百万用户规模级vBRAS实践

Scaling vBRAS to Million-User Network

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主办方：

参与方：

协办方：

视频支持方：
The number of Online user supported by Panabit vBRAS has succeeded 5000,000
vBRAS

Migrating to virtualization

Industry consensus

- Tightly coupled hard&software
- Poor scalability
- Low reuse density of resources
- Poor elasticity & flexibility

Traditional BRAS
Pain point of large operator’s vBRAS

3 pain point

- Poor ability in handling concurrent PPPoE requests
- Throughput bottleneck
- Incomplete protocol stack

vBRAS structure of large operators
what’s the key to problem

- **Technology view**
  - throughput
  - PPPoE session maintenance ability
  - Account compatibility
  - virtualization
  - Added value and profit

- **Economic view**
  - enormous value of the stock market
  - decoupling of control and forwarding
Applications
- BT, emule, xunlei, 超级旋风, 优酷, 爱奇艺, Skype等
- HTTP, SMTP, QQ, MSN, POP3, IMAP, Oracle, ...

TCP/UDP
- Dynamic ports
- Static ports
- 202.104.21.57
- 001CC4CF0747

IP

Link Layer

Computation demands

Encryption analysis, node tracking, active probing

X86/multicore/coprocessor

Hardware based matching

ASiC/NP

router

firewall

UTM/NGFW

7-layer analysis equipment

Static detection & ALG

ASiC/NP/X86/multicore

Hardware based matching
Problems of home-made gateway products
Relying on modifying the kernel of general purpose operating system such as Linux/FreeBSD
Poor stability, performance and scalability
Can't satisfy high level demand through low level repetition

advantages of PANAOS
- Data plane oriented development of OS key elements, such as driver, memory management etc.
- Complete decoupling of data plain and control plain, adopting independent IP protocol stack and driver, guarantee extremely high performance.
- Dual OS backup system, guarantee high stability.
- Built-in functions of routing, NAT, load balance, application recognition and control, providing integrated solution.
- Provide App virtualization engine for third party applications, support built-in third party module.
Wrong cognitions of gateway performance:
- Forwarding performance ≠ application performance
- Use 256 byte packet in benchmark throughput testing
- Performance bottleneck: CPU, network card, driver, application software

Performance of panabit:
- Two-way throughput: 80Gbps
- Maximum concurrent connections: 15,000,000
- Maximum concurrent IP address: 600,000
- Session establishment speed ≥ 650,000/s
- Application forwarding delay < 0.1ms
Support more than 500 PPPoE virtual server!
virtualize 500 vBRAS services in one interface

- every vBRAS service support independent account and IP address configuration
- support more than 32k/U concurrent PPPoE users
- 40G/U throughput

- support QinQ and PPPoE agent
- Active content push and DPI big data analysis capability
- PPPoE service load balance
- complete QoS/NAT/routing protocol stack
support 40G traffic in one CPU
vBRAS vs BRAS: software agility
vBRAS infrastructure - DPI

- **Signature based DPI**
  - Most common & effective
  - Evolve to DFI
- **Node tracking**
  - improving the accuracy and performance of inspection
  - Active probing
  - Probing the far end status of
  - Encrypted protocol
- **Protocol multi-state machine**
  - From plaintext dual-state machine to multi-state machine
  - Packet length and frequency
  - Leaking message
Q&A