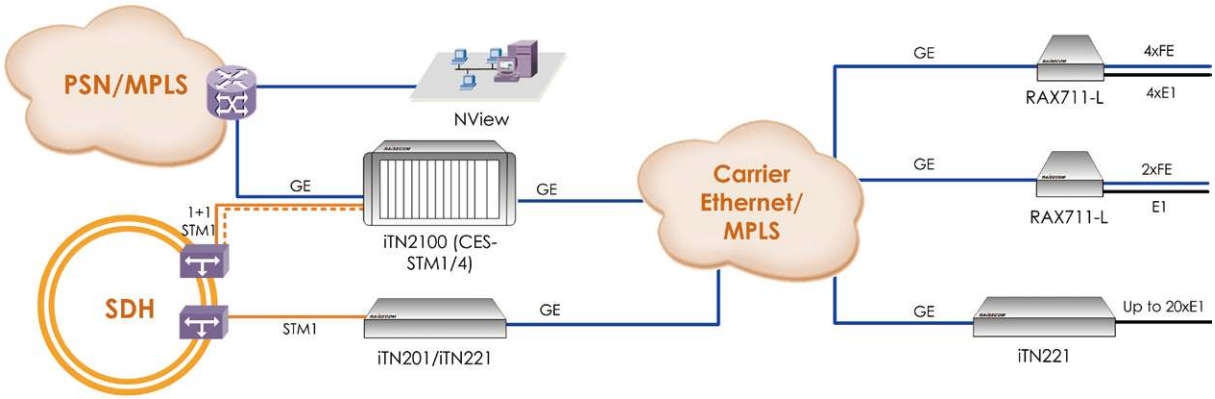
High Performance SLA-based Wholesale and Carrier of Carrier Ethernet Services

• Offer MEF based wholesale Ethernet service to other service provider (Carrier of Carrier service)
• End-to-end SLA assurance based on MEF CE 2.0
• Complaint with MEF-33, E-ACCESS services for Multi carrier networks communication



TDM Extension over Packet Network

- Service providers can maintain TDM services and networks
- Maintain revenue flow from legacy services and add new IP/Ethernet services
- Reduce churn by preserving legacy services
- Broad portfolio of scalable pseudowire solutions: CPEs, medium and large aggregators
- Flexibility of TDM emulated services: nx64, E1 up to Channelized STM-4
- Pseudowire services can be delivered over point to point and point to multi-point topologies
- Ensure timing synchronization over packet transport network

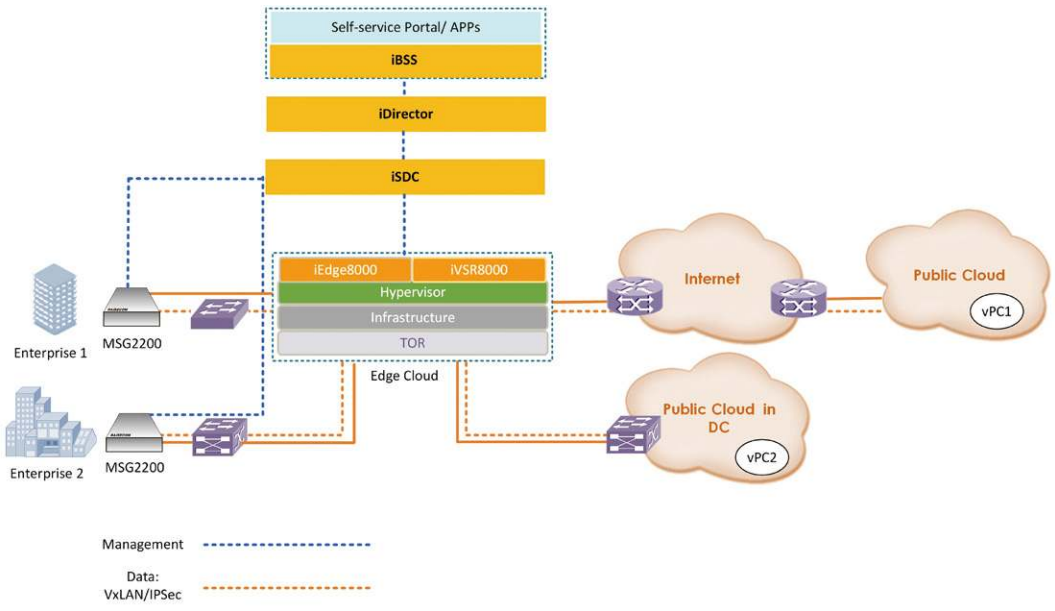


Virtulized Application over Cloud NEW

- Provide ONAP, ETSI born end-to-end service-driven abstract and flexible orchestration, based on Openstack architecture
- Portal/APP based multi-level self-service: such as carrier level, enterprise level and end-user self-service
- Minutes level service end-to-end provisioning and turn-up
- Convenient overlay VPNs to connect no matter what services subscriber needs: IP, MPLS, or Internet network service
- Highly flexible, on-demand elastic adjustment
- Highly stable, on-demand back-up
- Be compatible with 3rd party VNFs capability
- Real future-proof CT and IT combined architecture, pay-as-you-grow, effectively reduce CAPEX and OPEX

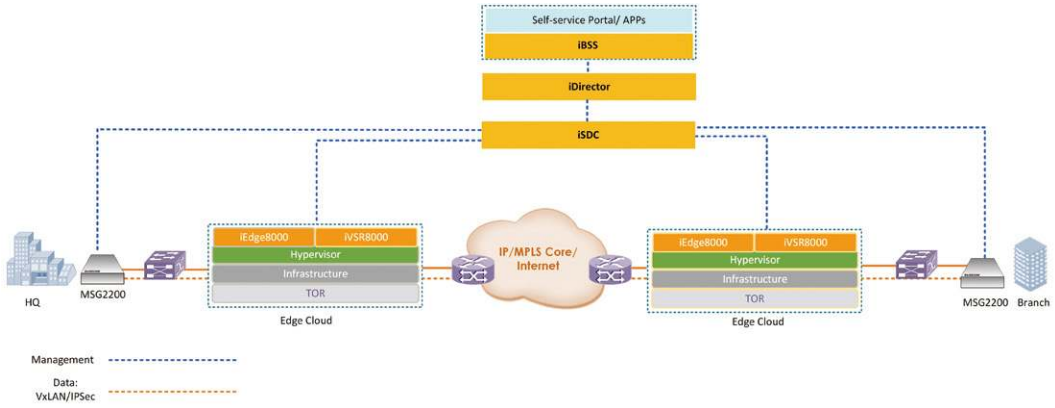
iDirect Connection service:

- Customer service connection to data center



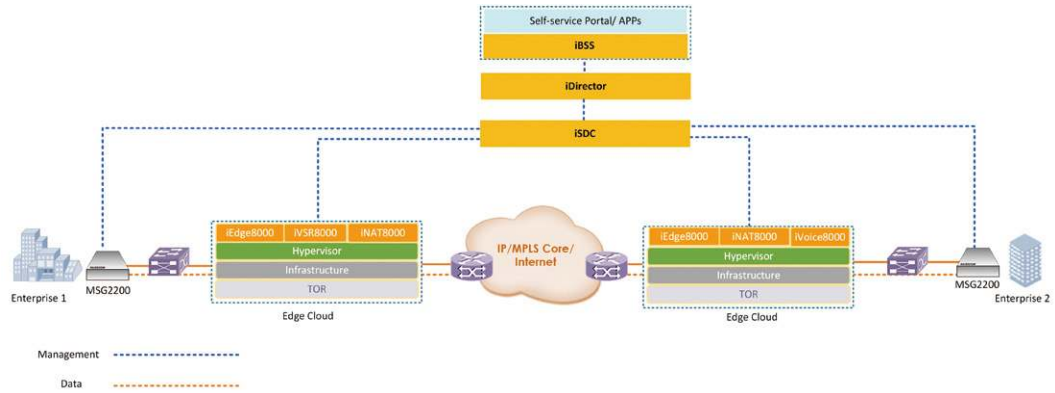
Multi branches connection service:

• VPN interconnection between HQ and Branch



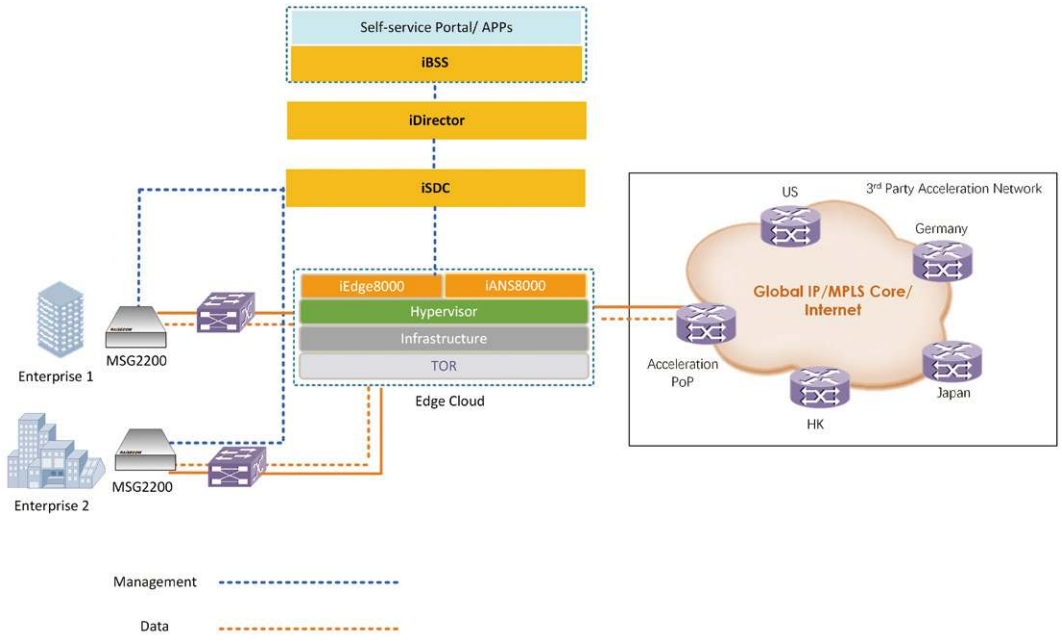
Flexibly enhance enterprise IT infrastructure service:

• Eliminate the need to buy individual pieces of equipment for VPN, router, voice and other network functions, IT services can be downloaded as subscriber requirs



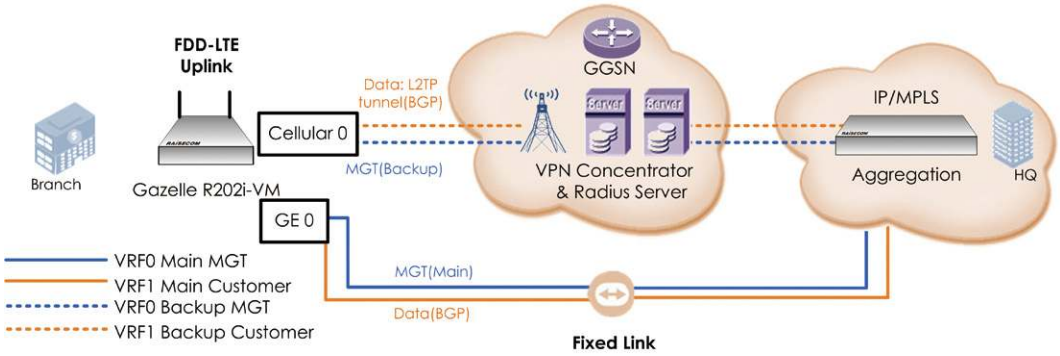
Service access to cloud for acceleration:

• Easy connection adapter between CPE and acceleration network POP site



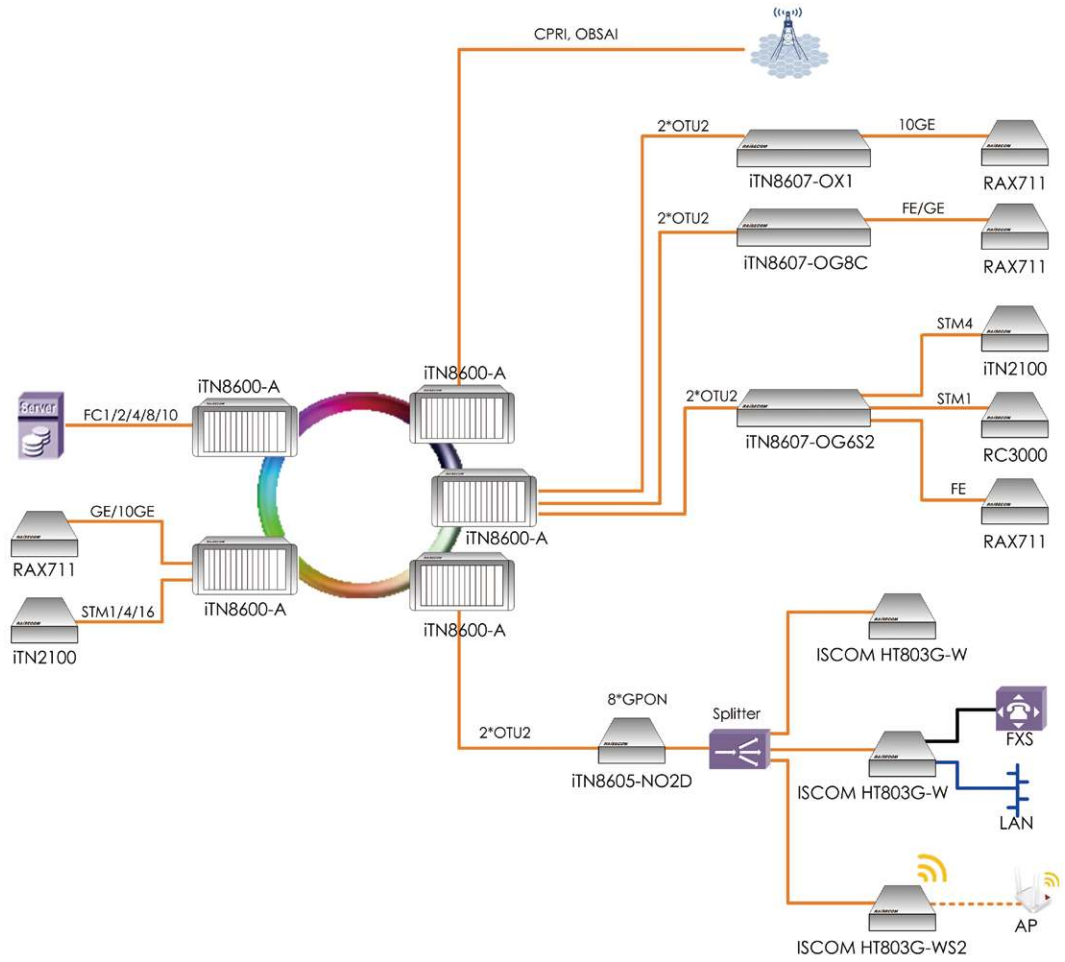
Business Connectivity with 4G (LTE) Backup

- Expand customer reach and increase customer base by using high-speed 4G LTE network
- SME Router with both wireline and 4G Uplink, with backup ensuring resiliency of customer connectivity data
- Ideal SME router for existing packet transport network
- Support multiple VRF's to enable the separation between the providers' management and customers' data traffic



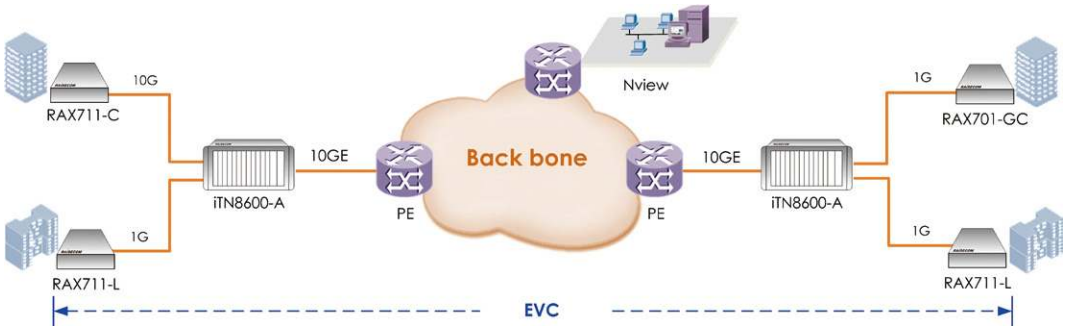
Multi Service Optical Transport Network Access Solution NEW

- The iTN8600 series can be deployed as access and aggregation nodes
- The iTN8600 series can build a full service access platform in the metro area
- The iTN8600 series can provide many service types like 1GE/10GE, STM1/STM4/STM16, OTU1/OTU2, FC1/FC2/FC4/FC8/FC10, CPRI, OBASI, etc
- In leased line application, Raisecom has iTN8607 pizza Box series on remote site connected to iTN8600-A
- For PON aggregation application, it is very useful for saving fiber between OLT and ONU, and it is easy for centralized management of OLT
- Support three service networks: leased line, fixed line backhaul and wireless backhaul
- The solution can offer seamless connection with core and aggregation layers by PTN/OTN/SDH
- Manage, enable and deploy services automatically from the iTN8600 NMS
- Operators strive to efficiently use their metropolitan fiber networks



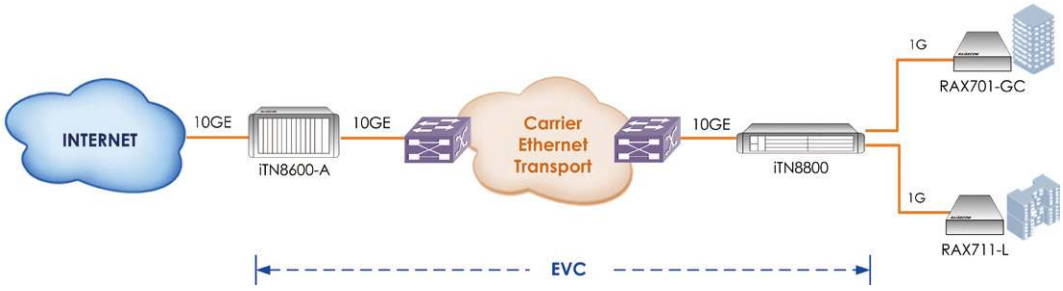
NEW MEF CE2.0 Access and Pre-Aggregation Leased Line Solution

- Pre-aggregated line-rate forwarding with high-density ports
- MEF CE2.0 based Ethernet services over core network
- Fast and convenient end-to-end service provisioning by EVC solutions including E-Line, E-Tree, E-LAN, E-Access
- Premium SLA service activation tests(RFC2544/Y.1564) with H-CAR base on each EVC service
- Quickly and easily export SLA measurement report on NView



NEW MEF CE2.0 Access and Pre-Aggregation Enterprise Internet Solution

- Pre-aggregated line-rate forwarding with high-density ports
- Fast and convenient end-to-end service provisioning by EVC solutions including E-Line, E-Tree, E-LAN, E-Access
- Unifed management platform with Raisecom's remote devices
- Manage, enable and deploy services automatically from the iTN8600 NMS



Mobile

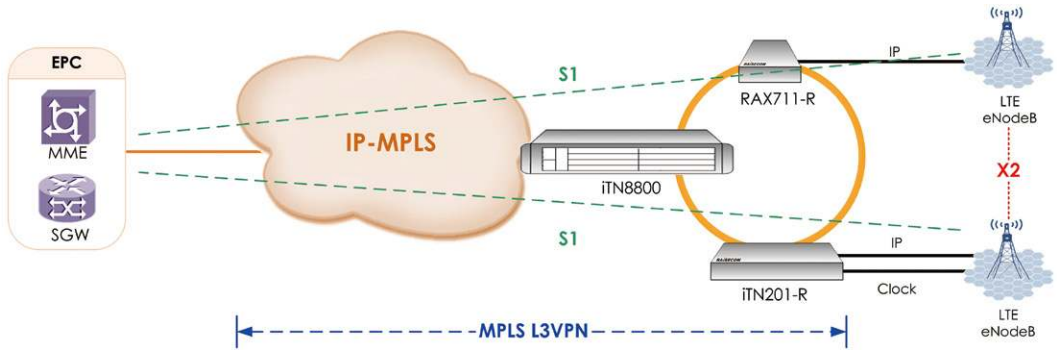
The constantly growing number of bandwidth-savvy smartphones and mobile devices drives mobile operators to improve their networks. This includes improved efficiency, increased bandwidth capacity and expanded coverage. The choice of mobile backhaul and fronthaul technologies is becoming a crucial factor for operators aiming to deliver guaranteed mobile services and remain profitable in an era of declining ARPU.

Raisecom mobile backhaul solutions support voice-sensitive and data-intensive traffic at affordable costs. They enable reliable and smooth migrations of multi-G (2G, 3G and 4G/LTE) mobile services over legacy, and packet-based or Metro Ethernet networks. These carefully engineered solutions include some of the following capabilities: auto-provisioning, bandwidth optimization and performance monitoring, which assist in reducing OPEX and increasing network availability. Raisecom's mobile backhauling solutions support various technologies like Carrier Ethernet and IP/MPLS, hence enabling network-wide packetization of operators transport networks.

Raisecom BBU fronthaul solution is used to deliver BBU functionality by Passive Optical Network, xWDM technology or OTN. It helps carriers to dramatically reduce cost and enlarge wireless coverage. The diversified solutions can meet different scenarios for different requirements.

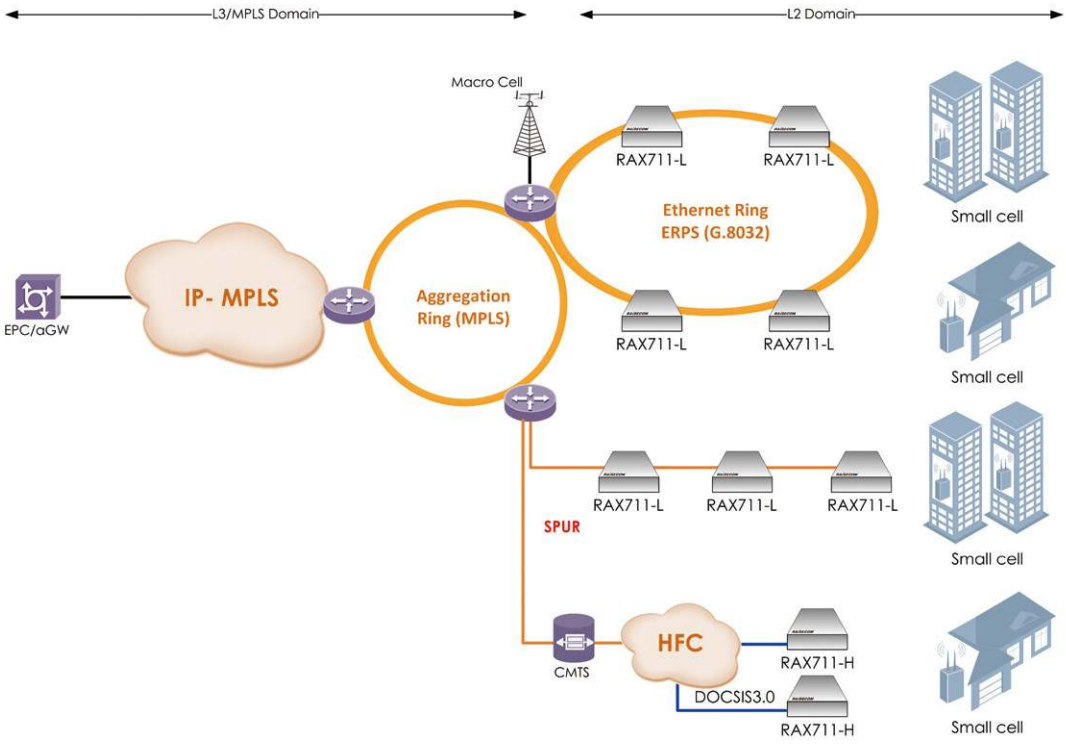
4G LTE Mobile Backhaul over MPLS

- Mobile operators migrate their transport networks to IP/MPLS for improved resilience and Traffc Engineering
- Raisecom's IP/MPLS-enabled CPEs offer end-to-end MPLS L3VPN for LTE Services (S1/X2 data)
- NG Multi-G Cell site Router (with MPLS) and MPLS service aggregator
- Comprehensive timing synchronization: SYNC-E, 1588 Frequency and phase (BC/TC)
- Multi-layer protection and OAM/SLA for the critical voice data
- Enhanced QoS ensures low jitter, low latency, stringent traffc engineering and real-time SLA



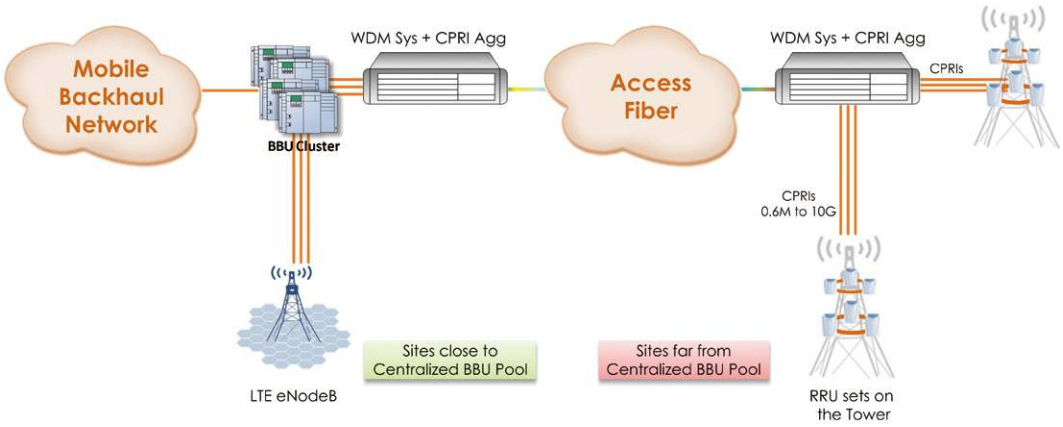
LTE Small Cell Aggregation

- IPv6 based network
- G.8032 ERPS for Ring topology
- Zero Touch Configuration (DHCP/TFTP Server)
- 1588v2 TC clocking
- MLD Snooping
- CoS based on DSCP/VLAN based classification and Prioritization of traffic
- In-band management
- Hardened -20°C to 65°C for outdoor deployment



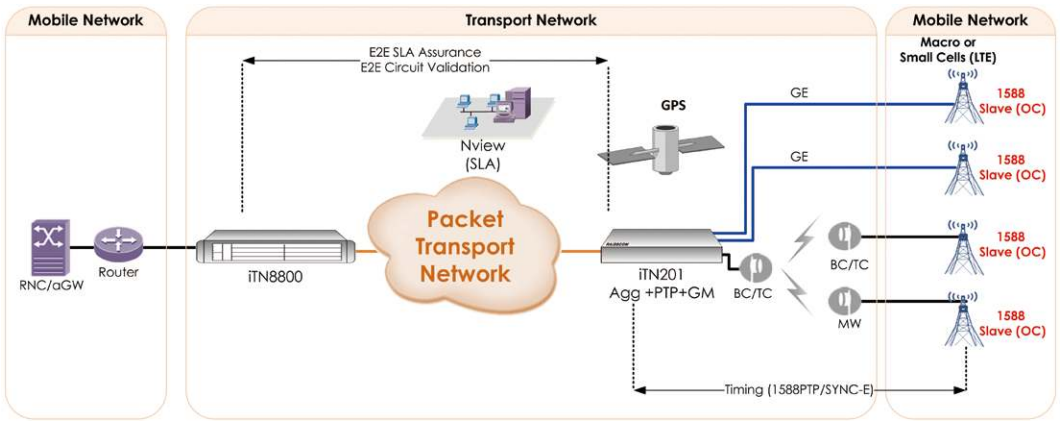
Mobile BBU Fronthaul

• Raisecom's BBU Fronthaul solution aid carrier to extend and enlarge radio coverage for mobile networks
• The solution lowers operational cost for carriers including rental expense, power consumption, air conditioner and site survey
• Aggregation up to 35 CPRIs (fully protect) per fronthaul system
• Mobile operators can benefit from the solutions by better maintenance and management of the complete wireless network



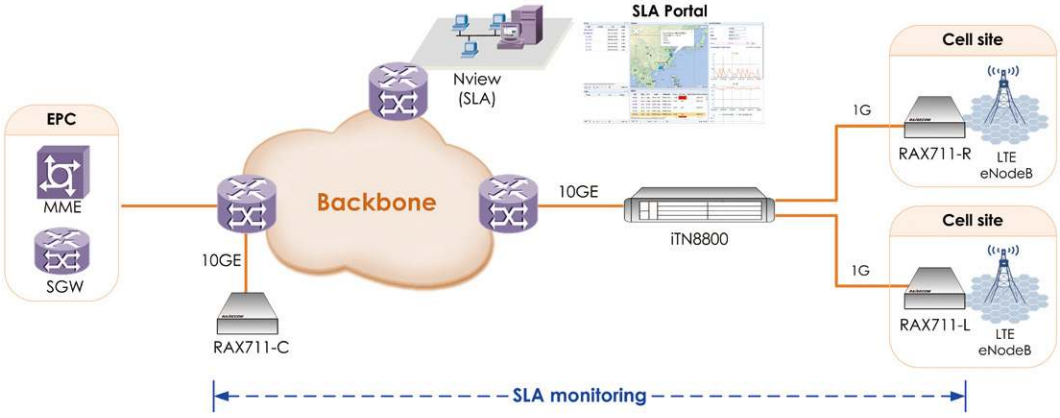
Clock Distribution for MBH with 1588-GM

Distribution of IEEE-1588 "islands" is the best approach allowing:
• GPS savings for every cell-site
• No need for supporting long BC/TC chains across the whole network
• iTN201–1G/10G Mobile Hub site aggregation device with built in GPS receiver and 1588-GM, supporting up to 64 1588 simultaneous sessions (can provide 1588 based Clock to up to 64 remote sites)
• Small Cell site Aggregation (up to 12 GE ports) & Distributed Grand Master device



4G LTE Performance Monitoring for Cell Sites

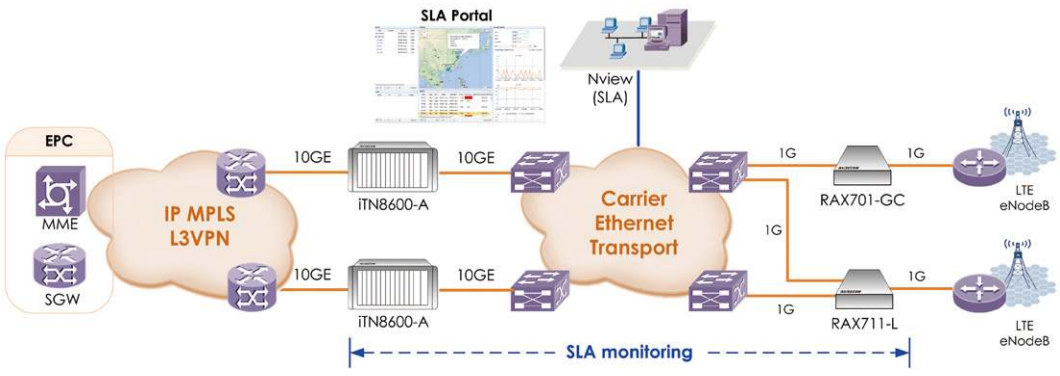
• Premium SLA services with L2/L3 performance monitoring(Y.1731, TWAMP, ICMP echo)
• SLA portal integrated into NView NMS provides a customizable interface to collect all KPIs
• Comprehensive SLA portal effectively reduces OPEX
• Raisecom's multi-technology CPEs empower rapid deployments of diversiform of SLA services in different kinds of cellular networks



NEW

MEF CE2.0 Access and Aggregation Mobile Backhaul Solution

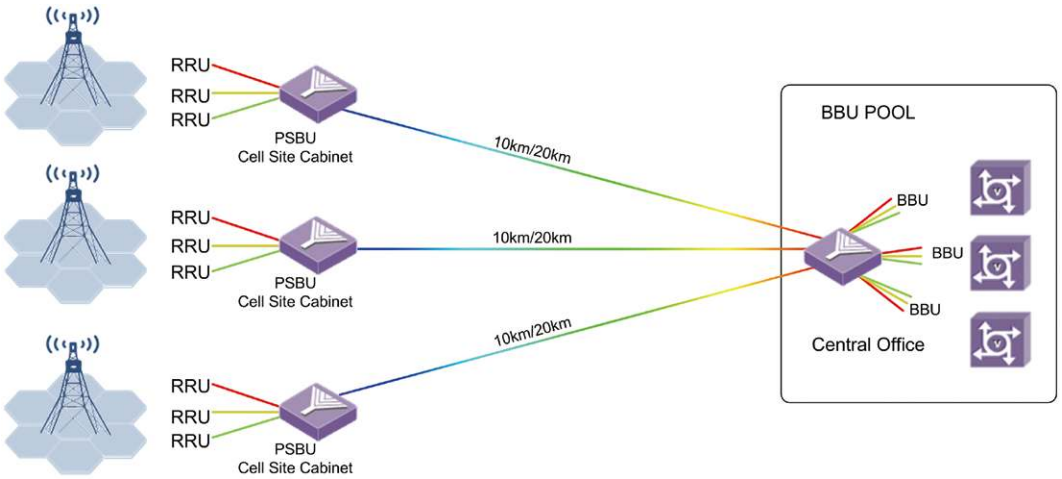
• Aggregated line-rate forwarding with high-density ports
• Fast and convenient end-to-end service provisioning by EVC solutions including E-Line, E-Tree, E-LAN, E-Access
• End-to-end SLA assurance based on MEF CE2.0
• Premium SLA service activation tests(RFC2544/Y.1564) with H-CAR base on each EVC service, also providing real-time services monitoring to ensure low jitter, low latency, zero frame loss rate and high availability
• Quickly and easily export SLA measurement report on NView



Mobile Fronthaul Passive Solution NEW

Distribution of IEEE-1588 "islands" is the best approach allowing:

- Saving more fiber,1 core can transmit 6/8/12/18 wavelength
- Easy for setup and zero maintenance
- Concentrate BBU in central site to improve 4G coverage with lowest investment to elimenate OPEX
- Saving space in cabinet, pay-as-you-grow to optimize wireless coverage



Broadband Access

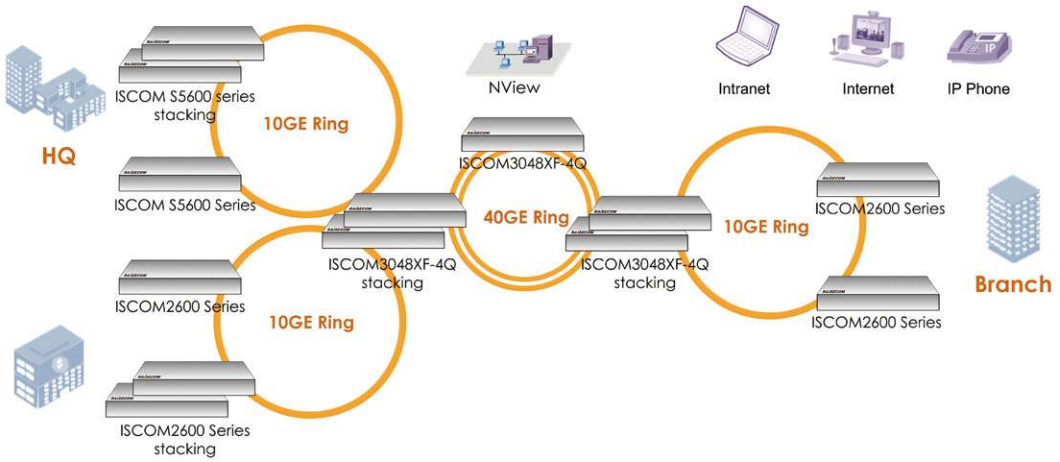
More and more residential users are benefiting from Fiber To The Home (FTTH) technologies. In addition to the ultra-fast internet access, these users can also benefit from triple services (Internet + Voice + Video) using the same infrastructure at reasonable costs. Some broadband service providers are now adding a fourth service (Mobile/FMC) and this increases the bandwidth usage and the need for QoS.

Raisecom offers both active Carrier Ethernet (AON–Active Optical Networks) and passive optical network (PON–Passive Optical Networks) access and aggregation solutions for high-density urban residential applications. Comprehensive streams of voice, data, video and sometimes cellular can be delivered to rural and less populated areas with low cost fiber, copper and wireless routers.

The versatile solutions enable fast deployments and pay-as-you-grow approach.

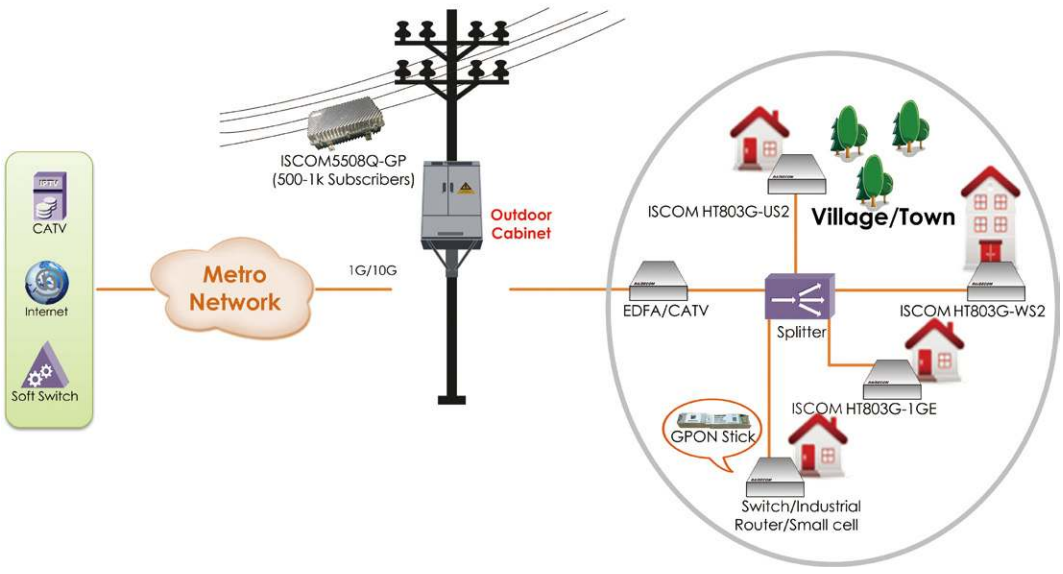
10G/40G L2/L3 Metro Access Rings for Business Services

• Raisecom offers a full family of Carrier grade Ethernet switches ranging from L2 access to L3 aggregation, providing models from 8 x100Mbps + 2 x 1Gbps, to 48 x 10Gbps + 4 x 40Gbps
• Complete L2/L3 function set ensures transmission of multi-service over Ethernet. Sufficient resilience and redundancy technology increase the reliability of the network
• Intelligent stacking helps increase single site capacity and simplify management complexity



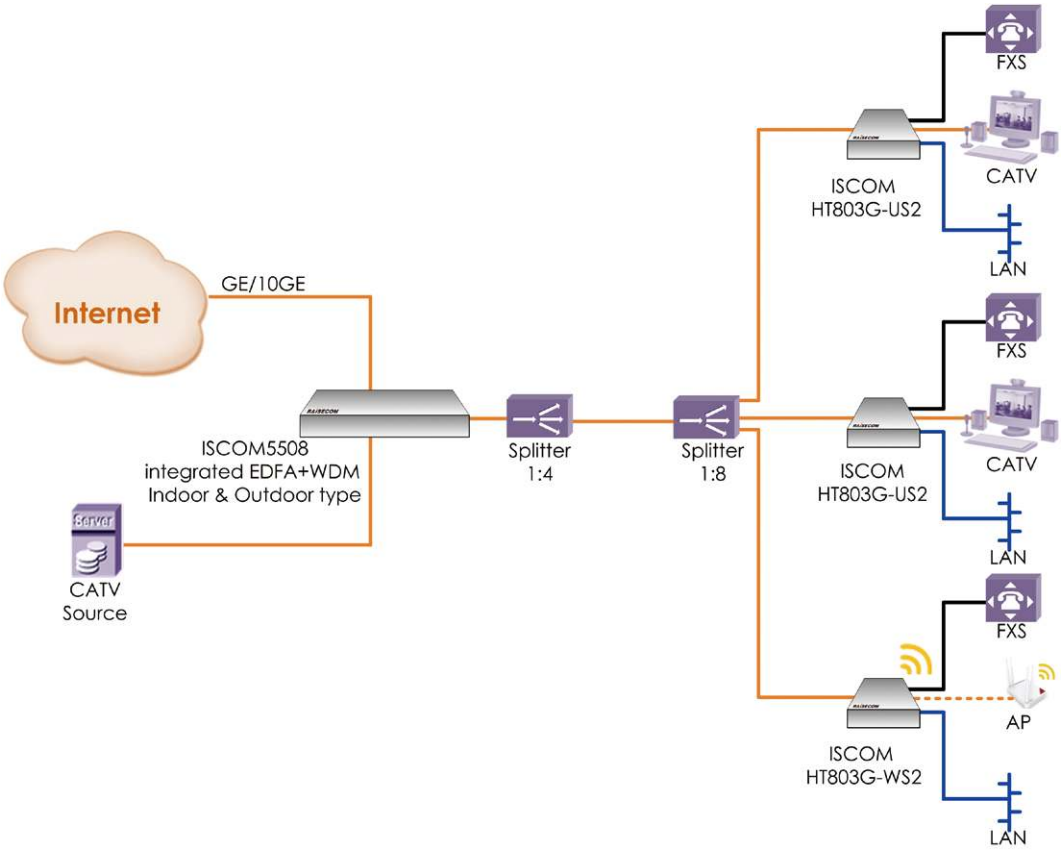
FTTH for Rural/Regional Quadruple-play with Full Outdoor Scenario

• Optimized solution for serving 1000-3000 customers
• A pay-as-you-grow scalable OLT that will enable fast deployment and future growth (by adding additional slots)
• Carrier class network management solution can reduce Capex with "Zero Touch" provisioning towards the ONT and northbound interface TL1 based on OMCI enabled auto configuration of OLT & ONT higher BSS/OSS
• TR69 option enables auto configuration of ONT from ACS Server
• The ISCOM5508Q-GP can provide IP67 protection level, thus meeting dustproof and waterproof requirements in the outdoor environment
• The HT803G-WS2/US2 can create a superior wireless performance by adopting IEEE802.11ac and 11b/g/n techniques including MIMO 2 x 2
• With data rates up to 866Mbps, data transmission becomes more efficient and high bandwidth



Building A Broadband Access GPON Network for Service Providers

• Raisecom's GPON OLTs are proved to be the most cost-effective option for ISP's and Tier 2/3 deployments
• Optimized solution for a scale of 500 to 20,000 customers
• With a pay-as-you-grow approach, scalable OLT will enable fast deployment and future growth (by populating additional service slots)
• Raisecom's ONT offerings allow service providers to offer different service bundles to different users
• Carrier class network management solution can reduce CAPEX with "Zero Touch" provisioning towards the ONT and northbound interface TL1 based on OMCI enabled auto configuration of OLT & ONT higher BSS/OSS
• Support indoor and outdoor type
• Integrate 4 ports EDFA with 4 ports OLT in 1U pizza box
• Interged with optical switch for CATV singnal protection



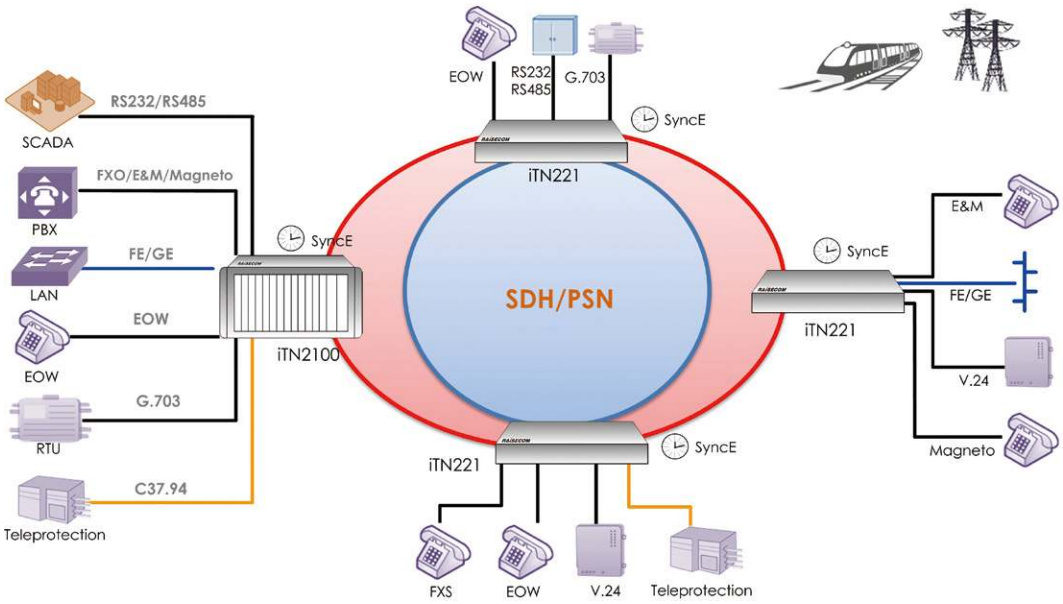
Mission Critical Networks

Industrial and utility applications present unique challenges for network planners. First, they involve mission-critical traffic, which may be closely related to public safety and people's every-day life, and requires high network reliability and resiliency. Typically, it is needed to support various types of traffic like: low-speed data communication, digital and analog voice, TDM circuits and analog control, mobile traffic, multimedia traffic, integrated surveillance and broadband access and more. In addition, the equipment must survive a wide range of environmental conditions and comply with the stringent industrial conditions.

Raisecom provides PCM connectivity solutions for SCADA traffic as well as Ethernet-based industrial products. This combination serves the broadband demands in the fields of energy (power, gas, oil, mining, and water), transportation, public information and military.

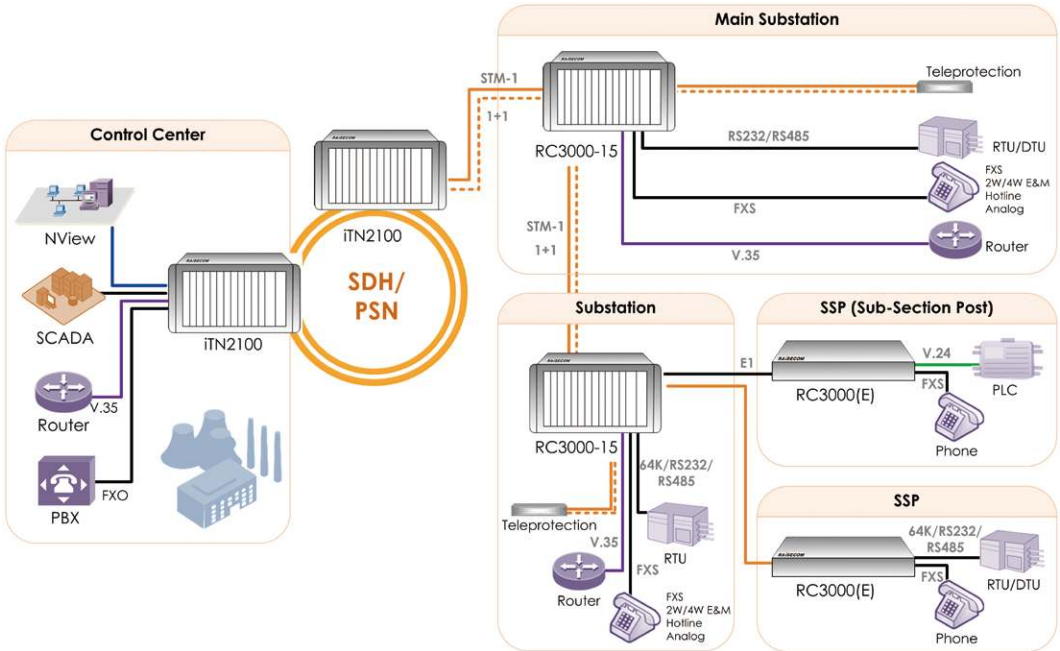
Multiservice Access over SDH/PSN for Mission Critical Networks

• Access service types include STM-1/4, E1, Ethernet, EOW, FXS/FXO, E&M, Magneto Telephone, V.24, RS232, RS422, RS485, G.703, C37.94, and etc. which can cover almost all required access interface types in Mission Critical Networks
• SDH and PSN dual backplane guarantees a smooth upgrade from SDH to packet based network (Carrier Ethernet, MPLS-TP, IP) following the packetized trend
• Redundancy in power supply, crossconnect matrix, switching matrix, and uplink builds up a fully redundant system with high-reliability
• Flexible clocking solutions can fit in customer's real deployment plan
• Available with 6U chassis based solution and 1.5U stand-alone solution for substations of different sizes



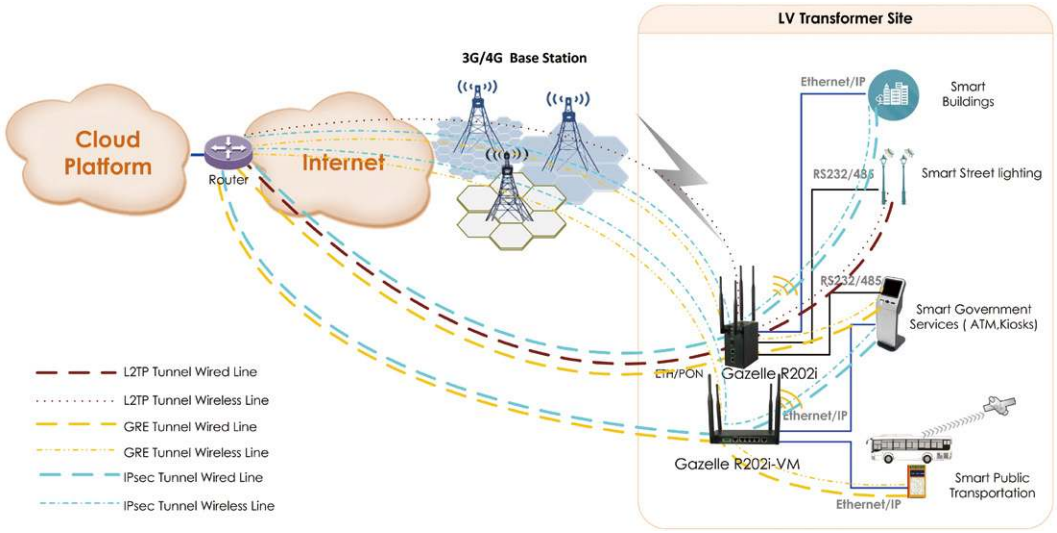
SCADA Service for Utility

• Provide reliable transmission of critical control signals and data traffic between central offices and substations
• Delivery of SCADA, Teleprotection, voice, LAN, data and video streams using reliable and robust multi-service solutions
• Maintenance and installation based on the Legacy equipment
• Dual Core architecture solution can support the smooth migration of both SDH (TDM) and PTN (CE and MPLS-TP) towards PTN networks



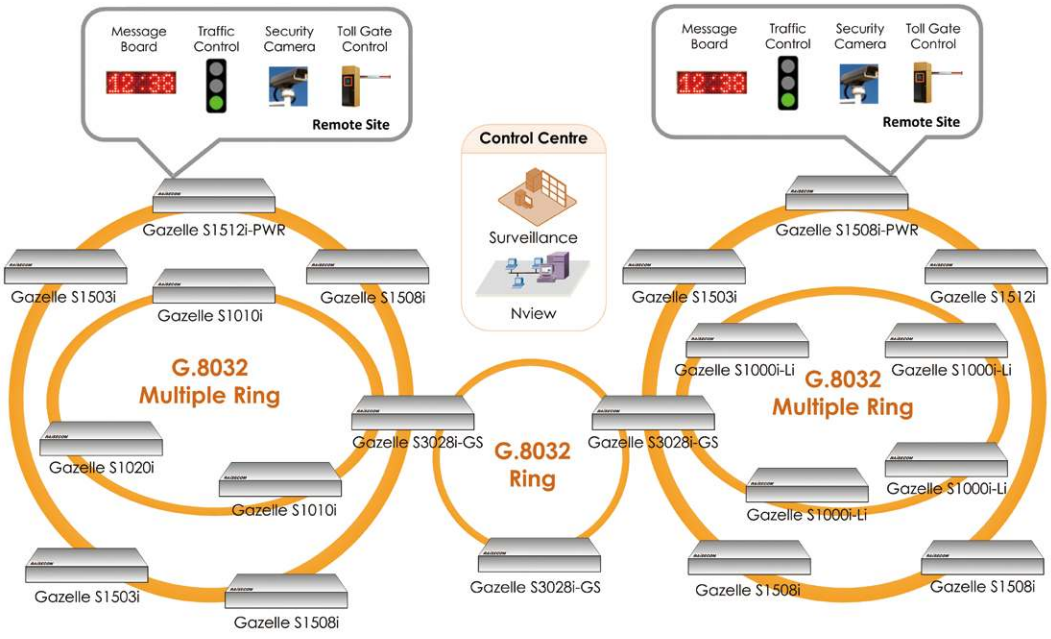
Machine-to-Machine (M2M/IoT) Solution for Smart Metering and Automation

- Cellular networks enable an ideal connectivity to remote sites
- 2G/3G and 4G networks can support various bands
- Raisecom's industrial routers can be widely used in M2M and IoT applications
- The routers, which can be used over multi-G cellular networks, offer a number of features like:
  - Static and Dynamic Routing
  - VPN with L2TP, IP Sec or GRE tunnels
  - 1 x RS232/485 DB9 serial interface



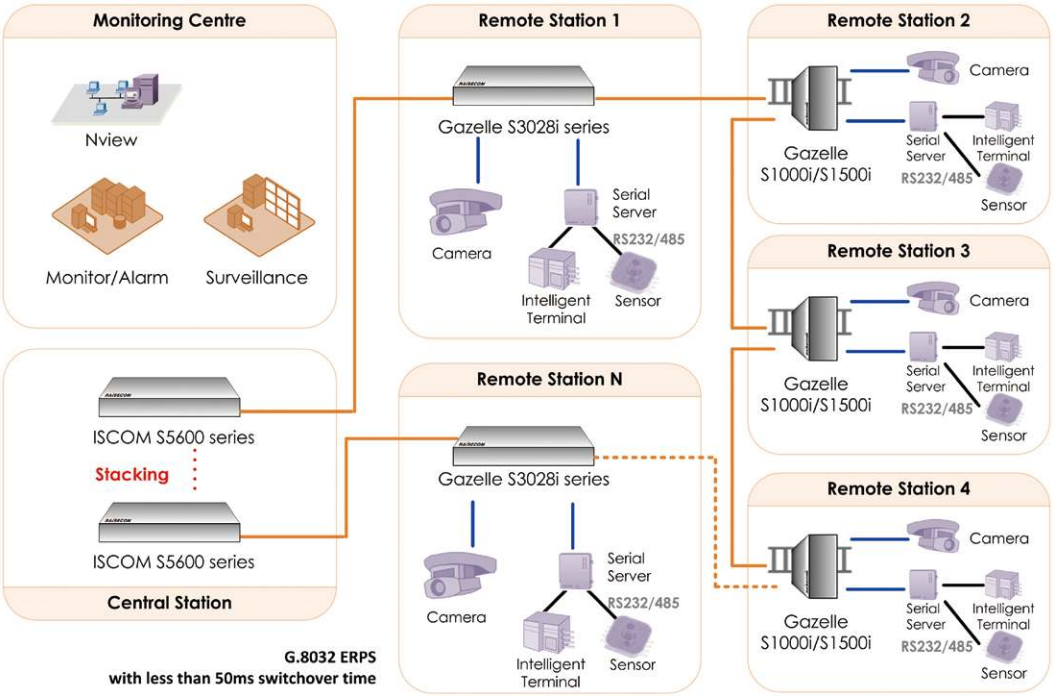
Highway Security, Monitor and Automation

- Raisecom offers a family of industrial-grade switches to help highway operators build up communication network for their surveillance, control and toll system
- The family ranges from stand-alone core switch to DIN-Rail access switches with different number of ports
- PoE options available in different models can make deployment more cost-efficient
- Network topology can be ring/multiple-ring based on G.8032, chain, star and hybrid based on customer's networking infrastructure



Substation Interconnection for Utilities and Live Environment Monitoring System

• Raisecom provides a family of industrial-grade switches. The products are designed in compliance with IEC61850-3
• Switches with different port capacity and different installation methods (rack-mountable and DIN-rail) are available to meet customer's real needs
• The support of G.8032 ERPS standard and other standard protocols helps utility customers to build a substation interconnection network with high reliability. The topology can be very flexible



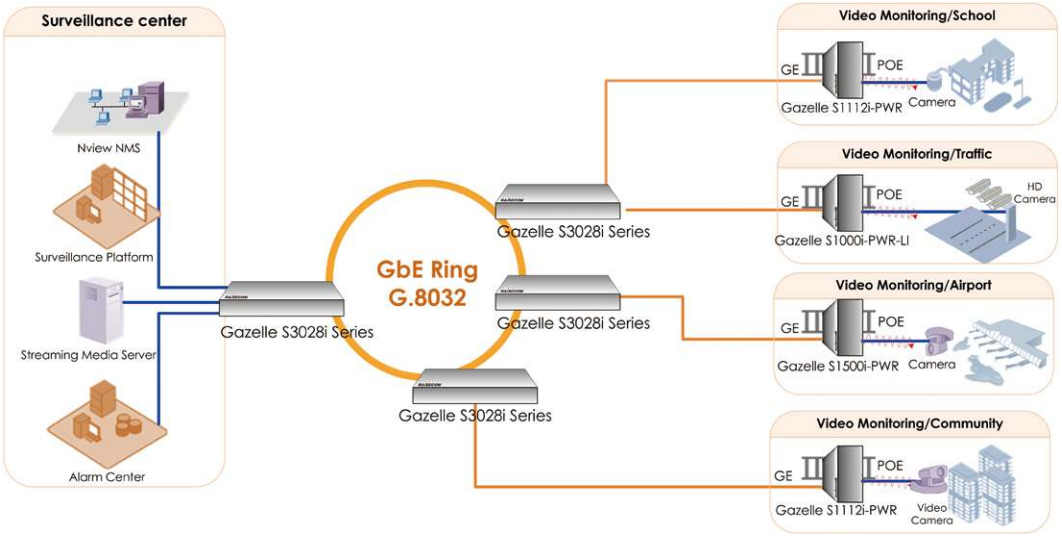
Enterprise and Government

Small and medium size businesses create a vast marketplace for telecommunication players, by migrating their business solutions to the Internet and cloud. The required information-base is a crucial factor for SME owners to stay in the market, and requires secured, powerful and cost-effective networking.

Raisecom provides extremely cost-effective VPN access solutions for SME users that help to overcome such challenges as the lack of IT capabilities, limited budget, and the need for secured access. Raisecom solutions offer features like device integration, service integration and customer benefit maximization. These solutions assist SMEs to fully utilize private and public cloud network by combining routing, Ethernet switching, voice-support, 3G/4G backup, Wi-Fi, VPN and secure-access features in their devices.

Safe City/Smart City Monitoring and Public wifi Access

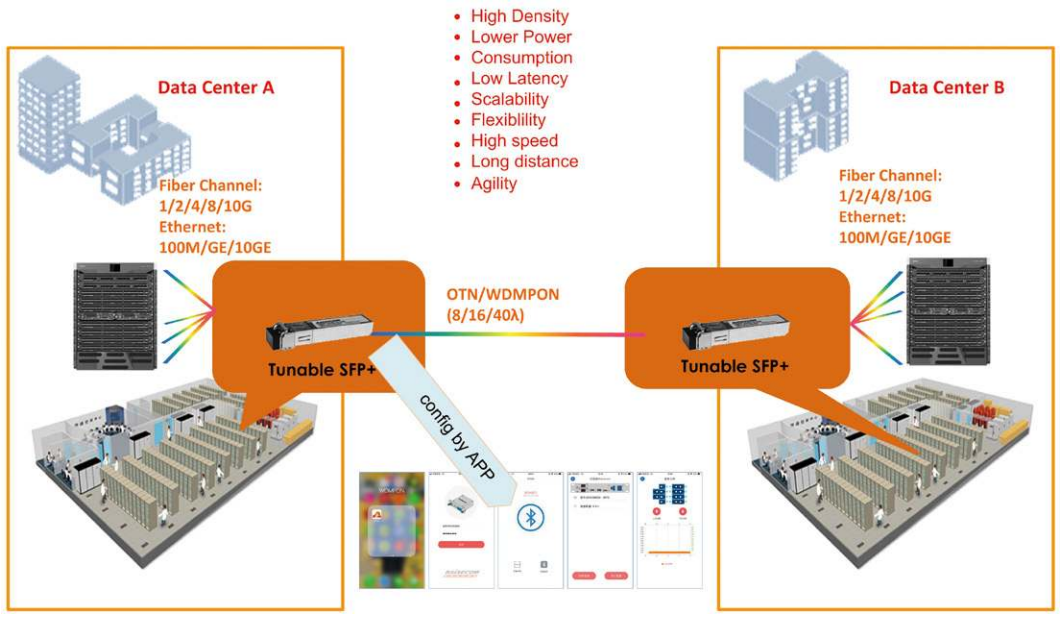
- End-to-end backhauling solution for Video Surveillance (IP Camera) to ensure city security
- Industrial Ethernet switches with built in PoE (Power to the IP camera)
- Resiliency on the backbone site, GbE G.8032 Ring over Fiber
- Full suite of Layer 2 Ethernet features and function
- Suitable for outdoor installation, street cabinets with DIN Rail mounting



NEW

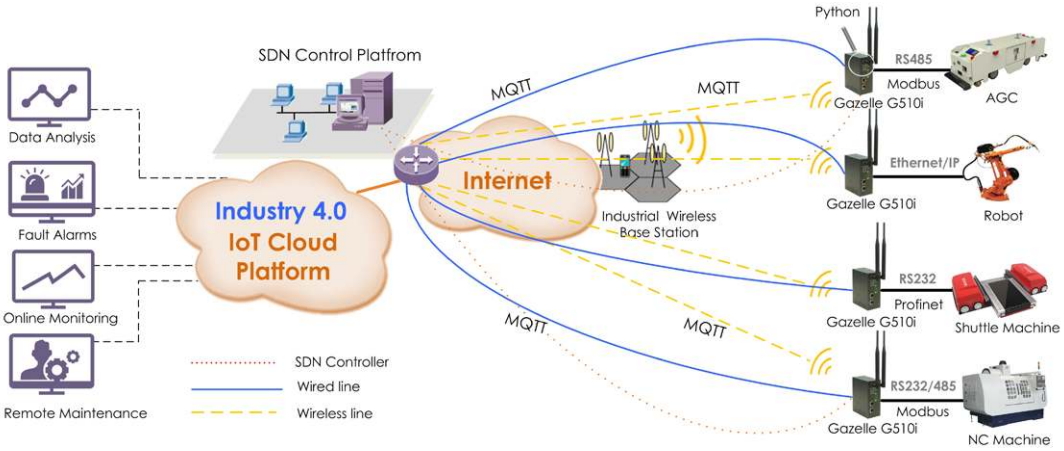
Data Center Interconnection (DCI) Solution with WDM PON

- Support 1/2/4/8/10G Fiber channel and 1GE/10GE Ethernet interface
- Space saving high-density platform, the iTN8600-II is only 2U high, 35 x 10G ports and the iTN8600-A is only 5U high, 75 x 10G ports
- Support real-time application, low latency, low transmission delay (<1us)
- Support long distance up to 100km
- Low power consumption port 3.8W with SFP
- Management platform is mature and easy to use
- Support convenient maintenance, dying gasp and LOS alarm, support optical power and wavelength monitoring, support fiber monitoring and more efficient network maintenance
- Support fast deployment, plug and play, port agnostic, wavelength auto tuning
- Support flexible bandwidth upgrade, support 10G per user, support flexible seamless bandwidth upgrade
- Easy to config by APP on phone



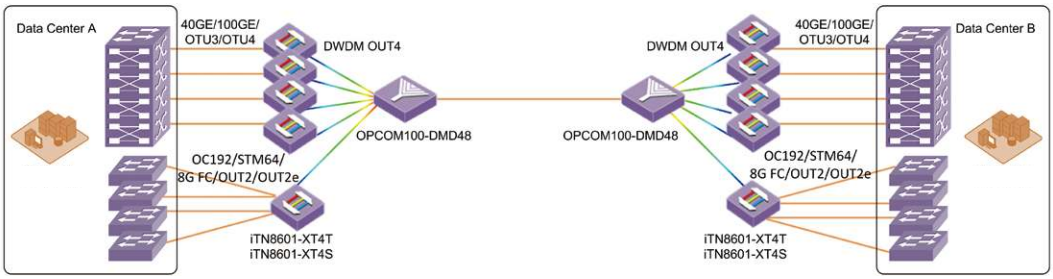
Enterprise IoT for Advanced Factory Automation NEW

• Full industrial grade, high EMC grade, IP40 protection grade designs to ensure reliable and stable operation of the equipment on unattended site
• The equipment can be operated in high temperature and low temperature environment of -20 °C - +70 °C for a long time
• Support edge calculation function, realize data acquisition, data monitoring, data filtering, data cleaning, data security protection, data storage, data reporting, logic processing and other functions
• Support LTE network, fast and convenient access to 4G network
• Support automatic redialing of network disconnection, self-healing of faults, multi-level link detection mechanism to ensure that equipment is online
• Send real-time alarm and on-site alarm messages to the remote monitoring SCADA system center and maintenance engineers in a customer-defined manner
• The device uses a standard Linux architecture that supports C/C++ and Python to run customer-developed code and scripts for local logic and decision making



100G P to P DCI Solution NEW

• Support Coherent 100G CFP on line port
• Maximum transmission distance for 48 x 100G: 15 x 22dB
• 100G line port: GFEC, SD-FEC
• Flexible wavelength configuration
• Up to 48 x 100G capacity
• Multi-service access in client side: Ethernet, OTN, SONET, SDH, FC



PRODUCT CATALOG

Chapter 1. Carrier Ethernet

Raisecom offers a complete line of Carrier Ethernet (CE) switches, aggregation and demarcation devices. The MEF-certified Carrier Ethernet 2.0 product line can be used to deliver E-Line, E-LAN, E-Tree, and E-Access services. These services can provide end-to-end SLA and QoS monitoring and full service performance visibility as well as OAM, CFM, multi-CoS and other carrier-grade Ethernet protocols. Typically used to provide SLAs and service assurance for business services, CE2.0 products are vital for demarcation between service providers.

Intelligent Ethernet Demarcation Device

RAX701, RAX711-L

These next generation Ethernet demarcation devices can be used for E-Line, E-LAN, E-Tree, and E-Access services for large enterprises and small/medium business services, as well as mobile backhaul. They comply with ITU-T Y.1564 SAT for the service turn-up, and they guarantee end-to-end SLA performance monitoring and service visibility based on hardware that is capable of supporting OAM, CFM and Y.1731 SLA. The service-based QoS helps to differentiate flows and to commit forwarding priority within each EVC. In addition, the EDDs support ITU-T G.8032/1, providing ring protection with a sub-50ms recovery for MBH and business connections.

Due to today's network challenges related to deploying, provisioning, managing and trouble-shooting Ethernet devices, Raisecom introduces the NView auto-provisioning GUI tool, which provides an integrated, effective and economic solution for Carriers to gain additional benefits from Metro Ethernet. NView can be supported by RAX711-L and RAX701.

FEATURES

- ITU-T G.8031/8032 ELPS/ERPS with sub-50ms switch-over time
- ITU-T Y.1564 SAT and RFC2544
- Hardware-based IEEE802.3ah OAM, 802.1ag CFM, Y.1731/SLA
- TWAMP light (Generator & Reflector)
- "Zerotouch"provisioning Synchronization: SYNC-E and 1588-TC
- NView, Web-portal based SLA report
- MEF CE2.0 Certified E-Line, E-LAN, E-TREE and E-Access services
- L2VPN MPLS-TP OAM and Protection features

RAX701

RAX711-L

P/N	RAX701	RAX711-L
NNI Interface	2 x FE/GE SFP	2 x GE SFP
UNI Interface	1 x FE/GE combo	4 x GE combo
E1 PWE	N/A	4 x E1
Clocking	1588-TC	SYNC-E, 1588-TC
Dimension(mm)	180 (L) × 160 (W) × 43.6(H)	220 (L) × 180 (W) × 43.6(H)
Power	100-240V AC, -36 to -72V DC WP Full Load: ≤ 12W	100/240V AC, -36 to -72V DC Full Load: ≤15W
MTU	12,288 Bytes	

Intelligent 10G Ethernet Demarcation Device

RAX711-C

Raisecom RAX711-C is an advanced 10GE demarcation device, incorporating high capacity in a compact size (1RU by 1/2 19" width) with 4 × 10GE SFP+ ports and 12 × 1GE SFP ports. As the demand for bandwidth increases, but revenue streams stay flat, service providers want to differentiate the services and provide a proper QoE for various application requirements, at various access speeds. MEF CE2.0 support and SLA Portal are available in RAX711-C and 256 monitoring sessions are sufficient for business SLA monitoring.
RAX711-C is also a better access solution in MBH application and it supports SyncE and IEEE1588v2 TC features.

RAX711-C

FEATURES

- ITU-T G.8031/8032 ELPS/ERPS with sub-50ms switch-over time
- ITU-T Y.1564 SAT and RFC2544
- Hardware-based IEEE802.3ah OAM, 802.1ag CFM, Y.1731/SLA
- TWAMP light (Generator & Reflector), 256 sessions
- "Zerotouch" provisioning Synchronization: SYNC-E and 1588-TC
- NView, Web-portal based SLA report
- MEF CE2.0 compliant E-Line, E-LAN, E-TREE and E-Access services

P/N	RAX711-C
NNI Interface	4 x 10GE SFP+
UNI Interface	12 x GE SFP
Clocking	SYNC-E, 1588V2-TC
Dimension(mm)	220 (L) × 266 (W) × 44(H)
Power	100/240V AC, -36 to -72V DC Full Load: ≤40W
MTU	12,288 Bytes

DOCSIS Ethernet Demarcation Device

RAX711-H

Raisecom RAX711-H is the first generation DOCSIS NID which include 4 x GE RJ45 interfaces and 1 x coax interface in a ½ 19" compact size. RAX711-H supplies MEF CE2.0 carrier-grade service and helps the MSO to improve the business service level.
Based on the most cost-effective solution for cable MSOs to leverage their network and provide commercial services to business customers.
RAX711-H support 8 x 4 DOCSIS capacity, and combines the Cable Modem and L2 NID to reduce CapEx/OpEx.

RAX711-H

P/N	RAX711-H
NNI Interface	1 x Coax DOCSIS
UNI Interface	4 x GE RJ45
DOCSIS	Support DOCSIS/EuroDOCSIS 3.0, 2.0, 1.1, 1.0
Dimension(mm)	220 (L) × 180 (W) × 44(H)
Power	100/240V AC, -36 to -72V DC Full Load: ≤40W
MTU	12,288 Bytes

NEW

Carrier-Grade Aggregation Product

iTN8600-A

The iTN8600-A is a new intelligent all-service access and transmission platform oriented to future network. By integrating Ethernet switch, MPLS-TP features and OTN cross connection, it helps carriers carry multiple types (FE/GE/10GE etc.) of services on one platform, and provides a complete solution to MAN access and aggregation.

iTN8600-A

FEATURES

• Support centralized switching processing of packet services. The maximum supported capacity of the system is 300 Gbit/s
• Support up to 96 x GE, 24 x 10GE
• Support service models such as EPL, EVPL, EPLAN, EVPLAN, and EVPTREE
• Support MPLS-TP-based packet service processing and supports MPLS-TP OAM processing
• Support LSP linear 1:1 protection and PW 1:1 protection
• Support Ethernet interface LAG, ELPS and ERPS protection
• Supports 48 link aggregation groups, each of which supports a maximum of 8 members
• Supports PWE3 and supports SS-PW and MS-PW
• Supports VPWS and VPLS. The VPLS VSI supports MAC, black and white list, storm suppression, and broadcast rate limiting
• Supports Layer 2 MAC, VLAN, QinQ, link aggregation, storm suppression, interface mirroring, interface protection, loop detection, L2CP, CFM, EFM and ACL
• Supports QoS and supports traffic shaping, queue scheduling, CAR, traffic policy, and MPLS QoS
• Support SLA testing and support Y.1731
• Support querying and modifying the interface mode (UNI or NNI)
• Support configuring the MTU, flow control, number of received and sent packets, and loopback mode for the interface
• Compliant with SDN standard

System and Sub-cards

• iTN8600-A-DC: iTN8600-A-DC chassis, 5U, includes 2 DC power supply and 1 fan
• iTN8600-A-NXU: System management and control card for iTN8600-A, support 1+1 hot swapping protection for main and standby NXU card
• iTN8600-A-PX4: 4 × 10GE service accessing card
• iTN8600-A-PG8: 8 × FE/GE service accessing card

L2 Carrier-Grade FE Access Switch

ISCOM2100 (-PWR) Series

The ISCOM2100 series switch has multiple interface types, such as ISCOM2110EA-MA (8FE + 2 x GE Combo), ISCOM2118EA-MA (16FE + 2 x GE Combo), ISCOM2128EA-MA (24FE + 4 x GE Combo), ISCOM2126F (26 FE SFP + 4 x GE Combo).
It offers key access features such as port-based/selective QinQ, VLAN mapping, advanced Access Control List (ACL) and bandwidth management policies that facilitate customizable Quality of Service (QoS). They provide solutions for FE access of enterprises, campuses, residences.
In addition, this series includes the ISCOM2100-PWR Carrier Grade PoE switch: ISCOM2110EA-MA-PWR (8 x FE PoE + 2 x GE Combo), ISCOM2118EA-MA-PWR (16 x FE PoE + 2 x GE Combo), ISCOM2128EA-MA-PWR (24 x FE PoE + 4 x GE Combo). The ISCOM2100-PWR PoE switches offer a power supply for power demand (PD) devices such as wireless Access Point (AP).


ISCOM2110EA-MA


ISCOM2110EA-MA-PWR


ISCOM2118EA-MA-PWR


ISCOM2128EA-MA


ISCOM2128EA-MA-PWR


ISCOM2126F

FEATURES

• VLAN, QinQ, ACL per port/VLAN/CoS
• IGMP, MVR, Multicast-filtering, DHCP, IPv6 and TACACS+
• STP and Ethernet Ring (50ms switch-over)
• CLI, Telnet and SNMP (NView compatible)

Model	ISCOM2110EA-MA ISCOM2110EA-MA-PWR	ISCOM2118EA-MA ISCOM2118EA-MA-PWR	ISCOM2128EA-MA ISCOM2128EA-MA-PWR	ISCOM2126F
Port type	Uplink: 2 x GE Combo Downlink: 8 x FE RJ45(PoE)	Uplink: 2 x GE Combo Downlink: 16 x FE RJ45(PoE)	Uplink: 4 x GE Combo Downlink: 24 x FE RJ45(PoE)	Uplink: 4 x GE Combo Downlink: 24 x FE SFP
Management interface	1 SNMP interface, 1 Console interface, 1 out-of-band interface			
Dimension(mm)	260(L) ×130(W) × 43.6(H) PoE: 300(L) × 220(W) × 43.6(H)	210(L) x 210(W) x 43.6(H) PoE: 440(L) × 300(W) × 43.6(H)	440(L) x 220(W) x 43.6(H) PoE: 440(L) × 300(W) × 43.6(H)	440(L) × 220(W) × 43.6(H)
Weight(kg)	<1.2 PoE: <2.5	< 1.3 PoE: <4.8	<3.0 PoE: <4.8	< 3.0
Max Power consumption	10w PoE: 150w 124w Power supply	12w PoE:440w 370w Power supply	14w PoE:440w 370w Power supply	30w
Hardware	Power: single AC/DC Fan: no fan design (except PoE) Working temperature: 0–50°C Relevant humidity: 10%–90% RH (non-condensing) Voltage range: AC 220V(100~240V), DC 48V(-36~-72V) anti-thunder (cable port): 6kv MTU: 9216B			

L2+ Carrier-Grade GE Access Switch

ISCOM2600G (-PWR) Series

The ISCOM2600G (-PWR) series switches is the new-generation and cost-effective Layer 2 Gigabit Ethernet switches. It adopts a route switching software platform based on the Linux OS, and a high-performance hardware platform. With multiple interface types, such as ISCOM2608G-2GE, ISCOM2624G-4GE, ISCOM2624G-4C, ISCOM2648G-4GE, ISCOM2648G-4C, ISCOM2608G-2GE-PWR, and ISCOM2624G-4GE-PWR, it can provide flexible networking modes.
Featuring high reliability, high access security guarantee, easy administration, and simple management, it can meet carriers' requirements. In addition, it supports static route, ready IPv6, intelligent PoE, and so on. Therefore, it is widely adopted, such as access device of enterprises, campuses, residences, and CDN.

FEATURES

- High capacity, high density
- High reliability and protection
  - STP, RSTP, MSTP, and multi-RSTP
  - LACP and MLACP
  - ITU-T G.8032 with fault switching time less than 50ms
  - Dual-system and dual-configuration-file redundancy backup
- Various security guarantees
  - Various AAA mode such as RADIUS, TACACS+
  - IEEE 802.1x
  - Port secure MAC and limits on the MAC addresses to stop attacks from illegal users
  - Various ACL policies to control packet forwarding flexibly
  - DHCPv4/v6 Snooping and Option 82/18/37 to avoid DHCP attacks
  - DAI and IP Source Guard based on the DHCP binding table to prevent ARP flooding attacks and IP attacks
  - Broadcast storm and loop detection to ensure the stability of the network
  - Lightning protection for the power supply and all the Ethernet electric interfacesand protect hardware investment of the customer
- Fine tunable QoS
  - Rich scheduling policy such as SP, WRR, or SP + WRR, DRR, or SP+DRR
  - Dual-bucket three-color CAR based on the traffic and H-CAR
  - Statistics based on traffic
- IPv6 Ready
  - IPv6 management
  - IPv6 ACL
  - DHCPv6 Snooping, RA Snooping and Option18/37 to ensure the network security
  - MLD Snooping to ensure the IPv6 multicast monitoring


ISCOM2608G-2GE


ISCOM2608G-2GE-PWR


ISCOM2624G-4GE


ISCOM2624G-4GE-PWR


ISCOM2624G-4C


ISCOM2648G-4GE


ISCOM2648G-4C

- Smart PoE
  - IEEE802.3af/IEEE802.3at standard
  - PD alive-check
  - Configuring reboot the PD at a specific time each weak
  - Supplying power during specified time interval
- Advanced management system
  - SNMP, RMON, Telnet, SSH and provide friendly WEB management interface to increase the usability of the device
  - Automatic configuration and loading. The administrator can put the configuration file set in advance to the TFTP server for the automatic loading of the switch while it is booting, thus simplifying the management and maintenance

Model	ISCOM2608G-2GE ISCOM2608G-2GE-PWR	ISCOM2624G-4GE ISCOM2624G-4GE-PWR	ISCOM2624G-4C	ISCOM2648G-4GE	ISCOM2648G-4C
Port type	Uplink: 2 x GE Combo Downlink: 8 x GE RJ45	Uplink: 4 x GE Combo Downlink: 24 x GE RJ45	Uplink: 4 x 10G SFP+ Downlink: 24 x GE RJ45	Uplink: 4 x GE SFP Downlink: 48 x GE RJ45	Uplink: 4 x 10G SFP+ Downlink: 48 x GE RJ45
Management interface	1 SNMP interface, 1 Console interface, 1 out-of-band interface				
Switching capacity	20Gbit/s	56Gbit/s	128Gbit/s	104Gbit/s	176Gbit/s
Packets switch rate	14.88Mpps	41.66Mpps	95.23Mpps	77.38Mpps	130.94Mpps
Dimension(mm)	260(L) × 130(W) × 43.6(H) PoE: 300(L) × 220(W) × 43.6(H)	440(L) × 220(W) × 43.6(H) PoE: 440(L) × 300(W) × 43.6(H)		440(L) × 300(W) × 43.6(H)	
Weight(kg)	<1.08 PoE: <2.5	< 2.6 PoE: <4.95		< 4.3	
Max Power consumption	< 20w PoE: <150w, 124w power supply	< 25w PoE: <440w, 370w power supply		< 45w	
Hardware	Power: single AC/DC (except ISCOM2648G-4C: single or dual power, AC/DC/AC-D/DC-D) Fan: no fan design (except ISCOM2648G-4C and PoE) Working temperature: 0–50°C Relevant humidity: 10%–90% RH (non-condensing) Voltage range: AC 220V(100~240V), DC 48V(-36~-72V) anti-thunder (cable port): 6kv MTU: 9216B				

L2+ Carrier-Grade GE Aggregation Switch

ISCOM2900G Series

The ISCOM2900G series is an enhanced aggregation Ethernet switch. This series is CE2.0 certified and can operate as an aggregator for EDDs and access devices to meet for the scenario with all CE 2.0 devices. By adopting advanced Layer 2 switching structure, ISCOM2900G series provides high-efficient line speed switching capacity. With models that can support uplink 10G interfaces, ISCOM2900G series facilitate network expansion.

By supporting static routes, ISCOM2900G series can implement seamless connection with Layer 3 routing devices. Additionally, ISCOM2900G series includes features such as QoS and ACL, complete network management, and high reliability; it can fully meet the carrier's network requirements. In addition, it can work as an aggregator for enterprises, schools, residential areas, and carrier CPN.


ISCOM2924GF-4GE


ISCOM2924G-4C


ISCOM2948G-4C


ISCOM2924GF-4C


ISCOM2948GF-4C

FEATURES

- High capacity, high density
- High reliability and protection
  - STP, RSTP, MSTP, and multi-RSTP
  - LACP and MLACP
  - ITU-T G.8032 with fault switching time less than 50ms (the fault detection can be based on physical interface and CFM CC)
  - Dual-system and dual-configuration-file redundancy backup
- OAM and SLA
  - Point-to-point: EEE802.3ah
  - End-to-end: hardware IEEE802.1ag to implement 3.3ms CC monitoring
  - Rich SLA, Y.1731
  - MEF CE2.0 certified E-Line, E-LAN, E-TREE and E-Access services
- Various security guarantees
  - Various AAA mode such as RADIUS, TACACS+
  - IEEE 802.1x
  - Port secure MAC and limits on the MAC addresses to stop attacks from illegal users
  - Various ACL policies to control packet forwarding flexibly
  - DHCPv4/v6 Snooping and Option 82/18/37 to avoid DHCP attacks
  - DAI and IP Source Guard based on the DHCP binding table to prevent ARP flooding attacks and IP attacks
  - Broadcast storm and loop detection to ensure the stability of the network
  - Lightning protection for the power supply and all the Ethernet electric interfaces and protect hardware investment of the customer
- Fine tunable QoS
  - Rich scheduling policy such as SP, WRR, or SP + WRR, DRR, or SP+DRR
  - Dual-bucket three-color CAR based on the traffic and H-CAR
  - Statistics based on traffic
- IPv6 Ready
  - IPv6 management
  - IPv6 ACL
  - DHCPv6 Snooping, RA Snooping and Option18/37 to ensure the network security
  - MLD Snooping to ensure the IPv6 multicast monitoring
- Advanced management system
  - SNMP, RMON, Telnet, SSH management interface to increase the usability of the device
  - Automatic configuration and loading. The administrator can put the configuration file set in advance to the TFTP server for the automatic loading of the switch while it is booting, thus simplifying the management and maintenance

Model	ISCOM2924GF-4GE	ISCOM2924G-4C ISCOM2948G-4C	ISCOM2924GF-4C ISCOM2948GF-4C
Uplink	4 x combo GE	4 x 10GE SFP+	
Downlink	24 x 100/1000M Base-X SFP	24/48 x 10/100/1000M Base-T RJ45	24/48 x 100/1000M Base-X SFP
Management interface	1 SNMP interface, 1 Console interface, 1 out-of-band interface		
Switch Capacity	56Gbps	128Gbps or 176Gbps	
Packets Switch Rate	41.66Mpps	95.23Mpps or 130.94Mpps	
Dimension(mm)	440(L) x 360(W) x 43.6(H)		
Weight(kg)	<6	<6/8	<6/8
Max Power consumption	55w	55/80w	65/85w
Hardware	Power: hot-swappable dual AC/DC Working temperature: 0–50°C Relevant humidity: 10%–90% RH (non-condensing) Voltage range: AC 220V(100~240V), DC 48V(-36~-72V) anti-thunder (cable port): 6kv MTU: 1.28KB		

NEW

L3 Carrier-Grade GE Aggregation Switch

ISCOM S5600-EI Series

The ISCOM S5600-EI series switches are the new-generation and high-efficiency Layer 3 Gigabit Ethernet switches. This series adopt a new-generation route switching software platform based on the Linux OS, and provide flexible networking solutions, such as ISCOM S5600-28C-EI (24GE RJ45+4 x 10G SFP+), ISCOM S5600-28C-EI-24F (24 x 1G SFP+4 x 10G SFP+), ISCOM S5600-52C-EI (48GE RJ45+4 x 10G SFP+), ISCOM S5600-52C-EI-48F (48 x 1G SFP +4 x 10G SFP+), and even supports one slot for extension cards. There are three interface choices for extension cards: 8 x 10G SFP+ or 8 x 1G SFP and 2 x 40G QSFP+.

The ISCOM S5600-EI series feature high reliability, high security, easy maintenance, simple administrator, etc. and adopt advanced OAM technology, meeting the carrier's requirements, which is complied with CE2.0 standards to deliver EPL, EVPL, EP-LAN, EVP-LAN, E-Access services The ISCOM S5600-EI series also support abundant IPv4/IPv6 unicast/multicast routing protocols and Intelligent Stacking Framework (ISF) technology.

With these features, they can be widely applied to various network scenarios. For example, they can function as edge devices on the MAN, aggregation switches on a campus or enterprise network, or gigabit access in the Internet/Enterprise Data Center (IDC/EDC).

ISCOM S5600-28C-EI

ISCOM S5600-28C-EI-24F

ISCOM S5600-52C-EI

ISCOM S5600-52C-EI-48F

ISCOM S5600-28X-EI

ISCOM S5600-28X-EI-16F8G

ISCOM S5600-52X-EI

FEATURES

- High capacity, high density
- High reliability and protection
  - STP, RSTP, MSTP, and multi-RSTP
  - LACP and MLACP
  - ITU-T G.8032 with fault switching time less than 50ms (the fault detection can be based on physical interface and CFM CC)
  - Dual-system and dual-configuration-file redundancy backup
  - VRRP
- ISF Stacking
  - 9 device
  - Liner connection of ring connection
  - Uplink connect
- IPv4/v6 routing
  - RIPv2/RIPng
  - OSPFv2/OSPFv3
  - PIMv4/PIMv6 SM/SSM
  - IGMPv1/2/3 / MLDv1/2
- OAM and SLA
  - Point-to-point: EEE802.3ah
  - End-to-end: hardware IEEE802.1ag to implement 3.3ms CC monitoring
  - Rich SLA, Y.1731
  - MEF CE2.0 certified E-Line, E-LAN, E-TREE and E-Access services
  - Hardware BFD
- Various security guarantees
  - Various AAA mode such as RADIUS, TACACS+
  - IEEE 802.1x
  - Port secure MAC and limits on the MAC addresses to stop attacks from illegal users
  - Various ACL policies to control packet forwarding flexibly
  - DHCPv4/v6 Snooping and Option 82/18/37 to avoid DHCP attacks
  - DAI and IP Source Guard based on the DHCP binding table to prevent ARP flooding attacks and IP attacks
  - Broadcast storm and loop detection to ensure the stability of the network
  - Lightning protection for the power supply and all the Ethernet electric interfaces and protect hardware investment of the customer
- Fine tunable QoS
  - Rich scheduling policy such as SP, WRR, or SP + WRR, DRR, or SP+DRR
  - Dual-bucket three-color CAR based on the traffic and H-CAR
  - Statistics based on traffic
- IPv6 Ready
  - IPv6 management
  - IPv6 ACL
  - DHCPv6 Snooping, RA Snooping and Option18/37 to ensure the network security

◦ MLD Snooping to ensure the IPv6 multicast monitoring

• Advanced management system

◦ SNMP, RMON, Telnet, SSH management interface to increase the usability of the device

◦ Automatic configuration and loading. The administrator can put the configuration file set in advance to the TFTP server for the automatic loading of the switch while it is booting, thus simplifying the management and maintenance

Model	ISCOM S5600-28C-EI	ISCOM S5600-28C-EI-24F	ISCOM S5600-52C-EI	ISCOM S5600-52C-EI-48F	ISCOM S5600-28X-EI	ISCOM S5600-28X-EI-16F8G	ISCOM S5600-52X-EI
Port Number & Type	24 x 10/100/1000M RJ45 + 4 x 10G SFP+	24 x 100/1000M SFP + 4 x 10G SFP+	48 x 10/100/1000M RJ45 + 4 x 10G SFP+	48 x 100/1000M SFP + 4 x 10G SFP+	24 x 10/100/1000M RJ45 + 4 x 10G SFP+ + 2 x 40G QSFP+	16 x 10/100/1000M RJ45 + 8 x 100/1000M Combo + 4 x 10G SFP+ + 2 x 40G QSFP+	48 x 10/100/1000M RJ45 + 4 x 10G SFP+ + 2 x 40G QSFP+
Extension Card	One slot for the extension card: 2 x 40G QSFP+, 8 x 10G SFP+, 8 x 1G SFP, 8 x 1G RJ4				NA		
Management interface	1 SNMP interface(1G RJ45) 2 Console interface: 1 RJ45 console and 1 mini-USB console(high priority) 1 USB(reserved, non-function now)						
Dimension(mm)	1U, 19" 444(L) × 420(W) × 44.4(H)				1U, 19" 444(L) x 220(W) x 44.4(H)		
Device Weight (kg)	without power supply 5.4	without power supply 5.3	without power supply 5.6	without power supply 5.5	2.7	3.2	3.1
Power Supplies Weight(kg)	0.8kg for one swappable power supply				NA		
Power Supplies	hot-swappable dual power supplies: dual AC /dual DC/AC+DC also support single power supply: AC/DC				build-in single power supply: AC + RPS / DC + RPS		build-in single power supply: AC + RPS
Voltage Scope	AC 220V(100~240V), DC 48V(-36~-72V)						
MAX Device Power (Single/Daul Power supplies) (W)	39/43	59/63	51/56	86/90	45	70	55
MAX Card Power (W)	2 x 40GE QSFP+ card: 14 W 8 x 10G SFP+ card: 16.6W 8 x 1G SFP card: 8 W 8 x 1G RJ45 card: 5.3 W				NA		
FAN Noise	< 60 dBA						
Working Temperature	0-50°C						
Anti-thunder	cable port anti-thunder CM 6kv power anti-thunder AC: DM 6kv / CM 6kv DC: DM 1kv / DM 2kv						
Jumbo Frame	10KB						
Switch Capacity (Gbps)	128 + 160(optional for MAX card)		176 + 160(optional for MAX card)		288		336

Chapter 2. IP MPLS

IP/MPLS provider edge and customer edge products offer high performance MPLS switching & routing and effortless scalability. Raisecom brings all the benefits from an MPLS core all the way to the customer premises, delivering adjustable bandwidth and dedicated SLAs, without increased complexity and expense. Raisecom's ability to deliver cost-effective IP/MPLS all the way to the customer premises allows service providers to optimize network loads, improve performance and reduce on-going costs.

IP-MPLS PE and Pre-Aggregation Product

iTN8800

This medium size IP/MPLS PE router & MPLS Pre-Aggregation device is used for a number of applications such as backhaul FTTH, leased line services, mobile backhaul, and wholesale businesses utilizing aggregation devices on a carrier network. Raisecom offers a cost effective IP/MPLS PE router which fully supports all functionalities and smoothly interoperates with an existing multi-vendors core or aggregation network. The Raisecom PE IP/MPLS router also supports of TDM PWE3 circuit emulation, in order to aggregate legacy TDM services from the customer premises. A single device can provide all the IP/MPLS features and services for a campus network, private network or utility network.

FEATURES

- Reliable network assurance with redundant power supplies, NMS cards
- MEF CE 2.0, IP-MPLS and MPLS-TP
- OSPF, ISIS and BGP route protocol
- BFD for Everything, OSPF for MPLS-TE and CSPF
- MPLS VPWS, VPLS, HVPLS, L3VPN, Multi-Segment PW
- LDP for LSP/PW, MPLS-TP, RSVP-TE
- Global/interface LLDP
- Global/interface RSVP-TE
- Dynamic ARP learn function
- MPLS L3VPN
- L2 and L3 SLA, RFC2544, Y.1564
- IP and MPLS OAM, MPLS-TP OAM
- Synchronization: SYNC-E, 1588v2
- Pseudowire: E1, STM-1

iTN8800 System

System and Sub-cards

- iTN8800-II-DC, iTN8800-II chassis (includes fan & power module)
- iTN8800-II-NXU, iTN8800-II management & control module
- iTN8800-RG8, iTN8800 8 x GE module (SFP)
- iTN8800-RF8, iTN8800 8 x FE module (SFP)
- iTN8800-RG8T, iTN8800 8 x GE UTP module 10/100/1000
- iTN8800-RXG8, iTN8800 8 x GE SFP and 1 x 10G SFP+ (Slot 7, 8 only)
- iTN8800-RX2, iTN8800 2 x 10GE module (SFP+)
- iTN8800-RE16(-BL), iTN8800 16 x E1(CES-E1) module
- iTN8800-RS4, iTN8800 4 x STM-1 CES sub card, up to 252 PW tunnels
- iTN8800-TAU, iTN8800 1588v2 clock card
- iTN8800-SLAG8, 8 x GE SFP (only support 4 x GE SFP when installed at slot 7 and slot 8)
- iTN8800-SLAX2, 2 x 10 GE XFP/SFP+

IP-MPLS CPE Product

RAX711-R, iTN201-R

The IP/MPLS CPEs extend the functionality of IP/MPLS to the customer premise in order to increase network efficiency and performance. Raisecom's best in breed of IP/MPLS CE enable the creation of an end-to-end MPLS tunnel guaranteeing the best VPN performance conveying all the MPLS VPN benefits to the customers. The RAX711-R, which is the most compact and cost-effective MPLS CE, provides customers an affordable MPLS networks access product. Customers can replace legacy TDM based leased line services, maintaining quality but lowering costs. The IP/MPLS CE products provide performance monitoring at a lower cost than a Layer2 Ethernet device. In addition, it improves the service consistency on the customer's premises with the MPLS tunnel, instead of a low performance router. The IP/MPLS CE products are fully compatible with both the RAISECOM IP/MPLS pre-aggregation PE router as well as equipment from any other vendors on the existing MPLS aggregation network.

RAX711-R

iTN201-R

P/N	RAX711-R	iTN201-2XG-R / iTN201-4GF-R
Interfaces	2 x GE SFP Interfaces uplink, 4 x GE Electrical Interfaces downlink/4 x GE Combo Interfaces downlink; 4 x E1 Interfaces	iTN201-4GF-R 4 x GE uplinks + 6 to 12 x GE (TSFP) downlinks and 2 sub slots for another 8 x GE downlinks iTN201-2XG-R 2 x GE uplinks + 6 to 12 x GE (TSFP and 2 sub slots for additional 2 x 10GE and 4 x GE or 8 x GE downlinks
Technical Standards	ITU-T G.8131, G.8031, and G.8032, G.8113.1, and BFD ITU-T Y.1731, IEEE 802.3ah, IEEE 802.1ag IETF RFC5860 and RFC2544 OSPF, BGP, MP-BGP, and VRRP MPLS, LDP, MPLS-TP, and MPLS QoS, IETF RFC4664 L2VPN framework , VPWS, VPLS, and L3VPN	ITU-T G.8131, G.8031, and G.8032 ITU-T Y.1731, IEEE 802.3ah, and IEEE 802.1ag BFD , ITU-T G.8113.1, IETF RFC5860, and IETF RFC2544 TE FRR and VRRP OSPF, BGP, and MP-BGP MPLS, LDP, and MPLS-TP IETF RFC4664 L2VPN framework VPWS, VPLS, and L3VPN MPLS QoS
Dimension(mm)	220(L) × 180(W) × 43.6(H)	440(L)× 266(W) × 44(H)
Power Consumption	<25W	<60W

Chapter 3. Optical Transport Network

OTN (Optical Transport Network) systems smoothly handle ever-increasing bandwidth demands for data services and also for mobile backhaul, Fronthaul, Inter datacenter connectivity and GPON/EPON extension. They do so by integrating the functionality of transport, multiplexing, switching, protection and management of customer traffic in a single box. Compact OTN systems easily meet the high bandwidth demands of public and private clouds as well as software-defined networks, that require gigabit Ethernet and above. For FTTH and LTE/4G applications, OTN systems allow carriers to save on OPEX and fiber resources when deploying mobile Fronthaul and GPON/EPON.

NEW

Multi-Service OTN Platform

iTN8600-A

The iTN8600-A is a new generation of intelligent transmission device developed independently by Raisecom, which is a full-service access transmission platform dominated by key account service and high-bandwidth integrated service. iTN8600-A is aimed at accessing/aggregation layer of MAN, which is particularly suitable for MAN demarcation of leased line service and OTN accessing. iTN8600-A can be used for constructing high-quality leased line accessing integrated solution with iTN8600-II and iTN8607. The multiple services access at the customer premise and meanwhile realize service distribution and transmission by uplink to SDH, PTN, OTN. iTN8600 series products adopt sub-card or standalone accessing OTN devices to cover both CPE and PE application perfectly.

FEATURES

• iTN8600-A is 5U chassis supporting 2 NMS cards, up to 15 service cards, 2 power supply cards and 1 fan
• iTN8600-A has a high integrated device with front outlet design and supports sub-card hot swapping. AC or -48VDC power supply, 1+1 power supply protection
• Flexible access to STM-1/4/16/64, OC-3/12/48/192, FE/GE, 10GE LAN, 10GE WAN, FC 1G/2G/4G/8G, OTU1/OTU2, etc. signals in various format
• Support EOS, ETH over OTN, SDH over OTN, EOS over OTN, MPLS over OTN, MPLS-TP, etc. service encryption. Packets switching capability: 300G
• Support 96 × GE access, 24 × 10GE access
• Up to 57.5G cross-connection based on SDH VC4, up to 10G cross-connection based on VC12/VC3
• Max. STM1/4 access up to104, Max. EOS access up to 104 FE/GE
• Hybrid encryption and scheduling capabilities from SDH/PKT/ODUk to OTN
• ODUflex facilitate flexible bandwidth adjustment
• Support real-time DM delay measurement for PM and TCM
• Compliant with SDN standard

iTN8600-A

Sub-cards

• iTN8600-A-DC: iTN8600-A-DC chassis, 5U, includes 2 DC power supplyand 1 fan
• iTN8600-A-NXU: System management and control card for iTN8600-A, support 1+1 hot swapping protection for main and standby NXU card
• iTN8600-A-SH2: SDH aggregation card with 2 x STM-16 or 4 × STM-4
• iTN8600-MX2: hybrid circuit card for 2 × OTU2 service uplink
• iTN8600-A-PX4: 4 × 10GE service accessing card
• iTN8600-A-PG8: 8 × GE service accessing card
• iTN8600-SG8: EOS tributary card with 8 x GE/FE SFP interface and 2 ×STM4 SFP interface
• iTN8600-SS8: SDH tributary card with 8 × STM-1/4 SFP interface

Compact Multi-Service OTN Platform

iTN8600-II

The iTN8600-II is new intelligent all-service access and transmission platforms designed to future-proof networks. The iTN8600 series integrates OTN cross connection, MPLS-TP and SDH features and provides integrated all-service access, and flexible multi-core cross-connection and scheduling. Operators can use it to transport multiple types of services on one platform, including leased line, FTTX, and LTE services. Altogether, it provides a complete solution for MAN access and aggregation.
The iTN8600 is perfect for mobile Fronthaul, enabling mobile operators aiming to minimize OPEX and expand radio coverage. It allows carriers to multiplex up to 30 2/3/4G CPRIs and extend reach to over 25km.
An advanced new chip multiplexes 8 x EPON or 4 x GPON OLT ports into OTU2, and that traffic can be transmitted over a WDM or OTN network over 45km to extend GPON/EPON coverage and to save up to 90% of fiber. Compatible with Raisecom's iTN series products, iTN8600 can be deployed in a point to point and ring topology for various applications. It is commonly used for service provider OTN edge aggregation, mobile backhaul and Fronthaul, data center interconnect as well as high capacity business connectivity. The product can be managed by a GUI-based NView NNM system to simplify configuration and to monitor performance in real-time.

FEATURES

• Universal switching and flexible grooming for OTN, SDH, and packet services
• Maximum DWDM 40λ x 10G Line capacity
• 120G packet switching capability
• All service access capability, including E1, STM1/4/16/64, OC-3/12/48/192, FE/GE, 10GE LAN, 10GE WAN and OTU1/OTU2, CPRI/OBSAI, FC-1/2/4/8/10, EPON/GPON etc
• EP-Line, EVP-Line, EP-Tree, EVP-Tree, EP-LAN, EVP-LAN
• MPLS-TP
• 40G OTN cross-connection based on ODU and ODU1
• Static LSP, L2VPN and VPLS
• Up to 20G cross-connection based on VC4 or 10G cross-connection based on VC3/VC12
• G.8113.1 OAM, 802.1ag/Y.1731/SLA OAM and 802.3ah OAM
• 8 x1.25G over OTU2 and 4 x 2.5G over OTU2 multiplexer
• Transponder with 5 OTU2 ports on each card
• System management card and power supply module redundancy
• Supports Auto Laser Shutdown (ALS) protection and Dying Gasp
• Redundancy and reliability with one plus one MSP and LPP on OTN side, ITU-T G.8031 (ELPS), G.8032 (ERPS) and LAG protection on Ethernet side, MPLS-TP linear, ring and dual-homing protection on PTN side and 1+1 MSP, SNCP, 1+1 LPP on SDH side
• SNMP (NView compatible) via in-band and out-of-band network channels

iTN8600-II

System and Sub-cards

Chassis and NMS cards:
• iTN8600-II-DC, 2U/11 slot chassis
• iTN8600-II-NXU, system management and control card for iTN8600-II chassis
• iTN8600-II-NTU, optical system management and control card for iTN8600-II chassis
• iTN8600-EOW, EOW card, support 2 ways FXS interface
Muxponder cards:
• iTN8600-AO2D, OTU2 aggregation card with 8 x SFP interface for any services and 2 x OTU2 SFP/XFP interface
• iTN8600-EM2D, OTU2 aggregation card with 16 x GE/FE SFP interface, 2 x 10GE XFP interface at client side and 2 x OTU2/OTU2e/10GE XFP interface at line side
Transponder cards:
• iTN8600-XD2D, OTN tributary card with 2 x OTU2/OTU2e/10GE LAN/10GE WAN/STM64 SFP interface at client side and 2 x OTU2/OTU2e XFP interface at line side
• iTN8600-OTU5, support 2R, 5 paths of two-way wavelength transfer, can be applied for point to point, CWDM, DWDM, and so on
• iTN8600-OTU5E, support 3R, enhance 5 paths of two-way transponder card or 2-channel OCP card, can be applied for point to point, CWDM, DWDM, and so on
Optical cards:
• iTN8600-DM16E, DWDM Mux card, multiplexing up to 16-way single-wavelength optical signals to 1-way multiplexing signals, C21-C36
• iTN8600-DD16E, DWDM Demux card, demultiplexing 1-way multiplexing signals to up to 16-way single-wavelength optical signals, C21-C36
• iTN8600-DMU40, DWDM Mux card, multiplexing up to 40-way single-wavelength optical signals to 1-way multiplexing signals
• iTN8600-DDU40, DWDM Demux card, demultiplexing 1-way multiplexing signals to up to 40-way single-wavelength optical
• iTN8600-OMD8, 8-wavelength Coarse Wavelength Division Multiplexing (CWDM)multiplexing and demultiplexing card
• iTN8600-DAD1D, DWDM single-way dual-fiber bidirectional optical add-drop card
• iTN8600-DAD4D, DWDM four-way dual-fiber bidirectional optical add-drop card
• iTN8600-DAD8, DWDM eight-way dual-fiber bidirectional optical add-drop card
• iTN8600-OLP, optical line one plus one 1+1 protection, can be applied for protection purposes at the client side, line side and multiplex section
• iTN8600-OPA, EDFA optical Pre-amplifier card

• iTN8600-OBA, EDFA optical Booster amplifier card
• iTN8600-OBA20, EDFA optical Booster amplifier card
• iTN8600-OLA20, EDFA optical Line amplifier card
• iTN8600-FDU, OSC card
• iTN8600-OPD, optical power detection card

PTN cards:

• iTN8600-PG8, GE tributary card with 8 x GE/FE SFP interface
• iTN8600-PG8T, GE tributary card with 8 x GE/FE copper interface
• iTN8600-PG16E, GE tributary card , 8 x SFP ports and max 16 GE interfaces with TSFP (two-channel SFP)
• iTN8600-PX2, 10GE tributary card with 2 x 10GE XFP interface
• iTN8600-PE16, E1 CEs sub card to access 16 E1 service simulate to packet service
• iITN8600-PE16-BL, E1 CEs sub card to access 16 E1 service simulate to packet service ,E1 120Ohm Balance interface
• iTN 8600-PS4, 4 x STM-1or 1 x STM-4 CES sub card, up to 252 PW tunnels
• iTN 8600-TAU, IEEE1588v2 clock card

xPON cards:

• iTN8600-LGO2D, OLT-side GPON aggregation-extension card. Map maximum 8 x GPON service into 2 x OTU SFP+ interfaces
• iTN8600-LEO2D, OLT-side EPON aggregation-extension card. Map maximum 8 x EPON service into 2 x OTU SFP+ interfaces
• iTN8600-NO2D, ONU-side EPON/GPON aggregation-extension card. Map maximum 8 x EPON/GPON service into 2 x OTU SFP+ interfaces
• iTN8605-NO2D, ONU-side EPON/GPON aggregation-extension device. Map maximum 8 x EPON/GPON service into 2 x OTU SFP+ interfaces, size 1U, 19''

SDH cards:

• iTN8600-SH2, SDH aggregation card with 2 x STM16 SFP interface
• iTN8600-SS4, SDH tributary card with 4 x STM1/4 SFP interface
• iTN8600-SG16, EOS tributary card with 8/16 x GE/FE SFP interface and 2 x STM4 SFP interface

NEW

OTN 100G Standalone CPE Device

iTN8601-XT4T, iTN8601-XT4S

iTN8601 100G Pizza Box is high density 1U 19-inch 100G OTN standalone Transponder/Muxponder. By adopting advanced technology and ASIC chip, it is fully compliant with ITU-T standard, such as G.709, G.798, etc. iTN8601 100G Pizza Box device is suitable for datacenter interconnection, metro access and metro aggregation optical transport network. It is convenient to be managed by NMS system via SNMP.

iTN8601-XT4S

iTN8601-XT4T

FEATURES

• 1U,19-inch standalone device
• Dual AC or Dual DC Redundancy power supply
• Line side support 100G Coherent CFP,4 x 25G DWDM CFP or Grey CFP
• Support GFEC and SD-FEC on line port
• Support GCC0, GCC1 and GCC2 In-band DCN Management
• Support SNMP for Out-band DCN Management

P/N	iTN8601-XT4T	iTN8601-XT4S
FEC on 100G line side Port	100G OTU4: G.709 Regular FEC ; 100G coherent OCh: Soft-Decision FEC	
FEC on 10G client side Port	N/A	Regular FEC (G.709); I.4 Super FEC (G.975.1); I.7 Super FEC (G.975.1)
Client Interface	1 QSFP28 based 100G port (100G, OTU4) or 2 QSFP+ based 40G port (40GE, OTU3)	10 SFP+ based 10G ports (10GE LAN/WAN, STM-64/ OC-192, FC8G, OTU2, OTU2e
System Interface	1 CFP based 100G port (coherent CFP, 4 x 25G DWDM CFP, grey CFP) DWDM/CWDM SFP+ based 10G port	
Power Supply	AC: Input 100–240V, 47–63Hz; DC: Input -40 to -72V	
Power Consumption	125W with coherent CFP 105W with grey CFP	130W with coherent CFP 110W with grey CFP
Dimension(mm)	440(L) x 350(W) x 44(H)	

Chapter 4. Packet Transport Network

The shift from legacy networks to packet transport networks (PTN) and MPLS is continuing due to higher bandwidth, greater flexibility and lower cost offered by next-gen packet switched networks. However, traditional leased line and 2G mobile backhaul businesses still need to be supported by service providers. In addition, utilities and transportation companies continue to use low speed data, analog voice and other specialized equipment and interfaces which need to be supported on the next-gen network. Therefore, the next-generation networks must support existing service models and are required to inherit TDM features including reliability, OAM and synchronization. However, it must still be future-proof to delivery of vast data traffic at an affordable price level, catering to the ever-increasing needs of enterprise users and 3G/4G/LTE mobile backhaul applications.

The Raisecom PTN platforms are a multi-core system that can carry any service over either SDH or IP/Ethernet infrastructures at the same time. They are perfect for enabling a smooth transition from TDM to IP. The SDH-like network protection and redundancy requirements are met by supporting G.8031/G.8032 Ethernet and G.8131/ Wrapping-Steering MPLS-TP protection protocols with a recovery time of sub-50ms. Advanced management, monitoring and SLA assurance are implemented using 802.3ah, 802.1ag, Y.1731. For mobile backhaul and other timing sensitive applications, the PTN platforms support SyncE and I588v2. Integrated pseudowire technologies enable smooth migration of TDM and legacy equipment over packet.

Dual-Core Architecture PTN Aggregation Platform

iTN2100

iTN2100

The iTN2100 is a 6U/15-slot, high-capacity, modular PTN platform with a dual-core architecture for both Ethernet and TDM traffic delivery. It enables flexible and profitable deployment of carrier-grade business and mobile backhaul connections, and a smooth evolution from traditional to next-generation services. The iTN2100 supports up to 4 x 10G and/or 4 x STM-4/16 uplink capacities, and provides an efficient cross-connect, integration and transportation options over a wide range of copper/fiber based legacy and IP services. To maximize the uptime and to guarantee the carrier's network availability, iTN2100 supports full hardware redundancy, G.8032/ G.8031 Ethernet and G.8131/Wrapping-Steering MPLS-TP protection. Extensive management capabilities are provided for all aspects from equipment installation and service provisioning to real-time system operation and performance monitoring. The iTN2100 offers cost-effective transport of MEF-compliant CE2.0 Ethernet services, E1/T1, fiber multiplexing, and pseudowire connectivity for lease-lined and 2G/3G/LTE mobile backhaul. In addition, the system also supports seamless connections with MPLS-TP and IP-MPLS backbones and converged fixed-mobile infrastructure by adopting SyncE and 1588v2 PTP. With this integrated system, carriers and ISPs can save on CAPEX and OPEX by implementing scalable networks that can easily grow with infrastructure and bandwidth demand in the future.

FEATURES

- Combined dual cores can deliver Ethernet and TDM traffic in one system
- Available with 4 x 10G XFP and 4 x GE SFP, or 8 x GE SFP at line side and up to 128 x GE TSFP at client side
- Available with 4 x STM16 SFP or SFP at line side and up to 40 x STM1 SFP at client side
- Available with STM-1, EoTDM, PWE3, FiberMux, FE, DS3, E3, E1, Voice, V.35, V.24, RS232 at client side
- E-Line, E-LAN and E-Tree are compliant with CE2.0 relevant MEF specifications
- Uplink redundancy and resiliency with ITU-T G.8031 (ELPS), G.8032 (ERPS) on Ethernet side, G.8131 MPLS-TP liner protection and Wrapping/Steering MPLS-TP ring protection on PTN side and 1+1 liner MSP, SNCP, 1+1 LPP on SDH side
- IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA, L2MPLS-TP LSP/PW/section OAM
- VLAN, QinQ, QoS, LACP, and static MPLS compliant with MPLS-TP
- PWE3 tributary card supports SAToP, CESoP, MPLS, CESoETH (MEF) and UDP/IP encapsulations
- Port statistic based on VLAN/EVC/COS
- Compliant with 1588v2 (PTP) OC/BC/TC mode and SyncE
- Optional 2Mbit, 2MHz input/output external clock
- Full hardware redundant protections for GE, PWE3, SDH, Multi-service FiberMux sub-cards and power supply
- OAM for remote CPE management
- Auto Laser Shutdown (ALS) protection and Dying Gasp
- SNMP (NView compatible) via in-band and out-of-band network channels

System and Sub-cards

• iTN2100-12-A, 6U/15-slot chassis with ventilation modules only
• iTN2100-NMS, system management and control card
• iTN2100-NTU-2XG, 10G aggregation card with 2 x 10G XFP interfaces and 2 x GE SFP interfaces
• iTN2100-NTU-4GF, GE aggregation card with 4 x GE SFP interfaces and 1+1 card protection
• iTN2100-TSU, Clock card providing both IEEE1588(PTP) and SYNC-E
• OPCOM3500E-2STM1/4-M, SDH aggregation card with 2 x STM1 or 2 x STM4 SFP interfaces
• iTN2100-2STM16-M, SDH aggregation card with 2 x STM-16 SFP interfaces, 2 CC3 external clock interfaces
• iTN2100-4STM4-S, SDH tributary card with 4 x STM4 SFP interfaces
• OPCOM3500E-4STM1, SDH tributary card with 4 x STM1 SFP interfaces
• iTN2100-16GF, GE tributary card with 8 x SFP slots supporting 16GF with TSFP-Gb, 16FX with TSFP-03, and 8 x GF with SFP-Gb
• iTN2100-8FX, GE tributary card with 8 x FE SFP interfaces
• iTN2100-8EOS-8GF, EoS tributary card with 8 x GE SFP interfaces enabling a Gigabit Ethernet service delivery over 8 x VCG
• iTN2100-CES-STM1/4, PWE3 tributary card with 4 x STM1 or 1 x STM4 SFP interfaces
• iTN2100-CES-16E1T1-BL, PWE3 tributary card with 16E1/T1 interfaces
• OPCOM3500E-32/16E1, 32/16 E1 card
• OPCOM3500E-DXC-DS0 - DS0 based timeslot cross connection module
• OPCOM3500E-TP, four pairs of optical interface for C37.94 service
• OPCOM3500E-16C64K, G.703 tributary unit, 16 x ports
• OPCOM3500E-10E&M, 2/4wire E&M card with 10 interfaces
• OPCOM3500E-Audio, 16 port FXS or FXO module
• OPCOM3500E-MULTI, Multi low speed service tributary card, provide 8 voice (FXS/FXO) interfaces, 4 audio interfaces with and 4 data (RS232/V.24 or RC485/422) interfaces
• OPCOM3500E-8V35, 8 x V35 module

Compact PTN Aggregation Platform

iTN221


iTN221

The iTN221 is a "Pizza Box" 1.5U (full ETSI) sized, next generation multiservice access node. It offers a dual core architecture for both packet and SDH/TDM transmission.
The iTN221 supports up to 2 x 1G and/or 2 x STM-1/4 uplink capacities, and a built-in PDH multiplexer function, DXC non-blocking clock cross connect matrix at 64K level and TDM pseudo-wire functionality for TDM to Ethernet/IP/MPLS service migration.
The iTN221 supports three service slots suitable for various sub cards: Voice (FXS/FXO/E&M), Ethernet (GE/FE), C37.94, 64K codirectional, Data RS232/RS485 etc.
It provides utilities and transportation companies with reliable connectivity for controlling signals, mission critical data, voice, video monitoring and electrical protection services. It supports the smooth transition from PDH, SDH to the packet transmission network.
For mission critical services, the system maximizes uptime and provides carrier-class network availability using G.8032/G.8031 Ethernet and G.8131/Wrapping-Steering MPLS-TP protection that provide sub-50msec recovery as well as hot swappable redundant power supplies. Extensive management capabilities are provided for all aspects from equipment installation and service provisioning to real-time system operation and performance monitoring. The iTN221 offers a cost-effective solutions for providing MEF-compliant CE2.0 Ethernet services, as well as E1 and pseudowire connectivity for lease-lined and 2G/3G/LTE mobile backhaul. with integrated SyncE and 1588v2 PTP. Altogether, the iTN221 can be used to reduce CAPEX and OPEX and build a future-proof infrastructure that can scale both in capacity as well as migrate additional services to packet infrastructure without further equipment investment.

FEATURES

• Combined dual cores can deliver Ethernet and TDM traffic in one system
• Available with 2 x 1G SFP uplink, 4 x GE in the mainboard and 4 x GE subcard module (with PoE)
• Available with 2 x STM-1/4 SFP
• Available with E1 TDM, E1 PWE3, GE, Voice, V.24/RS232, TP and 64K Codirectional at client side
• E-Line, E-LAN and E-Tree are compliant with CE2.0 relevant MEF specifications
• Uplink redundancy and resiliency with ITU-T G.8031 (ELPS), G.8032 (ERPS) on Ethernet side, G.8131 MPLS-TP liner protection and Wrapping/Steering MPLS-TP ring protection on PTN side and 1+1 liner MSP, SNCP, 1+1 LPP on SDH side
• IEEE802.3ah, 802.1ag, ITU-T Y.1731/SLA, L2MPLS-TP LSP/PW/section OAM
• VLAN, QinQ, QoS, LACP, and static MPLS compliant with MPLS-TP
• PWE3 tributary card supports SAToP, CESoP, MPLS, CESoETH (MEF) and UDP/IP encapsulations
• Compliant with 1588v2 (PTP) OC/BC/TC mode and SyncE
• 2Mbit, 2MHz input/output external clock
• Dry contact Alarm Relay (Input/output alarms)
• Extended temperature range (-20 to 65˚C)
• Environmental Standards: CE, UL, EN 50121-4, IEC61000-4-2/3/4/5/6/7/8/9, 11/12/13/14, 29 IEC61850-3
• SNMP (NView compatible) via in-band and out-of-band network channels

System and Sub-cards

• iTN221-4GE, including the chassis, main card, double power, fans, and three sub card slot
• The main card includes: 2 x STM-1/4, 2 x GE uplinks, 8 x E1's and 4 x GE user
• iTN221-SUB-16C64K, G.703 codirectional subcard, 4 x ports
• iTN221-SUB-RS24, Serial interface subcard, Provides 4 x V.24/RSV222/RS485 or 8 x RS232 ports
• iTN221-SUB-TP, C37.94 subcard. Support two pairs of optical interface for C37.94 service. Support standalone, or configuration for protection. Bandwidth is N x 64k (N=1~12) every channel
• iTN221-SUB-10FXS/0, FXS/FXO subcard, 10 x ports
• iTN221-SUB-4GE-PWR, Provides four GE service ports and including two POE interface. The system can only use one card
• iTN221-SUB-4E1, E1 subcard, 4 x ports
• iTN221-SUB-4E & M, E&M subcard, 4 x ports
• iTN221-SUB-8MT, 8 magneto channels

P/N	iTN2100	iTN221
Chassis(high)	6U	1.5U
Number of Service slots	13	3
SDH cross-connect	86 x 86 VC4 or 4032 x 4032 VC12	8 x 8 VC4 or 504 x 504 VC12
Packet switch capacity	48G	16G
STM-16 interface	4	N/A
STM-1/4 interface	4	2
E1 channel	320	20
DS3/E3 channel	30	N/A
PDH optical tributary channel	40	N/A
EOS interface	80	8
FE port	80	8
GE port	128 x GE for tributary, 8 x GE for aggregator	8
10GE port	4	N/A
PWE3	4 x STM4/16 x STM1	N/A
	128 x E1/T1	20 x E1/T1
PCM Interfaces : FXS/FXO/E&M, V24/RS232, C37.94, V35, G.703 CoDir	Yes	

TDM over Ethernet/IP/MPLS

RC1201-2GE16E1T1, RC1201-4FE4E1T1(-O) RC1201-2FEE1T1

Raisecom offers an end to end solution for transporting TDM over Ethernet/IP/MPLS including both CPEs and aggregation devices. When working in pairs or with aggregation nodes, the RC1201 series can extend the TDM traffic transparently over the Ethernet, UDP/IP, MEF or MPLS Packet Switched Networks (PSNs). The RC1201 series offers a configurable jitter buffer that enables smooth compensation for the delay variation introduced by the PSN. All of RC1201 series support four clock modes and two Ethernet payload encapsulations. The aggregation models offer an optional clock sub-card to recover the external clock. The RC1201 series supports advanced traffic management such as flow control, fault propagation, rate-limit, tagging, stacking and filtering (in addition to a full suite of OAM functionality). All the PWE3 demarcation devices support in-band and out-of-band management, and can be configured locally via CLI, Telnet, or SNMP (NView compatible).


RC1201-2FEE1T1


RC1201-4FE4E1T1


RC1201-2GE16E1T1

P/N	RC1201-2GE16E1T1	RC1201-4FE4E1T1	RC1201-2FEE1T1
Interface	Client: 16 x E1/T1 + 8 x GE (GE cards are inserted in 2 expansion slots) Line: 2 x GE SFP Management: 1 x Console + 1 x SNMP	Client: 4 x FE + 4 x E1/T1 Line: 1 x GE SFP Management: 1 x Console + 1 x SNMP	Client: 2 x FE + 1 x E1/T1 Line: 1 x GE SFP Management: 1 x Console + 1 x SNMP
MTU	12,288 Bytes	1632 Bytes	
Ethernet	16k MAC, VLAN, QinQ	8k MAC, VLAN, QinQ	
IP service	N/A		
MPLS-TP	64 PW		
TDM PW encapsulation	MEF8, MPLS-TP, UDP/IP, SAToP, CESoPSN	MEF8, MPLS-TP, UDP/IP, SAToP, CESoPSN, HDLC and AAL1	
TDM interface	Unframed and framed modes		
Clock/Synchronization	Internal/slave/adaptive clock configurable		
Traffic Management	Stream-marked based on CoS and DSCP, SP, WRR and DRR queue schedule and 8 queues per port Rate limit per port/VLAN	Stream-marked based on Cos and DSCP, SP and WRR queue schedule and 4 queues per port, Rate limit per port	
Ethernet OAM	IEEE802.3ah OAM		
Reliability & Protection	Link aggregation group Loop detection per port/VLAN	Link aggregation group Loop detection per port	
Security	ACL based on MAC Storm control (broadcast, multicast, DLF)		
System Management	CLI, Telnet and SNMP (NView compatible)		

Chapter 5. xPON

GPON & EPON networks provide high throughput point-to-multipoint connections from the Point of Presence (POP) to the customer premise. It can be profitably used in massive deployments of triple-play services as it offers a low CAPEX and OPEX. It is also possible to optimize TCO when fiber resources are limited, by deploying point-to-point active optical networks. The Raisecom xPON product line supports both the EPON and 10G-EPON technologies introduced by IEEE, as well as the GPON and XG-PON technologies introduced by ITU. The former offers a GE or 10G symmetric bit rate, while the latter offers asymmetric 2.5GE/10G downstream and 1.25GE/2.5GE upstream bit rates.

The Raisecom GPON/EPON portfolio consists of high and low densities and standalone OLT chasses and diverse ONT models for subscribers in single family units (SFUs) and multi-dwelling units (MDUs). The Raisecom GPON line offers a wide array of chassis optimized for low subscriber counts in rural and suburban areas, as well as high density models for urban areas. The entire line can be deployed in a 'pay as you grow' model, with modules added as subscriber counts increase, continuously maintaining service providers' profitability. The Raisecom PON system enables transmission of native Ethernet services from backbones to the "last mile". The products ensure easy provisioning, remote management, high performance and network redundancy, and, most importantly, guarantee a profitable business case for FTTX network builders.

xPON OLT

ISCOM6800

ISCOM6800 is a 13U high-density integrated platform compatible with both IEEE802.3ah EPON and ITU-T G.984 GPON standards. The system can aggregate a maximum of 14,336 ONUs/ONTs with a typical 1:64/1:128 split ratio. ISCOM6800 also possesses great switching capacities and can be used to aggregate and transport data, voice and video traffic from other OLTs over Ethernet backbones. Enhanced network manageability, reliability and redundancy are supported with ring protection mechanisms and a hot-swappable redundant power supply. ISCOM6800 also supports multi-purpose access and aggregation PON Ethernet traffic at the same time.

FEATURES

- Available with mixed pluggable up to 224 x GE or 8 x 10GE interfaces for uplink, and up to 224 x GPON or 224 x EPON interfaces for downlink
- 2 x SMC control module supporting real-time redundancy
- Up to 1:64/1:128 split ratio, and 28,672 ONUs per full-load 10U OLT chassis
- Upstream wavelength of 1310nm (EPON/GPON/Non-symmetrical 10G EPON)/1270nm (Symmetrical 10G EPON/XG-PON1) and downstream wavelength of 1490nm (EPON/GPON)/1577nm (10G EPON/XG-PON1)
- IEEE 802.3ah (EPON), ITU-T G.984 (GPON), IEEE 802.3av (10G EPON), ITU-T 987 N1/N2 (XG-PON1)
- Symmetrical 10G/10G or asymmetrical 10G/1G
- Storm control of broadcast, multicast and DLF
- Trunk group and Link Aggregation Control Protocol (LACP)
- 1+1 automatic protection and link diagnostic for each PON port
- VLAN, QinQ, QoS, DBA
- IGMP, Multicast VLAN Registration (MVR), DHCP and Option 82
- AES-128 encryption and triple churning
- Hot-swappable redundant power supply
- CLI, Telnet, SSHv2 and SNMP (NView compatible)

ISCOM6800

System and Sub-cards

- ISCOM6800-18-A, 13U/18-slot chassis with an airflow slot and only a cable array
- ISCOM6800-SMCA, Switching and control card, working in slot 9 or 10. 1 Console interface (RJ45) for local Management and 1 SNMP out-of-band management interface (RJ45)
- ISCOM6800-EP16, GEPON line card, 16 x GEPON SFP ports, working in slot1-8 and slot 11-16
- ISCOM6800-XEP8, 10G EPON (asymmetric) line card, 8 x 10GEPON XFP ports, working in slot1-8 and slot 11-16
- ISCOM6800-XP4L, 10GE card, 4 x 10GE SFP+ ports, working in slot1-8 and slot 11-16
- ISCOM6800-GP16, GPON line card, 16 x GPON SFP ports, working in slot 1-8 and slot 11-16
- ISCOM6800-XP4A, 10GE card, 4 x 10GE SFP+ ports, working in slot 19 or 20
- ISCOM6800-GE16, GE card, 16 x GE SFP ports, working in slot 1-8 and slot 11-16
- ISCOM6800-XP2A, 10GE card, 2 x 10GE SFP+ ports, working in slot 19 or 20

Standalone GPON OLT

ISCOM6820-GP

ISCOM6820-GP is a 2U small density OLT that complies with the GPON's ITU-T G.984 standard. The device can support up to 32 GPON, 10 GE and up to 4 x 10G ports. The ISCOM6820-GP can aggregate a maximum of 4096 ONUs/ONTs in a typical splitting ratio of 1:128.
The complete modular design of the ISCOM6820-GP enables excessive flexibility in deploying, maintaining and expanding services at reduced CAPEX and TCO. Designed for large enterprises, SME and residential fiber access, the ISCOM6608-GP offers a broad range of features delivering triple-play services, simplifying management, and providing high network reliability. The security is assured by implementations of RADIUS and/or TACACS+, while maximum network uptime is guaranteed by a ring protection mechanism, real-time monitoring and hot-swappable redundant power supplies.

ISCOM6820-GP

Sub-cards

• ISCOM6820-MCUA: 10GE card, 2 x 10G SFP+ ports, Slot 1&2, 1 Console interface (RJ45) for local management and 1 SNMP out-of-band management interface (RJ45)
• ISCOM6820-GPSC: 16 x GPON SFP ports, as a basic card of ISCOM6820 system, Slot 3
• ISCOM6800-GP16: GPON card, 16 x GPON SFP ports, Slot 4
• ISCOM6800-GE16: GE card, providing 16 x GE SFP ports, Slot 4

FEATURES

• Available with up to 32 x GPON ports
• Up to 1:128 split ratio, 20km transmission distance and 4096 ONUs per full-load 2U chassis
• An upstream wavelength of 1310nm and a downstream wavelength of 1490nm
• VLAN, QinQ, QoS, DBA
• Link diagnostic, port backup/isolation/protection/monitoring, bi-directional FEC
• ARP, DHCP relay, DHCP v4/v6, IGMP snooping v1/v2, IPv4, IPv6
• Support complete ACL, including L2, L3, L4, customized ACLs and port-based mirroring
• Anti-DDoS, RADIUS, TACACS+, Storm control
• Service classification per port/VLAN/CoS (DSCP)
• SP, WRR, DRR and SP+WRR scheduling modes
• SFP digital diagnostic (DDM), FAN, CPU, voltage and temperature monitoring
• ITU-T G.984 (GPON)
• CE and RoHS compliant, RMON I and II standards
• CLI, Telnet, SSHv2 and SNMP (NView compatible)

Standalone Compact GPON OLT

ISCOM5508-GP

The ISCOM5508-GP is a compact GPON OLT with enhanced functionality that complies with the GPON's ITU-T G.984 standard. The device can support up to 8 GPON, 10 GE and 2 x 10GE interfaces, also support 1 CATV input and 4 triple-wave output by WDFA4 sub-card. The complete modular design of the ISCOM5508-GP enables excessive flexibility in deploying, maintaining and expanding services at reduced CAPEX and TCO. Designed for large enterprises, SME and residential fiber access, the ISCOM5508-GP offers a broad range of features delivering triple-play services, simplifying management, and providing high network reliability. The security is assured by implementations of RADIUS and/or TACACS+, while maximum network uptime is guaranteed by ring protection, real-time monitoring and hot-swappable redundant power supplies. In parallel, the ISCOM5508-GP device supports multi-purpose access and aggregation PON and Ethernet traffic.

ISCOM5508-GP

Sub-cards

• ISCOM5508-GPSC, Slot 1, MCU, 2 x 10GE(SFP) , 2 x GE (SFP), 2 x GE (RJ45), and 4 x GPON SFP ports, 1 Console interface for local management and 1 SNMP out-of-band management interface
• ISCOM5508-GP4A, Slot 3, GPON line card, 4 x GPON SFP ports
• ISCOM5508-WDFA4, slot 2 or 3, EDFA+WDM card, 1 x CATV Input (1550nm, SC/APC), 4 x GPON Input (1310nm, 1490nm, LC/PC), 4 x Output (Triple-wave, LC/APC)
• ISCOM5508-GE4B, Slot 2 or 3, GE Card, 4 x GE SFP ports

FEATURES

• Available with up to 12 x GE and 2 x 10G interfaces, or 8 x GPON ports
• Up to 1:128 split ratio, 20km transmission distance and 1,024 ONUs per full-load 1U chassis
• support upstream wavelength 1310nm and downstream wavelength 1490nm, 1550nm
• VLAN, QinQ, QoS, DBA
• Link diagnostic, port backup/isolation/protection/monitoring, bi-directional FEC
• ARP, DHCP relay, DHCP v4/v6, IGMP snooping v1/v2, IPv4, IPv6
• Support complete ACL, including L2, L3, L4, customized ACLs and port-based mirroring
• Anti-DDoS, RADIUS, TACACS+, Storm control
• Service classification per port/VLAN/CoS (DSCP)
• SP, WRR, DRR and SP+WRR scheduling modes
• SFP digital diagnostic (DDM), FAN, CPU, voltage and temperature monitoring
• 1545~1565nm operating bandwidth for optical amplifier
• Insertion loss: Max. ≤0.8dB
• High performance, high reliability
• Polarization dependent gain: Max. 0.4dBm
• Polarization mode dispersion: Max. 0.5ps
• Input and output pump leakage: -30dBm
• 1550nm output optical port, multiplex 1310/1490nm data stream
• Efficient space, flexible installation and easy operation
• CE and RoHS compliant, RMON I and II standards
• CLI, Telnet, SSHv2 and SNMP (NView compatible)


ISCOM5508Q-GP

NEW

Outdoor GPON OLT

ISCOM5508Q-GP

The ISCOM5508Q-GP is an outdoor GPON OLT with cast aluminum and integrated EDFA targeted for outdoor applications scenarios. In the uplink of input, it supports 2 ways (backup) of 1550nm CATV optical signals, two 1000Mbit/s electrical interfaces, two 1000Mbit/s optical interfaces, and two 10Gbit/s optical interfaces. In the downlink of output, it supports 4 ways WDM (GPON and CATV signals). It adopts an all cast aluminum chassis with wide range of temperature, high lightning protection level and modular design.
The ISCOM5508Q-GP has powerful GPON access capabilities and carrier-grade reliability, supports powerful security functions (such as ACL and anti-DoS attack) and selective QinQ, and provides good management, maintenance, and monitoring functions, and rich service features and flexible networking modes, thus meeting requirements for low-density and long-distance fiber access.
ISCOM5508Q-GP44W-AC supports 4 GPON ports and 4 EDFA ports with 220VAC. WDM Module and optical switch are integrated.
ISCOM5508Q-GP44W-AC60 supports 4 GPON ports and 4 EDFA ports with 60VAC. WDM Module and optical switch are integrated.
ISCOM5508Q-GP8-AC supports 8 GPON ports with 220VAC.

FEATURES

• Adopt cast aluminum shell, and provide 1 GPON OLT card, 1 EDFA card (embedded WDM is optional), and power supply
• Optionally support 4 or 8 ways GPON ports
• Provide two 1000Mbit/s electrical interfaces, two 1000Mbit/s optical interfaces, and two 10Gbit/s optical interfaces in the uplink
• 2 ways of 1550nm CATV optical signal input for link backup and protection
• Embedded dual power supply redundancy for improving device reliability
• Wide-temperature design for adopting to the -20 to 65°C environment
• IP67 protection level, thus meeting dustproof and waterproof requirements in the outdoor environment
• Debugging through the Console interface via Bluetooth, thus facilitating maintenance after installation
• Powerful VLAN features, including selective QinQ, VLAN mapping and aggregation
• Complete QoS, including DBA, priority control, multiple traffic classification mechanisms, and queue scheduling
• Complete ACL, including L2, L3, L4, and user-defined ACL
• Static route, Static multicast, IGMP Snooping, IGMP Proxy, IGMP MVR, and controllable multicast
• STP/MSTP, link aggregation, DHCP, interface isolation, and other common features
• Low power consumption of the MCC and EDFA card, with overall power consumption less than 85W, energy saving
• Multiple maintenance and management interfaces, supporting in-band and out-of-band management
• Rich alarms, such as door alarms, abnormal optical power alarms, and ONU offline alarms
• CLI, Telnet, SSHv2 and SNMP (NView compatible)

GPON SFU ONT

ISCOM HT803G-1GE, ISCOM HT803G-1GC
ISCOM HT803G

The GPON SFU type optical network terminal (ONT) series provides a flexible mix of residential access services including high speed data, IPTV, voice and CATV services compliant with the ITU-T G.984 standard. In particular, the ONUs are designed for Ethernet data services, IPTV, CATV, and wireless router accessing for various application scenarios, such as residential triple-play service and business connections. All GPON FTTX ONUs offer advanced end-to-end management and monitoring functionality, and the GPON series can be managed under the Raisecom NView platform.

ISCOM HT803G-1GE

ISCOM HT803G-1GC

ISCOM HT803G

P/N	ISCOM HT803G-1GE	ISCOM HT803G-1GC	ISCOM HT803G
WAN Interface	1 x GPON port, up to 20km transmission distance with a 2.5G downstream and 1.25G upstream rates		
LAN Interface	1 x GE interface		4 x GE interfaces
CATV	N/A	1 x CATV output	N/A
VLAN, QinQ	Support VLAN, QinQ, QoS, DBA		
Dimension(mm)	108(L) × 88(W) × 31(H)	140(L) × 105(W) × 40(H)	140(L) × 105(W) × 33(H)
Consumption	< 3W	< 6W	< 5W
Management	CLI, SNMP and OMCI via OLT		

NEW

GPON HGU ONT

ISCOM HT803G-W, ISCOM HT803G-U
ISCOM HT803G-WS2, ISCOM HT803G-US2

The GPON HGU type optical network terminal (ONT) series provides a flexible mix of residential access services including high speed data service, IPTV, voice and CATV services compliant with the ITU-T G.984 standard. In particular, the ONUs are designed for Ethernet data services, voice over IP, IPTV, CATV, wireless router accessing and convenient USB2.0 home network storage connections for various application scenarios, such as residential triple-play service and business connections. The GPON ONT series offer flexible choices in terms of downlink types and numbers, such as, GE/FE auto-adapting Ethernet ports, POTS (FXS) interfaces, RF port and WiFi function compliant with IEEE 802.11b/g/n/ac. All GPON FTTX ONUs offer advanced end-to-end management and monitoring functionality, and the GPON series can be managed under the Raisecom NView platform.

ISCOM HT803G-W

ISCOM HT803G-WS2

ISCOM HT803G-U

ISCOM HT803G-US2

P/N	ISCOM HT803G-W ISCOM HT803G-U	ISCOM HT803G-WS2 ISCOM HT803G-US2
WAN Interface	1 x GPON port, up to 20km transmission distance with a 2.5G downstream and 1.25G upstream rates	
LAN Interface	4 x GE	
POTS	2 x FXS	
CATV	1 CATV output (Except HT803G-W: N/A)	1 CATV output (Except HT803G-WS2: N/A)
USB	1 x USB2.0	
WLAN	802.11 b/g/n, 2.4GHz, up to 4 SSIDs, MIMO 2 x 2, Internal Antenna	802.11 b/g/n/ac, 2.4GHz & 5GHz, up to 4 SSIDs, MIMO 2 x 2, external Antenna
Dimension(mm)	185(L) × 130(W) × 43(H)	184(L) × 129(W) × 38(H)
Consumption	<18W	
TCP/IP	Support PPPoE Client, DHCP Server/Client, NAT, Static Route, ALG and WiFi Bridge	
Management	Web management, Telnet, CLI and OMCI, TR-069	

GPON MDU ONT

ISCOM5104G-GP

The GPON MDU series products are targeting the FTTB market in cases of fiber access to the building and copper access inside the building. The series includes data-only model, data and voice model, normal power supply and reversal power supply model. Built with iron shell design, the MDU series is strong in structure, durable and suitable for harsh environment. The built-in power supply ensures a high level of security and lightening proof.

FEATURES

- Metal shell, very strong and durable in harsh environment, high security and lightening proof
- Strong QoS capacity, multiple traffic classification and schedule mode
- MAC address capacity up to 8k and multi-cast address capacity up o 256
- Telnet, local serial port, Web, SNMP, OAM, etc. management mode

ISCOM5104-GP

GPON Stick ONT

ISCOM HT801-GSFP

The ISCOM HT801-GSFP is a GPON ONT stick. It is in the SFP form and can be inserted into the SFP uplink interface on switches, IP cameras, Small Cells, routers, DSLAMs, or other devices to implement video backhaul or wireless backhaul. In this way, the networking is changed to use GPON with less complexity in communication and connectivity lower power consumption and cost, and improved network reliability.

FEATURES

- SFP form, small size, elegant appearance, and light weight
- Compliance with ITU-T G.984/G.988
- Cost effective thus suitable for large-scale application
- Fully compatible with OLTs of other vendors

ISCOM HT801-GSFP

Standalone CATV EDFA

RC5827A-4, RC5830A-8, RC5833A-16, RC5836A-32X-WS

Raisecom standalone CATV EDFA includes models of RC5827A-4, RC5830A-8, RC5833A-16 and RC5836A-32X-WS. All models are 19' inch stand-alone product, integrated by splitter, optical amplifier, and 1270 & 1310/1490 & 1571/1550nm wavelength multiplexer, supports 1 or 2 CATV input port, up to 32 PON input ports and 32 COM (CATV+PON) ports. It is optical switch integrated for models with 2 CATV input port. Output power for each EDFA output port is 19dBm. All models support dual AC/DC power supplies and redundant backup.
RC5830A-PWR-D is a pluggable power supply module for RC5827A-4, RC5830A-8, and RC5833A-16. The output power is -48V DC.
RC5830A-FAN is a pluggable Fan module for RC5827A-4, RC5830A-8, and RC5833A-16.

FEATURES

- 1540nm~1565nm operating bandwidth for optical amplifier
- Low Noise Figure: Max. ≤5.5dB,(@Pin=0dBm, λ=1550nm)
- High performance, high reliability
- Polarization dependent gain: Max. 0.4dBm
- Polarization mode dispersion: Max. 0.5ps
- Input and output pump leakage: -30dBm
- 1550nm output optical port, multiplex 1310nm/1490nm or 1270nm/1571nm data stream
- Can be compatible with any FTTx PON Technology: EPON/GEPON, GPON, BPON, DPON and XGPON
- Perfect RS232, SNMP
- Efficient space, flexible installation and easy operation

RC5830A-8

Splitter

Passive Optical Splitter

Outdoor Optical Splitter

Indoor/Outdoor Optical Splitter

The optical splitter is a passive optical plug-and-play device, which connects OLT and ONUs with multiple fiber ends. A splitter is generally deployed in an optical distribution network, allowing carriers to split optical signals to numerous customer premises. Raisecom provides various optical splitters with the following split ratios: 1:2, 1:4, 1:8, 1:16, 1:32, 1:64 to 1:128. The series is classified as indoor, indoor/outdoor and outdoor optical splitters.

Chapter 6. Industrial Switch

As the Ethernet technologies mature, Industrial Ethernet products and solutions are gaining popularity in the vertical industrial, utility, transportation and public marketplaces for their core values of enhanced manageability, network redundancy, scalable bandwidth up to GE and 10G, and comprehensive performance monitoring. In addition, the managed Ethernet technologies, which are introduced into industrial applications assist with the integration of many systems over an expandable network across wired and wireless LANs and WANs.

The Raisecom Gazelle series is designed to meet strict industrial demands of mission-critical applications, such as the smart grid industry, traffic control and surveillance systems. The carefully selected L2 Gigabit and Fast Ethernet models support advanced QoS, enhanced network security, resiliency and reliability, and are applicable for a wide range of industry and business connections under tough conditions. In compliance with IEC 61580-3 and IEEE 1613, the series guarantees the highest standards of EMI immunity and error-free communication, which is generally required for intelligent power plants, substations, transmission lines and ammeter readings. Reinforced hardware design, 50ms ring protection and power redundancy further increase network reliability and greatly reduce the cabling and wiring complexity.

L2 DIN-Rail Manageable Industrial Switch

Gazelle S1000i(-PWR) Series, Gazelle S1500i(-PWR) Series Gazelle S1000i-LI(-PWR) Series

The Gazelle DIN-Rail switches consist of compact and manageable industrial switches with a wide selection of port numbers, speed and media types. S1000i(-PWR) series is a L2 FE Din-Rail switch, with GE uplink, while S1500i(-PWR) series is a L2 Full-Gigabit Din-Rail switch. They are designed for the Automatic Control System (ACS) in the industrial field. S1000i-LI series is cost-effective L2 FE and full-gigabit switch, which is specially designed for meeting the requirements of safe cities, smart transportation, data backhaul in the industrial sites. In addition, the Gazelle S1112i-PWR and S1512i-PWR support the POE function with at least 4 IEEE802.3at FE/GE ports or 8 IEEE802.3af FE/GE ports. The Gazelle S1508i-PWR supports POE function with 4 IEEE802.3at GE ports or 4 IEEE802.3af GE ports.

All these DIN-Rail switches enable delivery of reliable, continuous, and manageable services by complying with some industrial regulations and standards, which can operate stably for a long time in harsh environments. Network redundancy and reliability are guaranteed with LACP, G.8032 ERPS (<50ms switch-over time). Among them, S1512i-PWR and S1520i can support L3 routing, such as static routing and RIP/OSPF protocol. All these DIN-Rail switches are IP40 rated, support dual power supplies input, adopt low-power fanless cooling technology with a wide operating temperature ranging from -40 to 85˚C, and ensure up to 35-year Mean Time Between Failures (MTBF) and a 3-year warranty. They can support wall mounting and also rack mounting.

Additionally, S1000i and S1500i are designed to satisfy the requirements of data transmission in areas of smart grid (IEC 61850-3, IEEE 1613), transportation (EN50121-4), energy and industrial automation.

Gazelle S1000i(-PWR)

Gazelle S1520i Series

Gazelle S1000i-LI(-PWR) Series

Gazelle S1508i-PWR Gazelle S1512i-PWR Gazelle S1503i

Gazelle S1500i(-PWR) Series L2/L2+ GE DIN-Rail

Model	Gazelle S 1503i-GF-2GE	Gazelle S 1508i-2GF-4GE	Gazelle S 1508i-2GF-4GE-PWR	Gazelle S 1512i-4GF-8GE-PWR
Port number & Type	1 x 100M/1000M SFP +2 x 10/100/1000 RJ45	2 x 100M/1000M SFP +4x10/100/1000 RJ45	2 x 100M/1000M SFP +4 x 10/100/1000 RJ45 PoE	4 x 1000M SFP +8 x 10/100/1000 RJ45 PoE
Dimension(mm)	56(L) × 105(W) × 135(H)			80(L) × 130(W) × 150(H)
Weight(kg)	0.7			1.7
Power Supply	AC: single input DCW24: dual input DCW48: dual input	AC: single input DCW48: dual input	DC48: dual input	
Voltage Scope	AC: 110V/220VAC (100~240VAC) 220VDC (170~300VDC) DCW24: 12V/24V(12~36VDC) DCW48: 24V/48V(20~72VDC)	AC: 110V/220VAC (100~240VAC) 220VDC (170~300VDC) DCW48: 24V/48V(20~72VDC)	DC48: 48VDC(44~57VDC)	
MAX power(W)	4	6	6+120	15+240
MAX POE power(W)	N/A		120	240
Jumbo Frame	9KB			
Switch Capacity (Gbps)	6	12		24
Certification	None	CE certification		None
Compliant with	complaint CE, UL/FCC	complaint with CE, UL/ FCC, IEC 61580-3, IEEE 1613, EN50121-4	complaint with CE, UL/FCC	

Model	Gazelle S1520i-4GF-8GE	Gazelle S1520i-4GF-16GE	Gazelle S1520i-12GF-16GE
Port number & Type	4 x 1000M SFP + 8 x 10/100/1000 RJ45 PoE	4 x 1000M SFP + 16 x 10/100/1000 RJ45 PoE	4 x 1000M SFP + 8 x 100M/1000M SFP +16 x 10/100/1000 RJ45 PoE
Dimension(mm)	123(L) × 155(W) × 177(H)		
Weight(kg)	2		
Power Supply	AC: single input DCW48: dual input		DCW24: dual input
Voltage Scope	AC: 110V/220VAC(100~240VAC) 220VDC(170~300VDC) DCW48: 24V/48V(20~72VDC)		DCW24: 12/24/48V(9.6~60VDC)
MAX power(W)	20W		
Jumbo Frame	9KB		
Switch Capacity (Gbps)	24	40	56
Compliant with	complaint with CE, UL/FCC complaint with IEC 61580-3, IEEE 1613, EN50121-4(expect S1520i-12GF-16GE)		

Gazelle S1000i(-PWR) Series L2 FE DIN-Rail

Model	Gazelle S1010i	Gazelle S1020i	Gazelle S1112i-PWR
Port number & Type	S1010i-2GX-8FE: 2 x 1000M Combo + 8 x 10/100M RJ45 S1010i-2GF-2FX-6FE: 2 x 100/1000M SFP + 2 x 100M SFP + 6 x 10/100M RJ45	S1020i-4GF16FE: 4 x 100/1000M SFP + 16 x 10/100M RJ45 S1020i-2GF2GX-16FE: 2 x 1000M Combo + 2 x 100/1000M SFP + 16 x 10/100M RJ45 S1020i-16FE: 16 x 10/100M RJ45	S1112i-4GF-8FE-PWR: 4 x 100/1000M SFP + 8 x 10/100M RJ45 PoE
Dimension(mm)	80(L) × 121(W) × 150(H)	98(L) × 155(W) × 177(H)	123(L) × 155(W) × 177(H)(AC) 98(L) × 155(W) × 177(H)(DC)
Weight(kg)	1.2	2	
Power Supply	AC: single input DC12: dual input DCW48: dual input	AC: single input DCW48: dual input	AC: single input DC48: single input
Voltage Scope	AC: 110/220VAC(85~264VAC) 110/220VDC(88~300 VDC) DC12: 12/24VDC(10~36VDC) DCW48: 24/48VDC(20~72VDC)	AC: 110/220VAC(85~264VAC) 110/220VDC(88~300 VDC) DCW48: 24/48VDC(20~72VDC)	AC: 110/220VAC(100~240VAC) 220VDC(170~300 VDC) DC48: 48VDC(44~57VDC)
MAX power(W)	11	15	15+120
MAX POE power(W)	N/A		120
Jumbo Frame	1632B	9712B	9712B
Switch Capacity (Gbps)	1.6/ 5.6/ 2/ 5.6/ 7.4	11.2/ 11.2/ 3.2	9.6
Certification	None	UL/FCC certification	None
Complaint with	Complaint with CE, UL/FCC, IEC 61580-3, IEEE 1613, EN50121-4		

Gazelle S1000i-LI(-PWR) Series Cost-effective L2 FE/GE DIN-Rail

Model	Gazelle S 1000i-4GX-16FE-LI	Gazelle S 1000i-4GF-16FE-LI	Gazelle S 1000i-2GF-8FE-LI	Gazelle S 1000i-2GF-4FE-LI	Gazelle S 1000i-2GF-8GE-LI	Gazelle S 1000i-2GF-8GE-PWR-LI
Port number & Type	4 x 1000M Combo +16 x 10/100M RJ45	4 x 100/1000M SFP +16 x 10/100M RJ45	2 x 100/1000M SFP +8 x 10/100M RJ45	2 x 100/1000M SFP +4 x 10/100M RJ45	2 x 100/1000M SFP + 8 x 10/100/1000M RJ45	2 x 100/1000M SFP + 8 x 10/100/1000M RJ45 PoE
Dimension(mm)	98(L) × 155(W) × 177(H)		80(L) × 121(W) × 150(H)	56(L) × 105(W) × 135(H)	80(L) × 121(W) × 150(H)	
Weight(kg)	1.7		1		1	1.2
Power Supply	AC: single input				AC: single input	DC48: dual inpurt
Voltage Scope	AC: 110/220VAC(100~240VAC) 220VDC(170~300VDC)				AC: 110V/220VAC (100~240VAC) 220VDC (170~300VDC)	DC48: 48VDC(44~57 VDC)
MAX power(W)	12		6.5		7	10+240
MAX POE power(W)	N/A					240
Jumbo Frame	10K					
Switch Capacity (Gbps)	12.8		5.6	4.8	20	
Compliant with	Complaint with CE, UL/FCC					

L2/L3 19" Rack-mounted Manageable Industrial Switch

Gazelle S3028i-L, Gazelle S3028i-GL
Gazelle S3028i-GS, ISCOM3052G(H)

The Gazelle 19" rack-mounted switches are designed to satisfy the broadband backbone transportation and aggregation requirements under rigorous industrial and business conditions. The products support a flexible electrical and SFP optical interface with combinations of up to 4 x 10GE/GE uplinks and 48 x GE downlinks. Among these, ISCOM3052G(H)adopts a fully modular design, provides high-density interfaces, and is configurable and scalable. The Gazelle S3028i/ ISCOM3052G(H) enable maximum flexibility when configured, in rings (intersect ring and tangent ring topologies), ensuring sub-50ms switchover time. Enhanced security is provided by supporting IEEE802.1x, RADIUS and other authentication methods. The Gazelle S3028i/ISCOM3052G(H) can sustain high performance in extreme environments. It also claims a fanless design, as well as IP40 dust protection housing, a redundant power supply, and is compliant with IEC 61850-3, IEEE 1613 and EN50121-4. All these switches adopt low-power fanless cooling technology with a wide operating temperature ranging from - 40 to 85˚C, and ensure up to 35-year Mean Time Between Failures (MTBF) and a 3-year warranty.

Gazelle S3028i

ISCOM3052G(H)

Model	Gazelle S3028i-L	Gazelle S3028i-GL	Gazelle S3028i-GS	ISCOM3052G(H)
Slot number & type	2 x GE uplink slots 6 x FE downlink slots Upto 24 FE port and 4 GE.	2 x GE uplink slots 6 x GE downlink slots Up to 24 GE port and 4 10GE.	2 x GE uplink slots 6 x GE downlink slots Up to 24 GE port and 4 10GE.	4 x 1G/10GE SFP+ uplink ports, 12 x GE RJ45 + 12 x GE Combo downlink ports. 3 x GE downlink slots Up to 48 GE port and 4 10GE.
Card	Uplink Cards: 2GE: 2 x 10/100/1000M RJ45; 2GF: 2 x 1G SFP Downlink Cards: 4FE: 4 x 10/100M RJ45; 4FX: 4 x 100M RJ45	Uplink Cards: 2HF: 2x10G SFP+; 2GE: 2 x 10/100/1000M RJ45; 2GF: 2 x 1G SFP Downlink Cards: 4GE: 4 x 10/100/1000M RJ45; 4GF: 4 x 100/1000M SFP		Downlink Cards: 8GE: 8 x 10/100/1000M RJ45 8GF: 8 x 100/1000M SFP
Dimension(mm)	1U, 19" 440(L) × 360(W) × 44(H)			2U, 440(L) × 360(W) × 88(H)
Weight(kg)	7			9.1
Power Supply	HIP/D, HIP/S, DC/D, DC/S			AC/D, AC/S
Voltage Scope	HIP: 110/220VAC(85~264VAC) 110/220VDC(88~300 VDC) DC: 24/48VDC(20~72VDC)			AC: 110V/220VAC(100~240VAC) 220VDC(170~300VDC)
Jumbo Frame	9KB		16KB	
Switch Capacity (Gbps)	12.8	136	136	176
Certification	CE, FCC certification			None
Complaint with	Complaint with , UL, IEC 61580-3, IEEE 1613, EN50121-4			

L2 Manageable EN50155 Industrial Switch

L2 FE wall-mounted EN50155 Series: Gazelle S1218i(-PWR)(A)
L2+ GE rack-mounted EN50155 Series: Gazelle S1218i(-PWR)(B)

The Gazelle S1218i(A) and Gazelle S1218i(B) series are wall-mounted and rack-mounted manageable EN50155 industrial switch designed for the military industry and rail traffic communication fields and can operate stably for a long time in harsh environments. Gazelle S1218i(A) supports up to 2 GE uplinks and 8/16 FE downlinks with a M12 connector. Gazelle S1218i-PWR(A) supports up to 2 GE uplinks and up to 6 GE downlinks with a M12 connector. The Gazelle S1218i-PWR(A) supports PoE function with 2 IEEE802.3at ports or 4 IEEE802.3af ports. Gazelle S1218i-PWR has a fanless design with an IP67 protection and redundant power supply. Gazelle S1218i(B) supports up to 4 GE uplinks and 10 GE downlinks with a M12 connector. The Gazelle S1218i-PWR(B) supports PoE function with 4 IEEE802.3at ports or 8 IEEE802.3af ports, and a 110VDC power supply. The network redundancy and reliability are guaranteed with LACP, G.8032 ERPS (sub-30ms switchover time) for all of them. All these switches adopt low-power fanless cooling technology with a wide operating temperature ranging from - 40 to 85˚C, and ensure up to 35-year Mean Time Between Failures (MTBF) and a 3-year warranty.

Gazelle S1218i-2GE-8FE(A)

Gazelle S1218i-8GE-PWR(A)

Gazelle S1218i-14GE(-PWR)(B)

Series	Gazelle S1218i(A)		Gazelle S1218i-PWR(A)	Gazelle S1218i(B)	
Model	Gazelle S1218i-2GE-8FE(A)	Gazelle S1218i-2GE-16FE(A)	Gazelle S1218i-8GE-PWR(A)	Gazelle S1218i-12GE(B) Gazelle S1218i-14GE(B)	Gazelle S1218i-12GE-PWR(B) Gazelle S1218i-14GE-PWR(B)
port number & type	2 x 10/100/1000M bypass M12 + 8 x 10/100M M12	2 x 10/100/1000M bypass M12 + 16 x 10/100M M12	2 x 10/100/1000M bypass M12 + 6 x 10/100/1000M M12 PoE	4 x 10/100/1000M bypass M12 + 8/10 x 10/100/1000M M12	4 x 10/100/1000M bypass M12 + 6/8 x 10/100/1000M M12 PoE + 2 x 10/100/1000M M12
Management port	Console interface: M12 Power interface: M23			Console interface: M12 Power interface: M23	
Dimension(mm)	262(L) × 189(W) × 56(H)			440(L) × 300(W) × 44(H)	
Weight(kg)	2.5KG			4.7KG	
Power Supply	DCW24/D, DCW24/S DCW48/D, DCW48/S DC110/D, DC110/S AC/D, AC/S		DC48 DC110	DC110/D, DC110/S	DC110
Voltage Scope	DCW24:12/24VDC(10~36VDC) DCW48: 24/48VDC(20~72VDC) DC110: 110VDC(66~154VDC) AC: 110/220VAC(85~264VAC) 110/220VDC(88~300VDC)		DC110: 110VDC(66~154VDC)	DC110: 110VDC(66~154VDC)	
Dual Power	DC: single/double power AC: double power		DC110: single power DC48: single power	double power	
MAX power(W)	12W		DC110: 15+60W DC48: 15+180W	18W	23+150W
MAX POE power(W)	N/A		DC110: 60W DC48: 180W	N/A	150W
Jumbo Frame	9KB		1632B	12KB	
Switch Capacity (Gbps)	5.6	7.2	5.2	56	
Certification	CE, FCC, EN50121-4, EN50155 certification				
Complaint with	Complaint with UL				
IP Code	IP67			IP40	

3G/4G Router

Gazelle R102i, Gazelle R202i, Gazelle R202i-VM

The Raisecom Gazelle R101i/R102i/R202i/R202i-VM series provides solutions that satisfy the requirements for SME and outdoor networking deployment scenarios, such as financial industry, environmental protection, transportation, postal industry, monitoring, military, meteorology, utility and residential areas.

The Gazelle R102i/R202i/R202i-VM allows up to 6 Ethernet-based devices to simultaneously use a single cellular data account for primary or backup network connectivity to remote sites and devices. By integrating routers, switches, firewalls, VPN, and 3G/4G in a single device, the Gazelle series provides the high performance, which is essential for concurrent services. These services include firewall, content filtering, encryption for VPNs, cellular data for mobility, data storage with USB 2.0, and quality-of-service (QoS) features for optimizing voice and video applications at broadband speeds. The use of this device significantly reduces both equipment and management costs.

Gazelle R102i

Gazelle R202i-VM

Gazelle R202i

Features/Device List	Gazelle R102i	Gazelle R202i-VM	Gazelle R202i
10/100/1000M Base-TX ports	N/A	1 port	6 ports (2 x SFP+4 x RJ45)
10/100M Base-TX ports	4 ports	4 ports	N/A
3G Uplink	WCDMA		
4G Uplink	N/A	FDD/TD-LTE compatible (dual 4G modules)	FDD/TD-LTE compatible (dual SIM cards)
Serial Interfaces	RS232/485/422 (DB9)	N/A	RS232+RS485 (PIN)
Power Supply	DC12V	DC12/24V	
Wi-Fi	N/A	802.11b/g/n	
Security	IPSec, L2TP GRE VPN, Anti-DoS, Anti-ARP, Anti-Scanning		
Routing	Static routing	Static routing, RIP, BGP(VRF)	
Function	IGMP Proxy/Snooping, PPPoE, NAT NAT/PAT, DHCP and DNS/DDNS, DMZ function		
Temp Range	-25˚C to 70˚C		
IP Level	IP40		
Installation	DIN-Rail	Wall-mount	DIN-Rail
Management	Serial control platform, CLI, Telnet, Web management and SNMP (NView compatible)		
Certification	IEC61850-3 and IEEE1613 compliant		

Chapter 7. PCM for SCADA

The Raisecom PCM for SCADA has been designed especially for utility, industry, transportation and military application projects where special requirements must be fulfilled for mission-critical data and voice traffic. In addition, PCM helps users benefit significantly from maximum network extendibility over existing network infrastructures. The central platform RC3000-15/6, also known as the Multi-Service chassis, delivers and integrates narrowband and broadband services transmitted by the RC3000E at the remote side. The modular design of RC3000E chassis allows providers to benefit from maximum flexibility to achieve specific requirements and goals, while keeping their Total Cost of Ownership (TCO) under control. The Raisecom SCADA solution is known for its robustness and reliability in access networks. This solution gained and is gaining its popularity in the following industries: power grid, water and natural gas, oil, mining and national security, public health and transportation.

Multi-Service Chassis

RC3000-15

The Raisecom RC3000-15 is an intelligent multi-service access platform and is mainly applicable in dedicated networks, Utilities and Transportation transport networks. The device is a Digital Access and Cross-connect System (DACS), which integrates the following functions: digital/analog access, cross-connection and transmission. RC3000-15 is compatible with the Multi-Service Terminal Mux and can be synthesized under the Raisecom NView system for real-time configuration, management, monitoring and trapping.

RC3000-15

FEATURES

- Available with 4 x STM-1 and 2 x GE at line side; 7U chassis with 15 slots
- Non-blocking cross-connect of up to 4096 DS0 channels
- EOS
- 1+1 protection over STM-1 optical interface
- Available with sub-cards supporting electrical/optical E1, FE, FXS, FXO, 2/4W E&M, magneto, hotline, dry contact, co-directional 64K, V.24, RS232, RS422, RS485 at client side
- Configurable E1 interface gain mode to expand transmission distance
- A software configurable attenuation of each TX/RX channel with increments of 0.1dB for voice modules
- Link Capacity Adjustment Scheme (LCAS) for inverse multiplex modules
- DXC module supports alarm input and output, external clock supports 2Mbps and 2MHz
- All sub-cards hot-swappable
- 1+1 protection over E1 and PSU/DXC cards
- Power supply and fan modules with monitor
- Auto Laser Shutdown (ALS) and Build-in BERT
- Inside and outside loopback for individual tributary cards
- VCC channel for remote network management
- SNMP (NView compatible) via in-band and out-of-band network channels

P/N	RC3000-15
Size/slot	7U/15-slot
Cross connect	512 Mbps
STM-1 interface	4
E1 channel	88
FXS/FXO channel	352
E&M channel	176
V.24 channel	88
RS232 channel	176
FE port	88
Magnet interface	120

System and Sub-cards

• RC3000-15-A, 7U/15-slot chassis with ventilation modules only
• RC3000-15-DXC, system management & Control Card
• SUB-BITS-CLK, insert on the DXC card to provide 2Mbit and 2MHz external clock function
• RC3000-15-STM1, SDH aggregated unit with two STM-1 optical interfaces with SFP connector, 4 FE interfaces and 4 E1 unbalanced or balanced interfaces with DB37 connector
• RC3000-15-8E1, E1 tributary unit with 8E1 unbalanced or balanced interfaces, support one-plus-one port/card protection
• RC3000-15-P240-4FE-OPT-S1, PDH tributary unit with dual optical interfaces for redundancy and 4 FE interfaces and 8 E1s transmission capacity
• RC3000-15-32FXS, 2-wire Foreign Exchange Subscriber (FXS) interface card, 32 interfaces per card, DB37 connector
• RC3000-15-32FXO, 2-wire Foreign Exchange Office (FXO) interface card, 32 interfaces per card, DB37 connector
• RC3000-15-8S8O, 2-wire FXS and FXO interface card, 8-channel FXS and 8-channel FXO interfaces per card, DB37 connector
• RC3000-15-16E&M, 2/4 wire E&M interface card, 16 interfaces per card, HDB26 connector
• RC3000-15-8ETHP, High speed Ethernet interface card, which provides 8 channels 10/100 Base-T Ethernet port, data rate: N×64Kbps (N=1~31)
• RC3000-15-8RS232H, low speed RS232 data interface card with handshaking, up to 57.6Kbps RS232, 8 interfaces per card with RJ45 connector
• RC3000-15-8RS485, low speed RS485/RS422 data interface card, up to 38.4Kbps RS485/RS422 data, 8 interfaces per card with RJ45 connector
• RC3000-15-8V24H, low speed V.24 data interface card with handshaking, up to 128Kbps V.24 synchronous data 8 interfaces per card
• RC3000-15-16C64K, G.703 Co-directional of 64Kbps data interface card, 16 interfaces per card, RJ45 connector
• RC3000-15-TP, Teleprotection card, support 4 ST optical interfaces and optical interface 1+1 protection, and support capacity compression. Services of each interface only occupy "1+N" (N = 1–12) 64 Kbit/s timeslots at the line side when they are multiplexed

Multi-Service Terminal Mux

RC3000E

RC3000E is a standalone multi-service terminal mux that uses E1 circuit resources in order to provide digital and analog accesses, multiplexing, voice and data cross-connections and transmissions. The product can be deployed in a variety of network topologies, such as point-to-point, chain, star and mesh. The 1U compact device also utilizes a wide range of interfaces for narrowband and broadband access.

FEATURES


RC3000E

• Available with 1 uplink slot and 3 downlink slots
• Supports non-blocking cross-connect of up to 512 DS0 channels
• Available with uplink card 4/8 channels electrical E1 or optical E1+FE interface
• Available with sub-cards supporting FXS/FXO, E&M, V.24, RS232, RS422, RS485, G.703 co-directional 64K and 10/100M Base-T Ethernet at the client side
• 1+1 protection over electrical E1 interfaces and PSU cards
• Hot-swappable for all sub-cards
• Built-in BERT
• Remote configuration control and performance monitoring
• Software configuration alarm output function
• CLI, Telnet and SNMP (NView compatible)

Chapter 8. Last Mile Access

The Raisecom last mile access product line offers flexibility and robustness for diverse data and voice applications at a low cost, with minimum deployment effort and optimized administration, management and operation. The product line includes the best-selling mini-SDH, interface converter, fiber optical modem, FiberMux and multi-service modem pool and chassis.

Multi-Service Fiber Mux

RCMS2902-60FE-BL, RCMS2912-4(8)E1T1GE

The RCMS2900 series is a multi-service Fiber Mux, designed mainly for scenarios of small or medium enterprise access and 2G/3G mobile backhaul. The RCMS2902-60FE-BL and RCMS2912-4(8)E1T1GE are modular devices that can work in RC001-002 series chassis supporting both local and remote management via NMS. The RCMS 2900 series is typically used for point-to-point scenarios, or aggregated by an iTN2100 multi-service access platform.

RCMS2902-60FE-BL

RCMS2912-4(8)E1T1GE

P/N	RCMS2902-60FE-BL	RCMS2912-4(8)E1T1GE
Client side	2 x E1+1 x FE	4/8 x E1/T1 + GE
Line side	1 x F.O. interface	2 x F.O. interfaces (1+1 protection)
Loopback	Local/remote loopback	
MTU	1,916 Bytes	9,728 bytes
VLAN, QinQ, QoS	N/A	
Switching mode	N/A	
Rate limit	Supported	
Flow control	Supported	
Alarm	Remote power off alarm	
Inner bit error tester	Supported	
Fault pass through	Supported	
Management	CLI, Telnet and SNMP (NView compatible)	

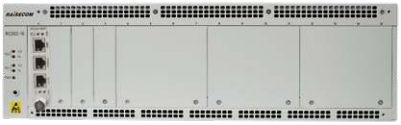
Multi-Service Modem Chassis

RC002-16

The RC002-16 is a 19" 3U height rack-mountable chassis, in which up to 16 service modules can be installed. It provides a CO/POP site solution for connecting up to 16 remote customers. The chassis is SNMP manageable with an SNMP agent module, which takes up one of the sixteen slots. Each service module in the RC002-16 operates in a point-to-point topology with a remote unit. The two devices work independently and do not influence the operation and management of the other modules in the same chassis. All modules, including the SNMP agent module, are hot-swappable. One AC or DC power supply module is able to support a full chassis of service modules regardless of service types. The RC002-16 can use two power supply modules to provide a redundant and flexible power supply solution for the customers. When working with the SNMP agent module RC002-NMS1, all the service modules in the RC002-16 can be network managed on the GUI of the Raisecom NView NNM system.

FEATURES

- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Flexible and redundant power supply modules
- Cascade up to 4 chassis with maximum management capacity of 60 pairs of service cards
- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Flexible and redundant power supply modules
- Cascade of up to 4 chassis with maximum management capacity of 60 pairs of service cards



RC002-16

Single/Double-Slot Chassis

RC001-1, RC001-1M, RC001-1D, RC001-2D, RC001-2M

RC001 single and double slots chassis series is designed for telecom carrier and important enterprise users in the fields of finance, electric power, oil and gas industries. When fixed into a RC001 chassis, the modular media converters, fiber modem, multi-service fiber mux, interface converters, CWDM, G.SHDSL modems and other modules, which are all designed for 1U slot, become stand-alone and network-manageable equipment.

The built-in SNMP agent module of the RC001 provides network management function, such as configuration management, diagnostics, and loop activation, monitoring and fault management. The RC001 has one console port, one Ethernet port and 1/2 slot for modular device on the front panel. The AC and DC power supply connectors on the rear panel of the chassis provide users with the flexibility of using an AC power supply, a DC power supply, or both.

FEATURES

- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Flexible and redundant power supply modules
- Cascade up to 4 chassis with maximum management capacity of 60 pairs of service cards
- Rack-mountable 3U chassis for housing and network management of up to 15 service cards
- 16 slots of plug-in cards including RC002-NMS1/RC001-NMS2 as SNMP agent
- Flexible and redundant power supply modules
- Cascade of up to 4 chassis with maximum management capacity of 60 pairs of service cards

RC001-1D

RC001-1

RC001-2D

RC001-2M

RC001-1M

P/N	RC001-1	RC001-1M	RC001-1D	RC001-2D	RC001-2M
Size/Slot	1U/1-slot	1U/1-slot	2U/1-slot	2U/2-slot or 2U/1-slot	
Power supply	AC/DC/WP	Single/dual AC Single/dual DC Single/dual WP, AC+DC	AC/DC/WP	Single/dual AC Single/dual DC Single/dual WP, AC + DC	
Power protection	Overcurrent/short circuit protection	Overcurrent/short circuit/overheat protection	Overcurrent/short circuit protection	Overcurrent/short circuit/overheat protection	
Management	Remote CLI, Telnet and SNMP (NView compatible)	Serial Line Control, Local/remote CLI, Telnet and SNMP (NView compatible)	Remote CLI, Telnet and SNMP (NView compatible)		Serial Line Control, Local/remote CLI, Telnet and SNMP (NView compatible)

Ethernet over Fiber

RC552-FE, RC552-GE

RC552-FE and RC552-GE are carrier-grade media converters designed for business access. The series offers advanced 802.3ah OAM features and redundancy, as well as high reliability enabled by 1:1 dual-homing uplink protection at both port and system levels. The series can be deployed in both point-to-point and point-to-multipoint topologies. Installed in the Raisecom RC002 chassis, the device can be managed by the Raisecom NView NNM system via the SNMP agent. It also supports a web management that simplifies remote troubleshooting and maintenance.

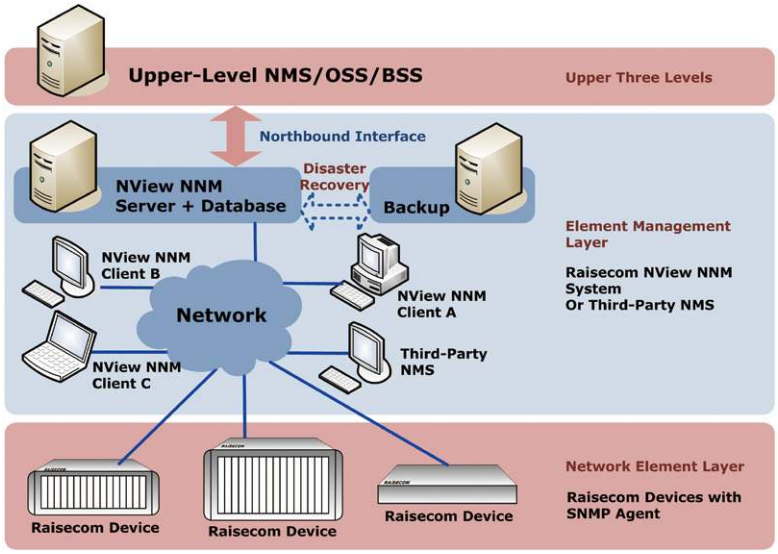
P/N	RC552-FE	RC552-GE
Client side	1 x 10/100M Base-T	1 x 10/100/1000M Base-T
Line side	2 x 100M Base-FX SFP	2 x 1000M Base-X SFP
Protection	1:1 uplink protection	
VLAN, QinQ	Supported	
OAM	802.3ah	
Rate limit	Supported	
Fault pass through	Fault pass through	
Certification	MEF9, 14	
Management	Web Management and SNMP (Nview compatible)	

RC552-FE

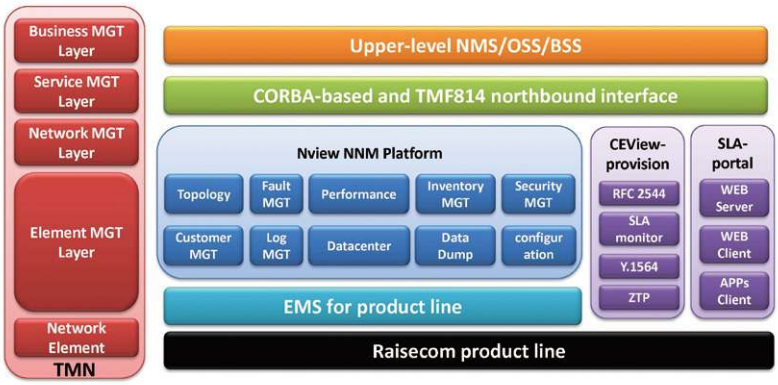
RC552-GE

Chapter 9. Network Management System

The ultimate goal of developing a network management system is to maximize the network efficiency and minimize. The Raisecom Network Management System NView NNM covers the two lowest layers of the TMN architecture. With a design is based on the FCAPS model, this software includes fault, configuration, performance and security management functions. A northbound interface is also available on the system for the integration of network management systems, implementing full FCAPS functions on the last three levels of the TMN architecture.



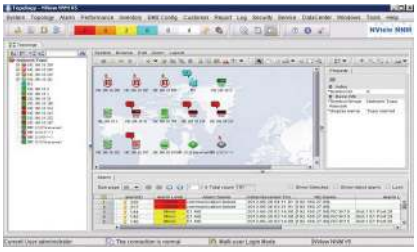
The Raisecom NView NNM system is a Client/Server structured system, in which several clients can work with one server to ensure efficient device monitoring and managing. All Raisecom network manageable products include built-in SNMP agents allowing them to communicate with Element Management Systems (EMS). They also integrate a uniform platform, consisting of topology, inventory, configuration, customer, fault, performance and security management components, to administer all equipment in the network in one topology. Third-party NMSs can directly manage Raisecom network manageable devices by using Raisecom MIBs.



In addition, an upper-level NMS/OSS/BSS can share data and results on the NView NNM system through the northbound interface. The system also provides a disaster recovery solution, protecting the server from fatal disasters and ensuring continuous running of the system by setting up a backup server and keeping it constantly synchronized with the main one.

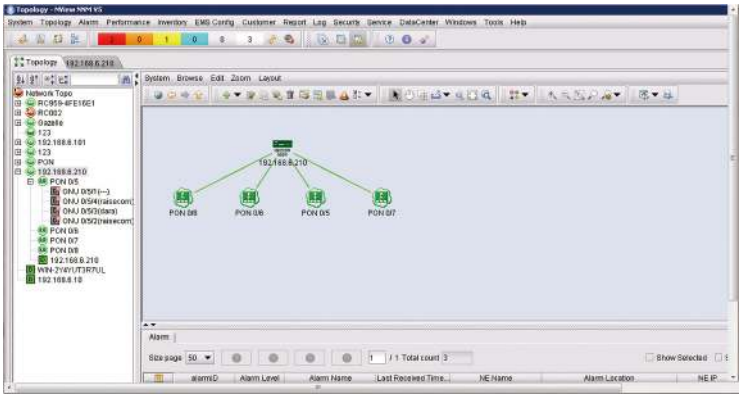
Topology Management

The Raisecom NView NNM system displays all the graphic network elements and links. Dynamic network status indicators and alarms are displayed according to port, card, device, sub-network and network topology, facilitating monitoring and directing the users clearly to the relevant information.



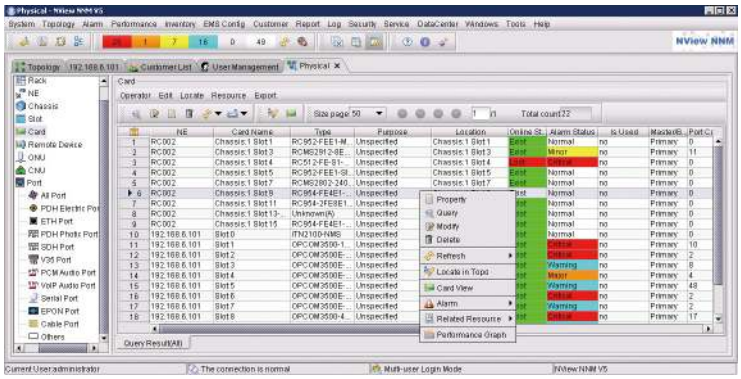
- Multi-level topology displaying
- Manual or automatic topology arrangement
- Device node auto-discovery mechanism
- Device sub-graph auto-drawing mechanism
- Network topology pre-planning mechanism
- Clear indication of current alarm status and

device offline status
- Quick location of point of failure in the network
- Topology style customization



Inventory Management

All resource-related information is displayed from different viewpoints in the inventory management module to assist network operators to manage resources uniformly and to provide a reliable basis for further network expansion.

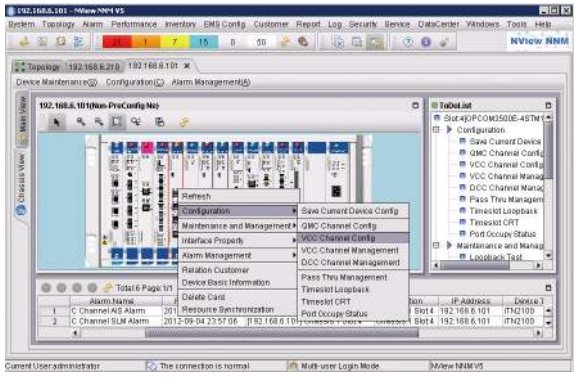


- Unified management tool for resources, such as devices, chassis, slots, cards, and ports
- Comprehensive resource description, including customer and fault information
- Uniform query platform for rapid search of resources
- Synchronization mechanism that guarantees the system showing real-time status of network resources

Configuration Management

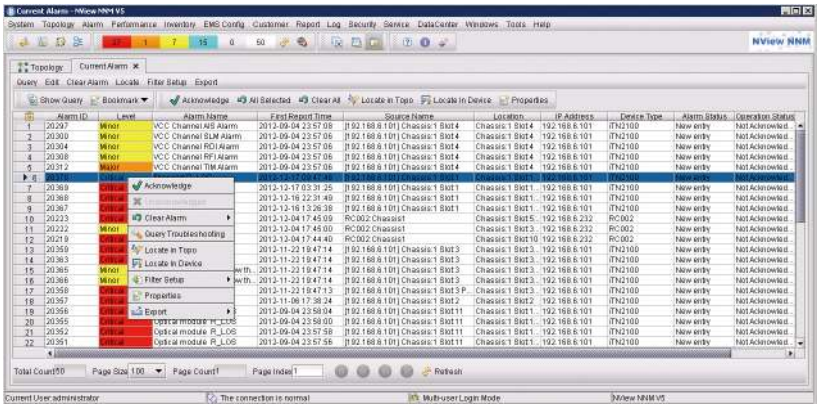
Configurations can be distributed to devices across the network. Easy management and provisioning is provided by a user-friendly point-and-click GUI with a realistic representation of devices.

- Uniform platform for different EMS systems, different devices share topology, resources, fault, performance, security functions
- User-friendly device status displayed on device panels drawn by EMS
- Real-time status feedback for every device configuration
- Data center provided for centralized management of firmware upgrade and configuration file upload/download
- Batch configuration of SNMP parameters
- Zero configuration mechanism



Fault Management

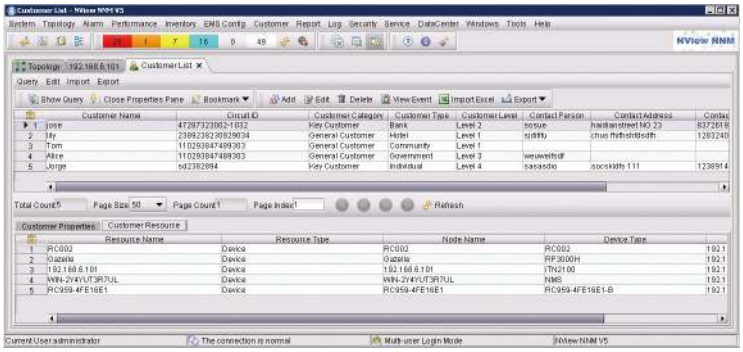
The Raisecom NView NNM system supports advanced fault detection and analysis functions, and realizes real-time monitoring and timely fault reporting. Full-scale alarm management information, such as alarm statistics, alarm location, alarm status, etc. helps the network operator restore devices to their original working configuration when necessary.



- Standard five-level alarm display
- Separate lists for current and historical alarm management
- Grouped alarm monitoring interface, defined according to customer requirements
- Customized alarm filter rules that enable the display of events in order of importance
- Automatic alarm lists clearing service
- Alarm forward service that forwards alarms received on NView NNM to third-party platforms via SNMP
- Alarm locating and troubleshooting library to ensure quick and easy fault removal

Customer Management

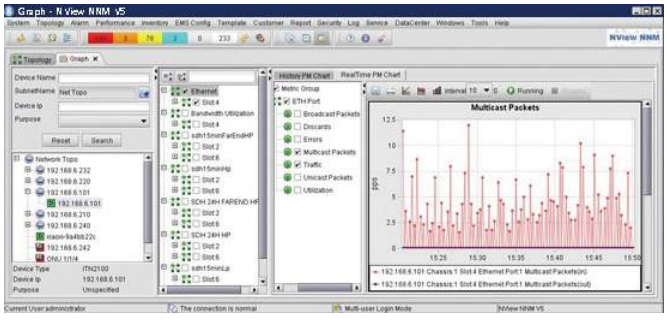
The Customer Management module establishes the correlation between devices and customers to ensure efficient handling of information, particularly in the event of abnormal operation, when it is essential to troubleshoot and to quickly establish the problem that will bring about a more rapid solution



- Centralized customer information management
- Customer-based resource management
- Customer-based fault management
- Import and export of customer information

Performance Management

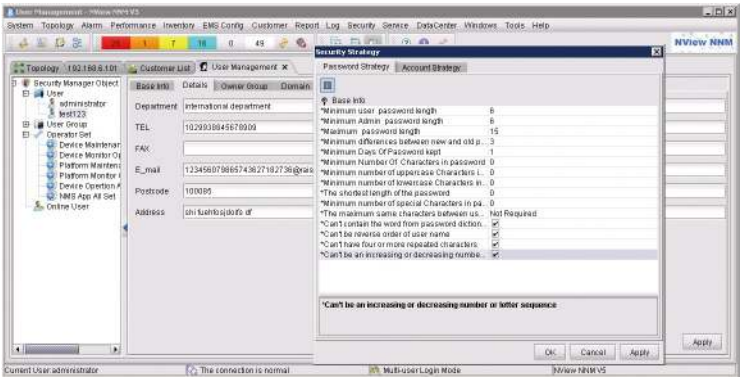
The NView NNM performance management function supports real-time monitoring of the SDH and Ethernet service performances to produce real-time as well as historical statistics for different periods. In addition, it also provides the basis for troubleshooting, fault speculation and network optimization.



- Uniform performance management system for all devices under management
- Tailored deployment for network of different capacity
- Monitor device CPU and RAM utilization
- Collect PON/Ethernet/UNI/SDH port current and historical performance data
- Performance graph based on performance data collected
- Performance data export
- Actual performance metrics based on ITU-T Y.1731/SLA
- Metric template management

Security Management

A number of user profiles and groups can be created in the security management module. However, only authorized users are allowed to login to the NView NNM system and operate it. This function protects all information on the system against illegal access, unauthorized use and other hazards.



- Multi-domain multi-authority management
- Different user profiles have different read and/or write authorities over devices in different subnets
- Client access control mechanism
- Unauthorized login deny mechanism
- Maintains system and device operation logs and supports log export

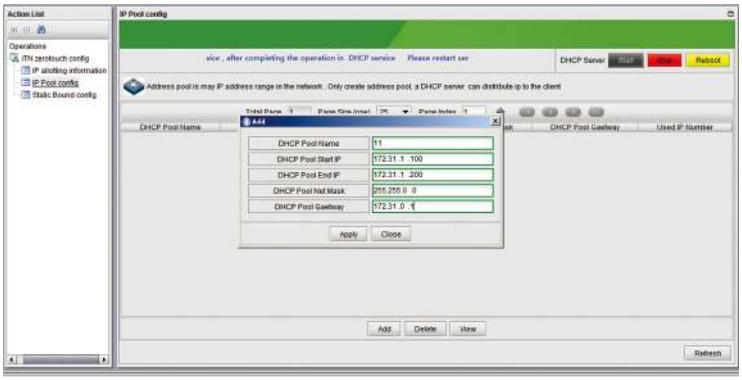
Web Management

Web management can help network operators to manage devices based on GUI interface via a web browser. It supports user management, configuration management, traffic statistics and devices status monitoring. Combined with Raisecom NView NNM system, it can also recognize fault management. All these functions can minimize overall operational costs and reduce provisioning times.

- User-friendly, intuitive graphical configuration interface
- Operator authorization levels
- Unauthorized login deny mechanism
- Synchronization mechanism ensuring real-time status update of the devices

Zero Touch Provisioning

In modern Carrier Ethernet networks, providers must consider a cross-functional automation that efficiently integrates commissioning, activation, inventory, fault, performance and network management. The challenging combination of the above capabilities is required for ensuring prompt new services launching, highly scalable network, effortless equipment roll-out and highest maintenance. In order to achieve such a level of automation, providers require an accurate and granular performance monitoring mechanism, combined with a fully-automated activation system.



Zero touch provisioning allows service-providers to facilitate remote devices automatically without manual intervention. When remote devices are physically connected to the network and booted, the initial management IP can be automatically distributed to remote devices based on DHCP. When this occurs, the configuration and software updates can be automatically loaded into remote devices via a service template to perform a simple deployment minimizing human errors.

This mechanism ensures lean TCO and therefore guarantees the modernization of packet networks.

- Simple procedure: Rack, connect and power on
- Diverse and editable service templates
- Topology auto-discovery mechanism
- Physical and logical graphic representation of links and nodes

SLA Portal

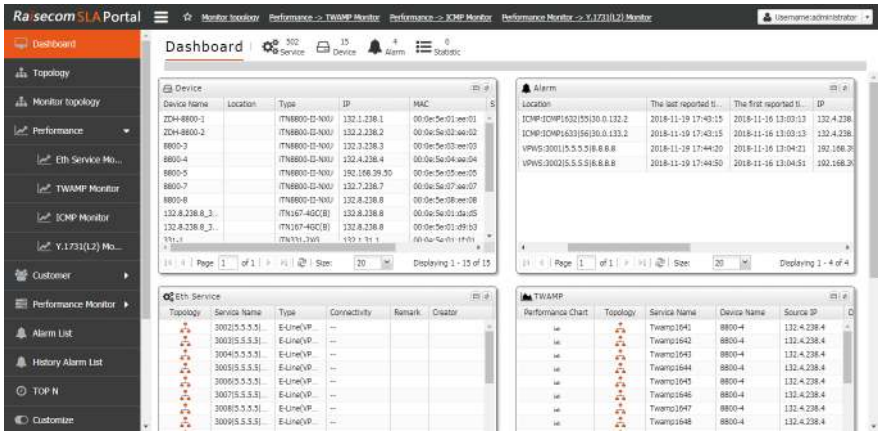
SLA portal provides various ways to real-time monitoring performance data that is collected from probes, includes of web client and APP client installed on the IOS or Android system.

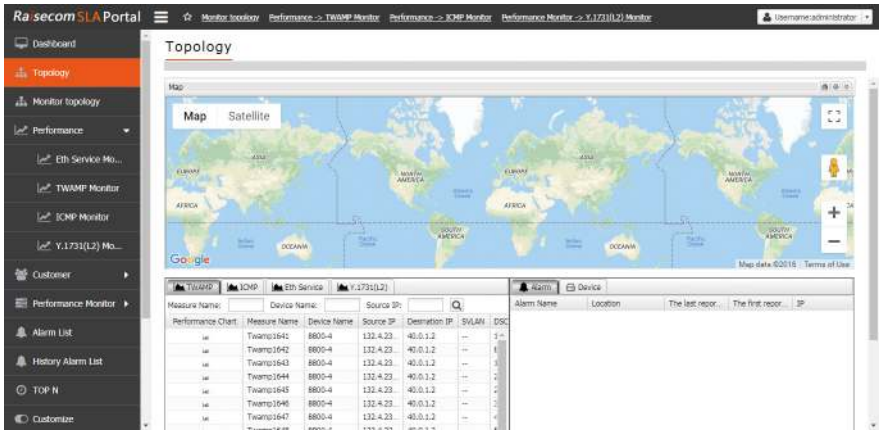
In addition, an upper-level NMS/OSS/BSS can share data and results on the NView NNM system through the northbound interface. The system also provides a disaster recovery solution, protecting the server from critical disasters and ensuring continuous running of the system by setting up a backup server and keeping it constantly synchronized with the main one.

In addition, SLA portal provides real-time monitoring to the devices performances collected from probes, and displays results from web client or IOS/Android smart phone APP client. Customer can export the performance report from smart phone.

The Raisecom SLA portal makes it simple for providers to optimize their network management. The easy management and monitoring result in a reduced workload. In addition, the simple operation and visual reports provide an improved service monitoring experience for customers.

- SLA KPI collection: Support collection of FD, IFDV, FLR, Bandwidth, Bandwidth Utilization
- Graphs: History and Real time display
- Export report: Support exporting history and Real time report
- Alarm: KPI exceed threshold, Device offline
- Logo: Customized Logo
- MAP: Support Google map
- WEB client: http, support IE10+/Firefox/Chrome/Safari browsers
- APPs: IOS, Android
- Capacity: 1000 total, 200 online, 20 concurrency





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