P4 Practice at Baidu

Distinguished Engineer

Gang Cheng

About Baidu

- **Founded on January 1, 2000**

- **World largest Chinese search engine & top AI Cloud company**

- **A leading AI company with a strong Internet foundation**

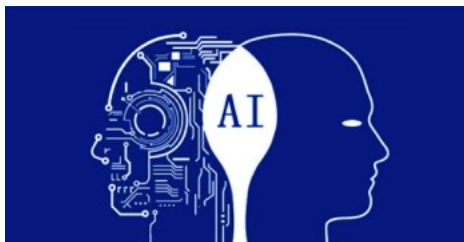- **Mission : "make the complicated world simpler through technology"**

About Baidu

Top 50 the most innovative companies (2019)

Top 50 smartest company (MIT Technology Review 2018, 2019)

10 breakthrough technologies (MIT 2016，2017，2018)

Top 5 AI company (Harvard business review 2020)

The first open intelligent driving platform of China

About Baidu

AI Cloud

Baidu AI Cloud

A major public cloud service provider of China

No. 1 AI public cloud at China

ID & OGI

apollo

World-leading autonomous driving open platform

DuerOS

China's leading conversational AI operating system

ME

Baidu APP

0.54 billion monthly active users

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百家号　智能小程序　托管页

Bai du 大脑　飞桨
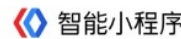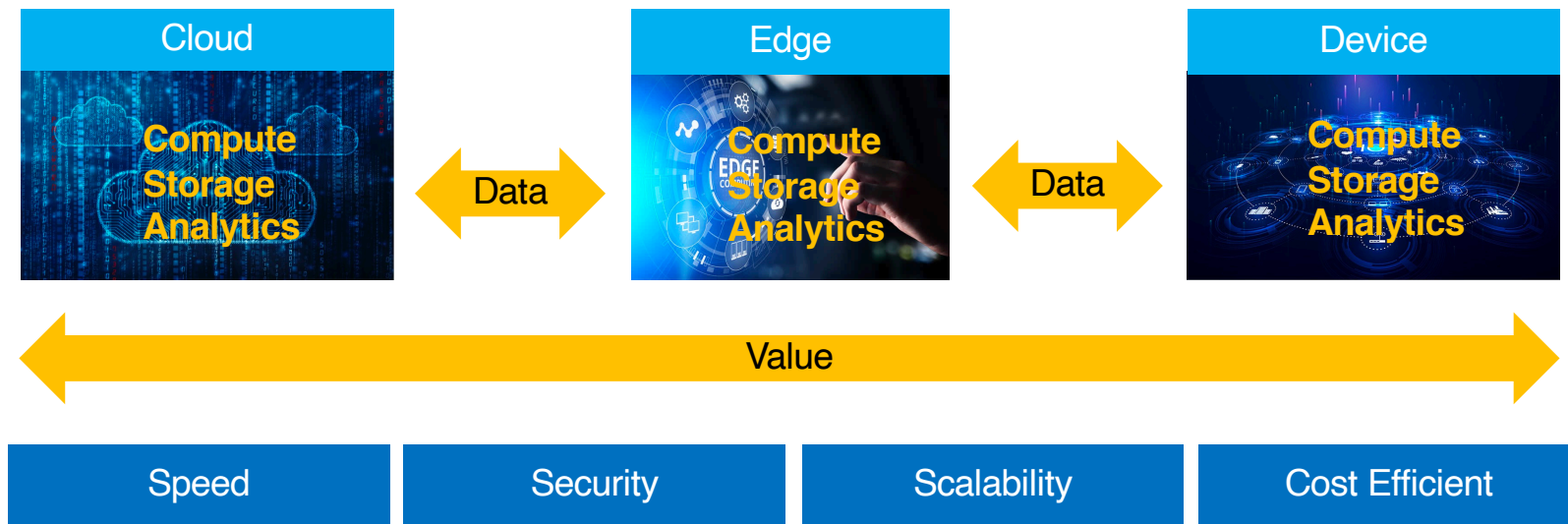
Baidu Brain integrates the company's general AI capabilities, making available over 270 AI capabilities, while requests on Baidu Brain have surpassed 1 trillion hits per day
PaddlePaddle is the first deep learning framework developed in China. An operating system in the era of AI, it has attracted 2.65 million developers and served 100,000 enterprises.

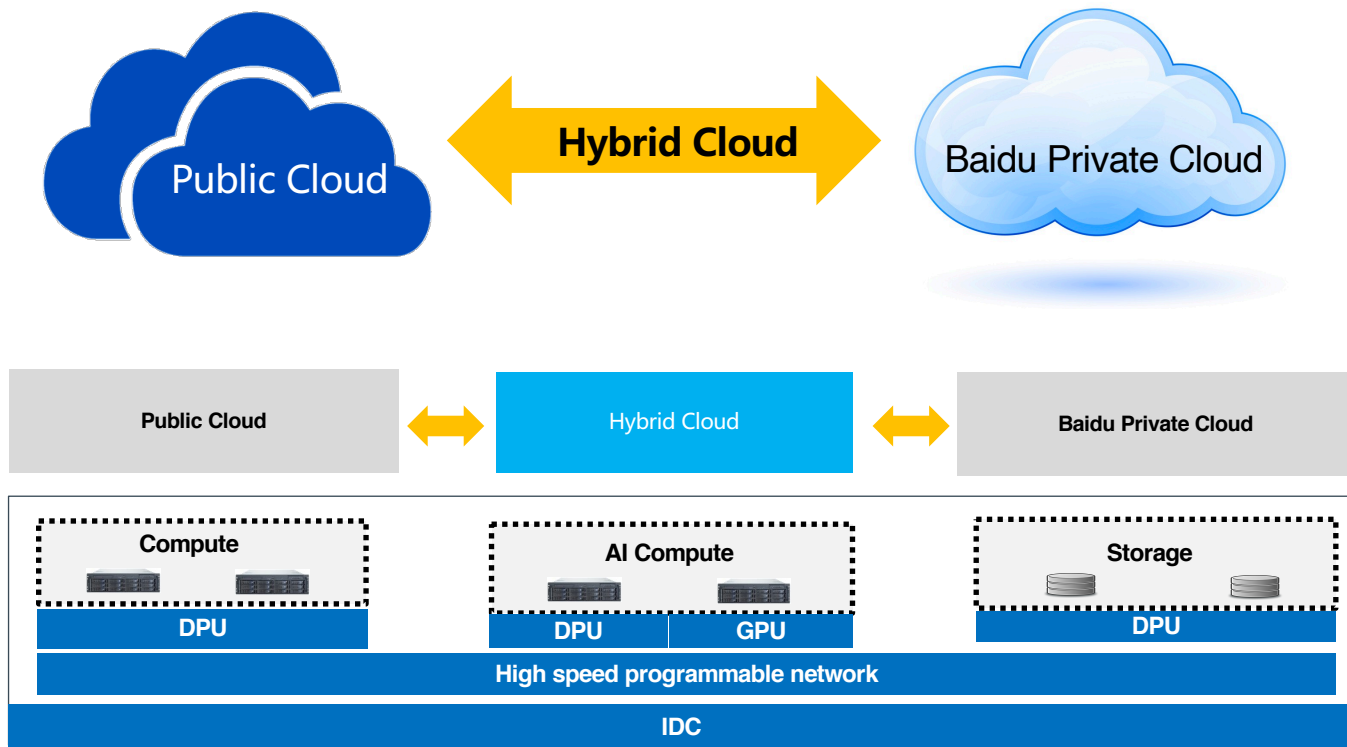# The Data Centric Infrastructure of Baidu

Cloud — Compute Storage Analytics

Data ↔

Edge — Compute Storage Analytics

Data ↔

Device — Compute Storage Analytics

← Value →

| Speed | Security | Scalability | Cost Efficient |

Baidu Data Center Network Overview

100G DCN network. Moving toward 400G in 2022	30 ~ 100K servers each cluster	Fully white box

Spine

Compute POD

Storage POD
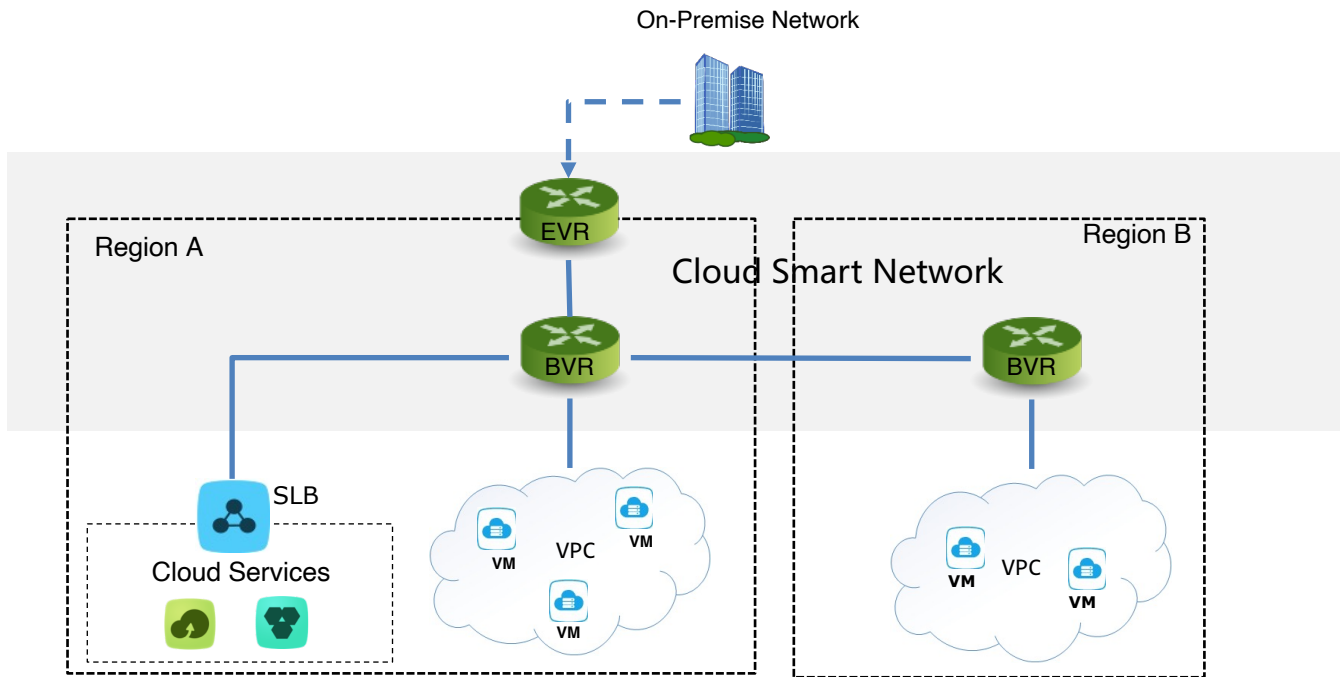
Service POD

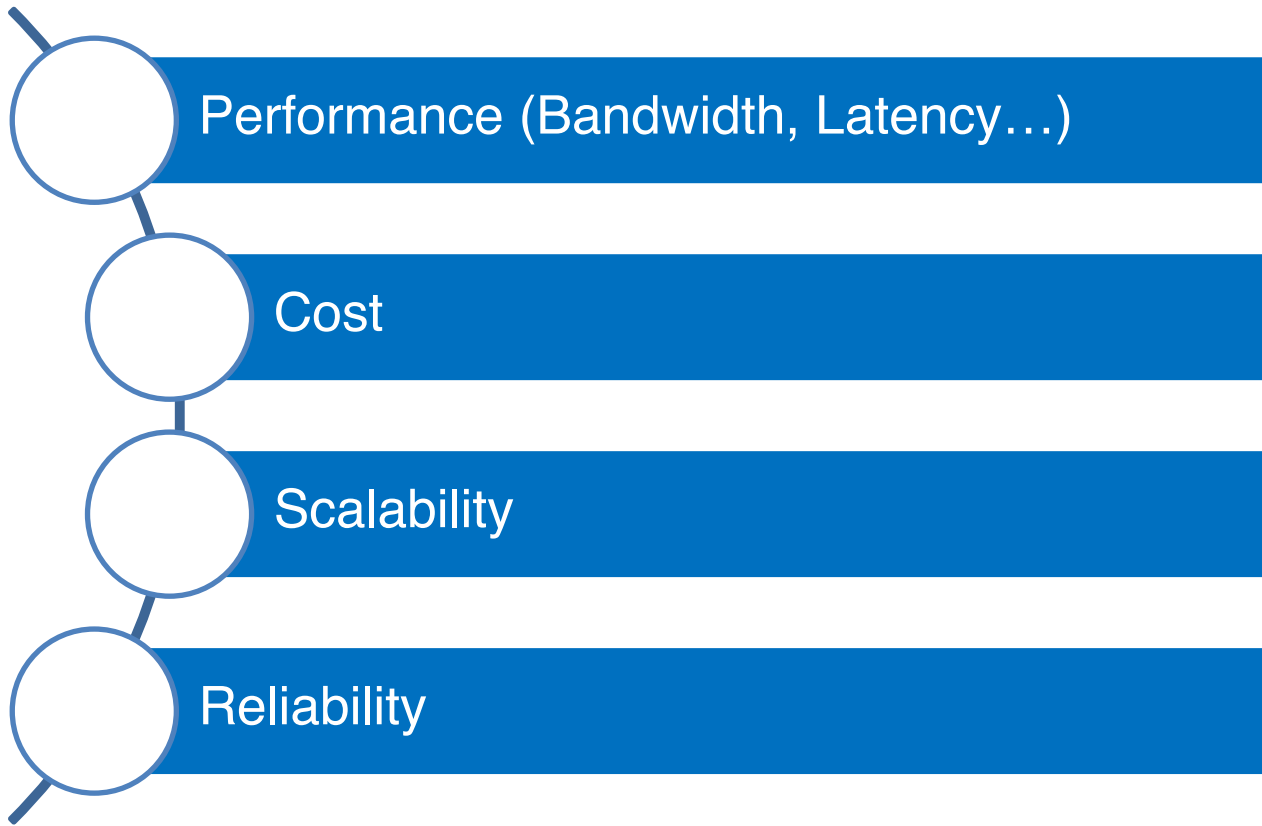| 2x25G or 2x100G	2x100G	XGW & SLB
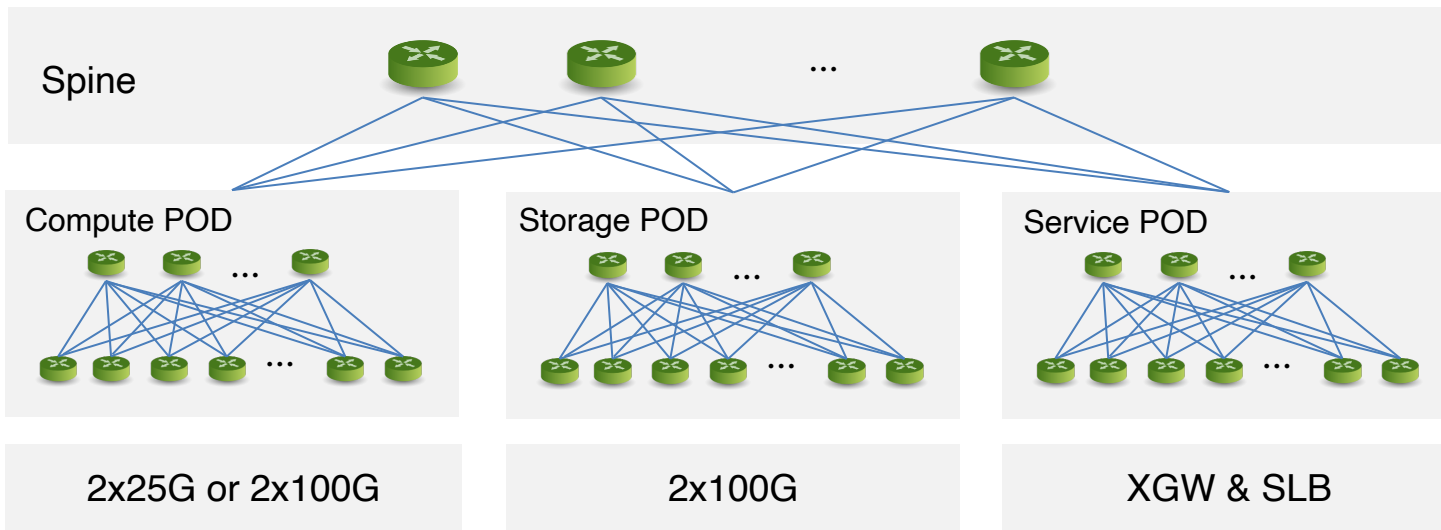
The Hybrid Cloud Infrastructure of Baidu

The Hybrid Cloud Solution of Baidu

Challenges

- Performance (Bandwidth, Latency…)
- Cost
- Scalability
- Reliability

Our Solution
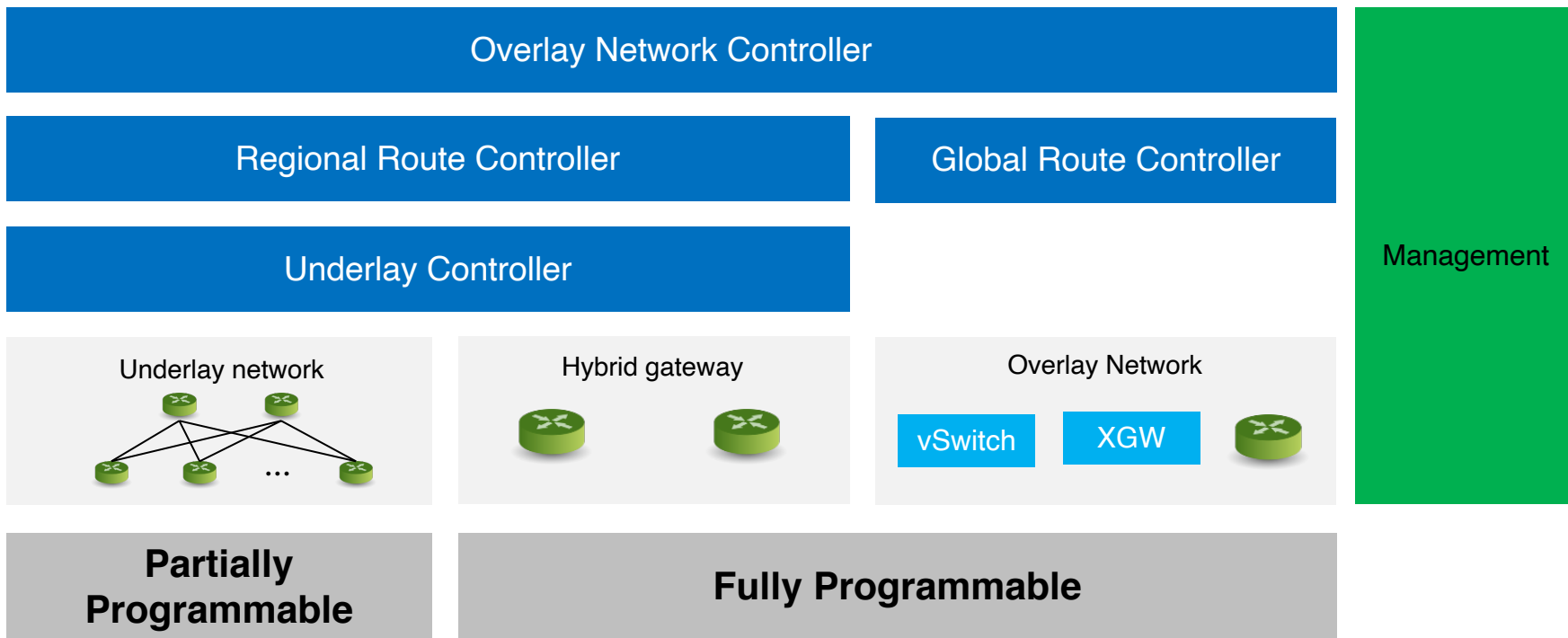
XGW Cluster Overview

Enhancement

P4

CPU

Packets

Programmable ASIC

FPGA
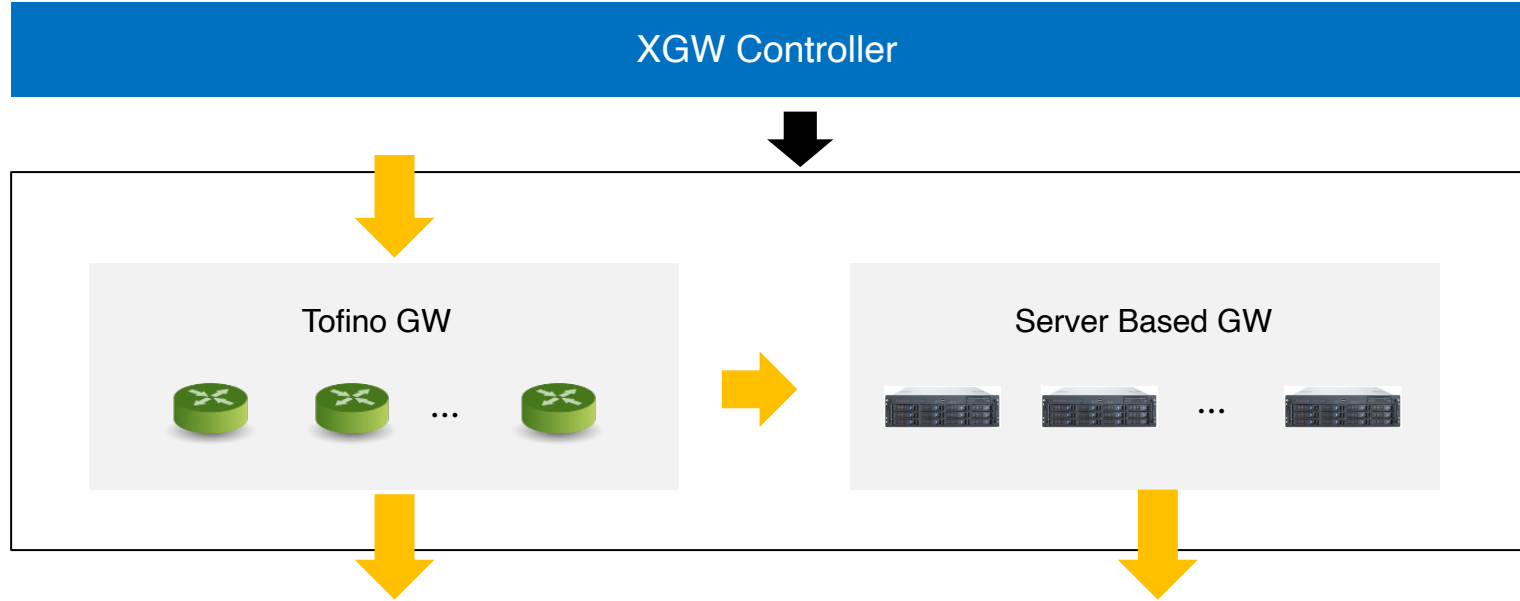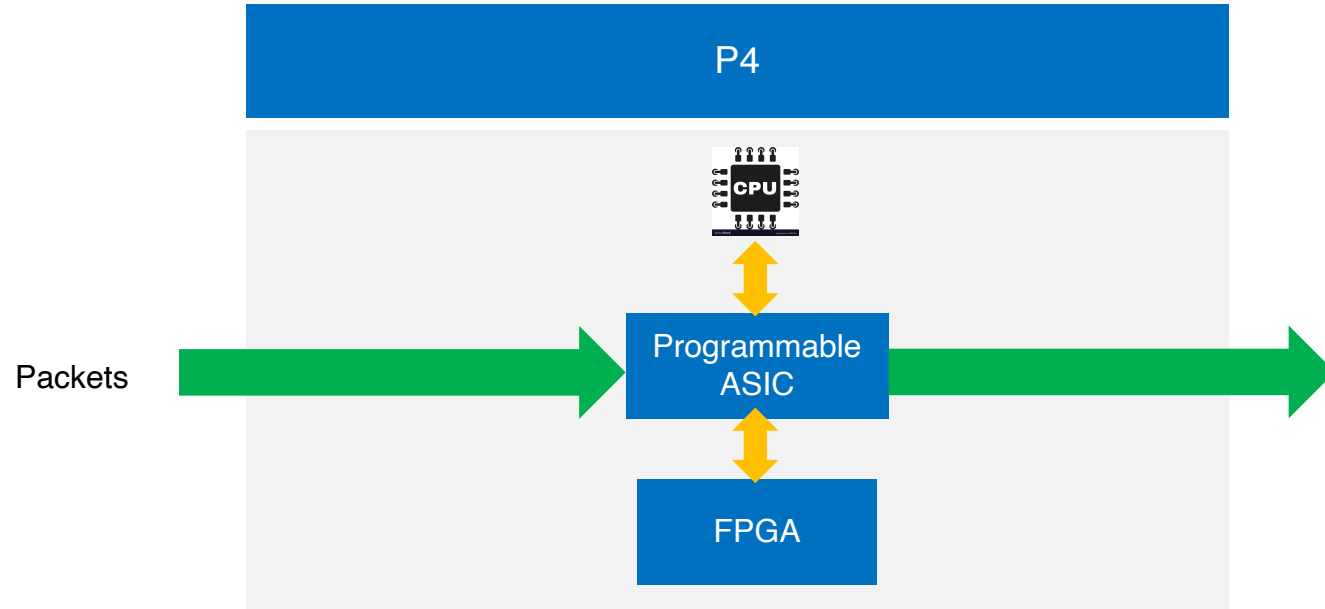
Down the Road

End-to-end programmable network

Software Defined Infrastructure

End-to-end Fully Programmable

Control Plane

P4

Server

vSwitch

DPU

Telemetry

In-network computing

...

vSwitch

DPU

Server

Thank You