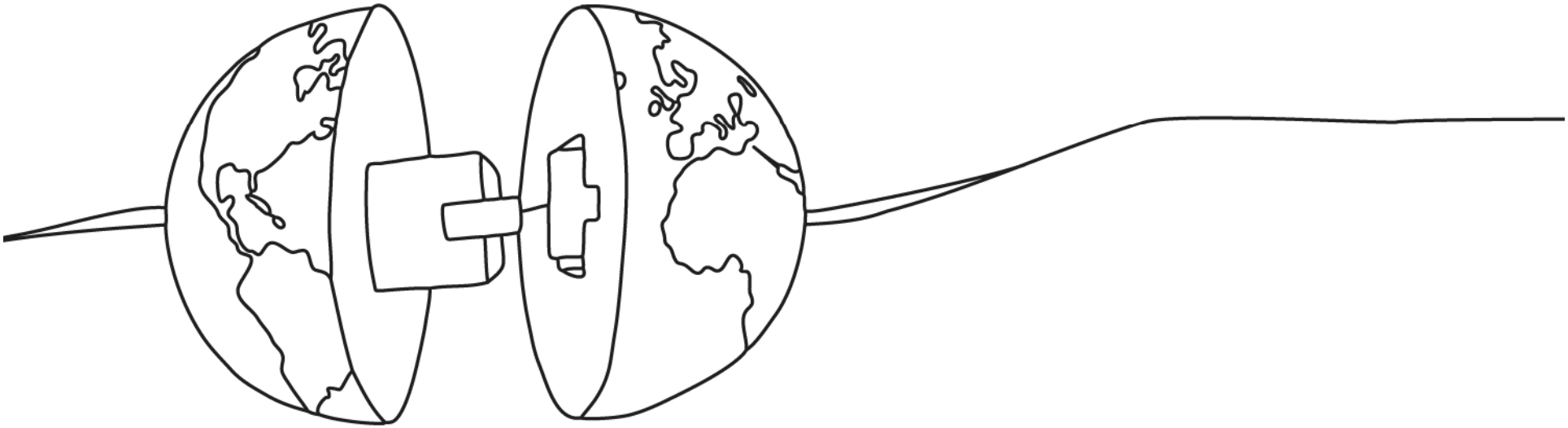
Seminar on ATM Automation-CAR/SAM

Rio de Janeiro, 11-13 Jun2008

An overview on the Pan European Network Service (PENS)



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Communication services

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Agenda

- European Air Traffic Management (EATM)
- The CFMU overview
- The EAD overview
- Why to change?
- The rationale for a Pan European Network
- PENS overview
- Conclusion

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Overview on European ATM

- European Air Traffic Managment (EATM) has a performance enhacement programme in place to create a seamless ATM system across 41 ECAC participating States.
- It is a multiphased programme of activities developing initial strategies, concepts and roadmaps, implementation programmes and service provision.
- The programme enables the provision of ATM services and operations in Europe, by increasing the interoperability of air navigation systems and delivering operational improvements in ATM.

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Enabling performance

EATM requires performance enhacement for its main components which should be able to establish end-to-end communication to each other :

- The CFMU applications and CFMU remote clients
- The EAD applications and the EAD remote clients
- The ANSP's via the ANSP backbone service

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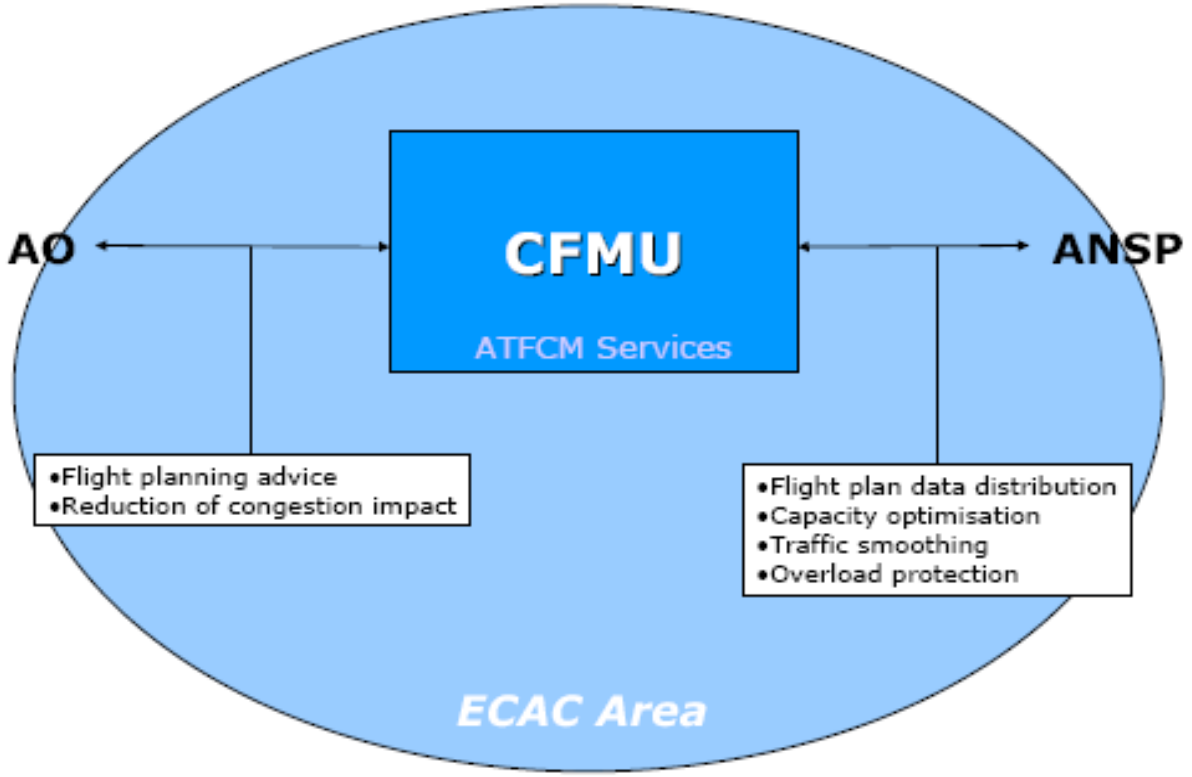
The existing context for CFMU

- The CFMU is responsible for the provision of an efficient ATFCM service within responsibility area of participating European States



CFMU Wide Area Network

- The CFMU makes use of SITA wide area network for the following services:
  - Access to public internet services
  - Private IP connectivity between CFMU and the remote ANSP(CFMU extranet VPN)
  - Private IP connectivity between CFMU and some AOs (CFMU extranet ATS VPN)
  - X25 connectivity
  - Type B connectivity
  - SITATEX connectivity

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CFMU overall topology

- CFMU Haren including SITA managed CPE
- CFMU Brétigny including SITA managed CPE
- Local PTT infrastructure (Belgacom and/or France Telecom)
- Class I and II sites (customised IPVPN services for numerous Flight Managment Positions (FMP) and Enhanced Tactical Flow Managment System (ETFMS) sites)
- Broadcast sites (5 EFTMS and 1 test site)
- SITA network services incorporating: PSTN/ISDN, CIAS, IPVPN, CFMUNet (for AO connectivity) and X25.

The Costumer Equipment Premises (CPE)

- The CPE provides high speed and high resilience access for each CFMU data centre to the SITA network
- SITA CPE are Nortel Passport equip, the routers are Cisco equip.
- All routers can be adapted to changing needs of CFMU as and when required.

The AFTN/CIDIN Network

- The AFTN/CIDIN network is a low speed net using AFTN and CIDIN protocols
- CFMU communicates with 6 AFTN sites through the SITA X25 network using CIDIN protocols:
  - Bordeaux
  - Brussels
  - Frankfurt
  - Swanwick
  - Madrid
  - Rome
- These sites are implemented as SITA class I sites: dual connection to SITA MDNS network via separate SITA entry nodes.

The EAD environment

- The European AIS database is owned and managed by EUROCONTROL in behalf of State members
- The EAD service provides access to Aeronautical Information from ECAC states and worldwide.
- Main topology elements includes: Network, WAN, Dial up, VSAT, Internet, Training site,Test & development site, AFTN/CIDIN connectivity, MAN, IT servers site, Operational sites, Clients sites.
- IT Servers sites are located in Vienna(main site) and Canada(contigency site)

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Why to change?

- X25 is now obsolete protocol with major suppliers withdrawing support from 2009 onwards:maintenance of existing data networks will become more difficult and expensive
- Alignement with industry standard services requiries IP based network
- EC interoperability rules and ICAO regional plans applicable to ATM have adopted IP for communications
- The majority of ATM applications and systems have been adapted to make use of IP
- The move towards SES functional airspace blocks will increase trans-national comms requirements.

The establishment of the proposed ANSP backbone IP network will satisfy these business demands and provide new opportunities for expansion of future ATM capabilities. It will provide any-to-any connectivity but would connect together the various local islands of national infrastructure with a high speed, high quality, backbone network.

The Rationale for a Pan-European Network

- The concept of a Pan European Network (PEN) providing an European-wide ground-ground comms infrastructure has been agreed as a strategic approach necessary to support future international ATM system developments.
- The existing ANSP ground-ground international comms infrastructure uses a mix of bilateral analogue and digital circuits providing voice and data connectivity.
- International data applications are mainly supported by the X25 protocol over these communication links. Voice comms are largely deployed between neighbouring States and are based on analogue protocols. Use of voice over IP(VoIP) tecnologies has just begun to be deployed for operational services.

So, current main constrains are:

- *There is no European-wide Ip network for ATM*
- *Limited European coverage – only "islands of connectivity"*
- *There is no central network managment of international services*

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Learning some concepts about PENS

- VAN: Value Added Network
- PENS: the common VAN backbone used for CFMU, EAD and ANSP backbone extranet services
- PENS user: CFMU, EAD or ANSP
- PENS site: any site connecting to the PENS (CFMU, EAD or ANSP)
- WAN/VAN: shall be understood as being the infrastructure between all sites including the provider's core network, the tail links and the Communication equipment (CPE) at the remote site

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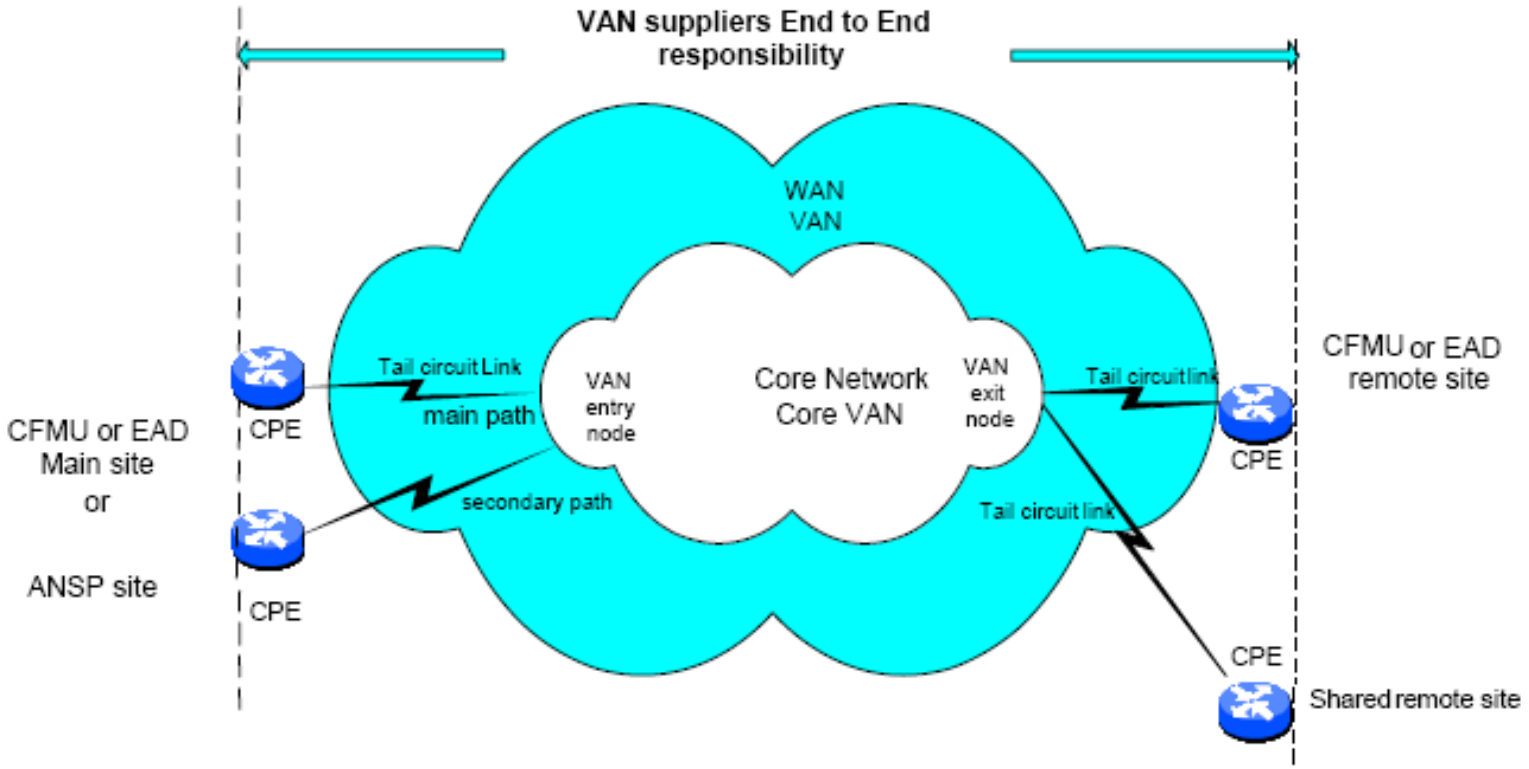
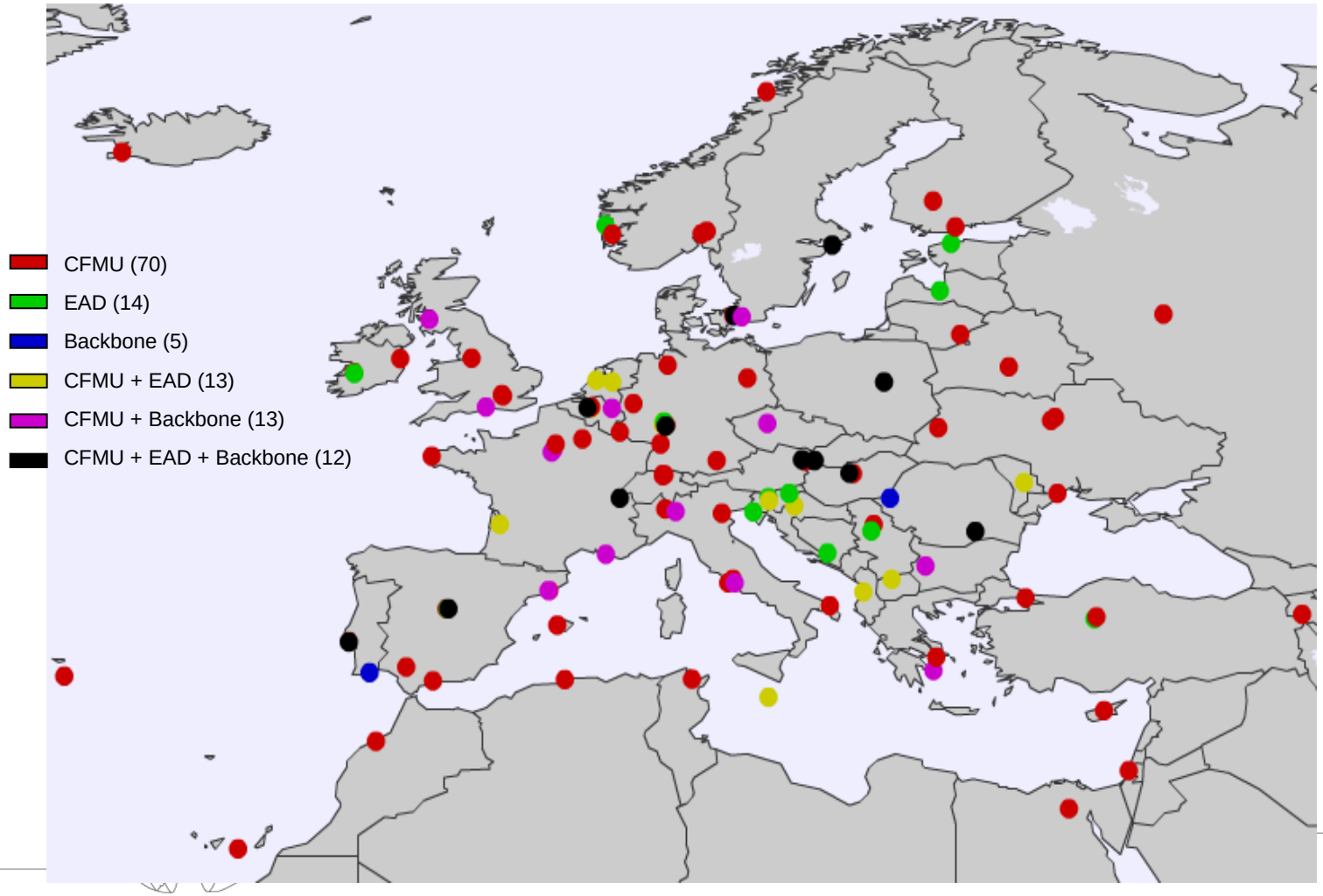
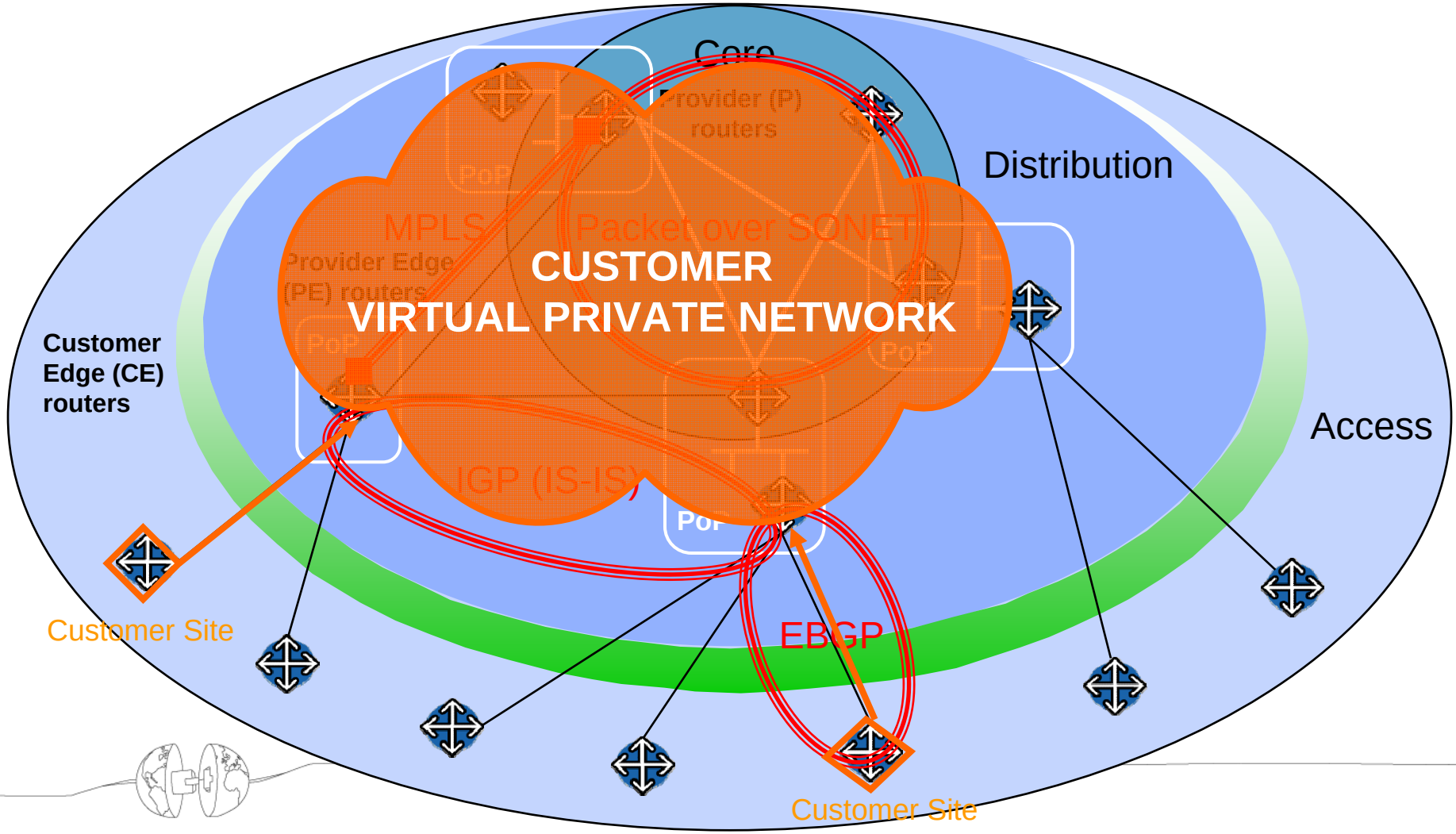
Graphical View on the main concepts



Potential PENS access points (127)

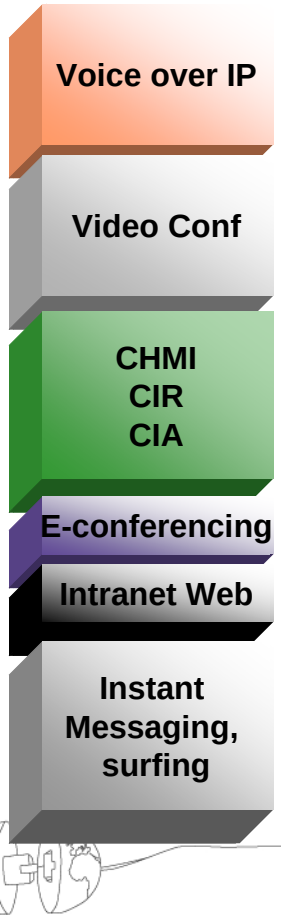


The Opportunity to SITA IP VPN Architecture

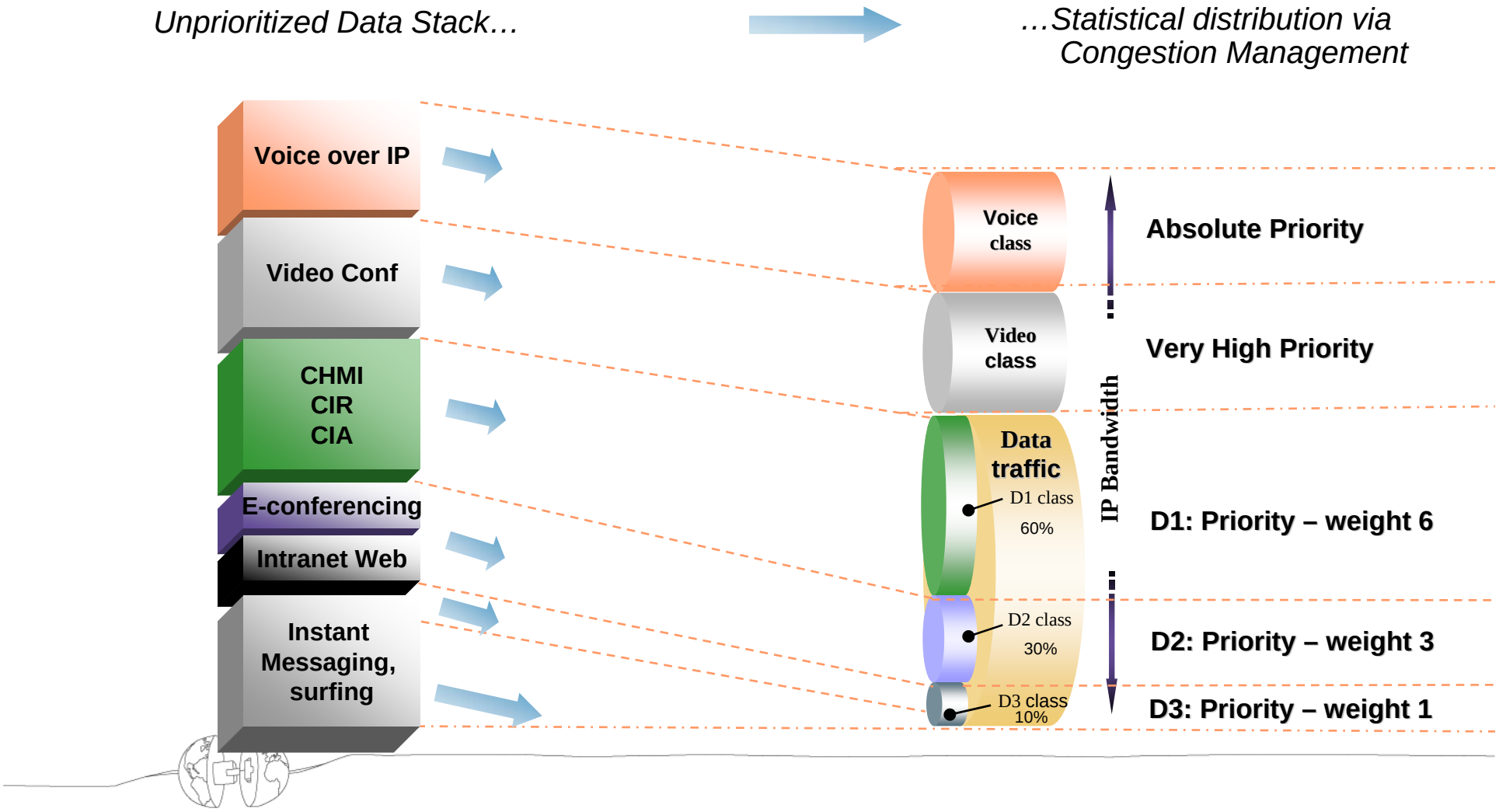


Class of Service… Traffic Queues

Unprioritized Data Stack…



Class of Service… Traffic Queues



Class of Service… GOLD FLEXIBLE

… plus

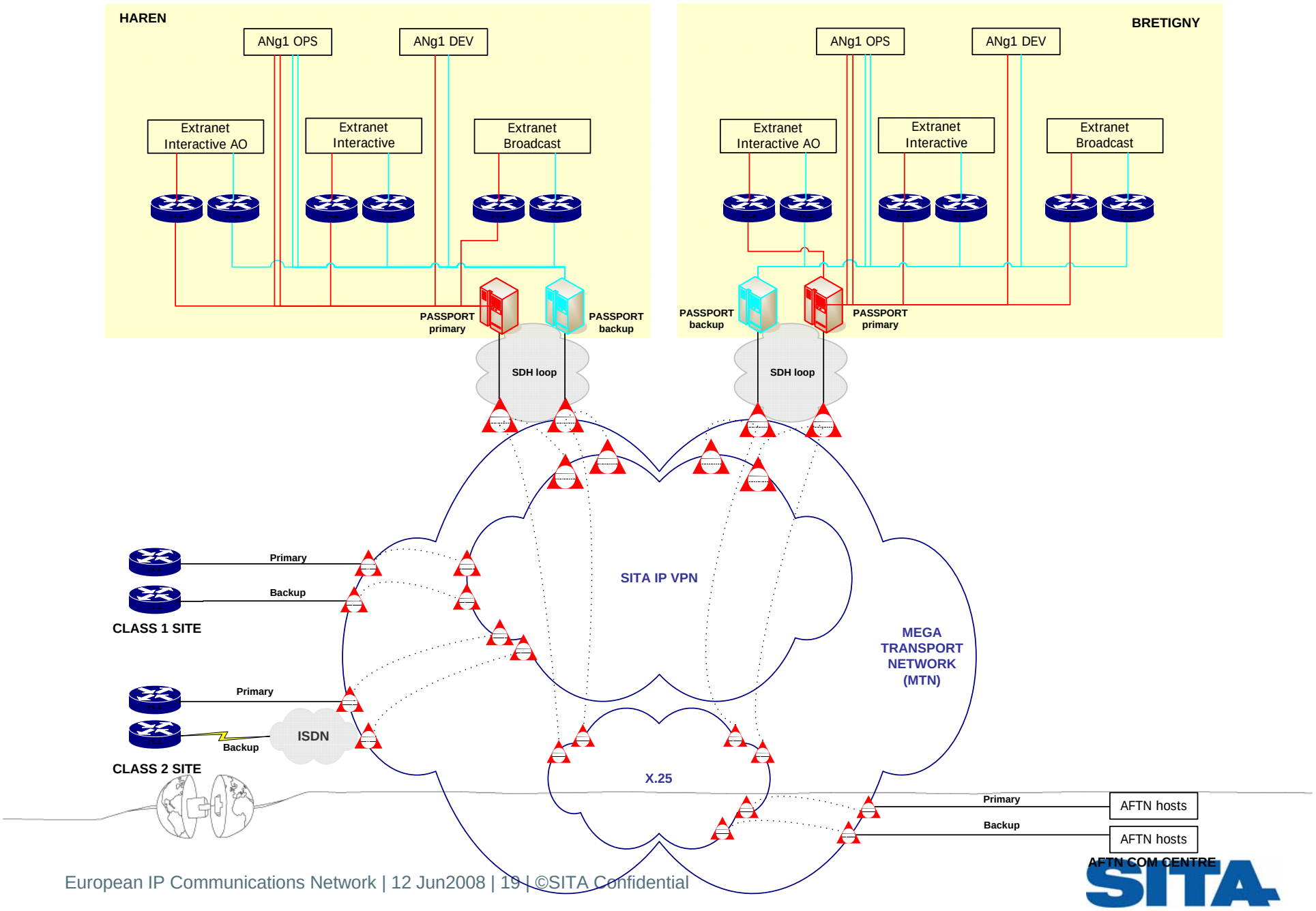
VOICE CLASS

where needed

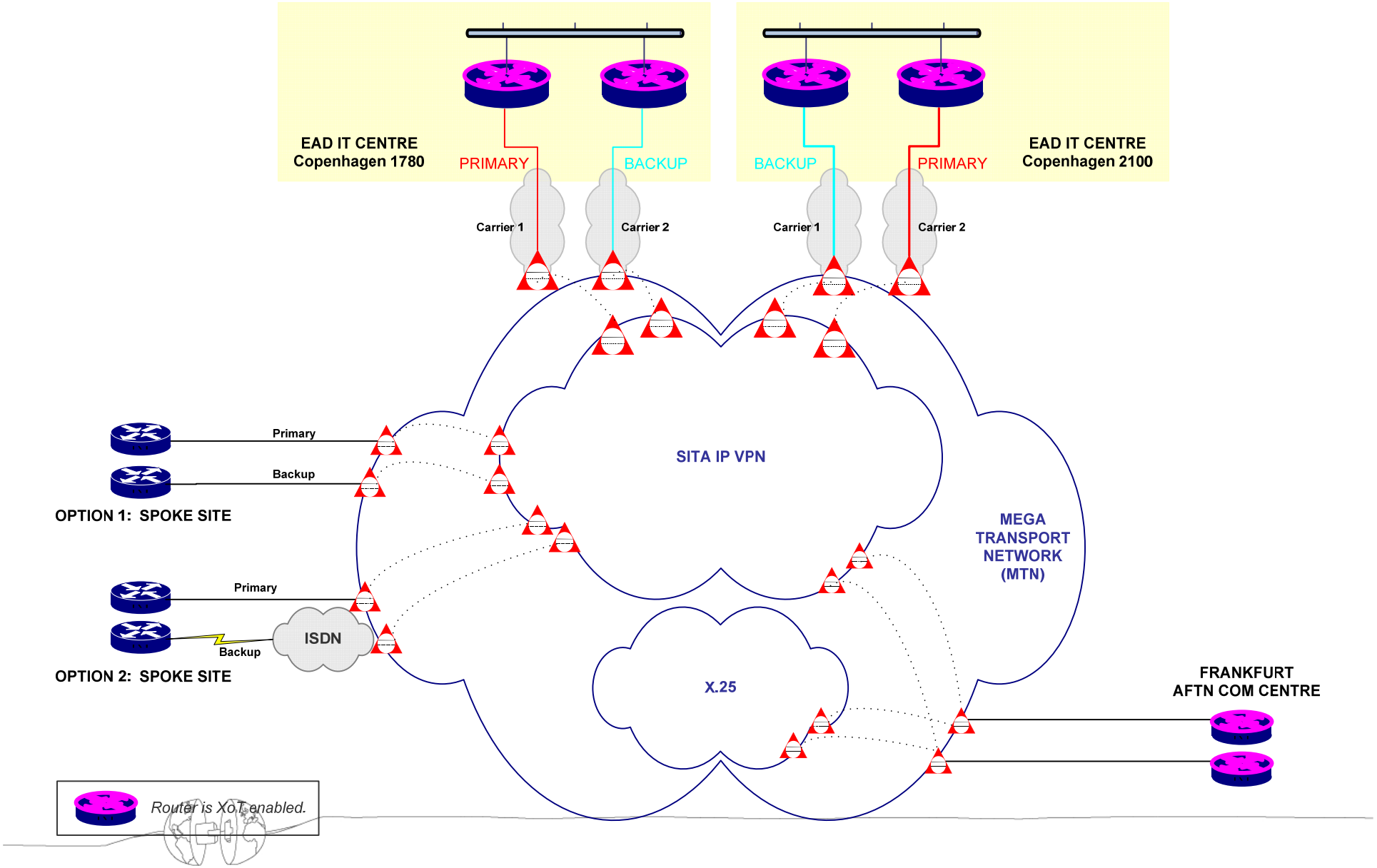
GOLD

CLASS OF SERVICE…

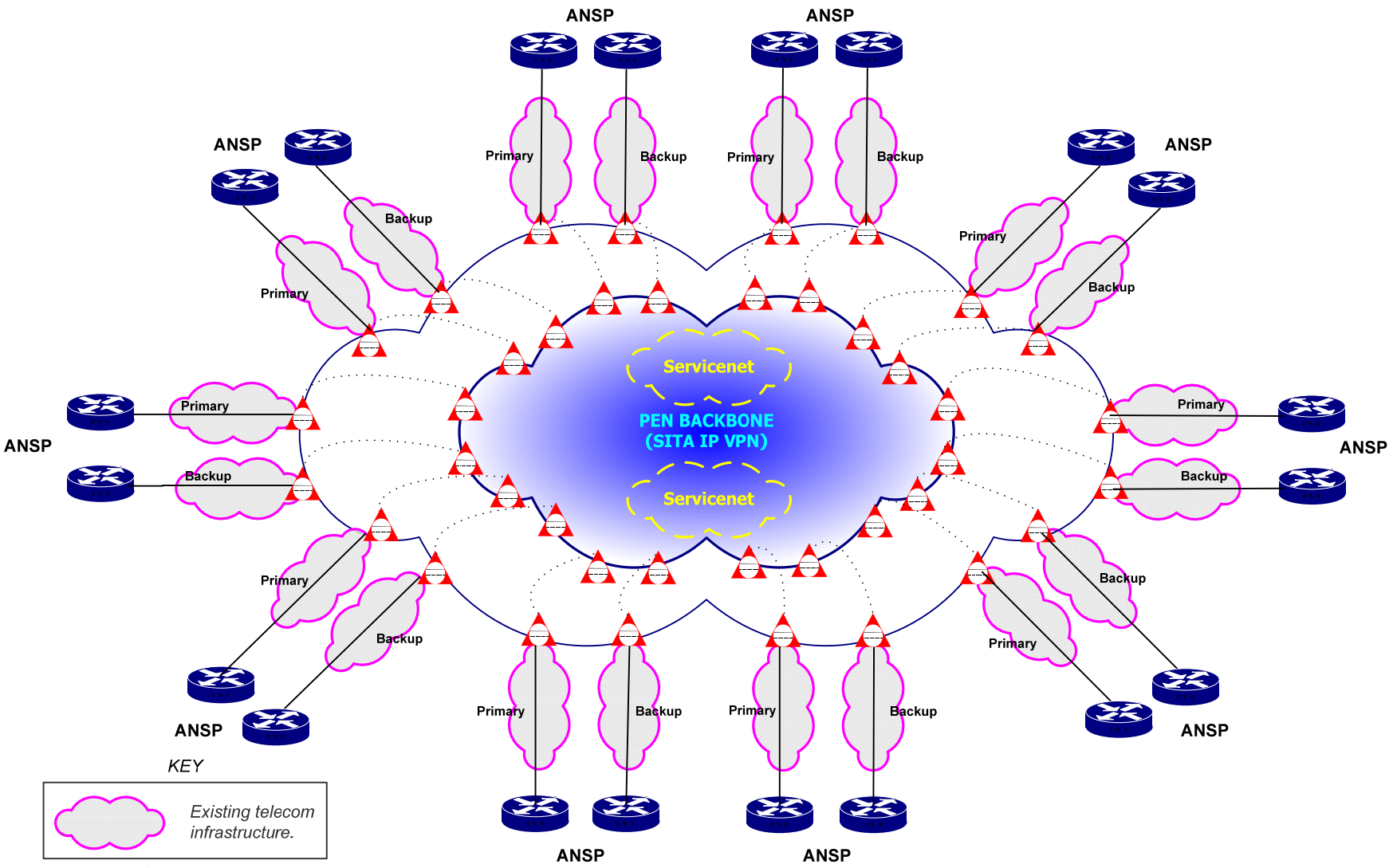
CFMU sites


HAREN
ANg1 OPS
ANg1 DEV
Extranet Interactive AO
Extranet Interactive
Extranet Broadcast
PASSPORT primary
PASSPORT backup
BRETIGNY
ANg1 OPS
ANg1 DEV
Extranet Interactive AO
Extranet Interactive
Extranet Broadcast
PASSPORT backup
PASSPORT primary
SDH loop
SDH loop
SITA IP VPN
MEGA TRANSPORT NETWORK (MTN)
Primary
Backup
CLASS 1 SITE
Primary
Backup
ISDN
CLASS 2 SITE
X.25
Primary
Backup
AFTN hosts
AFTN hosts
AFTN COM CENTRE

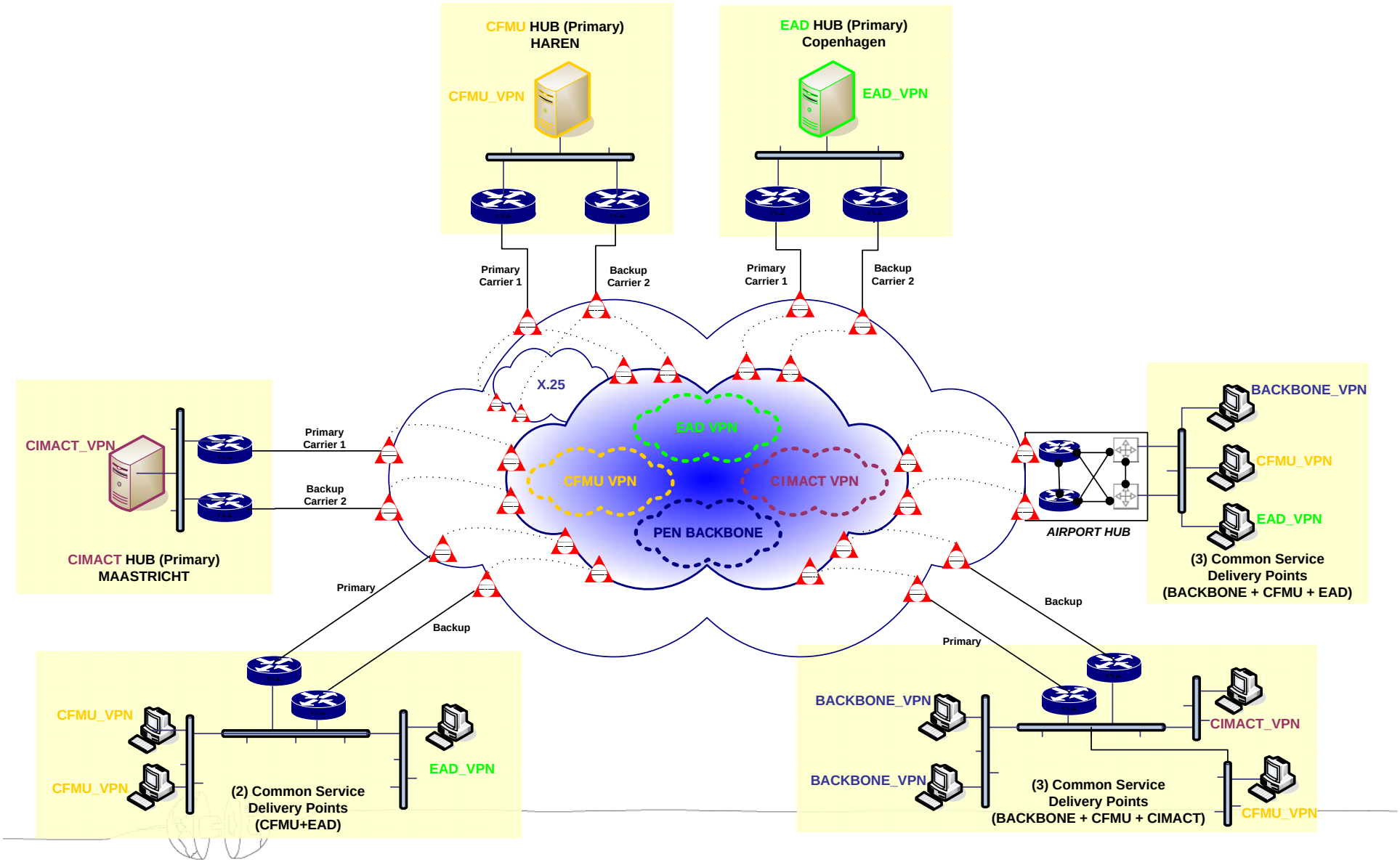
EAD sites


EAD IT CENTRE
Copenhagen 1780
PRIMARY
BACKUP
BACKUP
PRIMARY
EAD IT CENTRE
Copenhagen 2100
Carrier 1
Carrier 2
Carrier 1
Carrier 2
SITA IP VPN
MEGA
TRANSPORT
NETWORK
(MTN)
Primary
Backup
OPTION 1: SPOKE SITE
Primary
ISDN
Backup
OPTION 2: SPOKE SITE
X.25
FRANKFURT
AFTN COM CENTRE
Router is XoT enabled.

ANSP BACKBONE sites



Shared sites



Conclusion

- SITA is far the communications service provider with largest experience and expertise on delivering different communication services and technologies for aeronautical community worldwide.
- The Pan European Network reflects the concept used by SITA VAN network for integrating different costumer needs
- The ATM automation requirements for performance are highly related to infrastructure of communications used by the ANSP
- The CAR/SAM states when evaluating the deployment of comms infrastructure can benefit from SITA know-how on Value Added Network for performance and cost requirements

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Thanks!
For further details on PENS
please contact
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Some of slides presented are partially or totally based on Eurocontrol PENS specs

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