Programmable Handoff

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Motivation

- service creation
- seamless roaming
- support for multiple styles of handoff
- ability to architect handoff services
Approach

- open mobile telecommunications hardware
- separate handoff control from mobility management
- decompose handoff control

Architecture
Binding Model

- handoff control model
  - programmable detection algorithms, measurement, and beaconing systems
- mobility management model
  - supports the design space of different architectures
- handoff execution interface
  - separates handoff control from mobility management

Service Creation Environment

- CORBA-based
- supports dynamic deployment of services
- comprises profilers and service controllers
- uses simple profiling language
Applications

- Multi-service Access Networks
  - support multiple styles of handoff simultaneously
  - network is used as a common pool of resources
- Reflective Handoff
  - allows mobile devices to roam between heterogeneous access networks
  - access networks load signaling system support dynamically

Reflective Handoff

[Diagram showing mobile IP enabled internetwork with home agent, host, gateways, access points, and signaling module]
Design

- beacons carry unique identities characterizing mobility management architectures
- mobile devices maintain signaling module caches
- if a module is not cached it is loaded dynamically

Implementation

- access network initiate inter-gateway handoffs
- reflective handoff deployed over Mobiware and Cellular IP access networks
- soft state module caches are used
Remarks

- signaling module loading latencies affect testbed performance
- inter-gateway handoffs should be initiated before wireless data-link transfer
- forwarding delay at the new access network compensates for the handoff completion time

Example

- 350 Kbps video application

![Graph 1: Cellular IP to Mobiware](image1)
![Graph 2: Mobiware to Cellular IP](image2)
Further Work

- extent reflective handoff to the physical and data-link layers
- scalability and performance evaluation

Conclusion

- handoff can be made completely programmable
- mobile devices can re-program their behavior to interact with different access networks
- early results show that the approach is promising!