

Innovation Action proposal

Deeply Programmable High-speed Data Planes

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What's the problem – market situation

- **Need for new networking features**
 - By data centers, enterprise networks
 - For customizing and optimizing their networks
- **Currently, each new feature requires the switch software to be changed**
 - Domain specific knowledge on ASIC programming
 - Takes years to introduce a simple features
 - Just think of VXLAN – 4 years to add it to ASICs
- **Very high development costs**

What's the market opportunity:

Multi-target Compiler for generating high-speed data plane programs

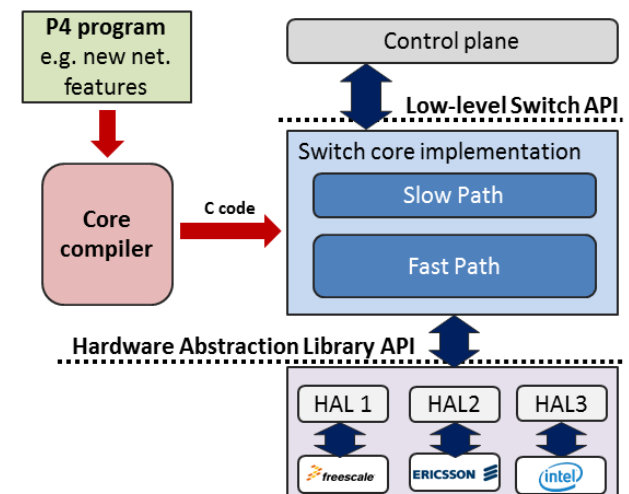
- **Quick development and deployment of new features**
 - Easy to learn network function descriptions in P4 language
- **Significantly reduced switch programming costs**
 - High-performance switch code can be generated automatically
- **Increased reusability**
 - Hardware independent code can be reused
- **Re-targetability**
 - Support of multiple network hardware (CPU, NPU, prog. ASICs,...)

What we have

ELTE P4C

An experimental multi-target P4 compiler

- **Open source** (see <http://p4.elte.hu>)
- **Network functions described in P4-14** (P4-16 is coming soon)
- **Multi-target support** (Core + Hardware Abstraction Library)
 - Currently supported architectures: Intel, Freescale, OpenWRT
- **Generates high-speed data plane program**
 - demo at [ACM SIGCOMM'16](#)
- **ELTE is a member of P4 consortium**
 - P4.org – over 60 members



What we need

Technology maturation & experimentation

- Integration into existing SDN ecosystems
e.g. OpenDaylight, OpenStack, etc.
- Supporting additional switching hardware
Flexible Match+Action ASICs
- Performance improvement
HW-based optimization (e.g. Intel DPDK extensions)

Business model & Business launch

- Open-source business model; Business use cases
- Go-to-market strategy is needed
- Business champion – partner or startup, spin-off
- Customers (hw vendor, cloud provider or telco) are needed



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Contact Info



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More details and demos: <http://p4.elte.hu/>

Current partners:

Ericsson Research Hungary (committed)

Intel (on going discussion)



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