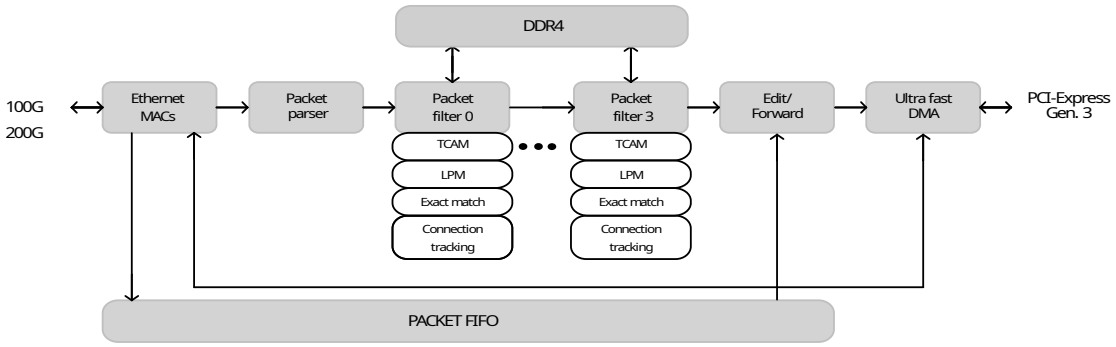
Complete FPGA-based SmartNIC solution

on RainboW G35P hardware from

SmartNIC (Smart Network Interface Card – NIC) is a specialized network adapter that **offloads certain processing tasks** from the host CPU to the NIC itself. These tasks can include **packet filtering, encryption/decryption, compression**, and other functions that are typically performed by software running on the host. By moving these tasks to the SmartNIC, it reduces the load on the host CPU, **increases network performance and significantly improves overall efficiency.** The **FPGA allows for flexibility** in terms of the specific tasks that can be performed, as well as the **ability to easily update or modify the SmartNIC's functionality** as needed.

How DYNANIC makes complete solution on RainboW G35P?

Programming FPGA is not an easy task. DYNANIC **comes with the universal high-speed FPGA packet processing pipeline** for RainboW G35P. This pipeline consists of components required for various packet processing in many use-cases. And so DYNANIC **enables full utilization of FPGA-technology without prior FPGA knowledge!**



This wire-speed capable FPGA pipeline is **controlled from the host software** by standardized and open-source RTE Flow DPDK API. For example, to set up the filtration rule in the pipeline, it is only needed to write **a few lines of code in C++ or Python** programming language. So simple!

Use-cases with DYNANIC

Network acceleration

Examples of processing tasks that can be offloaded with DYNANIC include packet processing, encryption/decryption, compression/decompression or implementation and acceleration of future network protocols.

Network security

Example applications are firewall, intrusion detection and prevention systems (IDS/IPS), and DDoS mitigation (Anti-DDoS). All these can be offloaded with DYNANIC for improving performance and reducing latency.

Network monitoring and analyses

Troubleshooting network issues, detecting anomalies, and identifying performance bottlenecks with full wire-speed traffic capture in real time is possible thanks to DYNANIC.

Content delivery

DYNANIC can help applications for accelerating content caching and delivery, improving user experience and reducing server load in content delivery networks (CDNs).

Virtualized networking

Virtualized networking functions (NFV) such as virtual switches and routers improve performance and reduce latency using DYNANIC solution.

And many more . . .

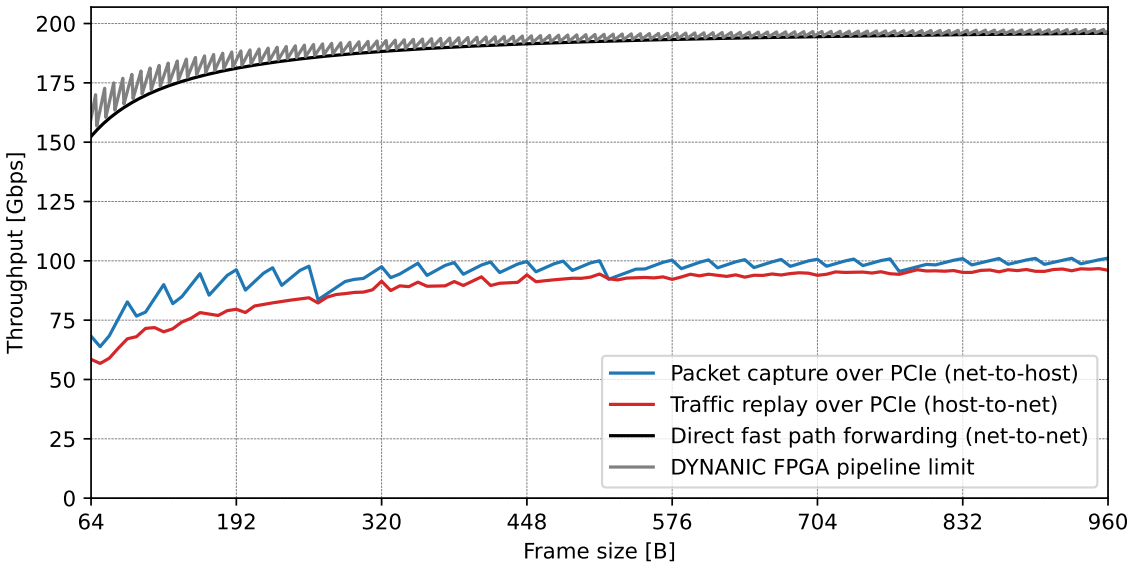
RainboW G35P** by **iWave.

Unique features of DYNANIC solution on RainboW G35P

- **No need for FPGA** development, processing pipeline is given
- **Standardized and open-source** DPDK software stack
- **Processing pipeline controlled** by standard RTE Flow interface
- **Full wire-speed throughput** to and from host RAM
- **Configurable packet** parser supporting protocols from L2 to L4
- **Different filtering options utilizing** internal or external memories
- **Flow tracking** with fast atomic insert/removal from host
- **Solution ready** for different link speeds even on given card
- **Lossless traffic** processing at wire-speeds up to 100G.

Link speed configuration	Exact match	LPM prefixes	TCAM rules
10/40 Gbps	0.5 M	0.25 M	6 k
100/200 Gbps	0.5 M	0.25 M	3 k

*Achievable rule capacity for different filter types on **RainboW G35P**. Values provided for IPv4 address matching. Exact match and LPM can be combined by sharing the capacity.*



*DYNANIC throughput measurements on **RainboW G35P** with 2x100GbE and PCIe gen3. On-chip pipeline is calibrated for sustained wire-speed processing with a small margin on top. The only performance bottlenecks are introduced by the overhead of DPDK transfers over PCIe.*

DYNANIC

DynaNIC Semiconductors Ltd. offers custom design and development services for FPGA-based projects. For more than 20 years are company team members specializing in the acceleration of algorithms required for high-speed network packet processing (e.g. packet parsing, packet/headers fields extraction, hash based pattern matching, filtering, traffic flow management, etc.) with link speeds up to 400 Gbps. Unique portfolio of IPs was also utilized to bring FPGA technology closer to any software company. That's how the flagship **DYNANIC** solution was created.

iWave Global

Since 1999, iWave has been driven by the mission to be the trusted embedded technology partner for companies across the globe. Building on our core expertise of embedded systems design and manufacturing, iWave serves customers with an extensive portfolio of System on Modules, Single Board Computers, COTS Modules, and ODM Solutions catering to industrial, automotive, and medical vertical markets. As a priority partner for semiconductor companies such as NXP, TI, AMD, Intel, ST, and Renesas, iWave enables customers to have access to the latest embedded technology.

How to start?

Contact iWave to obtain RainboW G35P at their website

and visit

DynaNIC website to download working package for RainboW G35P.