China Advance Info-Optical Network

Heqing Yi * Jianguo Yu **

Wuhan research institute of post and Telecommunication
P.O:430074 FAX：02787691548 TEL：02787691599

FAX: 01062772039 TEL: 01062772038 Email: yujg@moon.bjnet.edu.cn

Abstract: the background of CAINONET, four objects and main content of CAINONET are introduced in this paper.

Keywords: Optical Internet, Optical cross-connect equipment, Optical add-drop equipment, Core router.

1. THE BACKGROUND OF BUILDING CHINA ADVANCE INFO-OPTICAL NETWORK

When people plaint the tempo of computer, the network bandwidth of internet is boosting ahead as the tempo of three computer development，namely turn over within six month。According to the forecast at present，the operation in the north American will soon exceed that of voice.

Approximately year，China date network rapidly developed，date operation increased in very fast speed, data network（CHINAPAC、CHINADDN、frame relay）achieve definite scale, and play an important action in country economy development. But the bandwidth of network is very finity. The main problem is that the production of network depend on importation, especially advanced performance network production, lack advanced network experiment circumstance, hard to validate and test performance and technology of production inside and outside the on large scale .The research institute and management lack of testbed of larger cover range and moderation scale of technology validation .

In order to satisfy the above requirements, explore the development mode of network in the future, establish demonstration ,accelerate the China development in advance performance network technology ,at one time , there is testing to advance production in the world ,Department of science and technology authorize 863 information domain actualize the plan of CAINONET project(China advance info-optical network).

The object of China advance info-optical network

- The following four objects will be realized on the bottom of March, 2001:

The first important object is to build China advance info-optical network on base of optical internet technology; to connect a part of important science research institutes and famous colleges and universities in Beijing area.

The second, CAINONET will be the flat roof to check and accept the fruit of 863 information domain， integrate main fruit of 863 information domain approximately years.

The third, develop key technology research of optical Internet，emphasize innovation，develop technology system and technology standard and suggestion of optical Internet of freedom knowledge property right.

The fourth，induct domestic research group and enterprise to energetically develop research of network telecommunication technology; freedom develop advanced routers, all optical network equipment and access equipment; develop "863" research fruit of advanced level, symbol and freedom knowledge property right, accelerate these fruit to form industrialization.

The main content including introduces CAINONET IP core network framework, optical network framework and structure of core router, optical cross connects equipment and optical add-drop equipment.

2. THE MAIN RESEARCHING CONTENT ABOUT CHINA ADVANCE INFO-OPTICAL NETWORK

- The main content of optical network:

Development objective of Optical add-drop device: be provided with software configurable，four wavelength of add-drop，sustain fault management ，configure management，performance management and security management .The eight wavelength fitting G.692 suggestion may through or add-drop by OADM.

The developing objective of optical cross connect device: To provide with four double direction interface of optical fiber transmission ,every fiber can transport eight wavelength fitting G.692 suggestion .Equip with network element management ,and can sustain optical network management.

The optical network configure of CAINONET is described as Fig.1. OTU finish wavelength converter, receive and transmitting in optical network topology structure，convert the signal of IP ,SDH ,PDH from router or termination into standard WDM signal ,and enter OXC or OADM optical network .Optical network is of the function of bybass routing ,wavelength channel protection ,to support the best router for computer network and support transparency operation and enough bandwidth.

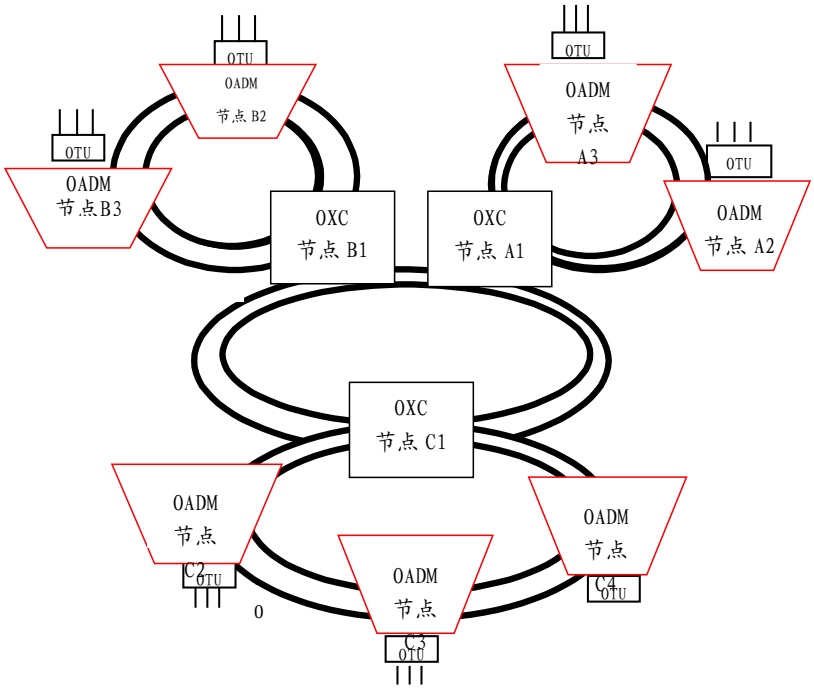

图 1：the topology structure of CAINONET optical network

- **COMPUTER NETWORK STRUCTURE**

CAINONET will adapt following IP network topology，the link connecting CSR is DWDM wavelength。（IP address is suppose）

The research objective of CSR :can support the technology of IP/DWDM and IP/SDH ,require to reach the transmit speed of 20Mpps ,adopt module structure , sustain 2.5Gb/s optical network interface and 10/100Base-T and gigabit Ethernet interface ,can sustain the access of edge router and integration access server .It is one of core devices of CAINONET.

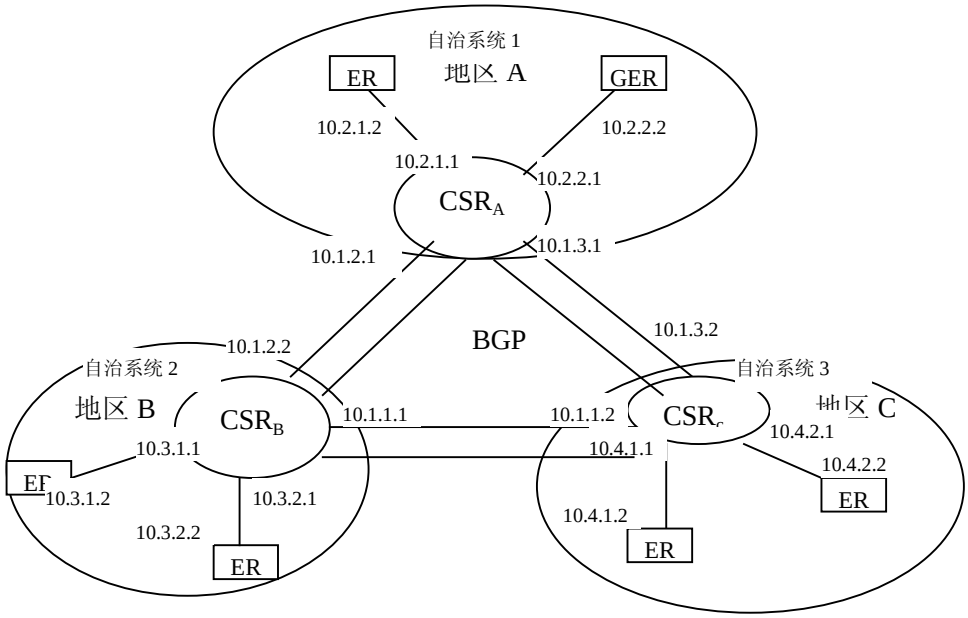

Figure2：IP network topology figure of CAINONET

- **CAINONET whole structure**

The topology structure of CAINONET is MASH optical network being composite of OXC device， can realize wavelength switch , there is of the function of channel protect basing on wavelength . Outer layer is self-heal rings of OADM，every OADM node is of add-drop function and expansibility and protect function basing on multiple section . The signal of SDH PDH ATM can be accessed from it in or out interface . The two layer optical node device is make up of core optical network , it is charge of optical transport and wavelength switch . There is CSR in outer layer of optical network. It realize IP package switch. The rate of transporting package is over 20MPPS in CSR . The outer layer of CSR is UAS and ER.

3. CONCLUSION

IP/DWDM is main selection on large scale connection network over several zone in the future, the intrinsic cause is the development of DWDM technology , accelerate the cost price to go down , therefore inpel the hire operation of optical channel continue development .

The first advanced info-optical of China based on IP/DWDM optical internet, it is of freedom knowledge property right, it is large network composed of CSR, OADM, OXC and the number of nodes is more than 13.

The problem to be solve is: the network management of SDH device must be shared by IP with DWDM devices. Therefore the relative protection ,renew and bandwidth management must be developed.

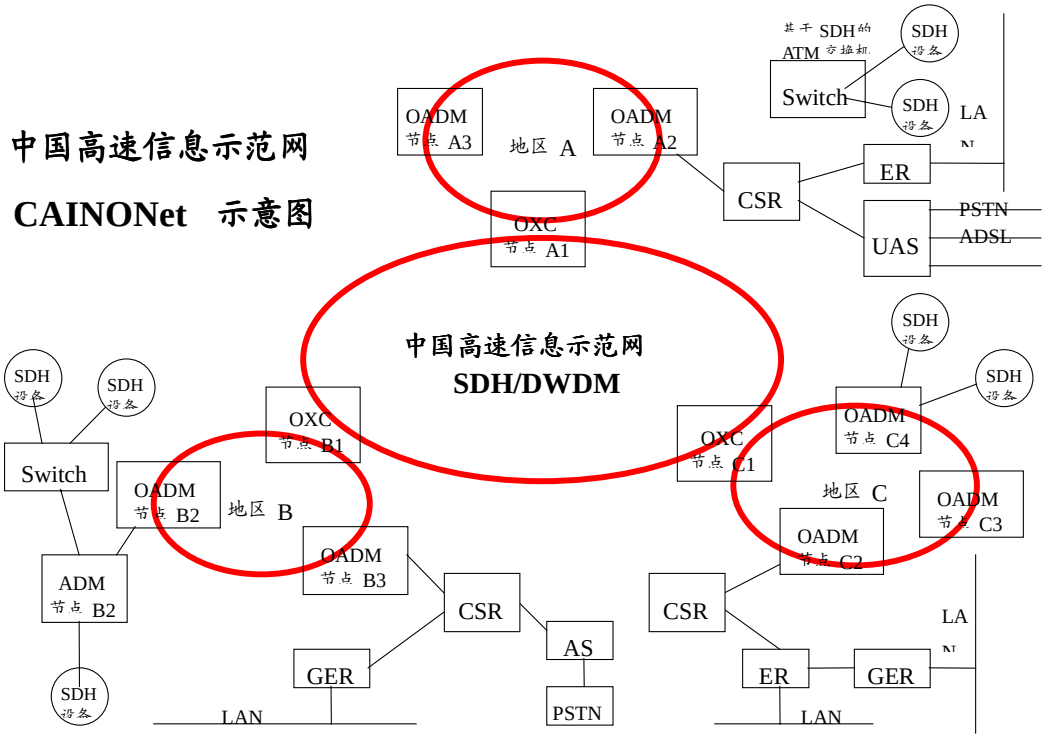

Fig. 3 network topology of CAINONET