

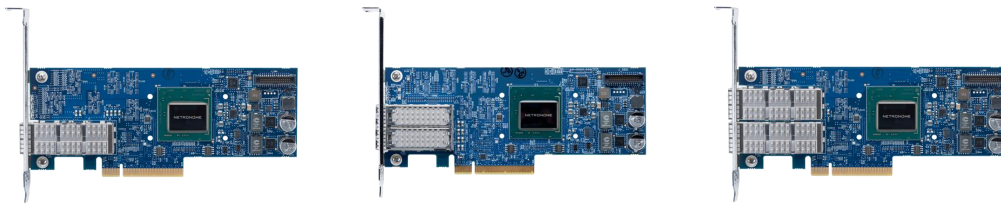


NETRONOME

**P4 Data Plane
Programming
on the
Agilio Server
Networking
Platform**



Agilio™ Server-Based Networking Software



Agilio™ CX Intelligent Server Adapters

1x and 2x 10/40GbE Production Solutions Now
2x 25GbE Samples in Q4 2016

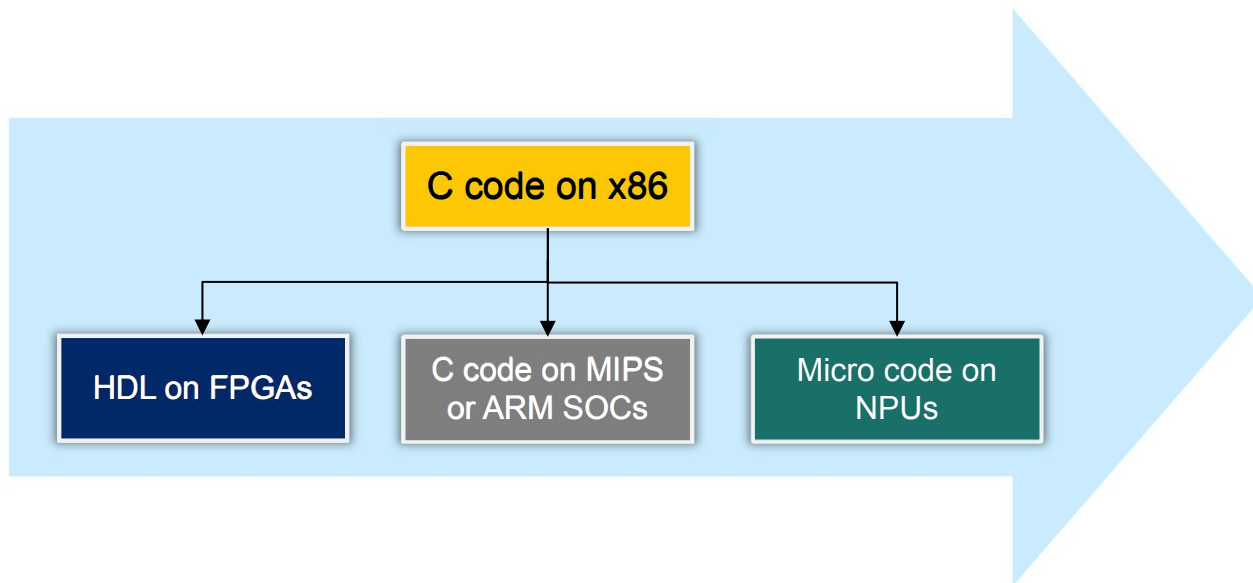
- Delivers up to 6X lower TCO for IT and NFV workloads
- Brings the speed of software innovation to hardware
- OpenStack-managed Open vSwitch, Linux Firewall, Contrail vRouter & P4 acceleration

Bringing the efficiencies of mega-scale data centers to mainstream server networking

SDN and NFV require many networking features

Data center operators and OEMs want to differentiate

Develop on x86 using C, then port to programmable networking hardware



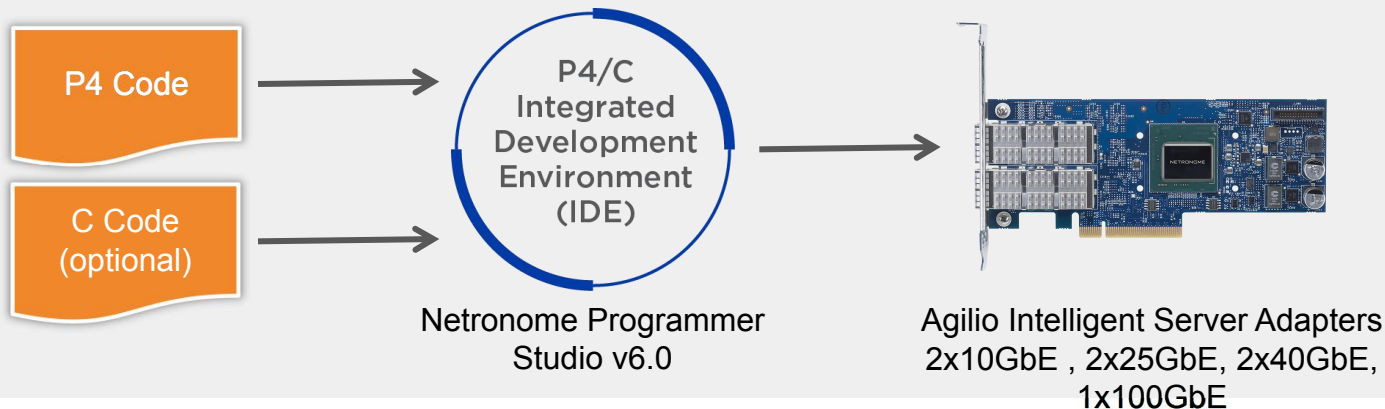
- Unpredictable or poor performance
- Long time to market
- Vendor lock-in

Seamless programming of SDN applications into the production Agilio solution

Utilizes open source P4 compiler, language from the P4 Language Consortium

Extensions enable optional C-based modules for sophisticated functions

IDE available now

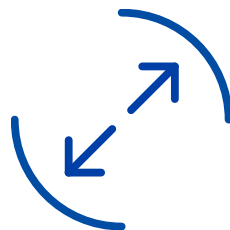


How the Agilio P4C SDK 6.0 helps IaaS and Telco cloud service providers:



PRODUCTIVITY

Cuts the number of lines of code by more than 10X



EXTENSIBILITY

Allows extension of production Agilio software with custom features



INV PROTECTION

Utilizes standard and open source P4 compiler and language

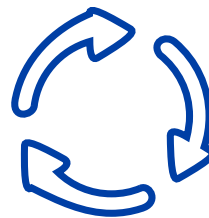
Delivers predictable development ROI and ensures investment protection

How the Agilio P4C SDK 6.0 helps IaaS and Telco cloud service providers:



OBSERVABILITY

Enhances ability to
statefully observe connections
per app by 10X

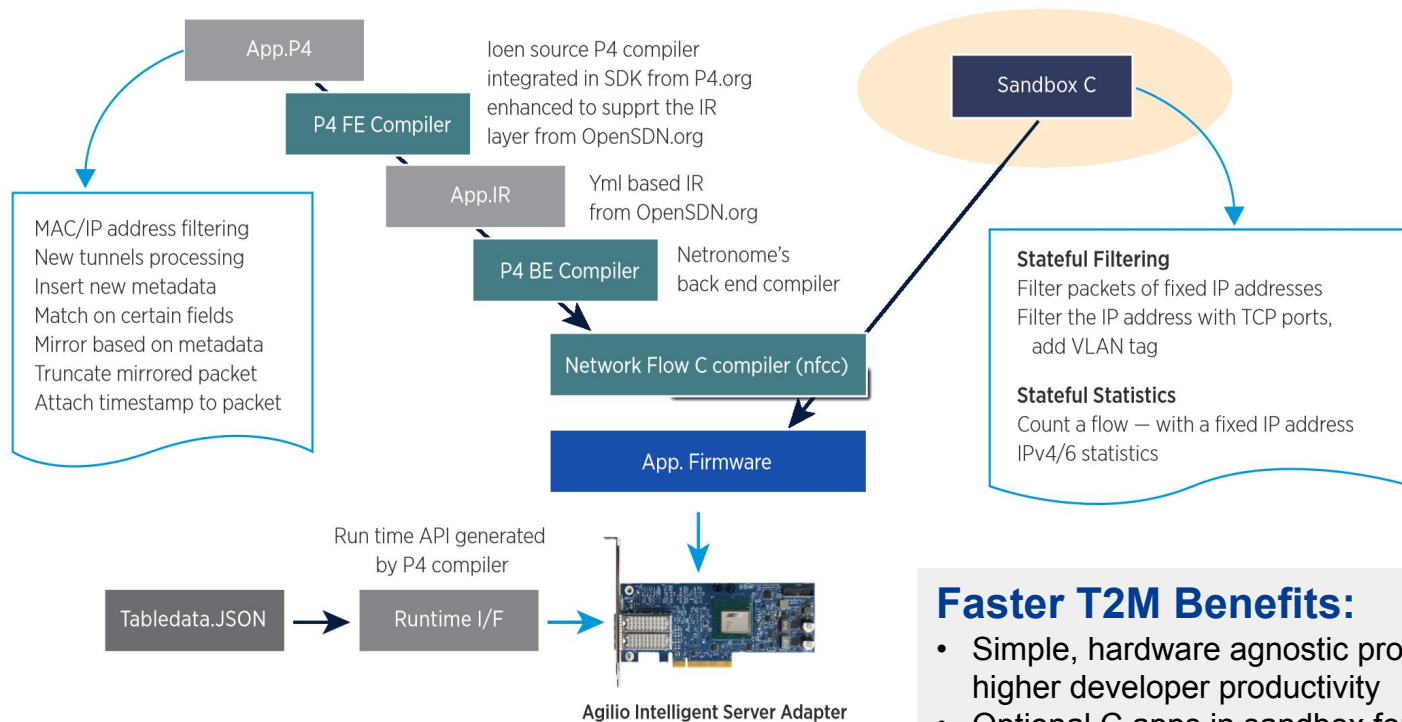


FLEXIBILITY

Allows dynamically
varying what is monitored
and what actions are taken

Bringing high-end capabilities within the economies of COTS servers

Open Tools and
Resources at
www.Open-NFP.org



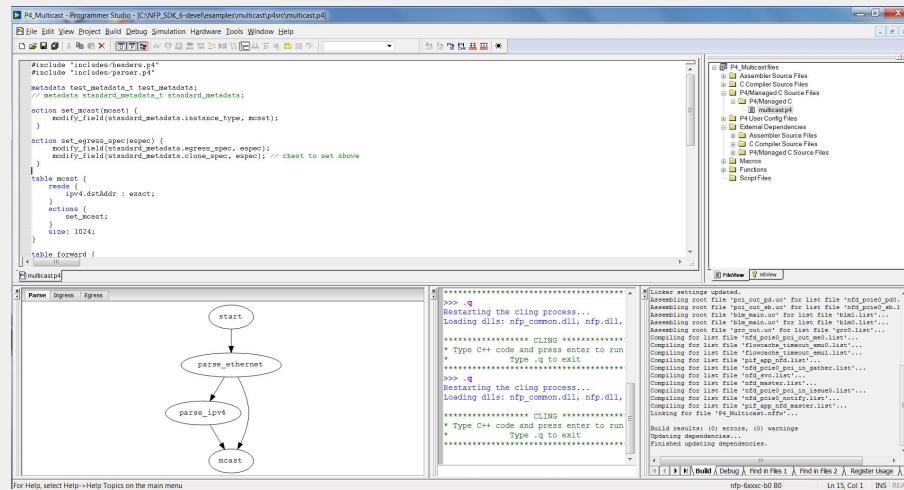
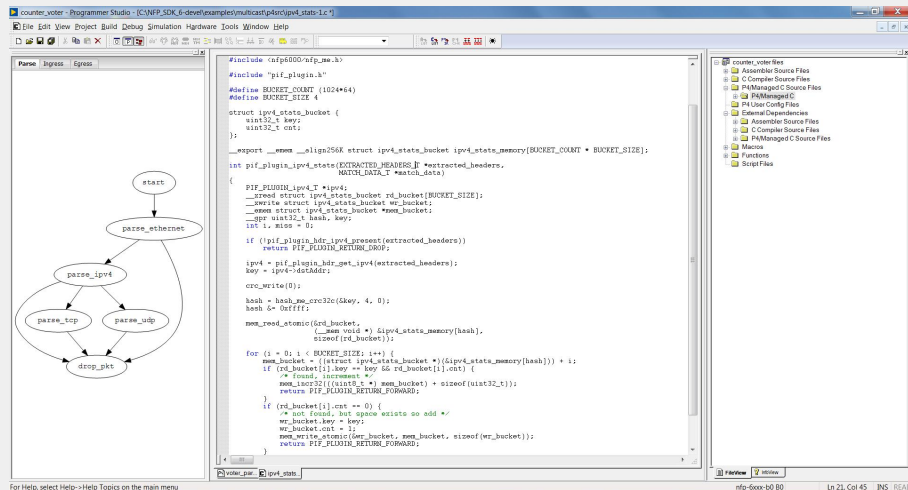
Faster T2M Benefits:

- Simple, hardware agnostic programming model means higher developer productivity
- Optional C apps in sandbox for sophisticated data paths
- Enables extension of Agilio S/W with custom features



P4 Programming and graphical view of data path

C module plug-in and graphical view of data path

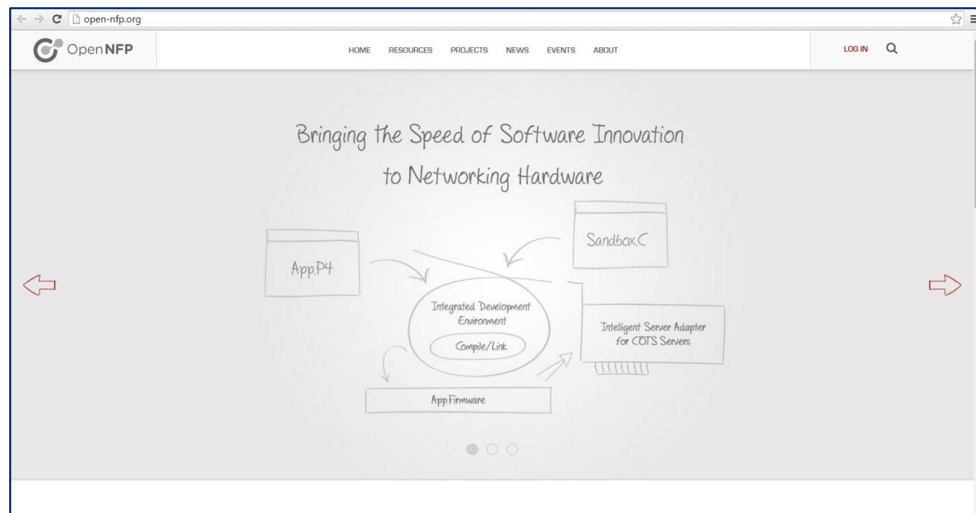


Community driven portal, sponsored by Netronome

Focused on data plane programming for server-based networking apps

IDE, labs, open source code, hardware, projects, knowledge-base

20 projects hosted and supported – academia, institutions and companies



To write new code or learn on the Agilio ISAs, developers get direct access to a server with ISA installed

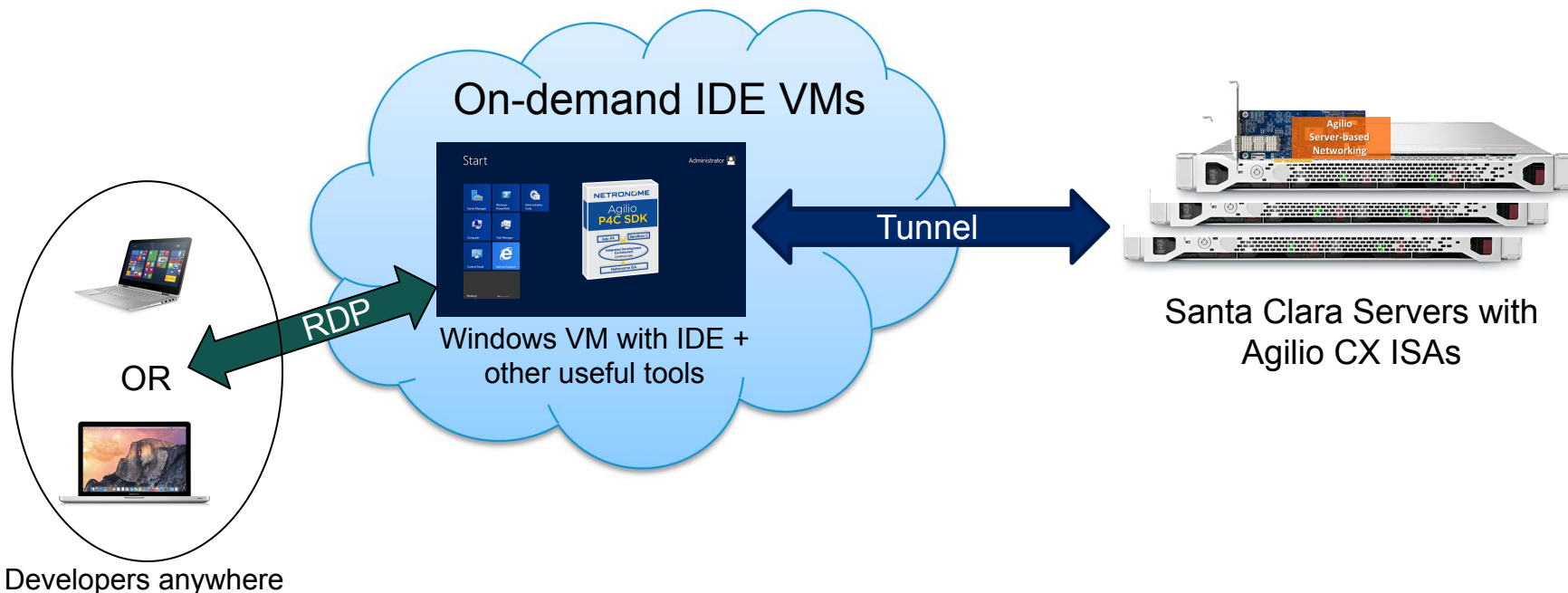
We offer cloud VMs with the IDE pre-installed and a cloud infrastructure that networks IDE VMs with the IDE to a pool of servers with the Agilio ISAs

Cloud-based access offers many benefits:

- ▶ Provides access to Agilio ISAs and tools to program them instantly to interested business and academic users
- ▶ Can deliver tutorials and hands-on labs at any location on-demand
- ▶ The infrastructure can be a service to researchers offering lectures and labs

Lab infrastructure

- IDE VMs to write P4, C code, and test OVS
- Server access from the pool to download/run code



P4_Demo - Programmer Studio - [i(32:0) Thread2 - PC: 1565 (Active)]

File Edit View Project Build Debug Simulation Hardware Tools Window Help

Packet Match Tables Counters Watches

Packet Structure Value Width

Packet Structure	Value	Width
Status	Valid	
Headers		
eth		
dst	0x00215ee07952	48
src	0x00090f092104	48
etype	0x0800	16
Metadata		
standard_metadata		
clone_spec	0	32
egress_spec	drop	16
egress_port	p0	16
packet_length	410	14
egress_instance	0	10
instance_type	normal	4
ingress_port	p0	10

ME: i32:me0 CTX: Thread 2

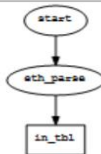
```
(32:0) pif_app_nfd_master.list
Thread2
header_type eth_hdr {
  fields {
    dst : 48;
    src : 48;
    etype : 16;
  }
}
header eth_hdr eth;
parser start {
  return eth_parse;
}
parser eth_parse {
  extract(eth);
  return ingress;
}
action drop_act() {
  drop();
}
table in_tbl {
  ...
}
```

P4_Demo threads

- Chip <unnamed>
 - Microengine i1:0
 - Microengine i1:1
 - Microengine i1:2
 - Microengine i1:3
 - Microengine i4:0
 - Microengine i4:1
 - Microengine i4:2
 - Microengine i4:3
 - Microengine i5:0
 - Microengine i5:1
 - Microengine i5:2
 - Microengine i5:3
 - Microengine i32:0
 - pif_app_nfd_master.list
 - Thread0
 - Thread2
 - Thread4
 - Thread6
- Microengine i32:1
 - pif_app_nfd.list
 - Thread0
 - Thread2
 - Thread4
 - Thread6

FileView ThreadView InfoView

Parse Ingress Egress



For Help, select Help->Help Topics on the main menu

nfp-4xxx-b0 B0 uEng: 5857

Ln 22, Col 2

INS READ



NETRONOME

Thank You