



# Interconnect Project: Network Design Principles



## Areas to explore

- physical infrastructure
- network configuration
- ancillary services needed



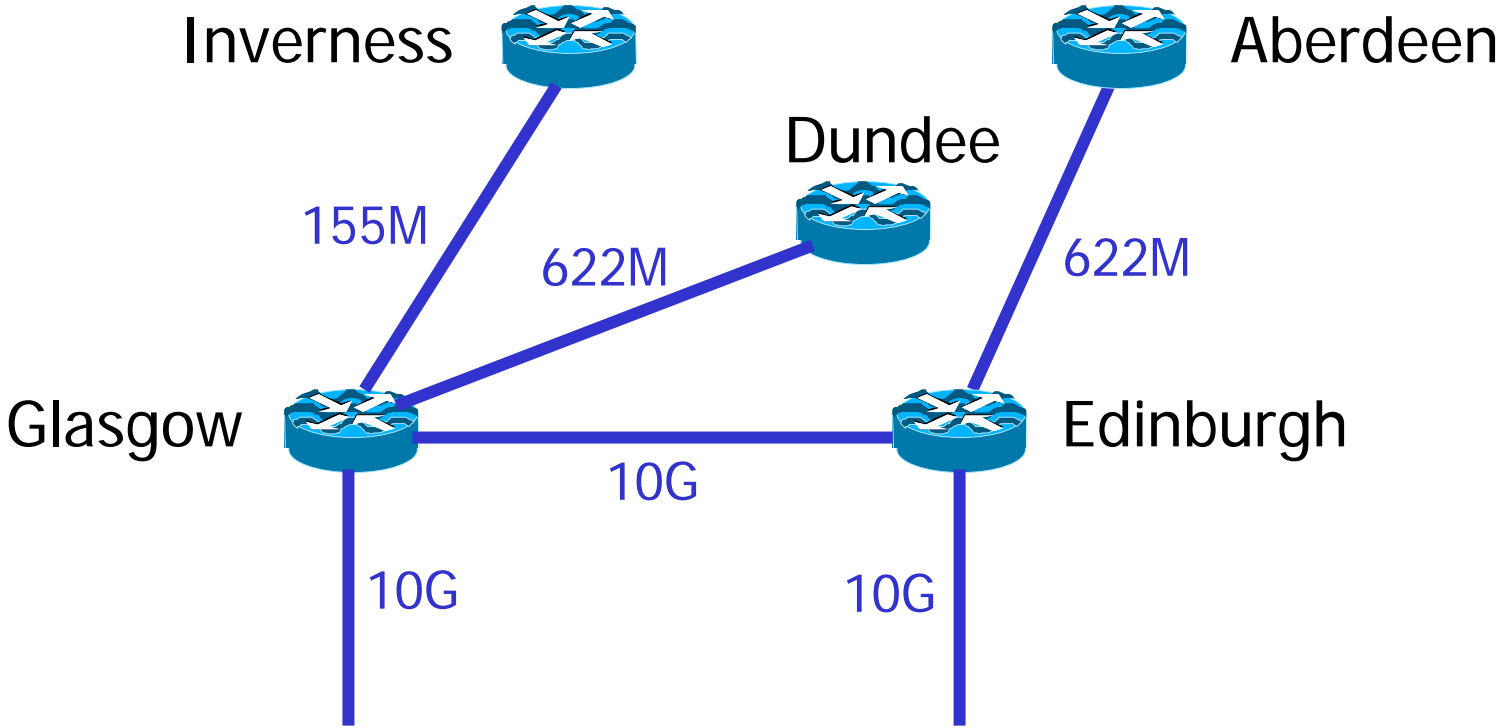
- IP connectivity
- transit to Internet
- efficient delivery of large-scale content



# Physical Infrastructure

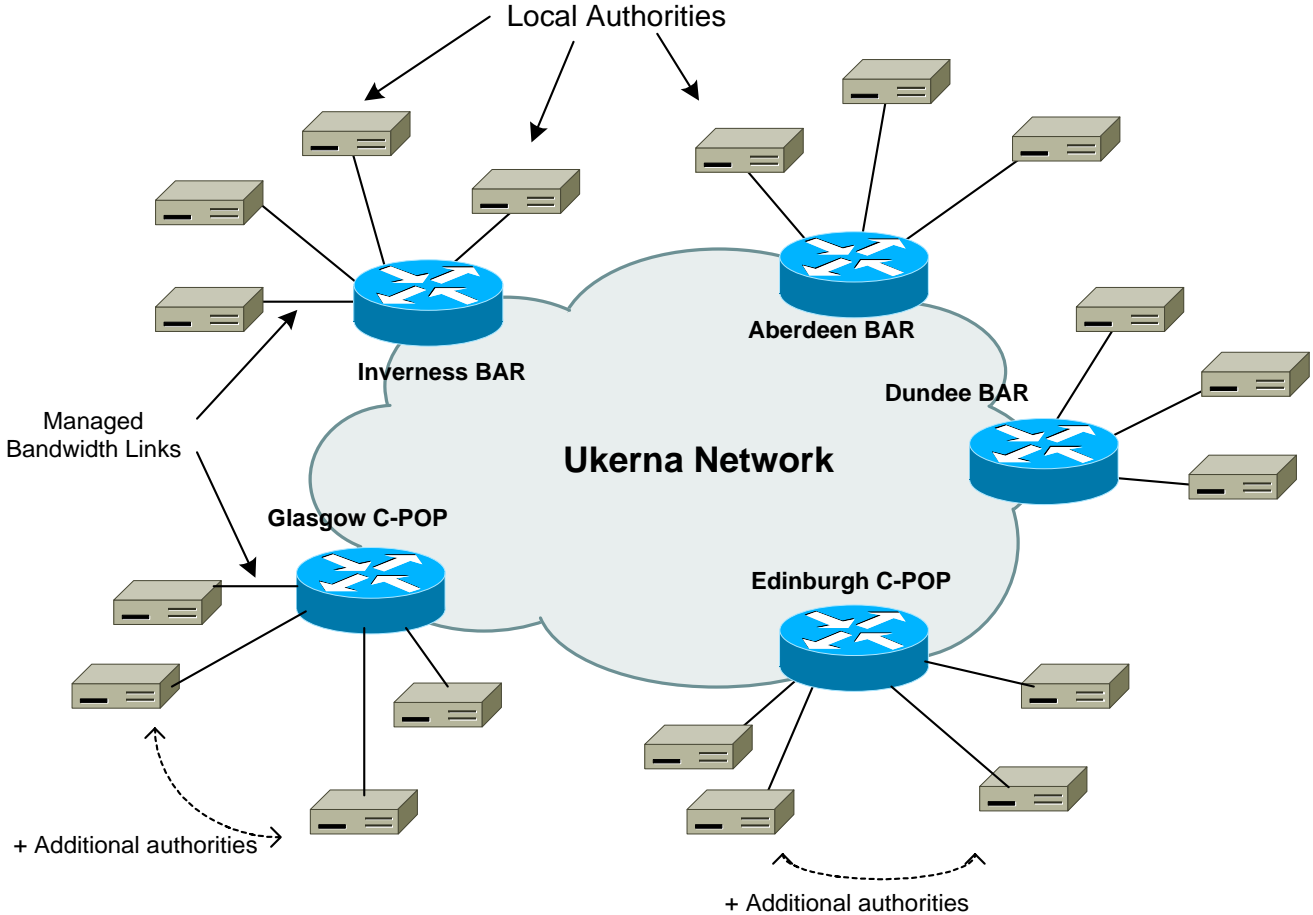


# SuperJANET backbone in Scotland





# Attaching LA networks





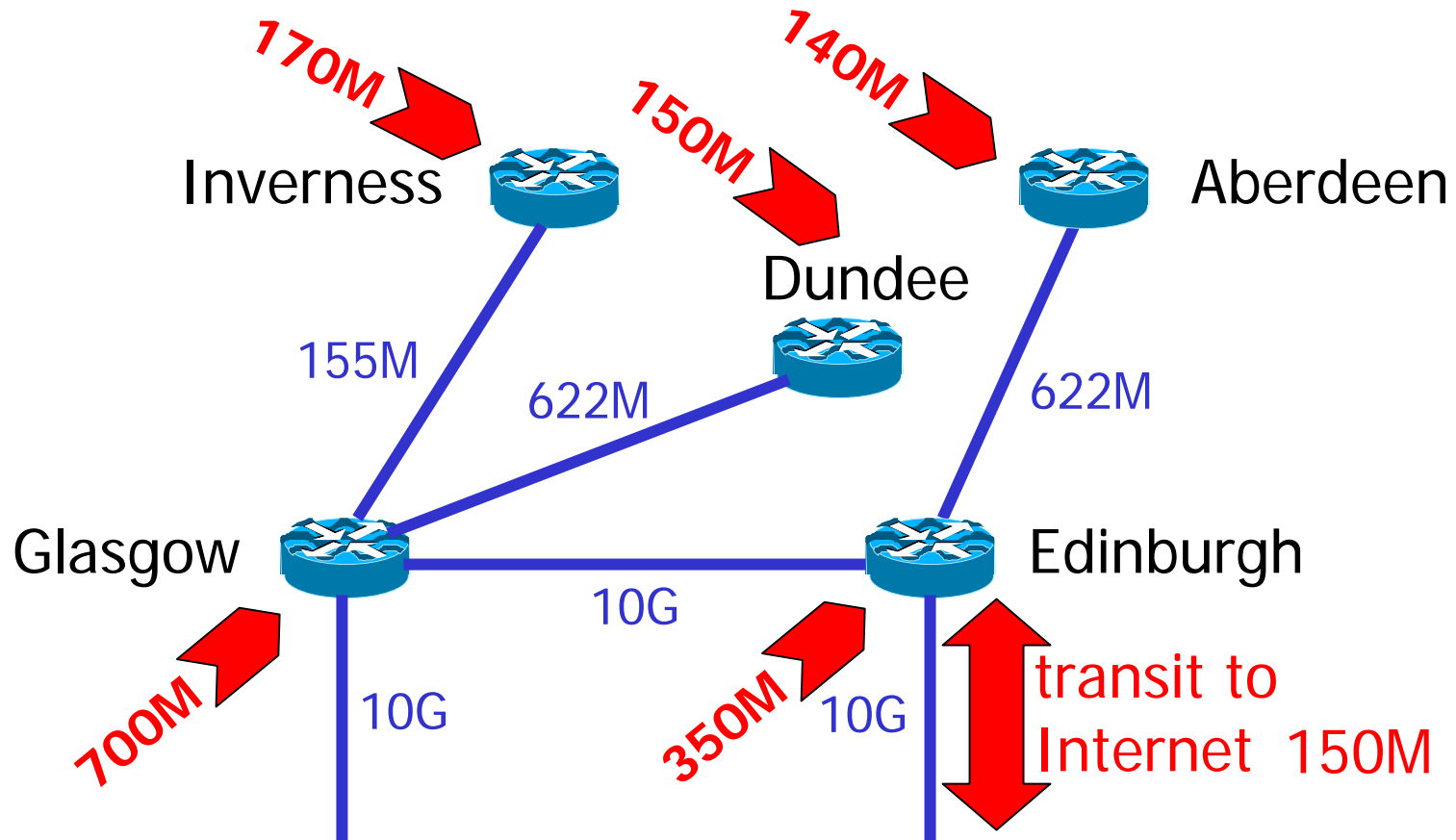
## Bandwidth estimation

- Spark assumptions for per school bandwidth
- assume initially 10% onto interconnect  
→ nominal bandwidth per LA
- map access link bandwidth to nearest standard link bandwidth above this (34/100/155 Mbps)
- aggregate nominal bandwidths to estimate flows from each SuperJANET PoP

**NB this is the starting assumption**

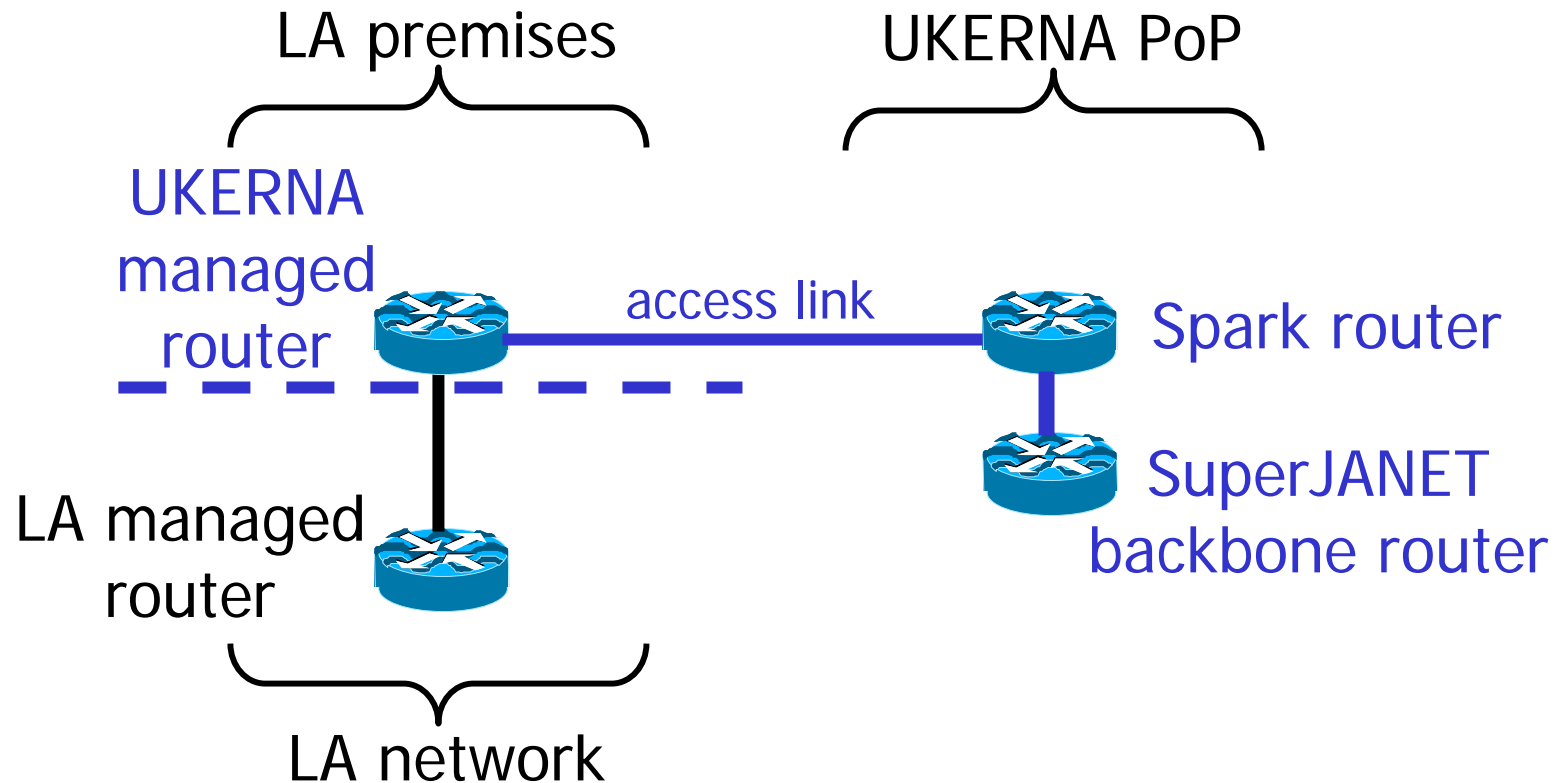


# Spark Interconnect bandwidth





# Connection & demarcation model

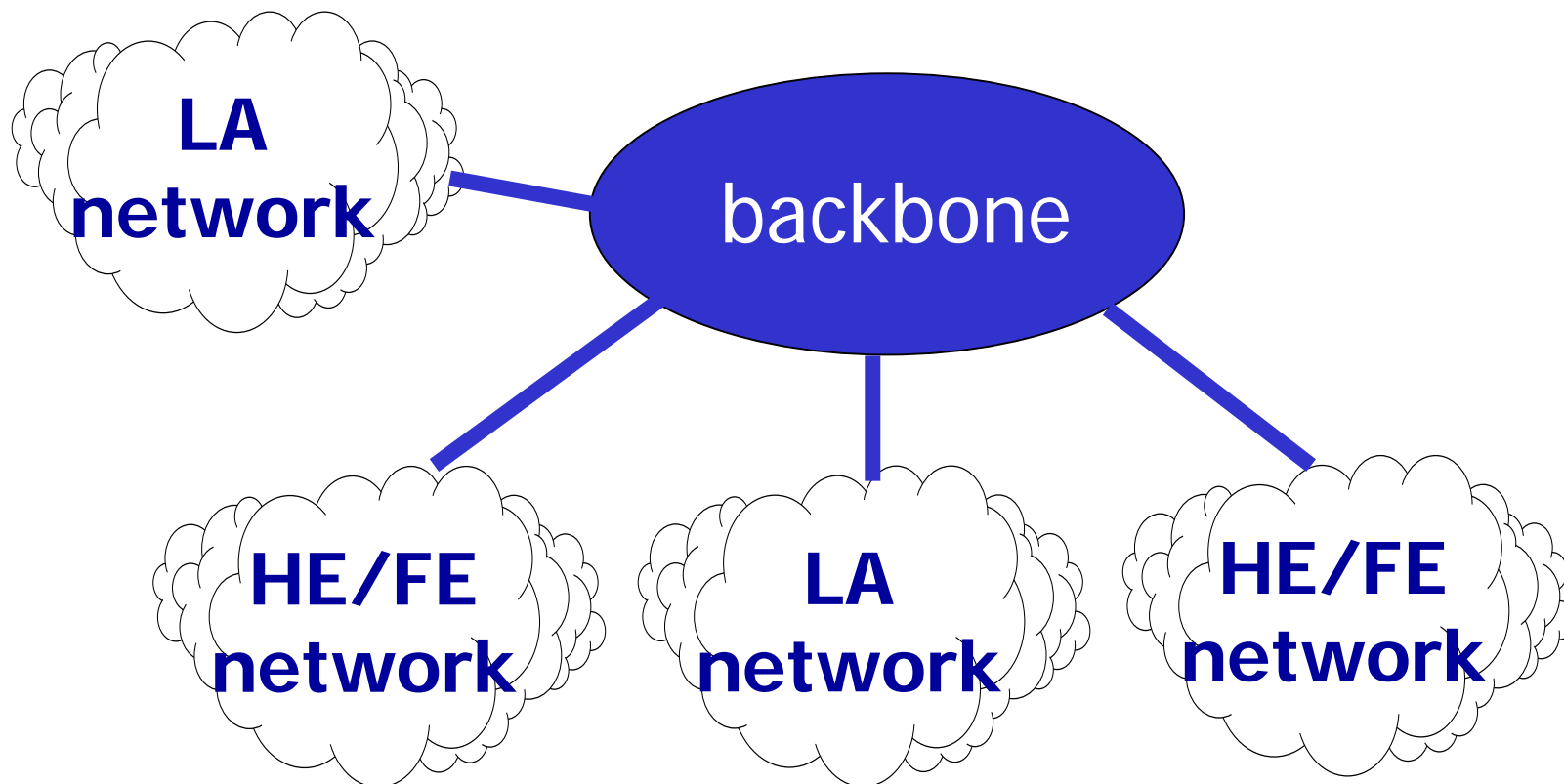




# Network Configuration

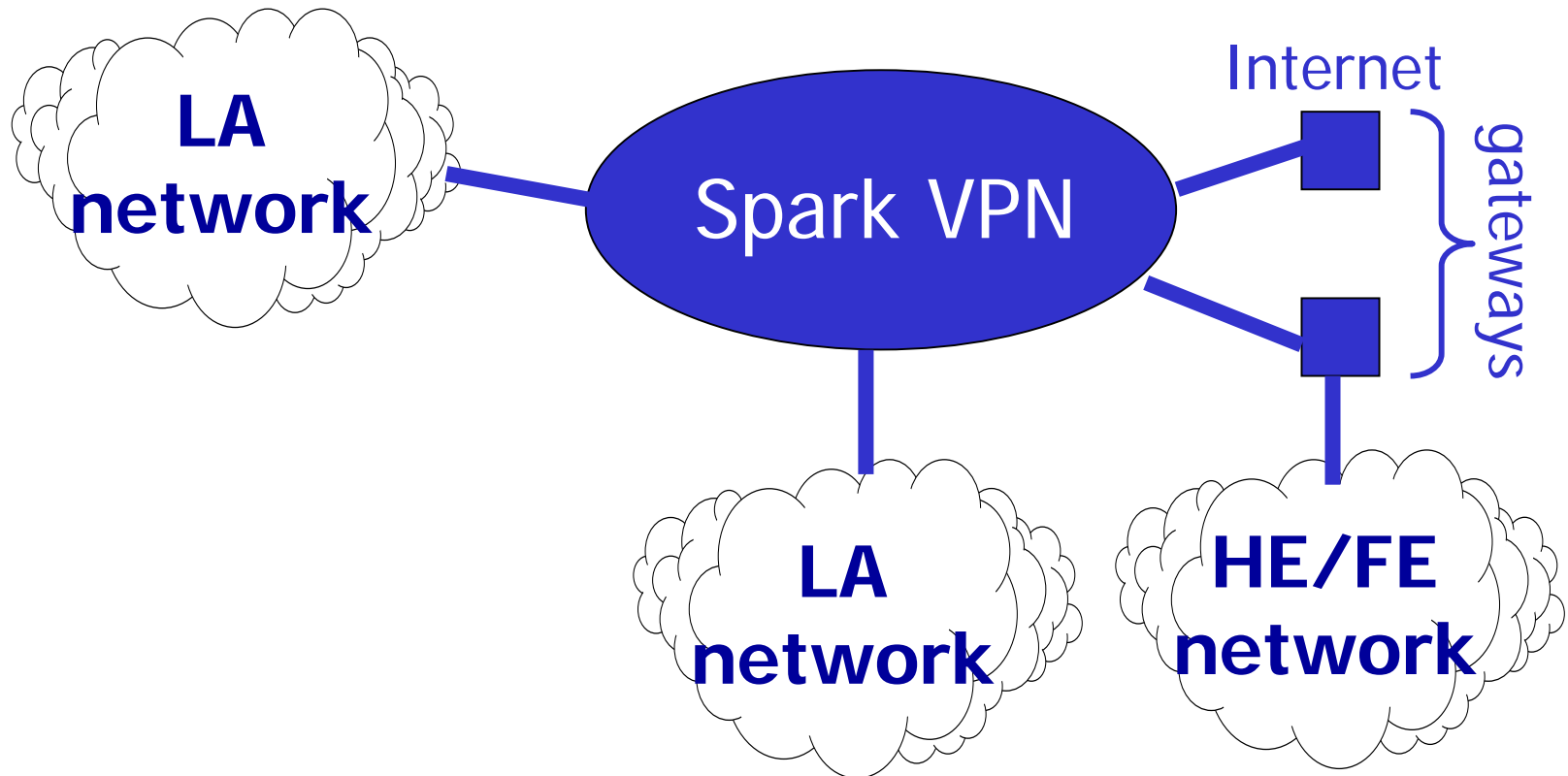


# Model 1: "Internet"





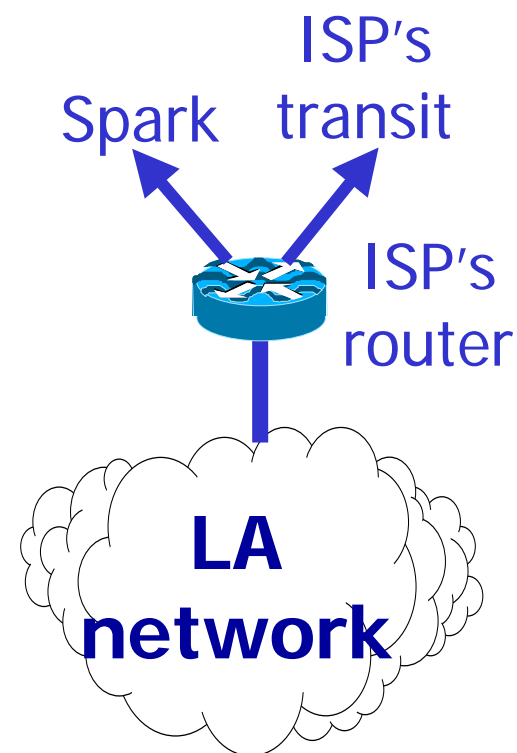
## Model 2: "Spark VPN"





## Comparison: model 1

- more natural choice for ISP managed LA networks
- industry standard for connection
- LA's ISP would handle access/filtering per LA
- efficient connectivity to HE/FE
- total backbone bandwidth available





## Comparison: model 2

- moves access/filtering and security management to the edge of the VPN
- more natural choice if one policy for all LAs
- more natural choice for total interconnectivity of all schools within the interconnect
- gateways are a potential bottleneck
- less efficient connectivity to HE/FE, and bandwidth usage
- potentially more to go wrong

# Questions about external connections



- dual homing for Internet connectivity: is this required?
- are there other specific network peerings we should be considering?
- If an ISP provides your network, where is the entry point really located?



# Content Delivery



## Delivery of large-scale content

- principle: should be on backbone
- existing co-location space in Edinburgh and Glasgow PoPs
- considering opening a Spark co-location facility in Scolocate (ScotIX peering as well ...)
- two models:
  - provider's servers hosted @ co-lo
  - direct connection @ co-lo of provider's content farm



**Discuss ...**