

Built to Scale

High performance networking solutions

# FABRIC ACCESS PROCESSOR

## FAP10/20V

### Highlights

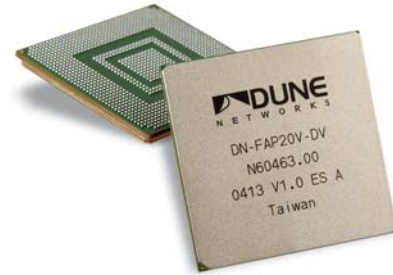
- 20Gbps and 10Gbps full-duplex traffic-manager device integrating switching fabric interface
- Supports a stand-alone 20Gbps traffic manager
- Provides distributed shared-memory switch via fabric-less (mesh) configurations
- Enables up to 40Tbps of fabric-based configurations
- End-to-end hierarchical rate and weight guarantees for packet flows and per-flow shaping
- One or two SPI4.2 full duplex interfaces towards the line-card logic
- RED/WRED queuing policies
- Automatic fault detection and recovery with no software intervention
- N+M, N-M and 1:1 redundancy schemes
- Comprehensive multicast support
- FAP10/20V-based line card can co-exist in systems with FAP10M-based line cards (Marvell's FX930) and with future types of FAP devices

### SAND Overview

Dune Networks SAND™ (Scalable Architecture for Networking Devices) chipset provides a complete solution for switching fabric and ingress/egress traffic management. The SAND™ chipset includes a Fabric Element device (FE200) and a family of Fabric Access Processor (FAP) devices. The FE200 enables switched-based systems across all types of FAP devices. The FAP devices differ from each other by the aggregate rate they provide to the user, their traffic-management capabilities, and the interface towards the NP or MAC/framer.

The SAND chipset enables, for the first time, Internet and storage-platform vendors to build a full product line using the same chipset guaranteeing a life cycle of 7+ years.

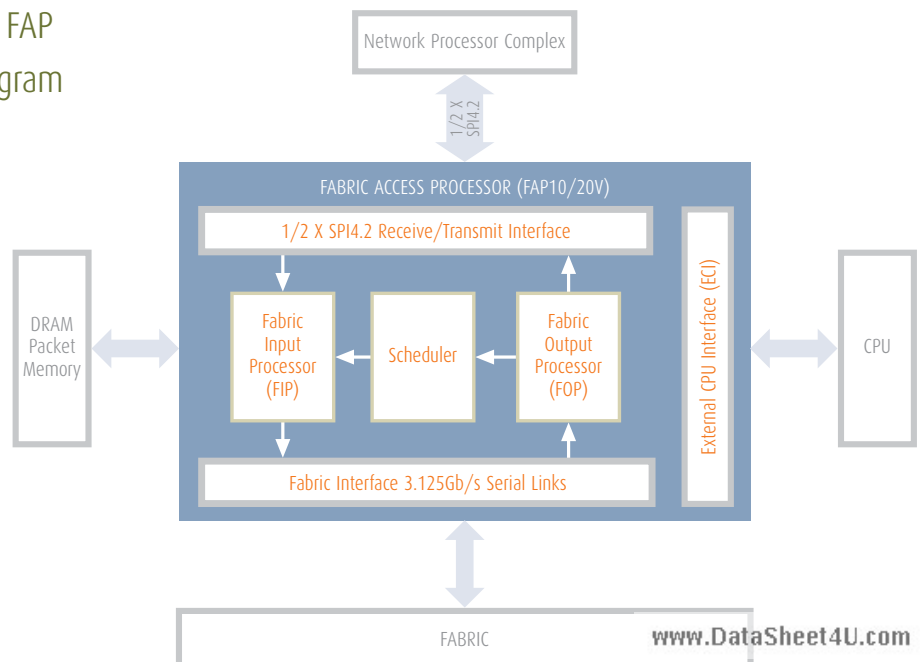
In order to provide this extensive life cycle the SAND chipset provides three scaling dimensions: port bandwidth, port count, and port service scheme. A system built using the SAND chipset is capable of providing total user bandwidth starting from 10Gbps and extending up to 80Tbps. The system allows the user to connect mixed rate line cards



(10Gbps, 20Gbps, 40Gbps and higher) and line cards with various traffic management capabilities.

The FAP10V and FAP20V devices provide 10Gbps and 20Gbps ingress/egress comprehensive traffic-management functionality via SPI4.2 interfaces while incorporating a switch fabric interface. The embedded switch fabric interface allows the FAP10V and FAP20V devices to interconnect and communicate via their fabric interface, allowing any system of any size to provide end-to-end rate and weight guarantees for packet flows.

### Top Level FAP Block Diagram



## Fabric Access Processor - FAP10/20V

## Processor

## System Configurations and Applications

The FAP10/20V can be used:

- As a 10G/20Gbps stand-alone ingress/egress traffic manager
- In mesh configurations of FAP10/20V devices
- In switch-based systems that can grow as large as 40Tbps

The versatility of the FAP10/20V devices enables a vendor to design a full product line using the same chipset, sharing the same line and fabric cards. For example, for low-capacity platforms, the fabric-less (mesh) FAP configurations may be used, while the higher-capacity platforms may use the same line cards connected via fabric cards.

## Traffic Management

The FAP10V and FAP20V are full-duplex 10G and 20G devices tailored to the needs of the Metro Ethernet market, fully supporting relevant traffic management standards (IETF, DSL Forum, ITU, MEF), and enabling flow-based hierarchical traffic management. The FAP10V and FAP20V devices combine the functionality of a traditional stand-alone traffic manager and a Fabric Interface Device. In a system they implement a distributed traffic management architecture which can scale while maintaining functionality and performance.

In a stand-alone mode, a FAP10/20V device provides comprehensive local traffic management services, such as deep buffering, congestion avoidance via WRED, fine-grained weight and rate-based flow shaping and hierarchical scheduling toward the egress port.

A switched configuration constructed by several FAP10/20V devices connected via their fabric interface, enables for the first time end-to-end rate and weight guarantees of traffic flows across a complete system. In such a configuration a FAP10/20V device performs

ingress and egress functions (scheduling and routing) to and from the switching fabric, in addition to providing complete traffic management functionality (shaping and queuing).

## Fault Tolerance

The SAND fabric implements carrier-class reliability, and incorporates failover mechanisms in hardware, which enable the creation of systems with various levels of fault-tolerance. Examples of systems that can be built include N+M, N-M and 1:1.

A FAP10/20V device automatically detects and re-routes around faulty links or elements, resulting in fault-tolerant, self-healing fabrics.

## Management

Through its CPU interface, one can configure the FAP10/20V device, access its counters and internal memories, and send and receive data and control cells. The CPU interface may also be used to communicate in-band with other CPUs in the system, monitor traffic, gather statistics, and generate error logs.

## Reference Sub-System

The FE200 and the FAP family of devices are backed by a full support package. The hardware development kit includes full guidelines with schematics and layout databases. The software development kit includes device drivers, source code and documentation. Two reference designs are available, providing a complete hardware & software development environment for SAND-based products.

## Power consumption

In a switched configuration, a FAP20V consumes less than 12W and the FAP10V less than 9W. The power consumption is further reduced when the devices are used as stand-alone traffic managers.

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