

Ulegene

A flexible user-space encapsulator for Linux

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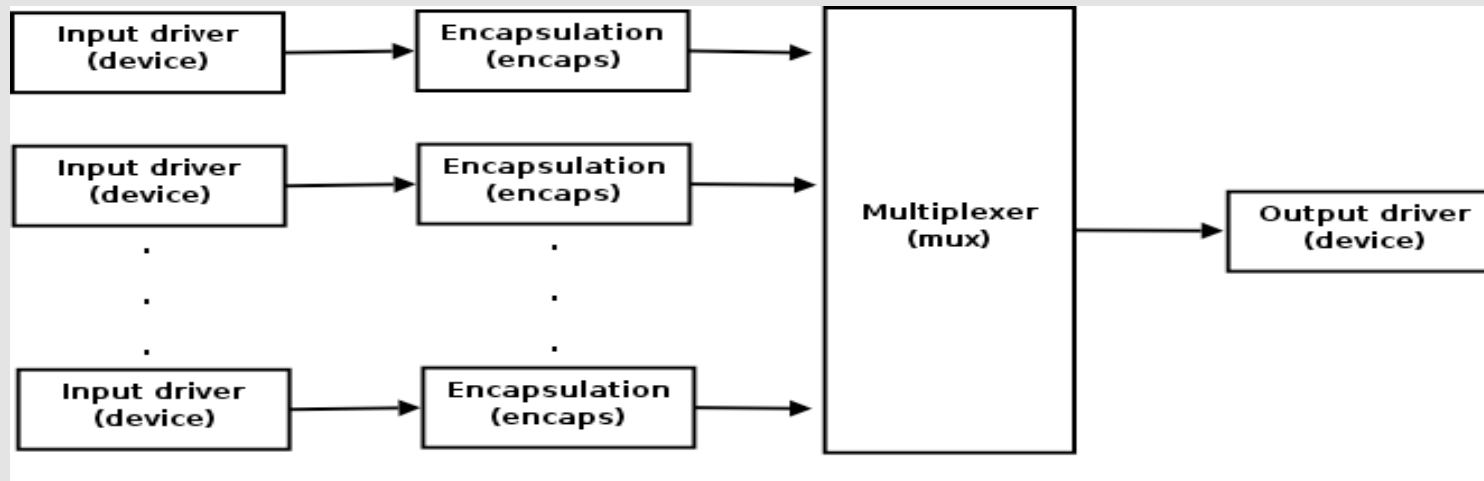
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Introduction

- Ulegene is a (userspace) program for encapsulating network packets or ethernet frames using, for example, Unidirectional Lightweight Encapsulation
- Initially created for supporting the implementation and testing of
 - New encapsulation formats
 - ULE extensions
- Evolved to a flexible framework
- Primary application: transport of IP/IPv6 packets over MPEG-2 Transport Streams using ULE/MPE
- Partially developed in the context of the SatNEx project (www.satnex.org)

Overview



- Comprised of dynamically loadable modules
- The API of each module is determined by its type
- Currently defined module types
 - device: drivers for supporting different input/output devices
 - filter: transform the data that is read from/written to a device

Overview (cont'd)

- Currently defined module types (cont'd)
 - **encaps:** take network PDUs or ethernet frames and prepare them for transmission on the selected transmission system (e.g. MPEG-2 Transport Streams)
 - **ulext:** extend or modify the creation of ULE SNDUs
 - **mux:** take the outputs of (multiple) encaps modules and provide the output device with a stream of data which conforms to the selected transmission system
 - **trace:** trace misc. data, e.g. for statistics
- Currently, the MPEG-2 Transport Stream multiplexer is the default multiplexing module

Features

- Generic encapsulation framework (can be used for different types of encapsulations)
- Modules are available for Multi-protocol Encapsulation (MPE) and Unidirectional Lightweight Encapsulation (ULE)
- IP to NPA address mapping support
 - Automatic mapping of IPv4 and IPv6 multicast addresses to NPA addresses
- All options can be specified via configuration files
- Arbitrary TS streams (e.g. from an ASI input device or other processes) can also be included in the multiplex

Features (cont'd)

- Supported devices
 - gcs DVB/ASI cards (www.gcs-salzburg.at)
 - flex:converger
 - Linear Systems ASI RX/TX boards (www.linsys.ca)
 - DVB Master FD-U
 - DekTec DTA-X cards with integrated modulator (www.dektec.com)
 - DTA-110 (DVB-C)
 - DTA-110T (DVB-T)
 - Files
 - Network streams (e.g. MPEG-2 TS over RTP)
 - Virtual network interfaces (input only)
- Support for daemon/background operation

Features (cont'd)

- Available ULE extensions
 - Bridging (RFC4326)
 - Header Padding (RFC4326)
 - TS-Concat (draft-ietf-ipdvb-ule-ext-03)
 - PDU-Concat (draft-ietf-ipdvb-ule-ext-03)
 - Timestamp (draft-ietf-ipdvb-ule-ext-03)

Outlook

- Applications for DVB-RCS?
- Release as open-source?
- Support for additional devices
- Support for generating (basic) Service Information
- Extension of MPE to support DVB-H
 - Time Slicing
 - MPE FEC
- Support for Generic Stream Encapsulation (GSE)
 - Requires a new BB-FRAME mux module
- More information will soon be available at www.network-research.org