

Built to Scale

FABRIC ACCESS PROCESSOR

FAP11/21V

High performance networking solutions

Highlights

- 20Gbps full-duplex traffic-manager device integrating switching fabric interface
- Supports a stand-alone 20Gbps traffic manager
- MEF, ITU, IETF, TR-59 compliant scheduling and shaping
- Enhanced Metro Ethernet capabilities
- Provides up to 60Gbps 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
- Two SPI4.2 full duplex interfaces towards the line-card logic
- Hierarchical memory management with RED/WRED and tail drop policies
- Automatic fault detection and recovery with no software intervention
- N+X, N-X and 1+1 redundancy schemes
- Comprehensive multicast support
- FAP21V may co-exist in systems with FAP10V, FAP10M (Marvell's FX930), FAP20V and with future types of FAP devices
- Supports system-wide "color awareness"
- Enhanced CPU "Streaming" interface mode, Supporting over 2.6Gbps of traffic

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 to 100Gbps) and line cards with various traffic management capabilities.

The FAP21V device provides 20Gbps ingress/egress comprehensive traffic-management functionality via SPI4.2 interfaces while incorporating a switch fabric interface. The embedded switch fabric interface allows the FAP21V device to interconnect and

communicate via its fabric interface, allowing any system of any size to provide end-to-end rate and weight guarantees for packet flows.

System Configurations and Applications

The FAP21V can be used:

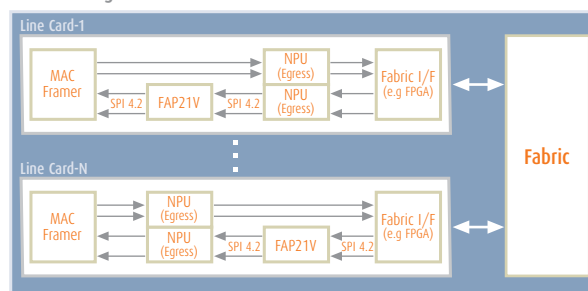
- As a stand-alone traffic manager in a system based on a Combined-Input-Output-Queuing (CIOQ) architecture, which uses a third party fabric. In such a configuration the FAP device is used as ingress and/or as egress TM
- In mesh configurations of FAP20V/FAP21V devices (up to 60G non-blocking systems)
- In Dune fabric-based systems which may reach 40Tbps

The versatility of the FAP21V device 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.

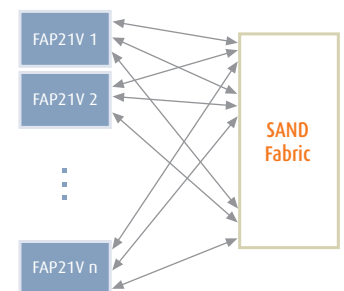
Stand-alone Egress Traffic Manager

The FAP21V device may be used as stand-alone egress traffic manager, connected directly to a MAC/Framer device as shown in the diagram below.

FAP21V as Egress TM



FAP21V In SAND Fabric

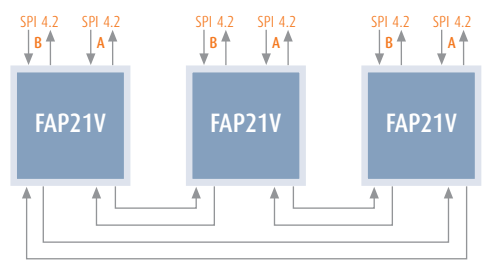


Fabric Access Processor - FAP11/21V

Processor

Multiple FAP21V's in Full Mesh

The FAP21V device can operate in configurations without the use of SAND Fabric Elements. Such configurations are cost effective and provide 60Gbps non-blocking total system performance.



In stand-alone mode, a FAP21V 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 FAP21V devices connected via their fabric interface, enables end-to-end rate and weight guarantees of traffic flows across a complete system. In such a configuration a FAP21V 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).

Multiple FAP21V Devices Interconnected Via a SAND Fabric

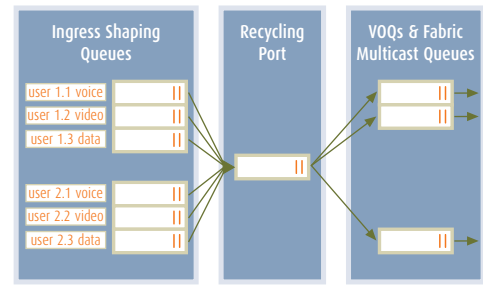
For non-blocking configurations that are higher than 60Gbps, a SAND fabric with Fabric Element (e.g., the FE200) devices is used to interconnect the FAP devices. The SAND fabric scales from 60G to 40Tbps. Typically, such configurations are chassis-based, with FAP devices on line cards and Fabric Elements on fabric cards.

Ingress shaping is a scheme for limiting and prioritizing the amount of data that a source can inject into the network. Ingress shaping controls the incoming traffic by increasing the delay for nonconforming flows.

Traffic Management

The FAP21V is a full-duplex 20G device 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 FAP21V device combines the functionality of a traditional stand-alone traffic manager and a Fabric Interface Device. In a system it implements a distributed traffic management architecture which scales while maintaining functionality and performance.



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