

# Complete FPGA-based SmartNIC solution

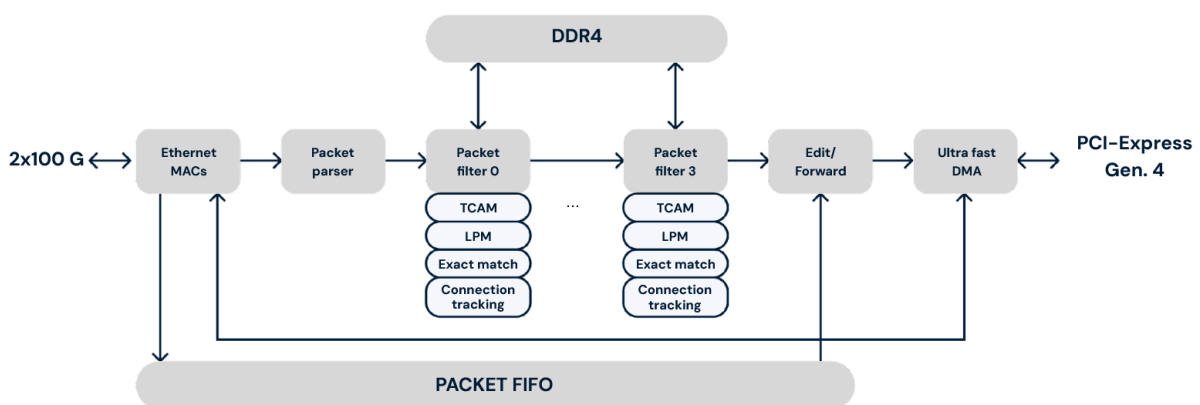
on IA-420F hardware from



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 IA-420F card?

Programming FPGA is not an easy task. DYNANIC **comes with the universal high-speed FPGA packet processing pipeline** for IA-420F. 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 . . .**



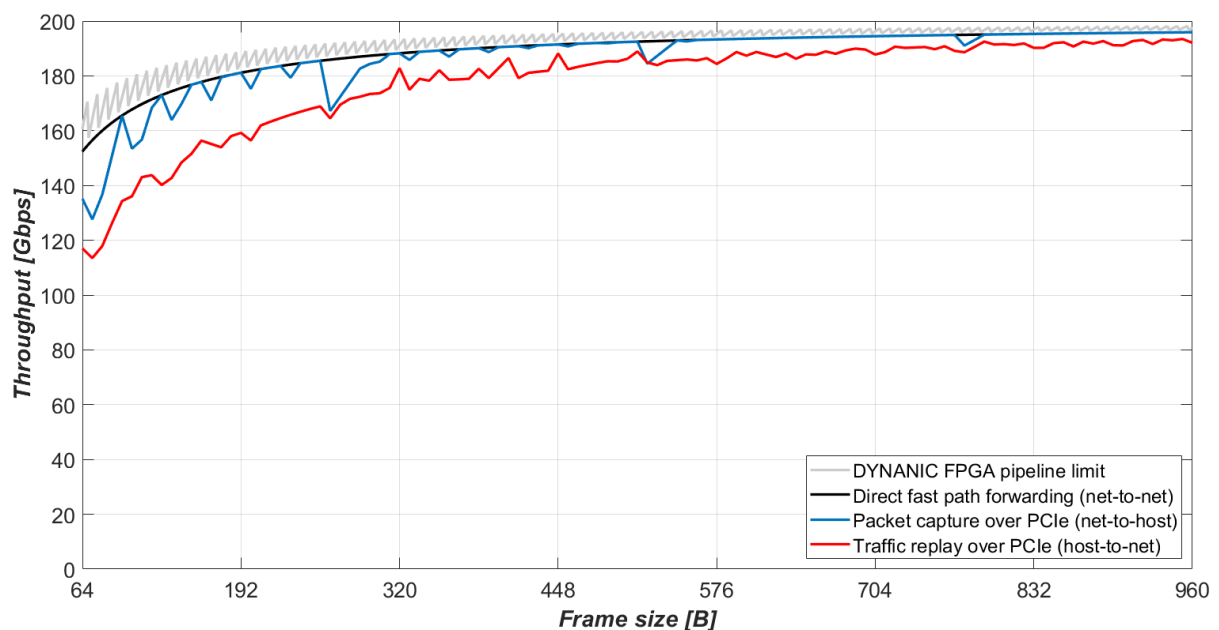
**IA-420F by BittWare.**

## Unique features of DYNANIC solution on IA-420F

- **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 200 Gbps 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 from 100G to 200G

Link speed configuration	Exact match	LPM prefixes	TCAM rules
100 Gbps	1 M	0.5 M	6 k
200 Gbps	1 M	0.5 M	3 k

Achievable rule capacity for different filter types on IA-420F. Values provided for IPv4 address matching. Exact match and LPM can be combined by sharing the capacity.



DYNANIC throughput measurements on IA-420F with 2x100GbE and PCIe gen4. 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.

## BRNO LOGIC

BrnoLogic 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 **DYNANIC** solution was created.

## BittWare

a **molex** company

BittWare, part of the Molex group of companies, has a 30-year track record of successfully designing and deploying advanced FPGA accelerator products. It is the only FPGA vendor-agnostic supplier of critical mass able to address enterprise-class qualification, validation, lifecycle and support requirements for customers deploying FPGA accelerators in high volumes. BittWare provides enterprise-class compute, network, storage and sensor processing accelerator products featuring Achronix, Intel and AMD FPGA technology. These programmable products dramatically increase application performance and energy efficiency while reducing total cost of ownership.

## How to start?

Contact BittWare to obtain IA-420F at  
<https://www.bittware.com/contact/>

and visit

<https://dyna-nic.com> to download working  
DYNANIC package for IA-420F