

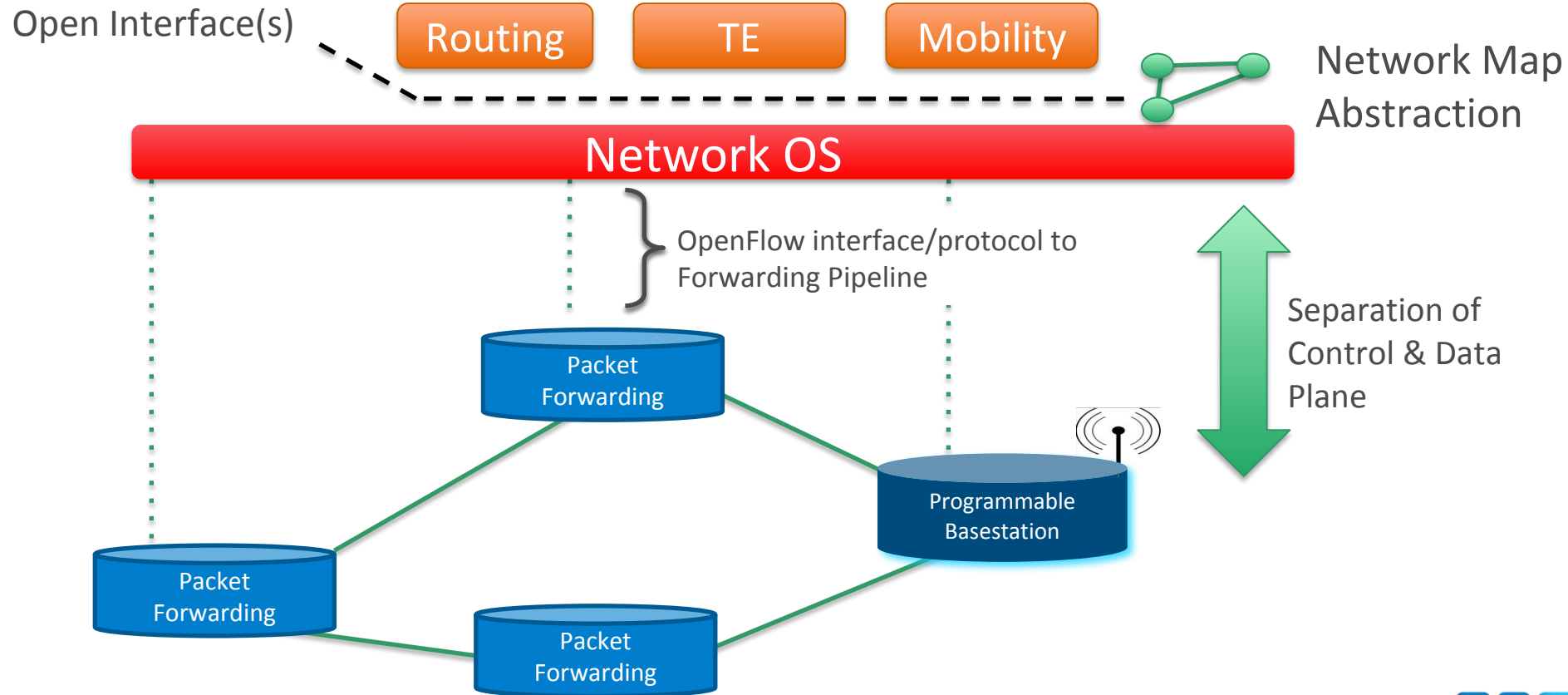


Stratum

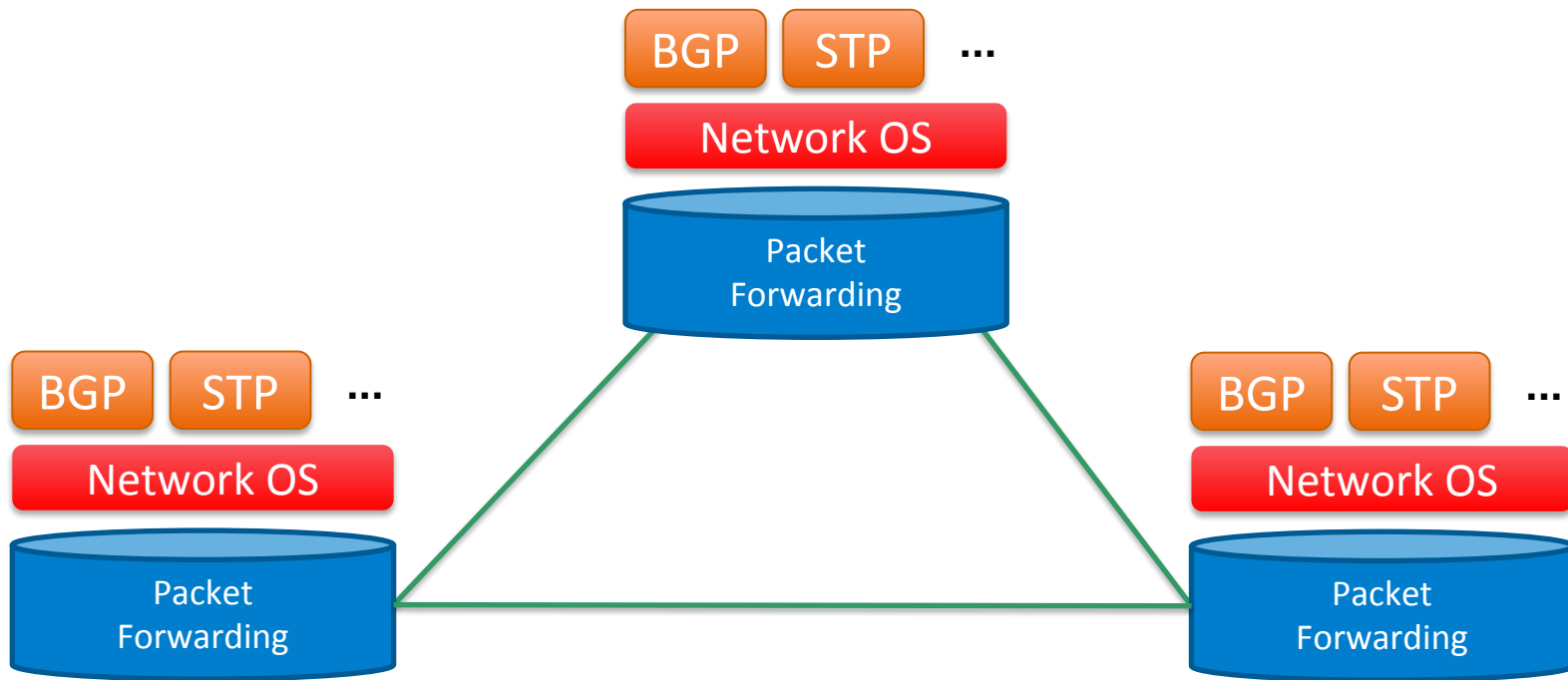
Enabling the next generation of SDN

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Canonical “SDN” Architecture



Traditional Network Architecture

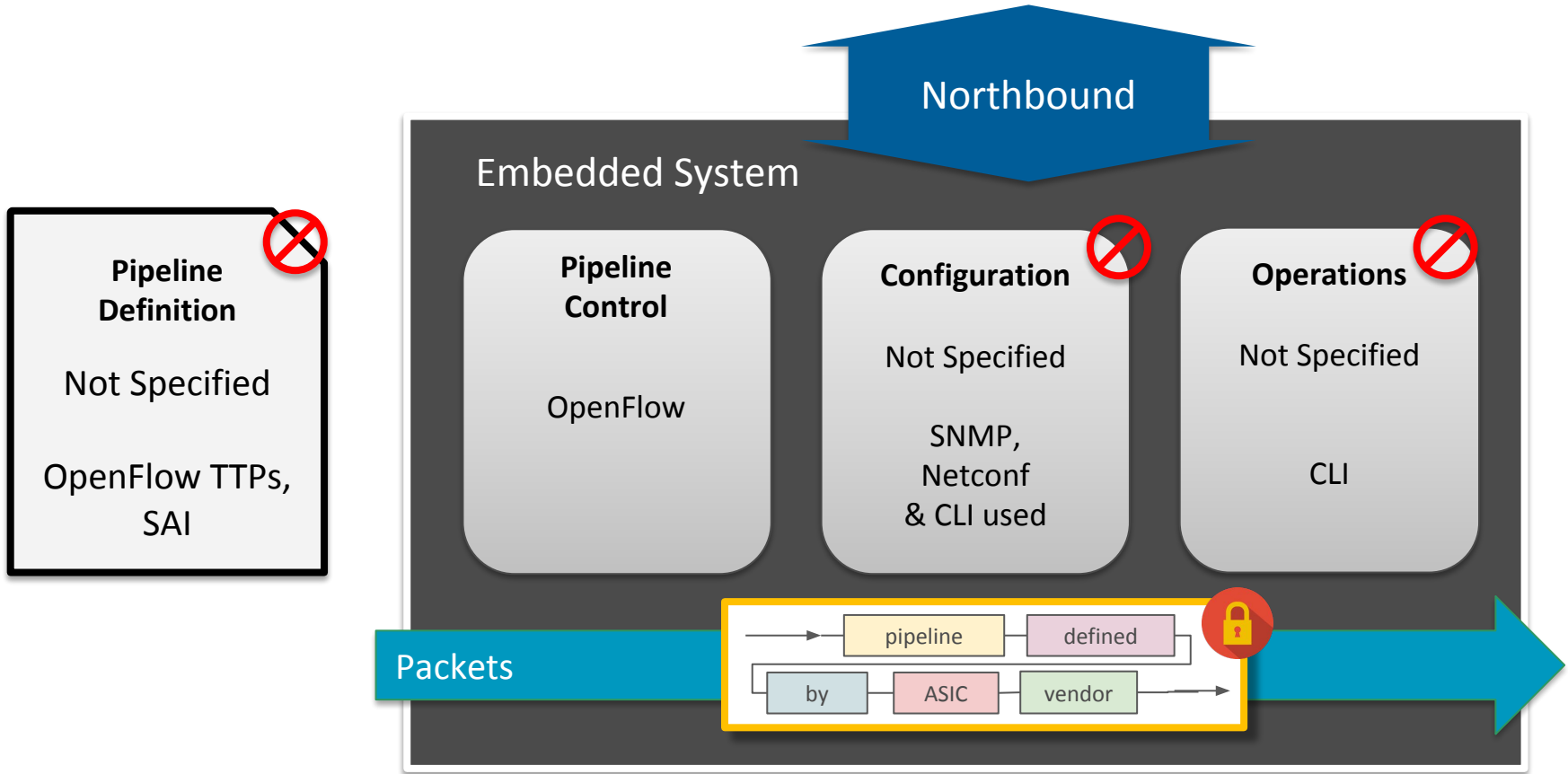


How do we enable migration / transformation to an SDN architecture?

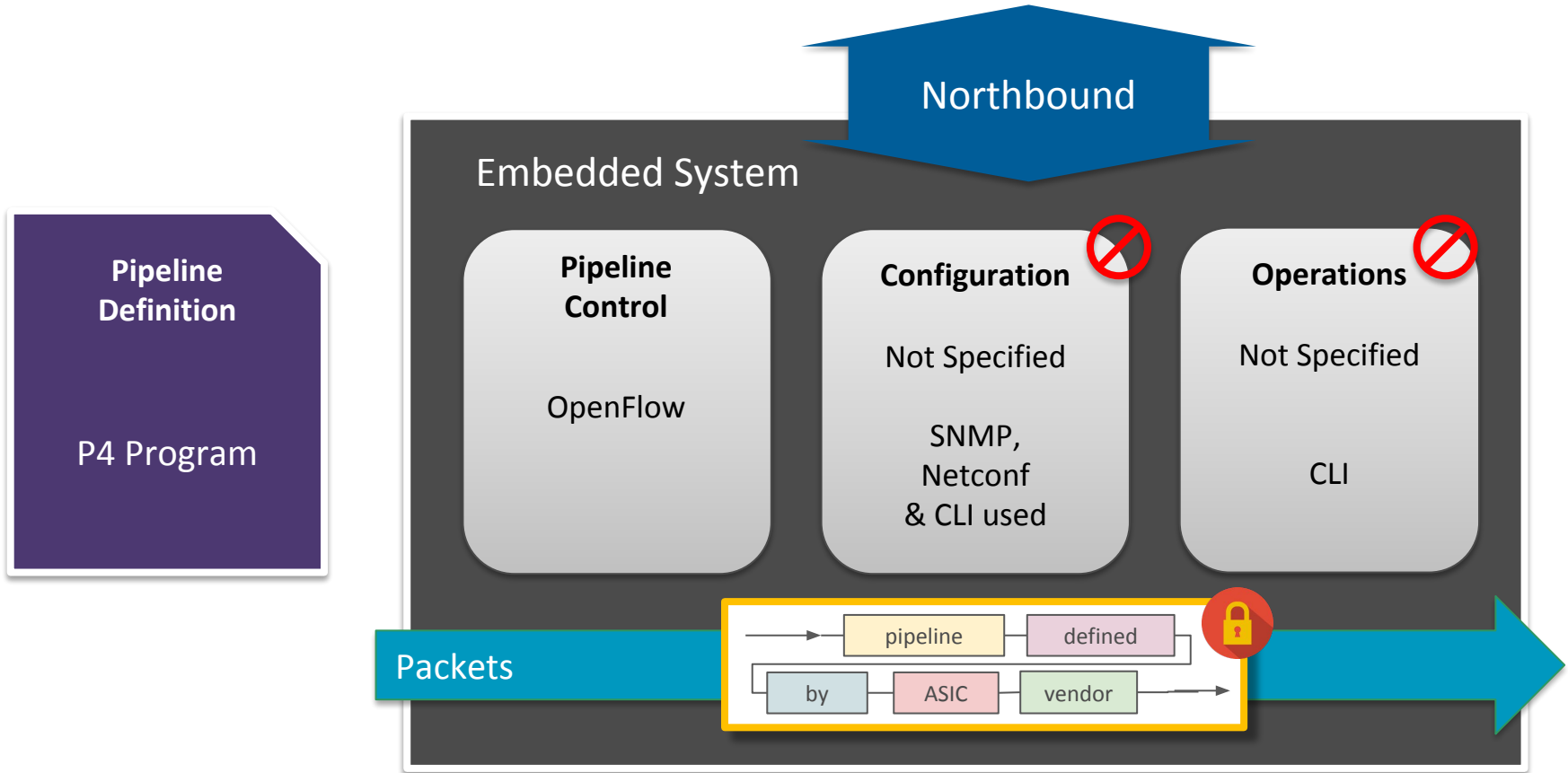
Challenges with Transformation

- Missing or insufficient control, configuration, monitoring and operational interfaces
- Lack of an easy, incremental migration path
- Maturity and availability of solutions at all layers of the network stack

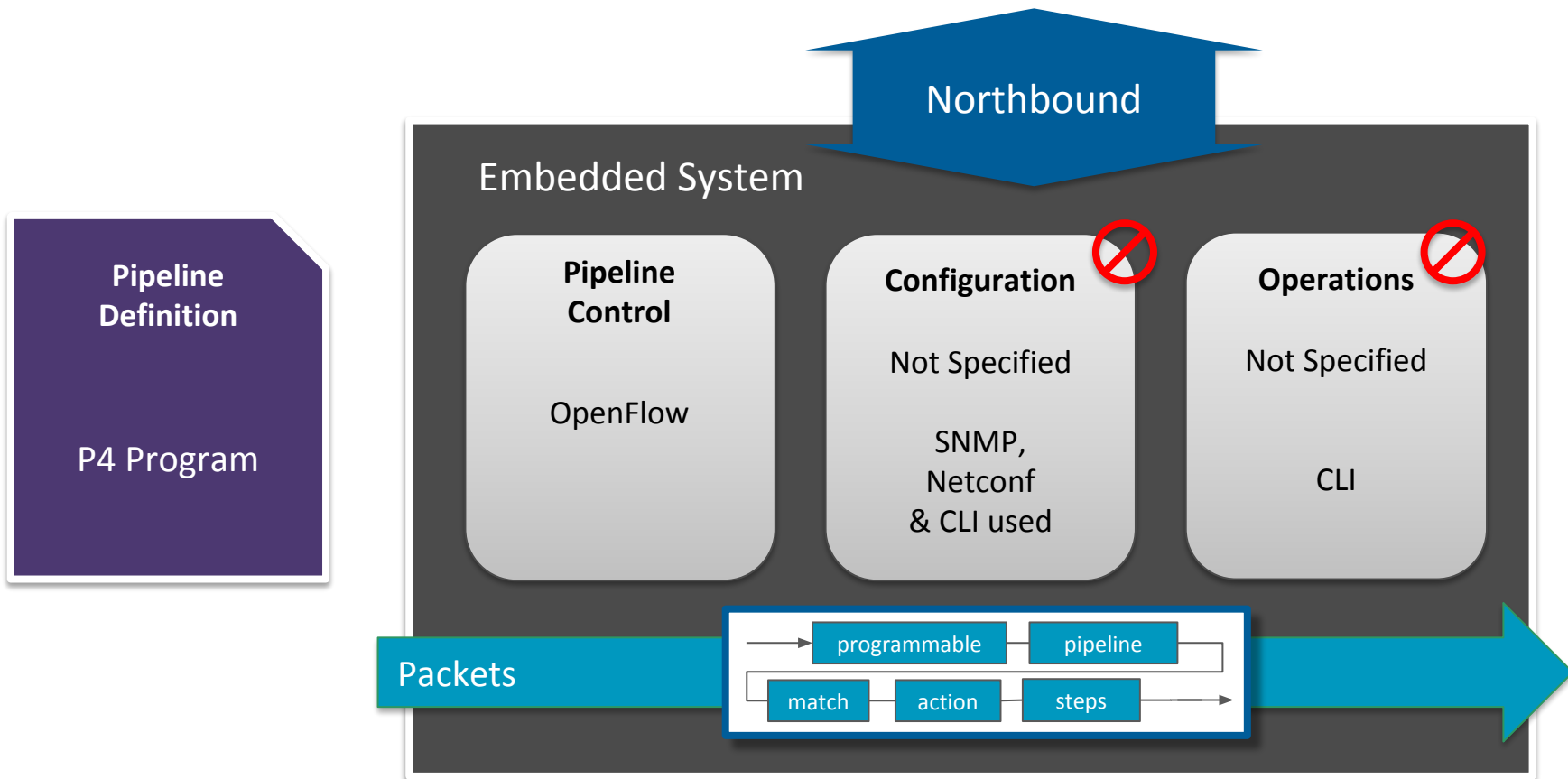
Current SDN Interfaces



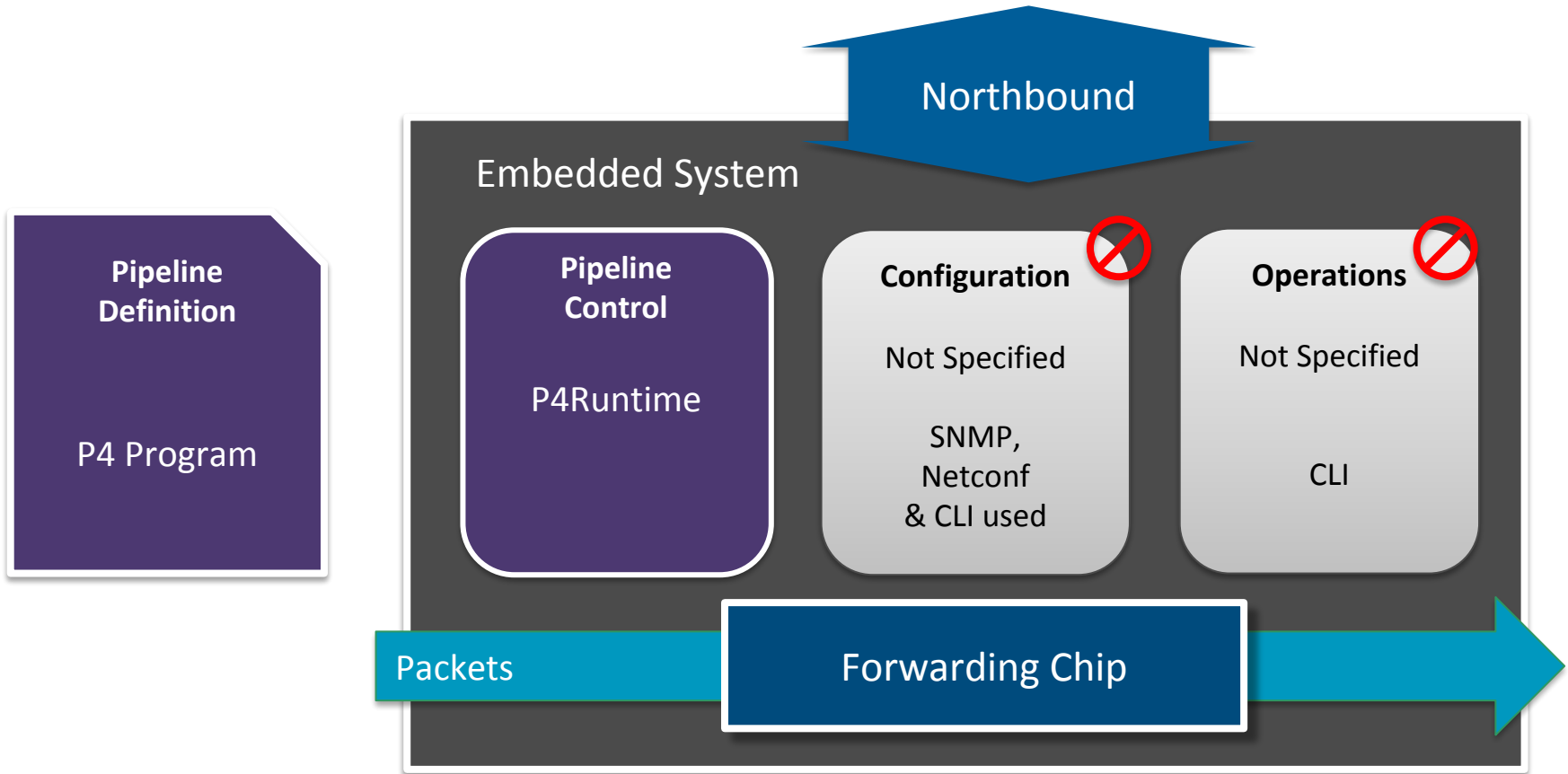
Pipeline Definition Interface



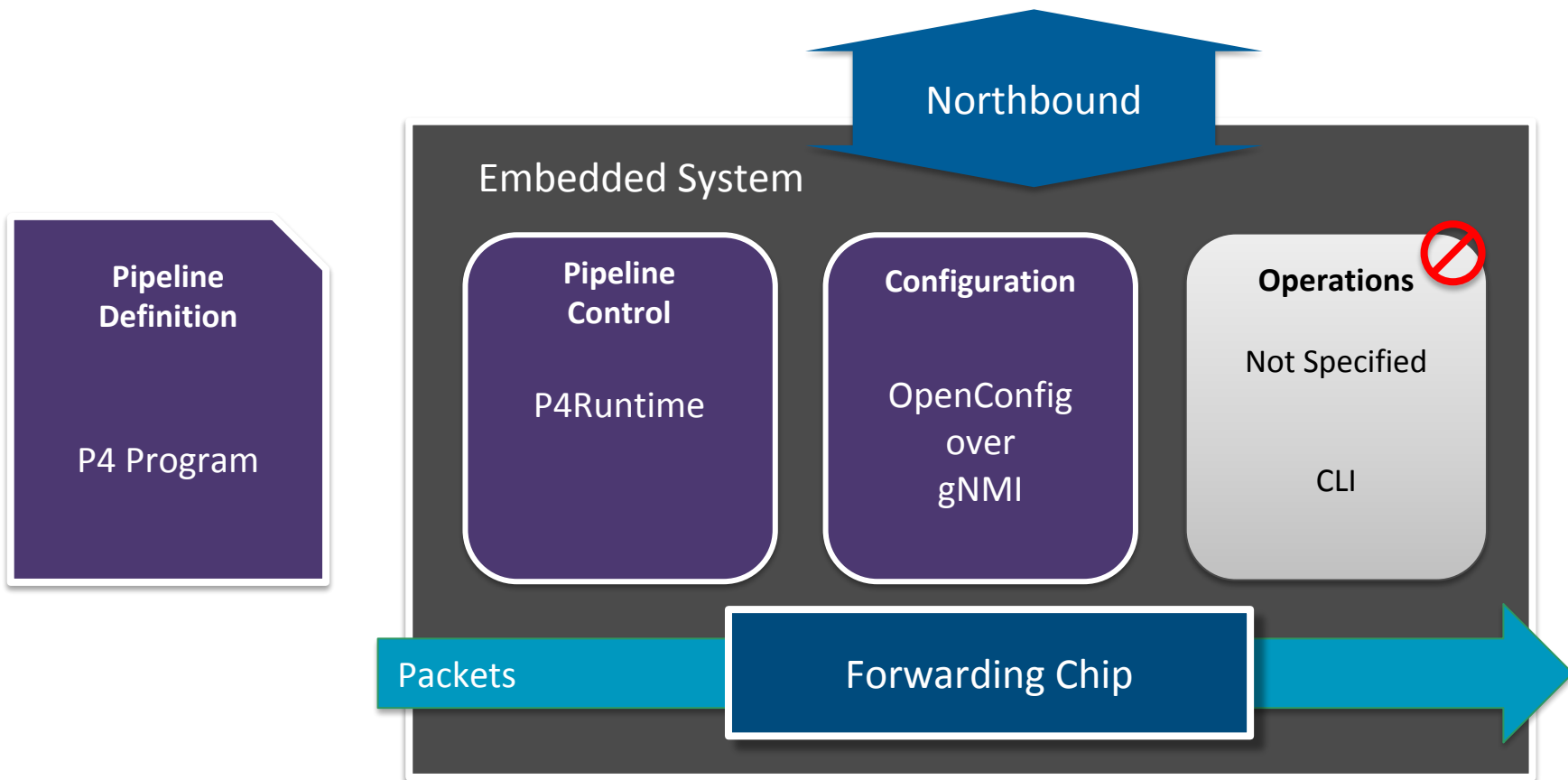
P4 works for Fixed and Programmable Pipelines



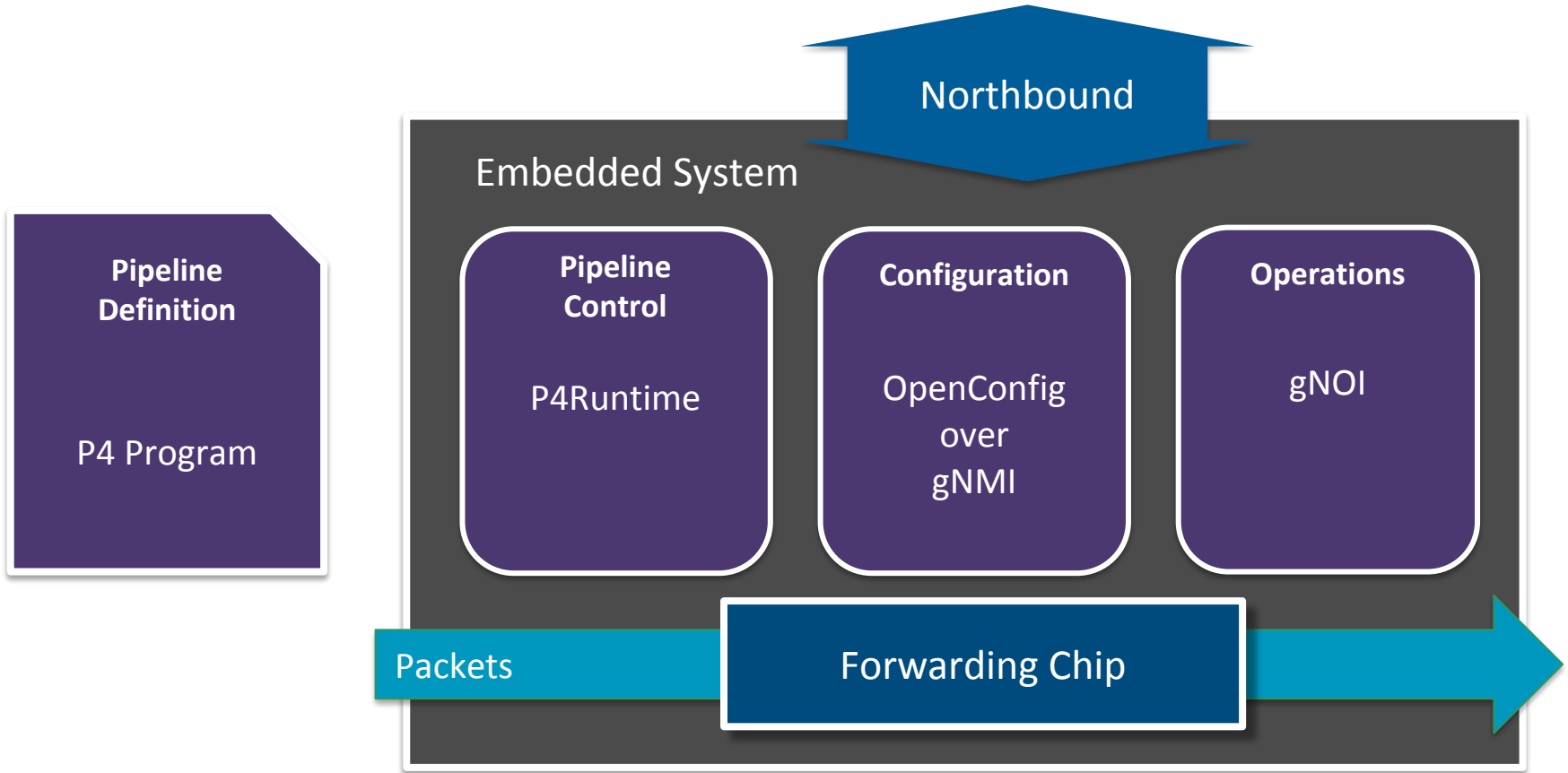
Pipeline Control Interface



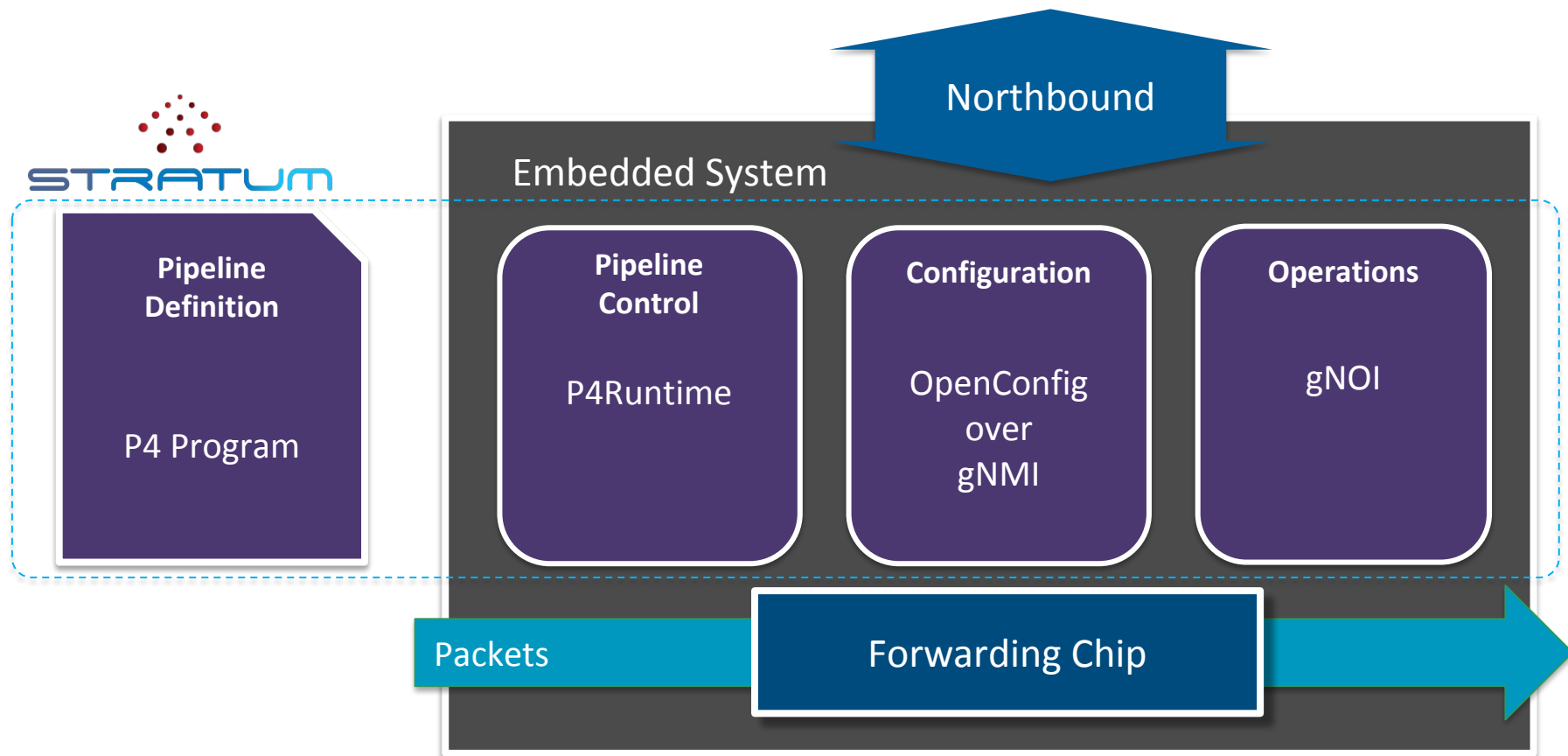
Configuration and Monitoring Interface



Operations Interface



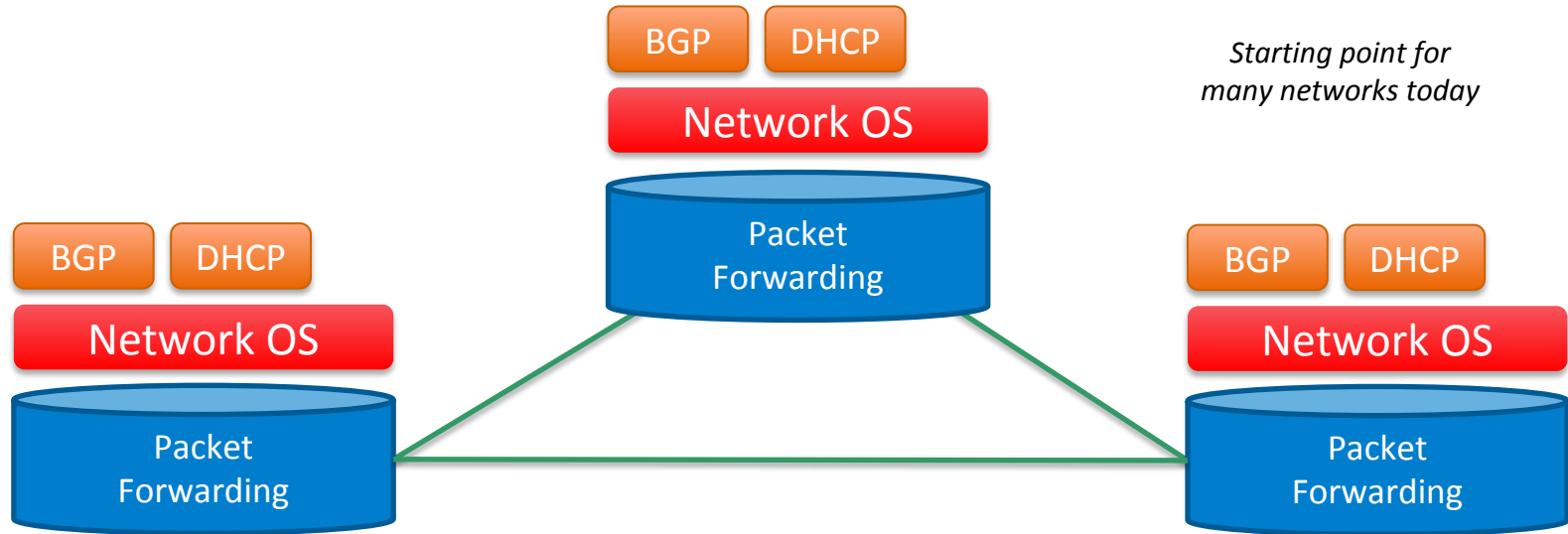
Lightweight and Production-ready Implementation



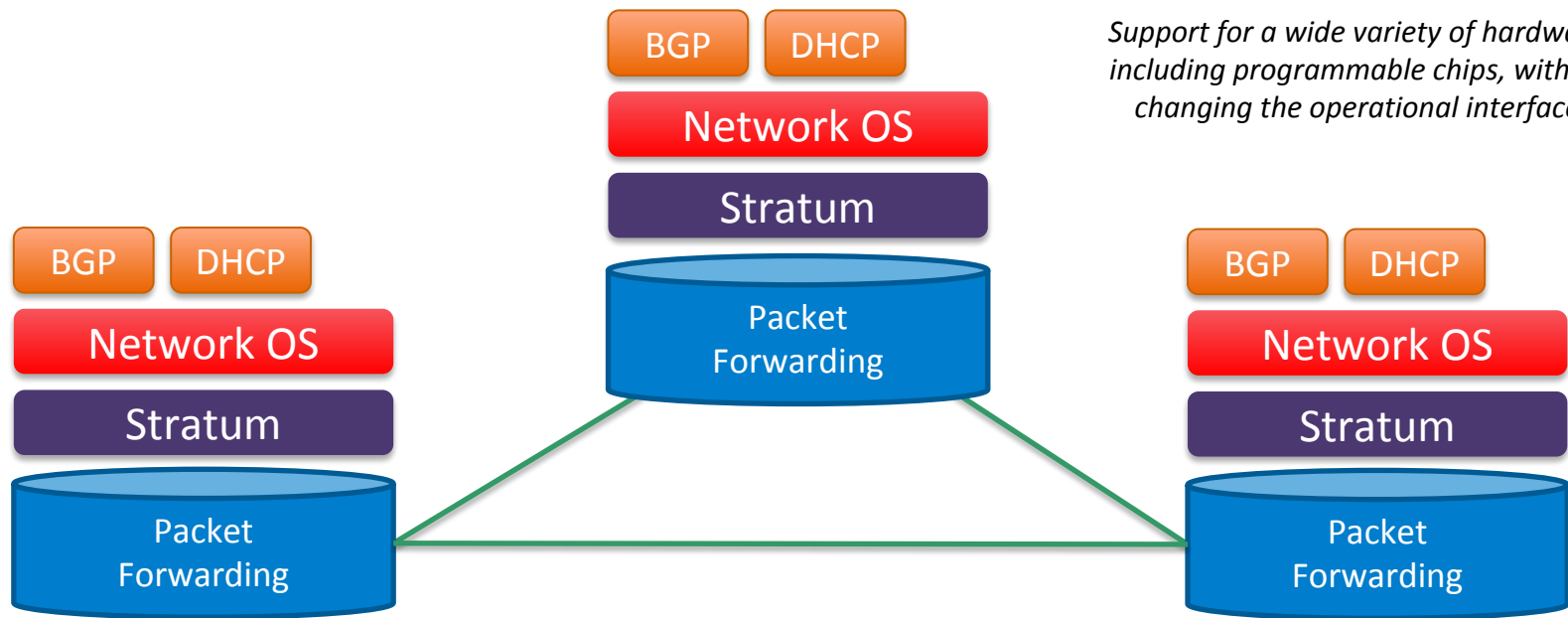
Stratum Common Interfaces

- P4Runtime ([service definition](#), [documentation](#))
 - gRPC-based data plane control protocol that is chip-, pipeline-, and packet header-agnostic
 - Message payloads derived from a P4 program using program-dependent P4Info instance to build messages
 - Enables a local or remote entity to load the pipeline/program, arbitrate mastership, read and write forwarding table entries, counters, and other chip features, as well as send and receive packets
- gNMI ([service definition](#), [models](#))
 - gRPC-based service to modify configuration and stream telemetry information
 - Messages payload is modelled in Yang, and Stratum prefers OpenConfig models
 - Config that gNMI deals with tend to be long-lived (i.e. persistent across device reboots), but mutable
- gNOI ([service definitions](#))
 - gRPC-based collection of micro-services for runtime management, for example:
 - Device reboots, pushing/rotating SSL keys/certs, BERT [bit error rate testing on a link/port], ping testing
 - Ephemeral state management (clearing L2 neighbor discovery/spanning tree, resetting a BGP neighbor session)

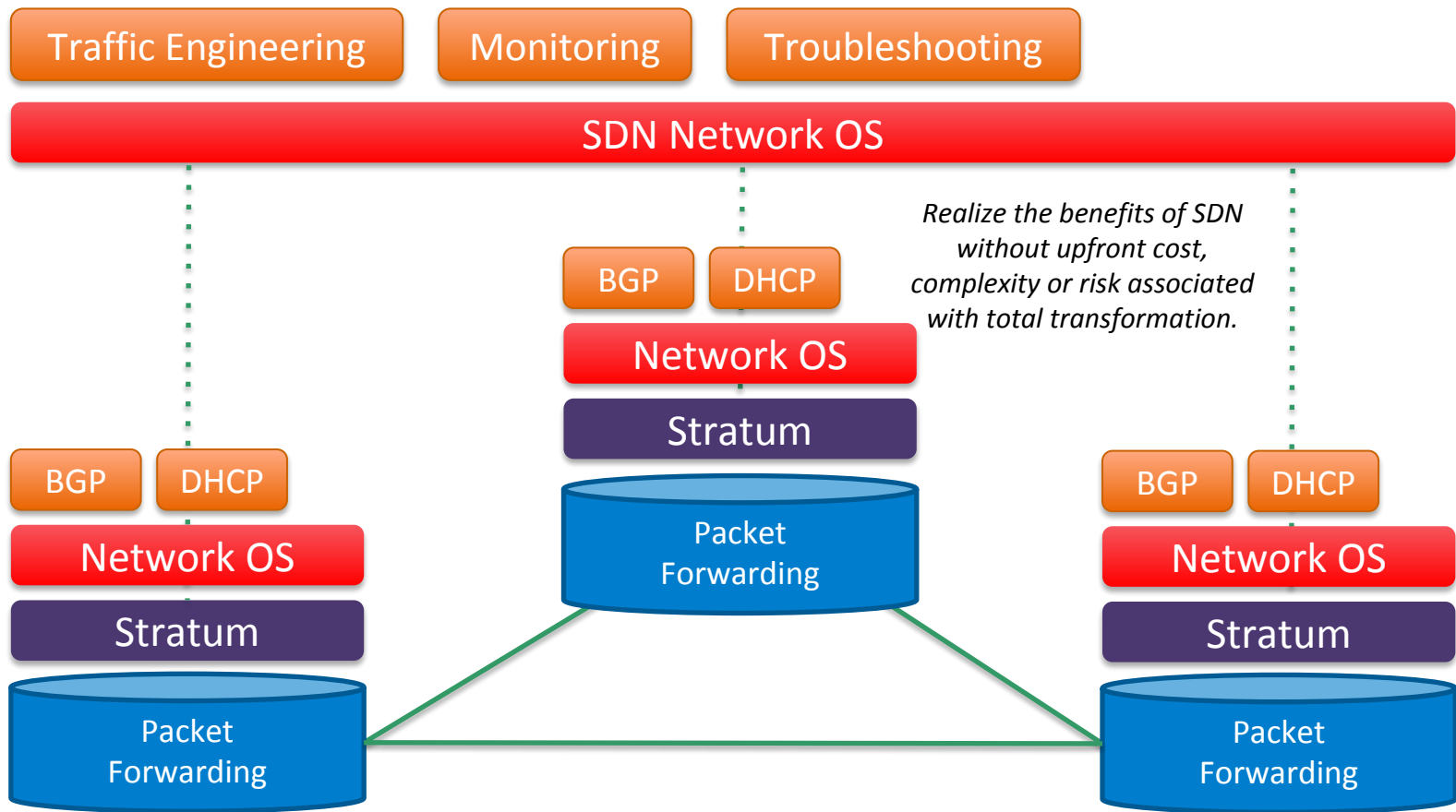
Path to Migration



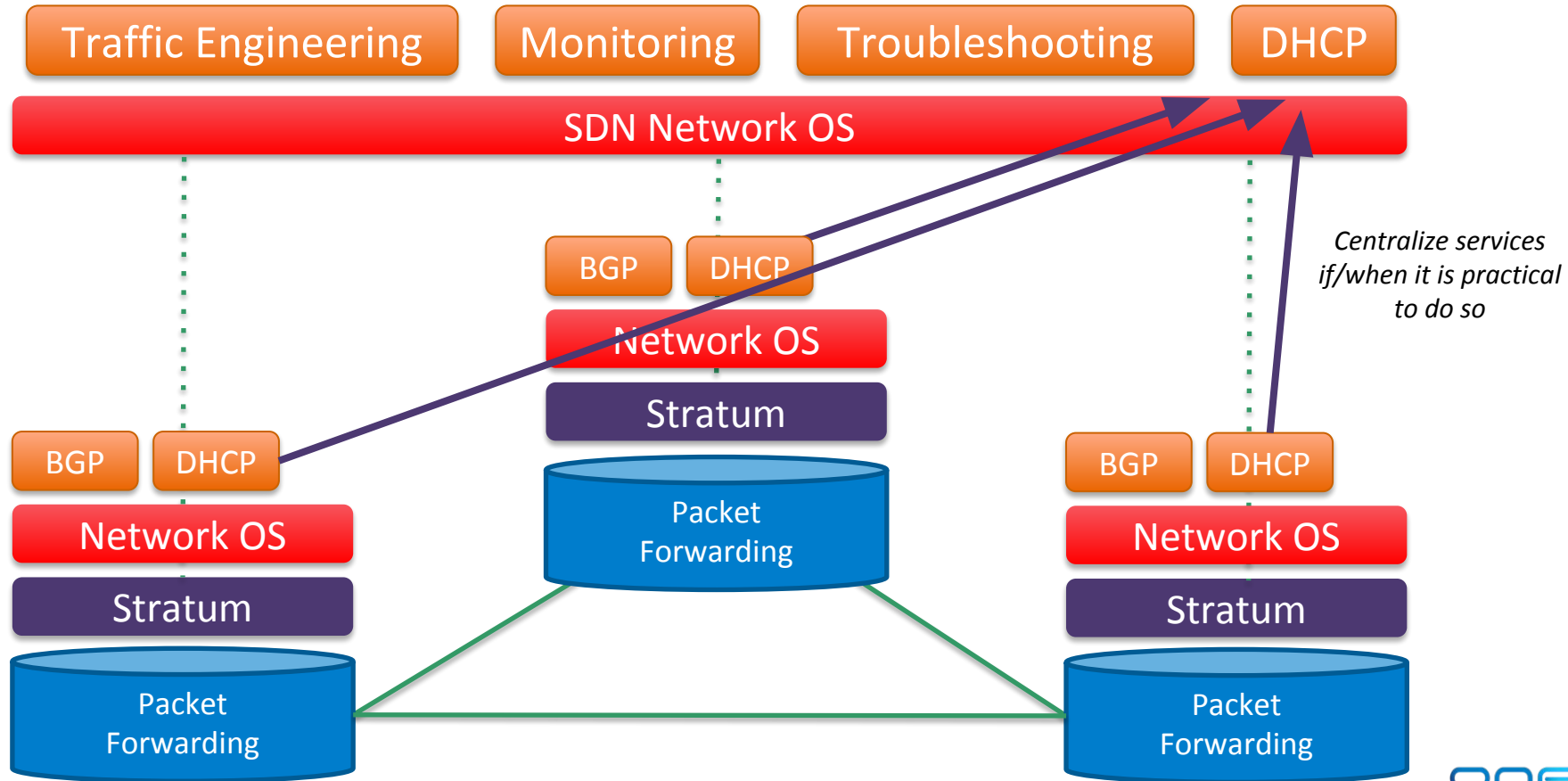
Path to Migration: Upgrade to a Stratum-powered NOS



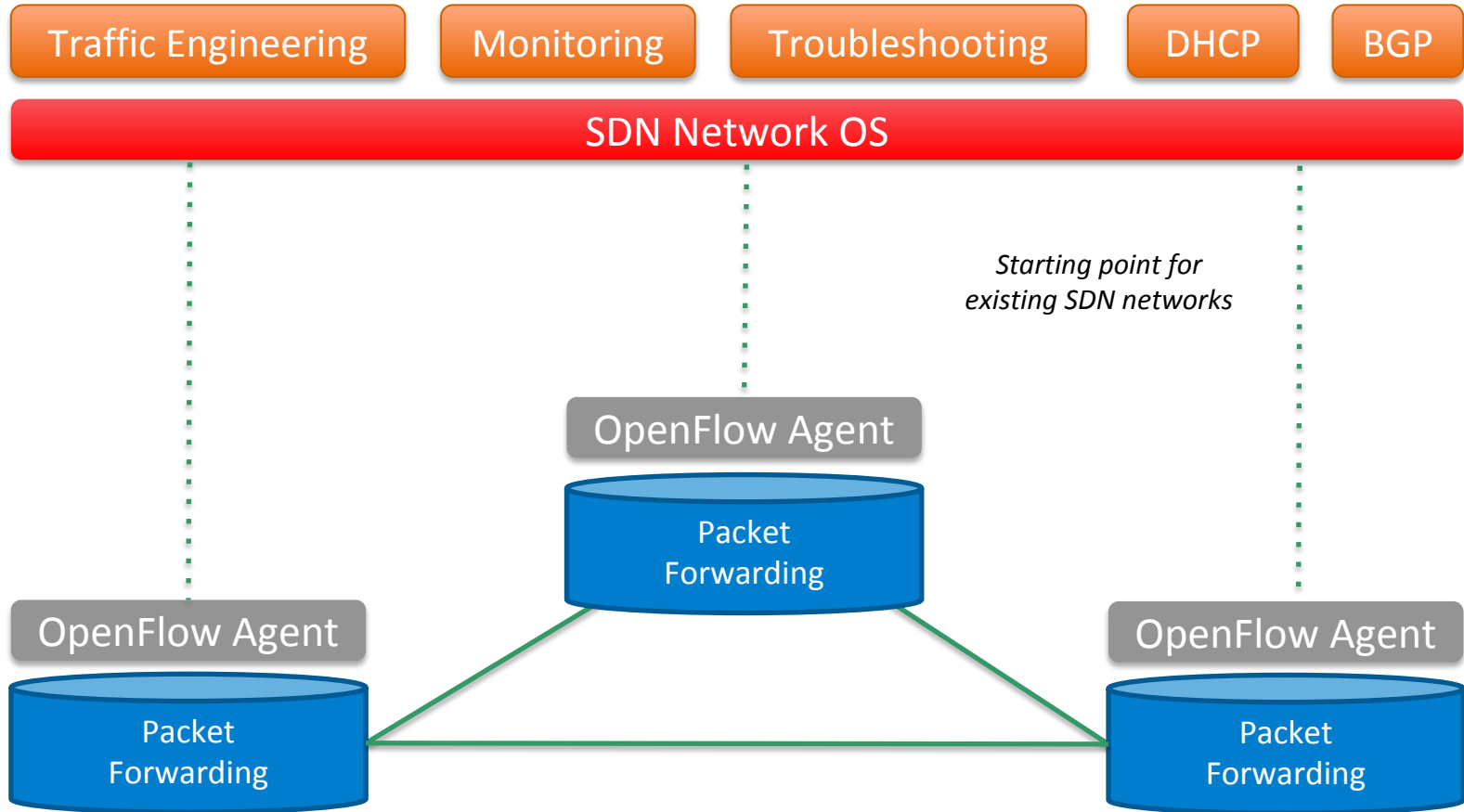
Path to Migration: Add an SDN OS and new services



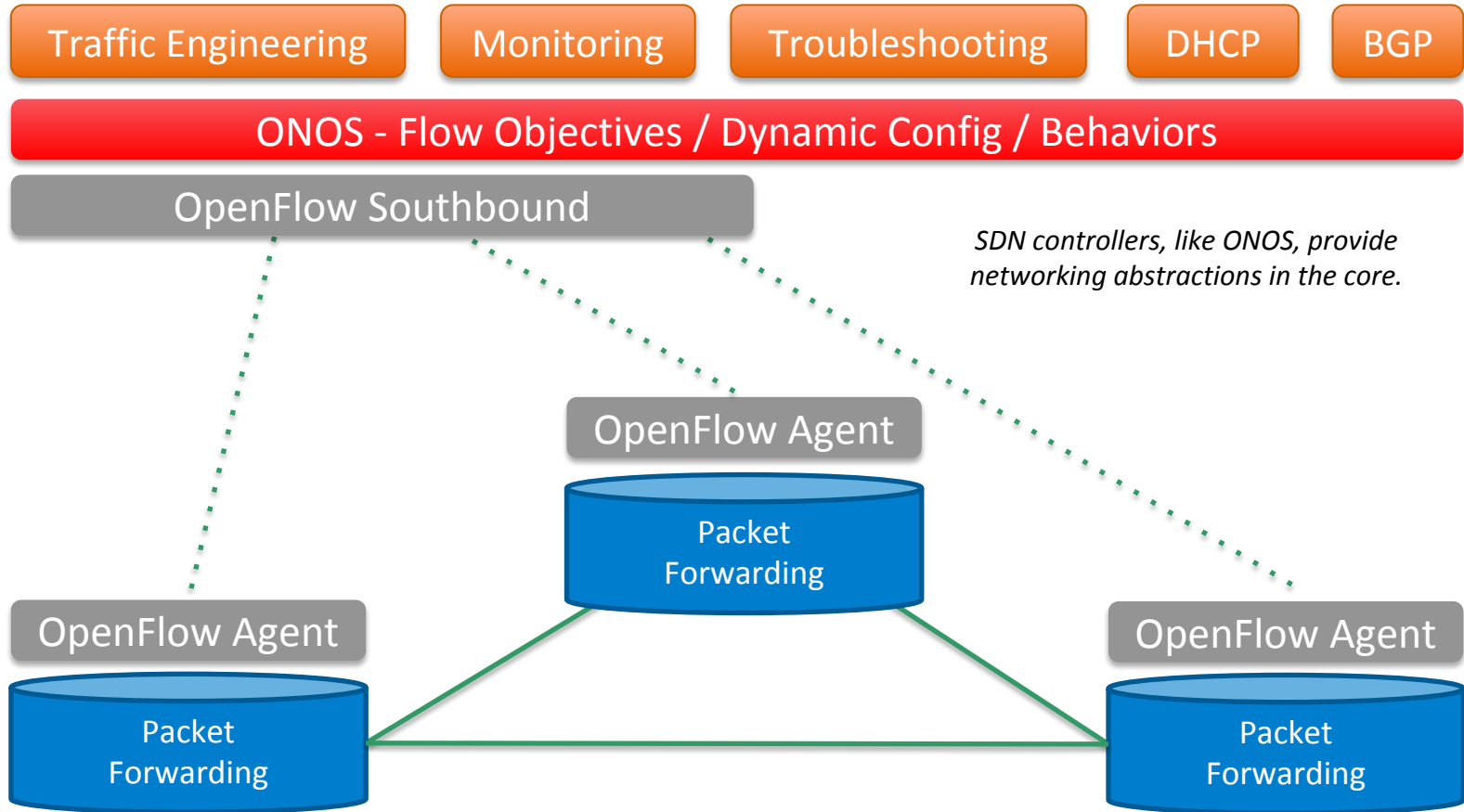
Migrate existing services



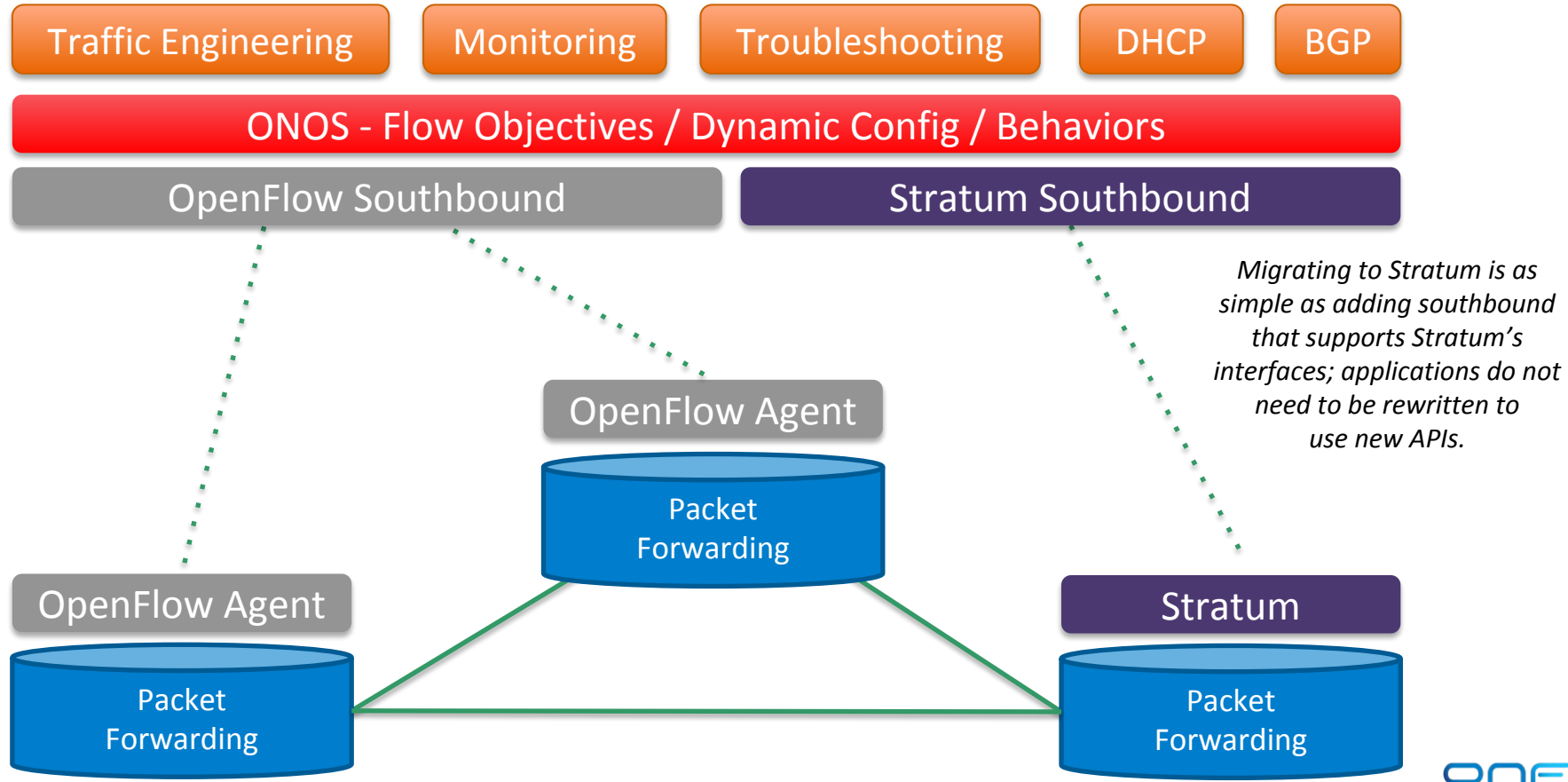
Migrating from OpenFlow



Migrating from OpenFlow

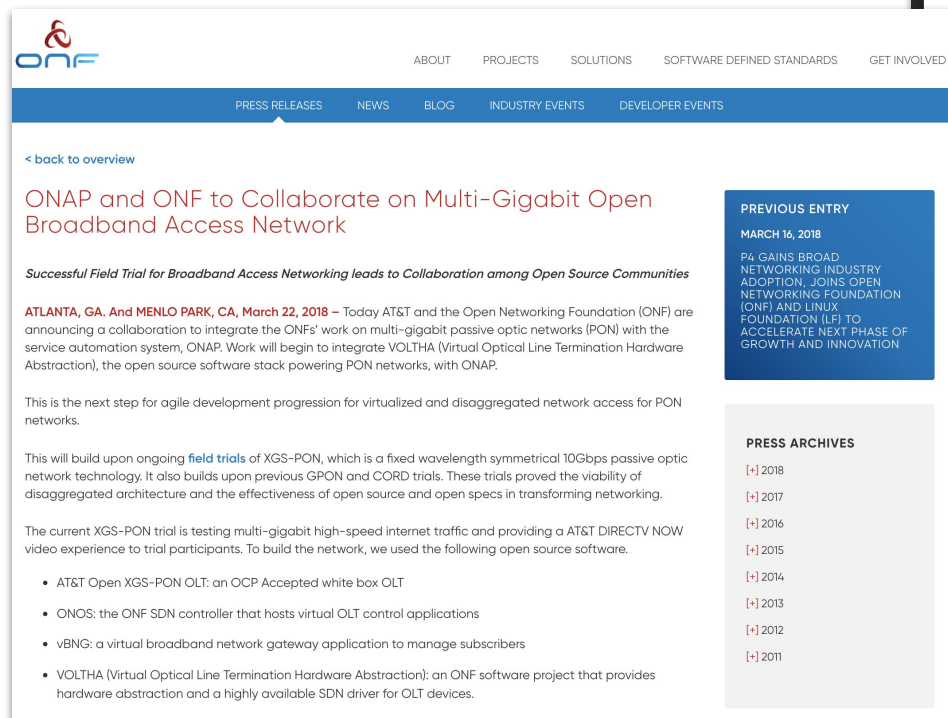


Migrating from OpenFlow



Production Readiness

Stratum project is seeded with production code from Google



The screenshot shows the Open Networking Foundation (ONF) website. The header includes the ONF logo and navigation links: ABOUT, PROJECTS, SOLUTIONS, SOFTWARE DEFINED STANDARDS, GET INVOLVED. Below the header is a blue bar with links: PRESS RELEASES, NEWS, BLOG, INDUSTRY EVENTS, DEVELOPER EVENTS. The main content area features a press release titled "ONAP and ONF to Collaborate on Multi-Gigabit Open Broadband Access Network". The release text states: "Successful Field Trial for Broadband Access Networking leads to Collaboration among Open Source Communities". It mentions that AT&T and the ONF are announcing a collaboration to integrate the ONF's work on multi-gigabit passive optical networks (PON) with the service automation system, ONAP. The release also mentions the integration of VOLTHA (Virtual Optical Line Termination Hardware Abstraction), the open source software stack powering PON networks, with ONAP. A "PREVIOUS ENTRY" section mentions "MARCH 16, 2018" and "P4 GAINS BROAD NETWORKING INDUSTRY ADOPTION, JOINS OPEN NETWORKING FOUNDATION (ONF) AND LINUX FOUNDATION (LF) TO ACCELERATE NEXT PHASE OF GROWTH AND INNOVATION". A "PRESS ARCHIVES" section lists years from 2011 to 2018.

ONF

ABOUT PROJECTS SOLUTIONS SOFTWARE DEFINED STANDARDS GET INVOLVED

PRESS RELEASES NEWS BLOG INDUSTRY EVENTS DEVELOPER EVENTS

< back to overview

ONAP and ONF to Collaborate on Multi-Gigabit Open Broadband Access Network

Successful Field Trial for Broadband Access Networking leads to Collaboration among Open Source Communities

ATLANTA, GA. And MENLO PARK, CA, March 22, 2018 – Today AT&T and the Open Networking Foundation (ONF) are announcing a collaboration to integrate the ONF's work on multi-gigabit passive optical networks (PON) with the service automation system, ONAP. Work will begin to integrate VOLTHA (Virtual Optical Line Termination Hardware Abstraction), the open source software stack powering PON networks, with ONAP.

This is the next step for agile development progression for virtualized and disaggregated network access for PON networks.

This will build upon ongoing [field trials](#) of XGS-PON, which is a fixed wavelength symmetrical 10Gbps passive optical network technology. It also builds upon previous GPON and CORD trials. These trials proved the viability of disaggregated architecture and the effectiveness of open source and open specs in transforming networking.

The current XGS-PON trial is testing multi-gigabit high-speed internet traffic and providing a AT&T DIRECTV NOW video experience to trial participants. To build the network, we used the following open source software.

- AT&T Open XGS-PON OLT: an OCP Accepted white box OLT
- ONOS: the ONF SDN controller that hosts virtual OLT control applications
- vBNG: a virtual broadband network gateway application to manage subscribers
- VOLTHA (Virtual Optical Line Termination Hardware Abstraction): an ONF software project that provides hardware abstraction and a highly available SDN driver for OLT devices.

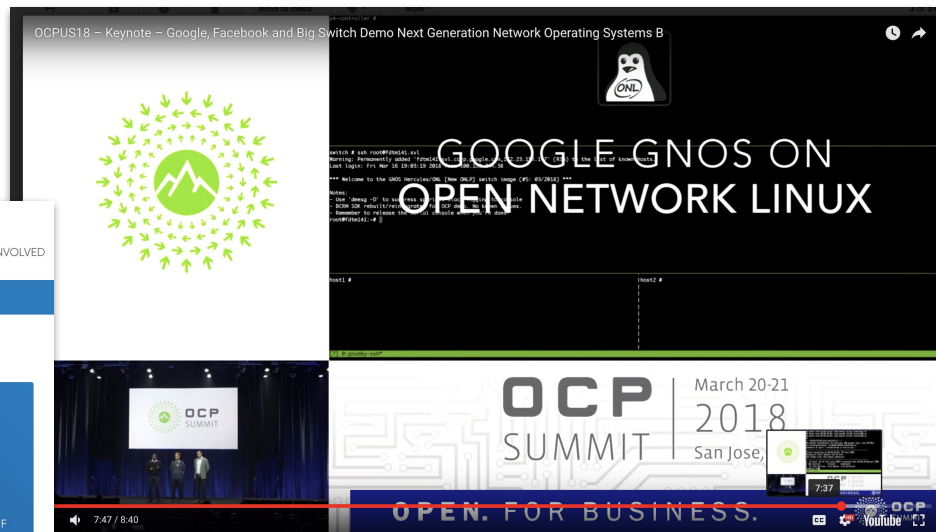
PREVIOUS ENTRY

MARCH 16, 2018

P4 GAINS BROAD NETWORKING INDUSTRY ADOPTION, JOINS OPEN NETWORKING FOUNDATION (ONF) AND LINUX FOUNDATION (LF) TO ACCELERATE NEXT PHASE OF GROWTH AND INNOVATION

PRESS ARCHIVES

- [+] 2018
- [+] 2017
- [+] 2016
- [+] 2015
- [+] 2014
- [+] 2013
- [+] 2012
- [+] 2011



ONOS, CORD, Trellis, and VOLTHA in multiple field trials with global service providers

Many ONF platforms are reaching production readiness, and Stratum is no exception.

Cloud Providers



Telecom Operators



Networking Vendors



White Box ODM Vendors



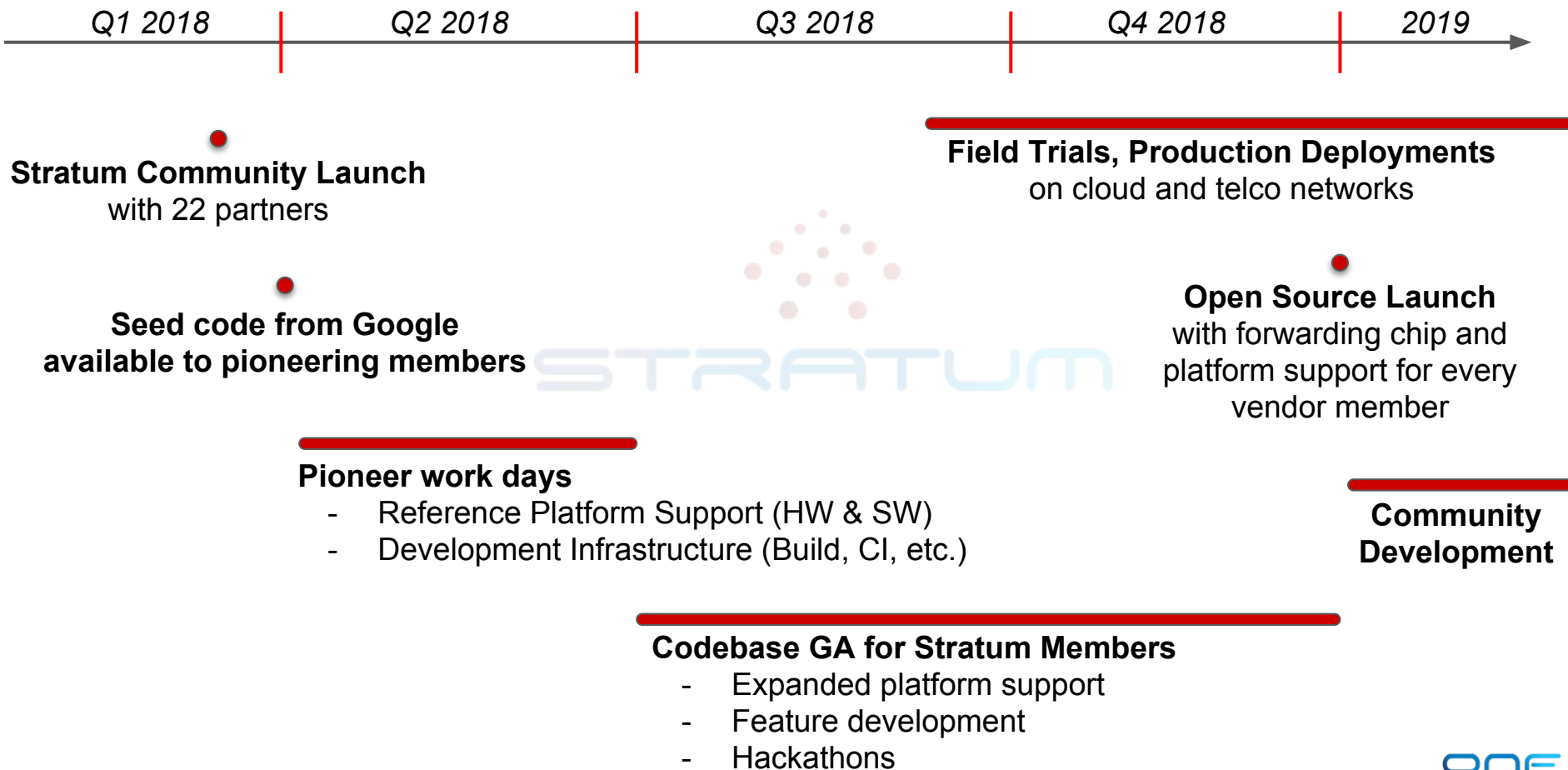
Silicon Vendors



Other Open Source Projects



Stratum Development Timeline



Stratum Summary

- Common interfaces for control, configuration, monitoring and telemetry
- Minimal design for high performance local or remote control and management
- Incremental migration paths enables incremental value-add (e.g. SDN, programmable hardware)
- Broad switching chip and platform support underway
- Production-root implementation designed to scale

<https://stratumproject.org/>

To join the announcement mailing list, send an email to:

stratum-announce-join@lists.stratumproject.org

(Then, click the link in the confirmation email)