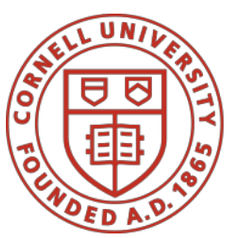
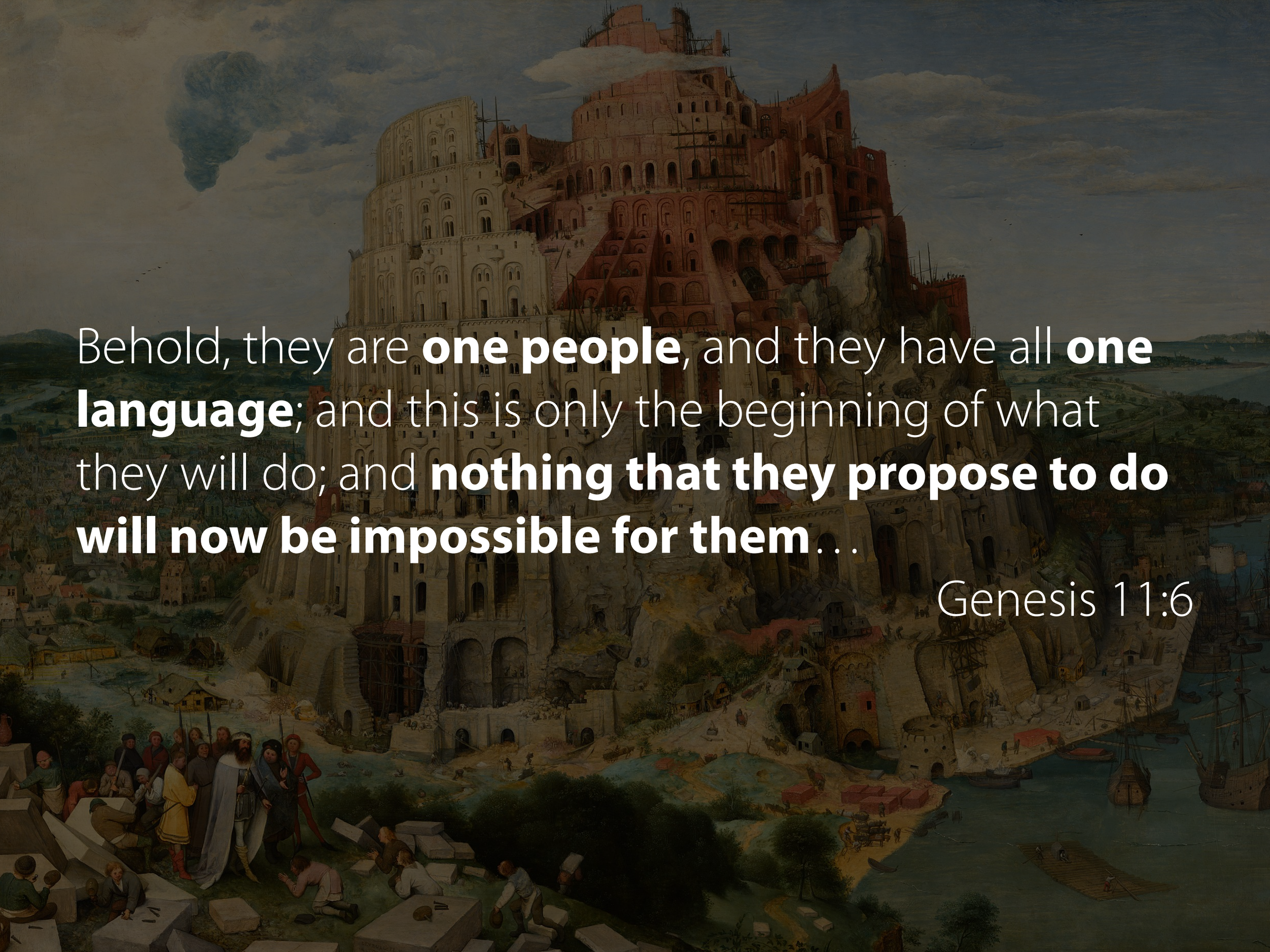
2019 P4 Workshop

Nate Foster
Cornell



Nick McKeown
Stanford

Guru Parulkar
ONF



Behold, they are **one people**, and they have all **one language**; and this is only the beginning of what they will do; and **nothing that they propose to do will now be impossible for them**. . .

Genesis 11:6

State of P4

Behold! We are one community, and we now have all of the ingredients we need to design, build, and operate networks with P4. Nothing that we propose to do will be impossible for us!

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- Award-winning papers at top conferences
- New courses at leading universities

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Industry Momentum

- Real-world deployments
- Diverse set of P4 targets
- Growing number of P4-based products

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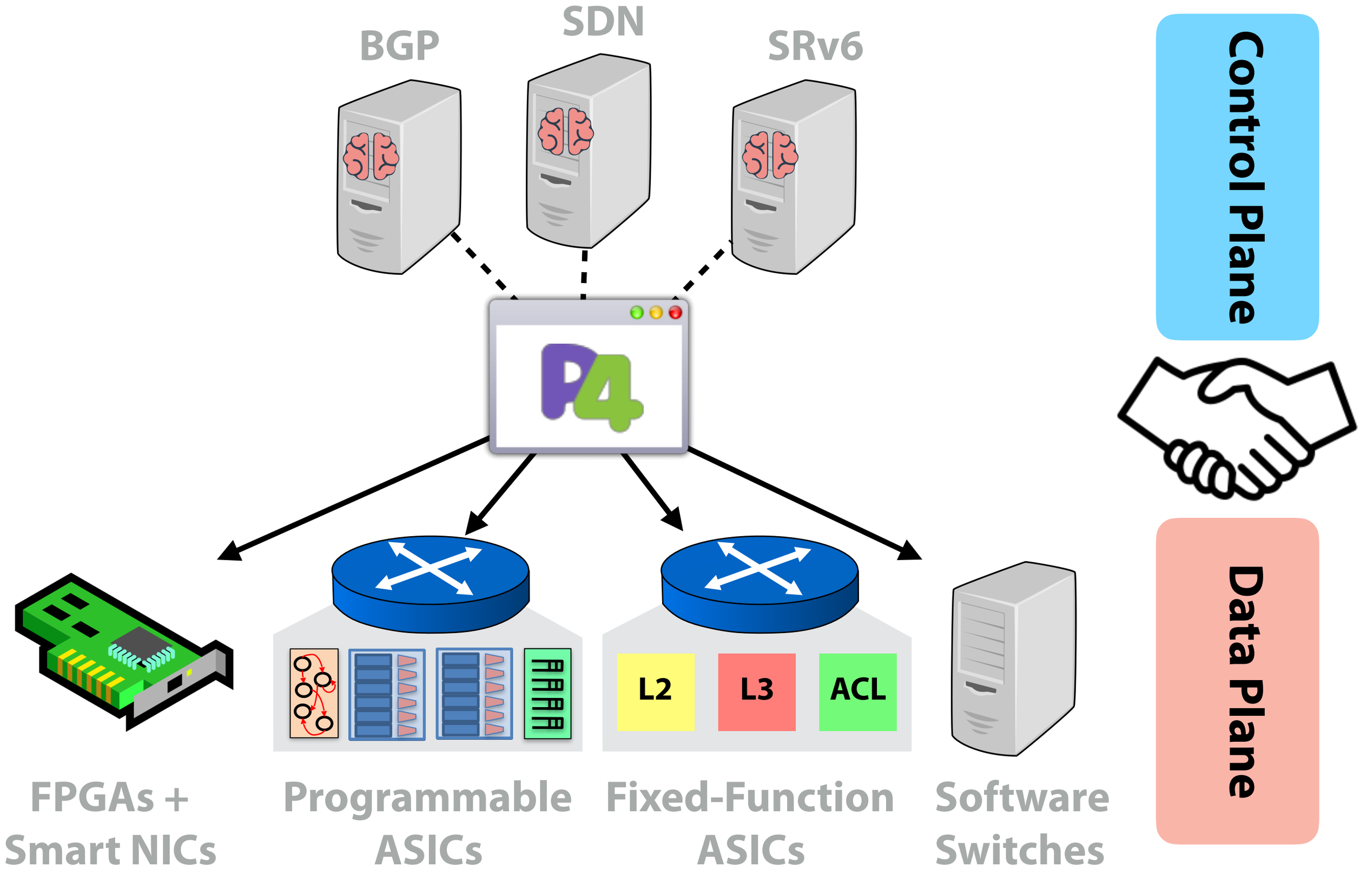
Open Source Community

- > 125 members + 5 working groups
- Open governance model
- Community events
- ONF alignment to nurture further growth

P4: *Lingua Franca* of Networking



API Working Group

This year:

- Released v1.0.0 of the P4Runtime Specification in January!
- P4Runtime is being used in Stratum NOS and the ONOS Controller

Antonin Bas
Barefoot

Waqar Mohsin
Google

Looking ahead:

- Improving controller arbitration process
- Exploring the notion of "controller role" to enable partitioning switch between multiple controllers
- Developing an interactive shell in Python for interacting with P4Runtime-controlled switches

Architecture Working Group

This year:

- Released v1.1 of the PSA Specification
- Initial PSA implementation (see demo!)

Looking ahead:

- Design of Portable NIC Architecture
- Exploring features to support programmable scheduling and active queue management
- Improving documentation of current architecture specifications (PSA, v1model)

Calin Cascaval
Barefoot

Andy Fingerhut
Cisco

Language Design Working Group

Mihai Budiu
VMware

Nate Foster
Cornell

This year:

- Fixed many inconsistencies and bugs
- Ergonomic improvements to type system
- Design of modular programming features

Looking ahead:

- Finalize P4 module system
- Develop constructs to support specifying behavior of P4 architectures
- Enrich notion of events (e.g., packets, timers, etc.)
- Formalize language semantics

Applications Working Group

This year:

- Much progress toward inband-network telemetry (INT) specification v2.0.0
- YANG model for INT metadata
- Extensions to support different transports, and export of telemetry data at each hop

Mukesh Hira
VMware

JK Lee
Barefoot

Looking ahead:

- Release v2.0.0!
- Possibly exploring applications other than telemetry

Education Working Group

This year:

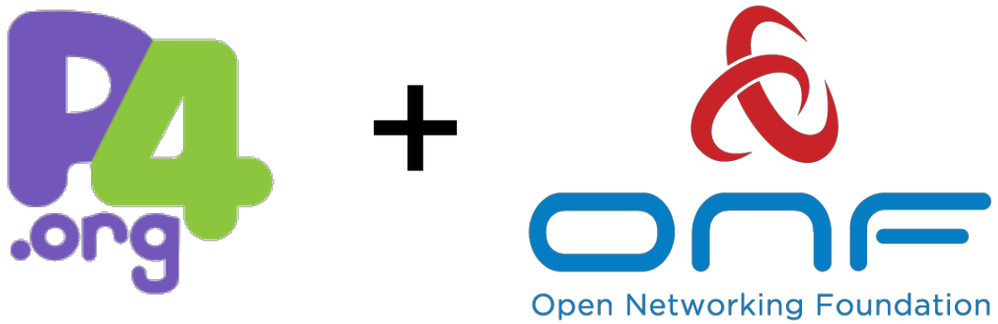
- Created repository for teaching materials
- Presented tutorials
  - Cambridge, UK (IEEE ICNP)
  - Budapest, Hungary (ACM SIGCOMM)
  - San Francisco, CA (NANOG)
  - Tokyo, Japan
  - Milan, Italy
- Organized hackathons
  - Boston, MA (USENIX NSDI)
  - Frankfurt, Germany

Robert Soulé
Lugano

Noa Zilberman
Cambridge

Looking ahead:

- Curate academic courses
- Develop a programmer's guide



Business as usual

- All P4 properties are still active (web, GitHub, mailing lists, etc.)
- All P4 working groups remain active under the same leadership
- Anyone can continue to contribute to P4-related activities
- As before, no fees required to participate

Governance

- P4 will be managed by the P4 Technical Steering Team (TST)
- Initial TST: current P4 Board and ONF Executive Director
- Starting in 2020: TST elected by active contributors to P4
- `https://github.com/p4lang/governance`

Future Synergies

- ONF software platforms (ONOS, Stratum)
- Seek alignment with Linux Foundation

Get Involved

Become a member of the community!

- No fee to join
- Code and data licensed under Apache2

Participate in working groups

- Activities are open to everyone
- Anyone with a good idea can help shape the future of P4

Contribute to open-source software

- Compiler (p4c)
- Software switch (bmv2)
- Control-plane APIs (P4Runtime)
- Tutorials
- Documentation
- Applications

P4 Distinguished Service Award

P4 Distinguished Service Award

Citation: *For dedicated service as co-chair of a working group, contributor to software project, and mentor to new members of the community.*
Over the past few years, he has been one of the most active members of the P4 community. He regularly participates in multiple working groups and has made essential contributions to the P4 Language, P4Runtime, and PSA specifications. He has written numerous lines of open-source code, including hundreds of test cases for p4c and bmv2 that exercise tricky corner cases and inform design discussions. And he has been a dedicated mentor to new users, answering questions on our mailing lists and Slack channel, and curating a wonderful set of example programs that are a popular introduction to P4.

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Andy Fingerhut
Cisco

Citation: *For dedicated service as co-chair of a working group, contributor to software project, and mentor to new members of the community.*
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Agenda

Overview

- Status
- Roadmap

Presentation Track

- 9 talks
- ~20 minutes each

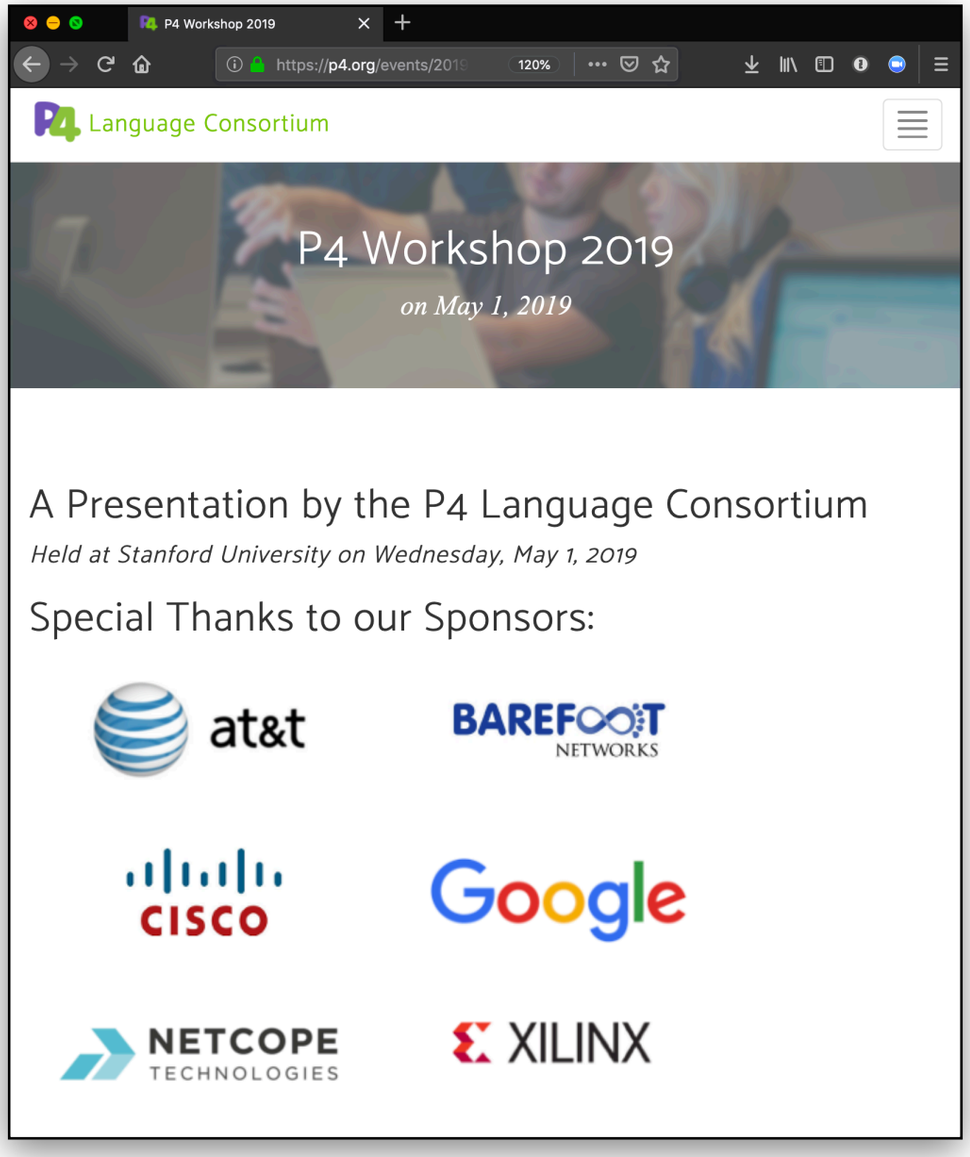
Keynote

- John Hennessy, Stanford

  The End of Moore's Law and Faster General Purpose Processors, and a New Road Forward

Demo Track

- 13 accepted demos + 2 posters
- 1 minute lightning talks + live demos (at other end of building)



Thank You

Program Committee

- Nate Foster, Cornell (co-chair)
- Nick McKeown, Stanford (co-chair)
- Anirudh Sivaraman, NYU
- Gordon Brebner, Xilinx
- Hongqiang Liu, Alibaba
- Mina Tahmasbi Arashloo, Princeton
- Sandesh Kumar Sodhi, Juniper

Conference Organization

- Sedef Ozcana, ONF
- Rachel Everman, Barefoot

P4 Technical Steering Team

- Nate Foster, Cornell
- Nick McKeown, Stanford
- Guru Parulkar, ONF
- Jennifer Rexford, Princeton
- Amin Vadhat, Google

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