

11 Principles of Communications (jac22)

- (a) In what way might we consider the goals of congestion control and peak rate price to be similar? [5 marks]
- (b) It is well-known that when home network users are offered different prices for services depending on the time of day, they change their behaviour. A smart engineer employed by an ISP plans to implement this by adding BGP route selection by time-of-day-price. The engineer plans to carry this out using the three most common mechanisms for BGP traffic engineering, namely preferences, multi-exit discriminators, and AS-path pre-pending. Explain how these mechanisms work to control inbound and outbound traffic for the two following cases: (a) where the engineer's network is multi-homed on one provider, and (b) where the network is multi-homed on two different providers. [10 marks]

For reference, the BGP route selection rules in order are:

highest local preference
shortest AS Path
lowest multi-exit discriminator (MED)
i-BGP < e-BGP
lowest IGP cost to BGP egress
lowest router id

- (c) The engineer is considering updating the paths on a one-hourly basis. What are the possible limitations of the traffic engineering mechanisms discussed above with that update frequency? [5 marks]