

Cisco Silicon One G100

Contents

Value statement	3
Product overview	3
Features and benefits	4
Prominent feature	5
Product sustainability	8
Cisco Capital	8
For more information	8
Document history	9

Value statement

The silicon industry has always been plagued with the trichotomy of switching silicon, routing line card silicon, and routing fabric silicon. Using these three basic building blocks, silicon and system vendors created unique architectures tuned for individual markets and industries. Consequentially, forcing customers to consume and manage these disjointed and dissimilar products caused an explosion in complexity, CapEx, and OpEx for the industry.

The Cisco Silicon One™ architecture ushers in a new era of networking, enabling one silicon architecture to address a broad market space, while simultaneously providing best-of-breed devices.

At 25.6 Tbps, the Cisco Silicon One G100 builds on the groundbreaking technology of the Cisco Silicon One Q200L but brings the efficiency and flexibility of Cisco Silicon One and 7 nm to new levels by enabling 1 Rack Unit (RU) 64x400GE spine and leaf switches.

Product overview

The Cisco Silicon One G100 processor is a 25.6-Tbps, full-duplex, standalone switching processor that can be used to build fixed form factor switches ideally targeted for web-scale data center spine and leaf applications. The G100 can be configured in one of two modes:

- 25.6-Tbps, full-duplex, standalone switching processor
- 25.6-Tbps, full-fuplex, fabric element

Cisco Silicon One G100 and P100 can be used together to build a wide range of products covering fixed form factor routers and switches, modular chassis routers and switches, and multipetabit disaggregated routers and switches.

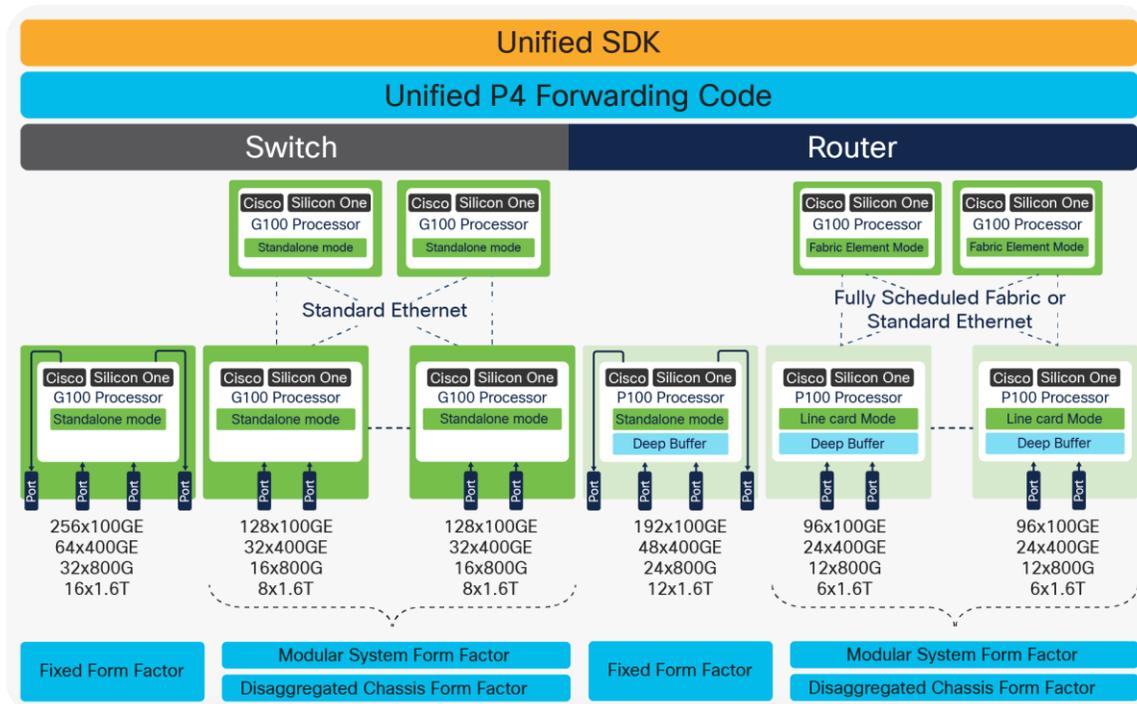


Figure 1.
Form Factors

Features and benefits

Table 1. Architectural characteristics and benefits

Feature	Benefit
Unified architecture across multiple markets	Greatly simplifies customer network infrastructure deployments
Unified SDK across market segments and applications	Provides a consistent point of integration for all applications across the entire network infrastructure
High-performance switching silicon	Achieve line rate at small packet sizes
Power-efficient switching silicon	The power efficiency of 7 nm and the Cisco Silicon One architecture optimized for the high-bandwidth web-scale switching market
Large and fully unified packet buffer	Fully shared on-die packet buffer
Switching efficiency with programmable features	Addresses the requirements of web-scale providers' switching applications without sacrificing features and programmability
Run-to-completion network processor	Provides feature flexibility without compromising performance or power efficiency
P4 programmable	A programmable processor to allow for rapid feature development

Prominent feature

Flexibility and performance for next-generation web-scale networks

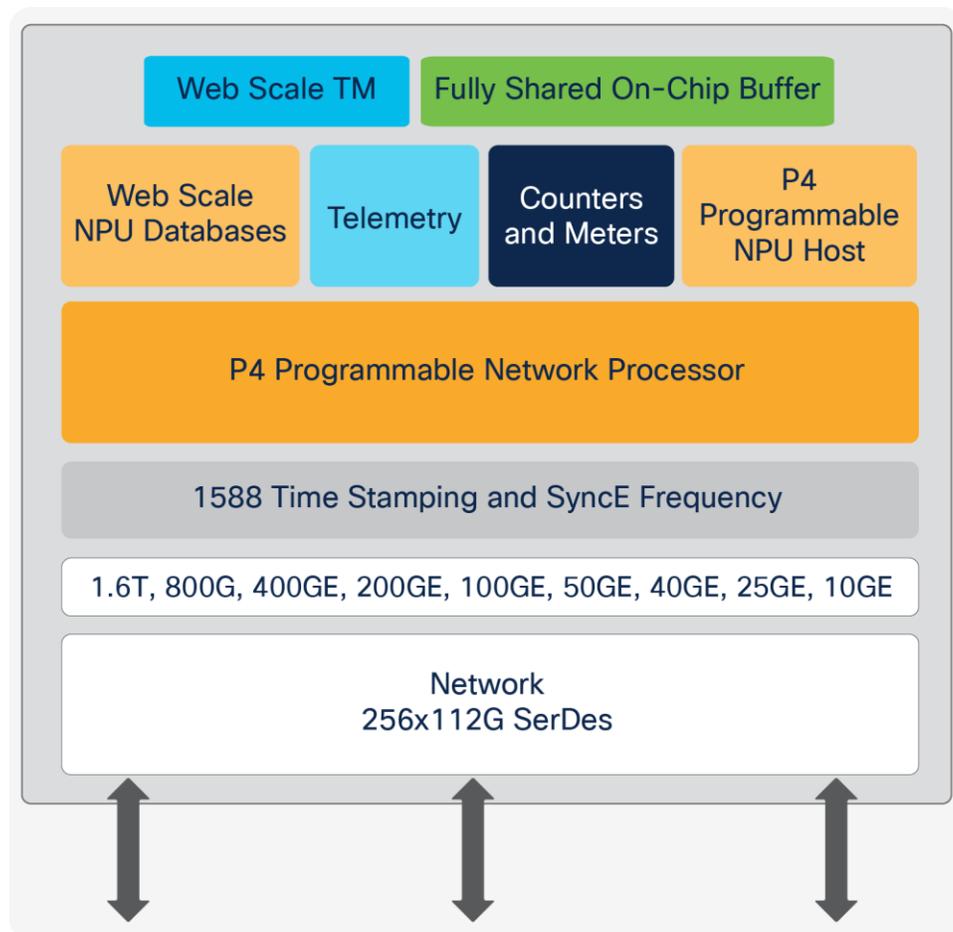


Figure 2.
Block Diagram

Features

- 256 112G SerDes; each can be configured independently to operate in 10G/25G/50G/100G using NRZ or PAM4 modulation
- Flexible port configuration supporting 10/25/40/50/100/200/400/800/1.6T Gbps
- Large, fully shared, on-die packet buffer
- 1588v2 and SyncE support with nanosecond-level accuracy
- On-chip, high-performance, P4-programmable host NPU for high-bandwidth offline packet processing (for example, OAM processing and MAC learning)
- Multiple embedded processors for CPU offloading

Traffic management

- Large pool of configurable queues
- Support for ingress and egress traffic mirroring
- Support for link-level (IEEE802.3x), PFC priority-level (802.1Qbb) flow control and ECN marking
- Support of port extenders

NPU

- Run-to-completion, distributed, P4-programmable NPU architecture
- Line rate at very small packets with complex packet processing
- Web-scale optimized and shared NPU fungible tables
- Support of demanding packet processing features without impacting data rate
- Support of simple packet processing features while optimizing power and latency

Load balancing

- Flow load balancing using ECMP or LAG
- Dynamic flowlet load balancing with ability to detect and handle elephant flows
- Packet-by-packet load balancing, creating an optimal, flow-independent, end-to-end scheduled and lossless fabric

Instrumentation and telemetry

- Programmable meters used for traffic policing and coloring
- Programmable counters used for flow statistics and OAM loss measurements
- Programmable counters used for port utilization, microburst detection, delay measurements, flow tracking, elephant flow detection, and congestion tracking
- Traffic mirroring: (ER)SPAN on drop
- Support for sFlow and NetFlow
- Support for in-band telemetry

SDK

- APIs provided in both C++ and Python
- SAI and SONiC support
- Configurability via high-level networking objects
- Distribution-independent Linux packaging
- Robust simulation environment enables rapid feature development
- CPU packet I/O through native Linux network interfaces

P4 programmability

- Application development is handled by a P4-based IDE programming environment
- At compilation, the P4 application generates low-level register/memory access APIs and higher-level SDK Application APIs
- Provides application support for a wide range of data center, service provider, and enterprise protocols
- Ability to develop the SDK and applications running over the SDK over a simulated Cisco Silicon One device

Cisco P4 application

Due to Silicon One's extensible P4 programming toolkit, we are always adding features to address new markets and new customer requirements; however, a sample of the features that are currently available with the P4 code is provided below:

<ul style="list-style-type: none">• IPv4/v6• MPLS• Ethernet Switching<ul style="list-style-type: none">◦ 802.1d, 802.1p, 802.1q, 802.1ad• IP Tunneling<ul style="list-style-type: none">◦ IP in IP◦ GRE◦ VXLAN• Integrated Routing and Bridging (IRB)• HSRP/VRRP• Policy-Based Routing• Security and QoS ACLs• ECMP and LAG (802.3ad)• Multicast<ul style="list-style-type: none">◦ IGMP• NAT/PAT• Protection (Link/Node/Path and TI-LFA)	<ul style="list-style-type: none">• QoS Classification and Marking• Congestion Management• Telemetry<ul style="list-style-type: none">◦ NetFlow, sFlow◦ In-Band Telemetry◦ (ER)SPAN◦ Packet Mirroring with Appended Metadata◦ Lawful Intercept• Warmboot• DDoS Mitigation<ul style="list-style-type: none">◦ Control-Plane Policing◦ BGP Flowspec• Timing and Frequency Synchronization<ul style="list-style-type: none">◦ SyncE◦ 1588
--	---

Product sustainability

Information about Cisco's Environmental, Social, and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Table 2. Cisco environmental sustainability information

Sustainability Topic		Reference
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries, and packaging	WEEE Compliance
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Sustainability inquiries	Contact: csr_inquiries@cisco.com
Material	Product packaging weight and materials	Contact: environment@cisco.com

Cisco Capital

Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more](#).

For more information

[Learn more](#) about the Cisco Silicon One.

Document history

Table 3. Document history

New or Revised Topic	Described In	Date
Added fabric element support	-	October 2021

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at <https://www.cisco.com/go/offices>.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)