

Crashing a Router Measuring BGP Pass-Through-Times

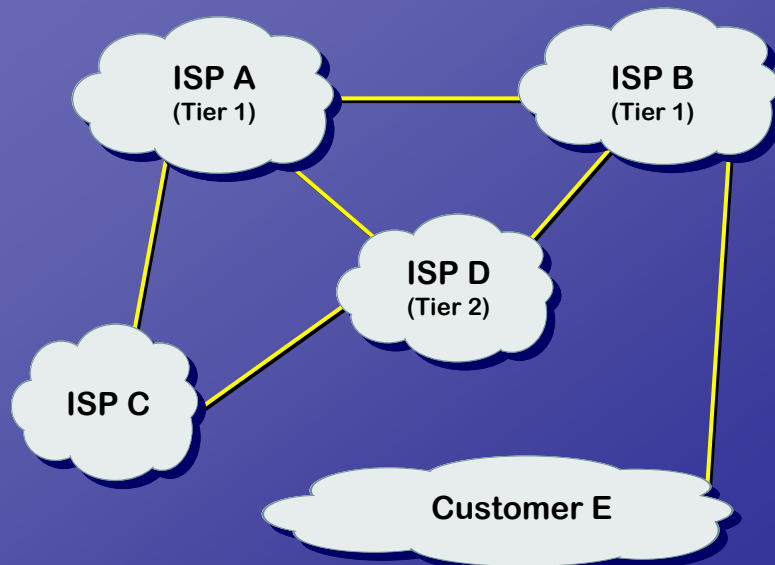
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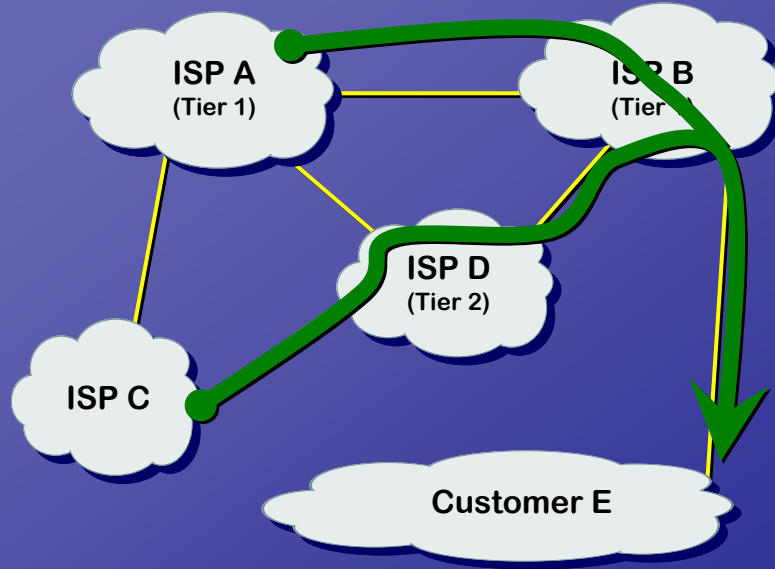
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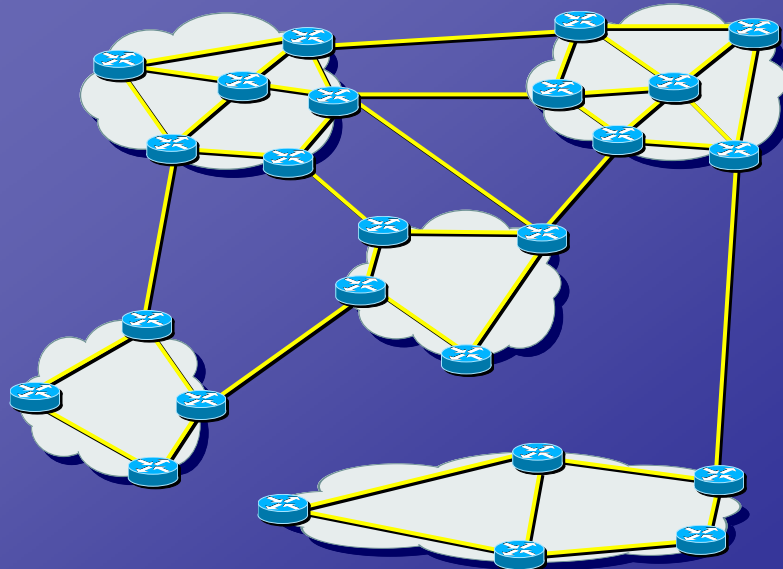
BGP: the Internet policy protocol !



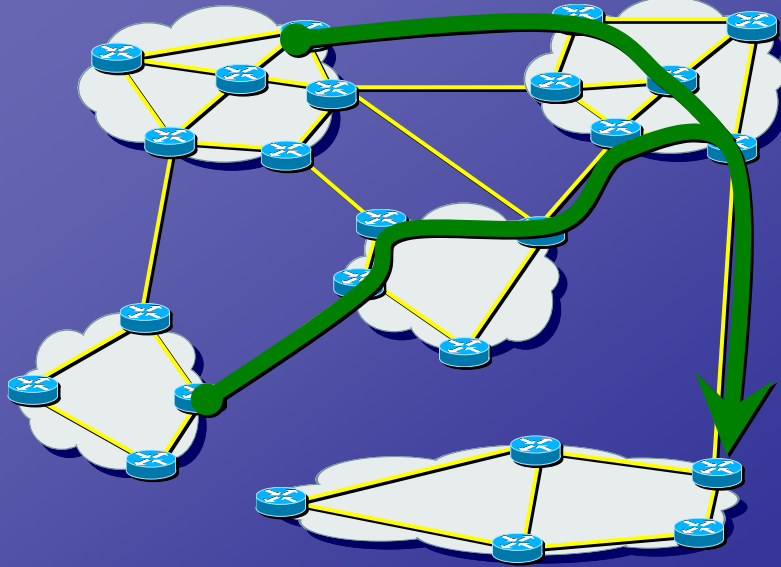
BGP: a policy protocol !



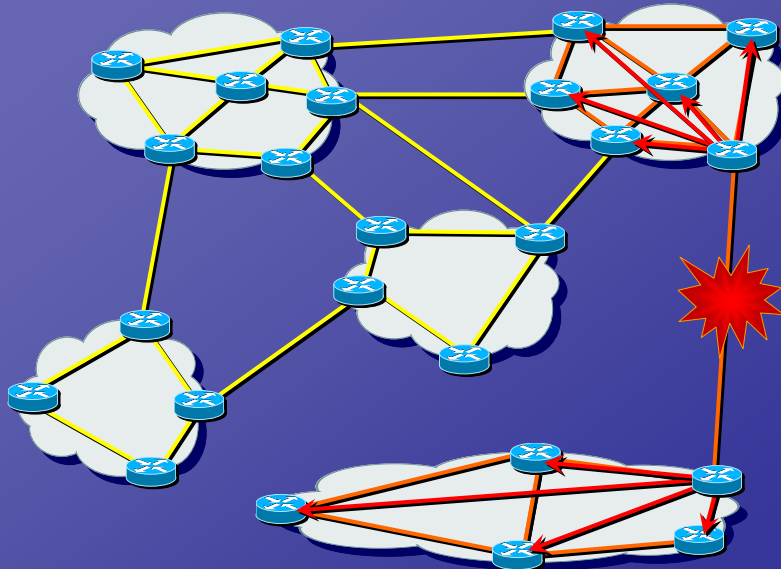
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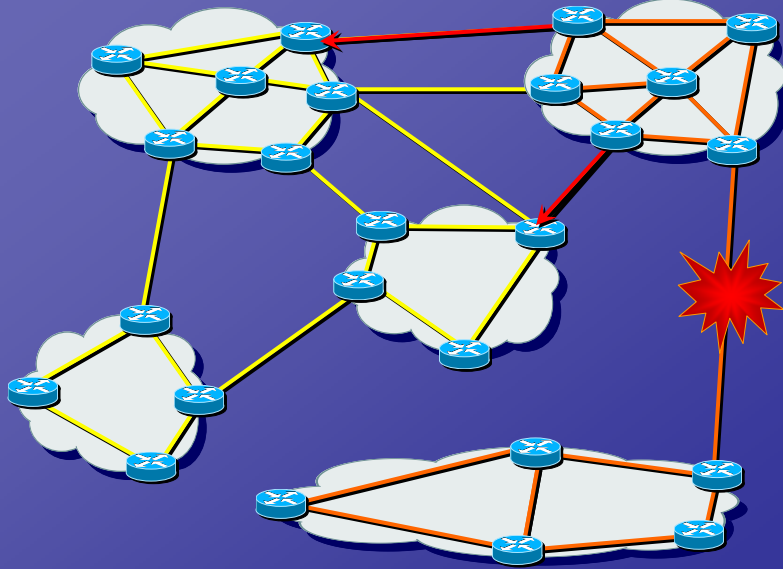
BGP: a policy protocol !



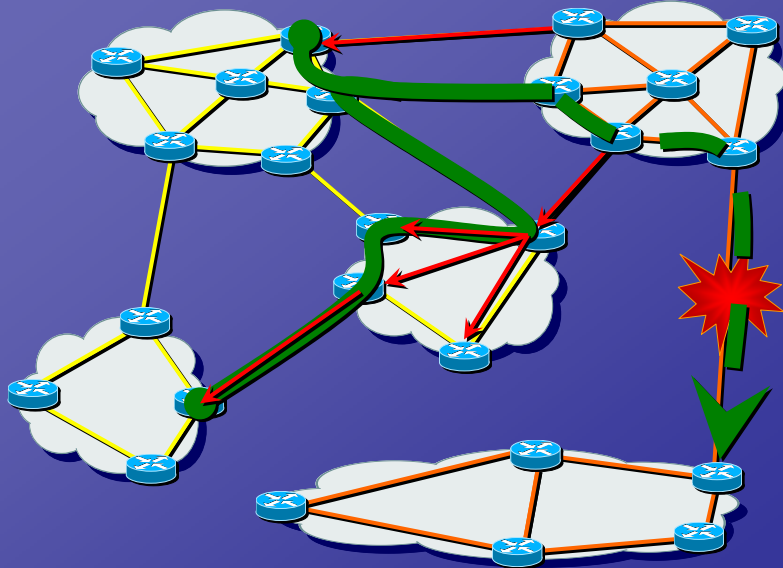
BGP: doing it's job...



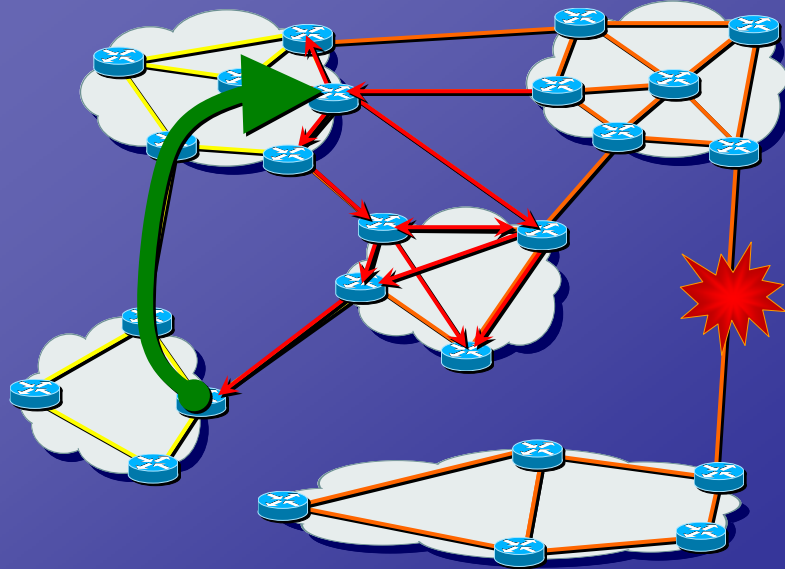
BGP: doing it's job...



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BGP: doing it's job...



What problem does BGP solve?

Solve reachability problem
Respects routing policies ...

...but:

- Dynamics and propagation properties are not yet well understood.
- Causes of instabilities are not yet well understood.

Motivation

BGP convergence can be long...

Various mechanisms in BGP:

- MRAI: restricts update frequency between updates
- Route flap damping: restricts propagation of updates for unstable routes

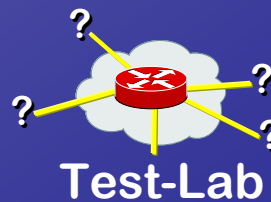
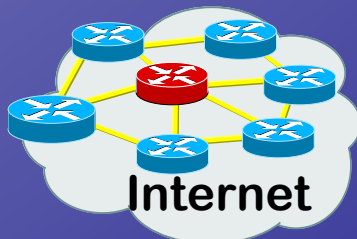
What is the contribution of a single router?

Single router delay contribution

What is the cost of BGP update processing?

What about future router generations?

How to find measure this in a test-lab?

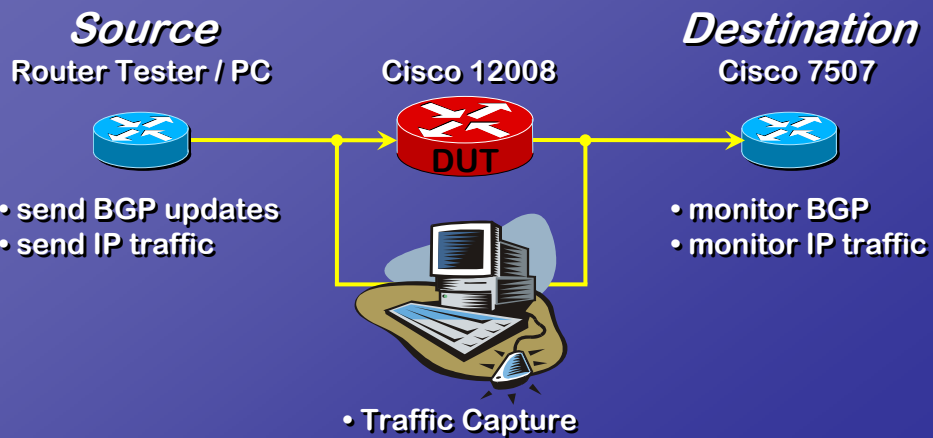


Test framework

Black box testing:

- **Device under test (DUT):**
Router
- **Load framework:**
Impose a specific, pre-defined load
- **Instrumentation framework:**
Packet-level monitor

Test framework



Methodology I

“Probe-session” (BGP update stream) :

- Type :
Preloaded RIB, fixed size
Implicit withdrawals
- Frequency :
Inter update time (1 update/sec)
Number of sessions (50 e-bgp sessions)
- Update Source :
Router Tester / BGP_Replay

Methodology II

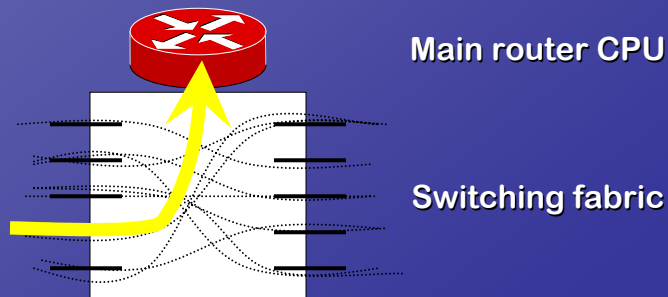
“Monitor-session” :

- Type :
DUT propagates “probe” updates to
single E-BGP monitor peer
- Update Destination :
Cisco router

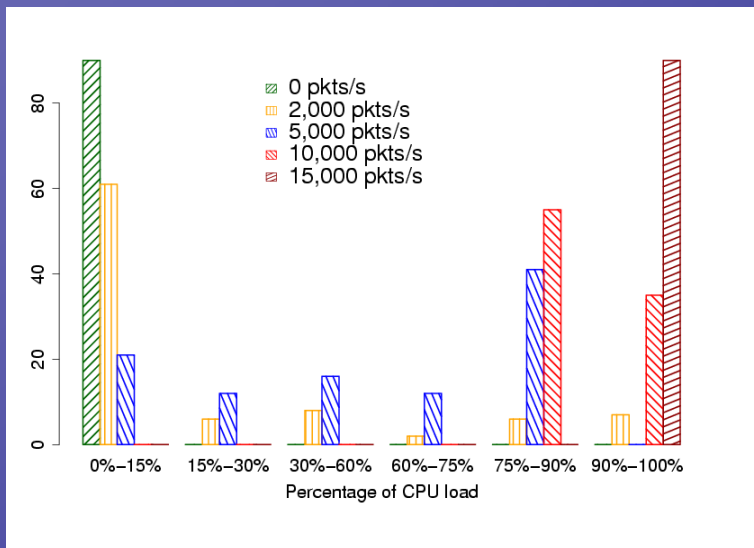
Impact of CPU load

Direct IP packets to main router CPU

```
ip_input (IOS process) CPU consumption  
rises with interrupt rate
```



CPU load



Crashing a router with IP packets is easy...