



# Implementing an IP-based video contribution network

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# Using existing WAN infrastructure?



- Scepticism among broadcasters
- Ethernet/IP packet type technology  
not ideal for real time services
- Can Quality of Services be guaranteed?



# Strategy behind choice of Technology

- Server based production already in place (1999)
- Use of file transfer for recorded material offloads  
the need for real-time contribution circuits
- More than 80% of material is non real-time
- Expensive to maintain separate network for  
live contribution links



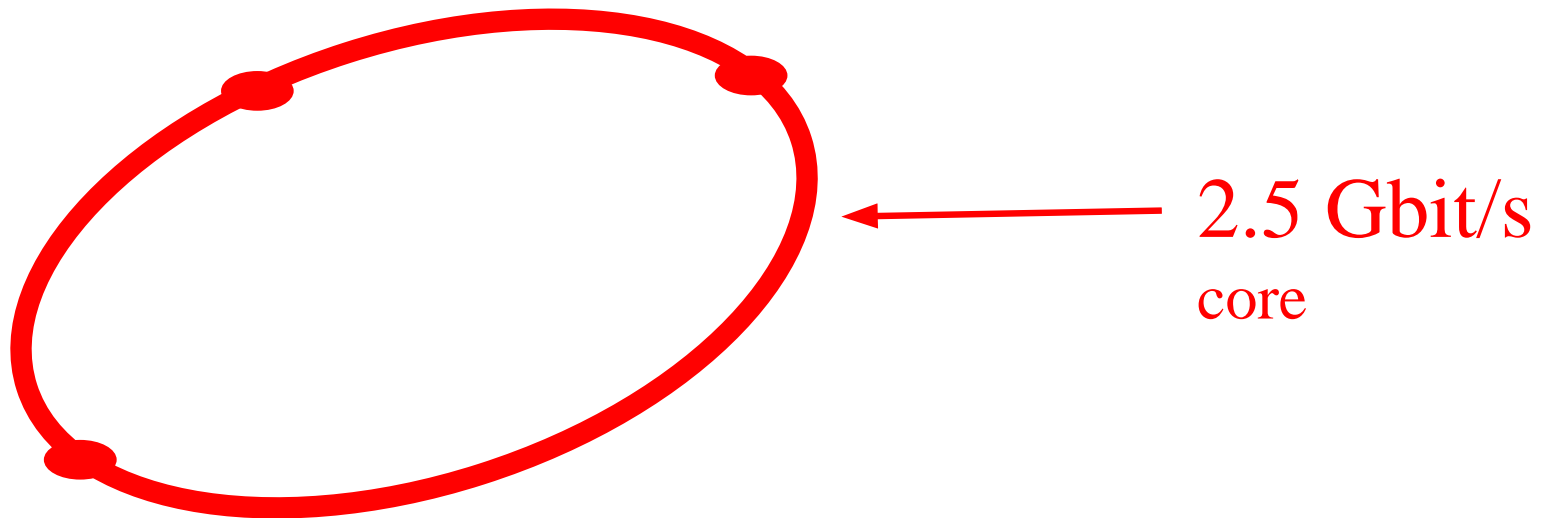
# Strategy behind choice of Technology

- One common technology for all communication
- Use of Existing Ethernet/IP based infrastructure
- DVB over IP meet flexibility and bandwidth criteria
- Economically viable using standard equipment
- Using well proven equipment
- But can it be done?



# WAN topology (core)

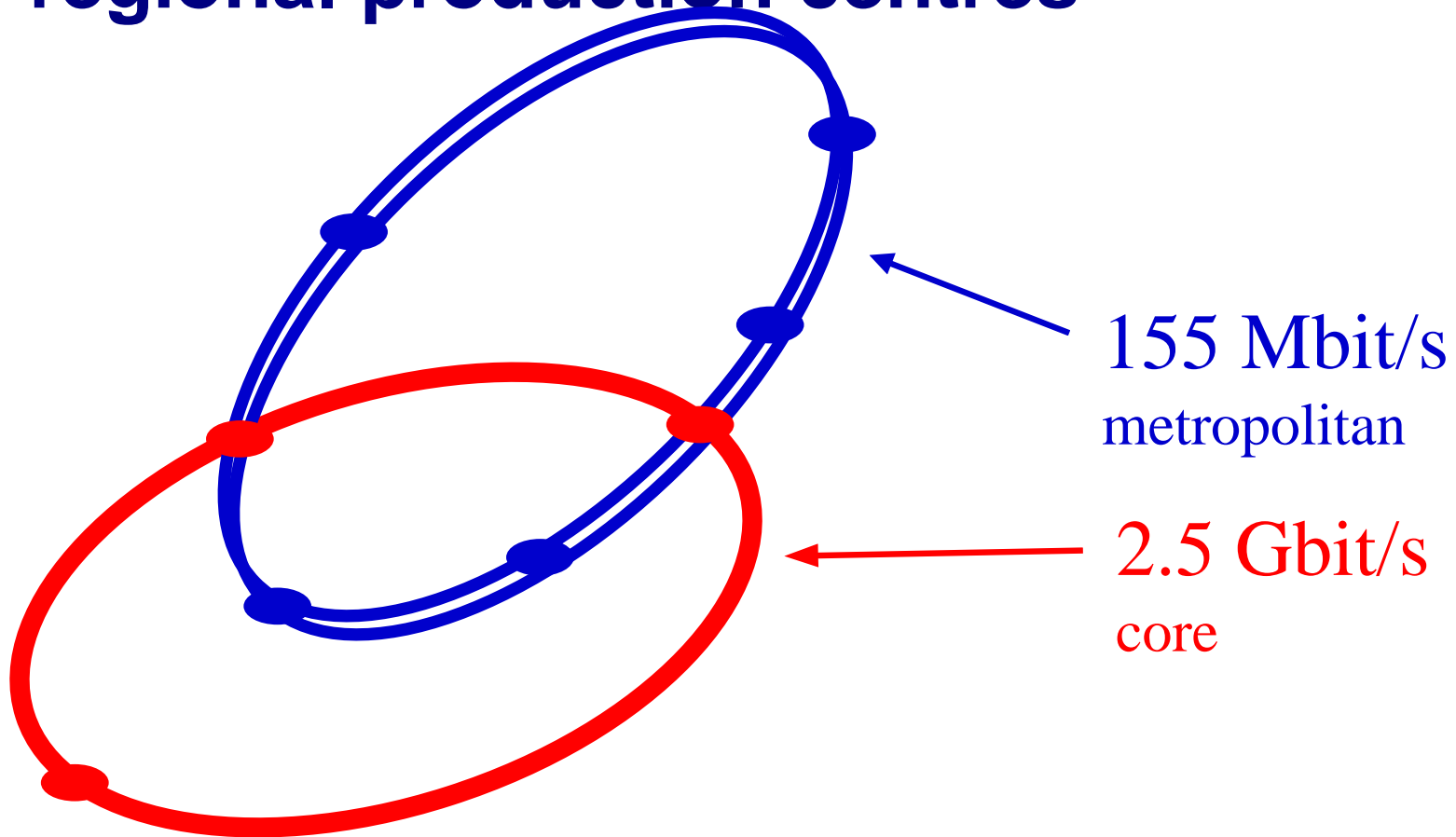
## 3 major production centres





# WAN topology (metropolitan)

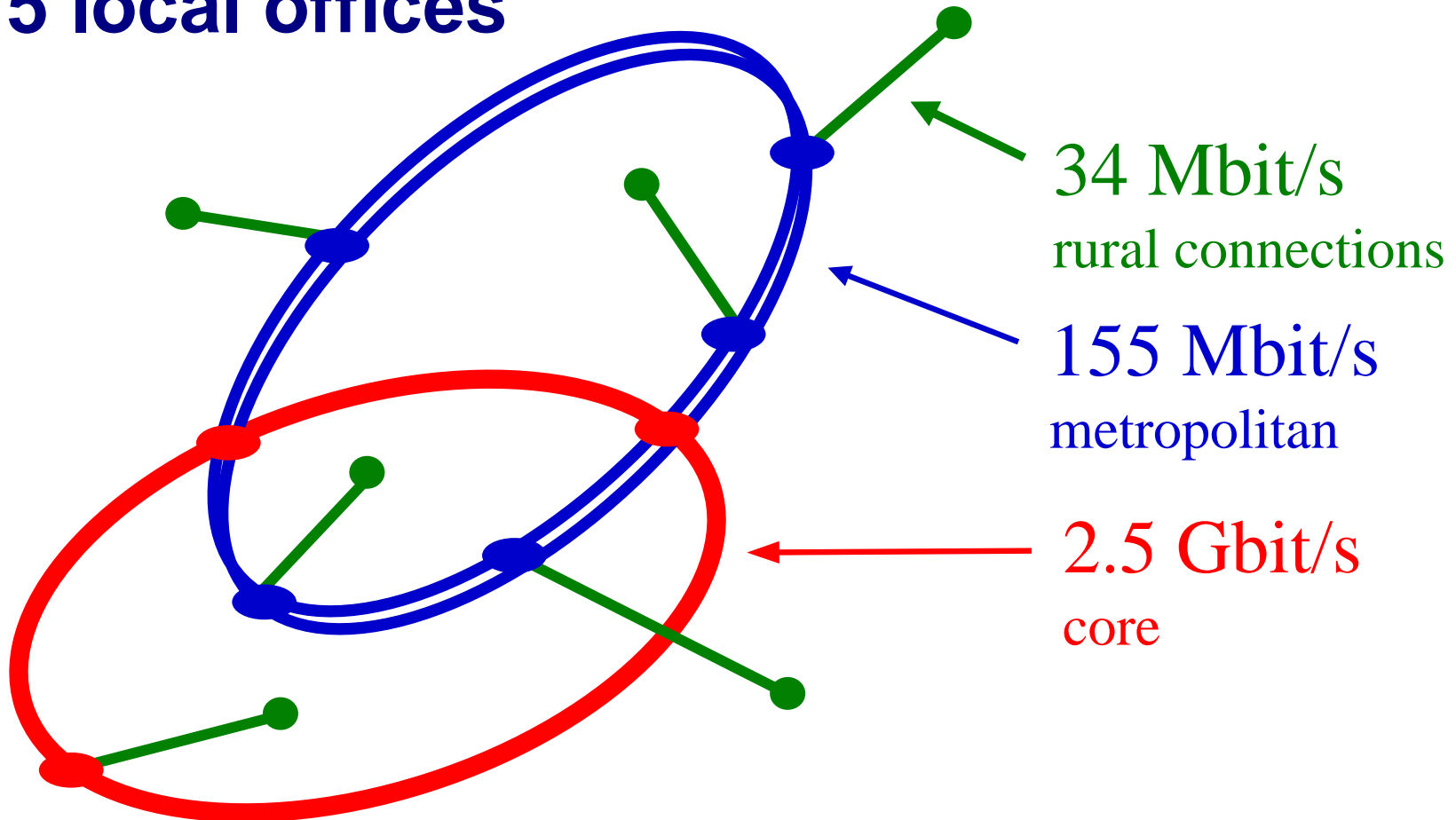
## 9 regional production centres

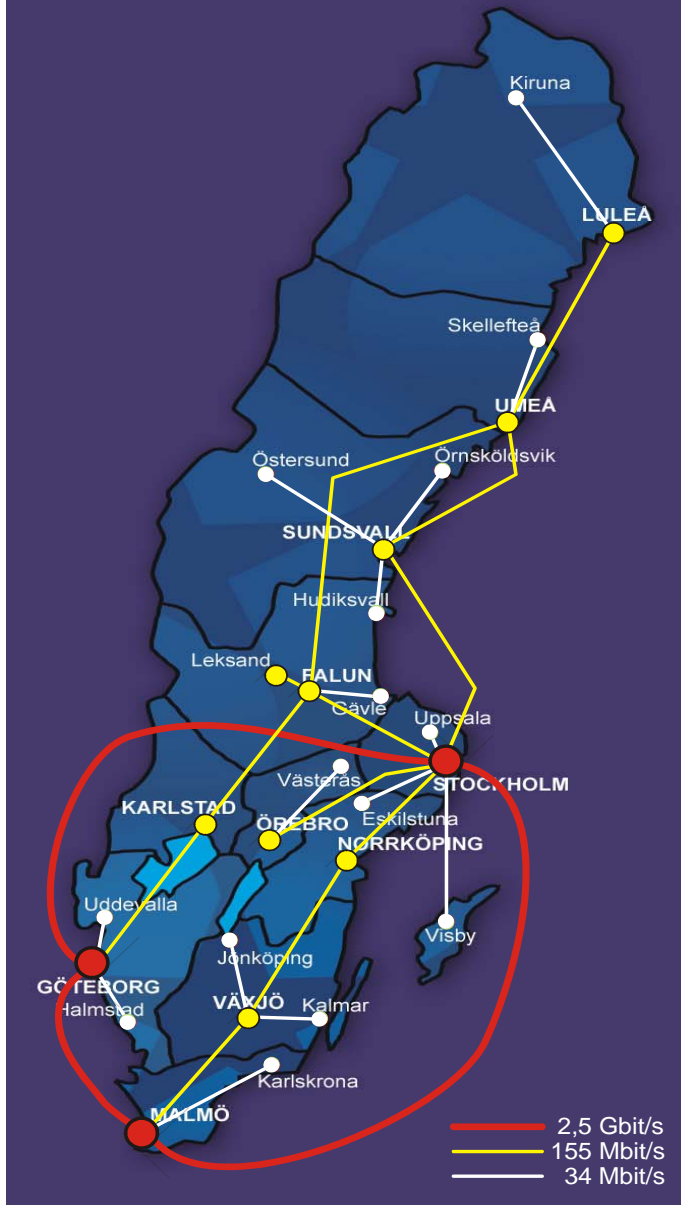




# WAN topology (rural)

## 15 local offices





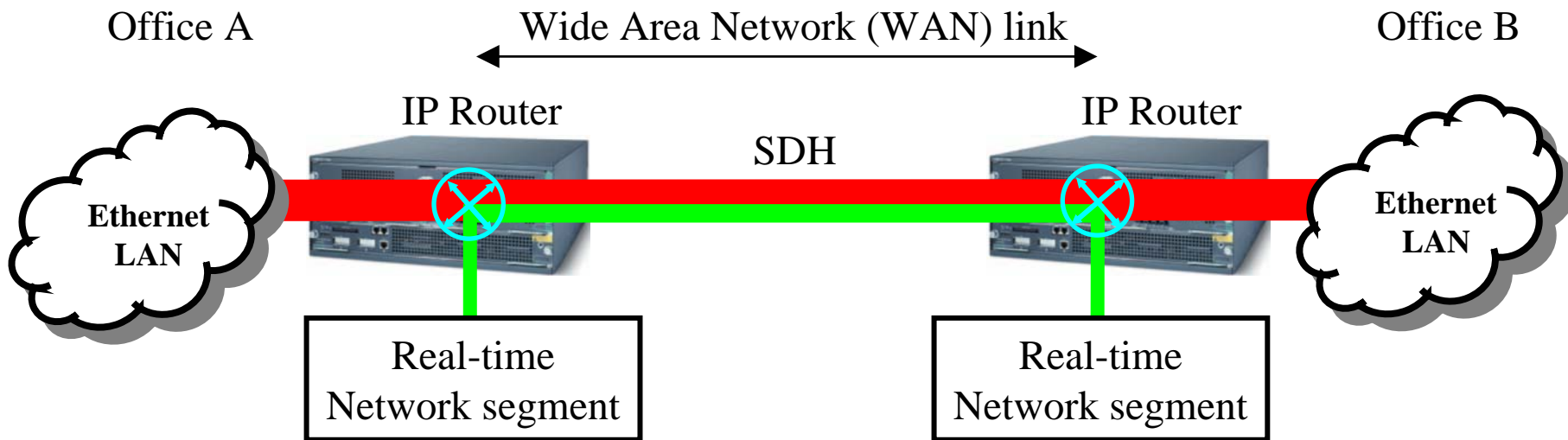
**Final solution**  
**27 locations**  
**more than 5000 km total**  
**fibre-optic network**  
**point-to-point circuits**  
**managed and provided by**  
**'Banverket'**  
**(Swedish railways)**

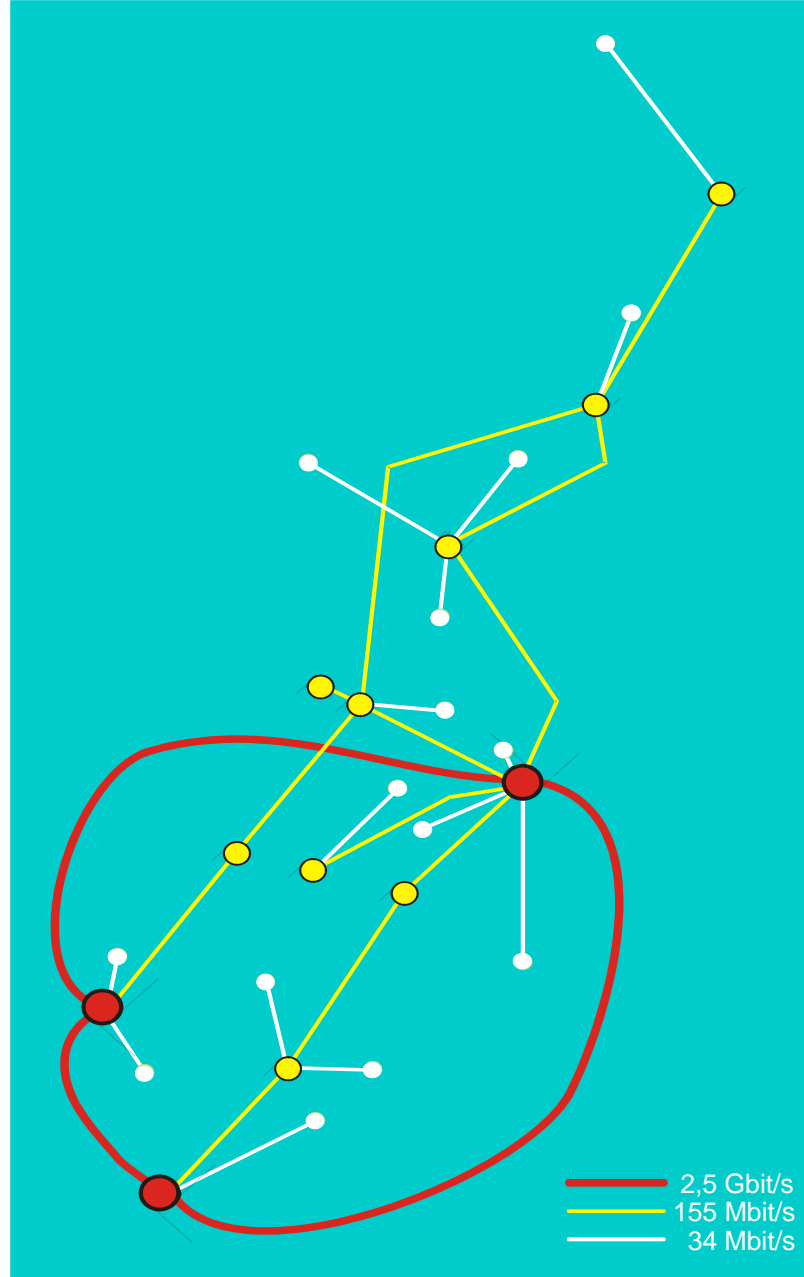




# Managing QoS

- Locations are connected over point-to-point links
- Physically separated network segments for real time data at each location
- Real time data only co-exists with other traffic in the WAN links
- Real time data have highest priority
- Real time traffic is allowed up to 80% of WAN-link capacity
- No packets are lost, unless real time data exceeds bandwidth over the WAN link





**Dedicated computer performs  
the following tasks:**

- **Manages bookings**
- **Calculates path through network**
- **Records current and future booked bandwidth utilisation in a SQL database**
- **Denies a booking if bandwidth will be exceeded on a point-to-point WAN link segment**



# Transmission modes

- **HIGH:** 22 Mbit/s, MPEG 4:2:2@ML
- **INTERVIEW:** 18 Mbit/s, Low delay MPEG-2 4:2:0@ML
- **LOW:** 9 Mbit/s, MPEG-2 4:2:0@ML
  
- All modes have 4 sound channels
- Total delay is approximately
  - **HIGH** 450 ms
  - **INTERVIEW** 250 ms
  - **LOW** 720 ms



# Booking software



- **The booking and management system is implemented on a Linux server running web services and a SQL database**
- **Equipment is controlled via SNMP**
- **Bookings are made through clients using conventional WEB-browser**
- **The booking system can be accessed from all (allowed) users inside the SVT Intranet**
- **Server side software is written in Perl**
- **Client side software is Java based**



# Booking system interface



http://ms-lankbok.svt.se - Lankbokningssystem SVT - Mozilla Firefox

Schemanavigering

Tid 10:08:23 Vy Default

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23

STOK01 24 Kon

STOK02

STOK03

STOK04

STOK05

STOK06

Mottagare i Stockholm

Sändare

Mottagare

STOK21 24 Kon

STOK22

STOK23 24 Sverigt

STOK24 Copy La Nytt Perspektiv

STOK25

STOK26

GTBG21

GTBG22

GTBG23

MLM021

MLM022

MLM023

LULE21

UMEA21 24 Kon

Elementinformation

Tid Meddelande

Sändare:

Mottagare:

Titel:

Noteringar:

Tid:

Rep:

Inslagshantering

Ny Zooma

Andra Visa info

Radera Stoppa

Förklaring

Schemalagd

Klar

Fel vid överföring

Aktiv överföring

Applet se.ardendo.dart.DartApplet started



# Experience



- In permanent operation from Jan. 1, 2004
- More than 10 000 completed transmissions during first 12 months
- OB-events using occasional fibre optical links
- High quality OB production with 5.1 ch. Sound