SOCNOC
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# Socnoc XPU: Dual-protocol Switch SoC for Integrated Edge Cloud

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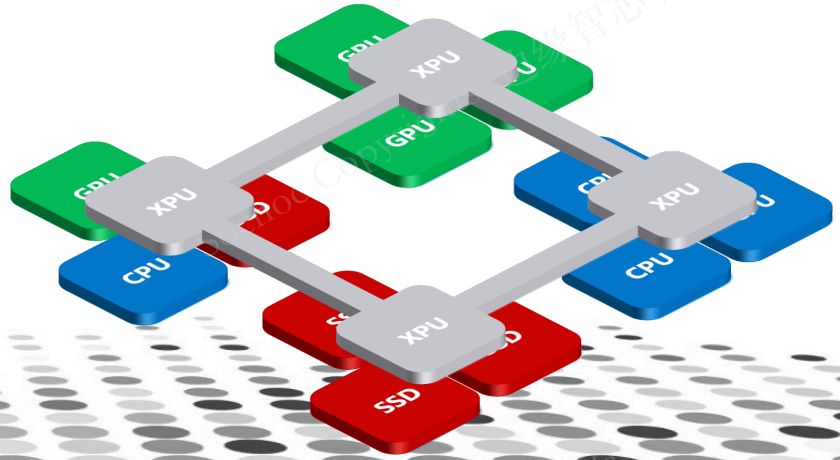


# Differences between Datacenter Cloud and Edge Cloud

## Datacenter

## VS

## Edge Room

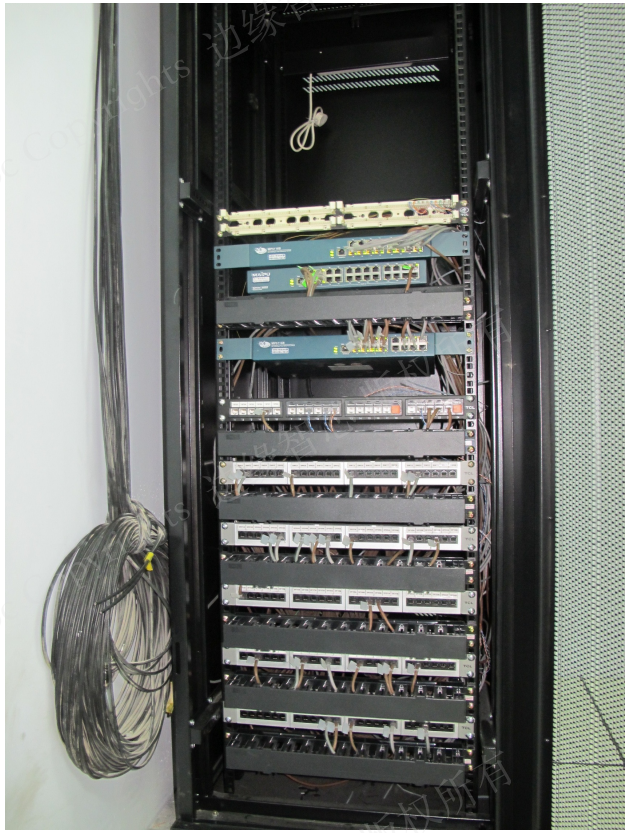
### Datacenter Cloud

- massive scale （>10k servers connected)
- highly organized (storage pool, computing pool, networking pool, GPU pool)
- management focused (datacenter OS, network OS, xOS)
- constant environment (professional building)
- devops friendly (in-field engineers)
- countable sites (*8000 datacenter globally*)

### Edge Cloud

- small scale (less than 50 servers connected)
- less organized (mix and match)
- hard to managed
- poor environment
- no engineers
- massive sites (*2.8million edge rooms*)
- *very low cost!*

# Goal: Low cost Switch SoC for Integrated Edge Cloud



Basic Feature:

- High outbound Bandwidth: 4x10Gbps/2x25Gbps/1x100Gbps
- Cluster ready: 8/16/32/64 servers
- High Intra-connection Bandwidth: 10-20Gbps
- Low Latency: Host-to-host latency less than 10us
- Dual network topology for data path and management path
- ***Low networking cost: less than $5 per Gbps for host-to-host networking***
- Support x86, arm CPUs, GPUs and AI sticks

Advanced Feature:

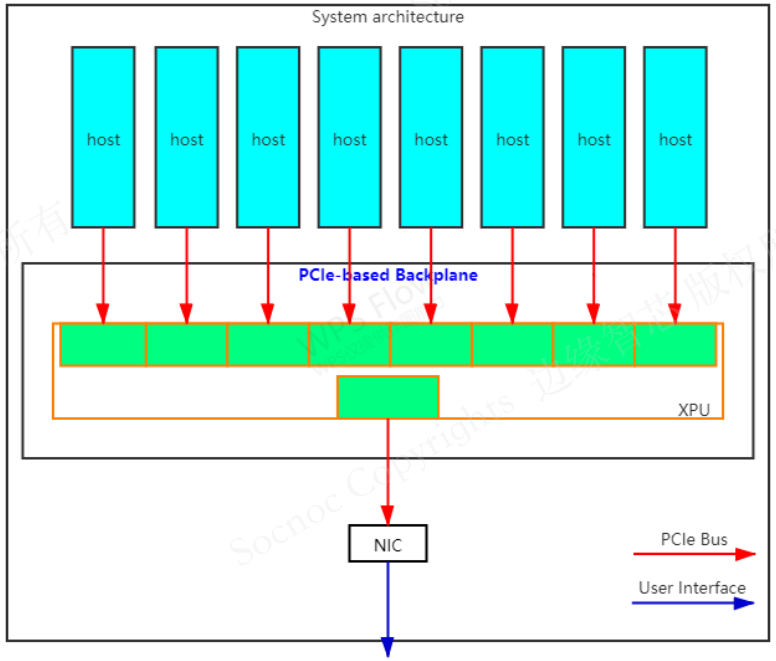
- Protocol offload: TCP/IP offload, RDMA accelerated
- Device pooling ready: GPU pool and SSD pool
- Plug-n-play maintenance and remote resource management

# Solution: Dual-protocol Switch SoC for Integrated Edge Cloud

- Socnoc XPU: dual protocol switch SoC supporting multichannel PCIe bus and ethernet protocol to connect CPU, GPU, SSD in the same plug-n-play fashion.
- Feature
  - PCIe interface, no special chips
  - Low cost, $5 per Gbps per connection
  - Low latency
  - Shared system BUS (manageable)
  - Low TDP

| Product specification | | |
|---|---|---|
| Product | Intra-Bandwidth | Outbound Bandwidth |
| X100(2021Q4) | 20Gbps | 40/80Gbps |
| X200(2022Q4) | 80Gbps | 100/200Gbps |
| X300(2023Q4) | 160Gpbs | 200/400Gbps |

## XPU-based Integrated Edge Cloud




- dual protocol (CPU and GPU)
- dual ports (data and management)
- plug-n-play
- remote management ready



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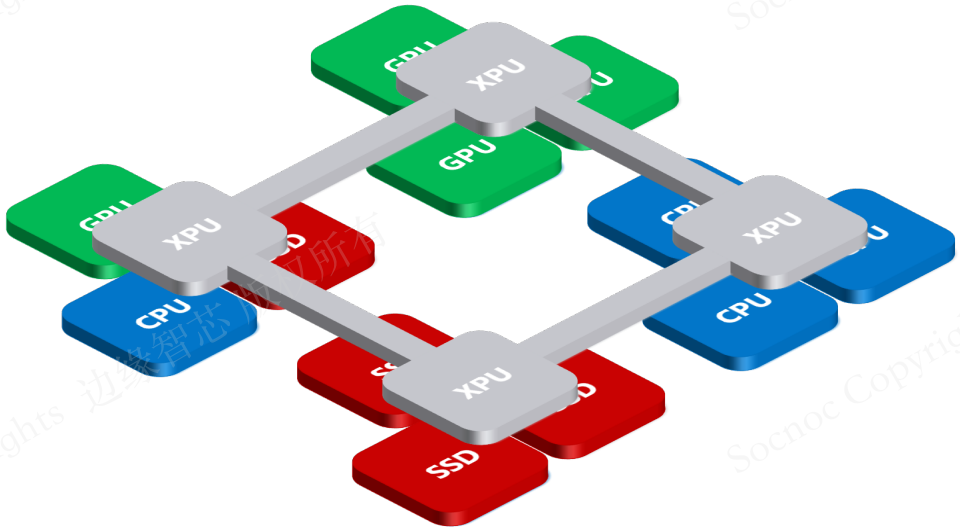
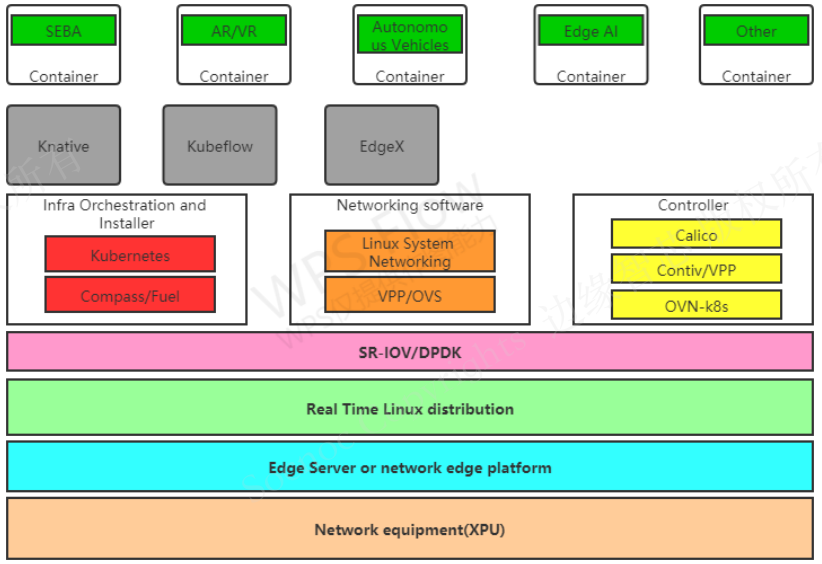
# Solution: SR-IOV and Mainstream Cloud and Edge OS

## Data Fabric




## Software Stack




Virtualization and Software Stack

- SR-IOV based networking virtualization for network performance
- TCP/IP for Cloud and Edge microservice-like Cluster OS
- RDMA and Pooling Fabric for Device and I/O Sharing



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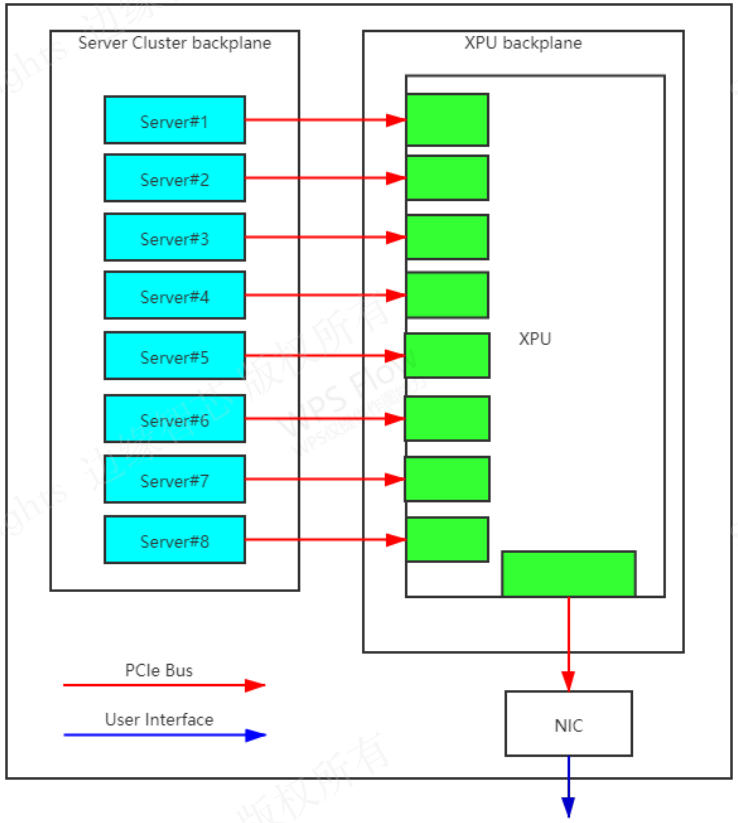
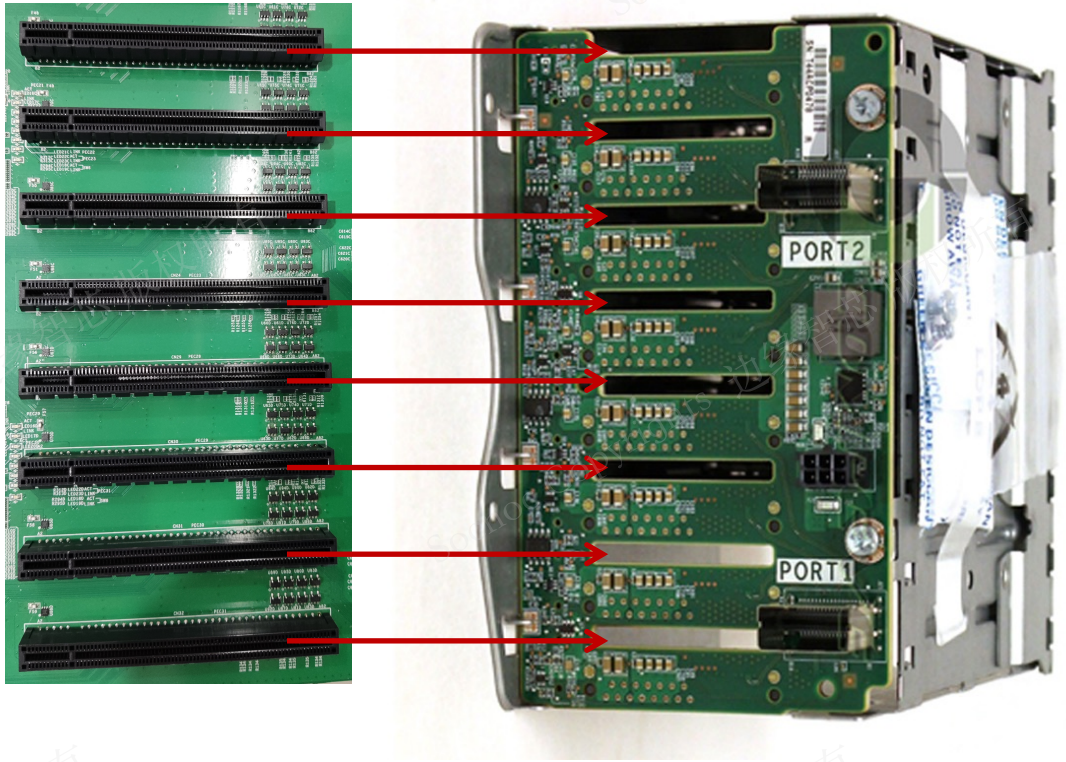
# Prototype and Demo System (2021Q4 release)



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# Just connecting

# Hefei

**Socnoc: Just connecting!**

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