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SMART SYSTEM OF FAST INTERNET ACCESS DEVELOPMENT USING BACKBONE NETWORK METHOD

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Abstract

Backbone is a channel or high-speed connection that becomes the main path in a network. Network backbone is a network that connects multiple networks with low speed through the gateway. Backbone in the internet is a network that connects the network between countries and even between continents. With this internet backbone then we can connect with people in various parts of the world very easily and in a very short time. In addition, the coverage of this backbone is also very wide compared to other technology technologies. In addition, the backbone in the computer network also provides a huge range of benefits for computer users. System design is a part of a planning concept. Before doing the design, then first done the analysis process to be known and identified problems and needs that exist in the company related to what will be done and needed. In this case the system design for the manufacture of Internet backbone network. Development of Backbone Network is a network development method that has access capability to anticipate access problems in work system using internet network technology. Then the need for the ability of internet network support technology such as internet network Backbone model.

Keyword: Internet Network, Backbone Network of Development Method

I. INTRODUCTION

The world of telecommunications today has undergone many changes, from manual communication between two or more people to communications made through the intermediate of sophisticated communication equipment (telephone, fax etc.). Along with the development of science, the media used to communicate mangalami many changes and many types. The exchange of information at the present time can be done by accessing a computer that has been connected to the network, the type of own network itself can generally be classified into two types namely, the global network or often referred to as the Internet network and local network or often referred to as an intranet network. To be able to connect with the internet network a user must have a path that can provide facilities to be able to receive and send packets to and from the internet. At this point the path is very easy to get, one of them is by using the service of Internet Service Provider or ISP. Along with the increasing number of ISP service users then the data sent over the Internet network will increase exponentially, this will cause the existing traffic on the internet network is very solid. Especially with the prediction that all communication systems will someday switch to NGN (Next Generation Network), whose system will depend on IP-base will certainly make the data network more complex.

1.1 Problem Formulation

Problem Formulation Developing an internet backbone network system using an internet backbone network based on routing protocol and multihomed BGP with load balancing method can create internet backbone network.

1.2 Development Goals

The purpose of this research is to develop internet backbone network system that has been running on the company's internet service provider. Where internet backbone network system is developed to improve

the quality of internet service company to the customer, so that company there is no difficulty when happened interference at one of upstream internet.

I. LITERATURE

The Internet is a network of computers that are connected to the world without recognizing territorial, legal and cultural boundaries. Physically analogous as a spider web (The Web) that envelop the globe and consists of points (nodes) are interconnected. Nodes can be computers, local networks or communications devices, while the connecting line between vertices is referred to as the backbone of terrestrial communication media (cable, fiberoptic, microwave, radio link) or satellite. Nodes comprise information centers and databases, computer equipment and network interconnection devices and equipment used by users to locate, place and or exchange information on the Internet. Dipo (2010) explains: Internet history began in the late 1960s when the United States Department of Defense (DoD) required a new standard for Internetworking communications. That is the standard that is able to connect any type of computer in the DoD with computers belonging to military contractors, research and scientific organizations at the university. This network must be robust, secure and damage resistant so that it can operate within minimum conditions due to disaster or war. Dahlan (2010): although physically the Internet is an interconnection between computer networks but in general the Internet should be viewed as an information resource. The content of the Internet is information, can be imagined as a database or multimedia library is very large and complete. Even the Internet is seen as a world in another form (maya) because almost all aspects of life in the real world is on the Internet such as business, entertainment, sports, politics and so forth.

Backbone is a channel or high-speed connection that becomes the main path in a network. Network backbone is a network that connects multiple networks with low speed through the gateway. Backbone in the internet is a network that connects the network between countries and even between continents. With this internet backbone then we can connect with people in various parts of the world very easily and in a very short time. In addition, the coverage of this backbone is also very wide compared to other technology technologies. In addition, the backbone in the computer network also provides a huge range of benefits for computer users.

Analysis of the current internet backbone system requires the necessary data to provide broad and feasible information for the company and for network administrators. So with the analysis of the system, can provide a description of a system to be known to what extent the needs of information that has been handled on the system running and how to meet the needs of information that can not be met can provide solutions to apply in the process of design stage of the system forward. Here is a model of backbone network system that is developed.

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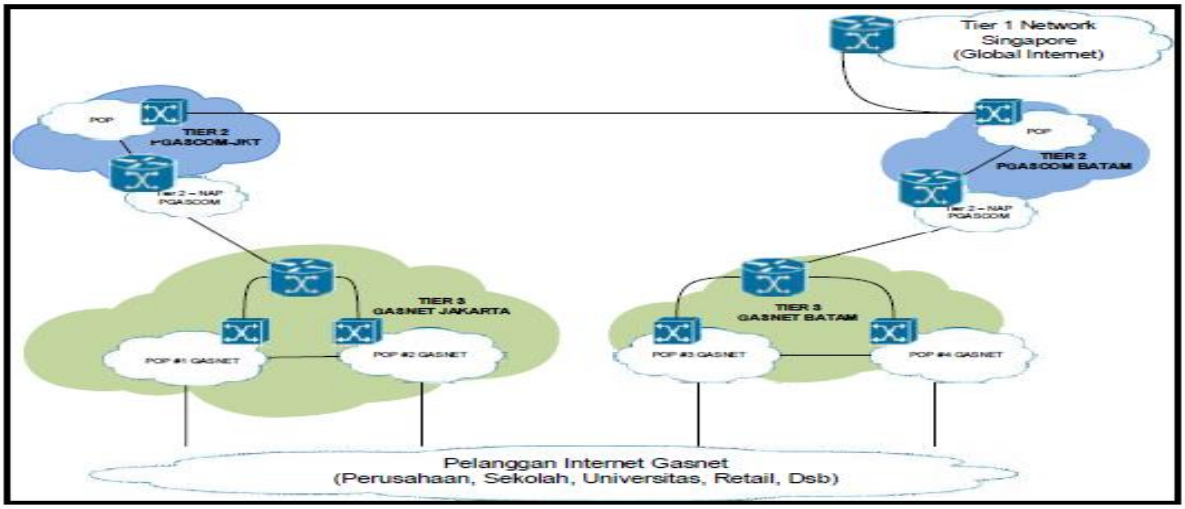

Figure 2.1 Internet Network Backbone EnterpriseNet Topology

For the topology used in the internal gasnet backbone network currently using mesh topology, where for the downlink path or path from the gasnet router to the customer has many links between one device with other devices.

II. ANALYSIS OF BACKBONE NETWORK MODEL TO BE DEVELOPED.

Internet backbone network system EnterpriseNet that needs to be developed using internet backbone network system, as follows:

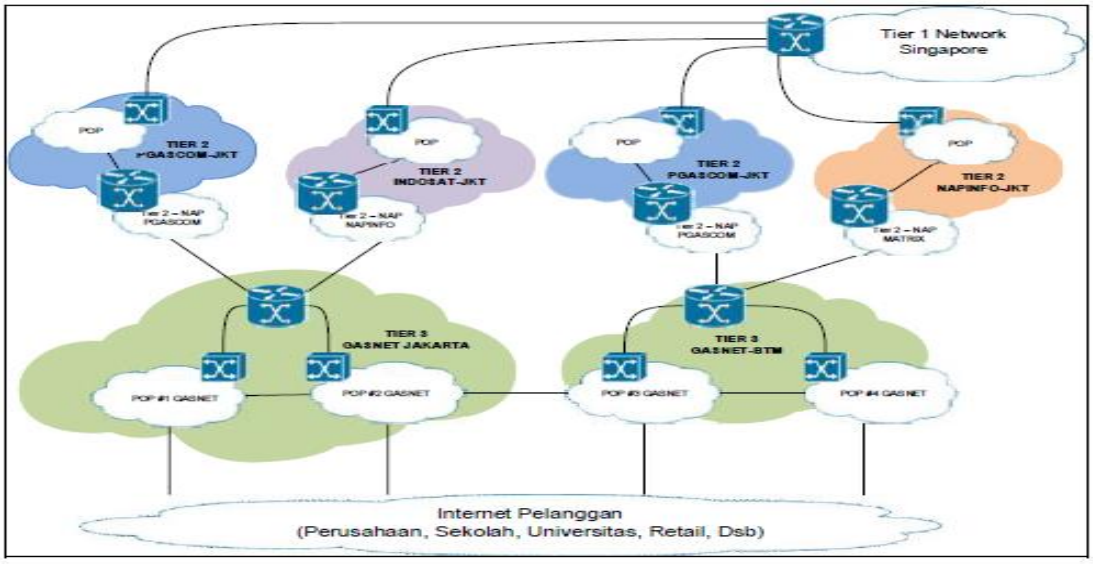

Figure 3.1. Design topology

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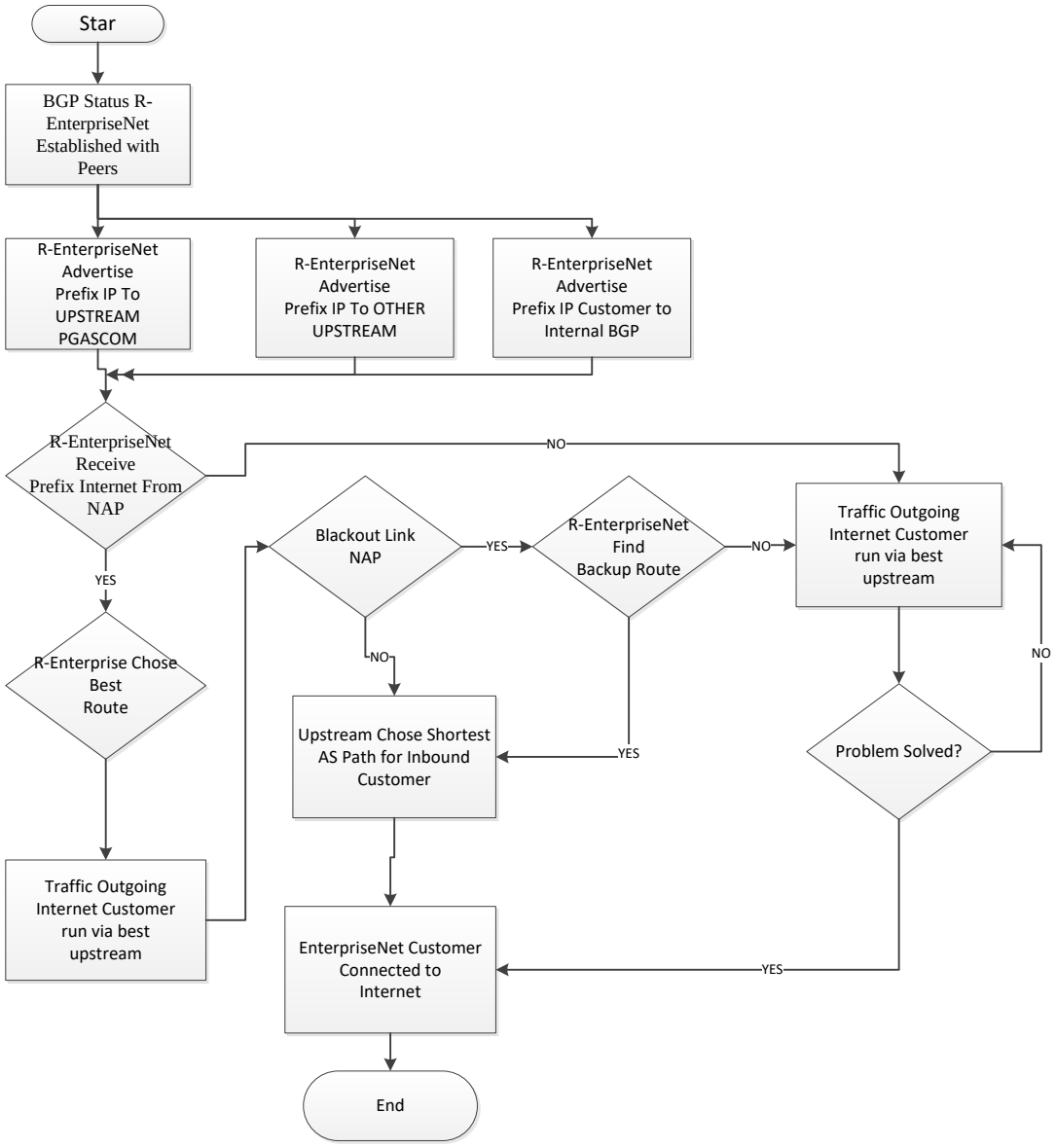

Figure 3.2 Workflow Routing Protocol Analysis to be developed

III. DESIGN OF BACBONE INTERNET NETWORK.

Network Topology is an image sketch that describes the geometric relationships between the network constituents of nodes, links and stations or hosts. Here is the proposed network topology on the design of Internet backbone network on EnterpriseNet.

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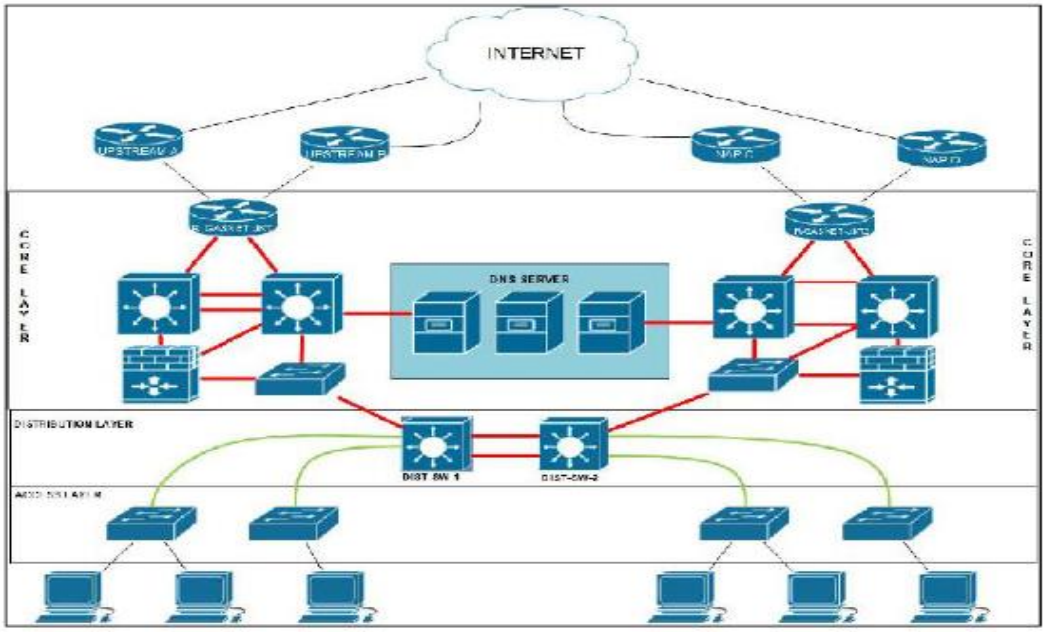

Figure 4.1. Network topology

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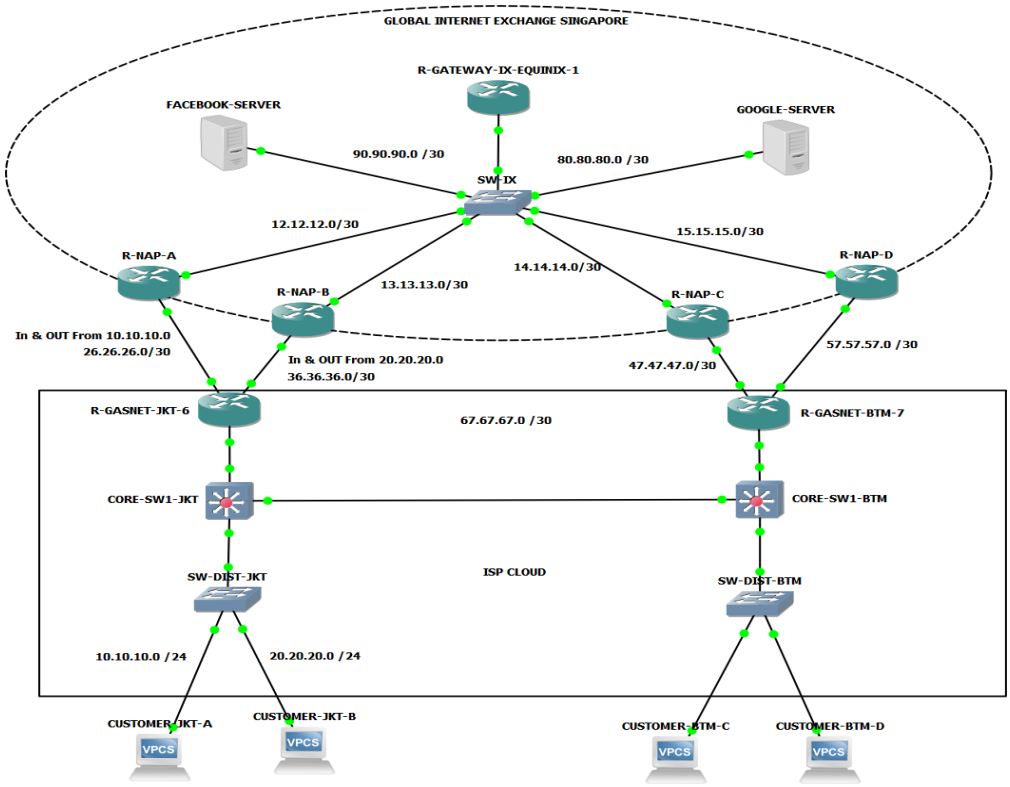

Figure 4.2. Network Topology to simulate

Network Device Specifications

Designing a network device specification that is intended as an internet backbone for internet services is indispensable. The following network specifications are intended as an internet backbone, that is:

1. Router

The minimum specifications required for the internet backbone router, that is:

a. CPU: Multi Core x86-64 64 Bit, Intel Core i3 3.3 GHz Processor
b. Memory: 4 x DDR3 1333 DIMM Slots, 1 x 2048MB Industrial Grade RAM (2GB RAM) installed on the base Model
c. Data storage: 2x SATA, 1x CF Slots with True IDE IBM MicroDrive Support
d. Compact Flash: 1 GB Industrial Grade Compact Flash for routerOS
e. HDD: 250GB SATA 2.5" HDD
f. Ethernet: 8 x 10/100/1000 Mbit/s Intel Pro 1000 Gigabit Ethernet ports supporting Auto-MDI/X through PCI-E single lanes
g. PCI Slots: 1x PCIe 8x Slot
h. Serial port: 1x DB9 RS232C asynchronous serial ports
i. Power: IEC C13 Power Cord, input power: 100VAC-250VAC 50Hz- 60Hz (International PSU)
j. Fan: 3x Redundant CPU/Power Supply /Chassis Fans,
k. Dimensions: 31cm x 45 cm x 4.4 cm
l. Temperature: Operational: 0°C to 45°C
m. Humidity: Operational: up to 95% relative humidity (noncondensing)
n. Power Supply: 270W ATX PSU

using Cisco's C3750 brand routers as a simulation of Internet backbone network design on EnterpriseNet.

2. Core Switch and Distribution Switch

Minimum specifications required for core Switch and distribution backbone internet, that is:

a. CPU: Dual Core 1.5 GHz
b. NVRAM: 2 GB
c. Onboard Memory (SRAM DDR-II): 4 GB
d. Port Buffers: 32-MB Shared Memory
e. Management Port: 10/100/1000 Base-T
f. Dual Power Supply
g. Total VLANs: 4094
h. Jumbo Frame Support for Bridged and Routed Packets
i. QoS Entries: 128K (64K ingress and 64K in egress) Shared with ACL
j. VLAN, router, and Port ACLs, Port Security, Class of Service (CoS).

3. Switch Access

Minimum specifications required for Switch access, namely:

a. Memory DRAM: 128 MB
b. Flash memory: 64 MB
c. VLAN ID's: 4000
d. Maximum transmission unit (MTU): 9198 bytes
e. Jumbo frames: 9216 bytes
f. Management Port: 10/100/1000 Base-T
g. Dual Power Supply
h. Total VLANs: 4094
i. Jumbo Frame Support for Bridged and Routed Packets
j. QoS Entries: 128K (64K ingress and 64K in egress) Shared with ACL
k. *VLAN, router, and Port ACLs, Port Security, Class of Service (CoS).*

IP Address Allocation

IP address stands for Internet Protocol Address, which is an identity owned by a tool. IP address works for the host identification tool or as a network interface. It can also serve as the location address of a network. The following IP Address allocation is used in the simulation of the design of Internet backbone network on EnterpriseNet.

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Table 4.1 IP Address Allocation

No	Host	IP Address	Subnet Mask	Interface	Description
1	ROUTER GATEWAY IX	90.90.90.1	255.255.255.0	FastEthernet 1/0.90	Gateway Internet untuk server Facebook
		80.80.80.1	255.255.255.0	FastEthernet 1/0.80	Gateway Internet untuk server Google
		12.12.12.1	255.255.255.252	FastEthernet 1/0.12	Gateway Point To Point EBGP ke NAP A
		13.13.13.1	255.255.255.252	FastEthernet 1/0.13	Gateway Point To Point EBGP ke NAP B
		14.14.14.1	255.255.255.252	FastEthernet 1/0.14	Gateway Point To Point EBGP ke NAP C
		15.15.15.1	255.255.255.252	FastEthernet 1/0.15	Gateway Point To Point EBGP ke NAP D
2	ROUTER NAP A	12.12.12.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke Equinix
		26.26.26.1	255.255.255.252	FastEthernet 1/1	Gateway Point To Point EBGP ke Router GASNET A
3	ROUTER NAP B	13.13.13.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke Equinix
		36.36.36.1	255.255.255.252	FastEthernet 1/1	Gateway Point To Point EBGP ke Router GASNET A
4	ROUTER NAP C	14.14.14.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke Equinix
		47.47.47.1	255.255.255.252	FastEthernet 1/1	Gateway Point To Point EBGP ke Router GASNET B
5	ROUTER NAP D	15.15.15.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke Equinix
		57.57.57.1	255.255.255.252	FastEthernet 1/1	Gateway Point To Point EBGP ke Router GASNET B
6	ROUTER GASNET A	26.26.26.2	255.255.255.252	FastEthernet 0/0	Point To Point EBGP ke R-NAP-A
		36.36.36.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke R-NAP-B
		67.67.67.1	255.255.255.252	FastEthernet 1/0.67	Point To Point IBGP ke R-GASNET-B
		10.10.10.1	255.255.255.0	FastEthernet 1/0.10	Gateway Internet untuk Customer-A (Dedicated)
		20.20.20.1	255.255.255.0	FastEthernet 1/0.20	Gateway Internet untuk Customer-B (Broadband)
7	ROUTER GASNET B	47.47.47.2	255.255.255.252	FastEthernet 0/1	Point To Point EBGP ke R-NAP-C
		57.57.57.2	255.255.255.252	FastEthernet 1/0	Point To Point EBGP ke R-NAP-D
		67.67.67.2	255.255.255.252	FastEthernet 0/0.67	Point To Point IBGP ke R-GASNET-A
		30.30.30.1	255.255.255.0	FastEthernet 0/0.30	Gateway Internet untuk Customer-A (Dedicated)
		40.40.40.1	255.255.255.0	FastEthernet 0/0.40	Gateway Internet untuk Customer-B (Broadband)

In this simulation, allocate Customer A's IP address to dedicated internet customers, while Customer B is for broadband internet subscribers or bandwidth share.

IV. CONCLUSIONS

The design of internet backbone network system using BGP routing protocol with load balancing method in company engaged in internet service provider, as the concept of internet backbone network. Can provide redundancy on EnterpriseNet Internet backbone network using two upstream, so the quality of internet link, becomes more like in terms of availability.

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