Automatic Lightpath Provisioning for Authorised Applications with TBN

App. 3

Community A

App. 2

App. 1

Community B
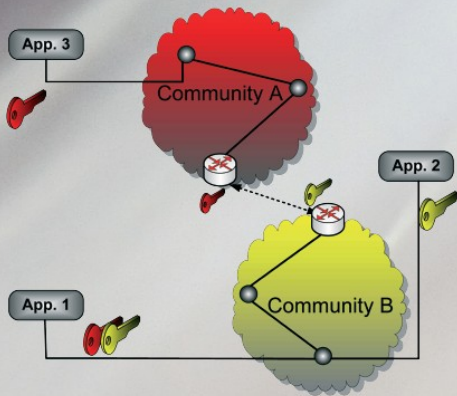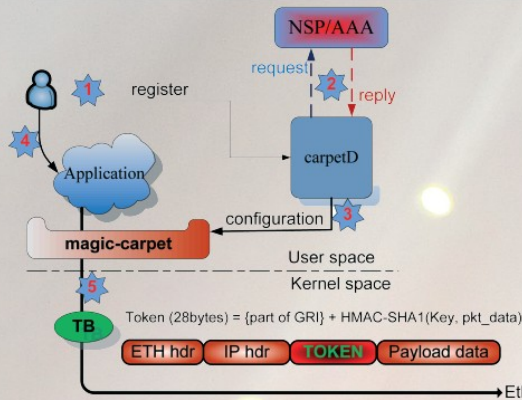
generalised TBN (gTBN) – basic functionalities

Application-specific services over heterogeneous networks:
- Resource reservation
- Dynamic resource provisioning for applications
- Need to support legacy applications
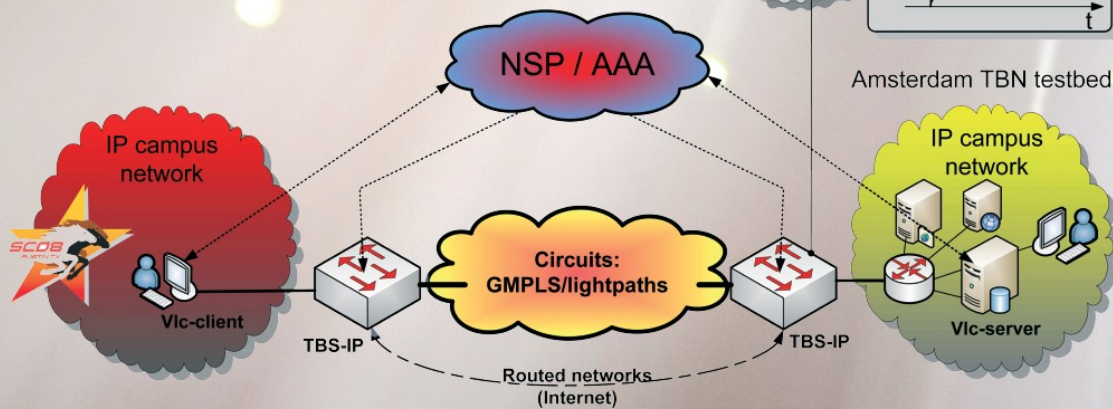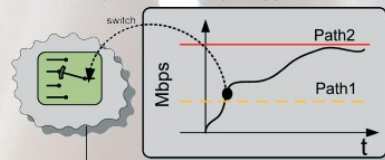
Orchestration between different parties:
- AAA infrastructure for coordinated network resource provisioning
- Secure binding of applications to networks: gTBN
- Token-based traffic authentication and authorisation in hardware (NPU, FPGAs)
- Integration into multi-layer network access control infrastructures
- Integration into workflow management and grid middle-ware

Binding applications to lightpaths: magic-carpet

NSP/AAA

request

reply

carpetD

register

Application

configuration

magic-carpet

User space

Kernel space

TB

Token (28bytes) = {part of GRI} + HMAC-SHA1(Key, pkt_data)

ETH hdr | IP hdr | TOKEN | Payload data

→ Ethernet frames

1 - User registers every application type which requires a lightpath onto carpet: e.g., application name | port numbers;
2 - *CarpetD* requests a lightpath for one application (as part of the registration process). It receives a pair *{GRI, Key}* from NSP;
3 - *CarpetD* prepares the *Magic-carpet* for the specific application;
4 - The user starts the application on the *Magic-carpet* environment
5 - When the application opens a socket and the carpet detects a bind to a lightpath, then the *TB* (token builder) module computes and inserts a Token into each outgoing packet.

Automatic path selection per application flow

switch

Mbps

Path2

Path1

t

Amsterdam TBN testbed

NSP / AAA

IP campus network

SCOS

Vlc-client

TBS-IP

Circuits: GMPLS/lightpaths

TBS-IP

IP campus network

Vlc-server

Routed networks (Internet)

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