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SAI For DPU
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Contents

• DPU Architecture and Use Cases
• New Overlay Pipeline
• Stateful Tables
DPU Architecture

- Host-agnostic network solution
- Integrated Control & Data planes
- Encrypt/Decrypt, RegEx, Compress/Decompress
- Distributed networking resources
- Functional Isolation
- Storage Disaggregation & Data Acceleration
- Scalability & Programmability
Use Cases

❖ Security offload:
• Inline encryption
• Key management
❖ Network offload:
• Custom pipeline
• Connection tracking
❖ Storage offload:
• NVMe emulation and acceleration
• Compression
New Overlay Pipeline

- Standard SAI may be used for common underlay functionality
- Custom packet processing can be defined for the overlay pipeline

Overlay pipeline

- Standard SAI (underlay)
- Direction lookup
- VM table
- Firewall
- Underlay mapping
- Standard SAI (underlay)
New Overlay Pipeline - Integration

Every overlay table defined as SAI extension
Many pipelines possible per use case
Connections between tables to be loaded into SAI in the future
Stateful Tables – Use Cases

- Stateful Firewall
- Dynamic NAT
- Flow Burstiness
- Flow Caching
- Stateful Load Balancing
- Etc.

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Stateful Tables – Elements

Control plane

Data plane

Packet

Define flow key

Learn new flow*

Program states and transitions

Learned Flows table

Start

State B

State C

Extract key

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Stateful Tables – Elements cont.

- Match Key
- State Graph
- Eviction Policy
- Size
- Context
- Timer
Stateful Tables – SAI Object Model

- ACL Action {GoTo stateful table}
- Flow key (mandatory)
- Flow context (mandatory)
- Global context (mandatory)
- Packet graph (mandatory)
- Timer graph (optional)
- Timer (optional)
- Eviction policy (mandatory, default LRU)

- Stateful Table
  - Field list
  - Mask List
  - Flow Key
  - Context
  - Graph State List
  - Timer Graph State List
  - Memory Pool
  - Transition CB
  - Packet State
  - Transition CB
  - Packet State
Call to Action

• Stateful SAI API proposal - https://github.com/opencomputeproject/SAI/pull/1326
Thank you!