

# **FRIACO**

## **Unmetered Internet access in the UK**

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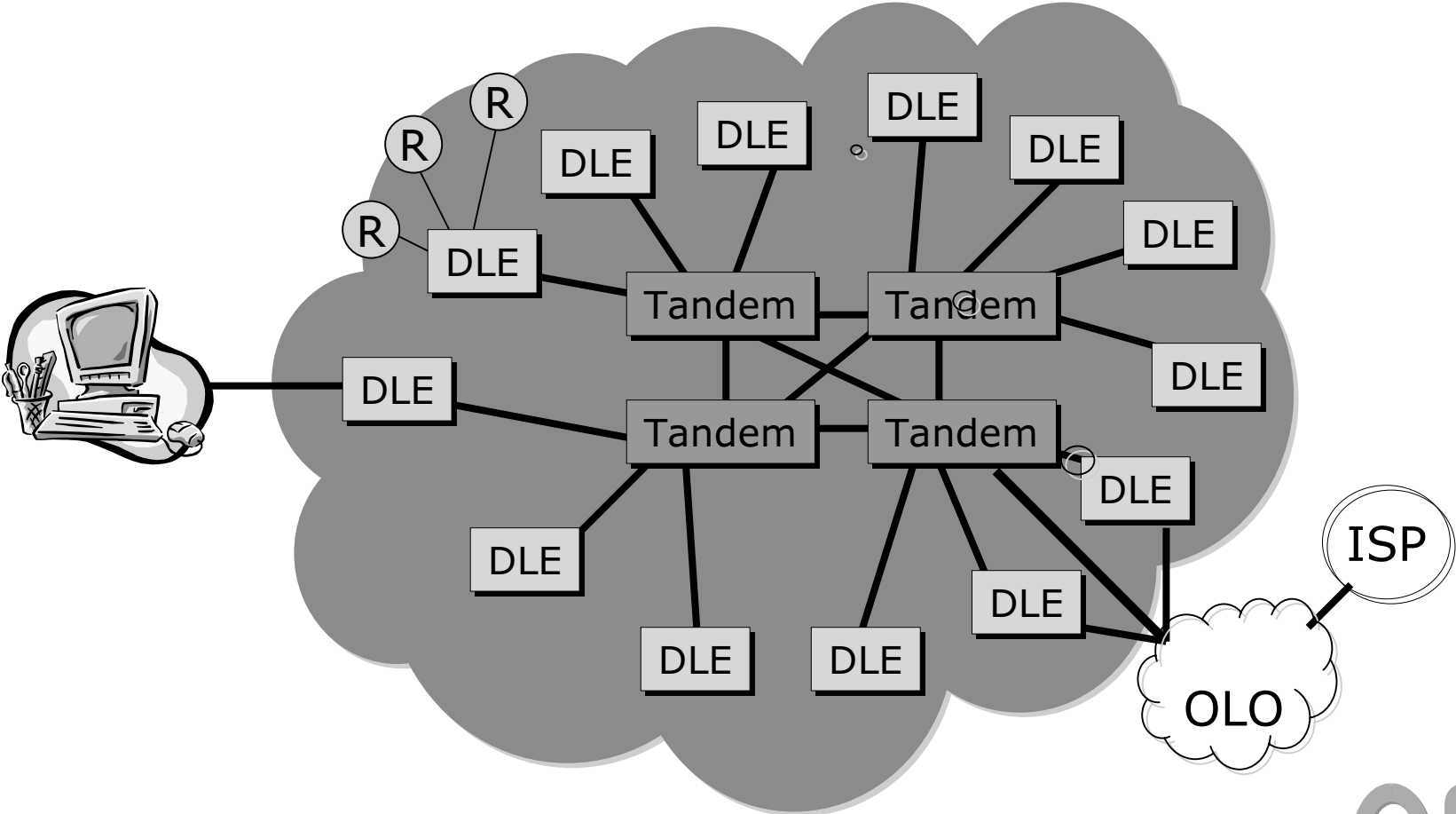
OECD Workshop on Internet Traffic Exchange  
Berlin  
7-8 June 2001

Ofel

# Outline

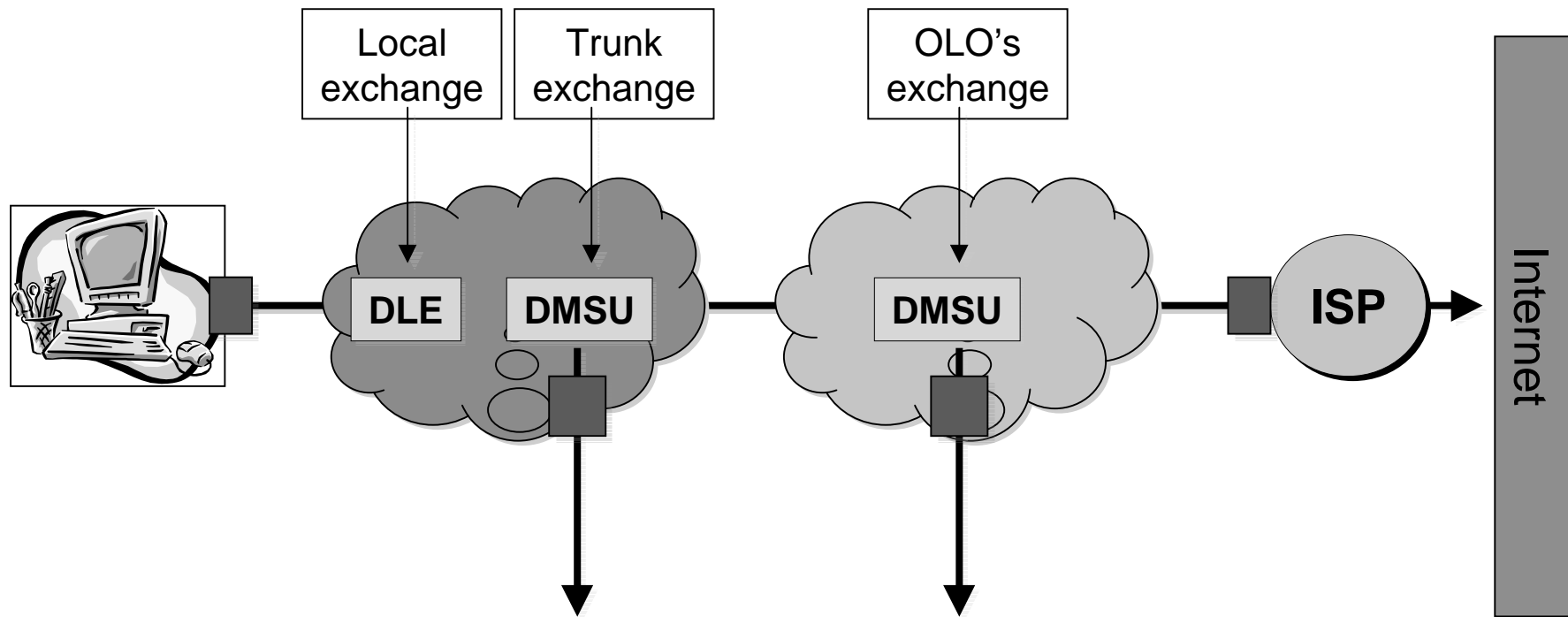
- BT network overview
- ‘Grooming’ of Internet traffic and BT SurfTime
- Complaints and responses
- Local exchange (DLE) FRIACO
  - Network capacity concerns
- Single Tandem (ST) FRIACO
- Calculation of FRIACO Charges
- Next steps
- Conclusions

# BT's Network



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# Network Architecture (before December 1999)

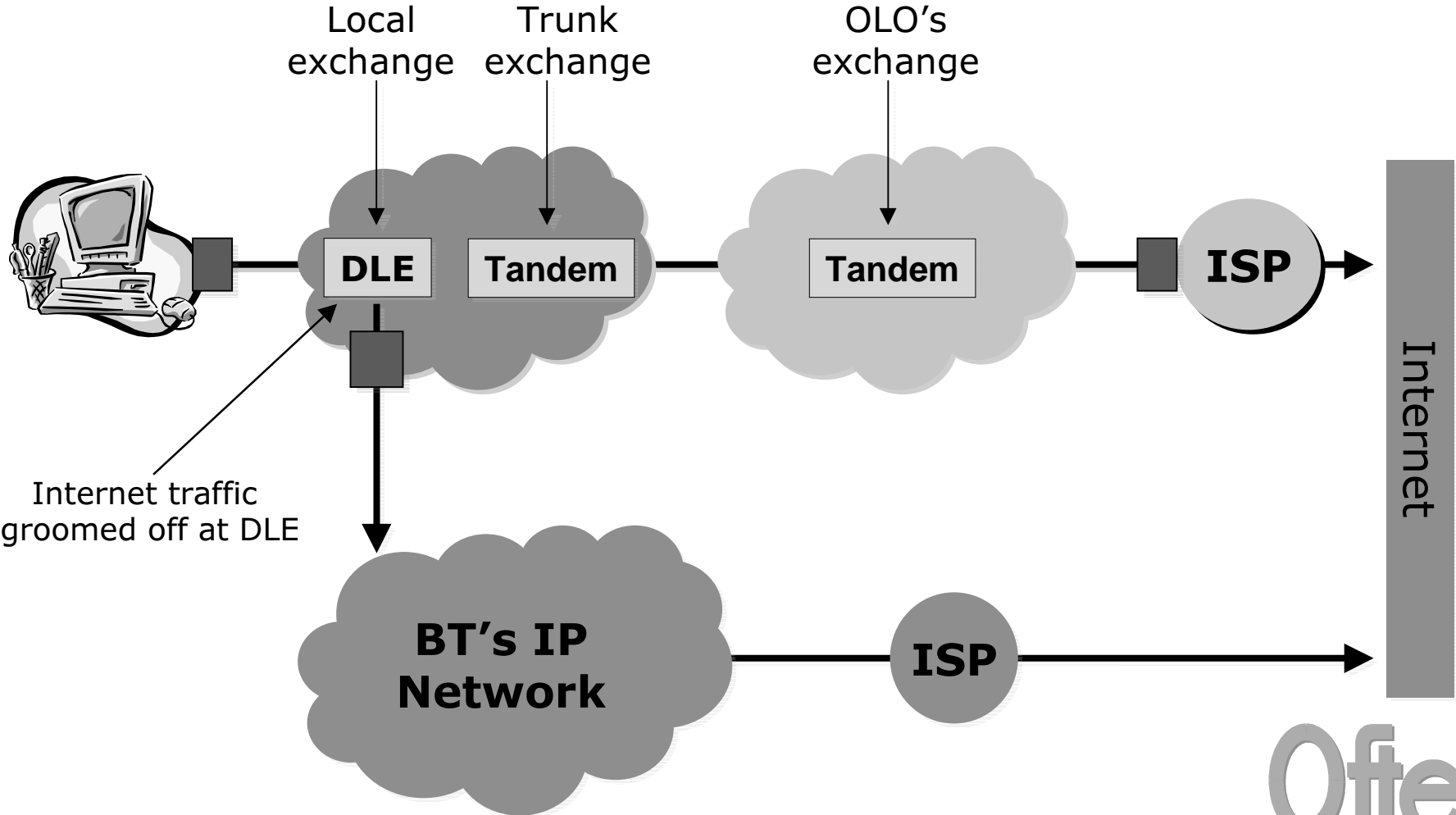


## December 1999 - Signs of Change

- BT announced that it would separate (groom) Internet traffic from other traffic as close as possible to the consumer at the local exchange (DLE)
- BT announced SurfTime, an unmetered retail product which used grooming at the DLE
- BT refused supply of unmetered wholesale product to the DMSU
- MCI/WorldCom complained to OFTEL

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# Network Architecture (after December 1999)



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## ‘Unmetered Retail in a Metered Wholesale World’

- Revenues from subscriptions were fixed
- Costs were sensitive to traffic volumes since they included metered wholesale payments to BT
- Large uncertainties in forecasting traffic volumes with unmetered retail products
- Operators likely to make losses if actual traffic volumes were higher than forecast
- Therefore, operators exposed to significant risk

# BT's Response to Complaints

BT argued that:

- 1 it faced the same risks as other operators - like other operators, its retail arm was paying for wholesale minutes on a metered basis.
- 2 its trunk network would overload/collapse if they carried unmetered Internet traffic



# OFTEL's view on BT's first argument

- BT Wholesale and BT Retail *together* would not be exposed to the same forecasting risks as other operators when launching unmetered retail products on the basis of metered wholesale
- OFTEL believed that other operators could not compete effectively with BT's SurfTime without an appropriate *unmetered* wholesale product

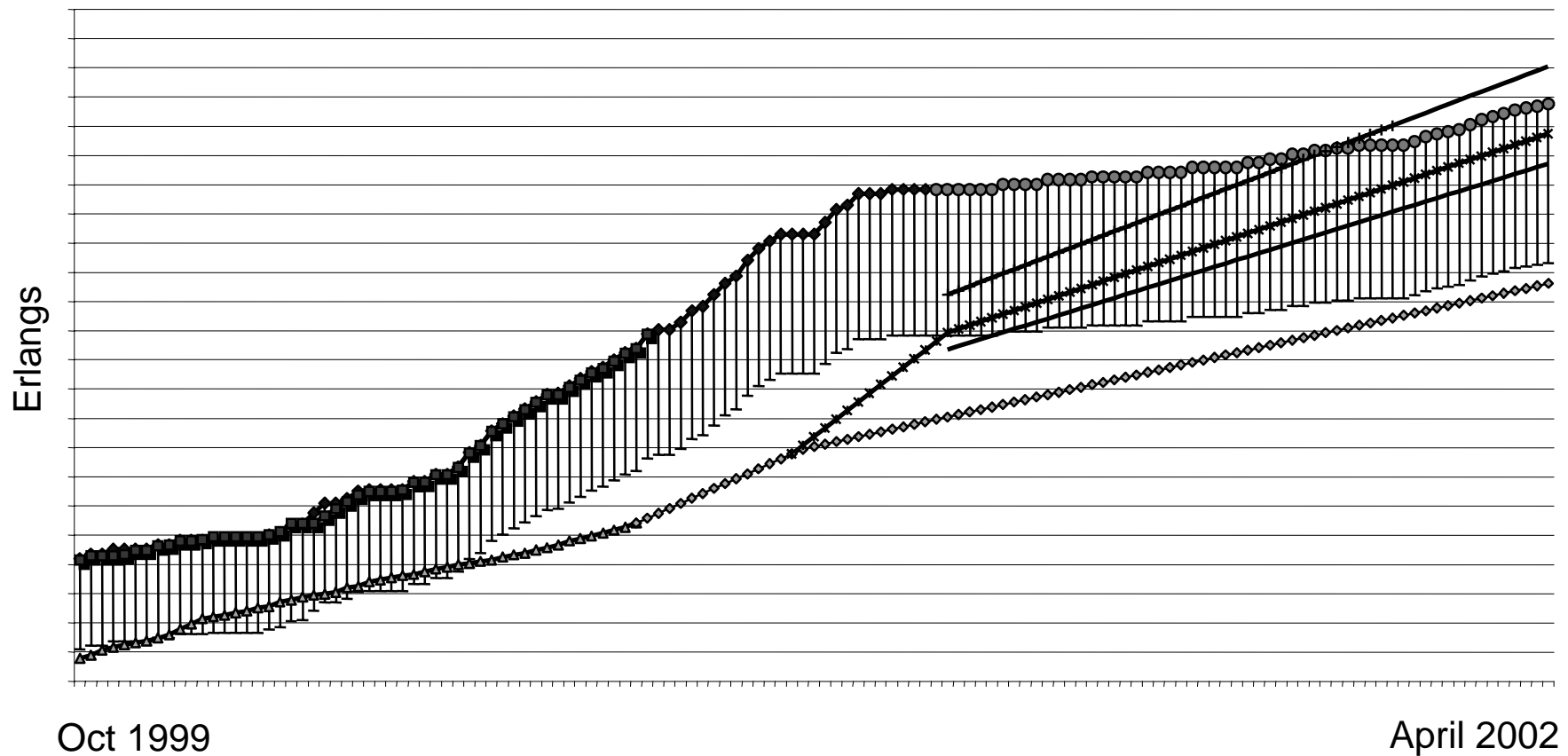
## OFTEL's view on BT's second argument

- Appointed Technical Experts to examine BT's claims about its tandem network being overloaded
- In advance of this report, not reasonable to require BT to provide unmetered wholesale product through the Tandem *switch*
- But was reasonable to ensure that the wholesale product provided at the Tandem *premises* since not reasonable to expect competing operators to interconnect at *all* local exchanges (DLEs)

## **DLE FRIACO** *(26 May 2000)*

- The provision of wholesale unmetered call origination from the customer to dedicated ports at the DLE
- Fixed charge per 2Mbit/s port
- BT agreed to offer interconnection extension circuits (IECs) from Tandem switch premises to DLEs
- Technical Experts report commissioned to examine how Tandem capacity issues could be addressed

# PSTN Capacity Forecast



Source: BT

Ofiel

# Addressing PSTN capacity issues

Oftel's experts confirmed

- BT's Tandem network capacity is not scalable
- Current growth plus unmetered would exhaust capacity by mid 2001

Recommended

- Move some existing traffic from tandem to DLE interconnection
- Look at building a separate tandem overlay for unmetered traffic
- Move to IP interconnection for Internet traffic

Oftel

# **ST FRIACO: (15 February 2001)**

Stage 1 - to 31 January 2003

- Limit capacity at individual switches (40x2Mbit/s)
- Where capacity is limited operators may have to re-arrange non-FRIACO traffic to co-located DLEs
- Voluntarily or at BT's 'reasonable' request

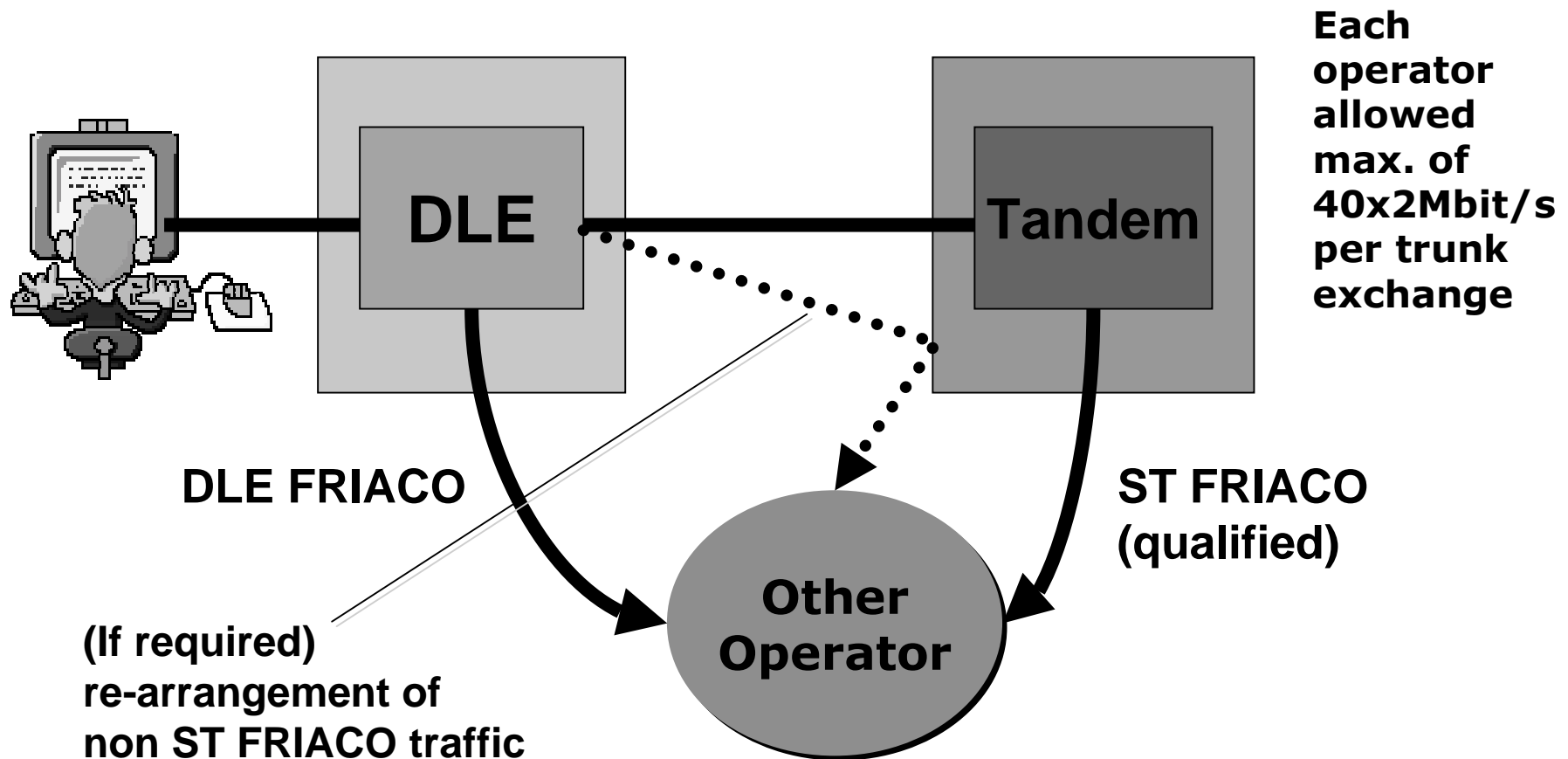
Stage 2 - from 1 February 2003 (subject to review)

- BT to provide unlimited access
- All operators to share costs of any "stranded assets"
- No further re-arrangement

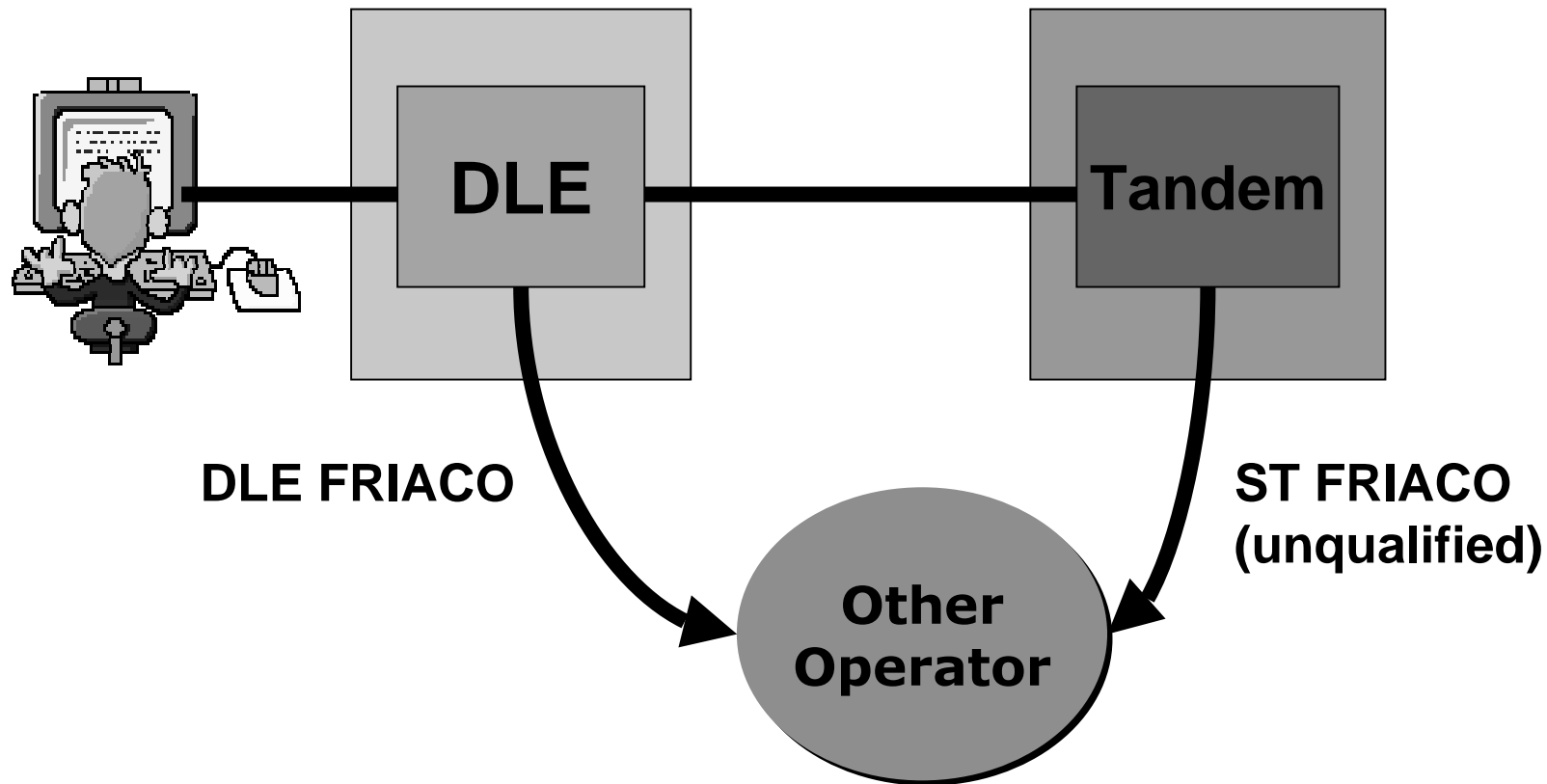
Stage 3 - quickly!

- IP Interconnection

# Stage 1 - to 31 January 2003



# Stage 2 - from 1 February 2003





# Calculation of FRIACO Charges

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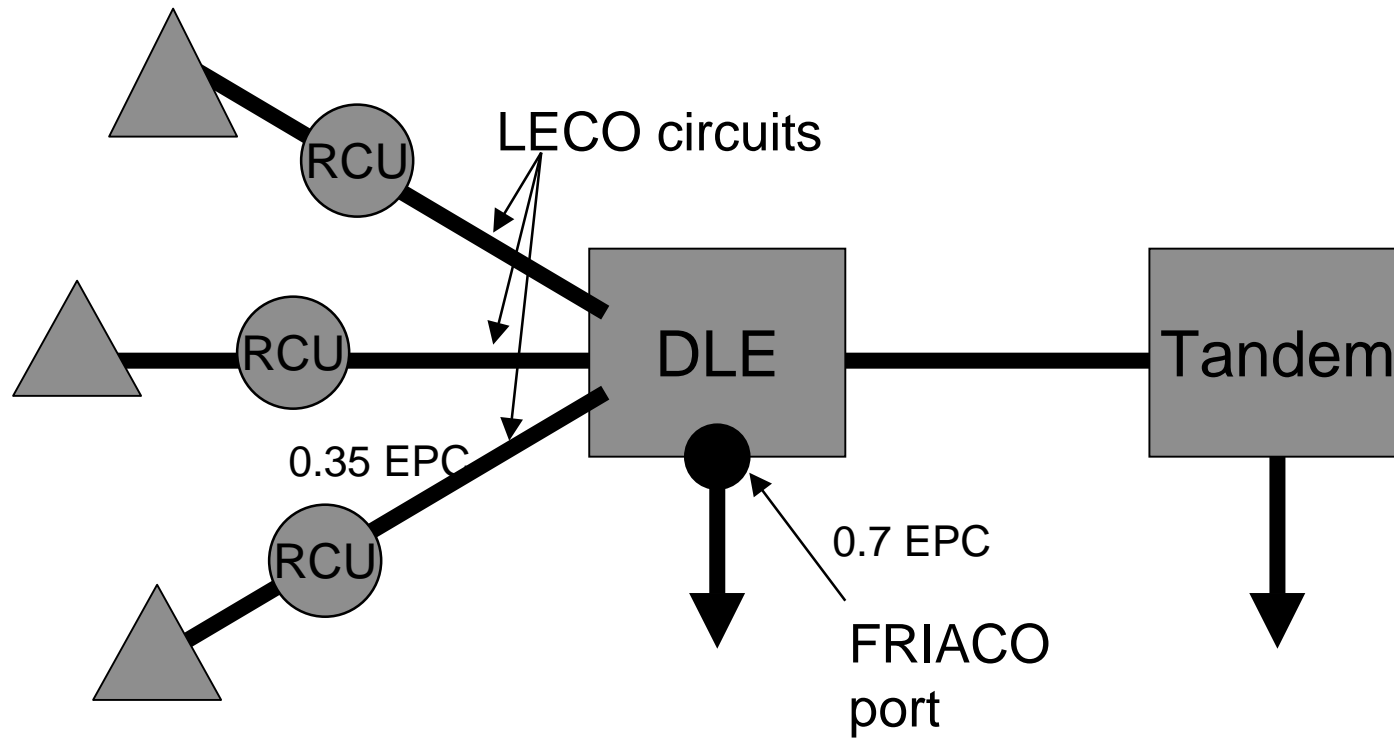
# Outline

- Methodology
- FRIACO at DLE
- Single tandem FRIACO
- Future work

# What is FRIACO?

- Fixed charge for a virtual circuit for call origination for internet access
- from originating customers up to interconnect port ('FRIACO port')
- Operator can then:
  - run FRIACO port at whatever GoS it wishes
  - generate traffic outside BH without increase in charge, but....
  - ....limited by max traffic that can be carried through FRIACO port

# DLE FRIACO port and circuits



# Overview of Calculation Methodology

- LRIC based charge for a single 64 kbit/s circuit
- Multiplied by adjustment ratio for number of circuits necessary per FRIACO port
- Plus LRIC based charge for FRIACO port (per 64kbit/s)

# Circuit charge

Average (LRIC-based) cost of a circuit

- equals total cost of relevant components divided by total number of circuits
- or equivalently, pence per minute average costs multiplied by average minutes per circuit

# Why is an Adjustment Ratio needed? (1)

- FRIACO traffic shares core network transmission links with PSTN traffic
  - and network unable to offer different GoS to each of these traffic streams
- Transmission links are operated at GoS required for voice traffic
- This means lower EPC for transmission links, eg LECO, than for FRIACO port/ interconnect links

# Why is an Adjustment Ratio needed? (2)

- Other reasons for lower EPC :
  - thinner routes (so lose economies of scale)
  - multiple BHs (ie not all RCU's experience their own BH at the same time)
- Since FRIACO port runs 'hotter', more than one transmission circuit is required per FRIACO port
- Adjustment Ratio is measured as ratio of Erlangs Per Circuit in network Busy Hour



# DLE FRIACO: Circuit and Port charge

In practice a convoluted calculation, because

- wanted to derive charges consistent with network charge controls set in 1997
- data deficiencies (=> need to deflate and reflate charges and need to estimate separate port charges)
  - Circuit charge: £134.77
  - Port charge: £40.25

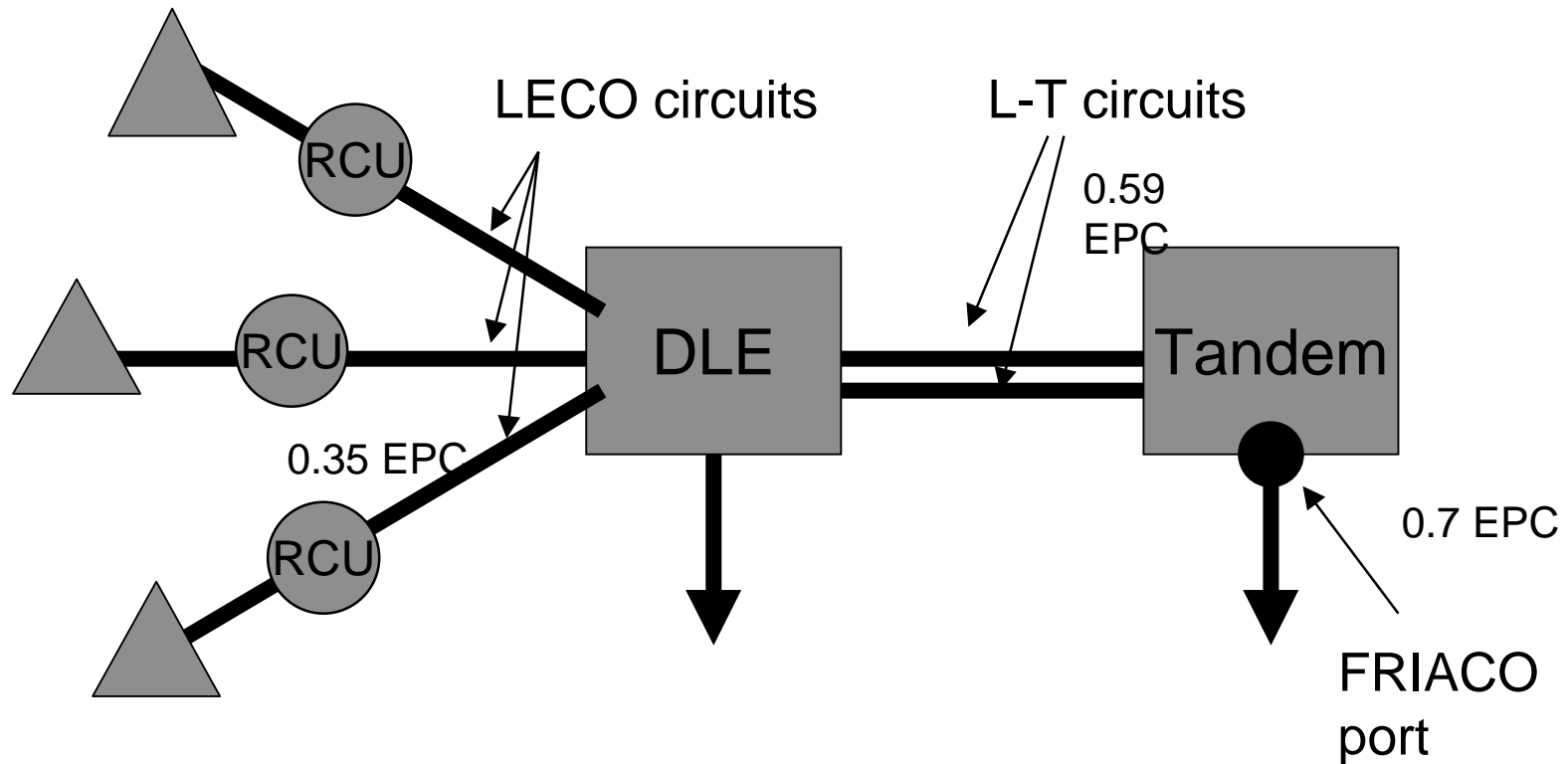
# DLE FRIACO: Adjustment Ratio

- Adjustment Ratio (AR) measured as ratio of Erlangs Per Circuit (EPC) in network Busy Hour
  - FRIACO port at DLE (=0.7) and
  - LECO circuits (=0.35)
- $AR = 0.7/0.35 = 2$
- The circuit charge is multiplied by AR

## DLE FRIACO - Results

- Circuit charge x AR = £134.77 x 2 = £269.53
- Plus port charge = £40.25
- Plus interconnect specific costs PPP) = £32.13
- Equals total charge for DLE FRIACO per 64 kbit/s port at DLE = £341.92
- Or charge per 2Mbit/s = 30 x 341.92 = £10,257.62

# ST FRIACO port and circuits



# ST FRIACO: Circuit and Port charge

- Applied same methodology as for DLE FRIACO
  - Charge for LECO circuit : £134.77
  - DLE Port charge: £40.25
  - Charge for L-T circuit : £102.78
  - Tandem Port charge: £36.11

# ST FRIACO: Adjustment Ratio

- Applied same methodology as for DLE FRIACO
- AR for LECO circuits = 2
  - FRIACO port at tandem (=0.7)
  - LECO circuits (=0.35)
- AR for DLE port and L-T circuits =1.19
  - FRIACO port at tandem (=0.7)
  - L-T circuits (=0.59)

# ST FRIACO - Results

- LECO circuit x AR = £134.77 x 2 = £269.53
- Plus DLE port x AR = £40.25 x 1.19 = £47.76
- Plus L-T circuit x AR = £102.78 x 1.19 = £121.94
- Plus Tandem port = £36.11
- Plus interconnect specific costs (PPP) = £32.13
- Equals total charge for ST FRIACO  
per 64 kbit/s port at tandem switch = £507.47
- Or per 2Mbit/s = 30 x 507.47 = £15,224.21

# Further Work on FRIACO Charges

- Incorporate Single Tandem FRIACO charge into network charge controls (charge caps)
- Adjustment Ratio Review - methodology and value (mid-2001)
  - see Discussion Paper published Nov 2000



# Next Steps

## Stage 2 Working Group

- Stranded assets etc

## IP Interconnection Group

- BT has offered a product variant
- OLOs have submitted SORs
- Target - end 2001

## Other

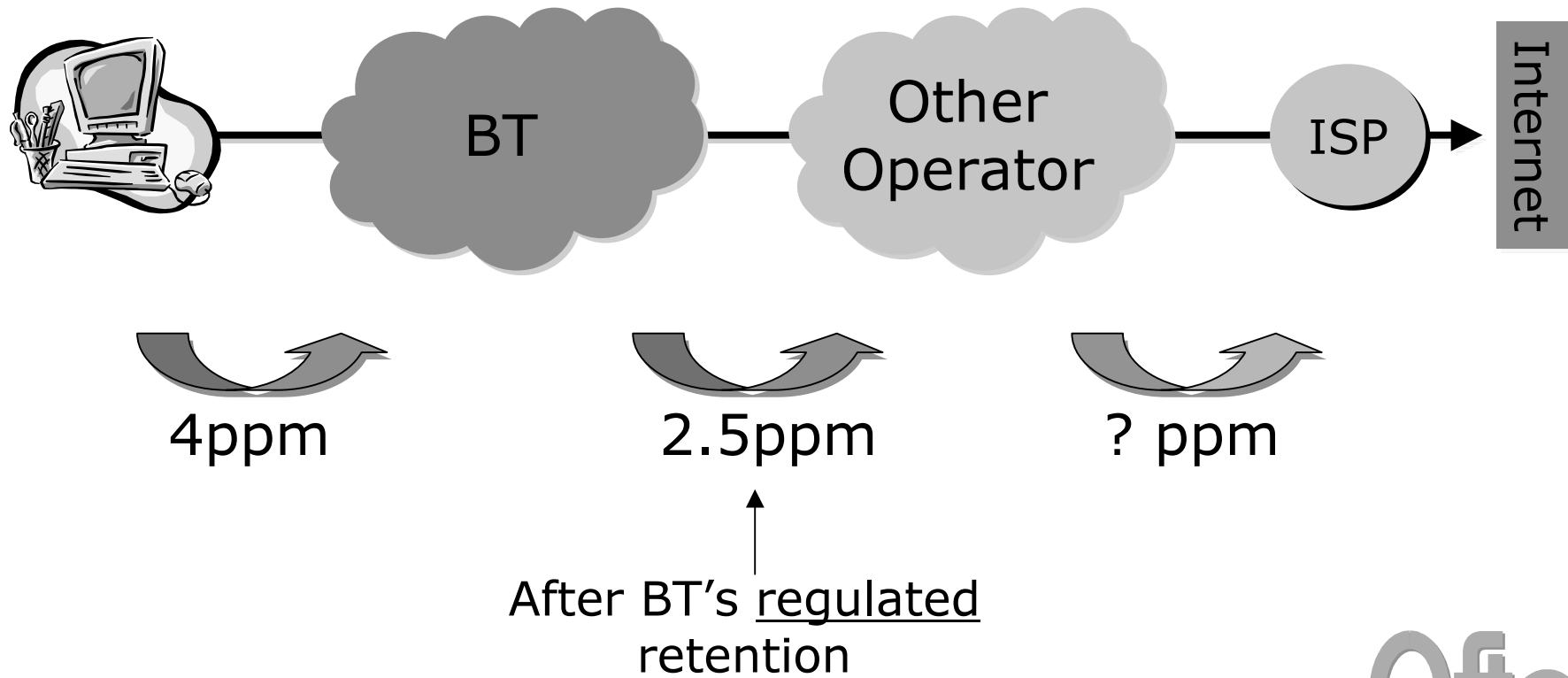
- Modem co-location
- Overflows
- 64Kbit/s channel selection

# Conclusion

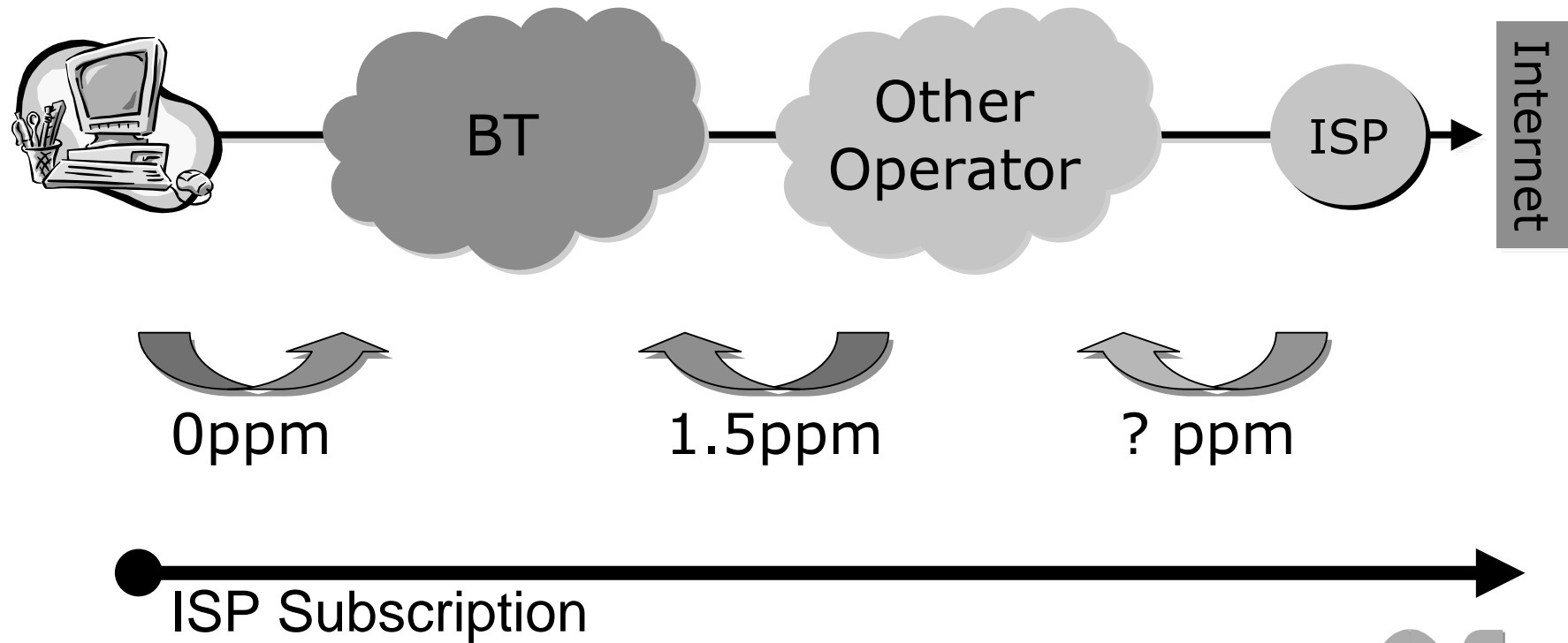
FRIACO was necessary to address:

- Pressure for sustainable unmetered access
- Unsuitability of the NTS model
- BT's retail activities
- Lack of suitable wholesale alternative
- Network capacity constraints and...
- To bridge the gap until Broadband becomes widely available

# NTS



# 0800 Internet Access



# 0800 NTS Unmetered ISPs

- Revenues
  - Subscriptions (fixed)
  - E-revenues (variable)
- Costs
  - Call origination
  - Operational
- ISP costs escalate with usage
- Some market exit seen

