



LEADING SOFTWARE COMPANY IN VIETNAM

# Router Development Projects



# Sample Router Development Projects

- ❖ *Multi-Service Provider Edge*
- ❖ *Broadband Remote Access Server*
- ❖ *Service Edge Router*
- ❖ *Universal Convergence Gateway*



# Multi-Service Provider Edge (1/2)



## ❖ Products:

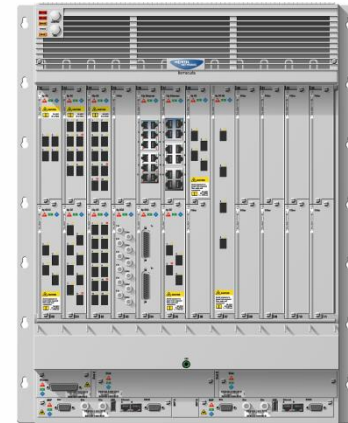
- Next-generation IP/MPLS multiservice edge - a single, powerful packetized infrastructure that delivers voice, video, data, and wireless services.

## ❖ Scope of Work:

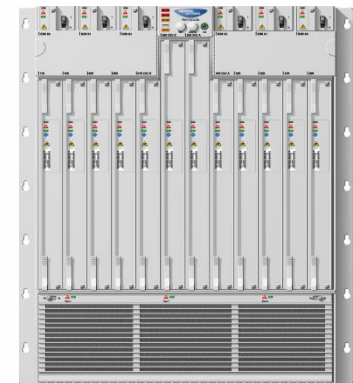
- Develop new features, sustaining on Data-path & Networking
- Develop test plans, test cases, and test scripts
- Execute functional, system, regression, and performance test
- Develop automation test framework
- Maintain and enhance test scripts

## ❖ Technologies:

- Modern mid-plane architecture design
- Networking
  - *IP/MPLS, frame relay, serial line, ATM, Ethernet, PPP, IPSec, DSL, etc.*
  - *TCP, UDP, HTTP/HTTPS, FTP, TFTP, IP-VPN, L2TP, routed IP*
- Software, languages, and tools
  - *C/C++, Java*
  - *Wireshark, Net-SNMP, SNMPc, IxExplorer/IxLoad*
  - *IXIA, Spirent, ATS Automation Test Framework*



I/O Side



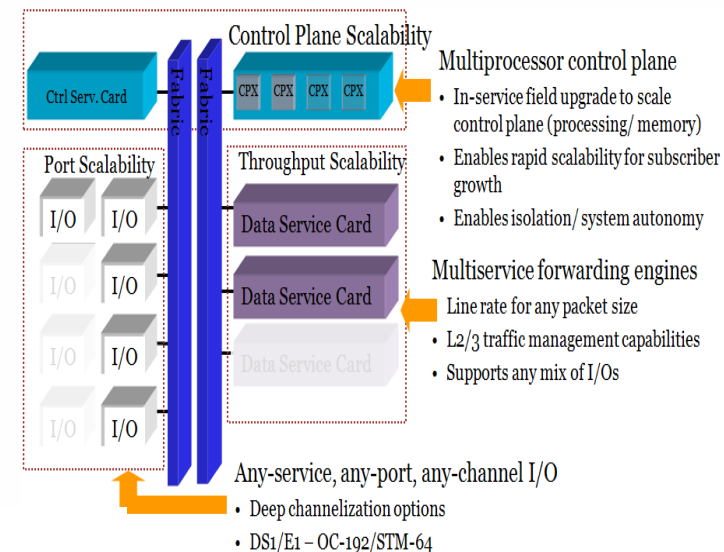
Compute Side

# Multi-Service Provider Edge (2/2)



## ❖ Embedded Systems:

- Fully deterministic performance – no reliance on flow cache hit rate
- A PowerPC™ MPC7447 G4 processor running at 600 MHz with on-chip 512 kbyte L2 cache and MPX, running in a single-processor configuration.
- A Marvell Discovery II system controller.
- 512 Mbyte of DDR-SDRAM memory.
- A 64/32-bit PCI bus running at 32/66 MHz.
- 64 Mbyte of onboard Flash memory.
- Dual/independent gigabit Ethernet interfaces.
- Dual serial interfaces.
- Embedded Operating System: CG Linux
- Flexible mid-plane architecture
- High-density I/O
- Network Processor Data Path
- Control Plane Engine Scalability
- Line rate forwarding at any packet size
- Built In Scalability
- Card re-use across product family



# Broadband Remote Access Server (1/2)



## ❖ Products:

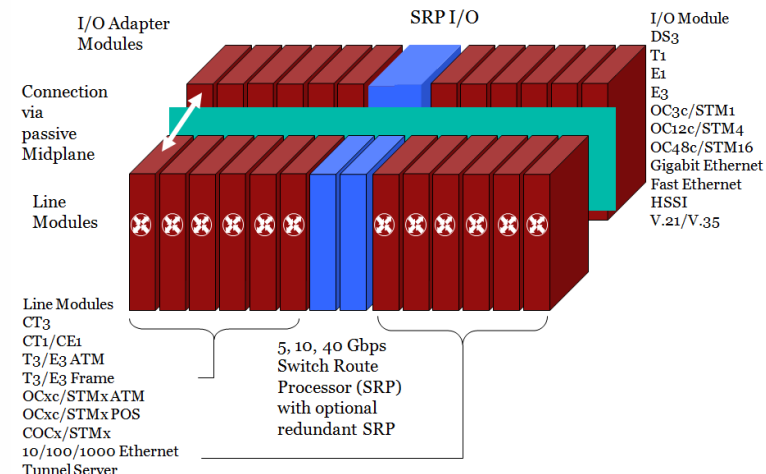
- Broadband Services Router is a high-performance router designed for large points of presence (PoPs).
- An edge routing platform that is optimized for large circuit aggregation applications

## ❖ Scope of Work:

- Develop new features, sustaining, hotfix
- Develop test plans, test cases, and test scripts
- Execute functional, system, regression, and performance test
- Develop automation test framework
- Maintain and enhance test scripts

## ❖ Technologies:

- Networking
  - *IP, PP PPP, PPPoE, PPPoA, DHCP, AAA, Radius*
  - *TCP, UDP, HTTP/HTTPS, FTP, TFTP*
  - *Multicast routing, DVMRP, PIM*
- Software, languages, and tools
  - *C/C++, Java*
  - *IXIA, Spirent, Automation Test Framework*





# Broadband Remote Access Server (2/2)

## ❖ Leverage ASIC + RISC

### Processor Architecture:

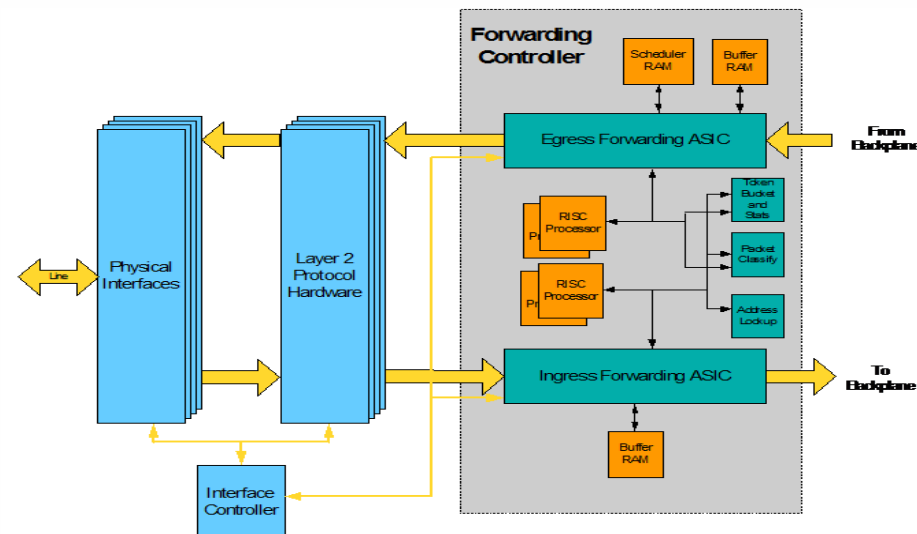
- RISC processor provides flexibility
- ASICs and FPGAs provide hardware assist to achieve high performance
- Fully deterministic performance – no reliance on flow cache hit rate

## ❖ ASIC and FPGA Functions:

- Buffer management
- Queue management
- QOS scheduling
- Address lookup
- Flow classification
- Flow rate measurement
- Statistics support

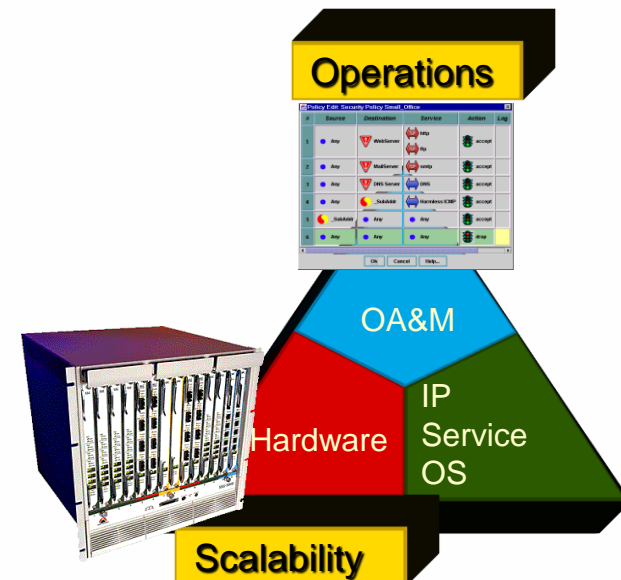
## ❖ RISC Processor Functions:

- RISC processor provides flexibility
- L2/L3 packet header parsing
- L2/L3 packet header modifications
- QOS control
- Classification control
- Statistics control



# Service Edge Router (1/2)

- ❖ **Product:** Combining network transport services and IP services in one MPLS platform and a gateway between GPRS/UMTS and other external packet data networks such as radio networks, IP networks, or private networks.
- ❖ **Scope of Work:**
  - New Feature Development
  - Maintenance
  - Product Verification/Testing
  - Technical Support



## ❖ Technologies

- Embedded and Real-time OS: VxWorks, RT-Linux
- IP Service Operating System
  - *Software framework and libraries for IP applications*
- Networking
  - *Layer 2-3*
  - *IP services (traffic shaping, NAT, DDoS, etc.)*
  - *VPN, VPRN, ATM, Frame Relay, MPLS*
  - *GTP, GTP Billing, RADIUS Authentication/Accounting*
- Software, Languages, and Tools
  - *C/C++, Java, CORBA, TCL, SilkTest*
  - *STAF, W32/mshtml, Wireshark, IxExplorer/IxLoad*
  - *IXIA, Spirent, ATS Automation Test Framework*
  - *Net-SNMP, SNMPc*



- ❖ **Product:** FMC (Fixed Mobile Convergence) platform that concurrently supports 3GPP, 3GPP2, ETSI and PacketCable standards for next-generation applications.
- ❖ **Scope of Work:**
  - Product verification
  - Automation development
  - Sustaining and new feature development
- ❖ **Technologies:**
  - VxWorks
  - Networking
    - *Layer 2-3, L2TP*
    - *IP services (traffic shaping, NAT, DDoS, etc.)*
    - *Virtual Router, VPN, VPRN*
    - *SIP ALG, SIP NAT ALG, SIP DoS, SIP authentication, SNMP, MPLS, OSPF, etc.*
  - C/C++, Java, TCL



# THANK YOU !

Tel: +84 28 3997-8000  
Mobile: +84 908 -676-212  
Fax: +84 28 3990-3303  
Email: [sales@tma.com.vn](mailto:sales@tma.com.vn)

North America number: + 1 802-735-1392  
Australia number: + 61 414 -734-277  
Japan number: +81 3 -6432 -4994  
Website: [www.tmasolutions.com](http://www.tmasolutions.com)