



SDFEP

SURVEILLANCE DATA FRONT END PROCESSOR

HIGHLIGHTS

- High performance IP based ASTERIX communication engine
- User configurable ASTERIX message dispatching
- Development meets SWAL 3 and IEC 61508 SIL 2 (better than 10^{-6})
- Integrated recording and replay capability
- COTS hardware platform
- Integrated firewall prevents unauthorized access and security attacks from external interfaces

COMSOFT

INTRODUCTION

Ground-based surveillance data exchange is changing! Mode S, ADS-B and Multilateration surveillance systems require low-latency dispatching of large amounts of data. SDFEP enables ANSPs to reliably and transparently manage such data streams in IP-based wide and local area networks.

In general the exchange of data is performed using commercial-off-the-shelf IP network technology which applies ASTERIX as a common means of data presentation. This exchange of surveillance data must fulfil increasingly high demands in terms of reliability, throughput and security.

SDFEP satisfies the demand for a high-performance communication engine to exchange ASTERIX data. The system fully supports both IPv4 and IPv6 protocol suites. It easily manages both wide area and local data exchange while offering full support of TCP and UDP service features such as unicast, multicast or broadcast. SDFEP receives ASTERIX data streams from single sensors or whole processing systems in order to dispatch them. The information is then dispatched according to user specific configurations to either one or many clients.

Multiple SDFEP may be used to establish secure wide area Surveillance Data Networks, allowing ATS units to obtain full control over the flow of the individual surveillance data streams.

SDFEP features an ultimate level of robustness in terms of availability and reliability. Its integrated firewall is widely configurable and prevents unauthorized access. The internal load detection paired with flow control mechanisms identifies critical overload conditions and inhibit flooding and denial-of-service attacks. SDFEP has been designed and developed to meet System Integrity Level 2 according to IEC61508 and provides Software Assurance Level 3 (SWAL 3).

TECHNOLOGY

The SDFEP is an IP based communication engine specifically designed for high performance throughput and real-time dispatching of ASTERIX data. Hosted on redundant hardware SDFEP manages multiple TCP or UDP data streams, receiving and transmitting ASTERIX messages from various inputs to outputs according to the user configuration. SDFEP monitors all interfaces and data streams for activity and throughput providing detailed diagnostics. An independent management station can monitor and control the system using SNMP.

SDFEP enables an ATS unit to establish connections with remote sensors and data sources while fully controlling the access to its ASTERIX-based services.

SDFEP is designed for minimal latency at maximum throughput while providing a high availability and robustness.

SDFEP has an integrated recording and replay function that captures passing ASTERIX data. Internal monitoring functions detect high load conditions and assign priorities to ensure the continuous transmission of real-time data. Recorded data can optionally be exported for technical analysis or played back by the internal replay function. The integrated housekeeping function ensures that disk capacity is never exceeded.

TECHNICAL DATA

Supported Protocols

IP	RFC 791	Internet Protocol (IPv4)
UDP	RFC 768	Surveillance Data exchange
UDP	RFC 1112, RFC 2236	Surveillance Data exchange, multicast
TCP	RFC 793	Surveillance Data exchange
ICMP	RFC 792	Internet Control Message Protocol
SNMP	RFC 1157	TSC Interface
NTP	RFC 1305	Network Time Protocol, version 1 to 4
IPv6	RFC 1883	Internet Protocol
IPv6	RFC 4291	IPv6 Addressing and IPv6 multicast

Connection Establishment

Parallel connection establishing,
50 wide area TCP connections / 10 seconds

Sustained Throughput

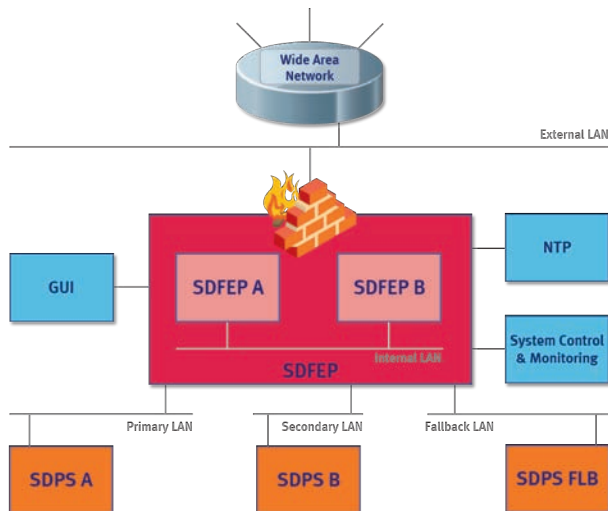
40 MBps per connection, 200 MBps overall at 50% system load
40 MBps (>100.000 target reports/second) per connection and
200 MBps overall (>500.000 target reports/second) at 50% system load

Latency

< 5 ms for 99% of messages

Number of LAN Interfaces

10 x 1000 MBps



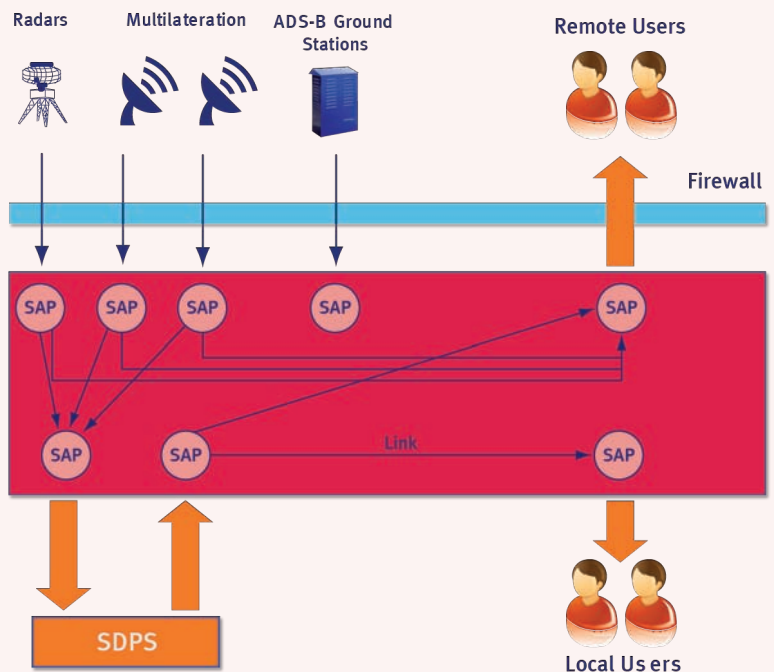
SDFEP in its environment

SDFEP CONCEPT

Service Access Points (SAP) define the TCP/IP protocol parameters of a connection. All details concerning connection establishment, data directions and restrictions are configured in the SAP.

By establishing links between input and outputs, the actual data flow is established. Such links connect any SAP with an input to any SAP with output property.

Multiple links can be connected to SAP, which allows the duplication and merging of data feeds to multiple clients.





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