Barefoot Networks Announces P4 Studio™ - Next-Generation Software Development Environment

Introducing New P4 Compiler, P4 Applications, APIs and Dataplane Debug and Visibility Tools to Accelerate Adoption of Programmable Forwarding Planes

AMSTERDAM, Sept. 25, 2018 (GLOBE NEWSWIRE) -- **Open Networking Summit Europe 2018** -- [Barefoot Networks](), a provider of high-performance and fully-programmable networking solutions, today announced Barefoot P4 Studio, the next generation Software Development Environment (SDE) used to harness the power of Barefoot Tofino™ series of P4-programmable Application Specific Integrated Circuits (ASICs). Barefoot P4 Studio accelerates the adoption of programmable forwarding planes by making it easier to develop, debug and optimize P4 applications and enables smoother integration with the network operating system control and management planes. With Barefoot P4 Studio, users gain the advantage of a robust modular infrastructure, production-ready P4 applications, streamlined set of APIs and powerful dataplane visualization tools.

"With the fast-growing adoption of Tofino in multiple markets, the speed at which our customers are able to develop both standard and new features and deploy them at scale is of paramount importance," said **Craig Barratt, CEO of Barefoot Networks**. *"With our Barefoot P4 Studio software development environment we are enabling all users of Tofino to seamlessly develop efficient and high quality switch systems that can be used to build scalable and future-proof networks."*

As networks experience greater demand due to ever-increasing traffic and the need to deliver new and differentiated services, Barefoot P4 Studio gives developers the tools necessary to build efficient and scalable network systems. The new offering provides a complete suite of tools including:

- **Barefoot P4 Compiler** - drawing upon multiple years of programmable networking experience, Barefoot is introducing the next-generation P4 compiler with dramatically improved compilation speeds, stronger automatic debugging capabilities and support for both P4-14 and P4-16 versions of P4 language. With the P4-16 language introducing a concept of target architectures, a **Tofino Native Architecture (TNA)** specification is provided to leverage rich capabilities of Barefoot Tofino using P4-16 and support different use-cases.
- **Barefoot Target Simulation Model** - software register-accurate model for Barefoot's current and future ASICs that allows developers to rapidly prototype their P4 applications before deploying them on real hardware.
- **Barefoot P4 Insight™** - dynamic web-based dataplane visualization tool, which gives developers visibility on how their P4 program will be laid out in the hardware and allows them to optimize those programs for maximum scalability and feature density.

- **Barefoot Runtime Interface (BRI)** - BRI is a streamlined and P4 program-independent API for enabling communication between control plane and forwarding plane in an extensible and scalable manner. It supports directly configuring all areas of the Barefoot ASIC by control plane or system vendor hardware abstraction layer. In particular, it is a foundation for supporting ONF's Stratum switch operating system and P4 Runtime.
- **Barefoot Model-driven Abstraction Interface (BMAI)** - a new infrastructure empowering developers to create their own higher-level object abstractions of P4 constructs and automatically generate APIs which can be used by the control plane to configure those objects.
- **Barefoot P4 Applications** - support for feature rich P4 switch applications written in a modular and reusable fashion and fully integrated with BMAI framework in one package. This integration enables developers to easily extend these P4 applications and have all parts of P4 program to be configured by the same abstraction API.
- **Barefoot Packet Test Framework** - Python-based test framework to validate functionality of the P4 applications at all API levels including BRI, BMAI and SAI.
- **Barefoot Unified Device Driver** - a single device driver supporting all current and future Barefoot ASICs.

Tofino is the world's first end-user programmable Ethernet switch ASIC, built using a Protocol Independent Switch Architecture (PISA). Currently in trials with multiple customers, Barefoot P4 Studio is a single SDE supporting all current and future Barefoot ASICs as well as various use-cases that require different ASIC pipeline configurations.

Industry support

Barefoot Networks is pleased to demonstrate strong adoption and support of new capabilities across original equipment manufacturers, cloud operators, telecommunications carriers and ecosystem partners.

"We are releasing our industry-first programmable data center fabric in October for general availability after years of hard work. It's a fully automated fabric designed for white boxes with a dataplane written in standard P4. The solution allows customers to drive innovation and introduce new services and features without having to wait for silicon upgrades. The Barefoot Tofino-based programmable switches have been essential in delivering our network slicing and automation capabilities," said **Laurent Marchand, CEO of Kaloom**. *"As someone who has developed a complete production pipeline in P4, we are looking forward to leverage Barefoot P4 Studio with P4 Compiler and P4 Insight in order to further accelerate our dataplane development."*

"Ruijie is one of the first OEMs to take advantage of the P4-programmability delivered by Barefoot Tofino," said **Wang Xiaojun, Software Director of Switch Product Line at Ruijie Networks**. *"The Barefoot P4 Studio software development environment enables us to create world-class products with differentiated features delivering rich benefits to our customers by helping to build networks with unprecedented visibility and agility."*

"At KPN, we believe programmable forwarding enables us to control our destiny and deliver extremely competitive wireline, mobile and cloud hosting services," said **Edo Pappot, Architect, CTO at KPN**. *"Having a software development environment that is robust, flexible and easy to use accelerates the rate of innovation we can deliver to our customers. We are able to quickly develop new P4-16 programs using Barefoot P4 Compiler and optimize those programs using Barefoot P4 Insight."*

"Fully programmable switch ASICs from Barefoot Networks allow us to fulfill our vision of rapid network function delivery as part of 'RtBrick FullStack' (RBFS) switch operating system", said **Pravin Bhandarkar, CEO of RtBrick**. *"We anticipate that using the new Barefoot P4 Compiler,*

Barefoot Runtime Interface and Barefoot P4 Insight will help us accelerate delivery of innovative products."

*"UCloud is an innovative cloud provider in Asia. We have developed a complete network software stack from P4 dataplane to control plane in order to support our growing business", said **Leo Xu, Head of Virtualized Networks Platform at UCloud**. "We expect to immediately utilize P4-16 and Barefoot Runtime Interface in order to expand the number of cloud use-cases that we can address with Barefoot Tofino."*

*"The programmable dataplane is fundamental for the vision of SDN and NFV to become a reality," said **Matt Bergeron, Chief Technology Officer of Keysight's Ixia Solutions Group**. "The new capabilities being introduced by Barefoot enable software developers to develop and debug their P4 programs with even more agility than before. Our evaluation of Barefoot P4 Studio has been very promising."*

*IP Infusion's OcNOS™ is bringing traditional routing and switching capabilities on top of Barefoot Tofino with dataplane telemetry using Barefoot P4 Applications and abstraction APIs," said **Atsushi Ogata, President and CEO, IP Infusion**. "The availability of next generation Barefoot P4 applications based on P4-16 and abstraction APIs powered by BMAI as part of Barefoot P4 Studio, will allow us to seamlessly add additional differentiated functionality to data plane and control plane without rewriting entire P4 program."*

*"The new Barefoot P4 Studio provides faster compile times, better visualization tools and deeper insight into the state of Tofino", said **Jesper Eriksson, VP of Sales and Product Management at NoviFlow**. "We believe that these new capabilities will significantly accelerate NoviFlow's P4 code development cycle for the NoviWare NOS's programmable match-action pipeline logic."*

*"High-performance programmable forwarding planes are essential for openness and innovation in networking," said **Guru Parulkar, Executive Director of the ONF and Stanford Platform Lab**. "Having a powerful tool-chain for development of applications using the latest version of P4 that can be run on Barefoot Tofino-based platforms has proved to be important in pushing this agenda forward. At ONF, we are using Barefoot's P4 compiler to prototype new and exciting VNF acceleration and visibility use-cases for 5G networks, which we will be showcasing together with Stratum switch operating system in our booth at ONS EU 2018."*

The new capabilities are available now to all existing and prospective customers and partners. For more information, contact Barefoot Networks at info@barefootnetworks.com

Barefoot Networks is pleased to feature one of its customers Kaloom discussing their experience with Barefoot Tofino and P4 Studio. The video can be viewed here: https://vimeo.com/291583928.

For a deeper dive into the technology and use cases, please join Barefoot for a webinar on Oct. 9, 2018: Barefoot P4 Studio Webinar

Barefoot Networks will be onsite at ONS Europe 2018, Sept. 25-27, showcasing P4 applications such as Segment Routing v6 for Mobility use-case, developed using Barefoot P4 Studio. For more details about the event, visit the session catalog. Media and analysts interested in meeting with Barefoot Networks may contact barefoot@10fold.com or visit its booth, #15.

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About Barefoot Networks
Barefoot Networks launched in 2016 after two years of developing technology that built switch silicon with a forwarding plane that is defined in software while not compromising on performance.

Barefoot empowers network owners and their infrastructure partners to design, optimize, and innovate to meet their specific requirements and gain competitive advantage. In combining the P4 programming language with fast programmable switches, Barefoot has also created an ecosystem for compilers, tools, and P4 programs to make P4 accessible to anybody. Barefoot Networks is headquartered in Silicon Valley and is backed by strategic investors including Alibaba, Dell Technology Capital, Google Inc., Goldman Sachs Principal Strategic Investments, Hewlett Packard Pathfinder, and Tencent, and by premier venture capital firms including Andreessen Horowitz, Lightspeed, and Sequoia Capital. For more information, visit **https://barefootnetworks.com/**.

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