Security for all: network-based protection for personal devices

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SEVENTH FRAMEWORK PROGRAMME

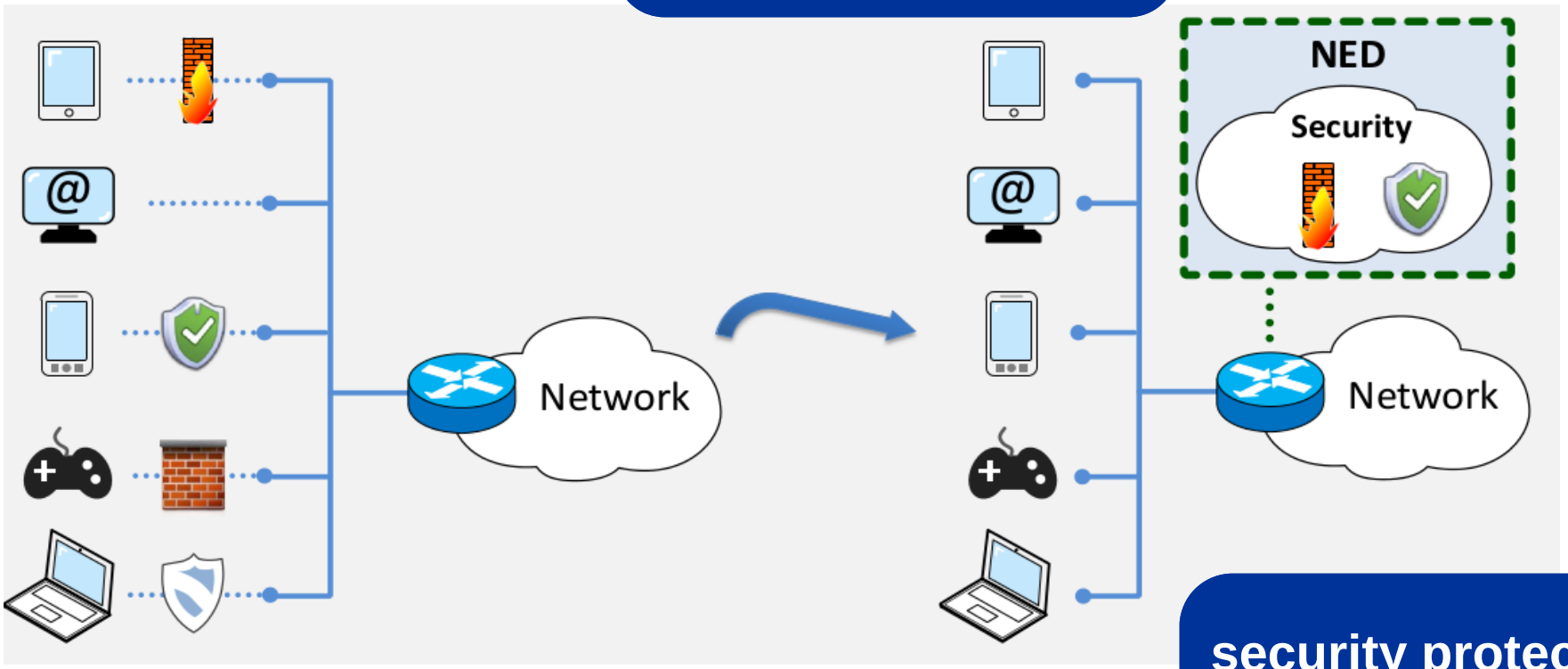
Why SECURity at the network EDge

- **users deal with many "terminals" (laptop, desktop, tablet, smartphone, Internet-connected TV, car infosystem, …**
  - with very different **security levels**
    - complex management of security controls for so many platforms with so different characteristics
  - withdifferent **network connection**
    - can't consistently rely on network border protection
  - with different policy requirements
    - mobile devices at home vs BYOD at work

SECURED = offload security controls from the user terminals to a trusted and secure network node

From heterogeneous to uniform security

security applications independent from user terminals



security protection independent from user location

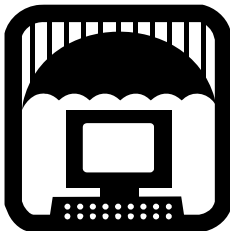
Use cases

- **home**
  - home gateway, protection of family (and visitors') devices
- **enterprise**
  - wired/wireless access, protection of hosts (including servers?)
- **public hotspot**
  - WiFi access, protection of visitors
- **mobile**
  - 3G/4G access, protection of subscriber's device
- **IoT**
  - wireless access point, protection of IoT node
- **NOTE: first hop not "SECURED"? then create a secure connection to a SECURED-node somewhere in the network**

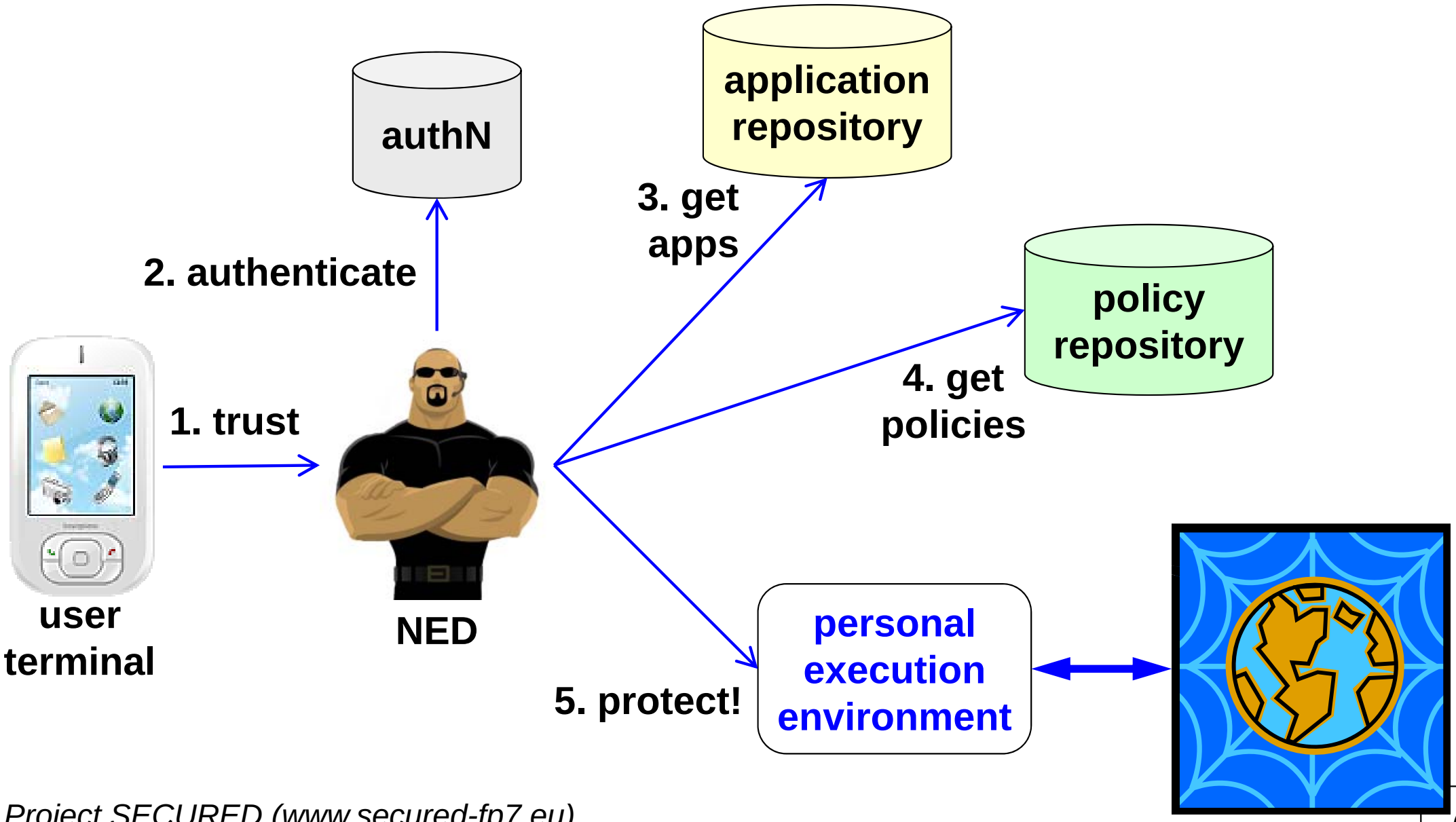
The SECURED components

- **NED (Network Edge Device)**
  - trusted node (with TC techniques)
  - provides a Trusted Virtual Domain per user
  - e.g. home gateway, corporate router, wireless AP, GGSN
- **Personal Security Applications (PSA)**
  - executed at the NED
  - specific tasks (packet filter, parental control, anti-phishing, content inspection, …)
  - chained according to security policies

- **security policies**
  - simplify configuration of PSAs and share "best practice"
  - flexibility (users care about policy, not implementation)



The SECURED framework architecture



The SECURED trust fabric

NED (Network Edge Device

policy

app(s)

TPM

user terminal

secure & trusted channel

measures

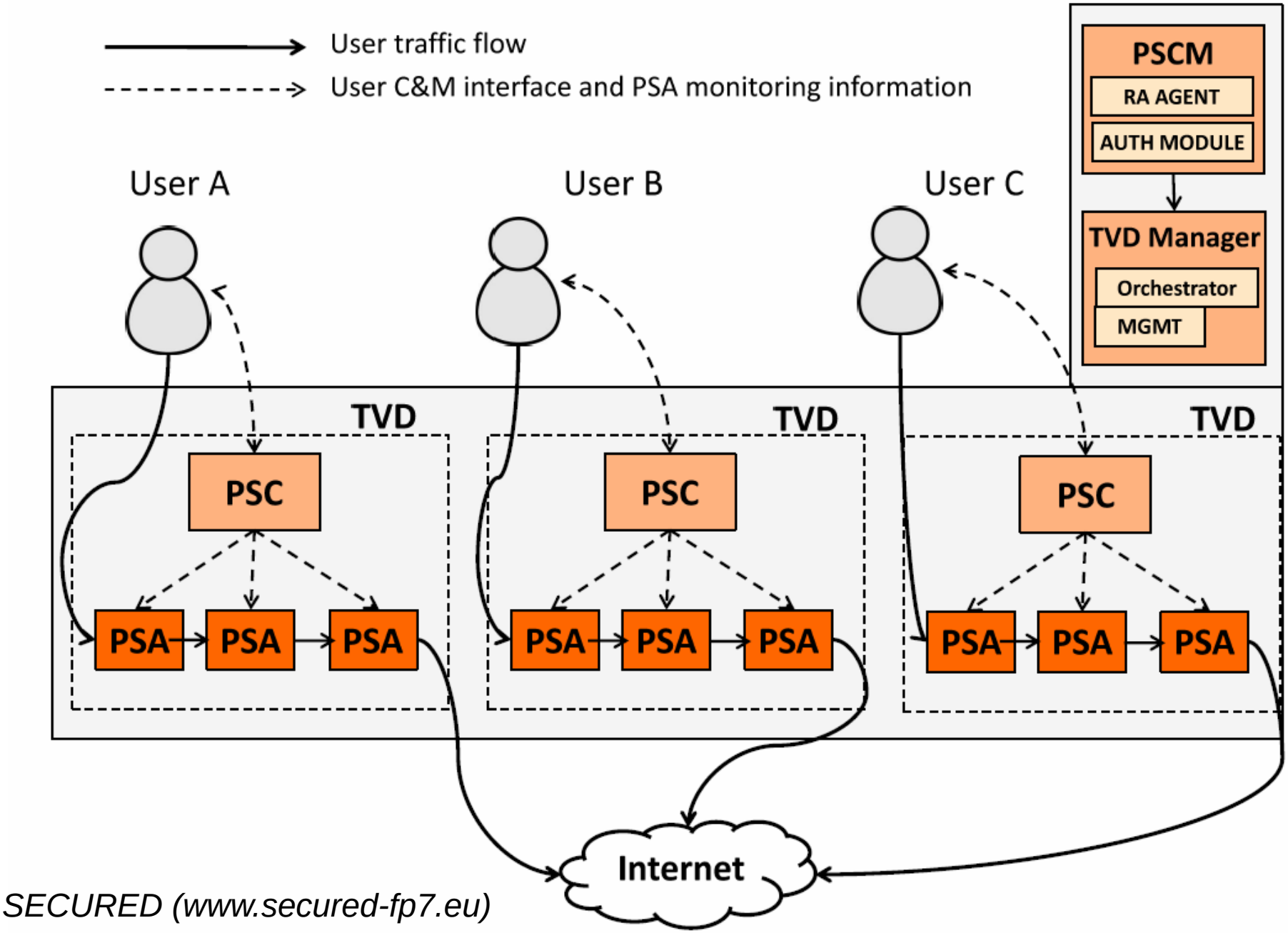
certification of "good" state (cryptographically bound to the secure channel)

verifier

The NED components

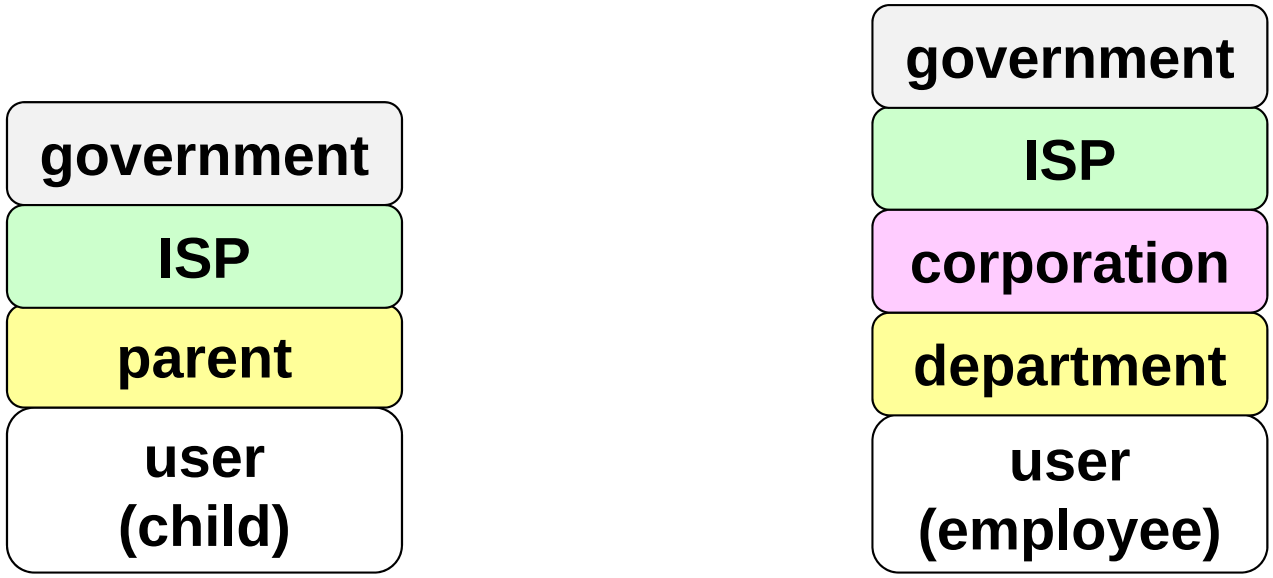
- **PSCM**
  - NED front-end, performs attestation, authN, policy analysis…
- **TVD Manager**
  - manages the network topology of a NED
  - configures the infrastructure
  - controls TVD lifecycle
- **Personal Security Controller (PSC)**
  - stores the user service graph (PSAs and interconnections)
  - determines the TVD topology from PSA and policy requirements
  - monitors the status of the TVD

The NED components at play



Multilayered security policies

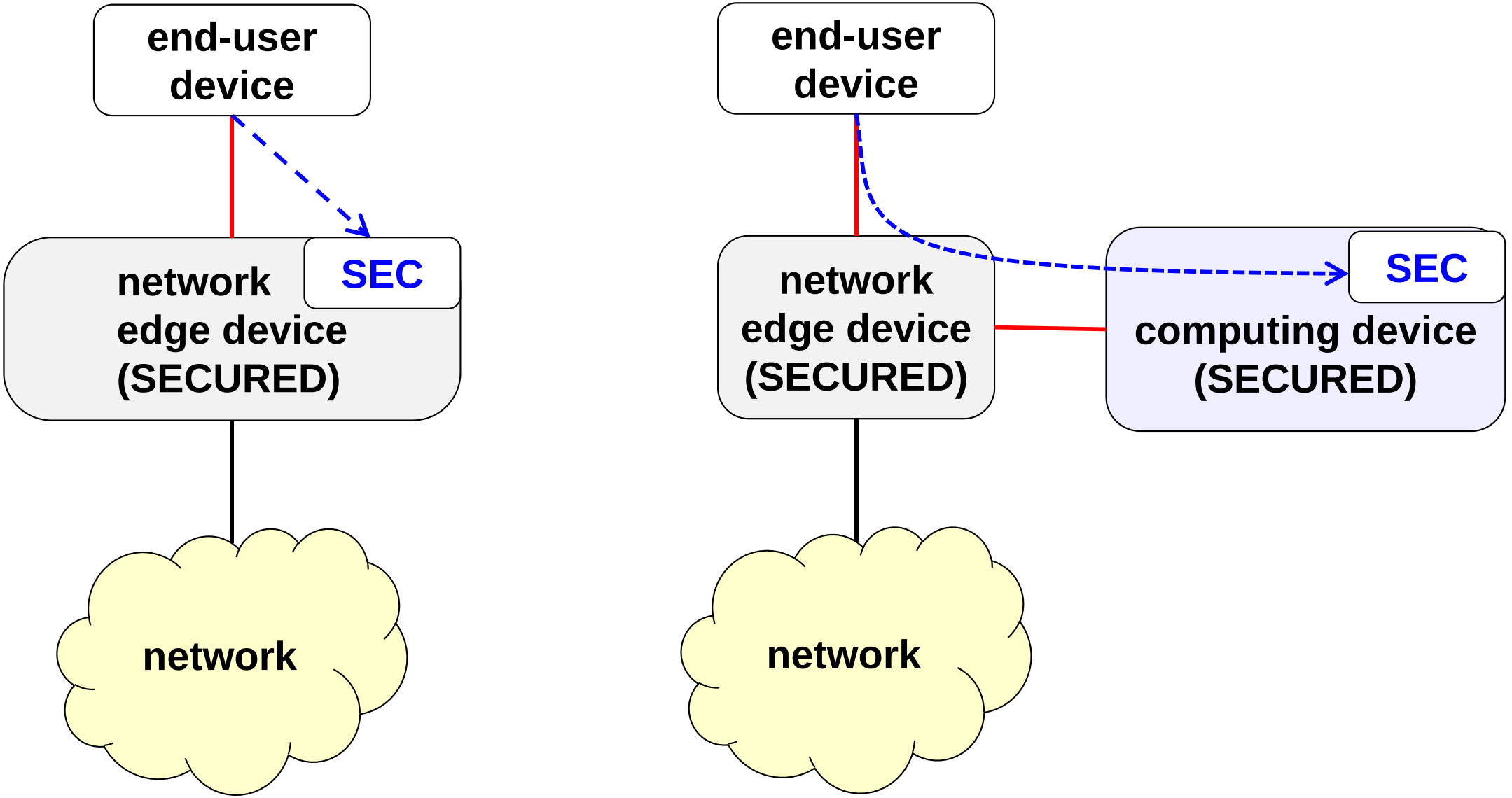
- **the same connection may be subject to constraints from different tenants (depending on the network environment)**
- **policies are applied in a hierarchical way (according to the user and connection profiles)**
- **user is informed of the overall policy applied to her connection (and may refuse connecting to the network)**



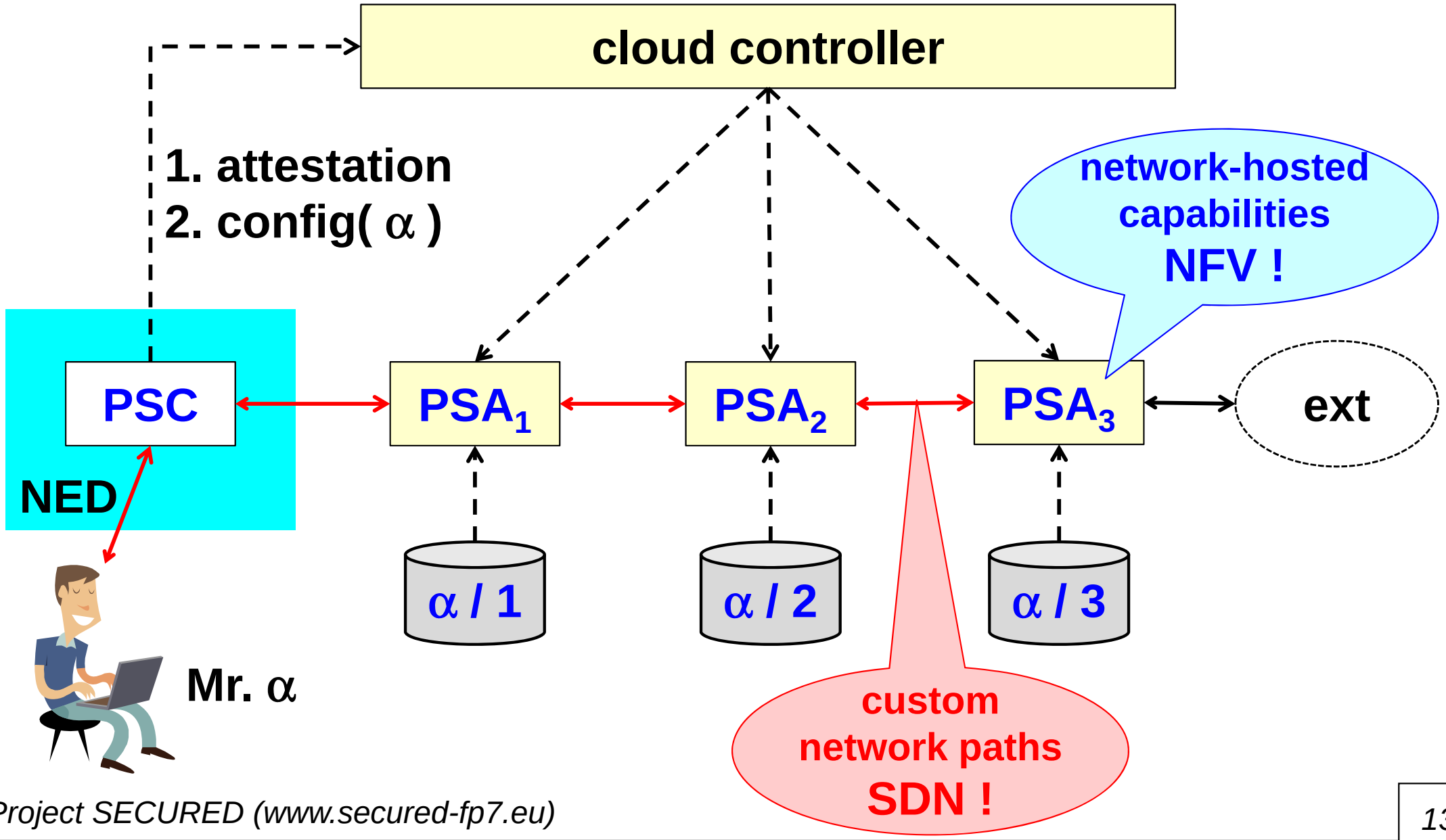
Expressing security policies

- **HSPL ~ high-level security policies**
  - for expressing the general end-user security requirements
    - Alice is not authorized to access Internet traffic (type of content,{illegal websites})
    - Bob wants email scanning (purpose,{malware})
- **MSPL ~ security capabilities**
  - to express configuration requests in an application-independent format
  - based on capabilities (atomic features of a security function)
  - capabilities grouped into categories, following an ontology
  - each PSA declares the categories it provides
- **automatic translation from HSPL to MSPL (and then to PSA)**

Monolithic vs split NED



Cloud / SDN / NFV for SECURED



The SECURED FP7 project

- **FP7 call 10 Collaborative Project (FP7-ICT-2013-10)**
- **grant agreement no. 611458**
- **duration: 3 years (1/10/2013 – 30/9/2016)**
- **EC contribution: 2.7 M Euro**
- **web: www.secured–fp7.eu**
- **mail: coordinator@secured–fp7.eu**

The Consortium (I)

- **Politecnico di Torino – Italy**
  - coordinator = Prof. Antonio Lioy (lioy@polito.it)
  - networking, trusted computing, security policies
- **HP Laboratory Bristol – United Kingdom**
  - networking, trusted computing
- **Primetel PLC – Cyprus**
  - telco, network and content provider (regional)
- **Telefonica Investigacion y Desarrollo – Spain**
  - telco and network provider (worldwide)

The Consortium (II)

- **United Nations Interregional Crime and Justice Institute – Italy**
  - social and policy aspects of security
- **Universitat Politecnica de Catalunya – Spain**
  - networking, mobility
- **(Barcelona Supercomputing Center – Spain)**
  - computational architectures
- **VTT Technical Research Centre of Finland**
  - cybersecurity

THANK YOU !

Project SECURED (www.secured-fp7.eu)

SEVENTH FRAMEWORK
PROGRAMME

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EU disclaimer

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