FM10000

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What Has…

• 9 100G Ports

• 9 PCIe Interfaces

• FlexPipe® Frame Processor Inside

• Open Standards Software Compatibility for SDN & NFV
**Goals**

1. Augment packet processing and accelerate virtual switching on Intel® Xeon servers
   
   **Net Result:** Reduce infrastructure overhead & latency
   Enabling more virtual functions
   Chained together using SDN

2. Flexible Ports and Interfaces to Server Platforms
   
   **Net Result:** New Form Factors & Levels of Integration
Form Factors & Integration

Open vSwitch Enabled & Accelerated in All Form Factors
Form Factor & Integration Advantages

1. 25G Serdes for multiple 25G & 100G Ports
   - 2.5x line rate improvement
   - Copper & Optical Cabling Supported

2. Multi-Socket Support
   - Avoid latencies transferring over QPI
   - Balance traffic across sockets

3. Multi-Host Support
   - Integrate multiple hosts to enable sharing of resources & higher density
FlexPipe® Forwarding Use Cases

Lowering the cost of network virtualization within the infrastructure

Scaling Multi-Core VNFs Running DPDK

Focus on Virtual Switching & Service Function Forwarding

VNF Programmable Packet Classification
Open vSwitch Software Advantages

- Support for Kernel & DPDK OvS Data Paths
  - Choose data paths depending on use case
  - Supports simultaneous operation
- DPDK Poll Mode Driver Optimizations
  - Vector PMD Driver (DPDK 2.2)
  - Stateless Offloads (TSO, RSS, checksums)
  - Stateless Offloads in the presence of tunnels

Support for Open vSwitch 2.4
FlexPipe™ Used Under a vSwitch

TCP SYN/FIN/RST Track to Host

From uplink or Queue on CPU

TCAM

Multipath

Encap/NAT Decap/NAT Recirculate

Tunneling Engine

QoS

Example Configuration

Service Function Forwarding Rules
L3/L4 Wildcard ACLs
QoS Associations

Server LB Entries

L2/L3 + VNI Forward to VMs over VXLAN/Geneve/NSH/NVGRE
Decap + NAT rules to VMs in the attached host

Per-DMA Queue Rate Limiters
CoS for traffic separation (data, mgmt, storage & messaging)
Acceleration Using FlexPipe™

- Accelerate Wildcard Match
  - Tag with Metadata
- Filter, Count, Mirror, Sample
- Accelerate Tunnel & SFC Encap/Decap
  - Tunneling & service function chaining information put into the DPDK netdev
- Accelerate Multi-Queue Virtio
  - Allow FM10000 to choose virtio queue (RSS, FlowDirector, & filtering)
OVS Controlled SR-IOV

- Preserves OVS Control Point
  - OVS kernel and/or DPDK are the default data paths
- Performance & Latency Sensitive Flows
  - Pushed down into FM10000
  - Directly forwarded in/out VF
- Consistent Performance
  - BW & latency stays the same independent of number of tunnels, ACLs, mirrors, etc.
Example: 4 DPDK VMs, OVS, VXLAN

- 100Gbps VXLAN Traffic
- 25Gbps Traffic Forwarded By Inner MAC & VXLAN VNI

RFC 2544 3rd Party 100G Test System
FM10000: Software Flexibility

100Gb Line Rate Virtual Switching
Scale Virtual Applications to 100Gb
Open Source Eco-System Compatibility
FM10000 – Ethernet Multi-host Controller

Up to 200Gbps of PCIe bandwidth
  • Supports up to eight hosts

Flexible Ethernet ports
  • 1/10/25/40/100GbE

Frame processing up to 960Mpps
  • Integrated TCAM further accelerates performance

Two integrated tunneling engines (encap/decap)
  • Tunneling for network service chaining headers (NSH)
  • VXLAN, NVGRE and GENEVE tunneling

DPDK Acceleration Enhancements
  • Allows vSwitch accelerations which enable more efficient NFV platforms