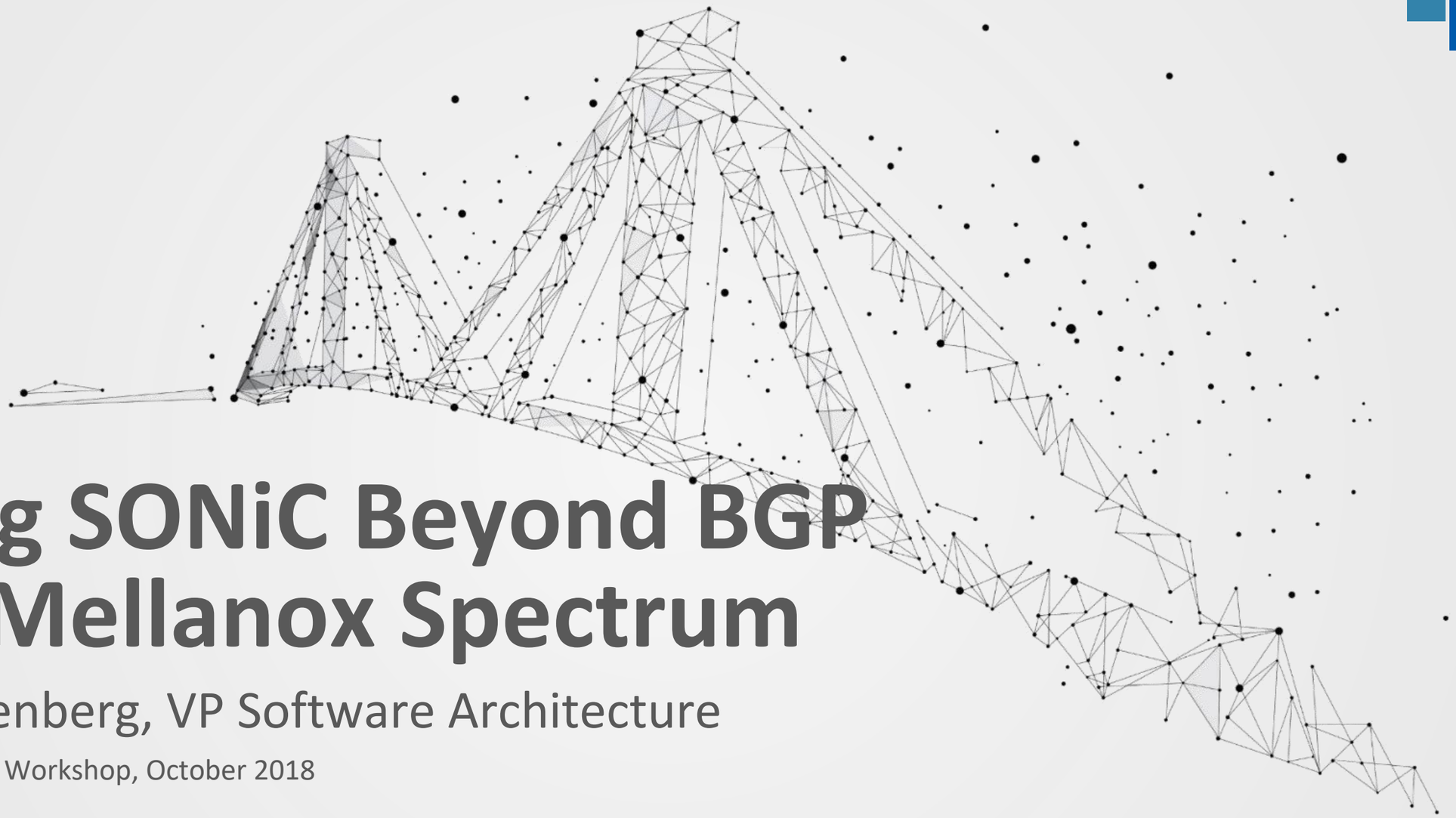


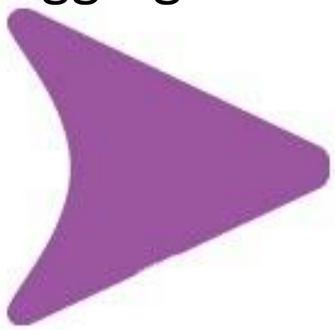
Taking SONiC Beyond BGP with Mellanox Spectrum

Dror Goldenberg, VP Software Architecture

Beijing OCP SONiC Workshop, October 2018

Close

Disaggregated



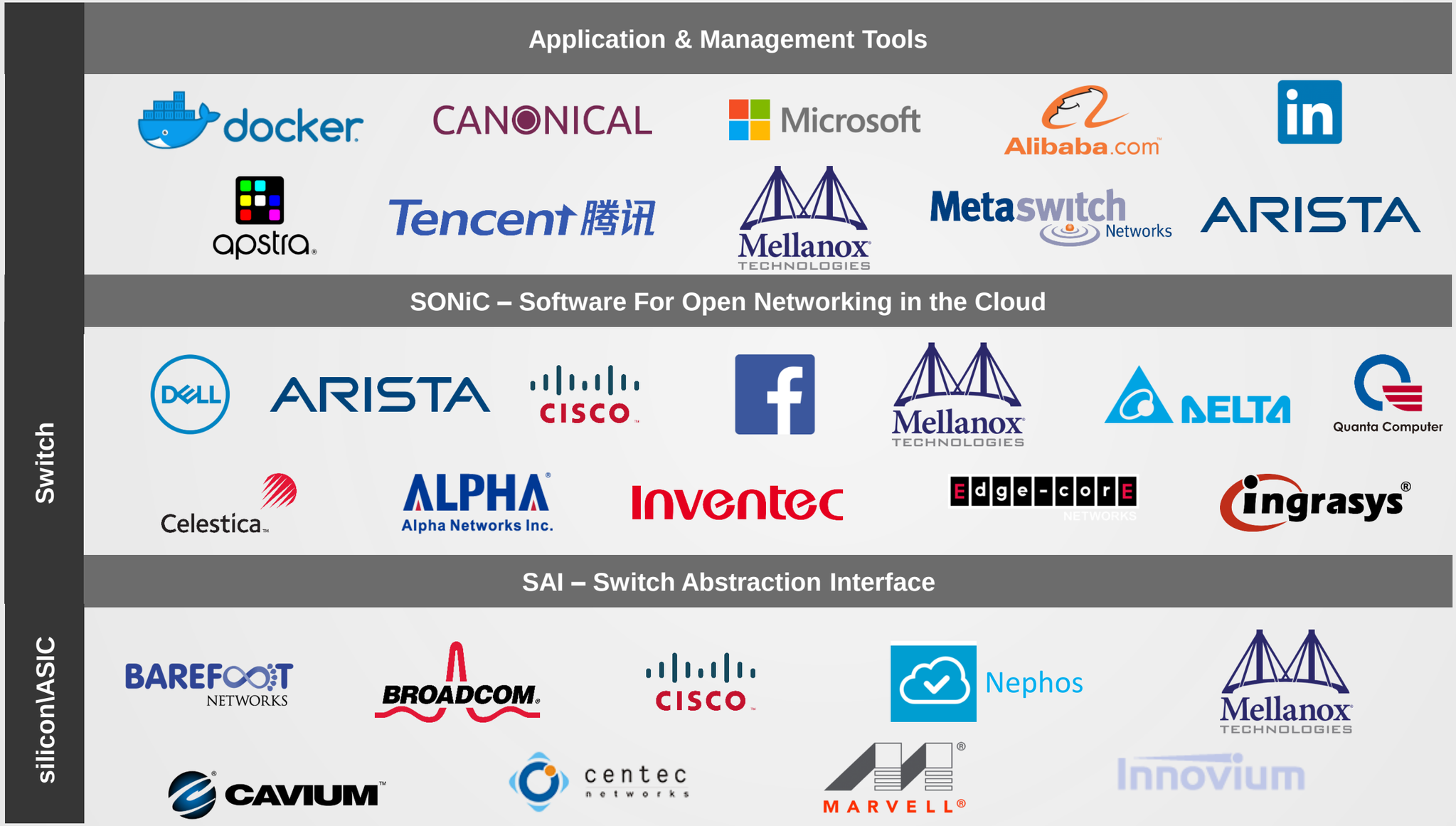
Open

Mellanox pioneered Network disaggregation

- Mellanox leads the Open Ethernet approach to network disaggregation from its early days
- Network disaggregation offers
  - capital cost reduction
  - reduced vendor lock-in
  - increased software flexibility

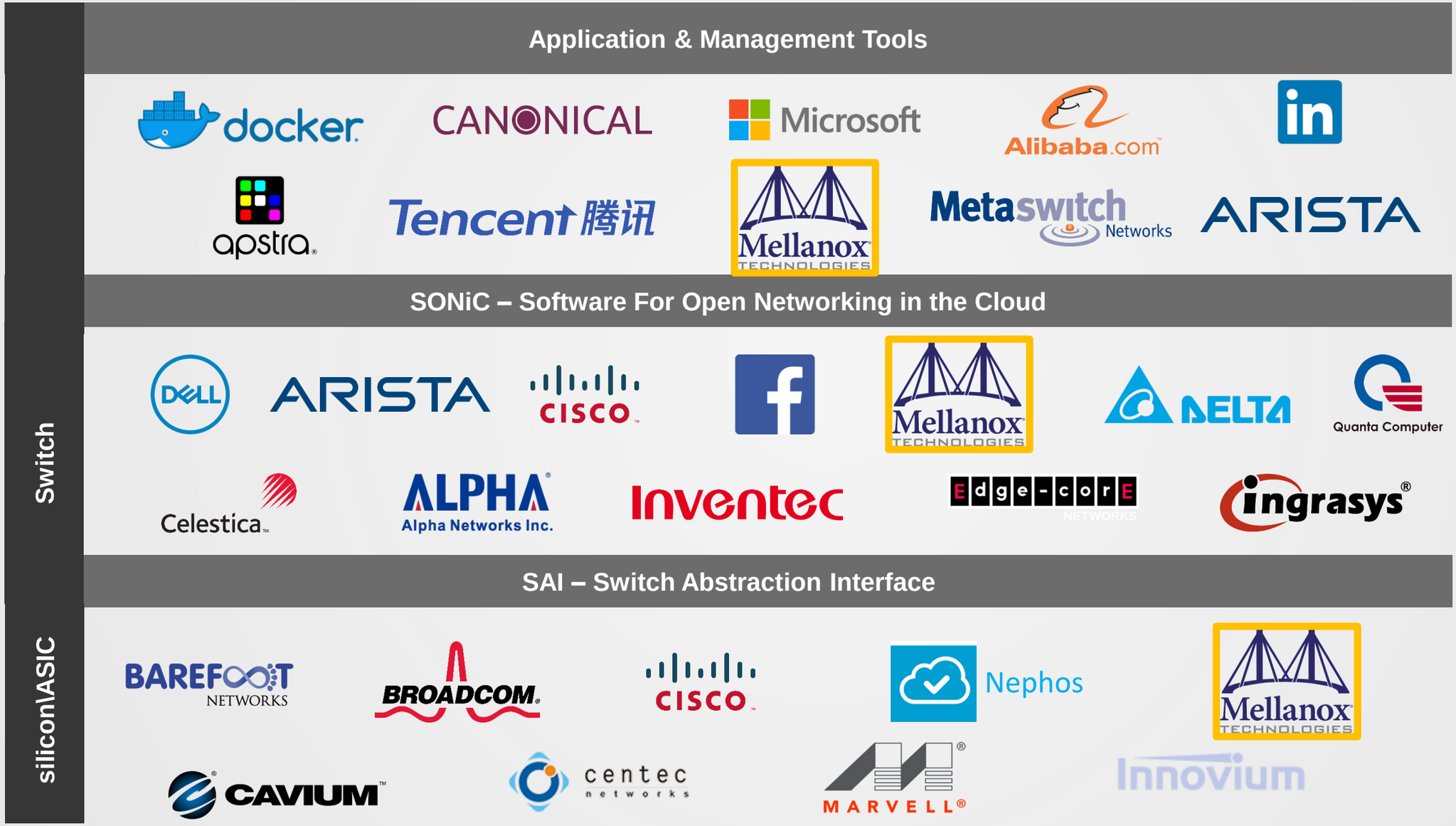
- Mellanox Spectrum Ethernet switches support the widest range of open network operating systems

SONiC participants (From Azure blog)



Source: Azure Blog March 2018

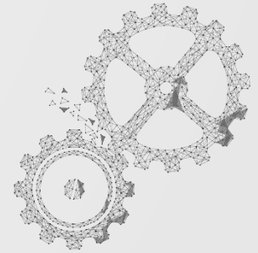
SONiC participants (From Azure blog)



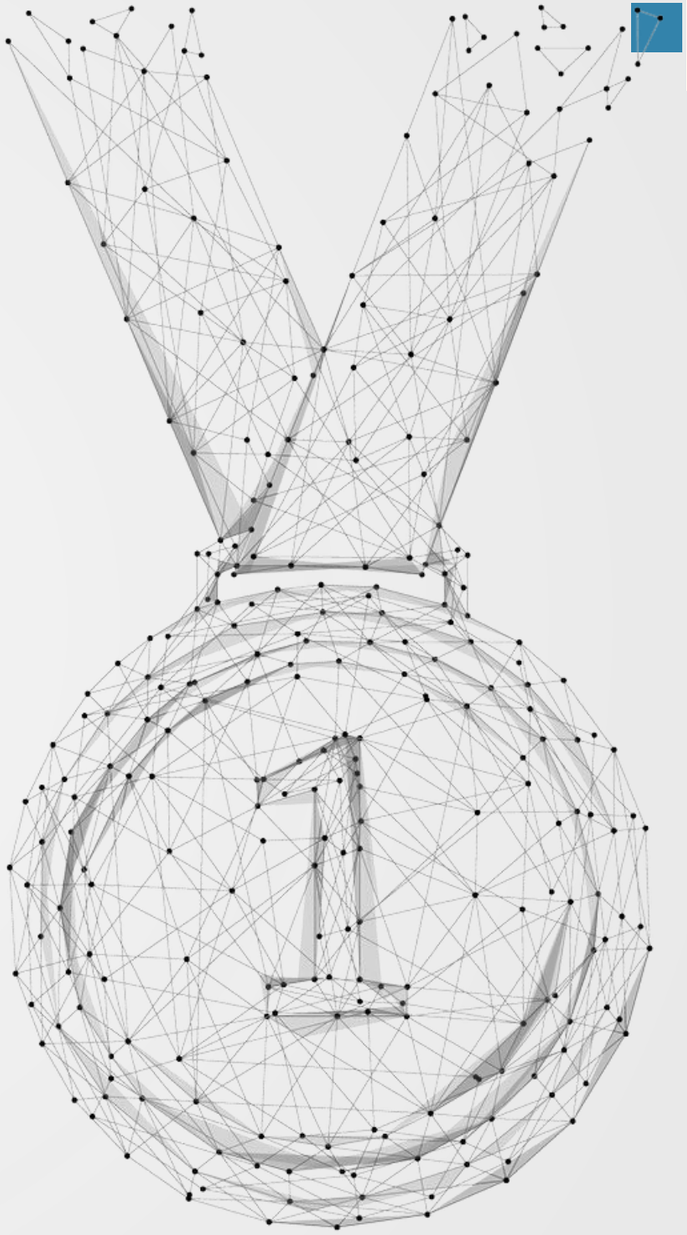
Source: Azure Blog March 2018

Mellanox contribution to the SONiC community

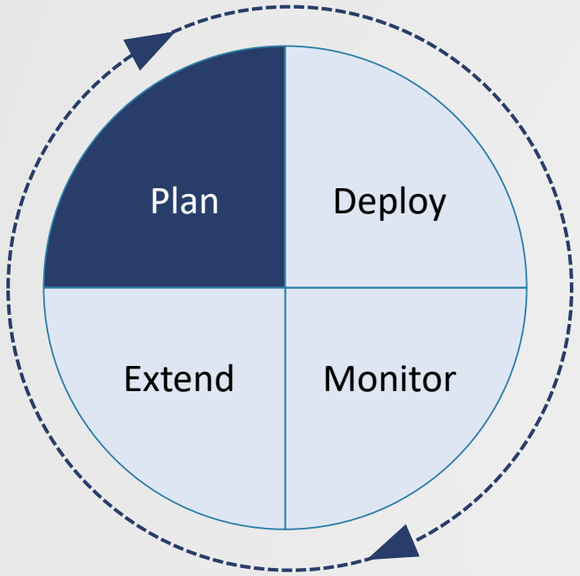
	Build procedure improvements		Nov-16
	sysdump		Jan-17
MAINTAINER	Logging facility and log size limit		Feb-17
MAINTAINER	ACL IPv4		Mar-17
MAINTAINER	Everflow		Mar-17
	SONiC single image build and versioning		Apr-17
	SONiC installer		Apr-17
MAINTAINER	BGP MP and BGP Graceful restart helper		Jun-17
MAINTAINER	ACL IPv4 interface vLAN and LAG		Oct-17
MAINTAINER	PFC Watchdog	RoCE	Oct-17
MAINTAINER	ECN marker for lossless queue	RoCE	Oct-17
MAINTAINER	Cable breakout		Oct-17
	Dynamic ACL configuration		Nov-17
	Dynamic ECN configuration	RoCE	Nov-17
	PFC monitoring and events	RoCE	Dec-17
	PSU utility		Dec-17
	FDB flush		Jan-18
MAINTAINER	Critical resource monitoring		Mar-18
MAINTAINER	MLNX SDK API sniffer		Apr-18
MAINTAINER	Buffer management	RoCE	May-18
MAINTAINER	Asymmetric PFC		Jul-18
MAINTAINER	Transceiver sensors monitoring		Aug-18
	IPinIP v6		Aug-18
MAINTAINER	SNMP management port support		Oct-18
	Watermark		Oct-18
	Warm reboot		Oct-18



Why SONiC on Mellanox platform



The uniqueness of Mellanox with SONiC



SONiC and SAI leadership

- Code contribution
- Community lead – bring network expertise to the design

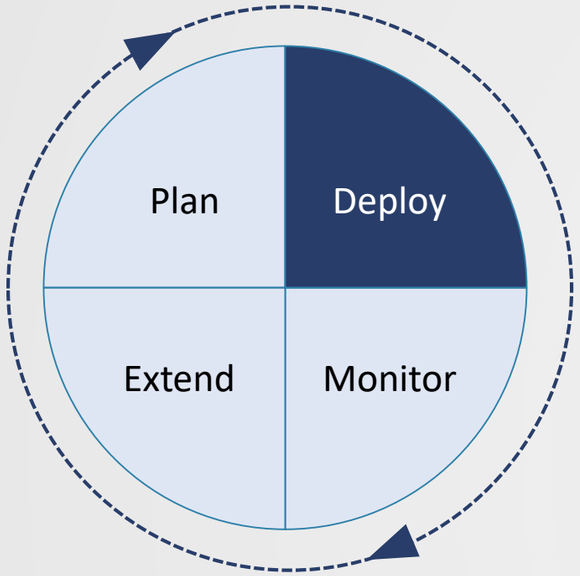
E2E network understanding

- Platform, Silicon, SDK, SAI, SONiC, Management

One Stop Shop

- ASIC, System, NOS, Management
- Various co-development and support models

The uniqueness of Mellanox with SONiC



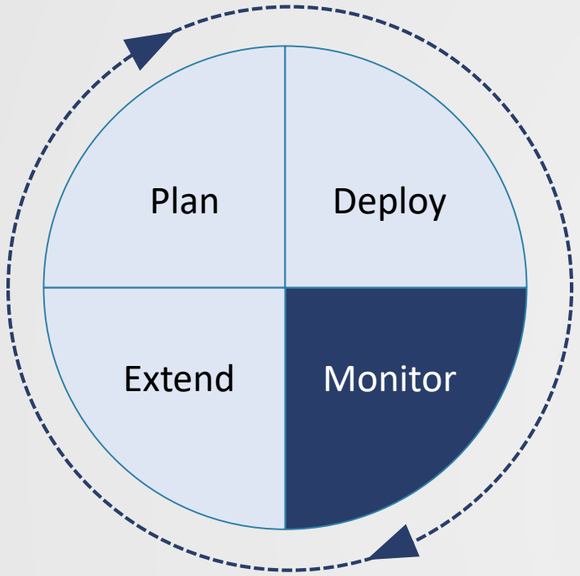
Mellanox’s Spectrum switch family platforms

- Spectrum ASICs: Optimized for AI, Storage, Cloud, Web scale Data Centers
- SONiC & Linux integrated PTP with high accuracy time synchronization
- RoCE optimized buffers and congestion control
- Vast telemetry information

Mellanox’s supports Hitless In Service Upgrade (ISSU)

- Zero data plane down time derived from ASIC capabilities

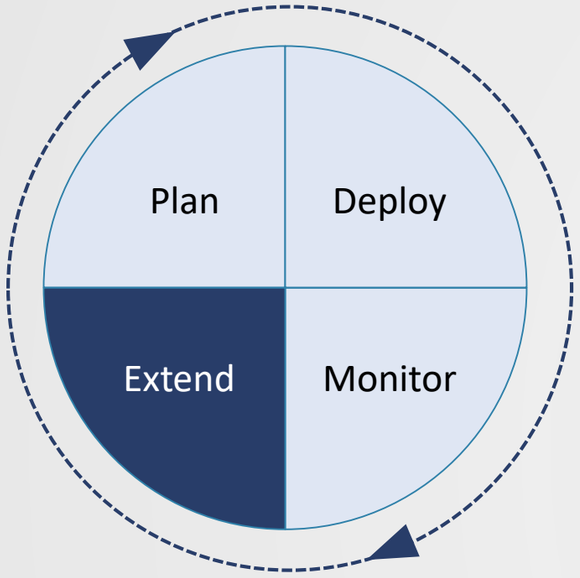
The uniqueness of Mellanox with SONiC



Mellanox SONiC network monitoring

- NEO – Data center fabric monitoring
- On-switch agent for advanced streaming telemetry
- Advanced debuggability - link, SDK sniffer

The uniqueness of Mellanox with SONiC+



Going beyond BGP

- BGP gives basic, reliable network for the underlay
- Use SONiC modularity with Mellanox spectrum gives more than just BGP

SONiC+ brings flexibility to SONiC

- Utilizing Linux Containers, SONiC flex APIs
- Spectrum Hybrid Programmable Pipeline
- Joint SONiC+ development
- Examples: SLB, WAN edge tunneling

ISSU
In Service Upgrade

ISSU in different flavours

Warm boot

- Requirement: Data plane disruption should be less then 1 second
  - The goal of SONiC warm reboot is to be able restart and upgrade SONiC software without impacting the data plane

- Use cases
  - In-Service restart
  - In-Service upgrade

Mellanox Hitless Boot ISSU

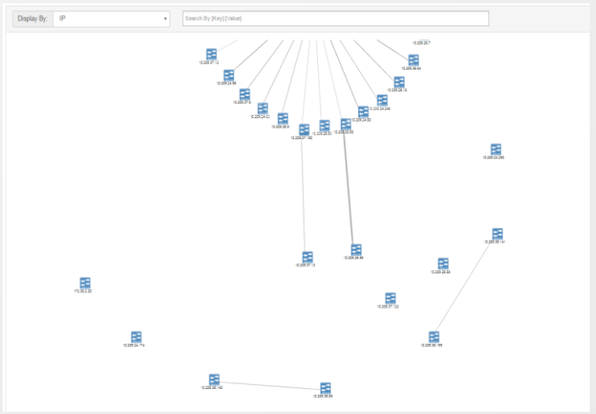
- No data loss– zero down time of the data plane
- Data plane partitioning : Spectrum Hitless Boot feature
- NOS agnostic

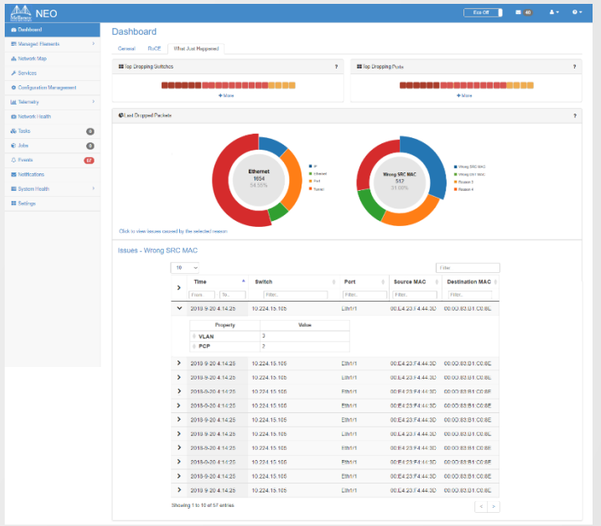
Telemetry & Monitoring

NEO for SONiC

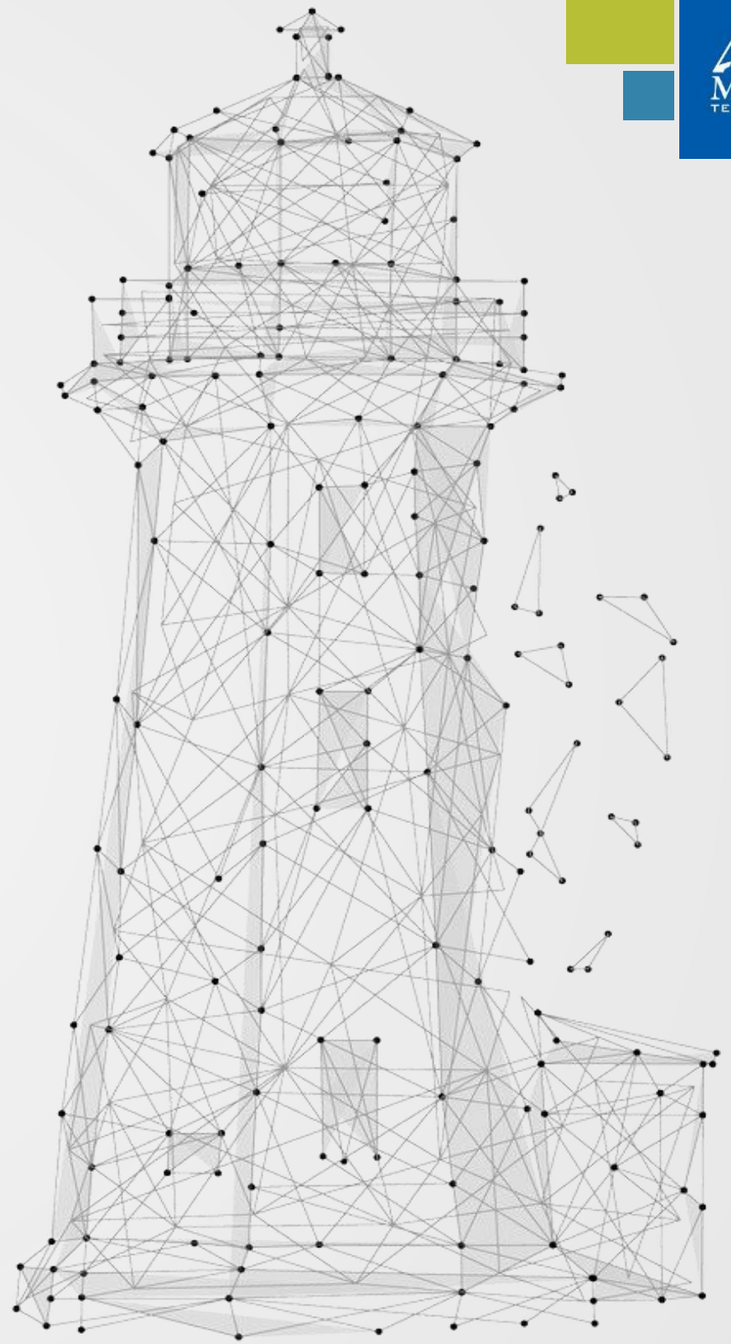
NEO datacenter management solution

- NEO provides ability to monitor, manage & orchestrate fabric wide SONiC switches
  - Also provides API to 3rd party orchestrators
- NEO switch telemetry agent supports streaming telemetry to monitoring stacks such as ELK & TICK on top of Mellanox NEO
- Get **actual drop reasons** from physical layer to L3, buffer drops, ACLs etc.
  - Continue in depth analysis of flow using In-band telemetry (Spectrum-2)
- RoCE focused dashboard





SONiC+ going beyond BGP



What Is SONiC+?

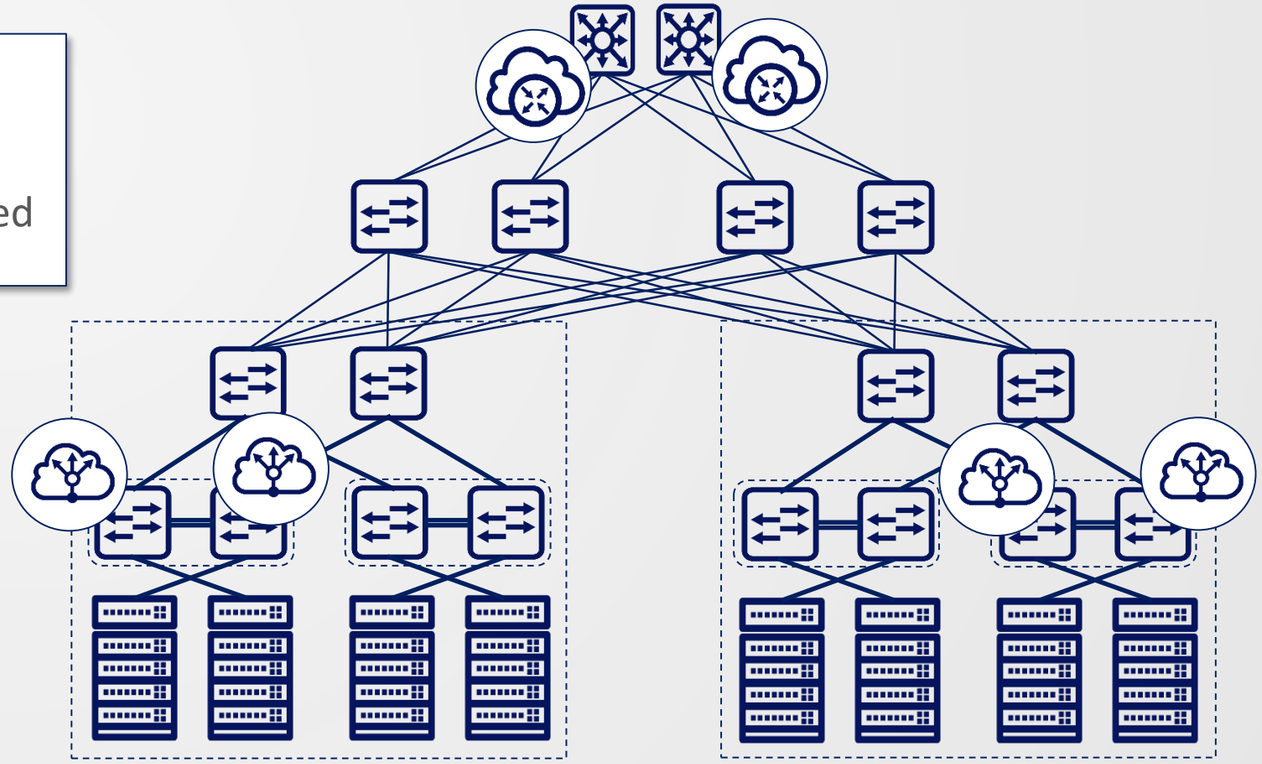
An application running in SONiC NOS, solving specific use case

Combination of application need and Spectrum capabilities

A ‘plus’ application is containerized for modularity

Integrate with SONiC infrastructure ie. SAI, Redis DB

- No impact on SONiC - Using SAI flex interface + REDIS DB
- All enhancements over SONiC are automated & auto generated



SONiC+ applications

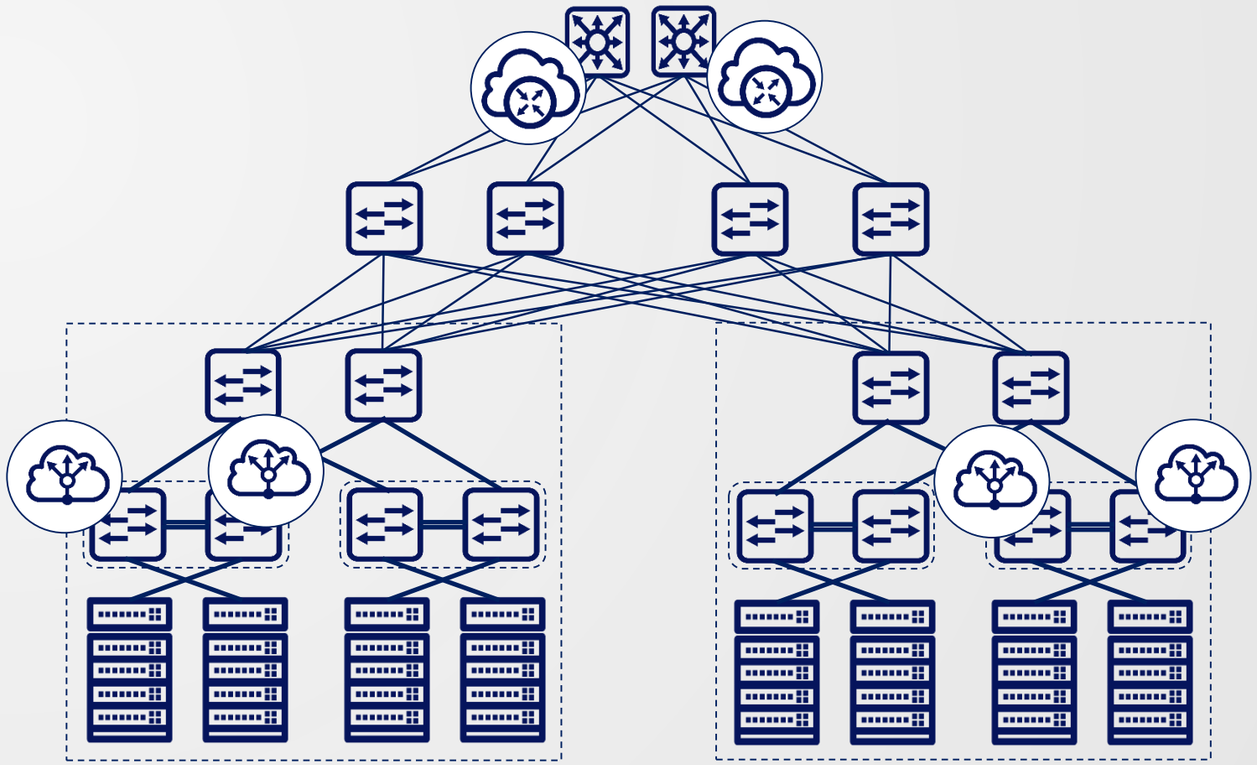
Making use of the Spectrum Hybrid Programmable Pipeline

SONiC+ Load Balancer

- Load balancing @ switch line rate
- Can run on existing ToR switch, Thus removes unnecessary load balancer servers

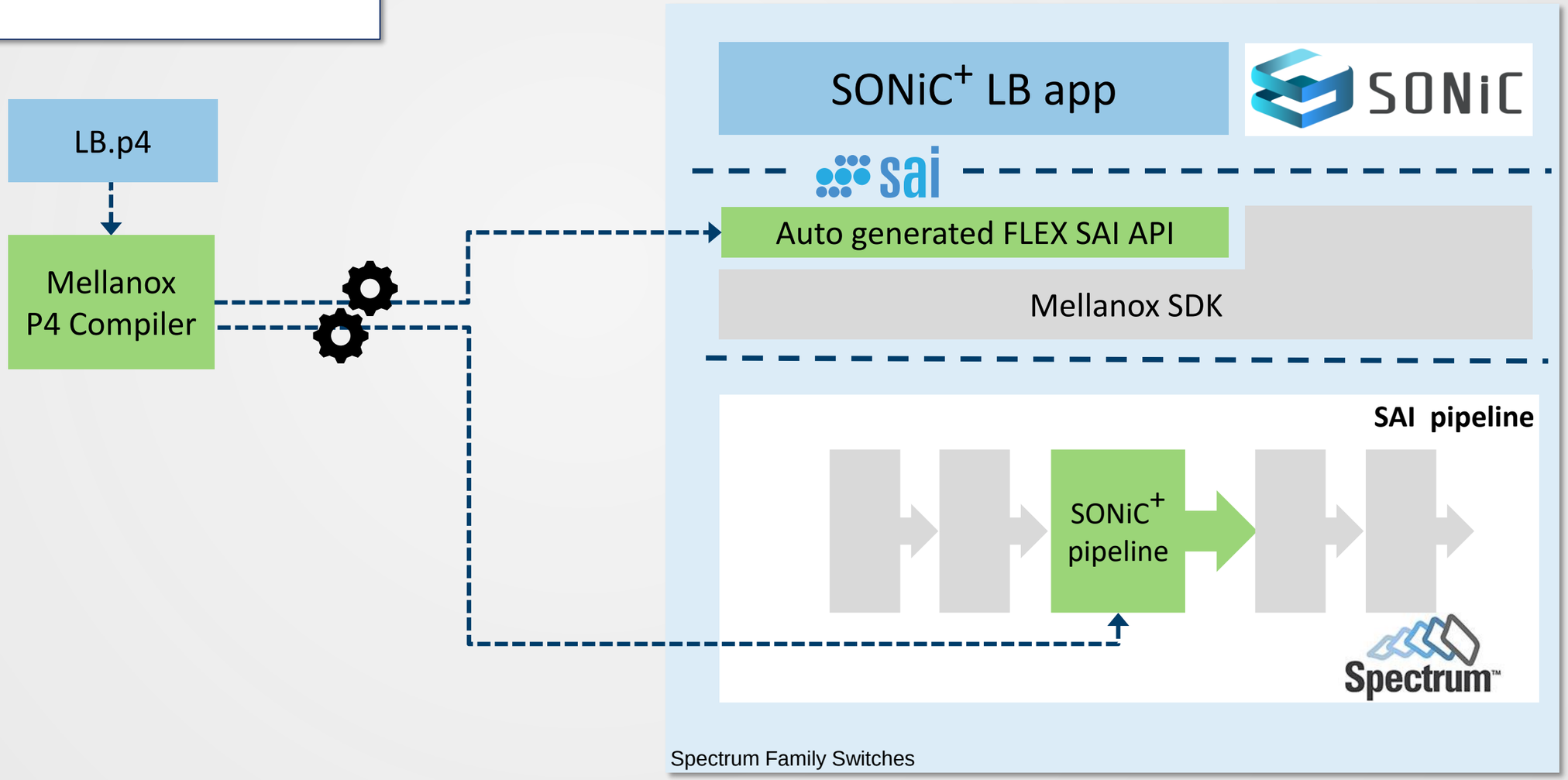
SONiC+ Tunnel

- Support tunnel mapping to overlay networks
- Support VRF peering to increase routing scale
- Use cases:
  - Connect bare metal servers to overlay networks
  - Map Costumer Tunnel to tenant network



SONiC+ Programmability – Hybrid

Ability to add changes to control & data plane according to costumer needs



Thank You