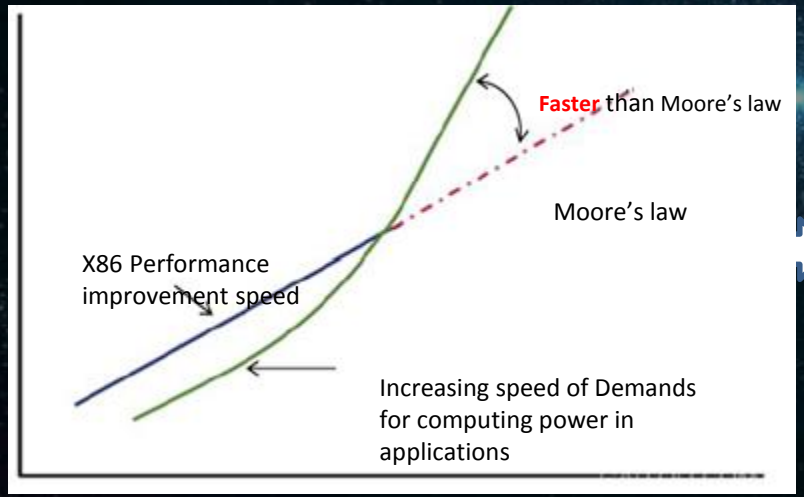
Experience Sharing of Hardware acceleraion in China Mobile

China Mobile
SHASHA GUO

The existing data forwarding mode cannot meet the demand gradually, so hardware acceleration is needed

- ✓ Large connection
- ✓ Low latency
- ✓ High bandwidth



OVS | GTP | HQoS | AR/VR

Accelerate NIC

IPSec | Video rendering | Audio and video codec | Picture processing

Agenda

1. OVS offloading
2. GTP acceleration
3. GPU acceleration

OVS offloading

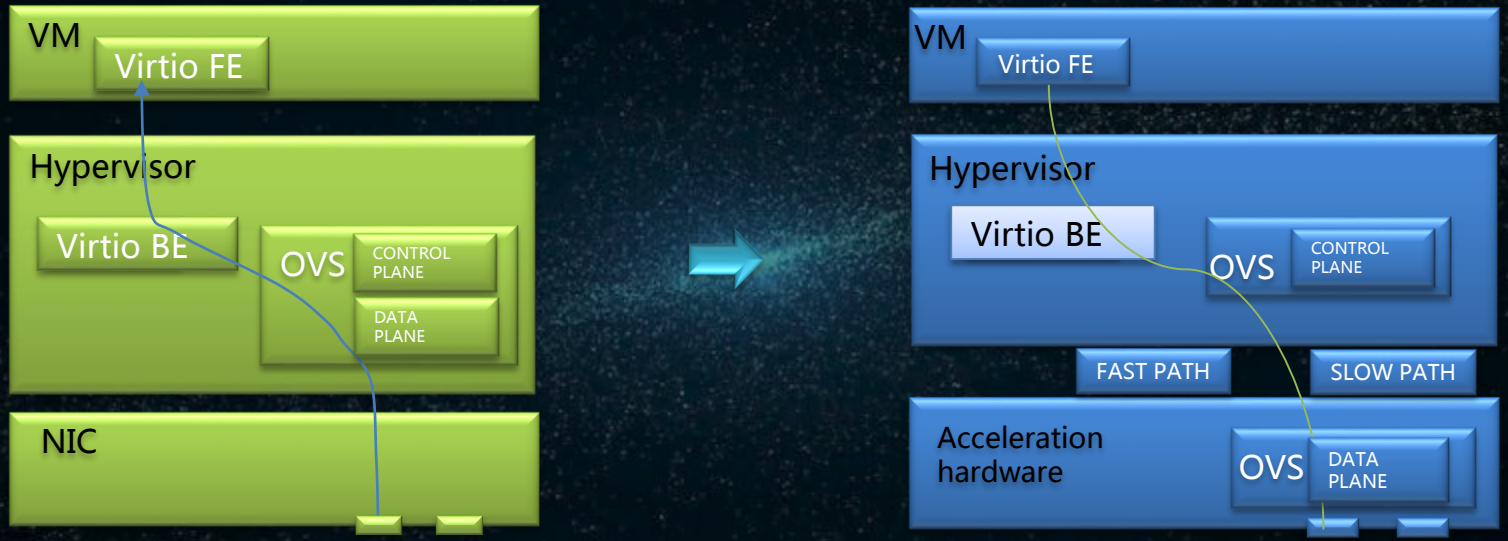
The current industry ovs offloading ways

- FPGA
- ARM
- NP
- ASIC

- Data plane offload
- Control plane offload
- Virtio BE offload
- Binding NFVI
- TC Flower Protocol

OVS offloading

What's ovs hardware acceleration



Main functions that ovs offload

- Network isolation and address reuse
- Vlan passthrough
- Muticast
- Mutiqueue
- Packet forwarding
- Traffic statistics and reporting
- Qos
- ...

OVS offloading

Different ovs offloading solutions:

- Acceleration hardware offloads different function module
- Different vendors can provide different software function module and hardware

Considers:

- Kernel/CPU/OS version
- Necessary API
- Deployment
- Operation and management
- …

OVS offloading

We have done some testing on some ovs acceleration hardwares in experimental network

testing content

- Support Virtio interface towards vm
- Vm driver decouple with acceleration hardware
- Support SDN VTEP point
- Support docking with third-party cloud platform
- Support live migration
- ...

From the tests have done we can see:

- Performance is insensitive to flow number
- When process long packet, throughout capacity performace is almost the same to the situation of SR-IOV nic
- Time latency is longer than that of SR-IOV nic
- Fewer CPU cores are used by VM than that in unloading scenario
- Lower perfomance loss than that in unloading scenario

Welcome more acceleration hardware vendors to join in the test project to verify the performance of ovs acceleration and ovs offloading solutions!

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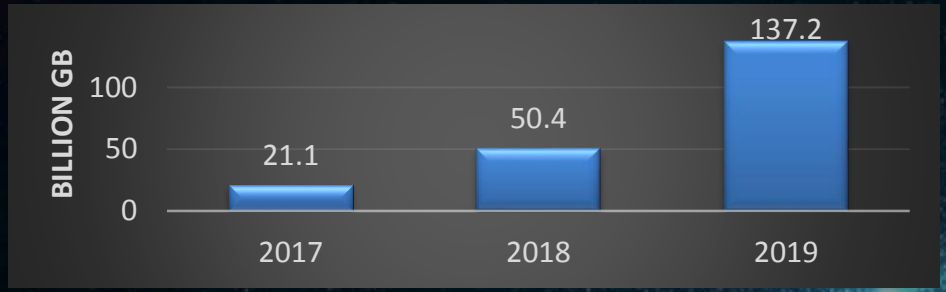
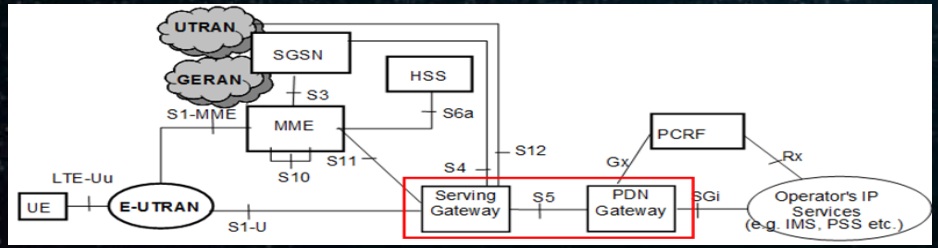
GTP acceleration

GW-U/UPF acceleration requirements analysis – focus on data plane



!!!CPU can't meet the data forwarding requirements, or stack CPU



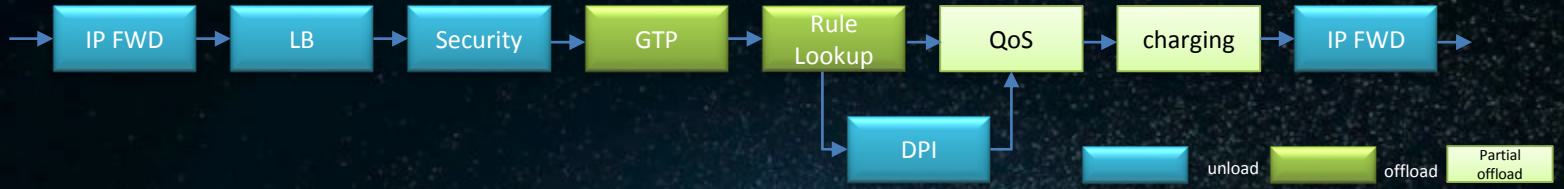
!!!High bandwidth nic increase consumption of a server's computing resources.

GW-U/UPF

- Computational、data forwarding network element
- GTP protocal process function
- For core network side

GTP acceleration

GW-U/UPF service process flow—VFN's service offloading



The factors function is chosed to offload

- Choose as many functions as possible
- Bus bandwidth consumption
- Time latency
- Fewer interactions between CPU and hardware

China Mobile associated with ZTE and LENOVO will show a demo of GTP offloading acceleration in MWC SHANG HAI this month.

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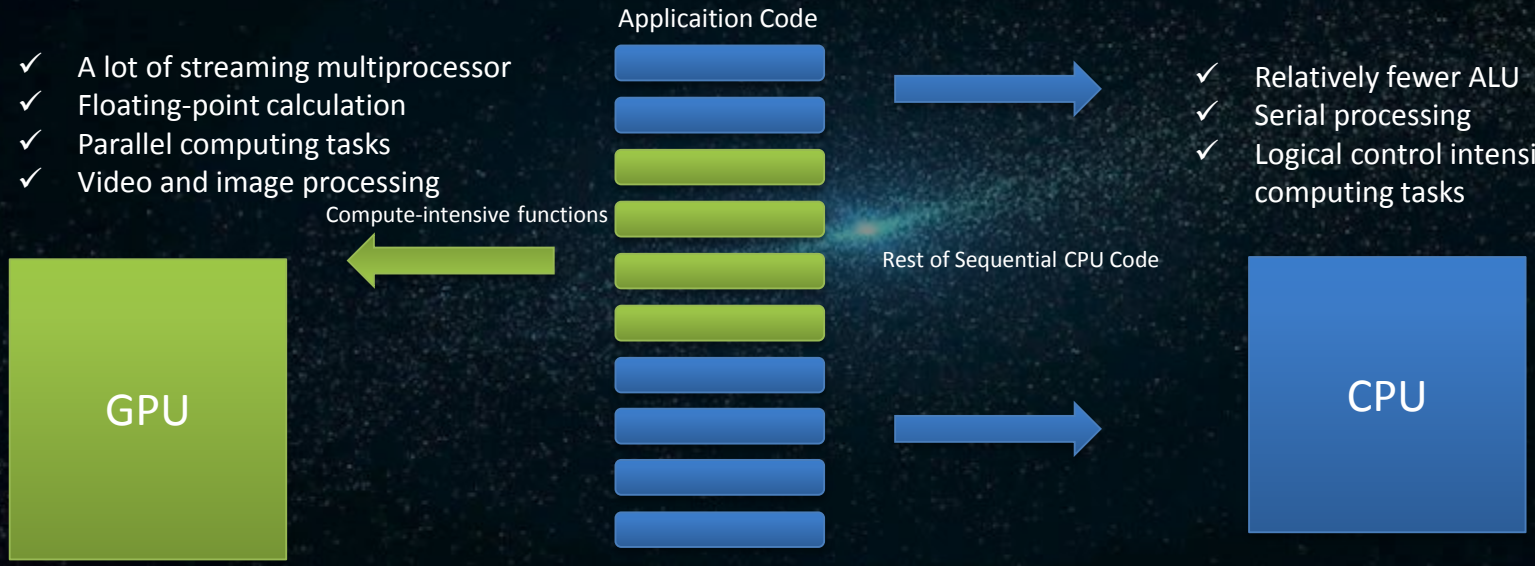
GPU acceleration

How GPU Acceleration works



GPU is a relatively mature techniques, DPDK and virtio are both support it.

GPU acceleration

GPU applicaition fields and senarios- focus on Edge

- Artifical intelligence
- Big data analysis
- Multimedia rendering

- VR games - image redering
- Face identification
- Other MEC relevant services

- Pass through
- Vitio
- vGPU

中国移动
China Mobile

THANKS!