Paging support for IP Mobility Using HAWAII

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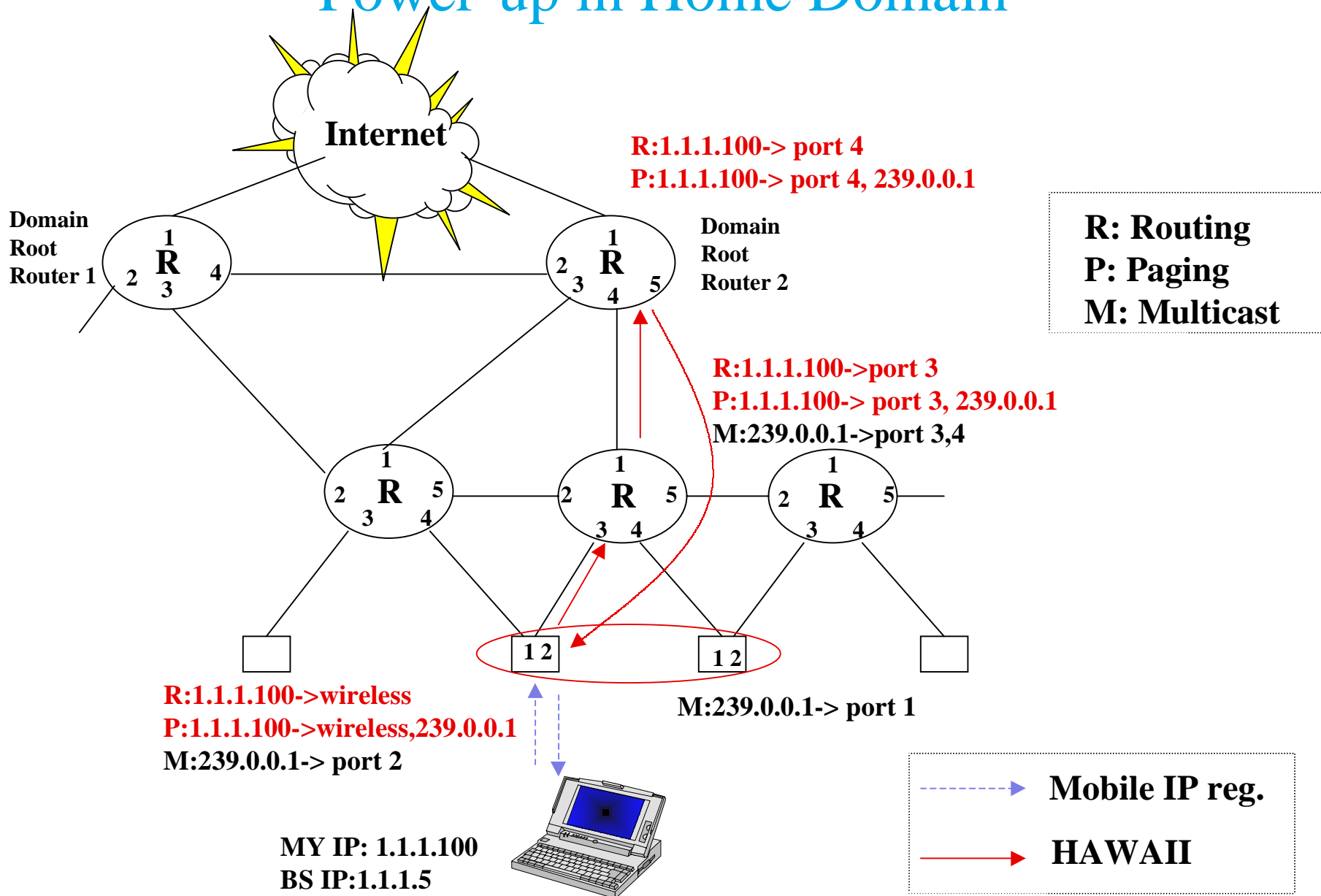
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Paging

- "Idle" mobile hosts update the network less frequently than "active" mobile hosts

- Network has only approximate location information for idle mobile hosts

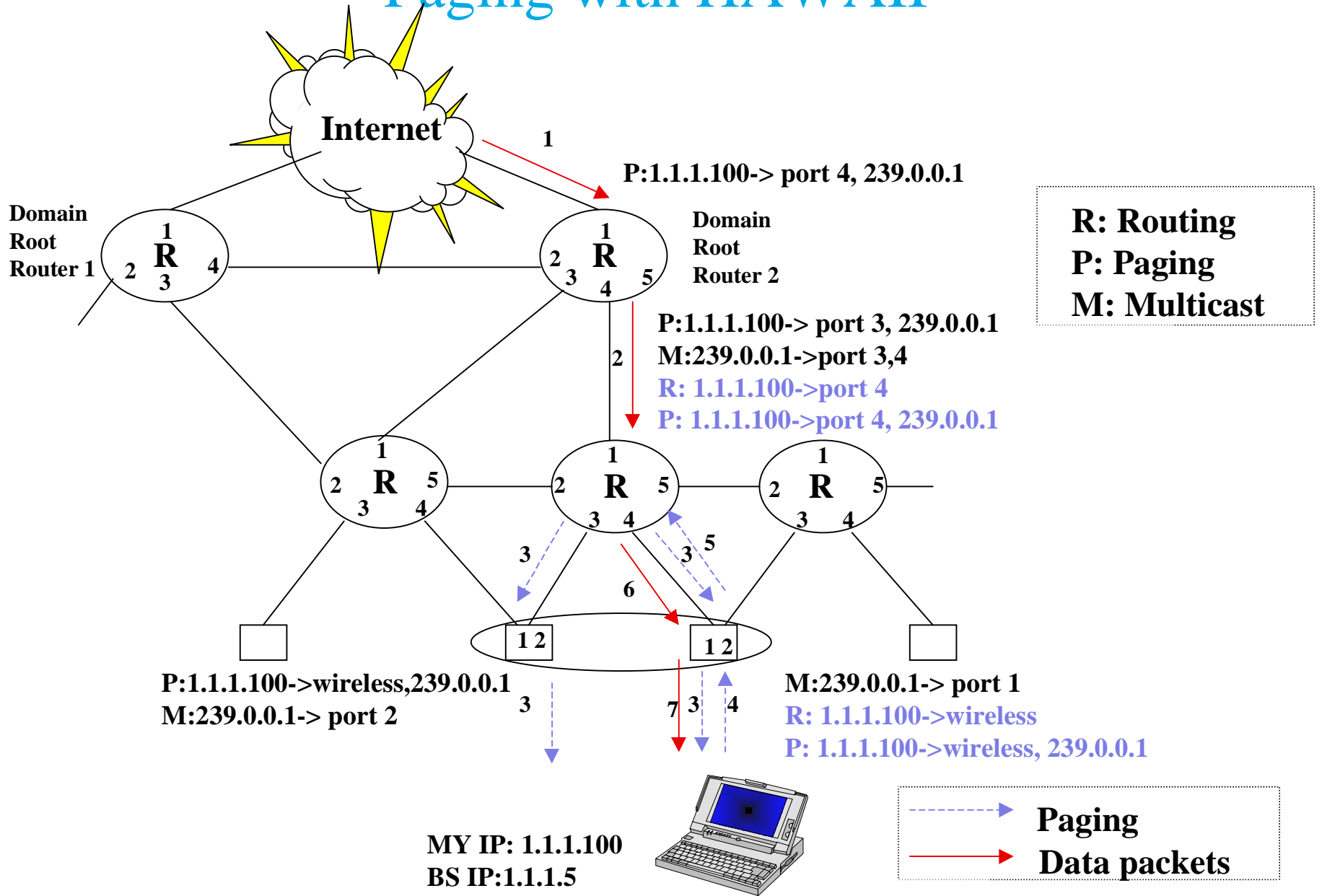☞ **Network determines the exact location by paging to deliver packets**

Design Goals

- *Efficiency*
  - limit updates from the mobile host when idle to conserve battery power

- *Scalability*
  - push paging initiation closer to the base station

- *Reliability*
  - allow paging initiation to occur at any router/base station (no single points of failure)

- *Flexibility*
  - allow for fixed, hierarchical, or user-defined paging areas

Power-up in Home Domain

Internet

R:1.1.1.100-> port 4
P:1.1.1.100-> port 4, 239.0.0.1

Domain Root Router 1

Domain Root Router 2

R: Routing
P: Paging
M: Multicast

R:1.1.1.100->port 3
P:1.1.1.100-> port 3, 239.0.0.1
M:239.0.0.1->port 3,4

R:1.1.1.100->wireless
P:1.1.1.100->wireless,239.0.0.1
M:239.0.0.1-> port 2

M:239.0.0.1-> port 1

MY IP: 1.1.1.100
BS IP:1.1.1.5

Mobile IP reg.

HAWAII

Paging with HAWAII

Internet

1

P:1.1.1.100-> port 4, 239.0.0.1

Domain Root Router 1

Domain Root Router 2

P:1.1.1.100-> port 3, 239.0.0.1
M:239.0.0.1->port 3,4
R: 1.1.1.100->port 4
P: 1.1.1.100->port 4, 239.0.0.1

2

R: Routing
P: Paging
M: Multicast

R

R

R

R

R

3

3 5

6

5

M:239.0.0.1-> port 1
R: 1.1.1.100->wireless
P: 1.1.1.100->wireless, 239.0.0.1

P:1.1.1.100->wireless,239.0.0.1
M:239.0.0.1-> port 2

3

7 3 4

MY IP: 1.1.1.100
BS IP:1.1.1.5

Paging
Data packets

Router operation

Routing entry	Paging entry	State	Operation
YES	YES	Active	Regular Forwarding
YES	NO	Active	No paging support
NO	NO	Null	Forward if default route exists, else discard

NO	YES	Standby	Paging:
			 If packet arrives from DRR
			　　If (node is base station or part of
			　　　　multicast tree with > 2 branches)
			　　　　　　Initiate paging
			　　else
			　　　　　　Forward to port in paging entry
			　　Endif
			else
			　　Forward along default route
			Endif

Paging with Mobile-IP

- ## When using foreign agents
  - Group set of foreign agents into multicast group
  - Previous foreign agent initiates paging
  - Impact of previous foreign agent failure
- ## When operating without foreign agents
  - Paging initiated from home agent
  - globally visible multicast address or separate unicasts necessary
  - scalability is an issue