

10 Principles of Communications (jac22)

- (a) *Fibbing* is a technique for adding custom forwarding information base entries in a routing domain. A controller masquerades as a router, which injects more specific destinations and shorter paths by some metric, than the ones discovered by the regular link state routing algorithm. Typically, the goal is to support a traffic engineering policy for some destination or source, for example for lower latency, or higher capacity.

A consortium of Internet Service Providers propose to use the same idea for Inter-Domain routing, by announcing *specialised* paths using the Border Gateway Protocol (BGP). They have heard of path-prepend as a technique to influence inbound traffic from neighboring Autonomous Systems (ASs). Of course, they can use local preferences for outbound traffic, so that doesn't need external influence.

- (i) How can we use the same idea as fibbing to inject BGP announcements that will influence inbound traffic, so as to create different paths for different destinations within this AS? Your answer should address the challenge that BGP is path-vector, not link-state, and that there are local filtering policies that may interfere with path advertisements. [10 marks]
- (ii) What is the potential security problem (think about trust)? [5 marks]
- (b) Imagine we wished to optimise a network for reliability, rather than say delay. Consider the approach of minimising delay by iteratively moving a portion of traffic from one path to others. How might this approach be adapted to provide reliability. [5 marks]