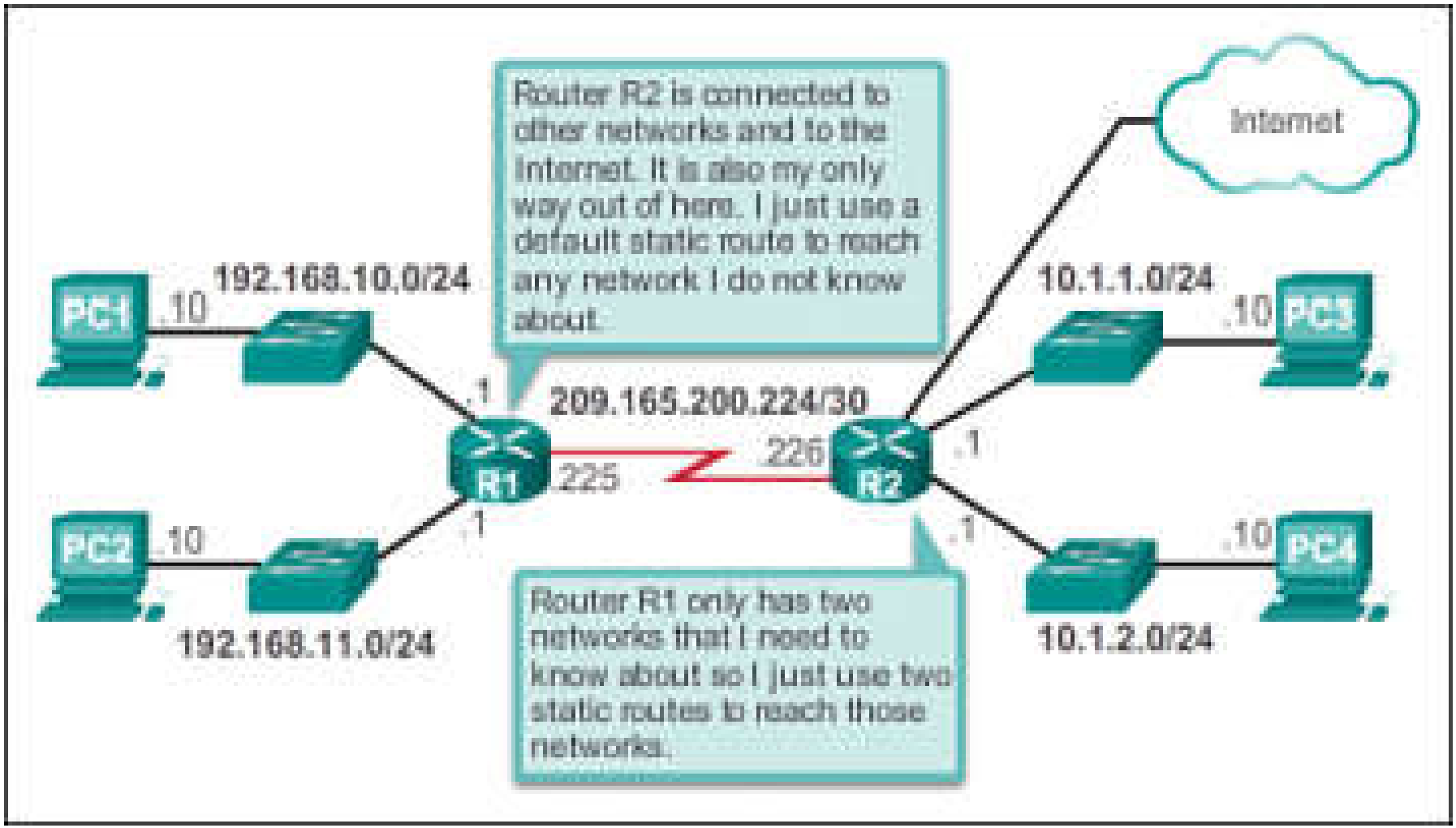
Static Vs Dynamic Routing

Static Routing

Using Static Routing

- Static routing has several primary uses, including:
  - Providing ease of routing table maintenance in smaller networks that are not expected to grow significantly.
  - Routing to and from a stub network, which is a network with only one default route out and no knowledge of any remote networks.
  - Accessing a single default route (which is used to represent a path to any network that does not have a more specific match with another route in the routing table).

A Sample Static Routing Scenario



Static Routing Advantages and Disadvantages (1/2)

- Static routing is easy to implement in a small network.
- Static routes stay the same, which makes them fairly easy to troubleshoot.
- Static routes do not send update messages and, therefore, require very little overhead.
- The disadvantages of static routing include:
  - They are not easy to implement in a large network.
  - Managing the static configurations can become time consuming.
  - If a link fails, a static route cannot reroute traffic.

Static Routing Advantages and Disadvantages – Summary (2/2)

Advantages	Disadvantages
Easy to implement in a small network.	Suitable for simple topologies or for special purposes such as a default static route.
Very secure. No advertisements are sent, unlike with dynamic routing protocols.	Configuration complexity increases dramatically as the network grows. Managing the static configurations in large networks can become time consuming.
It is very predictable, as the route to the destination is always the same.	If a link fails, a static route cannot reroute traffic. Therefore, manual intervention is required to re-route traffic.
No routing algorithm or update mechanisms are required. Therefore, extra resources (CPU and memory) are not required.	

Dynamic Routing

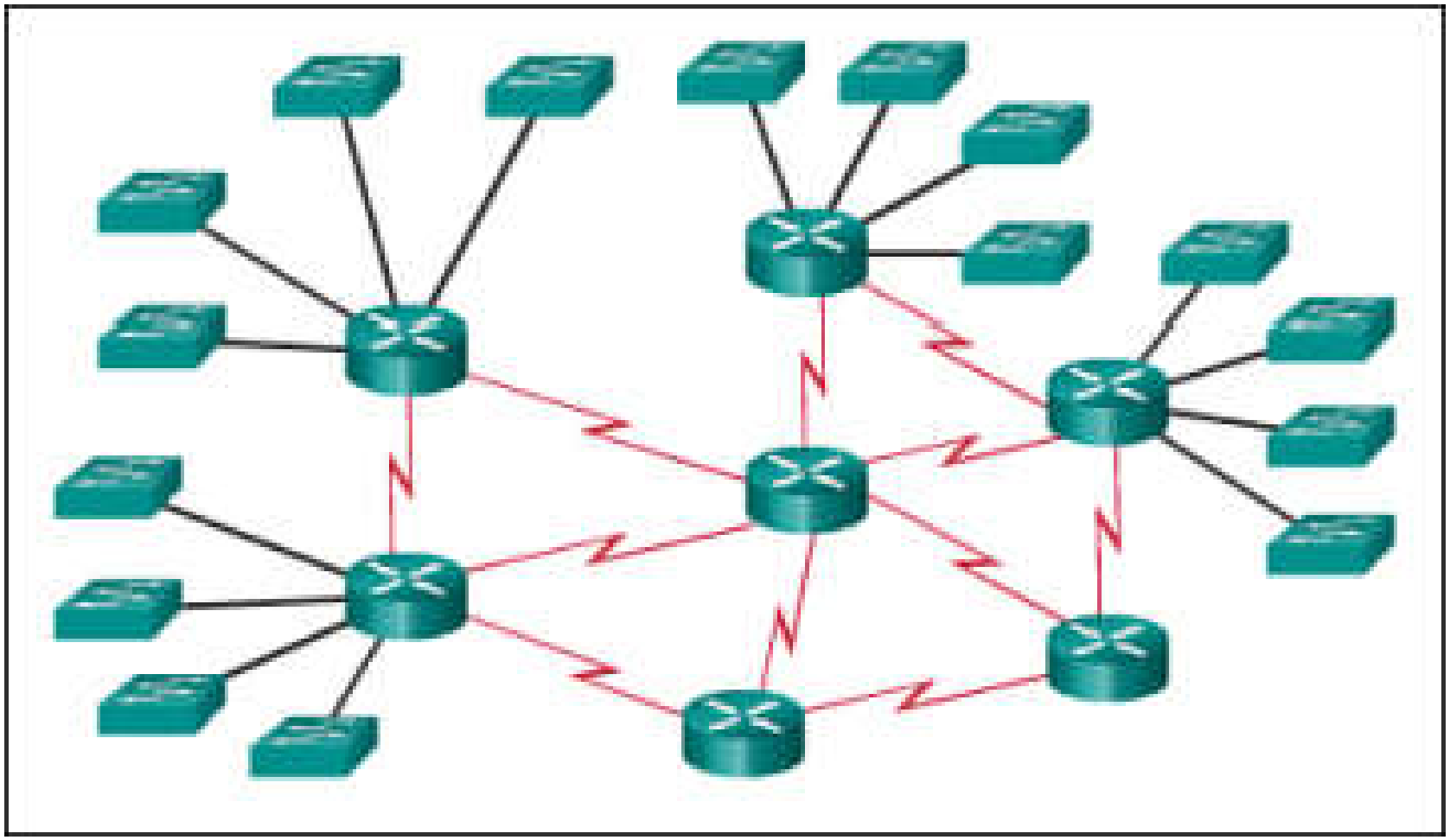
Dynamic Routing (1/2)

- Dynamic routing protocols help the network administrator manage the time-consuming and exacting process of configuring and maintaining static routes.

Dynamic Routing (2/2)

- Dynamic routing protocols help the network administrator manage the time-consuming and exacting process of configuring and maintaining static routes.
- Imagine maintaining the static routing configurations for the seven routers as shown in the figure(in the next slide).

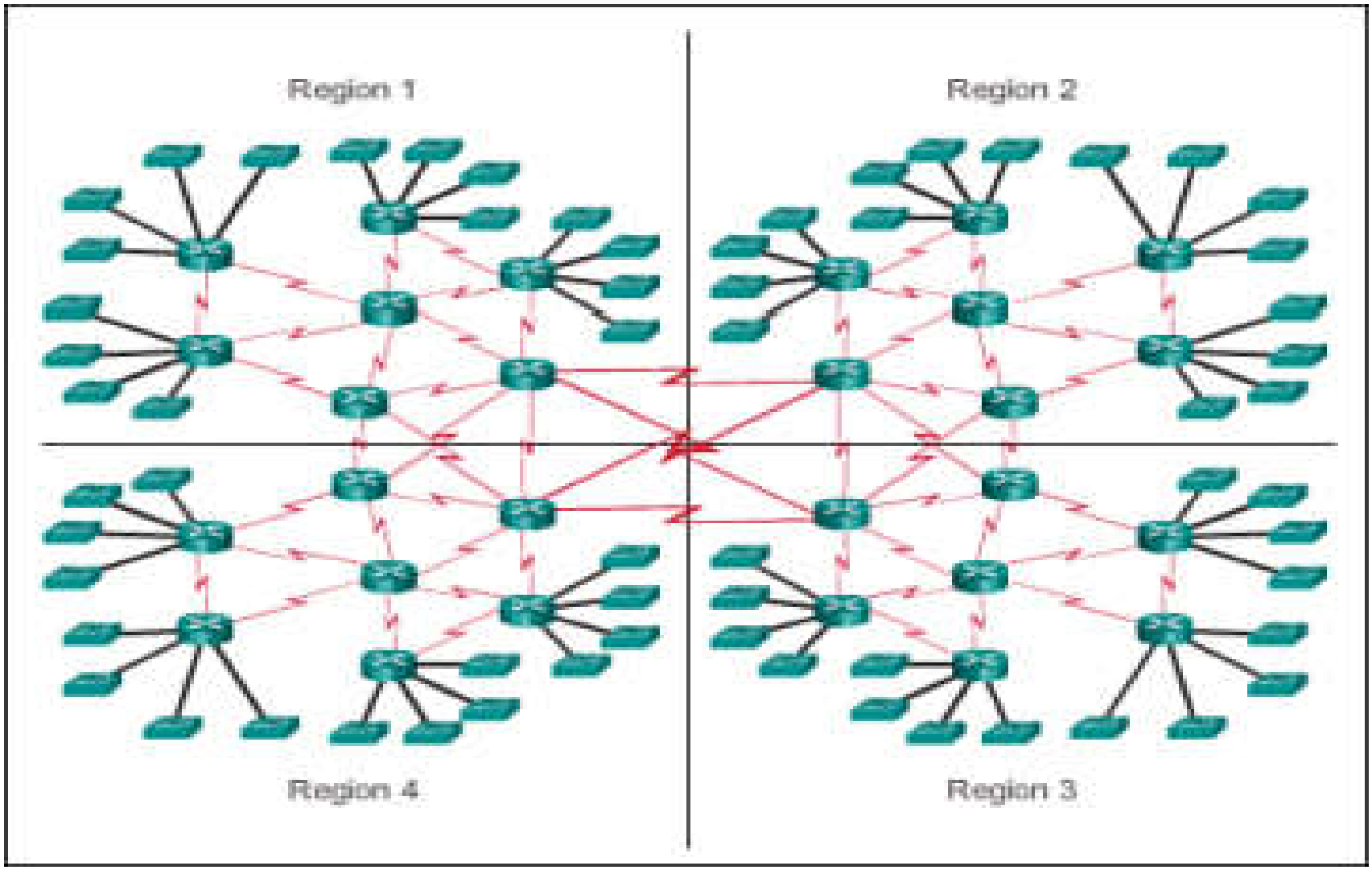
Small Dynamic Routing Scenario



Need of Dynamic Routing

- What if the company grew and now has four regions and 28 routers to manage, as shown in Figure (in the next slide)?
- What happens when a link goes down?
- How do you ensure that redundant paths are available?
- **Solution:** Dynamic routing is the best choice for large networks.

Large Dynamic Routing Scenario



Dynamic Routing Advantages and Disadvantages (1/2)

- Dynamic routing protocols work well in any type of network consisting of several routers.
- They are scalable and automatically determine better routes if there is a change in the topology.
- Although there is more to the configuration of dynamic routing protocols, they are simpler to configure in a large network.
- There are disadvantages to dynamic routing.
- Dynamic routing requires knowledge of additional commands.
- It is also less secure than static routing because the interfaces identified by the routing protocol send routing updates out.
- Routes taken may differ between packets. The routing algorithm uses additional CPU, RAM, and link bandwidth.

Dynamic Routing Advantages and Disadvantages - Summary (2/2)

Advantages	Disadvantages
Suitable in all topologies where multiple routers are required.	Can be more complex to initially implement.
Generally independent of the network size.	Less secure due to the broadcast and multicast routing updates. Additional configuration settings such as passive interfaces and routing protocol authentication are required to increase security.
Automatically adapts topology to reroute traffic if possible.	Route depends on the current topology.
	Requires additional resources such as CPU, memory, and link bandwidth.