TSDuck

an extensible toolkit for
MPEG/DVB transport streams

https://tsduck.io

What is TSDuck ?

- A general-purpose toolbox for digital TV engineers
- Working on MPEG transport streams
  - Broadcast and IP-TV (but not OTT)
- Flexible and extensible
- Lots of small tools and plugins to be combined
- Command line only, no GUI
- Made for scripting
- Available on Linux, Windows and macOS

TSDuck use cases

- Digital television systems
  - test
  - demo
  - network monitoring
  - system integration
  - debug
  - lab

TSDuck sample usages

- Acquisition or transmodulation : satellite, terrestrial, IP …
- Analysis : TS, PSI/SI, bitrates, timestamps …
- Monitoring : bitrates, A/V properties, signalization, crypto …
- On-the-fly transformation or injection : content, PSI/SI …
- Using and editing PSI/SI in XML or binary format
- Modify, remove, rename, extract services
- Inject or extract MPE, SCTE 35 splicing info
- Extract T2-MI, Teletext subtitles
- Test bed for CAS or STB, scrambling and DVB SimulCrypt

TSDuck input / output

- Live transport stream or offline files equally
- UDP/IP, HTTP
- Specialized hardware
  - cheap DVB tuners (USB, PCI)
  - professional Dektec devices
  - cheap HiDes modulators

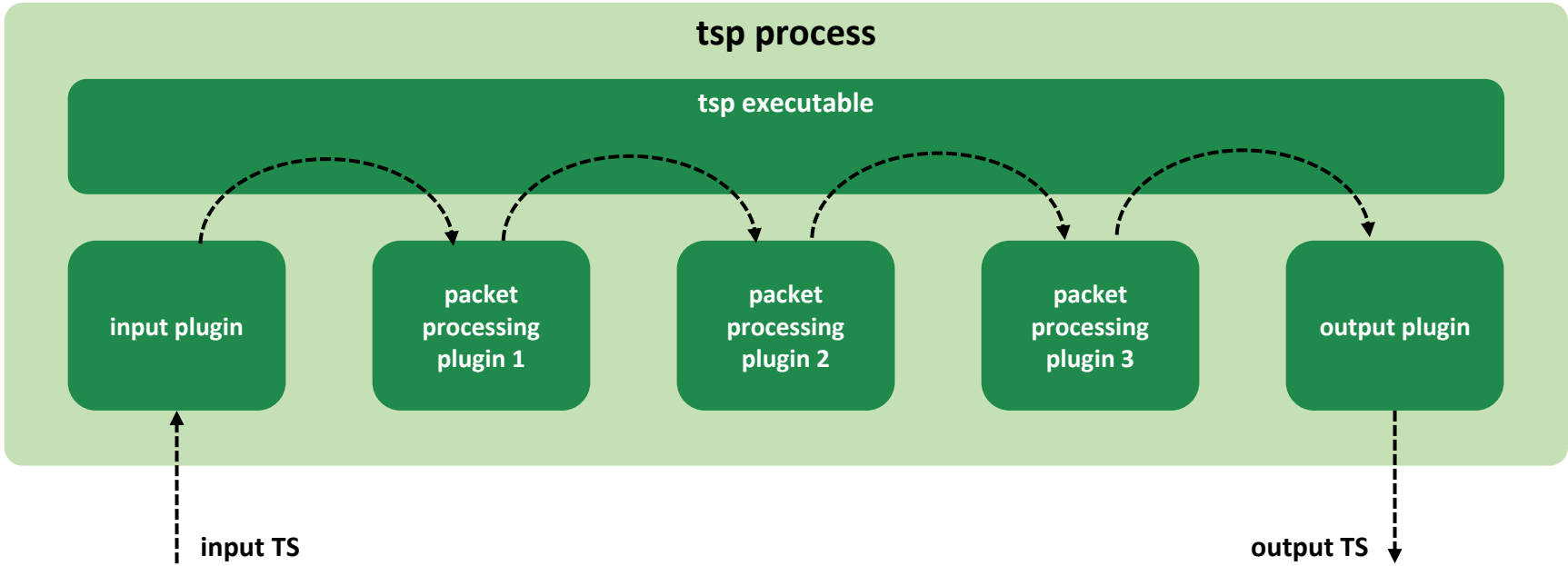
- Re-route transport streams to / from other applications

TSP – the transport stream processor

Transport stream processing framework

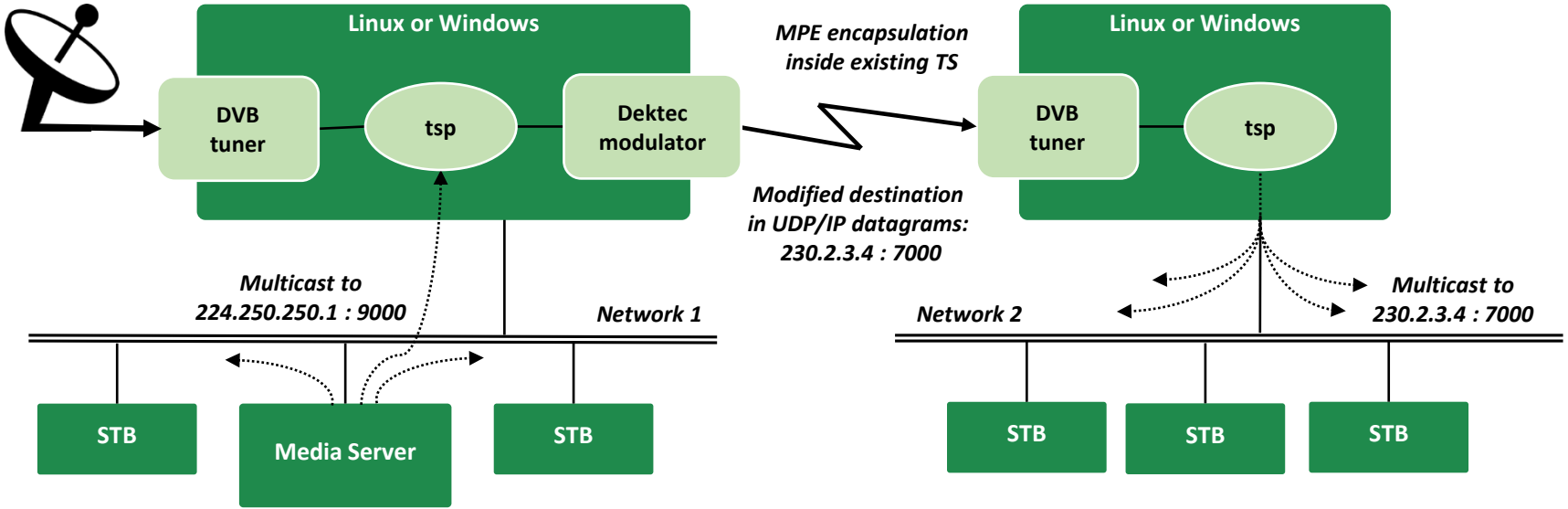
- combination of elementary processing using plugins
  - 60+ standard plugins available
- one input plugin
  - receive a TS from various sources
- any number of packet processing plugins
  - perform transformations on TS packets
  - may remove packets
  - may NOT add packets
- one output plugin
  - send the resulting TS to various destinations

TSP processing overview



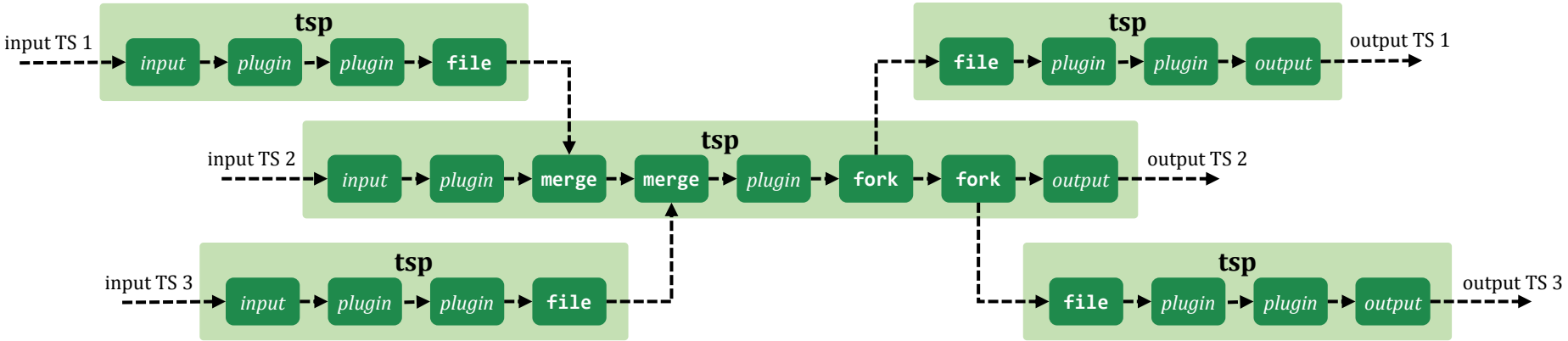
Sample MPE injection and extraction

MPE : Multi-Protocol Encapsulation



Multiple TSP using merge and fork plugins

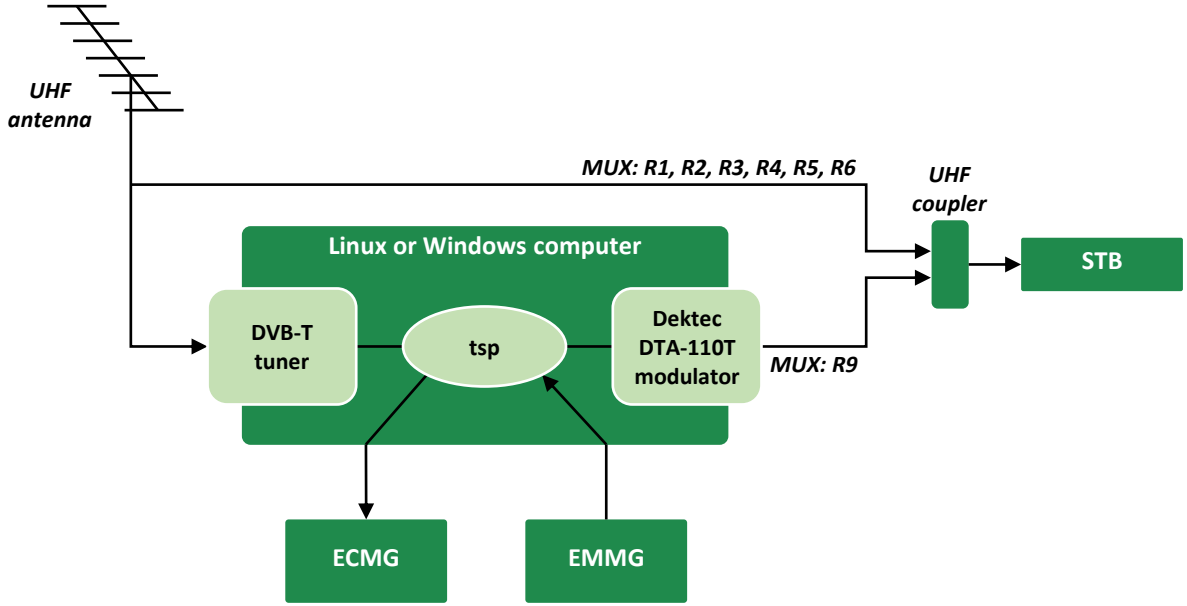
- Merge with a TS coming from another application
  - merge service references (PAT, CAT, SDT …)
- Duplicate the TS to another application



Conditional Access System test bed

DVB SimulCrypt interface to standard CAS equipment

- sample setup using French DVB-T network



Simple TSP examples

- Transmodulation of a service over IP multicast

```
tsp -I dvb --uhf 35
    -P zap france2 --audio fra
    -O ip 224.10.11.12:1000
```

extract service « France 2 », keeping only one audio track

broadcast resulting SPTS to multicast IP address:port

- On-the-fly replacement of a PSI / SI table

```
tsp -I dvb --uhf 24
    -P inject nit.xml --pid 16 --replace --stuffing
    -O dektec --uhf 24 --convolution 2/3 --guard 1/32
```

replace content of PID 16 with table from XML file

send modified TS to a Dektec DVB-T modulator on same frequency

TSDuck utilities

- TSP – transport stream processor
- PSI/SI ⇔ XML compiler / decompiler
- PSI/SI manipulation, extraction, injection
- Analysis tools
- TS files manipulation and recovery
- Hardware devices configuration (tuners, modulators …)

TSDuck is extensible

- Open source

  `https://github.com/tsduck/tsduck`
- Design based on a large TSDuck library
  - generic MPEG/DVB C++ library (400+ classes)
  - common API for Linux, Windows and macOS
  - programmer's guide online
- You may use this library to
  - develop new plugins
  - use in your own applications outside TSDuck

https://tsduck.io/