

# Pipeline Programmability with Dynamic Device Personalization (DDP)

## Increased packet processing efficiency for Cloud and Network Functions Virtualization deployments

Flexible, on-demand packet pipeline reconfiguration with personalization profiles enable more efficient and faster packet processing

- Programmable pipeline
- On demand workload optimizations
- No server reboot/reset
- Increased efficiency with fewer devices
- Enable new services

The Intel® Ethernet 700 Series was designed to address the rapidly evolving requirements in the Cloud and Communications' market segments. It introduced a programmable pipeline to support a wide range of protocols and packet types and has been expanded to include protocols such as GENEVE and VXLAN-GPE.

### Intel® Ethernet 700 Series with Dynamic Device Personalization (DDP)

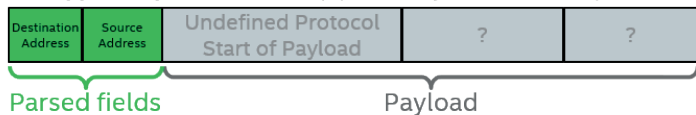
One of the key technologies of the Intel Ethernet 700 Series is Dynamic Device Personalization (DDP). This technology enables workload-specific optimizations using the programmable packet-processing pipeline. Additional protocols in the default set improve packet processing efficiency that results in higher throughput and reduced latency.

Personalization profiles are applied to the firmware defined pipeline in the 700 Series, adding new protocols or modifying existing protocols on-demand. The 700 Series allows these profiles to be applied at run-time using Software Defined Firmware or APIs, eliminating the need to reset or reboot the server. This not only keeps the server and VMs up, running, and computing, it also increases performance for VNFs that process network traffic that is not included in the default firmware.

## Increase performance by programming new protocol support at run time

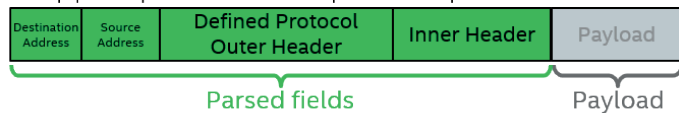
The ability to reconfigure network adapters on-demand, without migrating all VMs from the server, avoids unnecessary loss of compute for VMs during server cold restart. Parsing new protocols in the network controller at run-time improves packet processing performance for applications/VMs. Intel® Ethernet 700 Series with DDP, offers this type of on-demand reconfiguration.

**Unsupported protocols** in the pipeline rely on the host to parse them



**Dynamic Device Personalization (DDP) profile enabled**

The pipeline parser can look deeper into the packets



## VNFs and VMs can Request Services Based on Requirements

With DDP, the software entity can request personalized services – updating the adapter’s functionality by loading specific profiles on demand. If multiple adapters are present, each can have its own profile without affecting the other.

## Increase efficiency using fewer devices

Devices have a limited set of protocols that they support by default. The DDP profile package loads additional protocols on top of the device's default definition. Access to more protocols can reduce the need for more devices.

## On-demand workload optimizations

Using DDP to program or reconfigure the pipeline, enables the ability to classify additional protocols inline, and then distribute these packets to specified queues on the device's host interface. This capability can deliver a number of performance and core utilization optimizations, such as eliminating the requirement for CPU cores to perform classification, or load balancing for specific packet types.

## Enhanced Dynamic Device Personalization (DDP) for Intel® Ethernet 800 Series<sup>1</sup>

While the 700 Series supports most common protocols found in traditional data centers, there is an emerging need to support workload-specific functionality with new protocols, or customer-specific protocols, not yet supported by generally-available firmware.

The introduction of a fully programmable pipeline on the Intel® Ethernet 800 Series, enhances DDP functionality by improving the number of protocols that can be added in a DDP profile package, and provides baseline support for well-known protocols and queuing configurations, including tunneling protocol support, as defined by IETF NVO3 specifications, such as VXLAN, GENEVE, VXLAN-GRE and NVGRE. Built as a superset of the Default DDP profile, the enhanced DDP profiles will provide workload-specific protocols and configuration options.

Segment-specific profiles for the 800 Series provide:

- Greater flexibility, with many workload-specific protocols at driver initialization
- Independent programming with different DDP profile packages for each adapter in a system
- Ability to change the supported protocols without reloading NVM firmware image

The enhancement of the DDP capabilities for the Intel Ethernet 800 Series further improves the abilities for workload optimizations, especially in the NFV and network edge segments. New DDP profiles will continue to be developed enabling new protocols as they become defined.

1. The Intel® Ethernet 800 Series will be available in Q3' 19

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