



# Routing in the Cloud Titans

Addison Chi  
Solutions Architect  
Arista Networks  
[addison@arista.com](mailto:addison@arista.com)

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ARISTA

# Routing Architecture Transformations



## Cloud Principles

Flat & Scale out

Simplify

Netconf, YANG, Openconfig

Software Driven Control

Programmability, Automation, Telemetry

Ethernet and IP

Merchant Silicon

Economics, Scale, Services

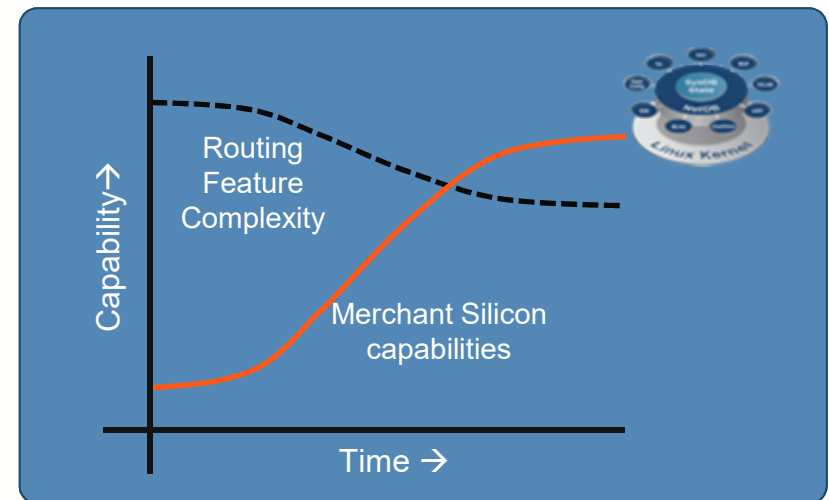
## Goal

OPEX

Business  
Agility

CAPEX

## Broadcom 'Jericho' Silicon



Routing with merchant silicon powered by EOS

Cloud Principles have driven Compute, Switching, Storage...and now Routing

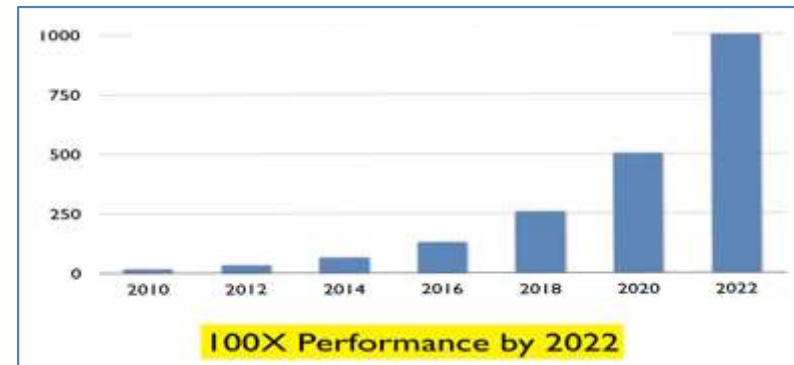
# CPU Aligns with Moore's Law well 2X/2Y

Moore's Law –

- The observation made in 1965 by Gordon Moore, co-founder of Intel, that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented

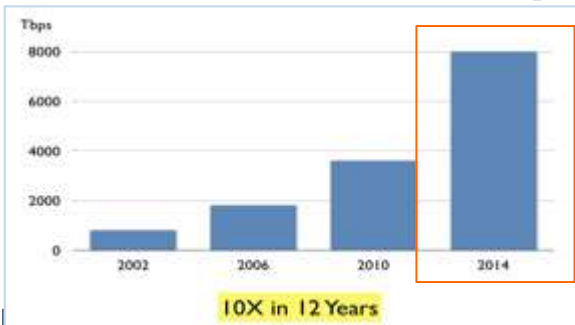
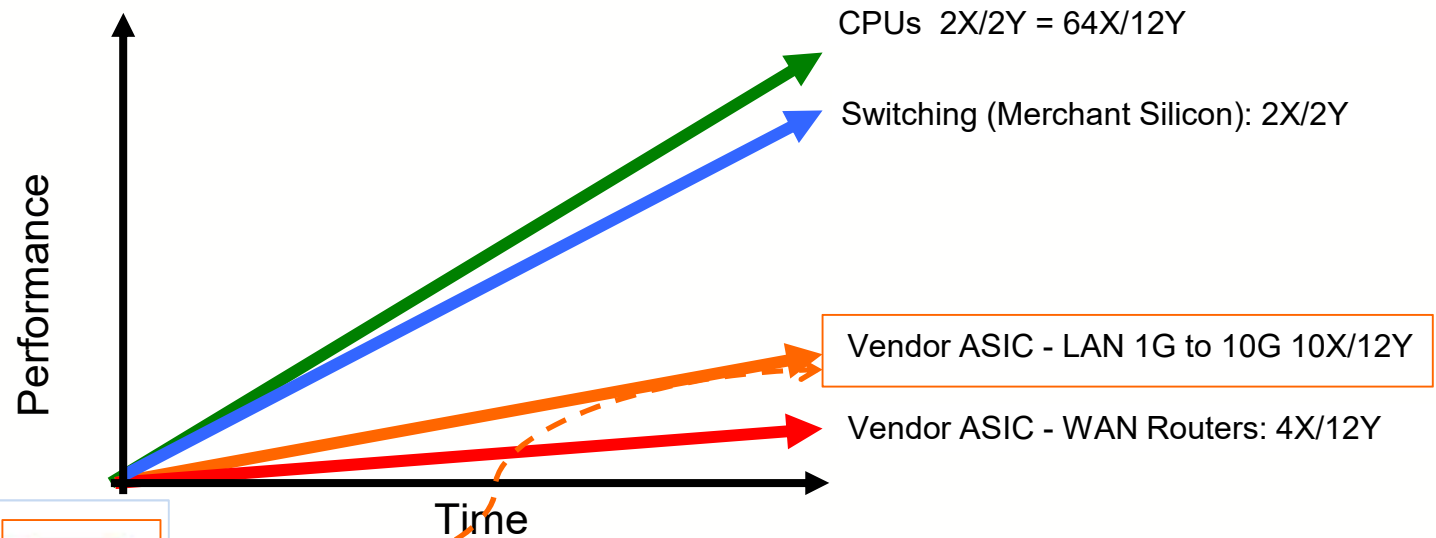
- Moore's Law Alive and well for the Data Center Server

- **2 x density every 2 years** for the past 40 years
- Million-Fold Advance from 1971-2011
- Another Factor of 100x next 12 years



Leading to the commoditization of the Server Market, driving down cost due to Vendor choice

# Why has Networking not kept up with Moore's Law? until Merchant Silicon Emerges



# Merchant silicon is on Moore's Law!

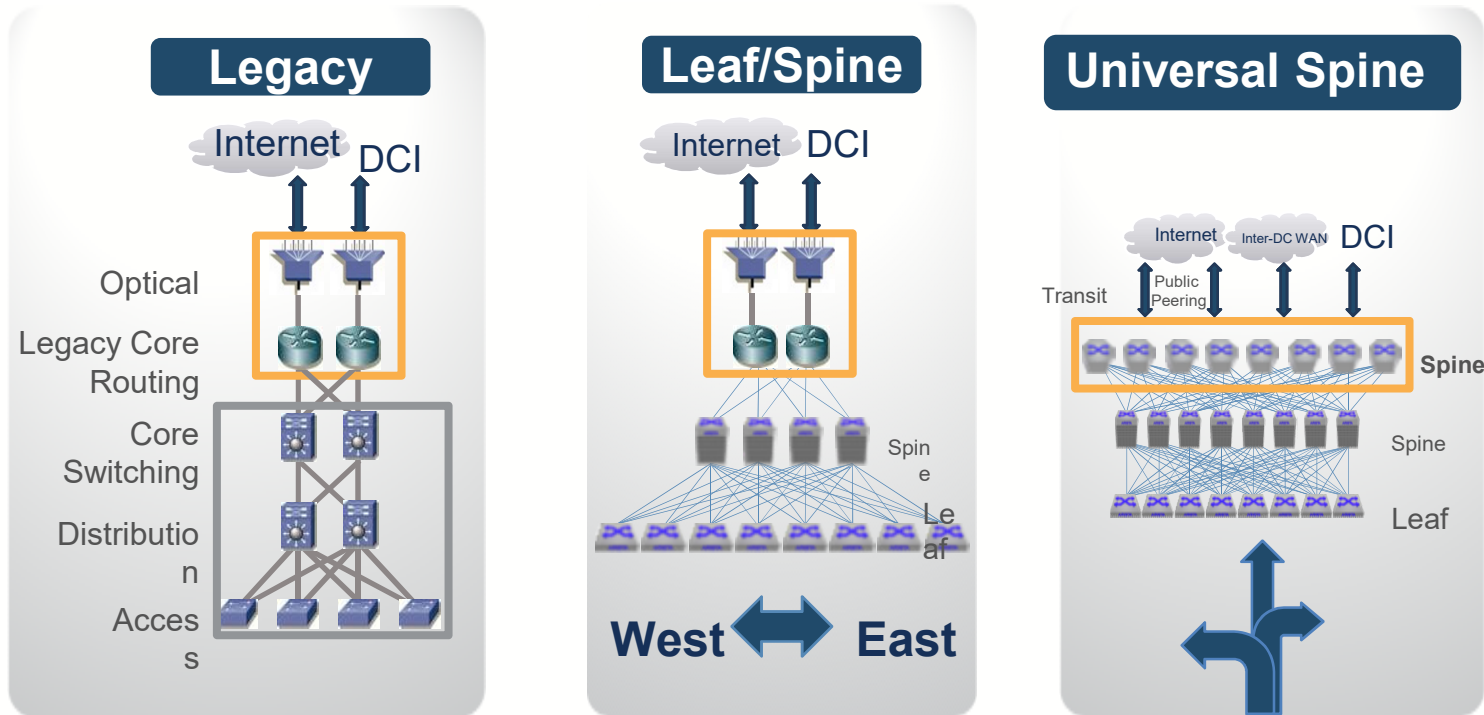
Technology	130nm	65nm	40nm	28nm	16nm
Switch Chip	Bali	T+	T2	Tomahawk	TH2
10G/25G	24*10G	64*10G	128*10G	128*25G	256*25G
Port Speeds	10G	10G/40G	10G/40G	10G/40G/25G /100G	10G/40G/25G /100G
Power /10G (switch)	~5w	~2w	~1.2w	<1w	<0.5W
Availability	2007	2011	2013	2015	2017
Improvement	-	3X/4Y	2X/2Y	2X/2Y	2X/2Y

# Routing Platform Transformations

	<b>Traditional Customized ASIC/NP Routing Platforms</b>	<b>Merchant Silicon based Universal Spine</b>
Interface Types	Legacy & Ethernet	Ethernet
100G Density	~80 Ports	432 Ports
Power (per 100G port)	~200+ watts	25 watts
List Pricing (per 100G port)	\$100,000+	\$3,000
Software Features	Heavy, legacy feature sets	Cloud-optimized Routing, FlexRoute Scale, Programmable Traffic Engineering

Universal Spine disrupting traditional routers with 100G transition

# Network Designs Change Every Decade

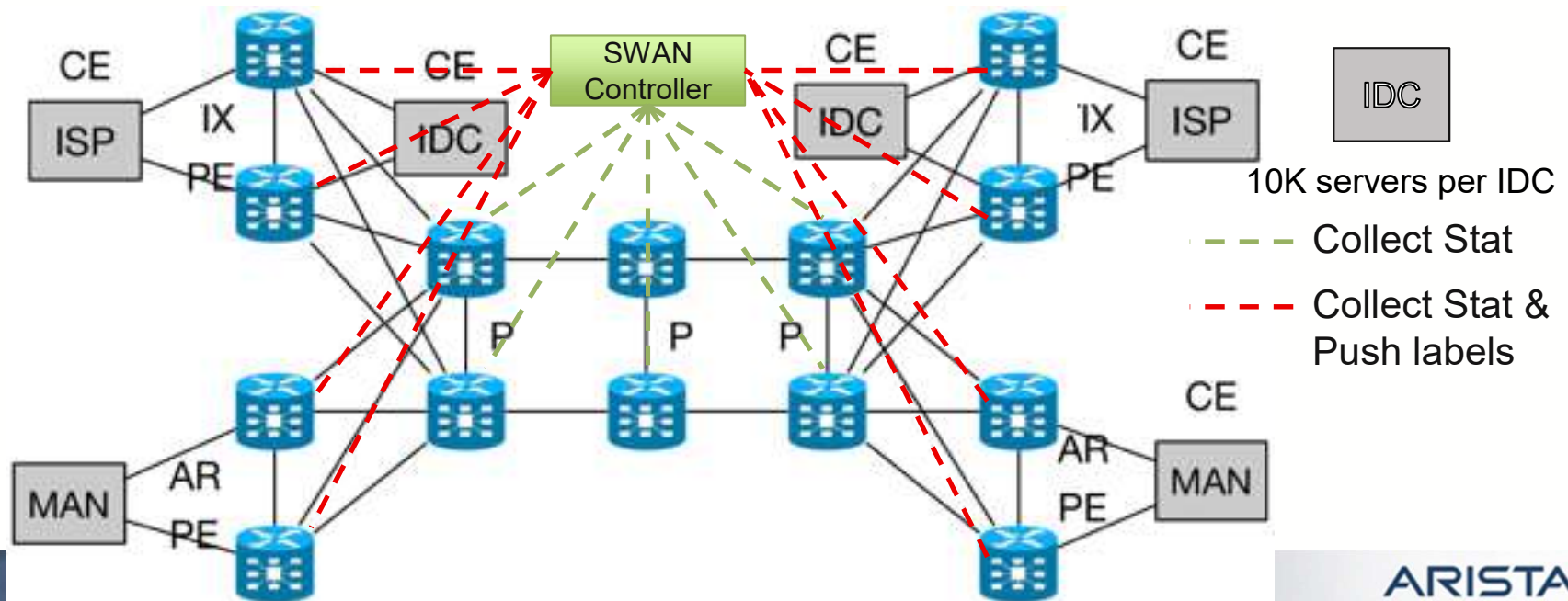


**Routers Core Will become Flat as DC Spine**




# Programmable Software Defined WAN (SWAN)

- Use SR to remove heavy MPLS-TE protocols
- Centralized SWAN Controller
- Routers supports API/SDK to communicate with controller for traffic stat upload and labels allocation





# OpenConfig Provides Common Data Models



OpenConfig is driven by Users instead of Network Vendors

Vendor-neutral, model-driven network management designed by users

Projects ▾ Software Documentation News [github.com/openconfig](https://github.com/openconfig) About ▾

## What is OpenConfig?

OpenConfig is an informal working group of network operators sharing the goal of moving our networks toward a more dynamic, programmable infrastructure by adopting software-defined networking principles such as declarative configuration and model-driven management and operations.

## Common data models

OpenConfig's initial focus is on compiling a consistent set of vendor-neutral data models (written in YANG) based on actual operational needs from use cases and requirements from multiple network operators.

## Streaming Telemetry

Streaming telemetry is a new paradigm for network monitoring in which data is streamed from devices continuously with efficient, incremental updates. Operators can subscribe to the specific data items they need, using OpenConfig data models as the common interface.