

# Internet on the Internet

*Or why don't we seem to have a worldwide pedagogical playground for wannabe networking experts?*

**Andrew Smith** ... *The Open University, UK*

# In $\leq$ 10 minutes

- Challenge of pedagogical vs modeling based simulation
- The space to create
- At zero cost (to the student) and zero risk
  - Freedom to fail
  - Freedom to discover

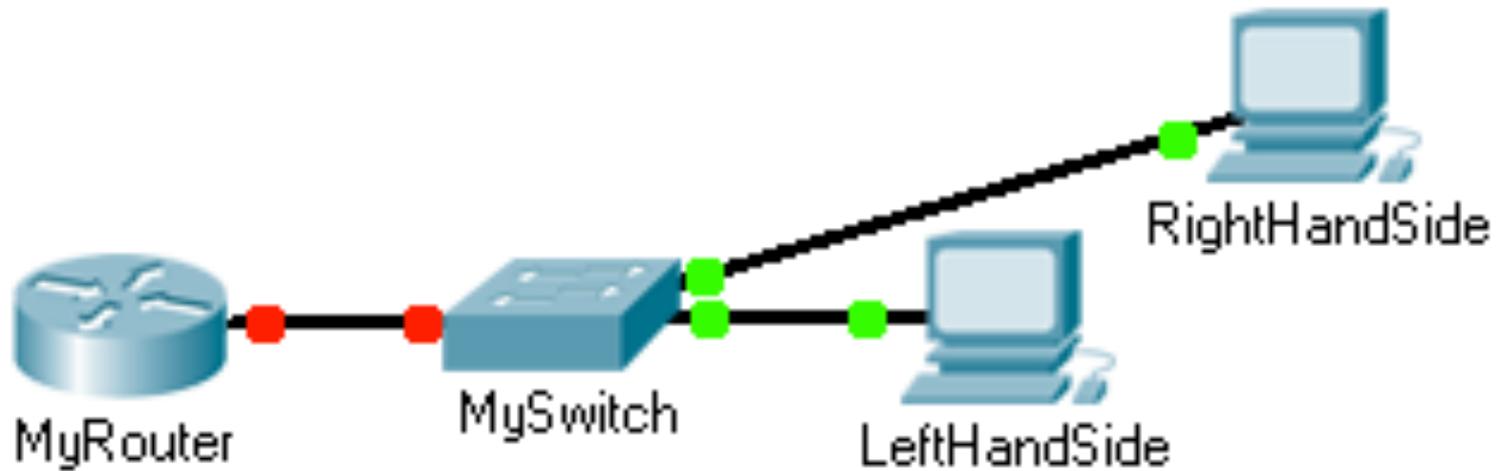
# Cisco Systems

- Have a pedagogical simulator
- Also have a large educational programme in partnership with Schools, Colleges, Universities and others
- Lots of students
- Used in assessment at the Open University

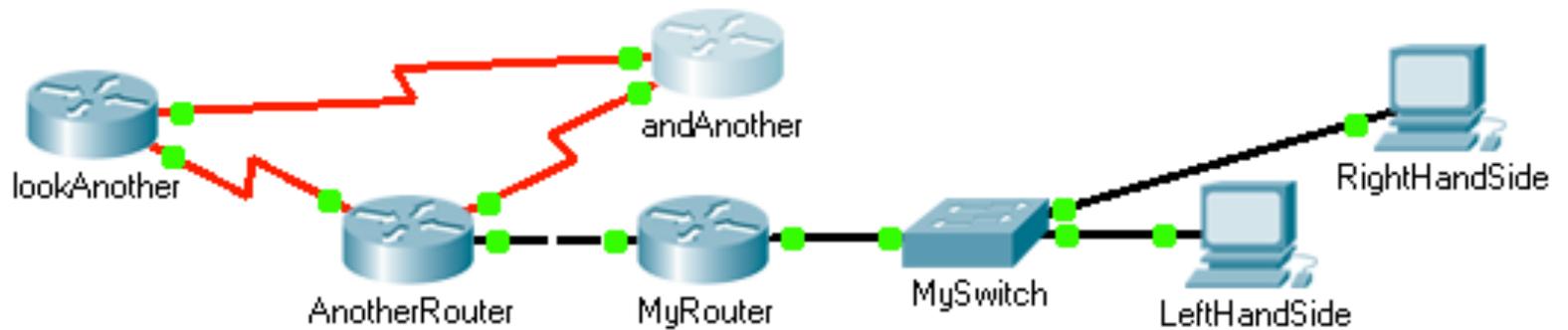


Networking  
Academy

# Packet Tracer .



# Packet Tracer ..



# Packet Tracer ...

```
router ospf 1
```

```
network 191.168.1.0 0.0.0.127 area 0
```

```
network 191.168.0.128 0.0.0.127 area 0
```

```
network 191.168.0.0 0.0.0.127 area 0
```

```
network 191.168.255.128 0.0.0.63 area 0
```

```
network 191.168.255.192 0.0.0.3 area 0
```

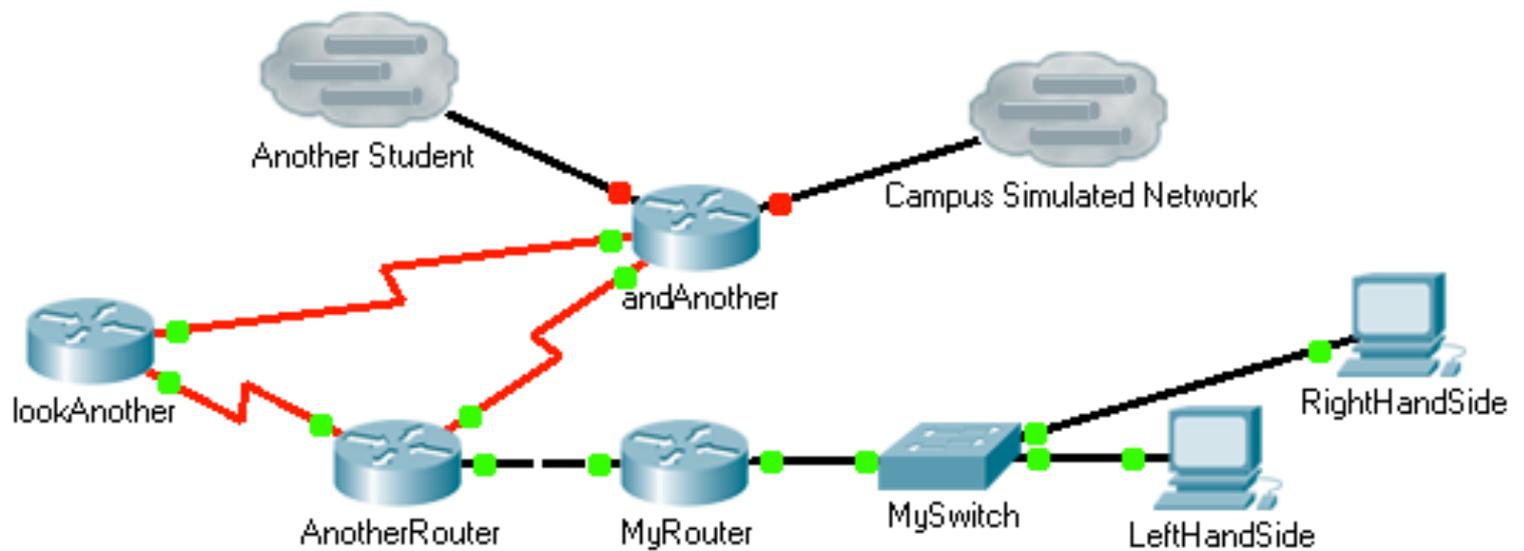
# Packet Tracer ....

```
-----  
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP  
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area  
       * - candidate default, U - per-user static route, o - ODR  
       P - periodic downloaded static route
```

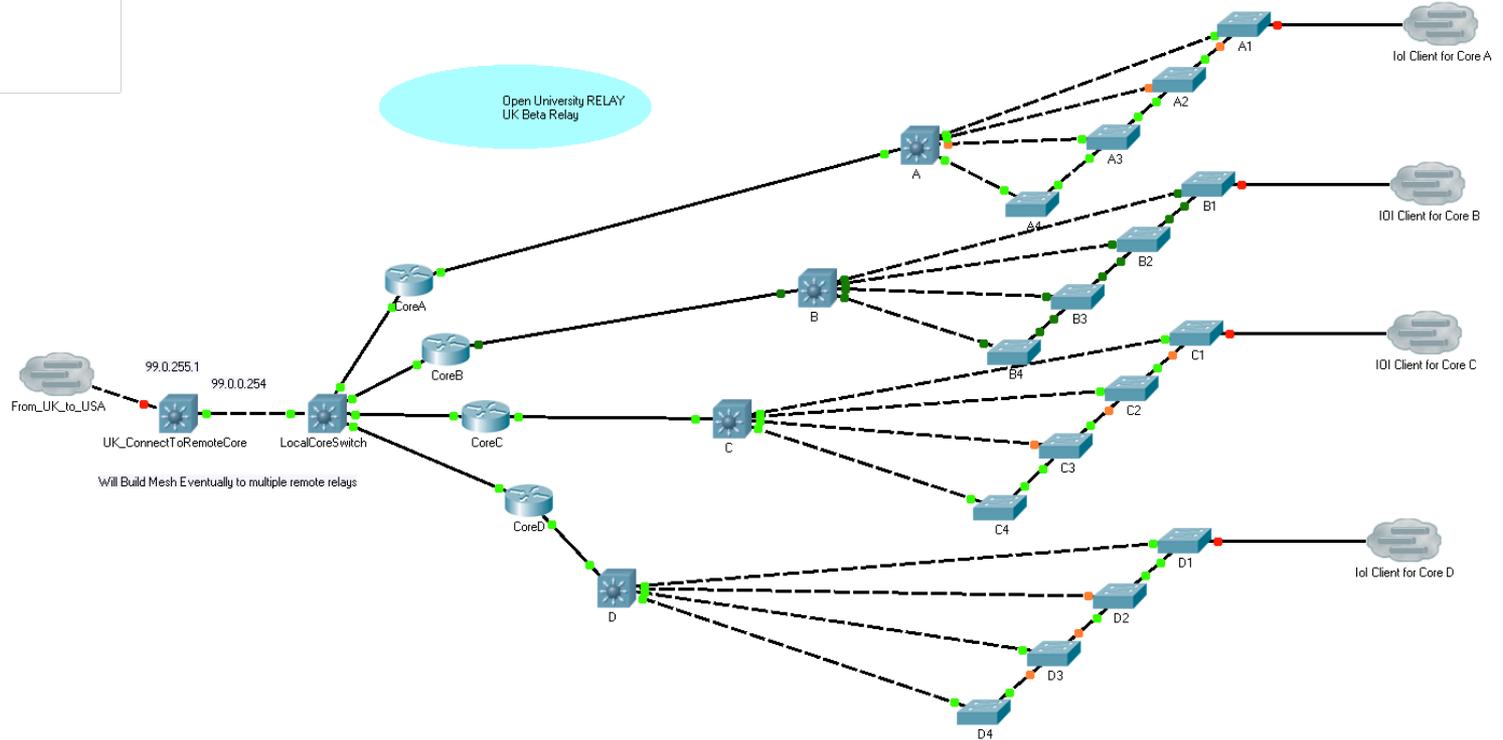
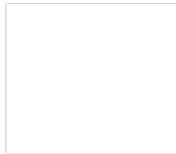
Gateway of last resort is not set

```
191.168.0.0/16 is variably subnetted, 13 subnets, 3 masks  
C    191.168.0.0/25 is directly connected, FastEthernet0/1.111  
C    191.168.0.128/25 is directly connected, FastEthernet0/1.222  
C    191.168.1.0/25 is directly connected, FastEthernet0/1.333  
O    191.168.1.128/25 [110/2] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.2.0/25 [110/2] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.2.128/25 [110/2] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.3.0/25 [110/3] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.3.128/25 [110/3] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.4.0/25 [110/3] via 191.168.255.194, 00:00:47, Serial0/0/0  
C    191.168.255.128/26 is directly connected, FastEthernet0/0  
C    191.168.255.192/30 is directly connected, Serial0/0/0  
O    191.168.255.196/30 [110/2] via 191.168.255.194, 00:00:47, Serial0/0/0  
O    191.168.255.200/30 [110/3] via 191.168.255.194, 00:00:47, Serial0/0/0
```

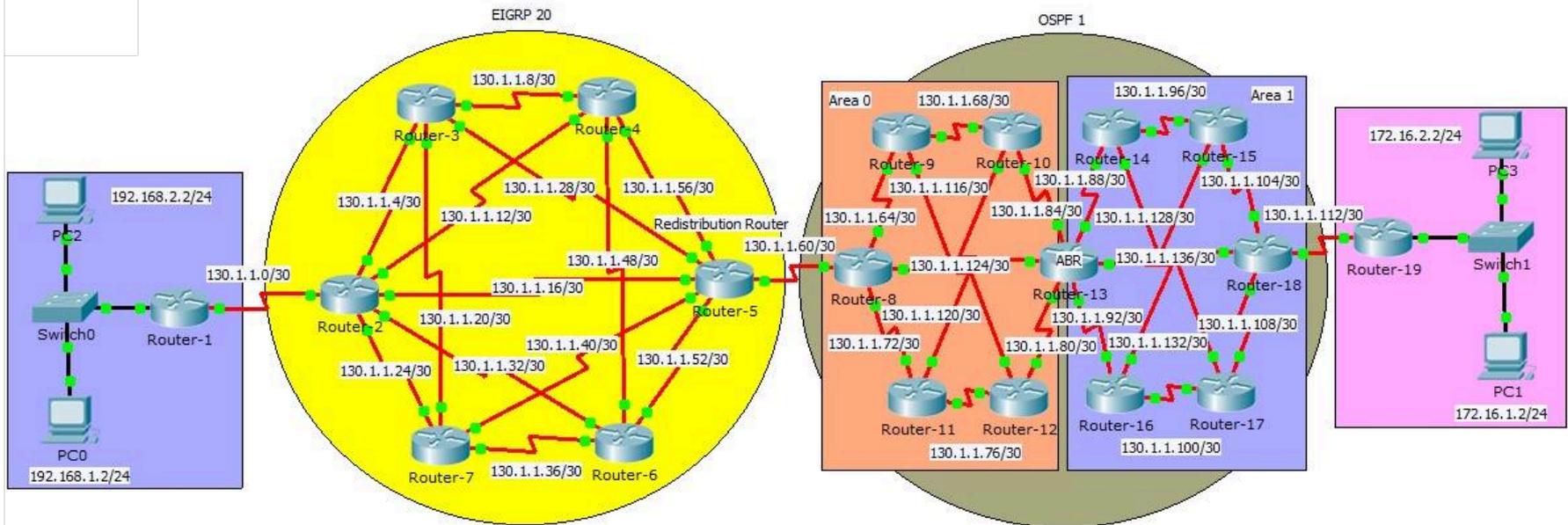
# Multiuser .



# Multiuser ..



# Multiuser ...



# Scale .

- That was half the idea
- What you saw was the UK side of a UK><USA project last year between Cisco Systems and the Open University
- Its not about simulating a network (as OPNET and NS2 are already doing this)
- It is about simulating a network structure that replicates the 'human' norm of adding, removing systems and enables students to learn how!!!

# Scale ..

- You can keep adding at the edges
- It does not need to be hosted in one location
- It can grow as the community of practice grows
- There is already 1,000,000 students using this platform
- Work has been done in UK, USA and South America

# Opportunity?

- Could we
  - Use rich media such as an iBook?
  - Connect PC to Mac to Linux to 'tablet'?
  - Create a simulated internet on the internet?
  - Enjoy a risk free pedagogical world?

The end

Judge someone by their  
questions, rather than their  
answers. *Voltaire*