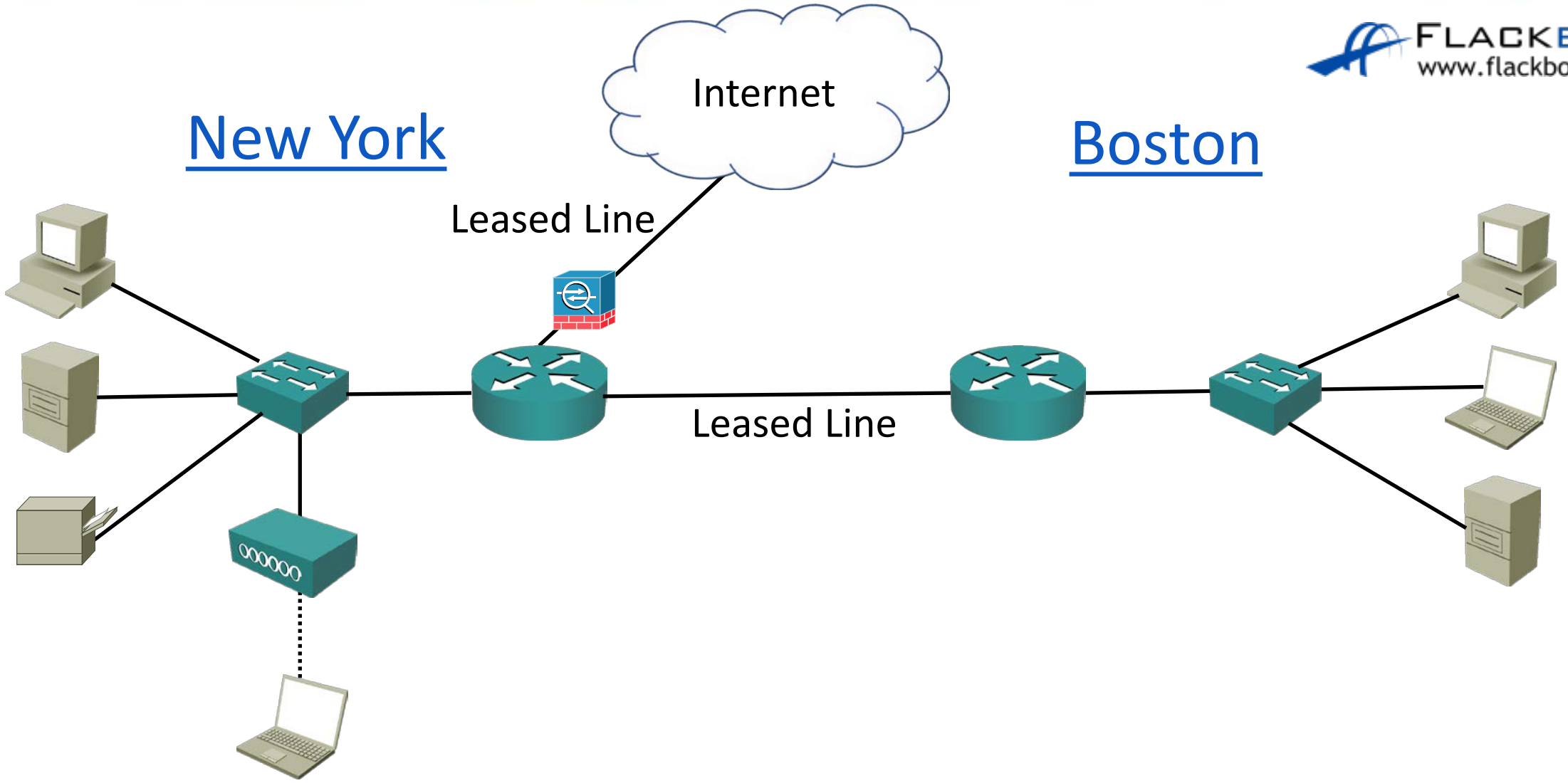
Leased Lines

- A leased line is a dedicated physical connection between two locations.
- It has fixed, reserved bandwidth which is not shared with anyone else.
- The same bandwidth is available in both directions.
- The company may own the cable infrastructure but more commonly it is leased from a service provider for a monthly fee, hence the name ‘leased line’.

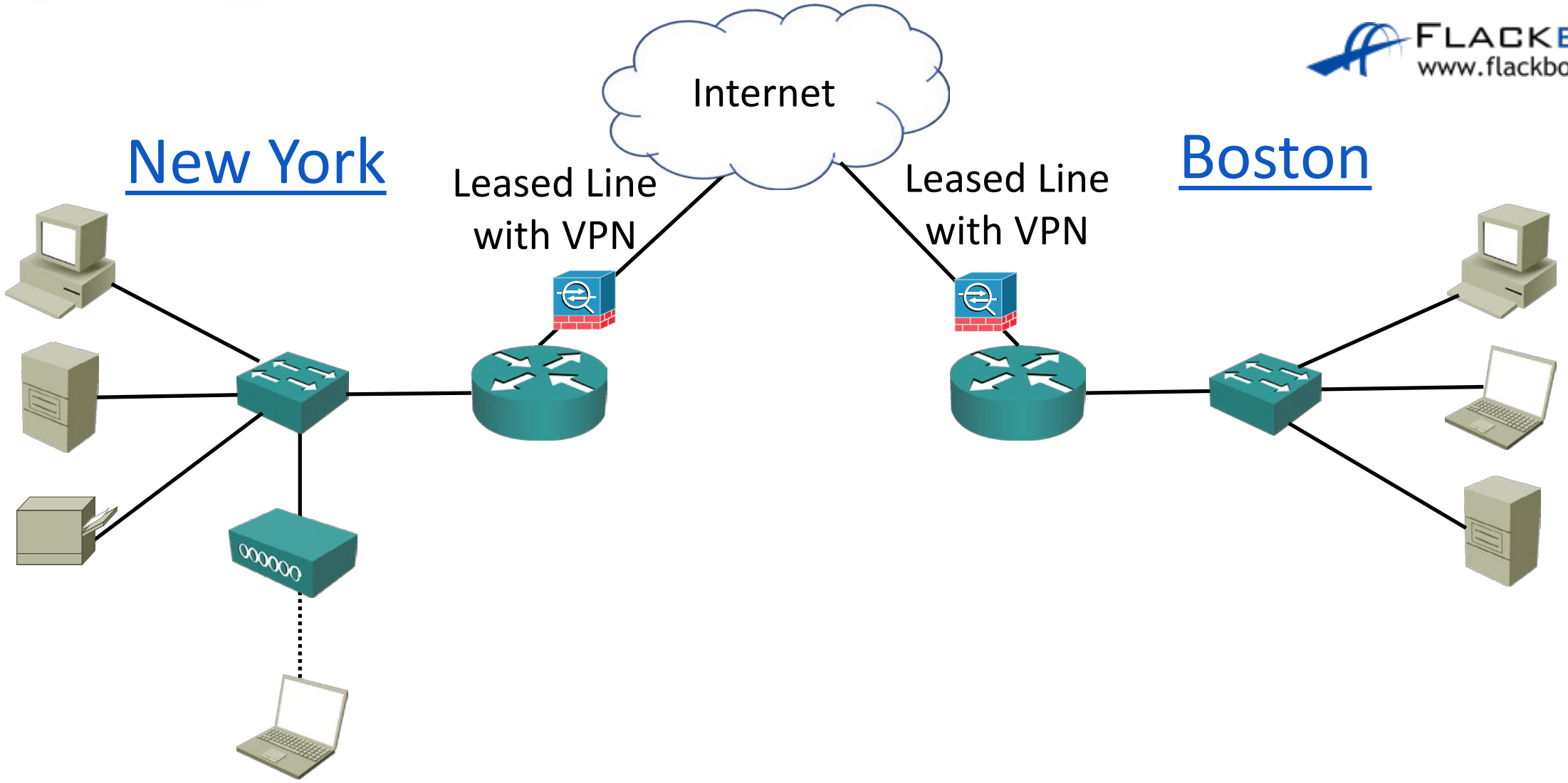
Leased Lines

- The first location is typically a corporate office.
- The second location is typically:
  - Another corporate office, providing point to point connectivity between the two offices
  - A data centre that's connected to the company's existing Wide Area Network, providing multipoint connectivity between offices
  - A data centre that's connected to the Internet, providing Internet connectivity, and optionally corporate office connectivity over Internet VPN

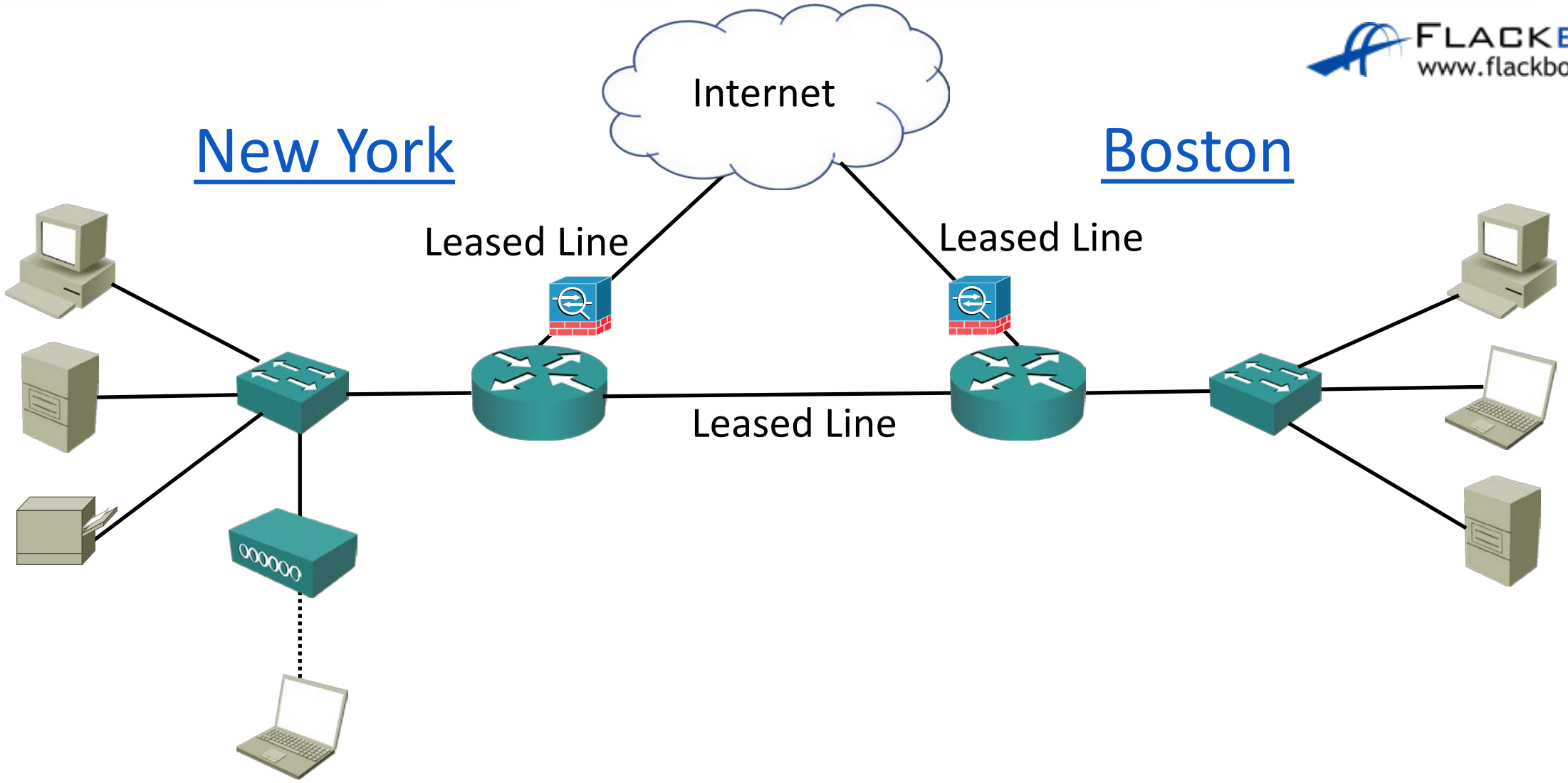
Leased Lines



Leased Lines



Leased Lines



Leased Lines

- Leased lines use a serial connection requiring the correct physical interface card in the router (they do not use an Ethernet port)
- Common bandwidth options:

North America	
T1	1.544 Mbps
T2	6 Mbps
T3	45 Mbps
T4	275 Mbps

Europe	
E1	2 Mbps
E2	8 Mbps
E3	34 Mbps
E4	140 Mbps

Leased Line Benefits and Drawbacks

- Leased lines have fixed, reserved bandwidth which is not shared with anyone else.
- The service provider will typically provide an SLA (Service Level Agreement) with guarantees for uptime and traffic delay and loss on the link.
- Leased lines are typically more expensive than the other options.
- There is usually a longer lead time for installation.
- Copper or fiber Ethernet connectivity options to the CPE (Customer Premises Equipment) are becoming more common than serial leased lines.

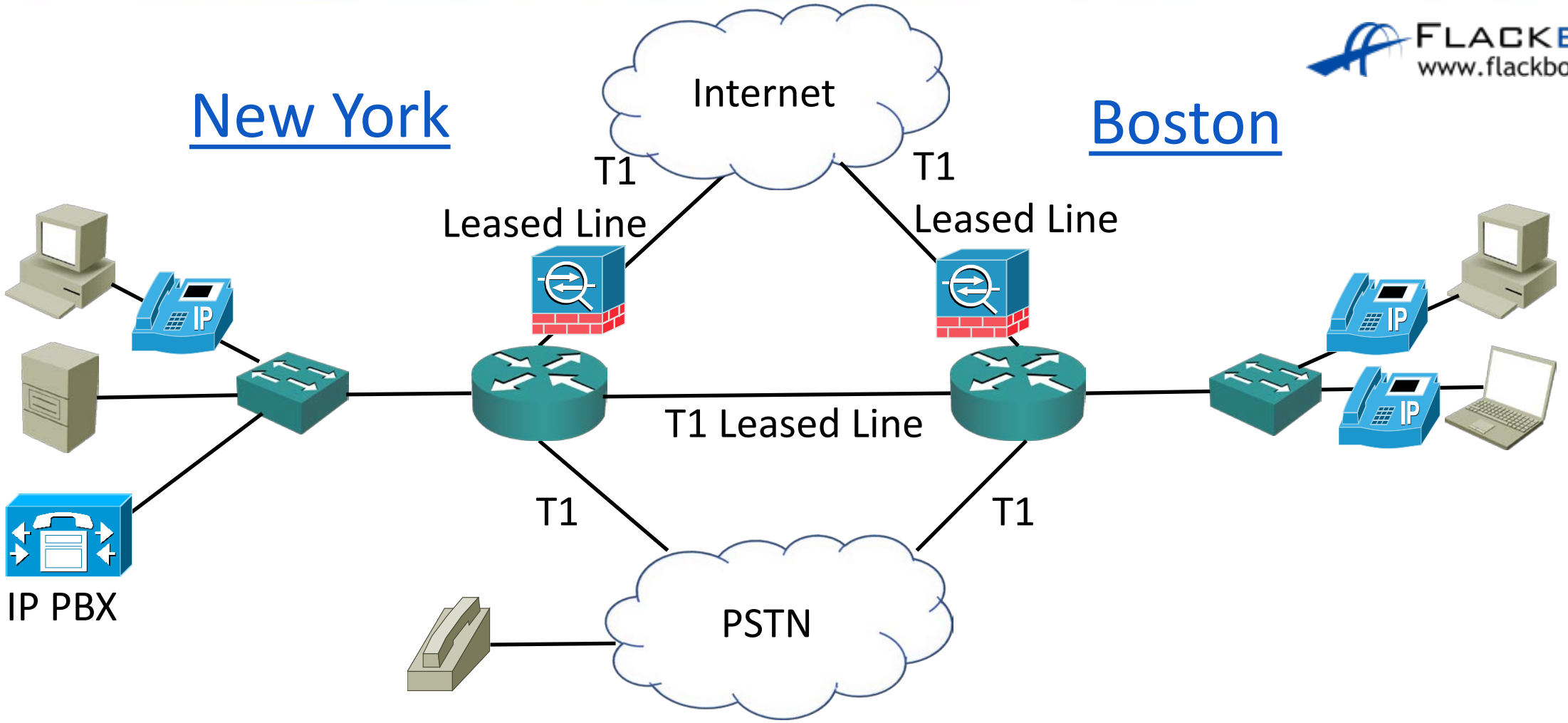
Satellite

- Satellite connections share the same characteristics as cabled leased lines
- They are typically expensive and low bandwidth
- They may be the only option in hard to reach areas

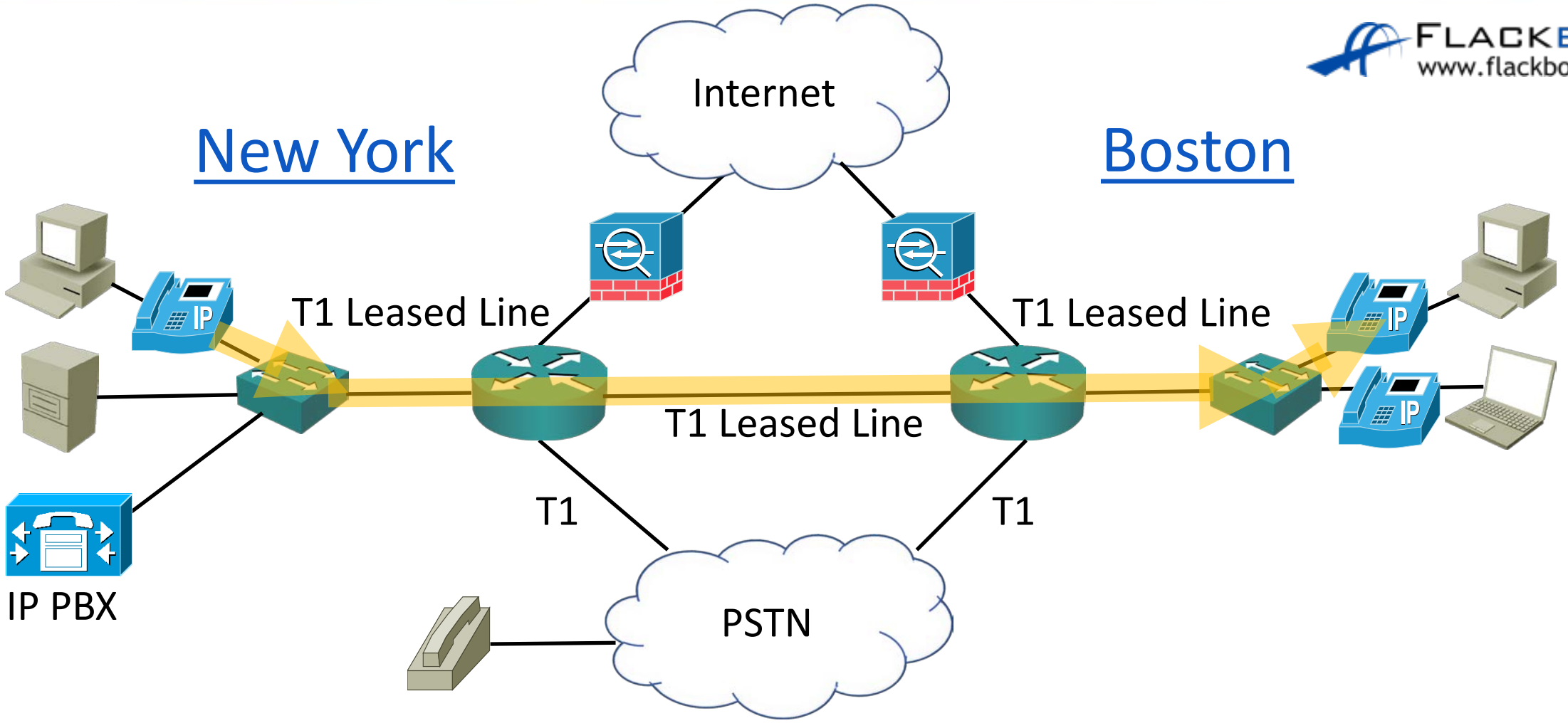
Phone Lines

- T1 and E1 links were also commonly used for connections to the PSTN (Public Switched Telephone Network)
- The analog phone cable to your house is capable of carrying one call
- A T1 digital line is capable of carrying 24 concurrent TDM calls, an E1 can carry 30 calls
- VoIP (Voice over IP) using SIP (Session Initiation Protocol) signalling over Ethernet WAN connections to the Telco are popular today

Public Switched Telephony Network



Calls Between Offices over WAN



Calls to Customers over PSTN