

HAWAII: A Domain-Based Approach for Supporting Mobility in Cellular Networks

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Design Goals

- Performance
 - Process updates locally
 - Limit disruption
 - Routing and data transfer efficiency
- Quality of Service (QoS)
 - Provide intrinsic support for QoS
- Reliability
 - Limit impact of failures

Design Principle I: Hierarchy with Unique Address per Host

- Hierarchy through domains
 - Mobile-IP for movement between domains
 - Path Setup for movement within domain
 - Users retain their unique IP address while moving within a domain
- ⇒ Unique and unchanging address limits updates to Home Agent and simplifies QoS support in the network

Design Principle II: Path Setup Schemes

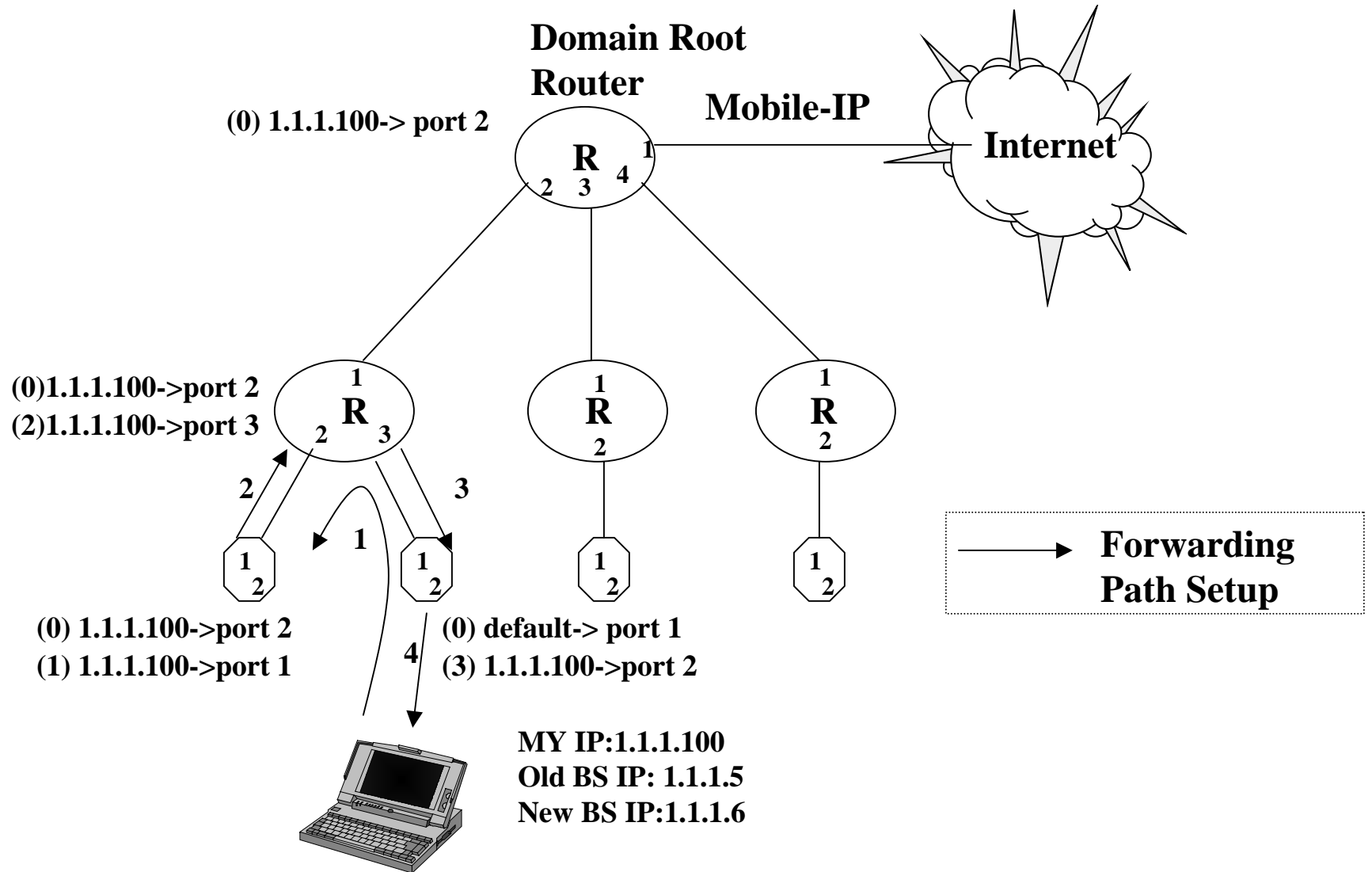
- Host-based routing within the domain
 - Path setup schemes selectively update local routers as users move
 - Path setup schemes customized based on user, application, or wireless network characteristics
- ⇒ Micro-mobility handled locally with limited disruption to user traffic

Design Principle III:Soft-state

- Host-based routing entries maintained as soft-state
- Base-stations and mobile hosts periodically refresh the soft-state

⇒ Recovery from link/router failures

Example: Micro-mobility



HAWAII: Potential Concerns

- Scalability at the Domain Root Router
 - *Number of entries*: entries from domain's IP subnet -> perfect hashing for route lookup
 - *Number of updates*: local handling of mobility limits number of updates
- Limited IP Address Availability
 - Use of DHCP for host's *home address*
- Security
 - User update authentication *similar to Mobile-IP*

HAWAII: Benefits

- Performance
 - Less control message overhead as micro-mobility transparent to home agents
 - Less data packet header overhead as no tunneling in a (large) home/power-up domain
 - Limited data transfer disruption as Path Setup Schemes are optimized for the environment
- Ease of QoS support: unique address
- Reliability through soft-state