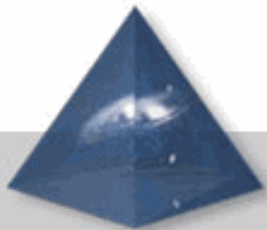


Generic AAA based optical networking

SURFnet Research on Networks Workshop
Utrecht 28/04/04



Leon Gommans
University of Amsterdam

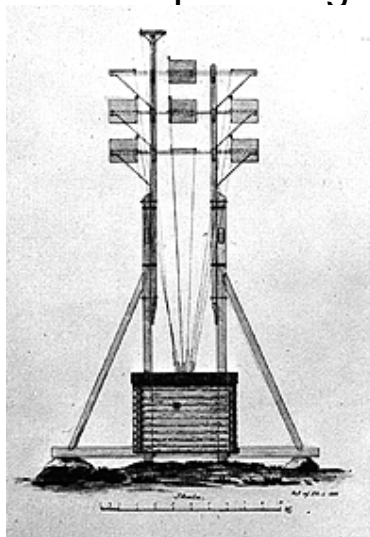


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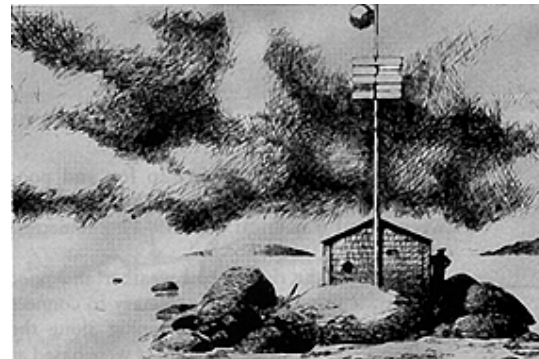


Some history

The optical telegraph represented the most refined development of non-electrified telecommunications systems. In Finland, the use of the optical telegraph based on the utilisation of signalling stations and telescopes began in 1796.



and



An optical telegraph on the line between Hankoniemi

Kronstadt



Automate the operator

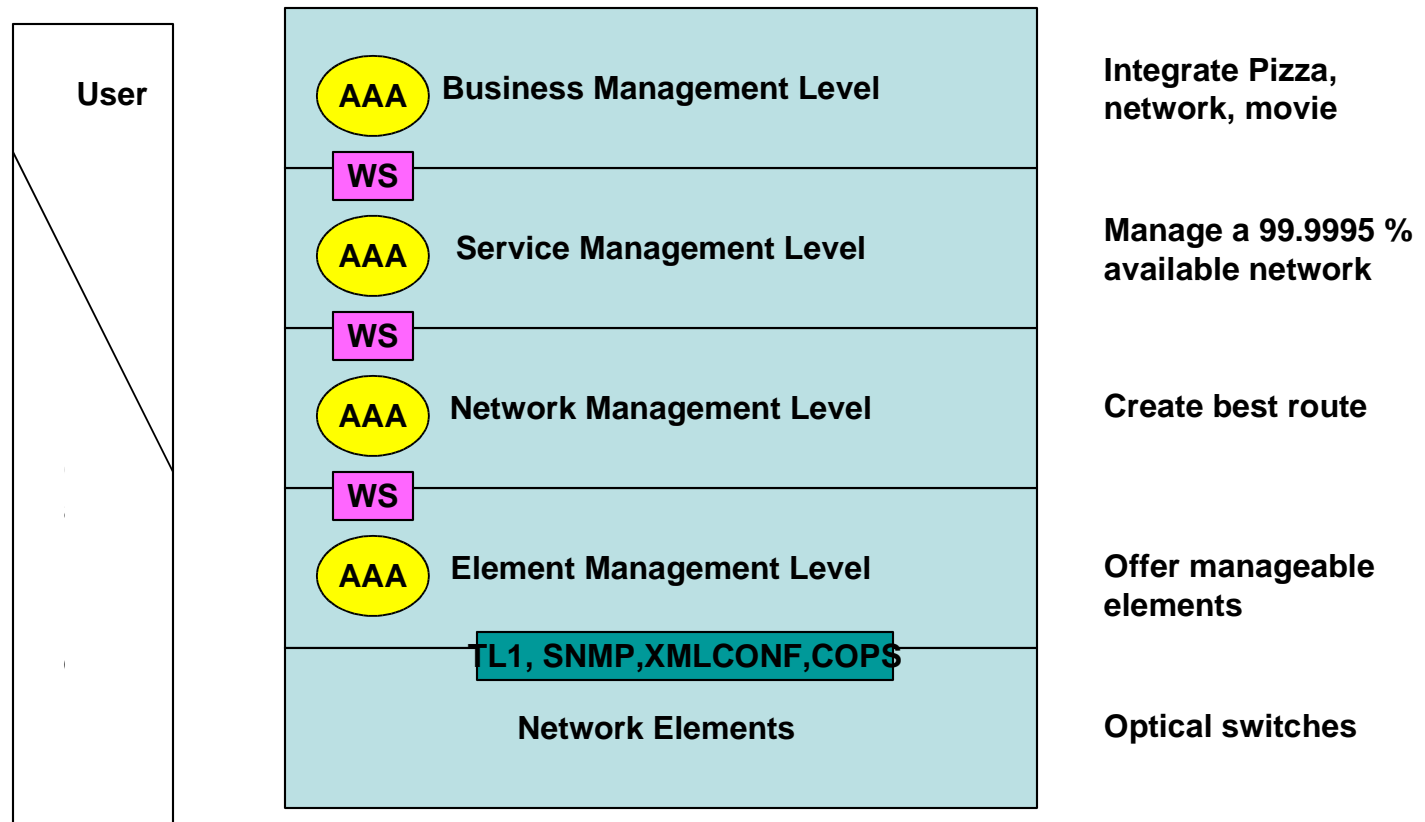


A woman telephone operator
at New England Telephone
c. 1926





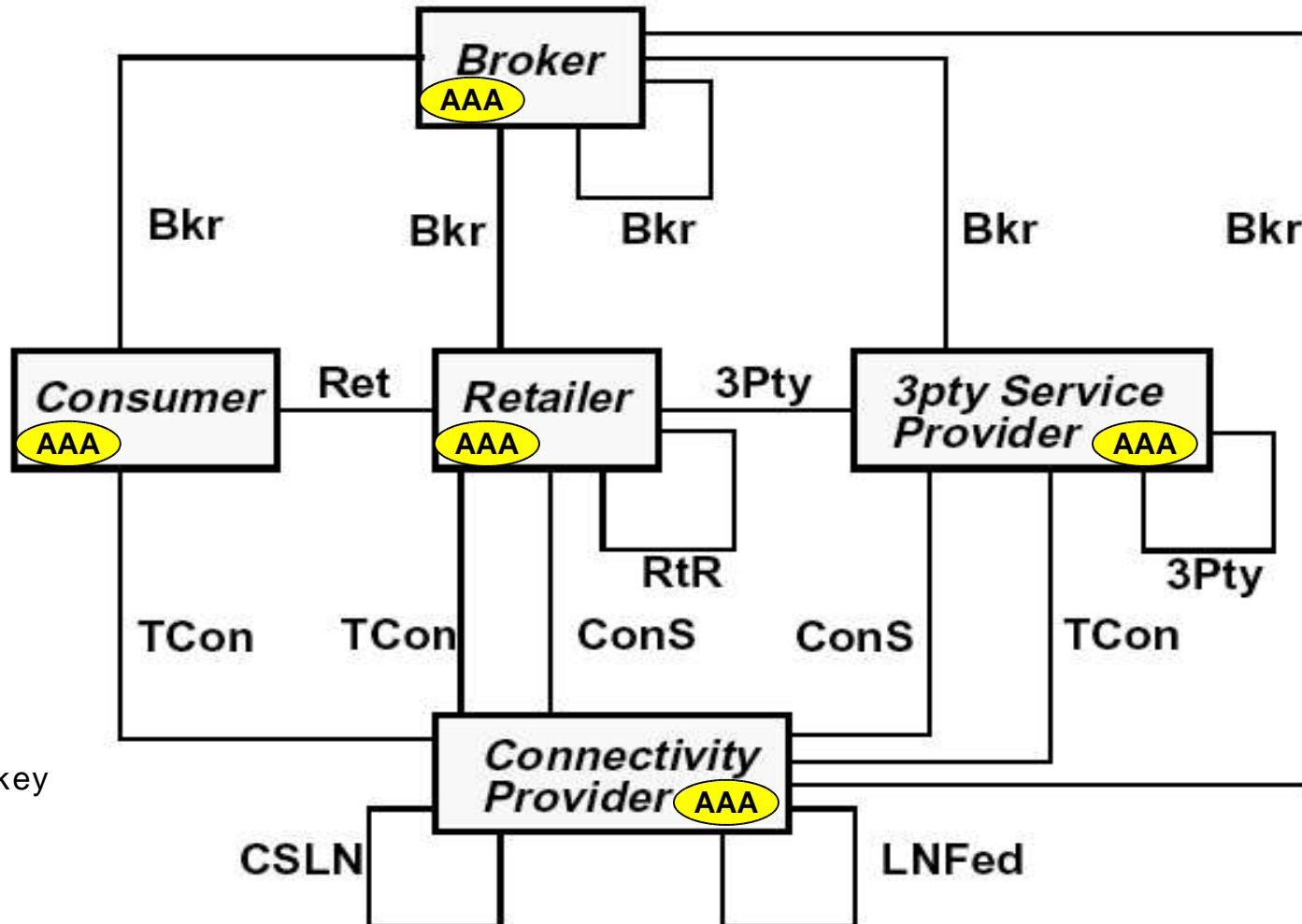
AAA and ISO Telecommunications Management Networks (TMN) reference model



TMN is based on the OSI management framework and uses an object-oriented approach, with managed information in network resources modeled as attributes in managed objects. TMN is defined in ITU-T M.3000 series recommendations



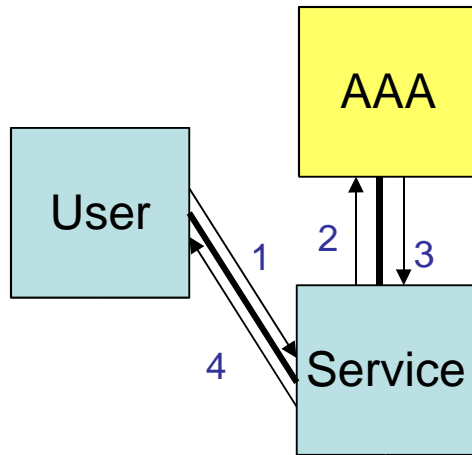
AAA in Telecommunication Information Networking Architecture (TINA)



TINA defines 5 key Business Roles and their relationships

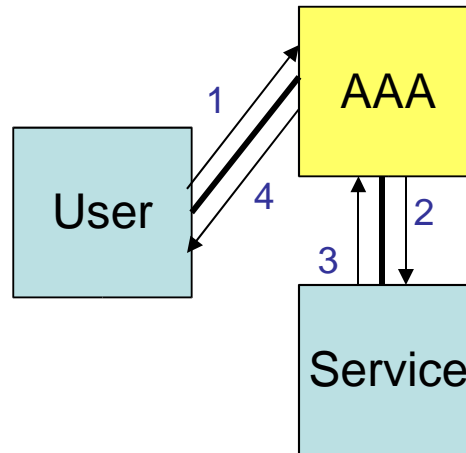


RFC 2904 Authorization sequences that allow users to access a service based on a policy decision taken by a AAA component.



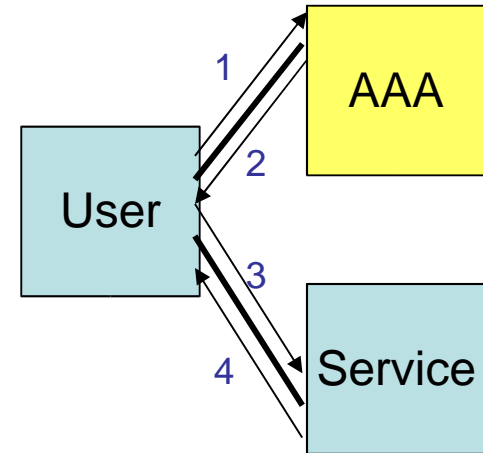
Pull sequence

NAS (remote access)
RSVP (network QoS)



Agent sequence

Agents, Brokers,
Proxy's.

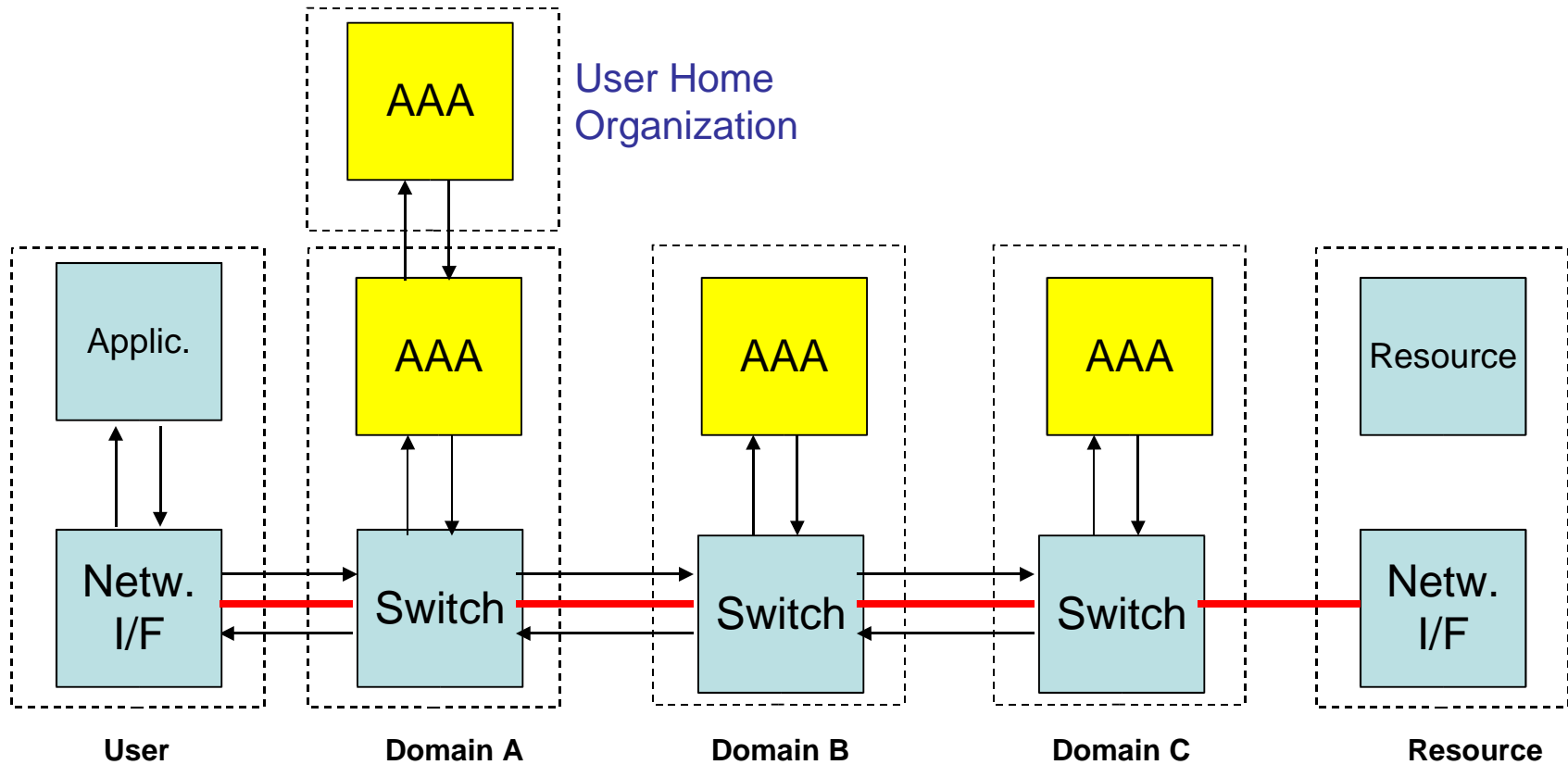


Push sequence.

Tokens, Tickets,
AC's etc.

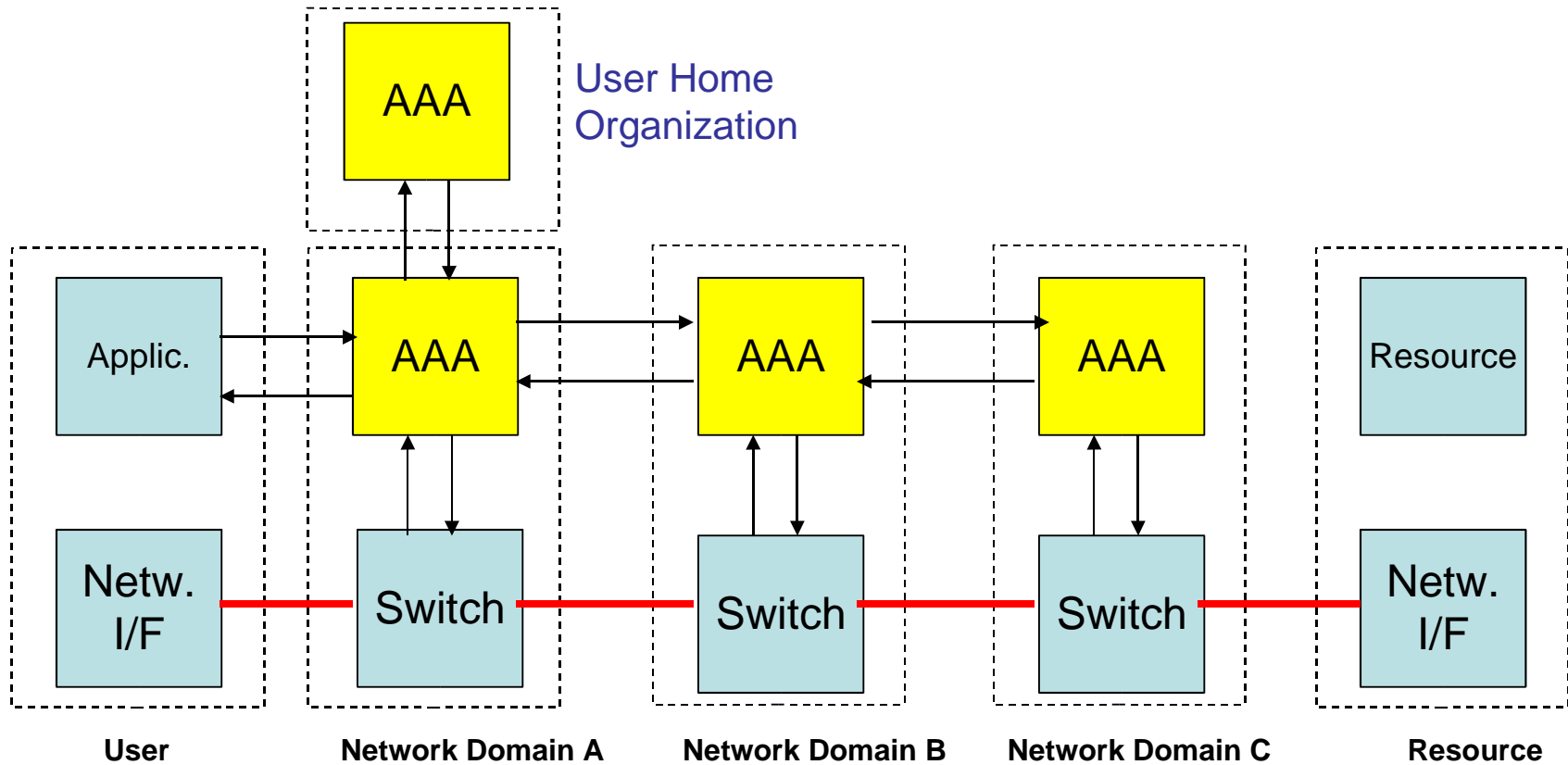


Example AuthZ RFC 2904 pull sequence



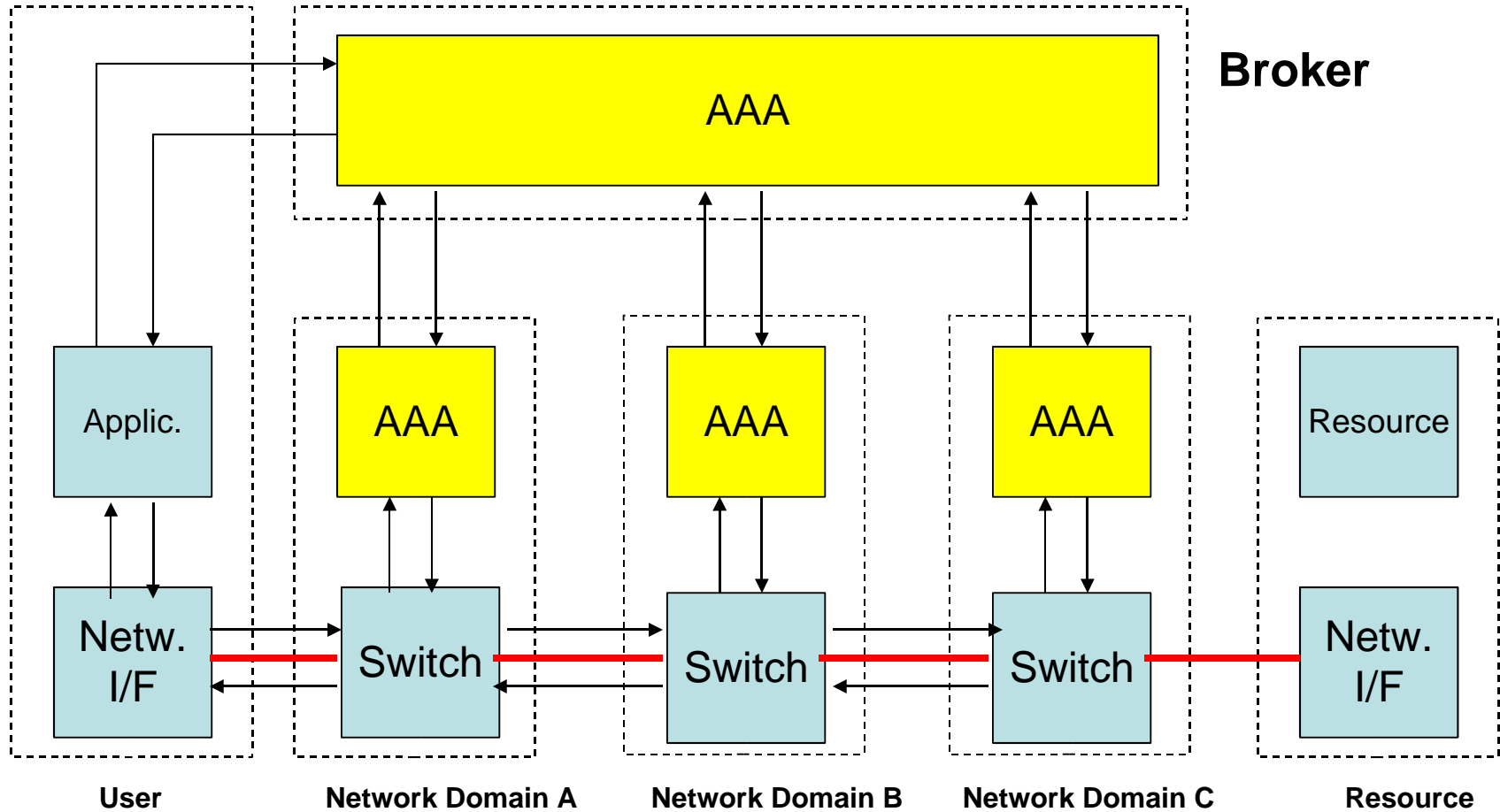


Example AuthZ RFC 2904 agent / pull sequence



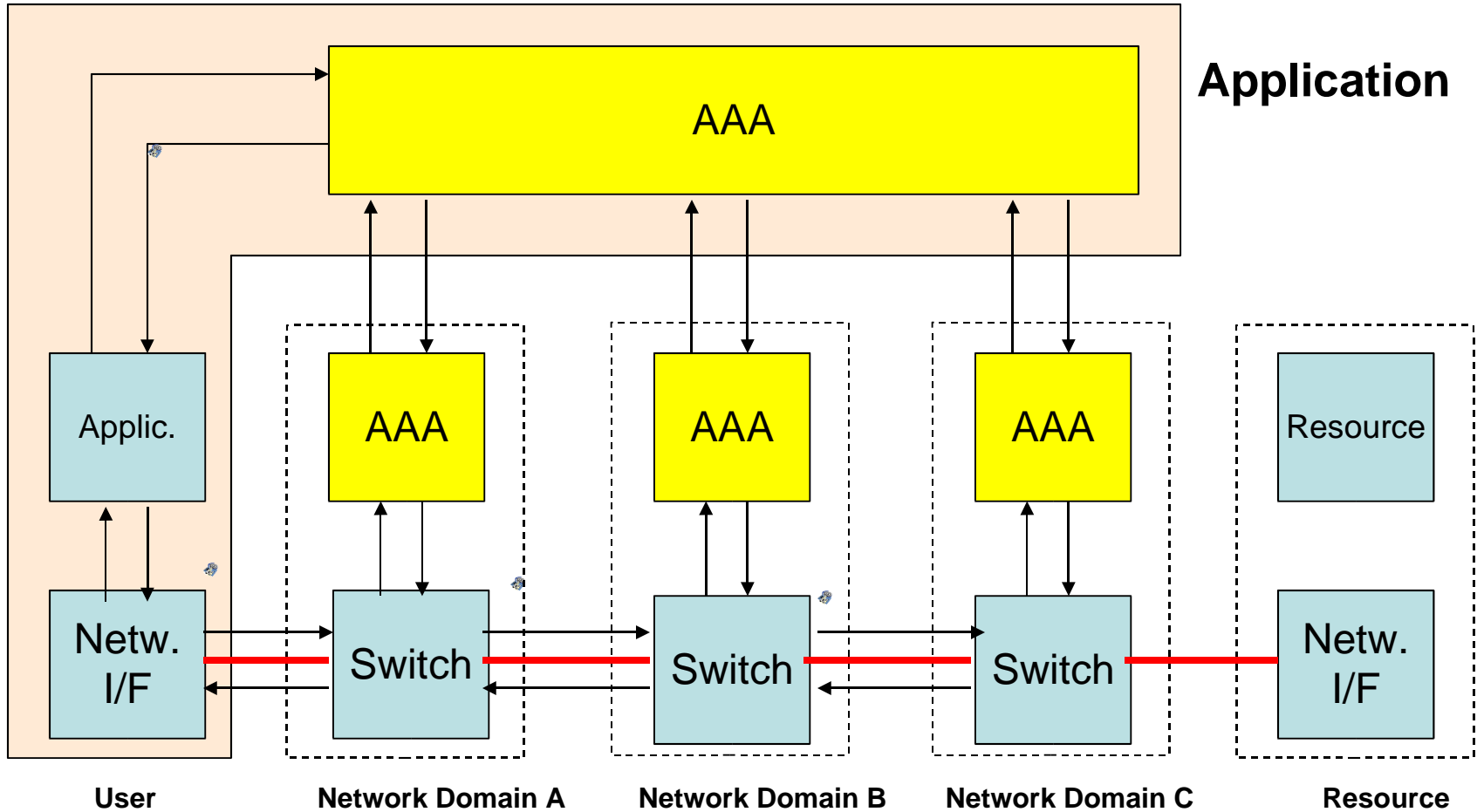


Example AuthZ RFC2904 hybrid sequence



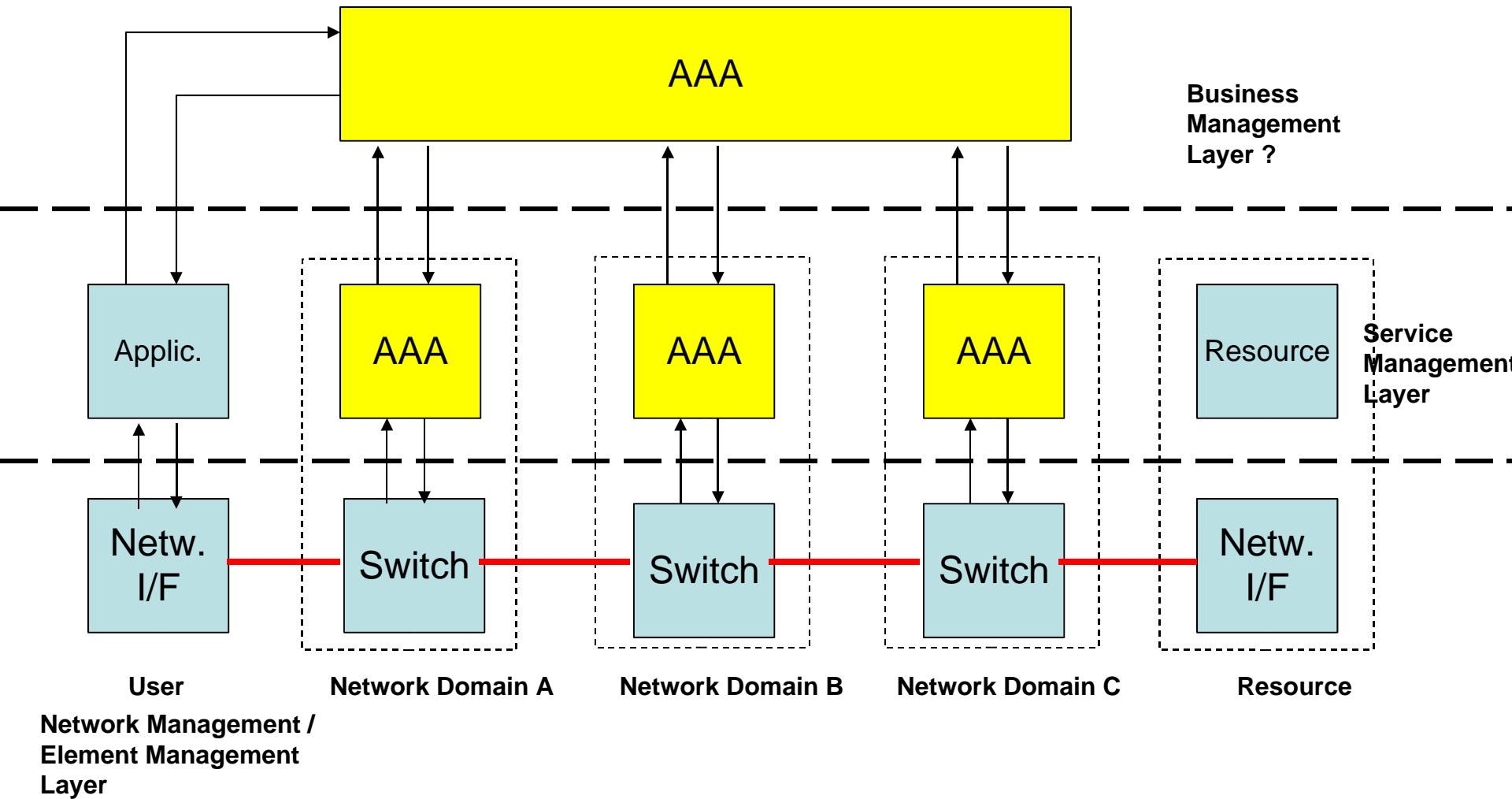


Example AuthZ hybrid sequence





Positioned in TMN example reference model.

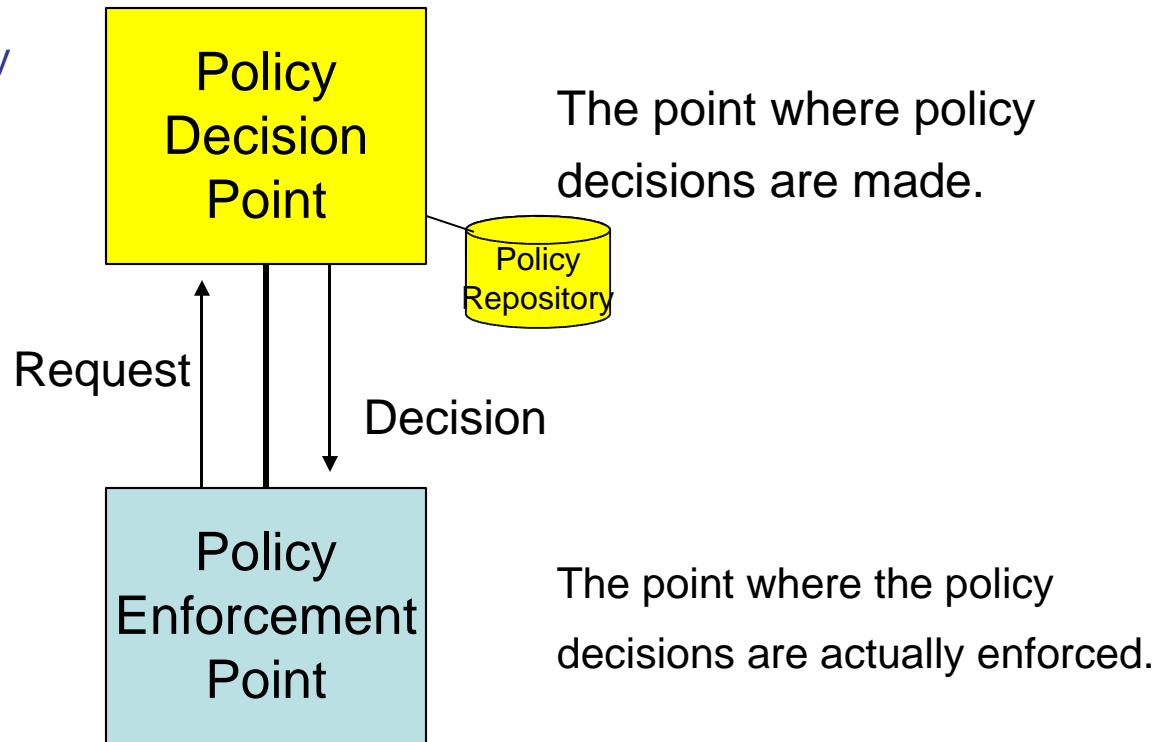




Base of Generic AAA Architecture - RAP

Fundamental idea's inspired by work of the IETF RAP WG that in RFC 2753 describes a framework for Policy-based Admission Control.

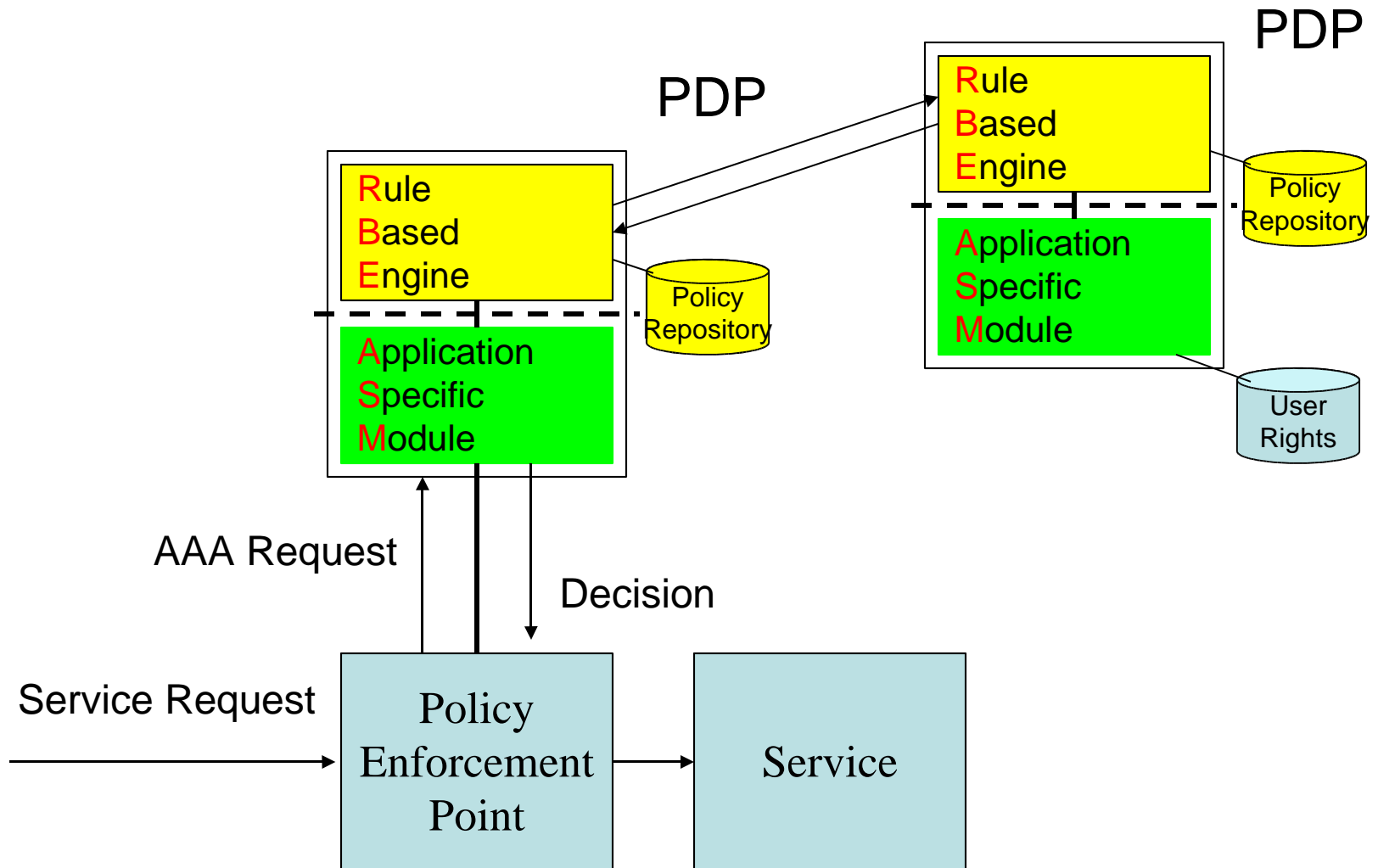
Foundation for COPS



Basic Goal Generic AAA: Allow policy decisions to be made by multiple PDP's belonging to different administrative domains.

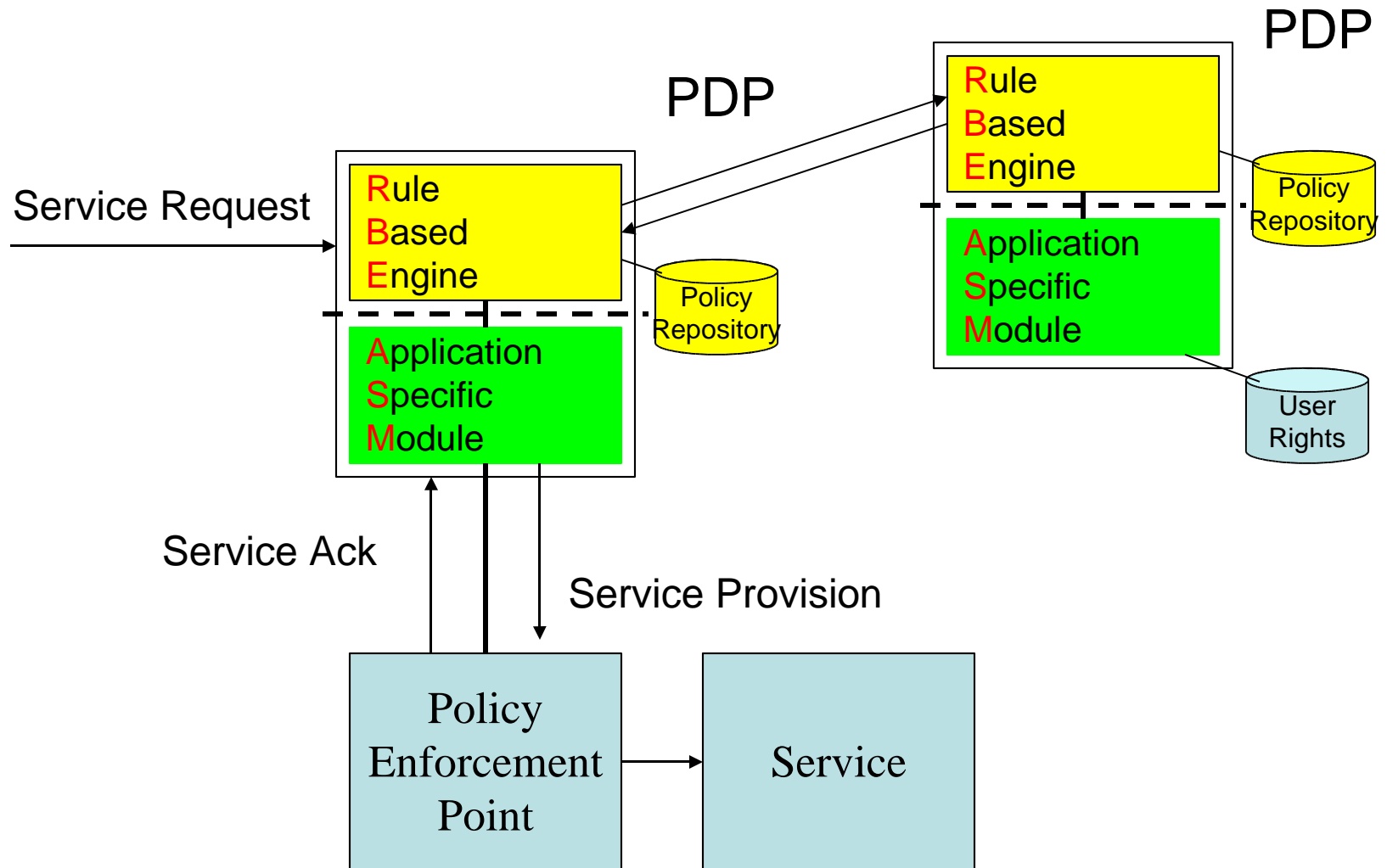


RFC 2903 Generic AAA Architecture in pull model



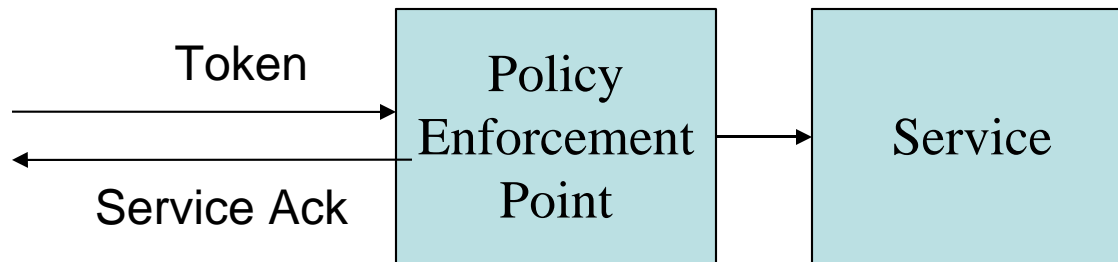
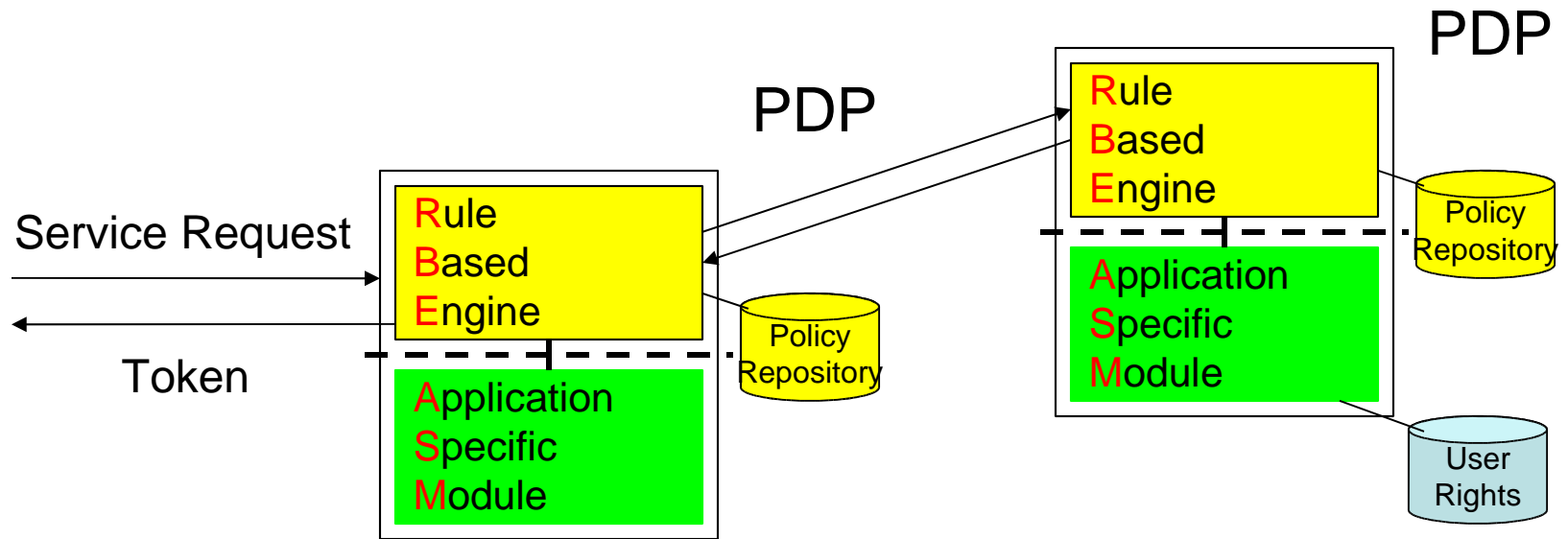


RFC 2903 Generic AAA Architecture in agent model



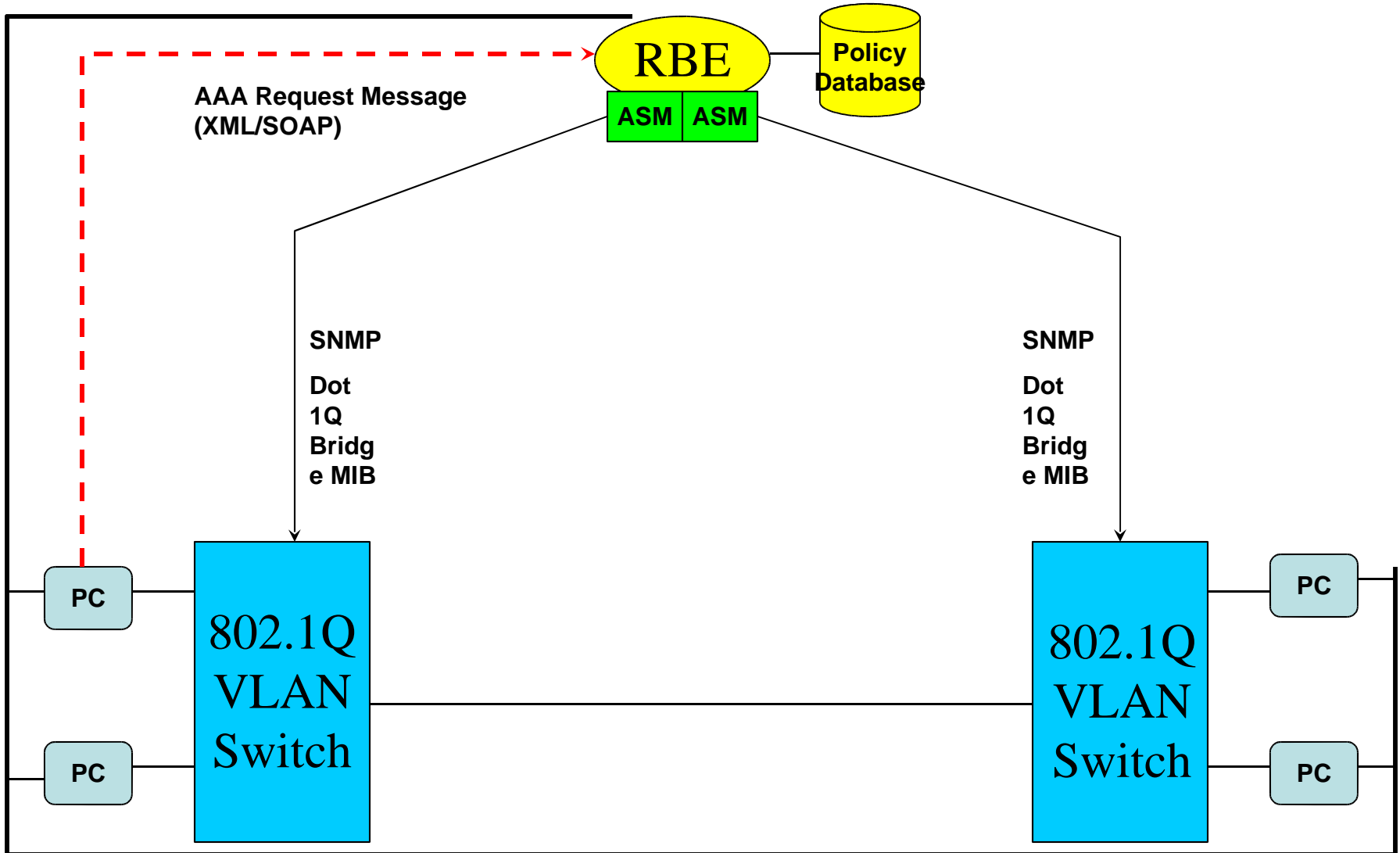


RFC 2903 Generic AAA Architecture in push model





Single - domain 802.1Q VLAN setup Demo iGrid 2002





Example XML request message

```
★ <AARequest version="0.1" type="BoD" >
  <Authorization>
    <credential>
      <credential_type>simple</credential_type>
      <credential_ID>JanJansen</credential_ID>
      <credential_secret>#f034d</credential_secret>
    </credential>
  </Authorization>
  <BodData>
    <Source>192.168.1.5</Source>
    <Destination>192.168.1.6</Destination>
    <Bandwidth>1000</Bandwidth>
    <StartTime>now</StartTime>
    <Duration>20</Duration>
  </BodData>
</AARequest>
```

WHY

WHAT



Example part of a Driving Policy (is an ID)

```
if
(
  (
    ASM::RM.CheckConnection(
      Request::BodData.Source,
      Request::BodData.Destination
    )

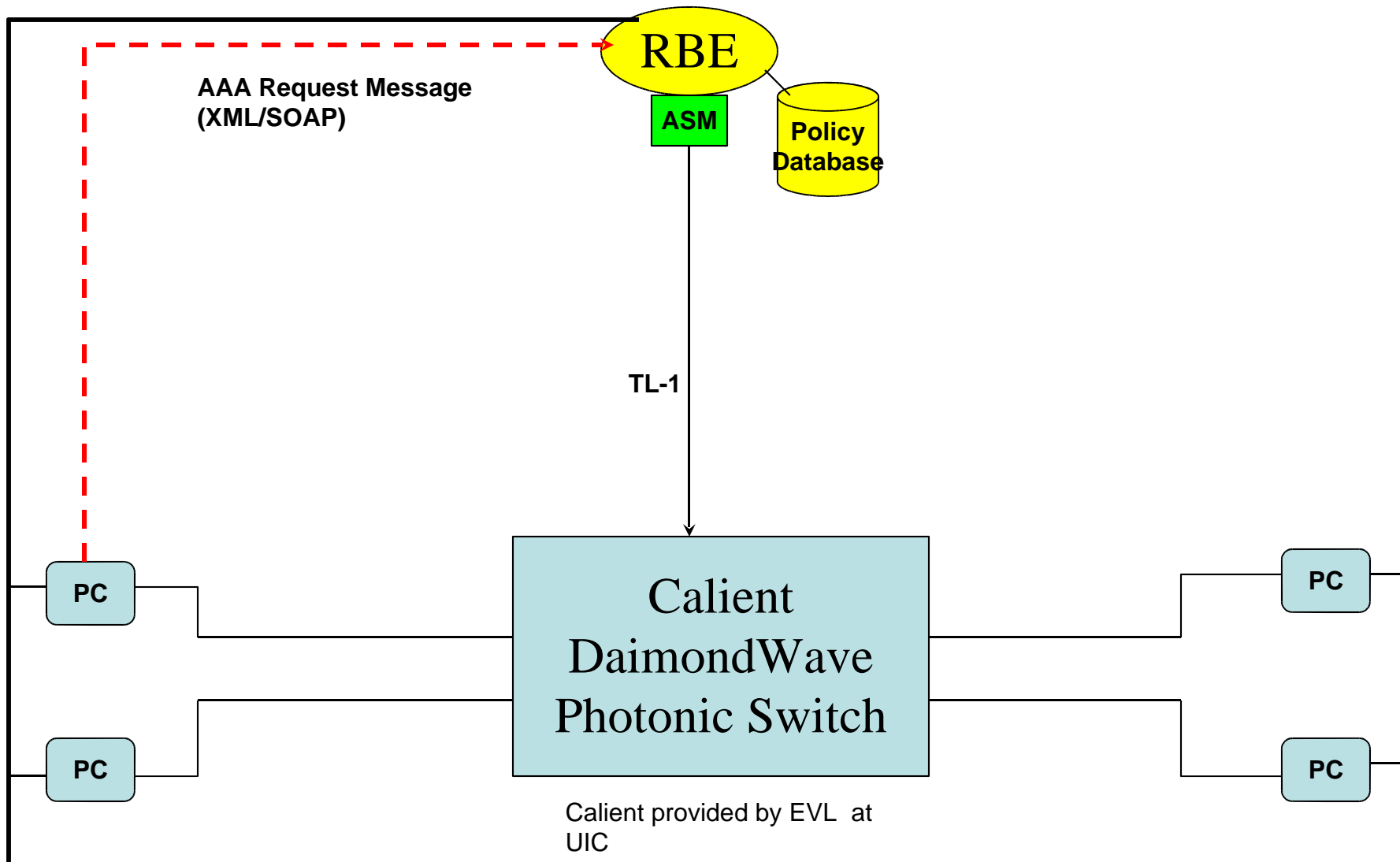
    &&

    ( Request::BodData.Bandwidth <= 1000 )
  )
)
then
(
  ASM::RM.RequestConnection(
    Request::BodData.Source,
    Request::BodData.Destination,
    Request::BodData.Bandwidth,
    Request::BodData.StartTime,
    Request::BodData.Duration
  )

  ;
  Reply::Answer.Message = "Request successful"
)
else
(
  Reply::Error.Message = "Request failed"
```

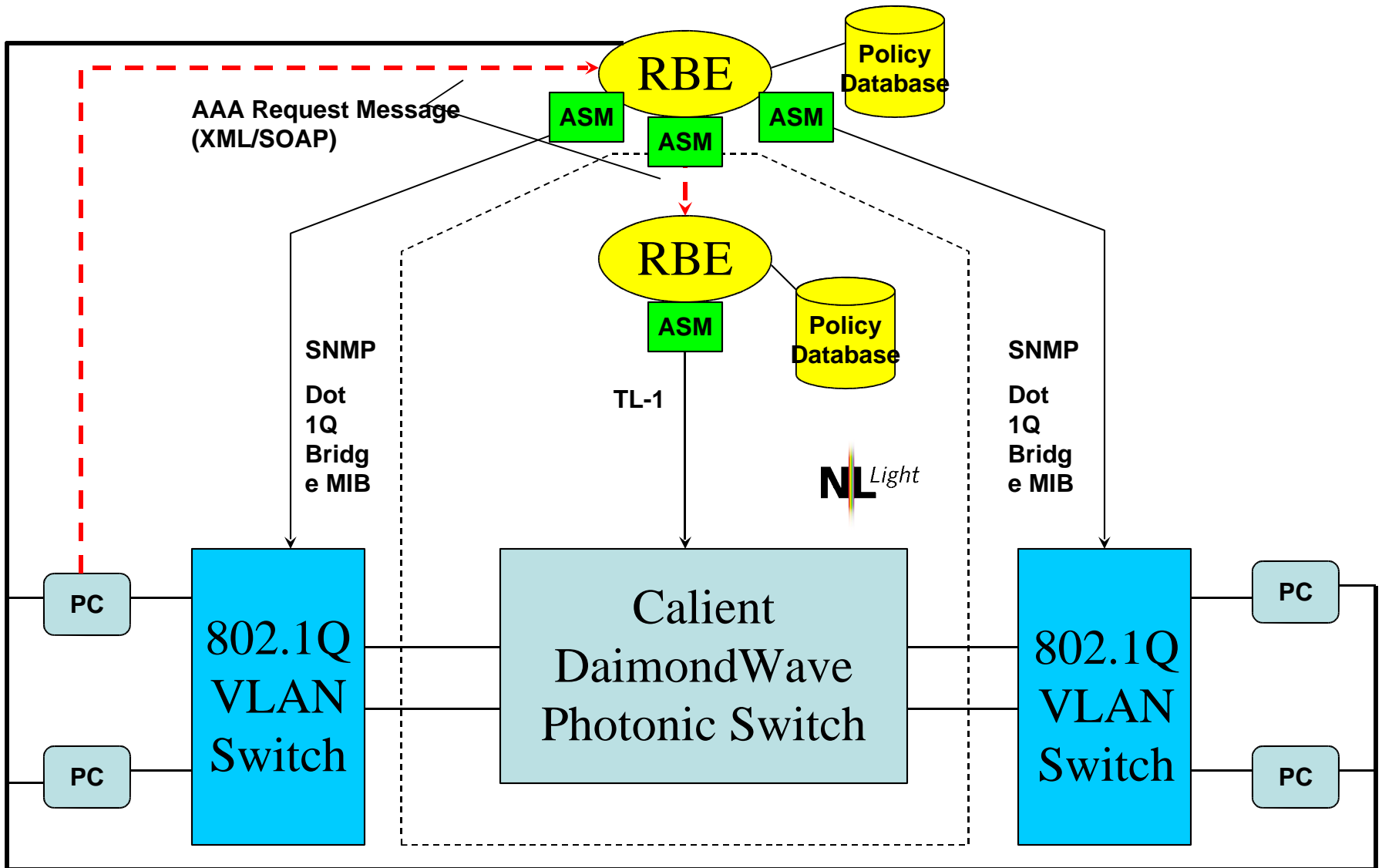


Single - Domain Calient OXC setup



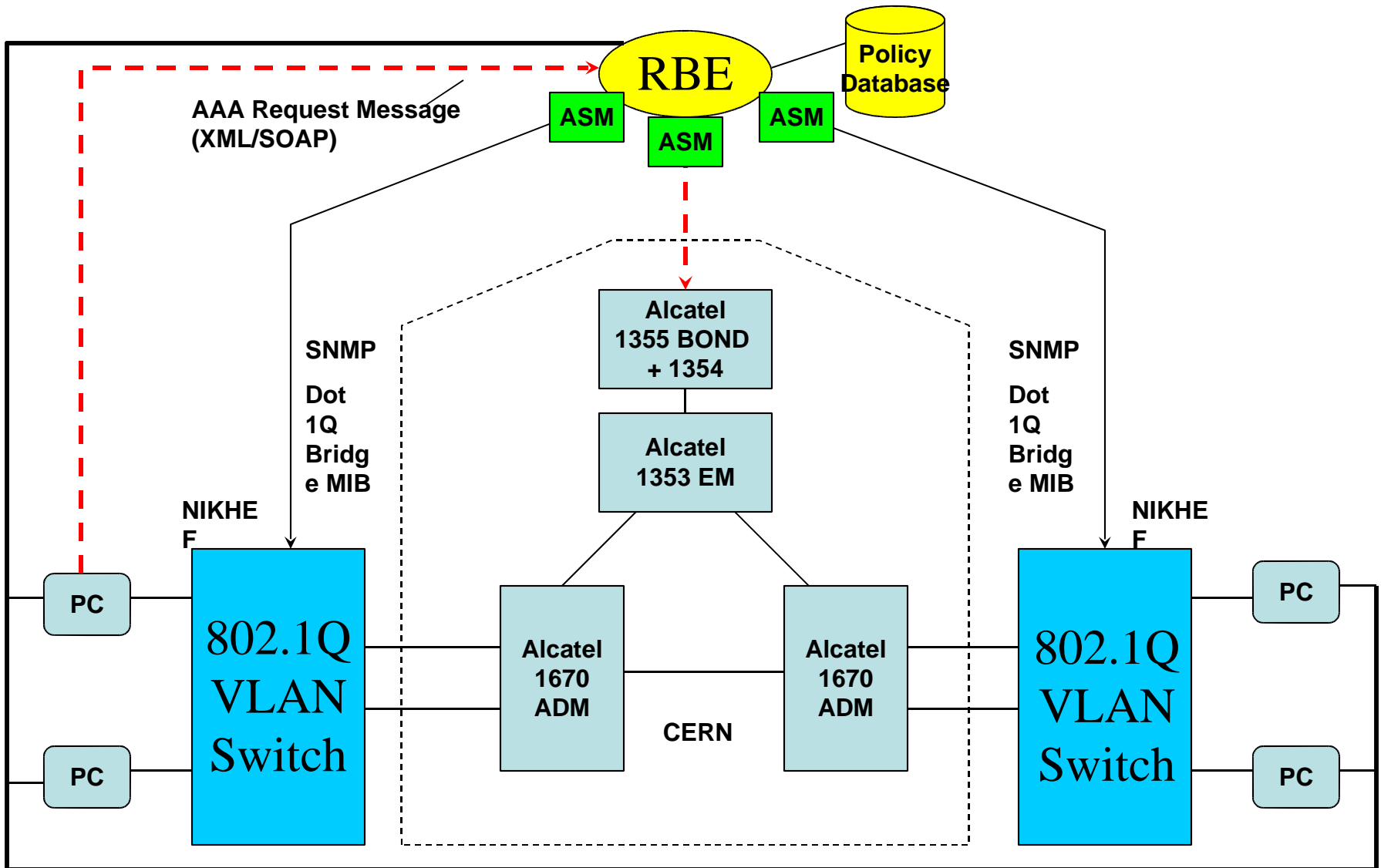


Multi - domain setup at Netherlight



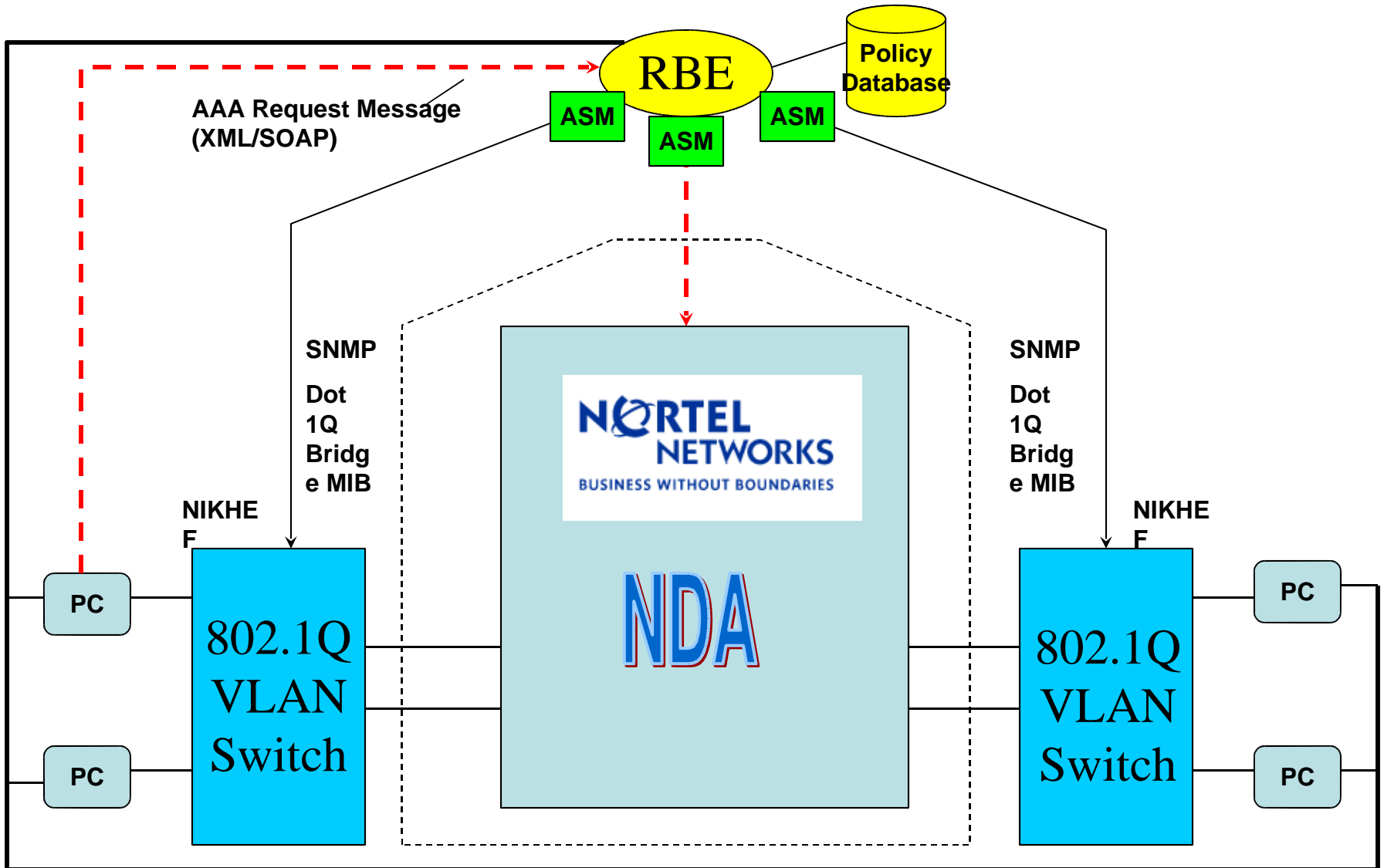


Multi - domain setup using a TMN system (DataTAG)



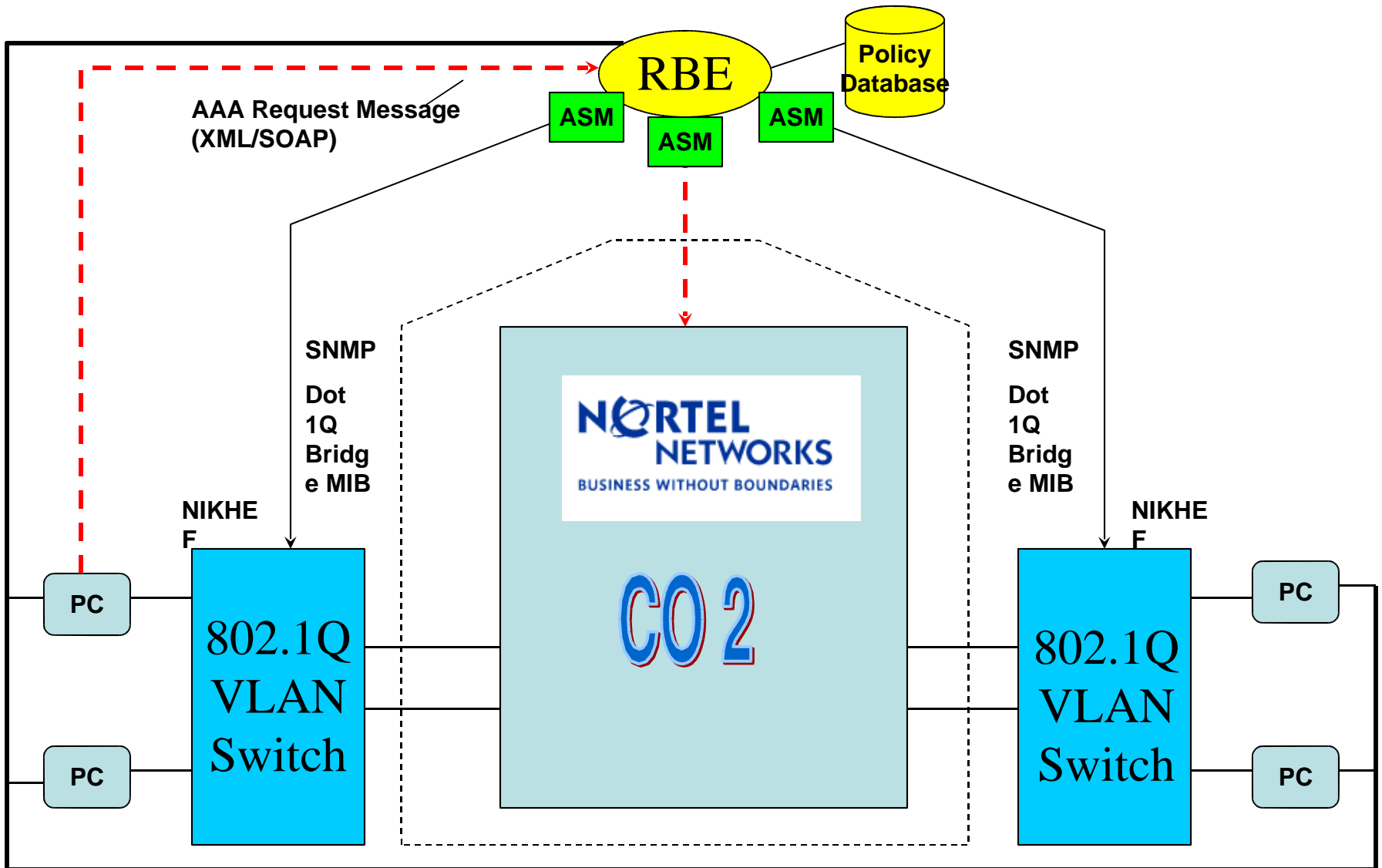


Multi - domain setup using Nortel



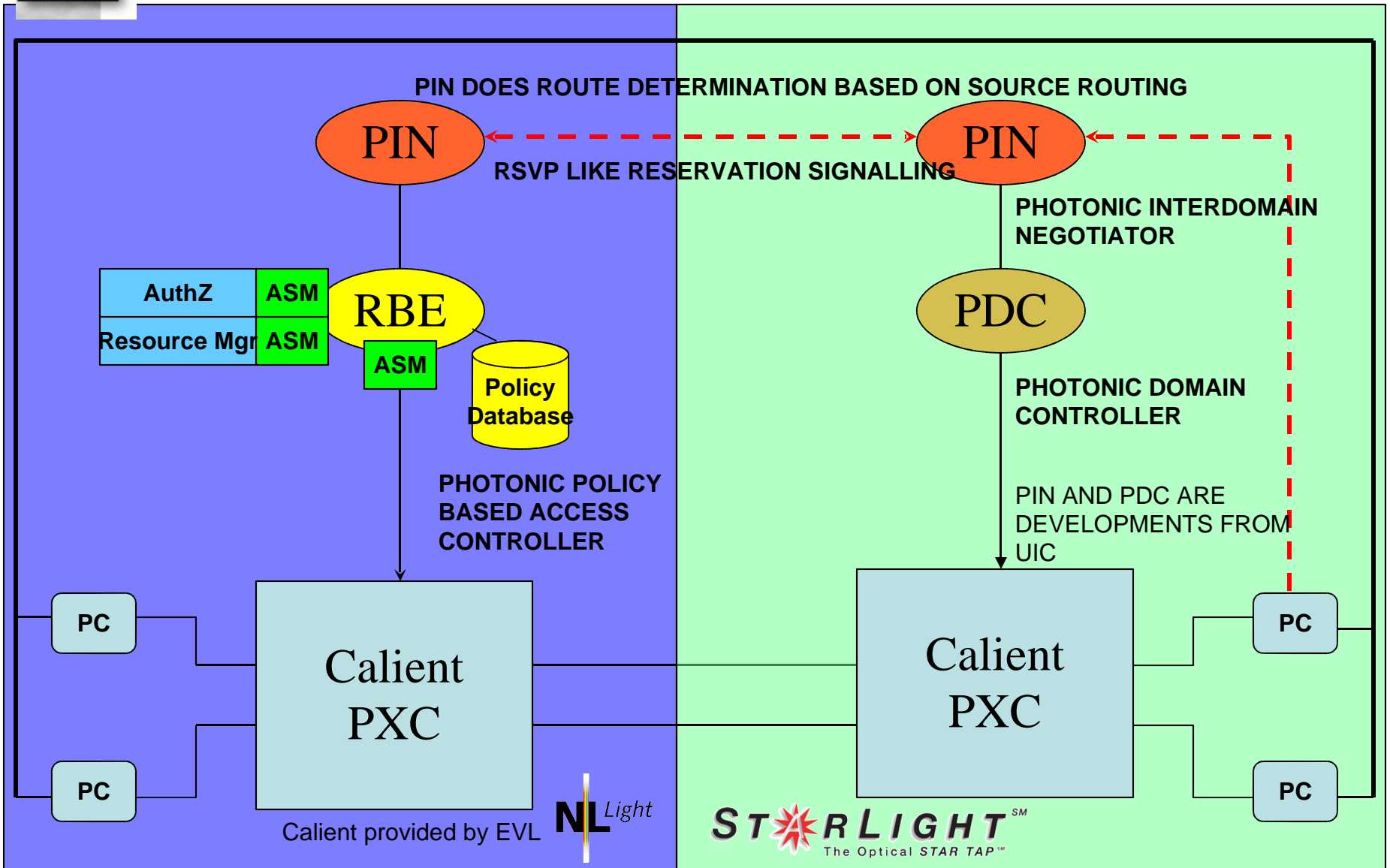


Multi - domain setup using Nortel



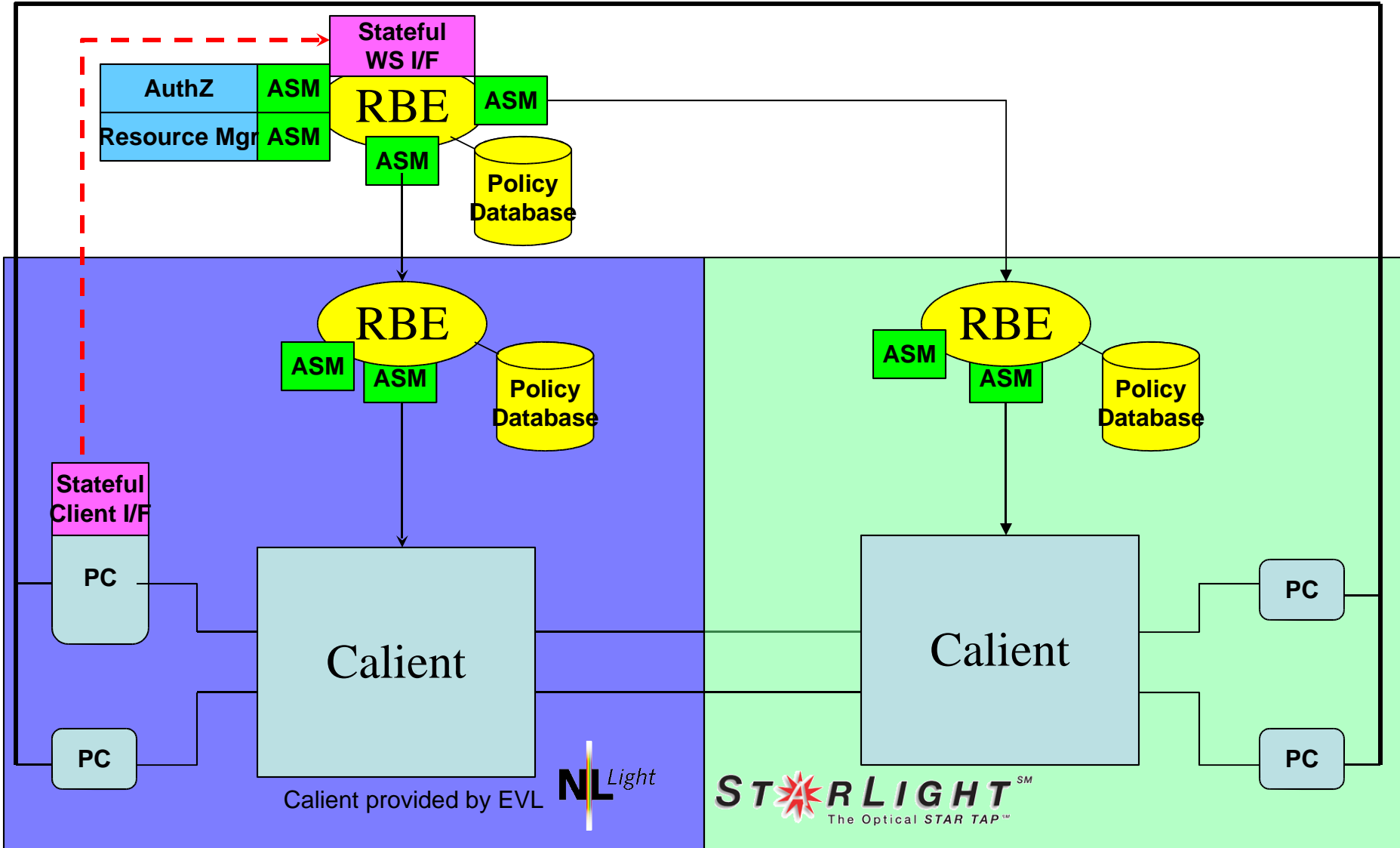


Collaborative Multi-domain experiment at SC2003



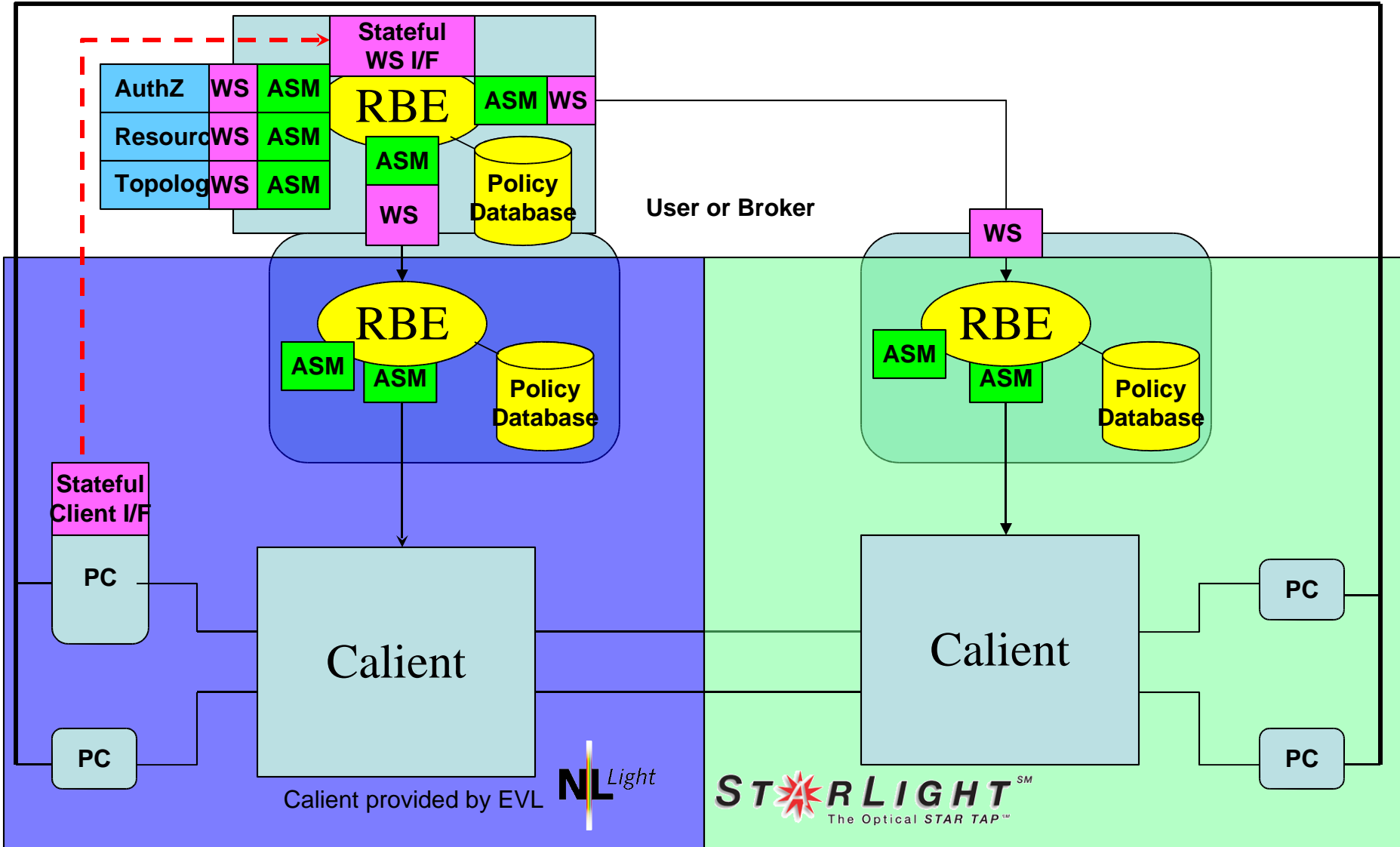


AAA based demo at SC2003



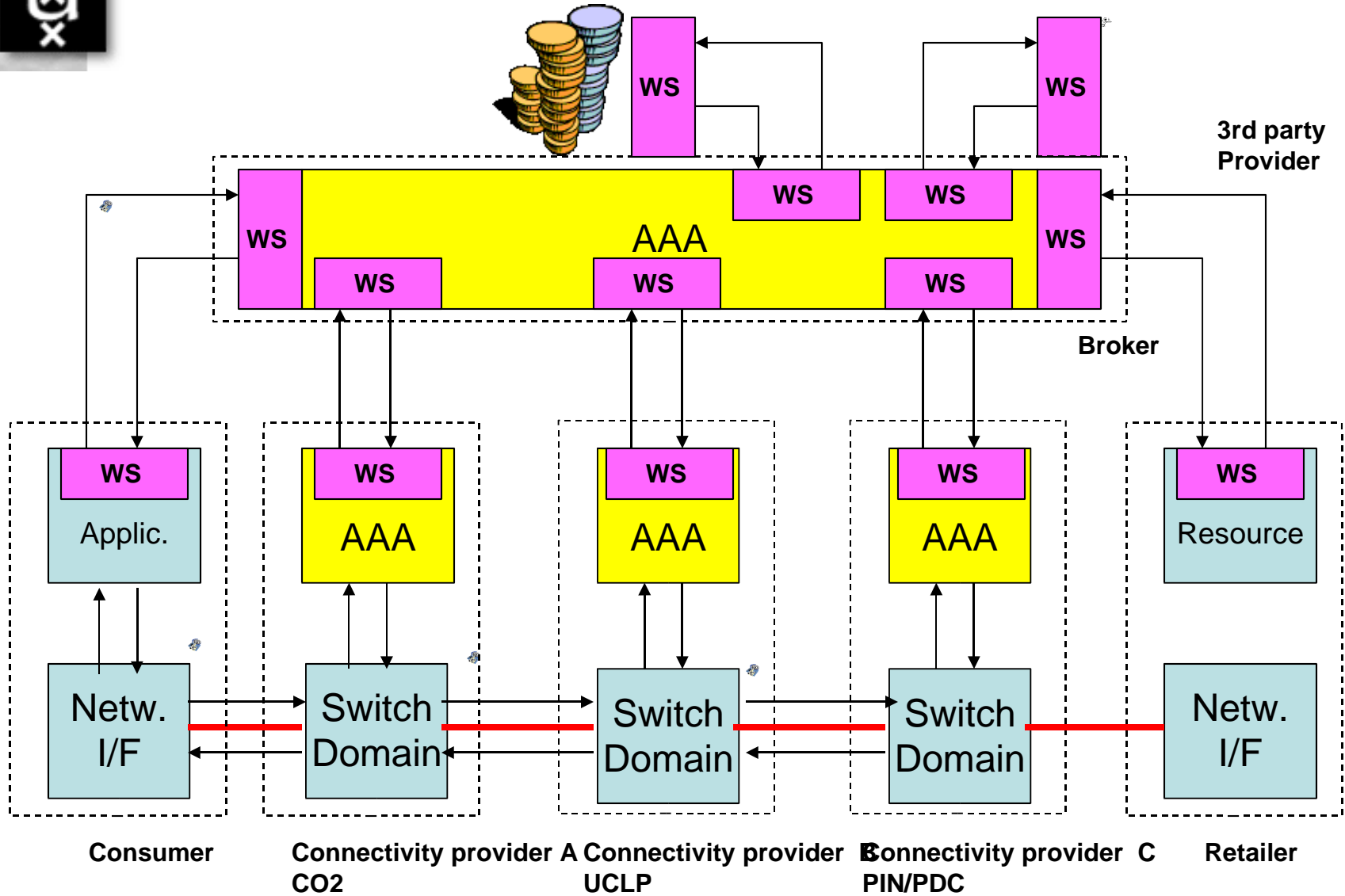


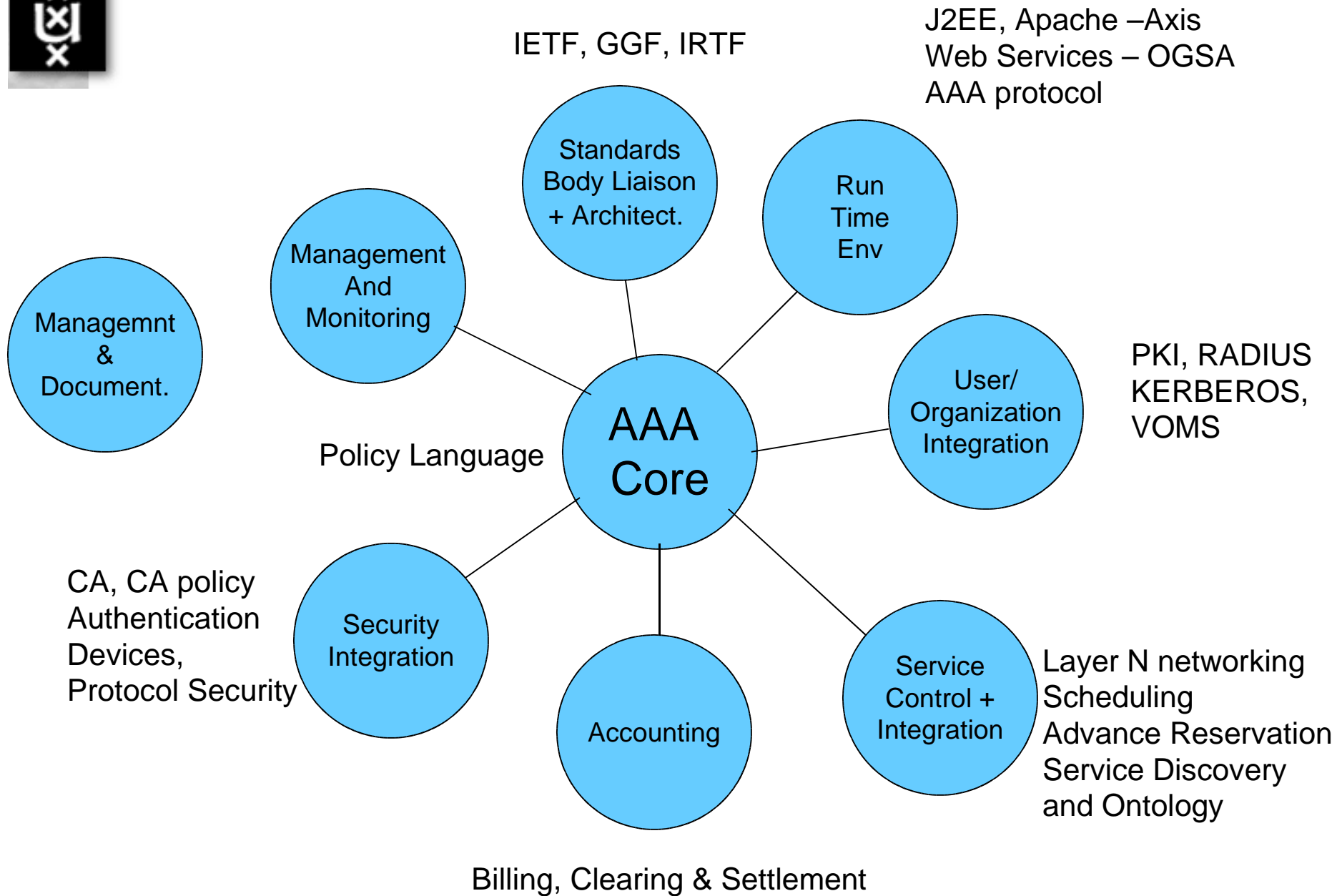
Next: Adding more Web Services interfaces towards a SOA. Put user/broker in control.





Research idea: WS/Token based TINA like model.







AAA related Research Topics

Policy:

- Stateful policy handling
- Concurrency

Policy Management:

- Policy generation
- Policy distribution

Object abstractions & position.

Run time & development environment

Positions of AAA in (optical) Control Models

AAA message security and trust federation.

Grid interaction (WSRF)

Thank you !

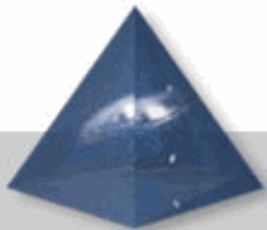
Research funded by:



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