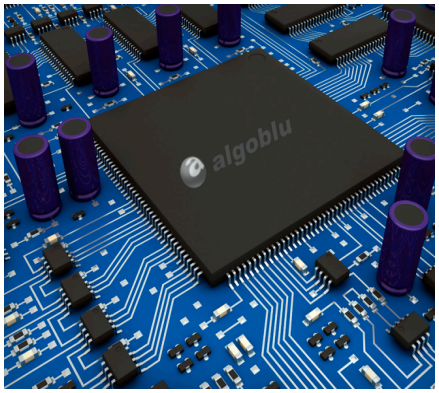
NEV Network Resource Virtualization Products and Services

Next wave of virtualization in cloud era

Networks built on traditional network technologies are designed to support best-effort delivery, imposing sloppy resource management and failing to guarantee end-to-end network service quality. As the global digital transformation tide advances, users' business and daily operations become more and more dependent on the network, and the demand for personalization of the network becomes stronger and stronger, the traditional proprietary hardware-driven network architecture and pre-planning-based construction model can no longer meet the requirements of high-speed data service development. It is necessary to overturn the concept of traditional telecom equipment understanding and use new technologies to support the customized demand for network resources in new business models, and promote the evolution of the network to a cloud-based and open network architecture in terms of equipment form, configuration management, and capacity expansion and upgrade.

The x86 server virtualization technology led by VMware help to create a trillion dollar cloud computing market, same concept is employed for NEV(Network Element Virtualization). The growth of network resource virtualization is driven by users' desire to improve the efficiency of network resources and gain application-oriented network service capabilities.

As the market leader in NEV network resource virtualization technology, Algoblu has a complete solution from self-developed silicon to hardware devices, from NEV products to NEV network services, which can achieve the elasticity and scalability that cannot be achieved by traditional networks and provide unique and innovative services to users.



NEV (Network Element Virtualization) Technology

Is a patented technology for abstracting/virtualizing the underlying network resources, similar to VMware's concept of abstracting/virtualizing x86 server resource. The FPGA-based NEV chip can virtualize the underlying network resources into 100,000 independent atomic channels, arrange/combine the atomic channels to form service interfaces through service scheduler. The PTS OAM system control and manage the virtualized service interfaces to provide support for the upper layer network services.

NEV sit between layer 1 and layer 2 in the OSI seven-layer model. Algoblu defines a complete NEV protocol stack, which has a unique NEV frame structure which is different from that of traditional Ethernet, and the NEV protocol stack defines different functional modules such as identification of atomic channels, encapsulation and forwarding control of messages, data encryption, scheduling and allocation of resources, in-band management, etc. The implementation of the whole NEV protocol stack is completed by the self-developed chip, which ensures the high efficiency of the whole system.

Technical parameters and functions of NEV chip

- 16nm process
- Up to 100,000 atomic channels
- Up to 100G processing capability
- Throughput rate of 99.19%
- Internal processing delay of 2.35 microseconds
- NEV L2 package/decapsulation
- NEV L3 package/decapsulation
- Link bundling
- OVS Exchange
- NEV OAM
- NEV API
- NEV monitor/debug

vBox Enterprise Gateway (CE)

Based on Algoblu's self-developed NEV chip, the enterprise gateway is deployed on the subscriber side, connecting to the subscriber LAN through standard Ethernet and to the carrier's network through GE interfaces, supporting the transmission of NEV messages over traditional access methods such as GPON/SDH/DWDM/OTN lines, enabling seamless interfacing with the carrier network.

Main technical parameters and functions.

- 4x 1GE RJ45 electrical port
- Wire speed forwarding
- NEV L2 Tunnel
- NEV L3 Tunnel
- Compatible with traditional access methods (GPON/SDH/DWDM/OTN)
- Multi-level QoS
- Data Encryption
- Link bundling
- OVS Exchange
- DHCP
- Firewall
- IGP
- BGP
- ZTP Zero Configuration Management
- Graphical User Portal

vBox Edge Gateway (PE)

Based on Algoblu's self-developed NEV chip, the edge gateway is deployed in the POPs and connected to the carrier network through a standard 10GE or 40GE interface, compatible with traditional SDH/DWDM/OTN, and interconnected with NEV backbone nodes through NEV protocol.

Main technical parameters and functions.

- 12x 10GE SFP+ optical ports
- 2x 40GE QSFP+ optical ports
- NEV L2 Tunnel
- NEV L3 Tunnel
- Compatible with SDH/DWDM/OTN
- VXLAN
- NVGRE
- OpenFlow
- Multi-level QoS
- Data Encryption
- Link bundling
- OVS Exchange
- DHCP
- IGP
- BGP
- HA
- Stackable
- Container
- Namespace

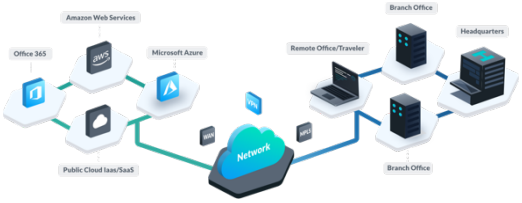
PTS Web Service Management System

PTS network service management system is a comprehensive management software platform developed by Algoblu for the communication network built on NEV network resource virtualization, which completes network management, service creation and deletion, network operation and maintenance, etc. The main functions are divided into three parts: operations, management and maintenance.

Operations
It is a software system with human-machine interface for partners, customers and platform operators, mainly responsible for network resource management, operation and maintenance operations, customer service scheduling, product ordering, business and operation data display and many other functions. It provides rich API interfaces for interoperating with third-party partners and operators.

Administration
It is a set of automated management system for the underlying network resources, which receives commands from the external management system through the standard API interface it provides, and complete all-round management of various network elements (traditional network elements and NEV network elements) in the NEV network.

Maintenance
It is a set of dedicated software platform integrating monitoring, alarming, troubleshooting and other maintenance functions, which mainly responsible for all-round real-time monitoring of various network resources and network channels at different levels, and provides timely alarms for the emergence of faults. Alarm information can be directly informed to relevant personnel through instance messenger, SMS, email and many other forms. At the same time, the alarm and fault data are provided with standard API interfaces to the management system and It's compatible with third-party operation and maintenance management platforms.



NEV Network Services

With NEV network resource virtualization technology as the core, Algoblu has built its own NEV backbone network and provided operation services. At present, it mainly provides three kinds of network services for users: NEV EPL/EPN Elastic Private Line/Elastic Private Network, NEV Application Broadband, and NEV Network Slicing.

- **NEV EPL/EPN Elastic Private Line/Network**

Provide users with point-to-point private line or private line networking services, usually for L2 Ethernet networking. Product features include support for elastic bandwidth, access bandwidth from 2M to Nx 10G, support for burst traffic, real-time bandwidth adjustment and network-wide bandwidth pooling; support for elastic topology, user can customize the network topology at will; support for network-wide end-to-end data encryption; support for multi-services with different classes of QoS, each service is physically isolated; support 95/5 percentile billing mode base on usage.

- **NEV Application Broadband**

Provides isolated virtual private lines for different applications over regular home broadband, enabling the establishment of point-to-point private line connections from home devices (TVs, set-top boxes, game consoles, cell phones) to targets (video content provider servers, game servers, SaaS service provider servers, etc). Provides extremely high quality connections with low latency (depending on physical distance), zero packet loss, and less than 0.1ms jitter. The product features include providing access to specified applications on cloud thru virtual private lines through NEV technology, and allowing users to choose different QoS service guarantees based on different service attributes; It establishes physical layer connection with the cloud platform service provider gateway through BGP or 802.1Q without going through the Internet, which can achieve end-to-end low latency, zero packet loss, and high quality network connection. It supports elastic bandwidth and burst traffic; the network side can be easily integrated with third-party cloud platforms and cloud service providers to continuously enrich the service portfolio. User can subscribe to new services directly over existing home broadband.

- **NEV Network Slicing**

For a carrier network (public network or private network), NEV network virtualization technology can cut out par of the underlying carrier network to create a resource-independent sliced network. The sliced network has independent resources and QoS guarantee, and the traffic is physically isolated. Network slicing service can help users build layer 2 or layer 3 private networks serving specific applications, such as enterprise multi-branch interconnection private network, supply chain partner private network, security monitoring network, video conferencing private network or industrial IoT network, etc. Product features include building multiple private networks through NEV slicing network over single access fiber, with each network slice carrying different services; NEV technology-based network slicing can realize physical isolation and support full end-to-end link encryption; different SLA service levels for sliced networks can be set based on different business characteristics; elastic bandwidth support, with access bandwidth from 2M to Nx 10G, and support for burst traffic and bandwidth adjustment in real time.

User Benefits

Algoblu's NEV network resource virtualization technology can seamlessly interoperate with existing carrier's IP network, and can connect to PON fiber access networks, SDH, DWDM, and OTN networks at the metro access network or backbone network level, without requiring users to change the existing network structure, and NEV messages can be transmitted within existing carrier's networks, it greatly removed the barrier of NEV deployment and expands its service scope. In addition to fixed networks, NEV technology can also be easily interfaced with 5G networks, whose open technology and open platform of NEF capabilities will allow Algoblu to directly call and control the underlying 5G network resources, thus customizing unique products in the market and providing differentiated services to users.

NEV network virtualization technology re-defines the underlying resource and resource management in a new way, which can provide users with more flexible network services with independent physical resources, service isolation, different SLA levels and end-to-end encryption throughout. Compared with traditional network services, the advantages of NEV network services include

- Elastic bandwidth
- Support burst traffic and real-time bandwidth adjustment
- User-defined network topology can be changed at will
- Strict SLA service guarantee
- Application Oriented Networking
- NEV Network Slicing

About Algoblu

Founded in 2012, Algoblu has established liaison offices in Canada, Hong Kong, Singapore, China and expanded business in North America, South East Asia and greater China. Algoblu is one of the earliest start-up in the world to engage in SD-WAN technology, product development and marketing services. Since its inception, Algoblu's mission was to build a flexible, programmable network that focuses on virtualizing network resources to achieve increased flexibility and scalability for telecom companies and enterprise customers. Algoblu has developed products based on the innovation of network resource virtualization technology, which is unique in the market has been recognized by customers.

The company's core team members are from well-known IT and Internet companies such as Cisco, Dell. Algoblu has accumulated deep expertise in the field of SDN, SD-WAN, cloud computing, and collaboration communications. To present, there are more than 30 SDN and SD-WAN related technology patents have been filed in the US and China.

Algoblu has built up its backbone across the world with more than 200 nodes. Algoblu's existing hundreds of corporate users span financial, insurance, retail, telecom operators, IDC, gaming, smart transportation, e-commerce, education, sports, manufacturing and many other industries, including a number of the world's top 500 companies.

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