SONiC, Programmability & Acceleration

ONF P4 Workshop 2022
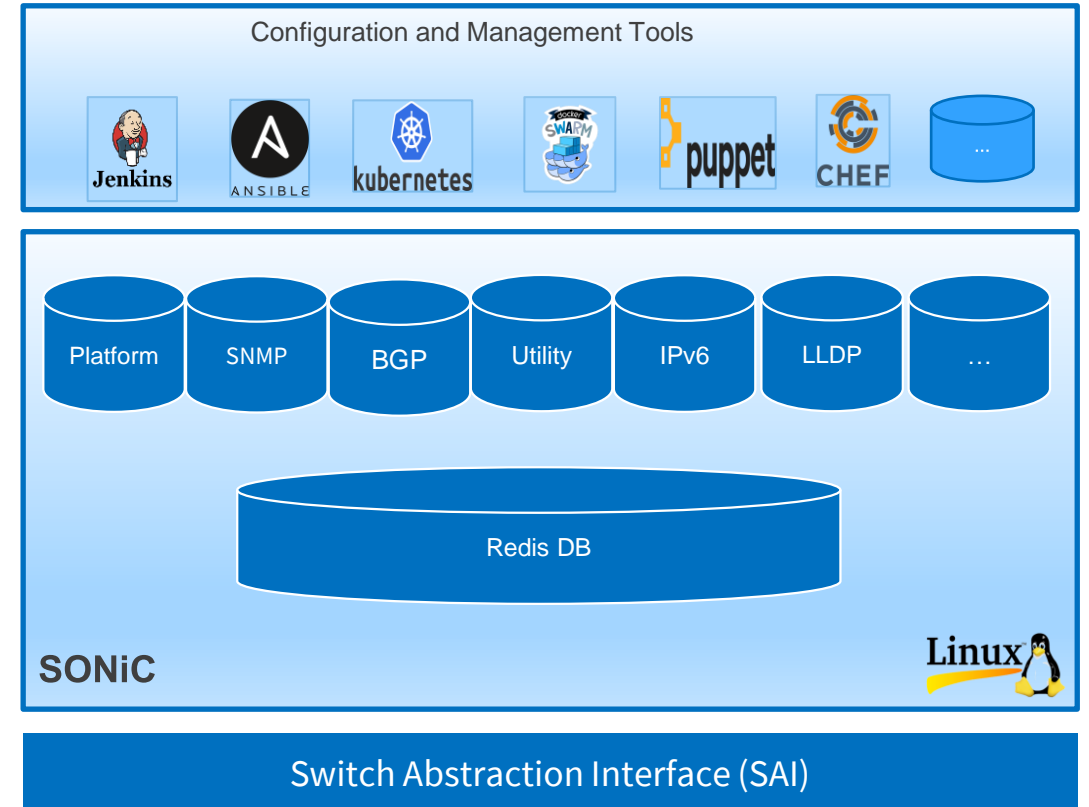
Xin Liu
Principal PM, Microsoft

What is SONiC [**S**oftware for **O**pen **N**etworking **i**n the **C**loud] ?

All about Disaggregation & Rich Choices

SONiC is a Debian Linux-based network operating system supported by more than 100 switch platforms and all major ASICs

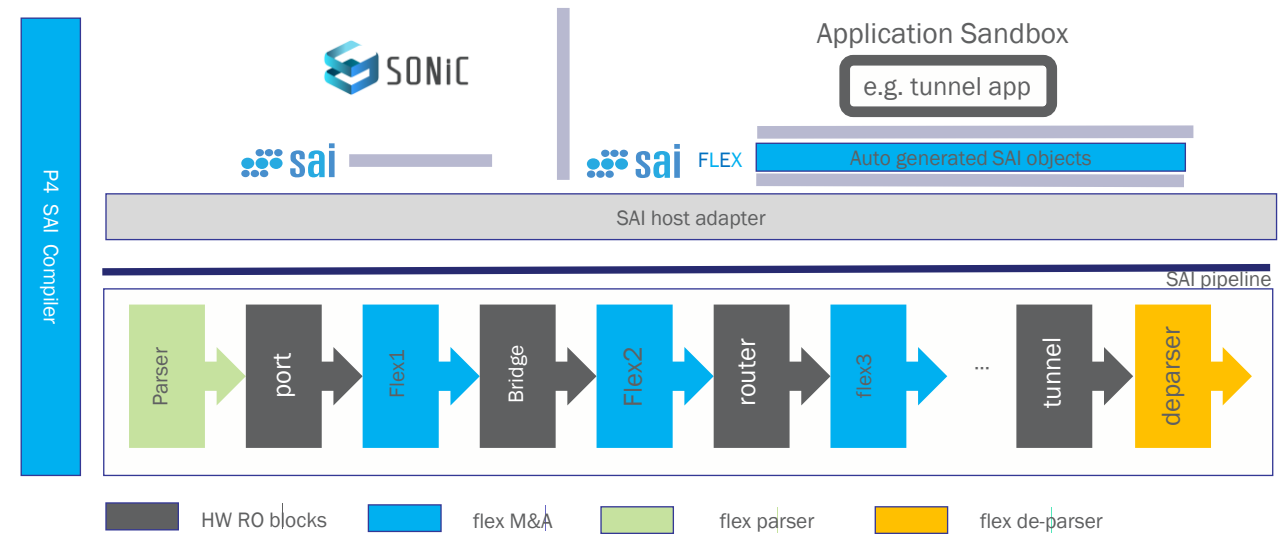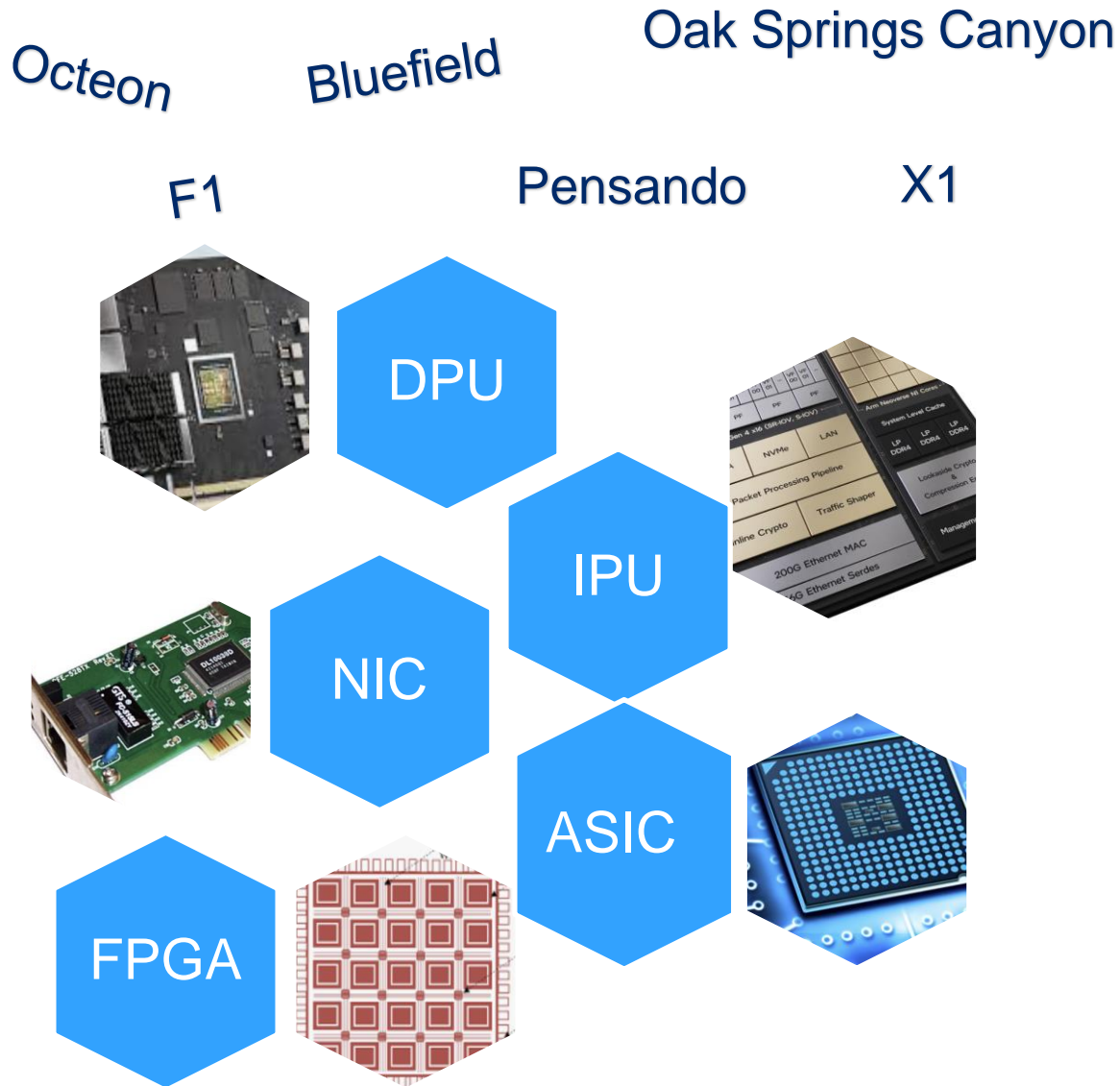# SONiC Programmability Journey – Early Stage

SAI Flex Enables

➤ Silicon: programable or fixed pipeline

➤ SAI implementation: P4 or other choice

SONiC Programmability Journey – since 2021

PINS (P4 Integrated Network Stack)

➢ Enable hybrid control planes – distributed and centralized

➢ P4 Runtime for flexible data plane SAI objects

➢ Familiar interface via gRPC

What Is Next ? – Most Recent Hardware Trending

Octeon

Bluefield

Oak Springs Canyon

F1

Pensando

X1

DPU

IPU

NIC

ASIC

FPGA

Connectivity 400G
PPS: 200M pps
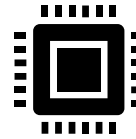
5nm low power
P4 programmable

10M+ flows at Millions CPS

Millions of rules
400Gbps Crypto/Security
IPSec: 16M connections

IOPs: >40M/s

Benefits & Challenges – Adoption Needs an End-to-End Solution
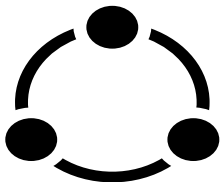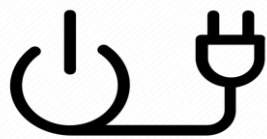
Acceleration
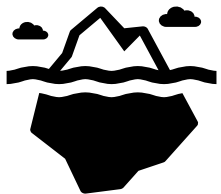
Offloading

Security Isolation

Should not overlook Serviceability

Ecosystem Interoperability

Optimization trade off
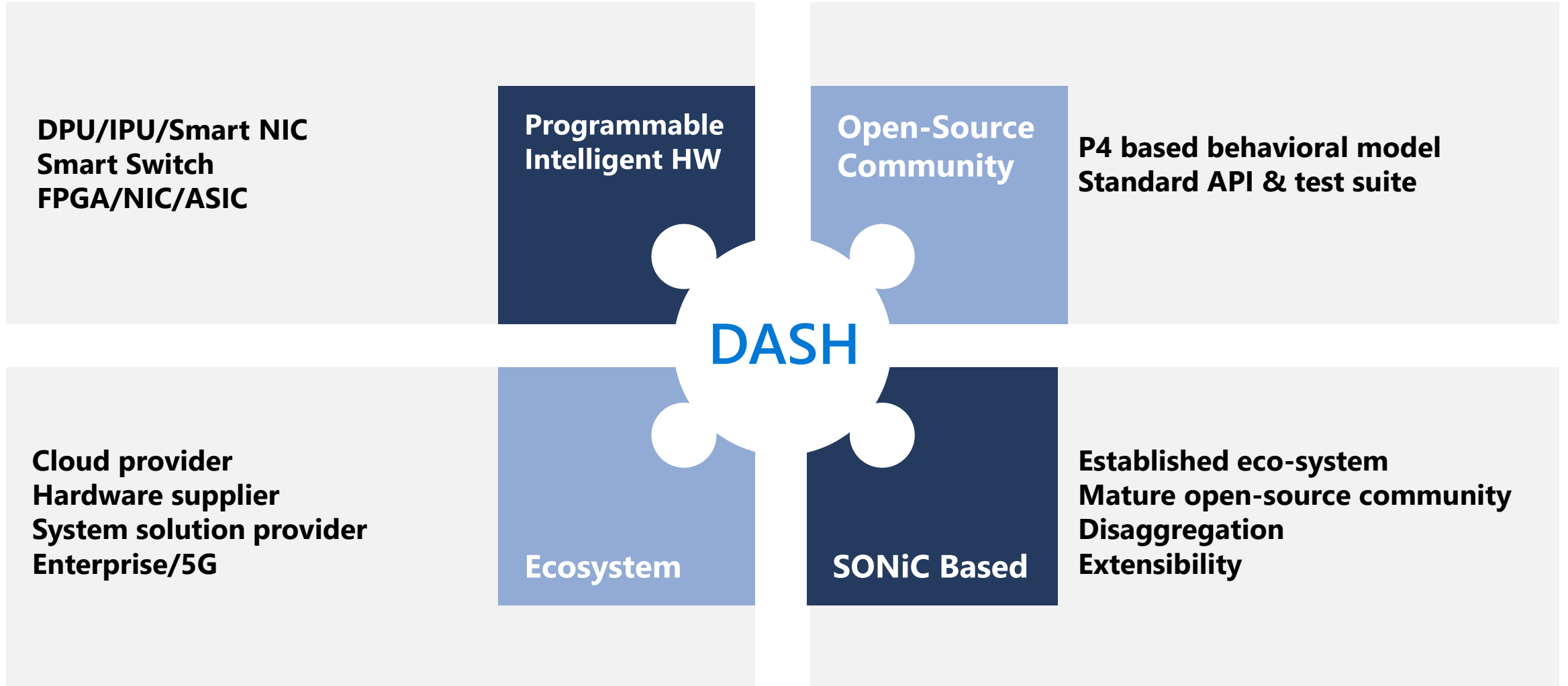
Complexity fully understand?

Introducing -

**DASH** (**D**isaggregated **A**PI for **S**ONiC **H**osts)

➤ An open source project

➤ to achieve 10-100x perf and scale than offered in today's Cloud & Enterprise

➤ by maximizing innovation across switch and DPU/IPU in a complementary manner where 1+1>3 ☺

DASH Components

DPU/IPU/Smart NIC
Smart Switch
FPGA/NIC/ASIC

Programmable Intelligent HW

Open-Source Community

P4 based behavioral model
Standard API & test suite

DASH

Cloud provider
Hardware supplier
System solution provider
Enterprise/5G

Ecosystem

SONiC Based

Established eco-system
Mature open-source community
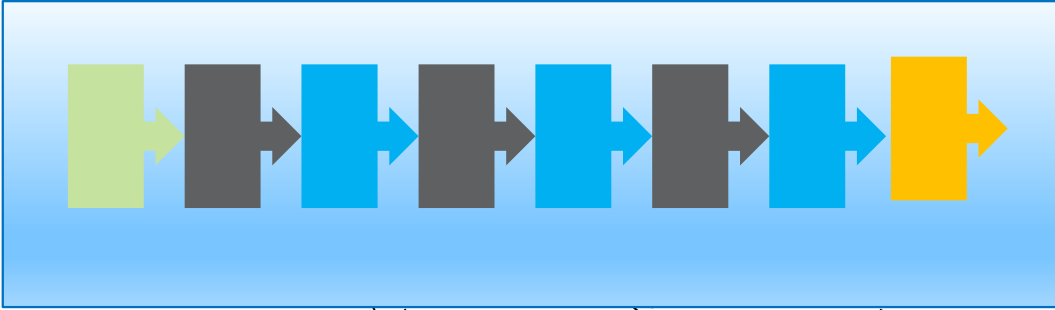**Disaggregation**
Extensibility

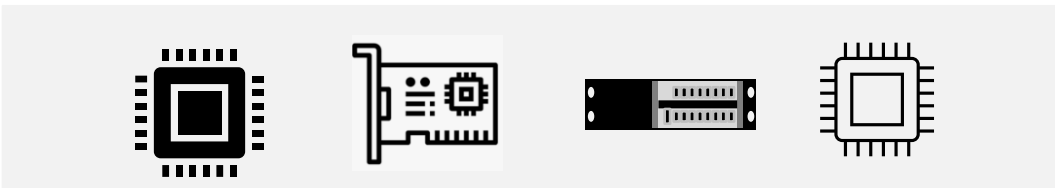# Disaggregation: Behavioral Model Enables Better/Targeted Acceleration

Hybrid Applications
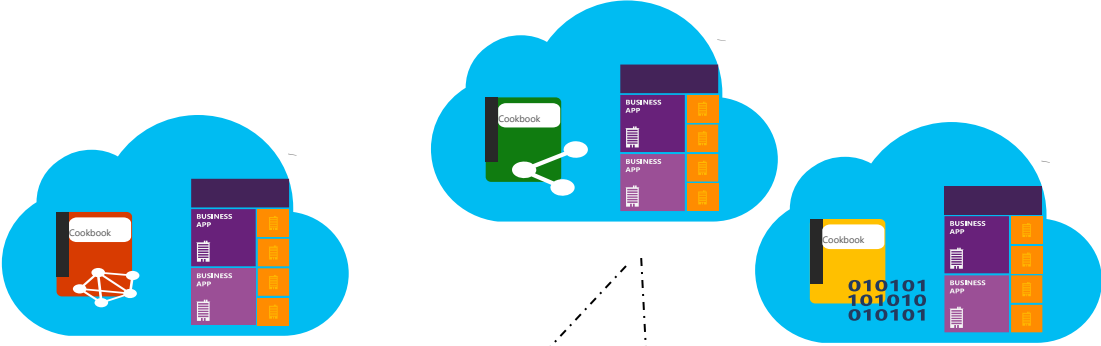
SONiC DASH

Powerful Smart Hardware

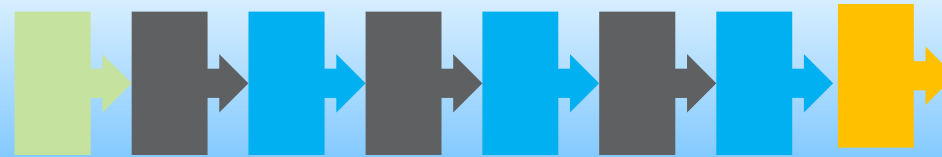# Disaggregation: North-bound/South-bound API Standardization

Hybrid Applications
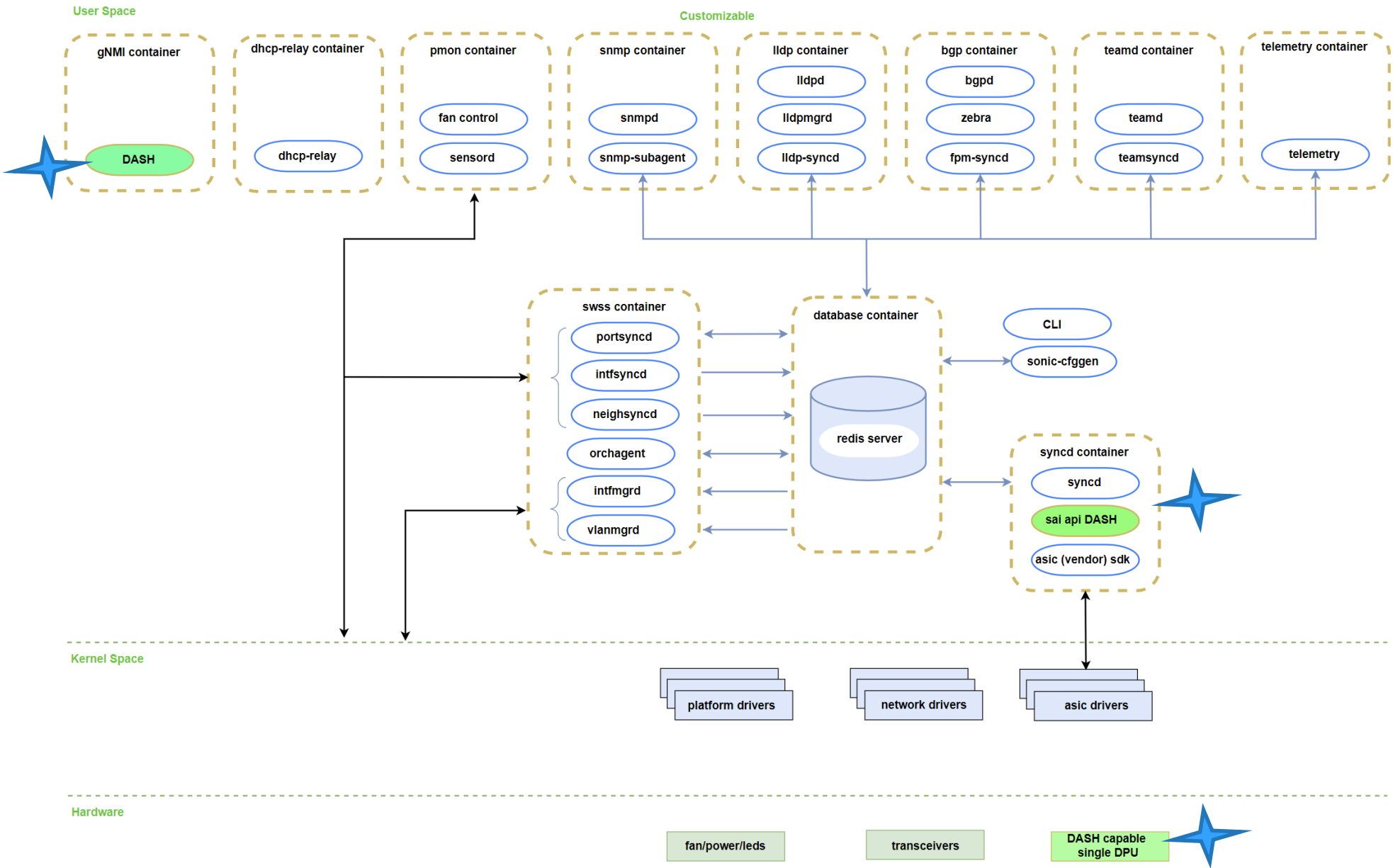
Manageability

gNMI/Yang

SONiC DASH

Standard API (SAI)

HW Agonistic

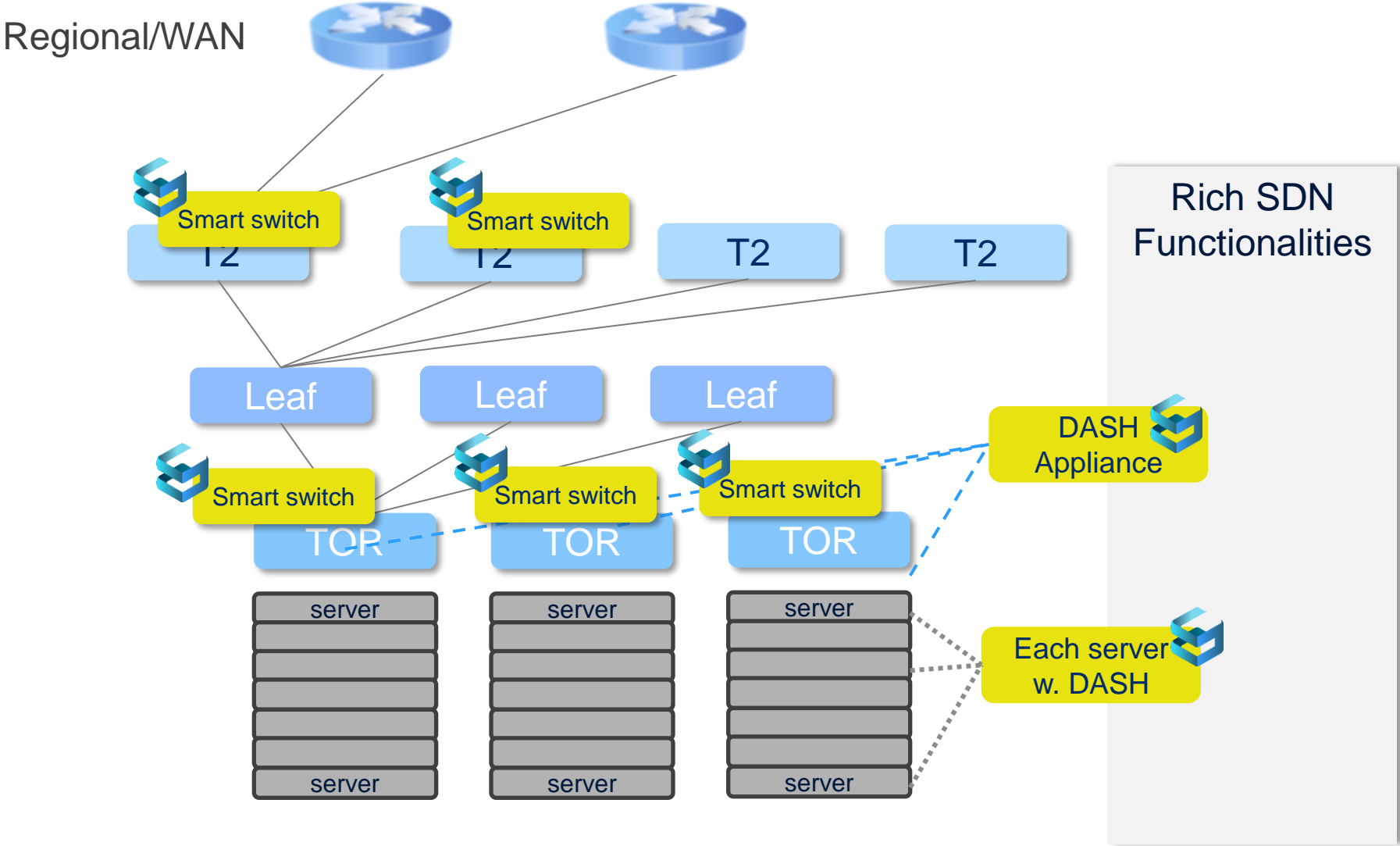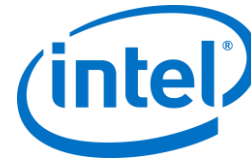Powerful Smart Hardware

Extend SONiC to Support DPU/IPU is Simple

Consideration - What is the Right Choice ?

Members in DASH Group

Roadmap

Working on   **Next**   **Future**
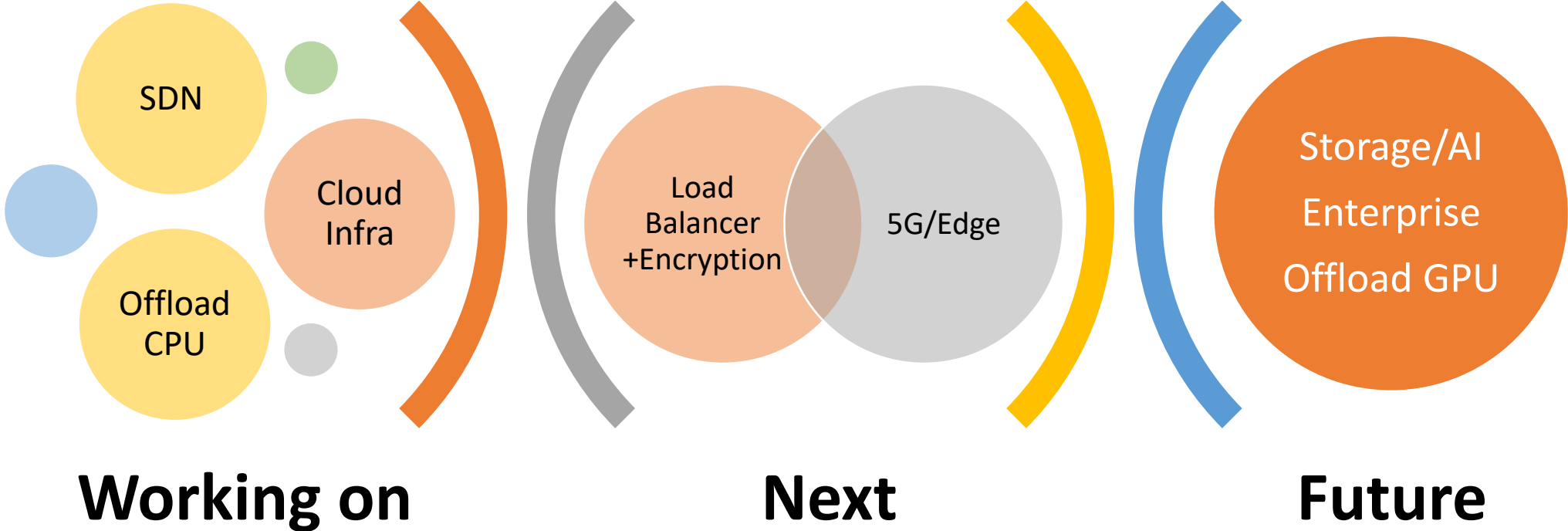
Takeaways

DASH – open-source program empower limitless networking with 10x~100x speed improvement

DASH – maximize hardware acceleration via P4 behavioral model and standard APIs (software)

SONiC – battle tested NOS, easy extensibility to support smart programmable devices via containers

Lots of opportunities – tons of user scenarios, rich choices, eco-system enables business/adoption

Call for Participation

DASH Github: Azure/DASH: Disaggregated APIs for SONiC Hosts (github.com)

SONiC Github :   http://sonicfoundation.dev/

Mailing list: sonic-dash@googlegroups.com

                              sonicproject@googlegroups.com

Inviting contributions in all areas

- DASH/SONiC/SAI/P4/Behavior Model

- Hardware platform

- New features, applications and tools

- Download, test, deploy!

- Training, Hackathon, FAQ

Thank you!