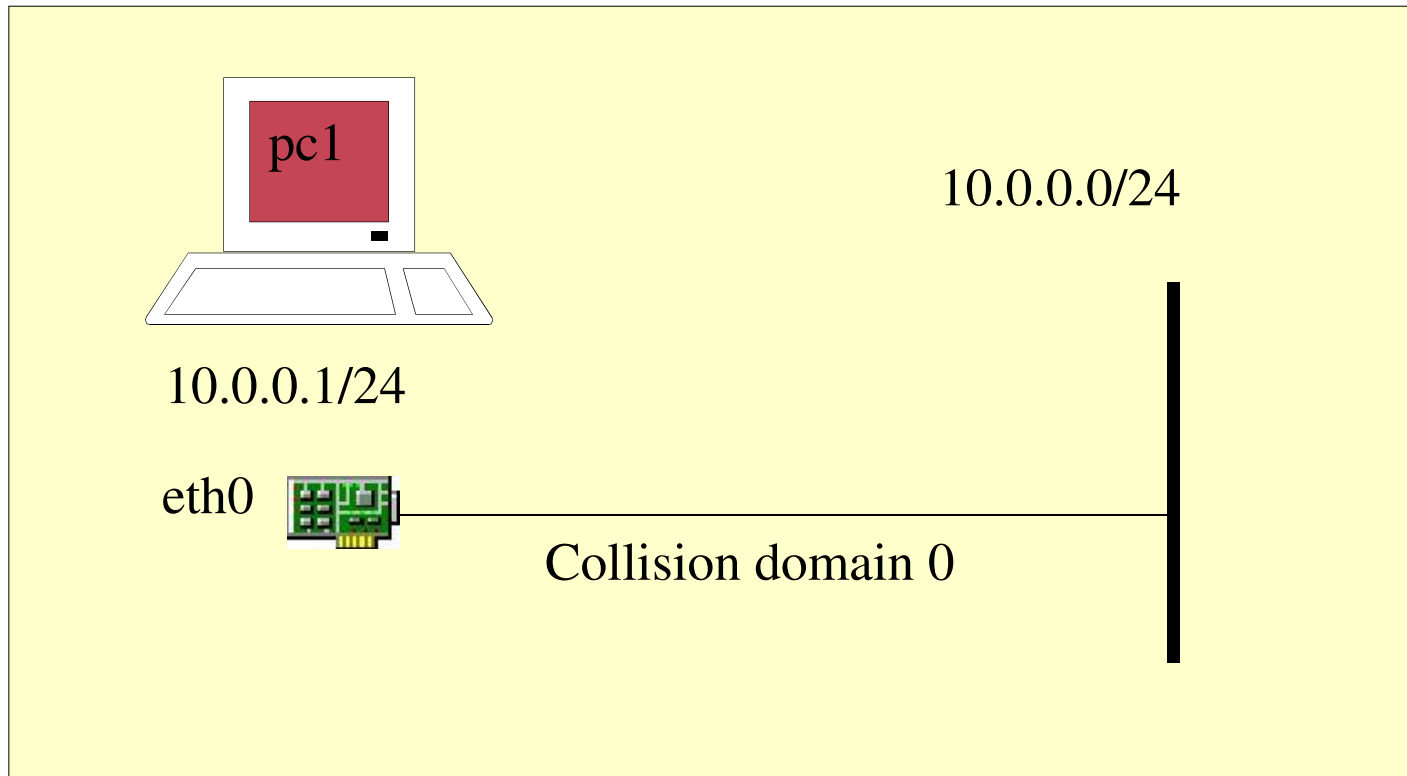


# Using NetML to describe hosts

# First example: single.xml

## Just one virtual machine



# single.xml

## Networks and Collision domains

```
<NetML xmlns="http://www.xmlnetwork.org"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.xmlnetwork.org
                    netml.xsd">
  <Networks>
    <n id="n-A">
      <networkAddress>11.0.0.32/30</networkAddress>
      <CollisionDomains>
        <c id="C0">
          <iface r_id="r_1" if="eth0"/>
        </c>
      </CollisionDomains>
    </n>
  </Networks>
  ...
```

# single.xml

## Router configuration

```
...  
<Routers>  
  <RouterConf id="r_1" Hostname="pc1">  
    <Interface name="eth0">  
      <ipAddress>10.0.0.1/24</ipAddress>  
    </Interface>  
  </RouterConf>  
</Routers>  
</NetML>
```

# single.xml

## Checking routing

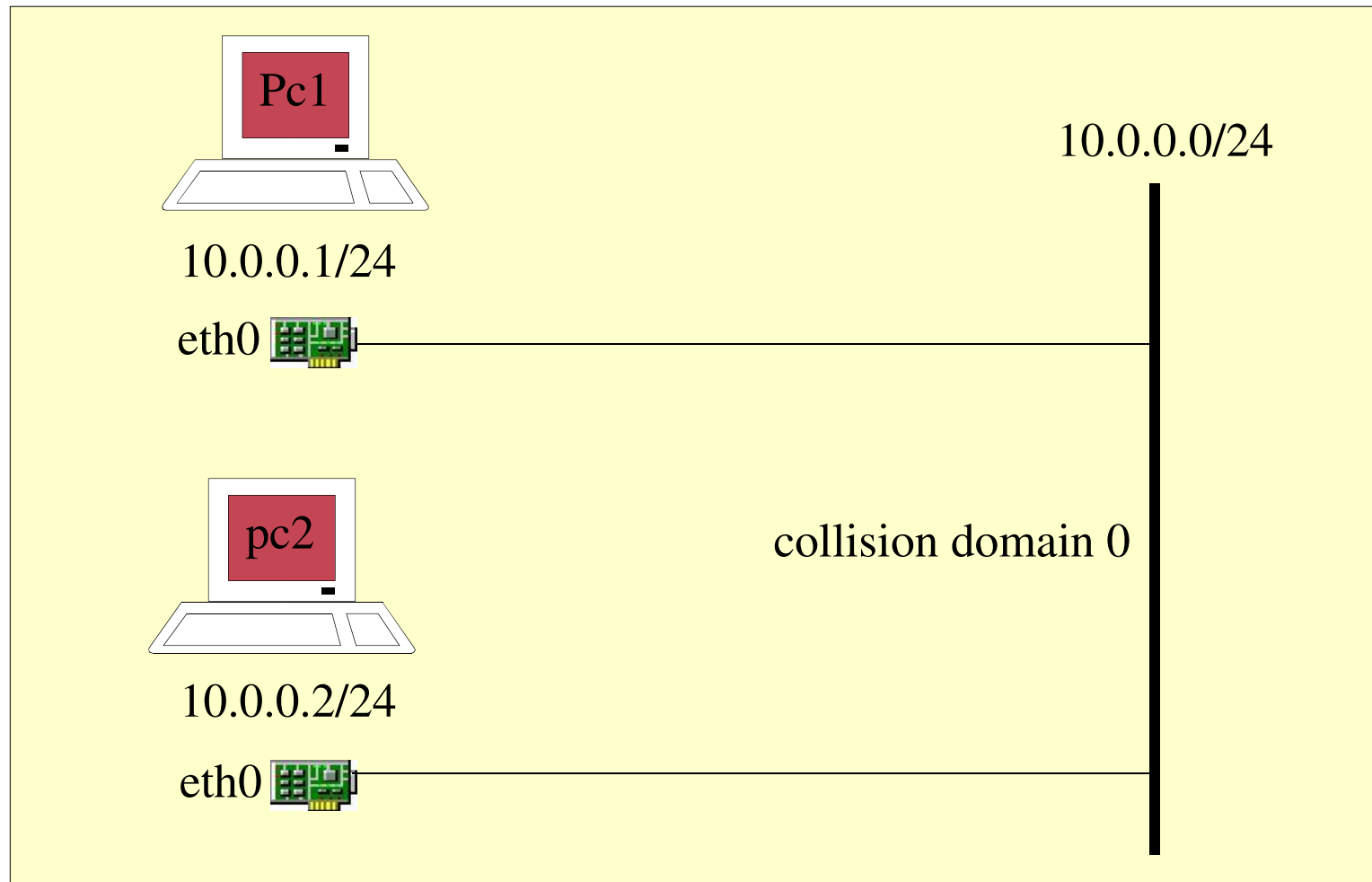
```
r_1-pc1:~# ifconfig
eth0      Link encap:Ethernet  HWaddr FE:FD:0A:00:00:01
          inet addr:10.0.0.1  Bcast:10.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::fcfd:aff:fe00:1/10 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:0 (0.0 b)  TX bytes:218 (218.0 b)
          Interrupt:4

...
```

```
R_1-pc1:~# route -n
Kernel IP routing table
Destination      Gateway          Genmask         Flags Metric Ref    Use Iface
10.0.0.0         0.0.0.0         255.255.255.0  U        0      0      0 eth0
```

# two-hosts.xml :

Two virtual machines connected by a  
single collision domain



# two-hosts.xml

## Networks and Collision domains

```
<NetML xmlns="http://www.xmlnetwork.org"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.xmlnetwork.org
                      netml.xsd">
  <Networks>
    <n id="n-A">
      <networkAddress>11.0.0.32/30</networkAddress>
      <CollisionDomains>
        <c id="C0">
          <iface r_id="r_1" if="eth0"/>
          <iface r_id="r_2" if="eth0"/>
        </c>
      </CollisionDomains>
    </n>
  </Networks>
  ...

```

# two-hosts.xml

## Router configuration

```
...  
<Routers>  
  <RouterConf id="r_1" Hostname="pc1">  
    <Interface name="eth0">  
      <ipAddress>10.0.0.1/24</ipAddress>  
    </Interface>  
  </RouterConf>  
  <RouterConf id="r_2" Hostname="pc2">  
    <Interface name="eth0">  
      <ipAddress>10.0.0.2/24</ipAddress>  
    </Interface>  
  </RouterConf>  
</Routers>  
</NetML>
```

# two-hosts.xml

## Checking routing

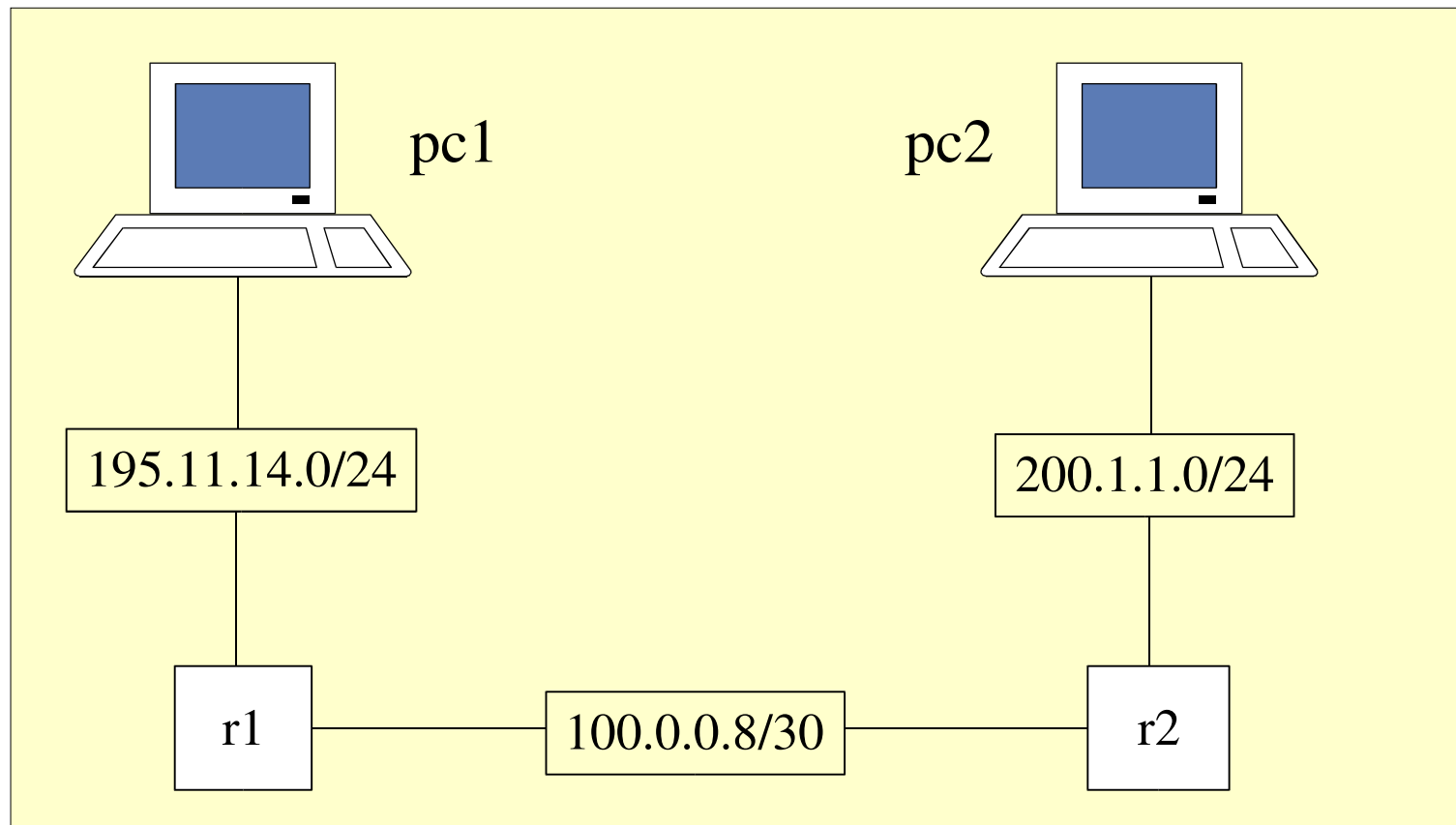
```
r_2-pc2:~# ifconfig
eth0      Link encap:Ethernet  HWaddr FE:FD:0A:00:00:02
          inet addr:10.0.0.2  Bcast:10.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::fcfd:aff:fe00:2/10 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:56 (56.0 b)  TX bytes:288 (288.0 b)
          Interrupt:4
```

```
r_2-pc2:~# ping 10.0.0.1
PING 10.0.0.1 (10.0.0.1): 56 data bytes
64 bytes from 10.0.0.1: icmp_seq=0 ttl=255 time=1.0 ms
64 bytes from 10.0.0.1: icmp_seq=1 ttl=255 time=0.5 ms

--- 10.0.0.1 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.5/0.7/1.0 ms
```

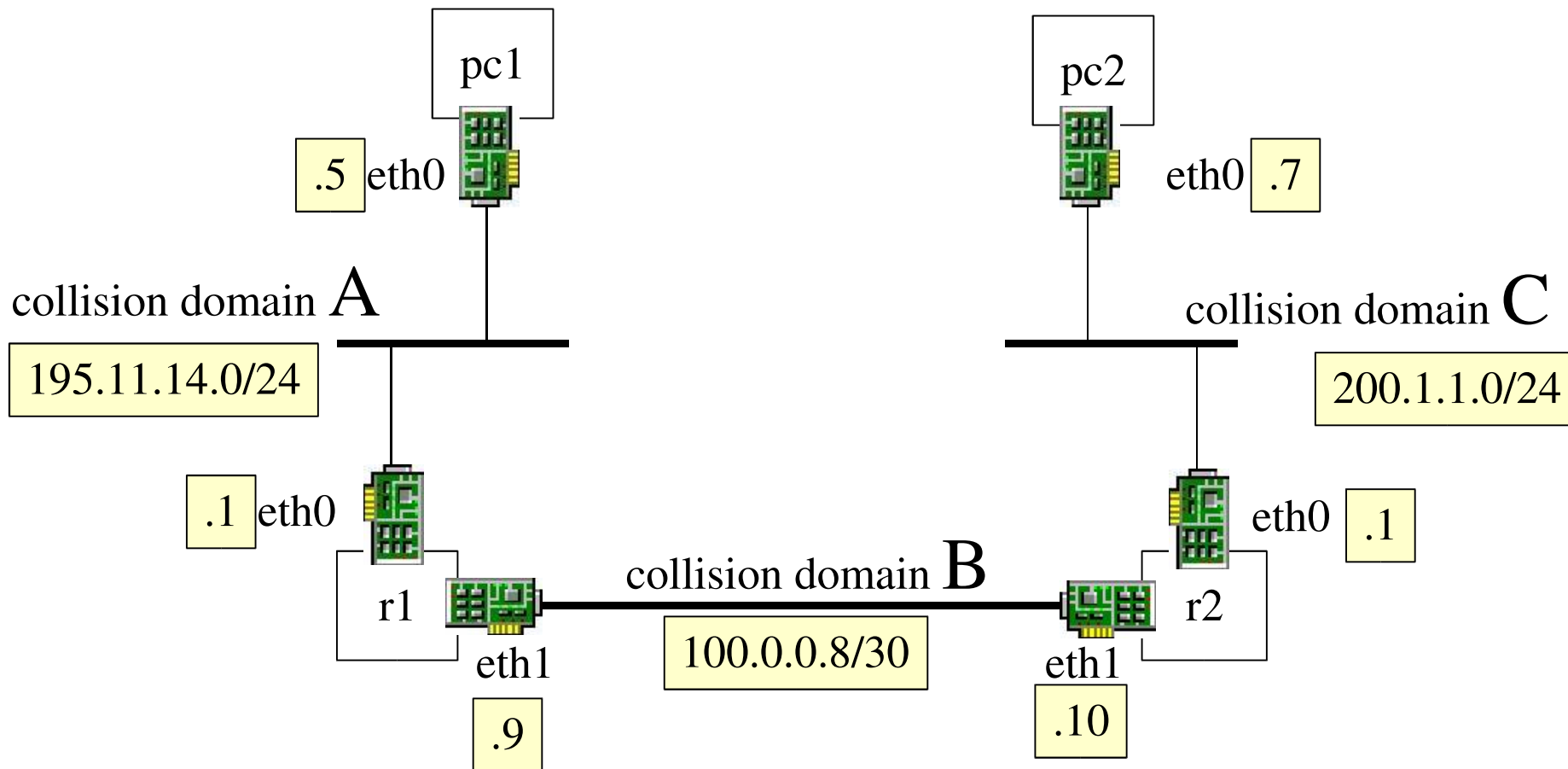
# static-routing.xml

## High level description



# static-routing.xml

## A deeper sight



# static-routing.xml

## Network A and its collision domain

```
<NetML xmlns="http://www.xmlnetwork.org"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.xmlnetwork.org
                      netml.xsd">
  <Networks>
    <n id="n-A">
      <networkAddress>195.11.14.0/24</networkAddress>
      <CollisionDomains>
        <c id="A">
          <iface r_id="r_pc1" if="eth0"/>
          <iface r_id="r_1" if="eth0"/>
        </c>
      </CollisionDomains>
    </n>
    ...
  </Networks>
</NetML>
```

# static-routing.xml

## Router with 2 interfaces and a static route

```
...  
<RouterConf id="r_1" Hostname="r1">  
  <Interface name="eth0">  
    <ipAddress>195.11.14.1/24</ipAddress>  
  </Interface>  
  <Interface name="eth1">  
    <ipAddress>100.0.0.9/30</ipAddress>  
  </Interface>  
  <StaticRoutes>  
    <route>  
      <destination>200.1.1.0/24</destination>  
      <nexthop>100.0.0.10</nexthop>  
    </route>  
  </StaticRoutes>  
</RouterConf>  
...
```

# static-routing.xml

## Host with a default route

```
...  
<RouterConf id="r_pc1" Hostname="pc1" >  
  <Interface name="eth0">  
    <ipAddress>195.11.14.5/24</ipAddress>  
  </Interface>  
  <StaticRoutes>  
    <route>  
      <destination>default</destination>  
      <nexthop>195.11.14.1</nexthop>  
    </route>  
  </StaticRoutes>  
</RouterConf>  
...
```

# static-routing.xml

## Checking routing

```
r_pc1-pc1:~# route -n
Kernel IP routing table
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface
195.11.14.0      0.0.0.0          255.255.255.0   U        0      0      0 eth0
0.0.0.0          195.11.14.1     0.0.0.0         UG       0      0      0 eth0
```

```
r_1-r1:~# route -n
route -n
Kernel IP routing table
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface
100.0.0.8        0.0.0.0          255.255.255.252 U        0      0      0 eth1
200.1.1.0        100.0.0.10      255.255.255.0   UG       0      0      0 eth1
195.11.14.0      0.0.0.0          255.255.255.0   U        0      0      0 eth0
```

```
R_pc1-pc1:~# traceroute -n 200.1.1.7
traceroute to 200.1.1.7 (200.1.1.7), 64 hops max, 40 byte packets
 1  195.11.14.1  1 ms  0 ms  0 ms
 2  100.0.0.10  1 ms  1 ms  1 ms
 3  200.1.1.7   1 ms  1 ms  1 ms
```