RANGI (Routing Architecture for Next Generation Internet) Experiment Report

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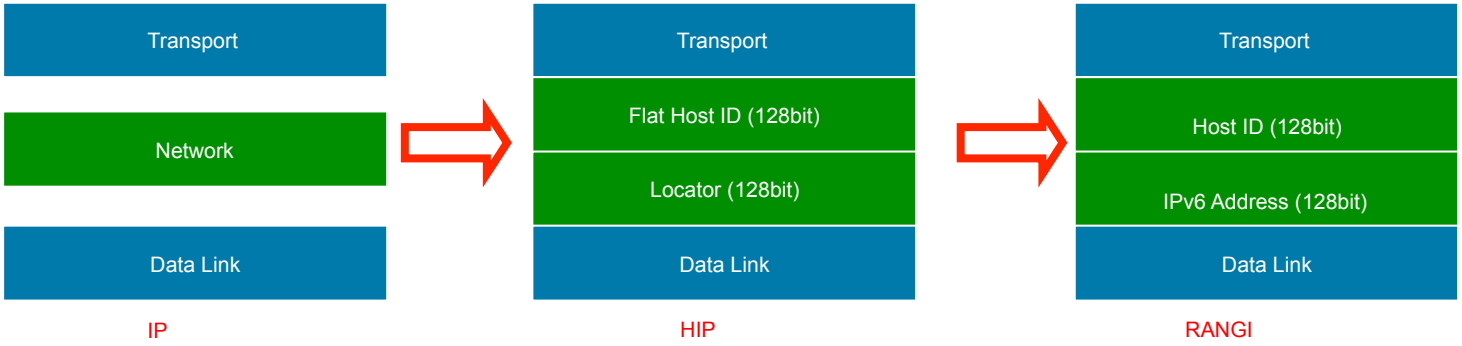
Background

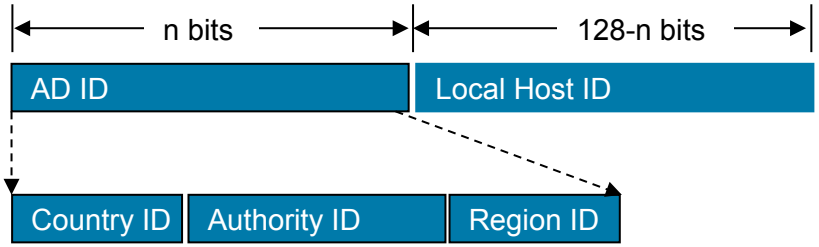


architecture.

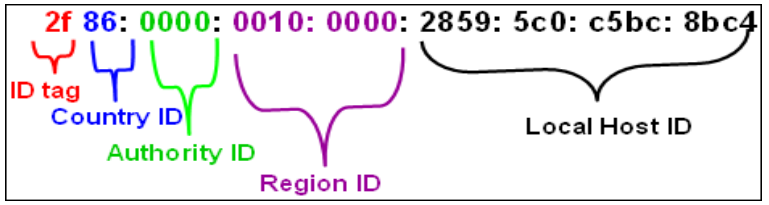
RANGI

muti-homing experiments

Host Stack Implementations



Host ID Format

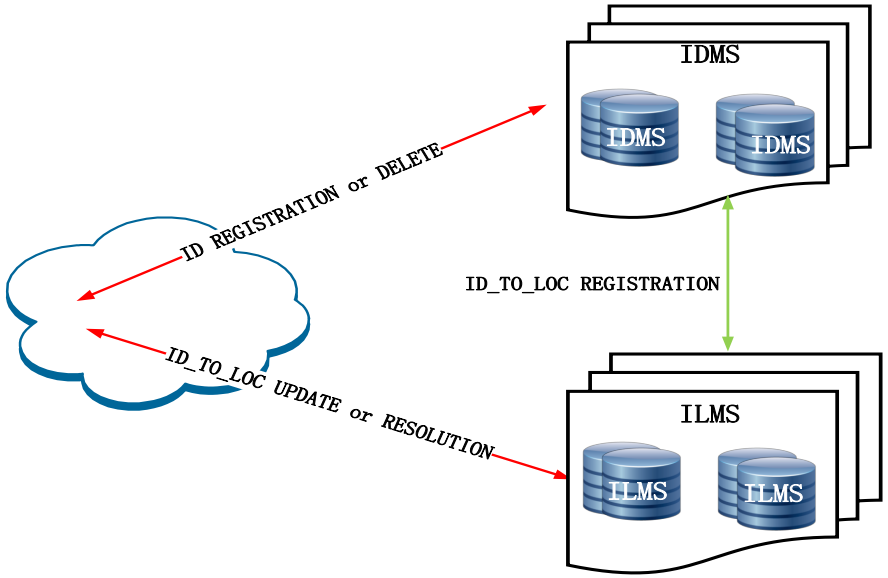


Host ID Implementation Example

- RANGI completed a further extension to HIP
  - Reuses the user-space pattern of HIPL
  - CGA authentication in the base exchange: authenticate the binding relationship between sender's ID and public key to confirm the authenticity of the data source
- Common functions:
  - ID generation and registration.
  - ID->Locator mapping registration and resolution.
  - ID/Locator split based communication.

Infrastructure Implementations

- IDMS is in charge of ID management, including the registration of host ID
- ILMS is in charge of ID->Locator Mapping service, Including mapping registration, updating and resolution.

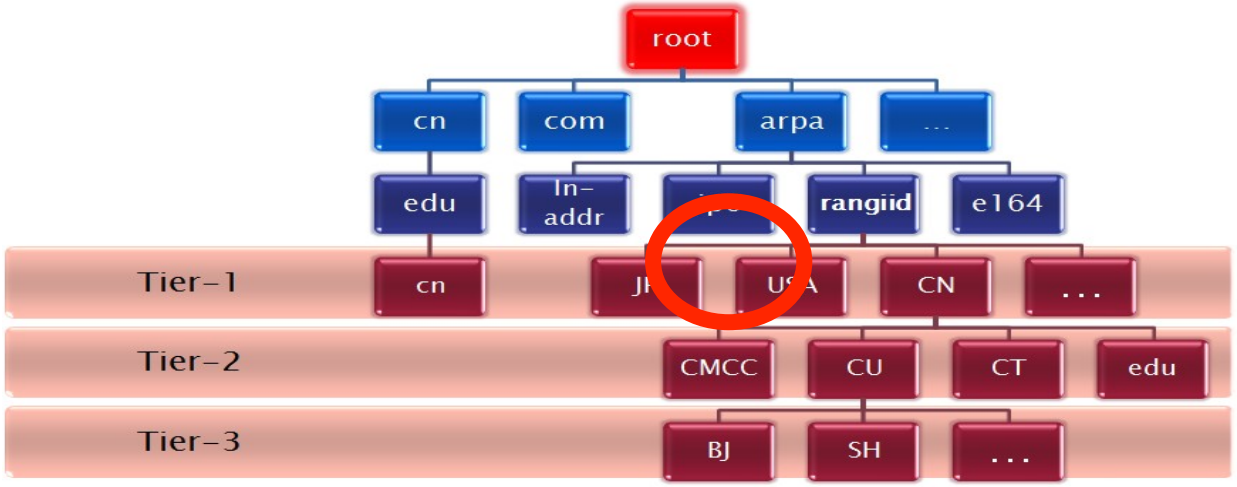


ID Management System(IDMS)

- IDMS has a hierarchical structure
  - Each IDMS is responsible for the management of IDs which belong to its AD domain.
  - Guaranteeing the uniqueness of ID within each AD domain
  - Maintaining TSIG shared secret per ID entry for protecting the dynamic updating process in the ILMS.

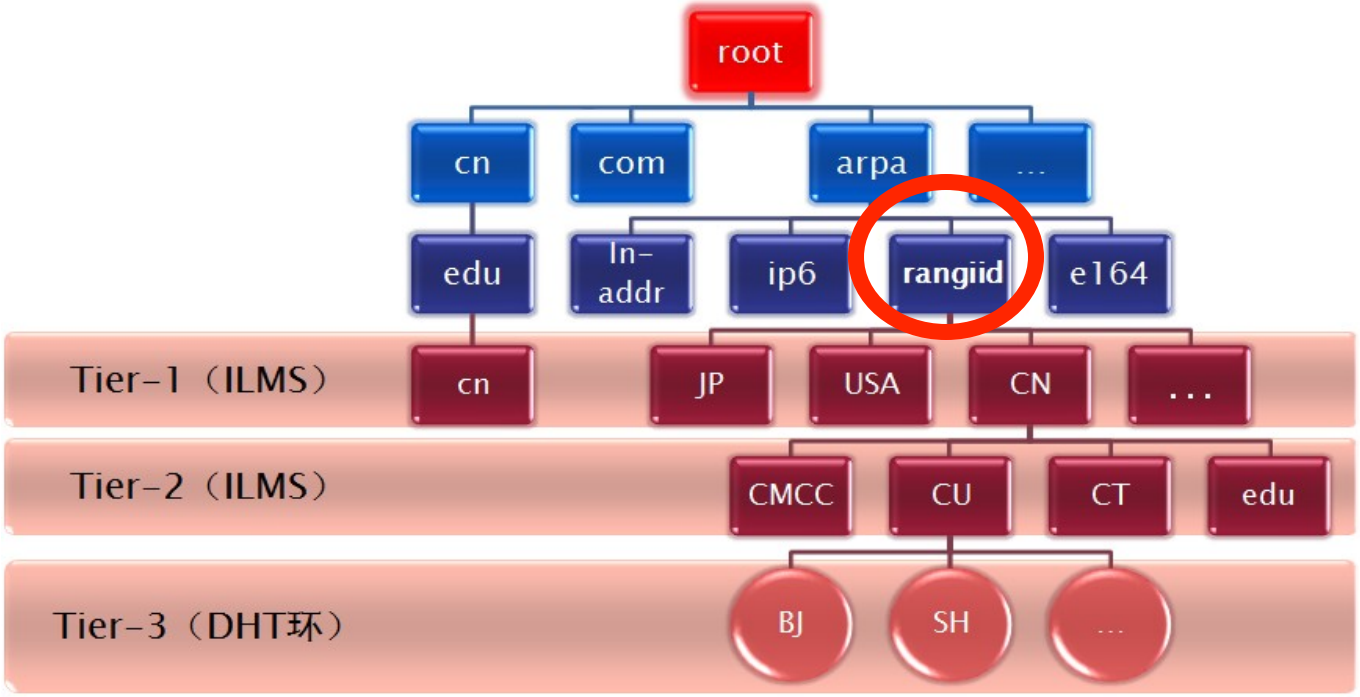
ID to Locator Mapping System (DNS based)

- ILMS based on reverse DNS
  - The mapping system server organizes hierarchical structure in accordance with the identity of RANGI
  - Brings trust boundaries
  - Interact with the corresponding IDMS to obtain TSIG shared secret for protecting the dynamic updating process

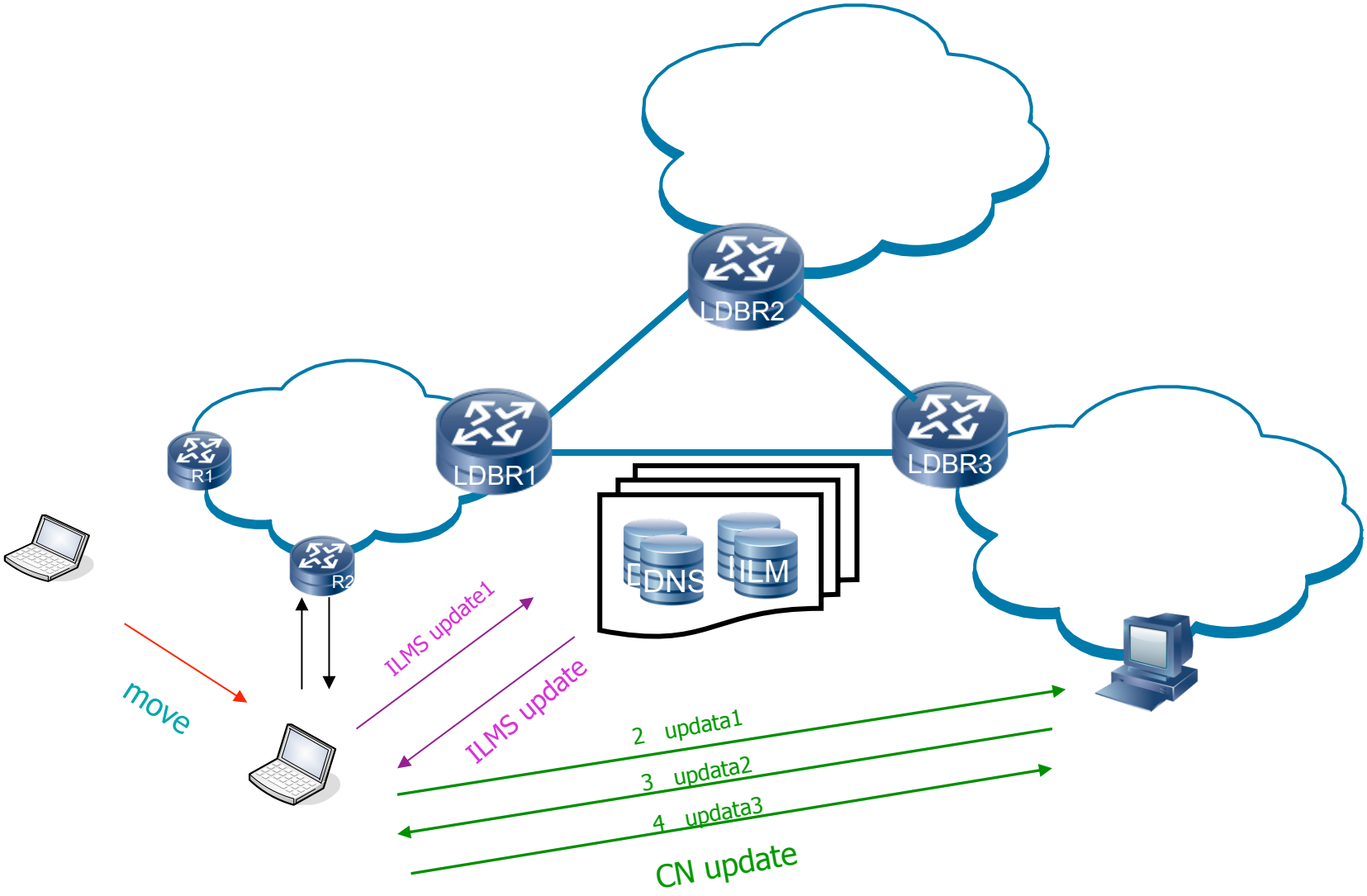


ID to Locator Mapping System (DNS+DHT based)

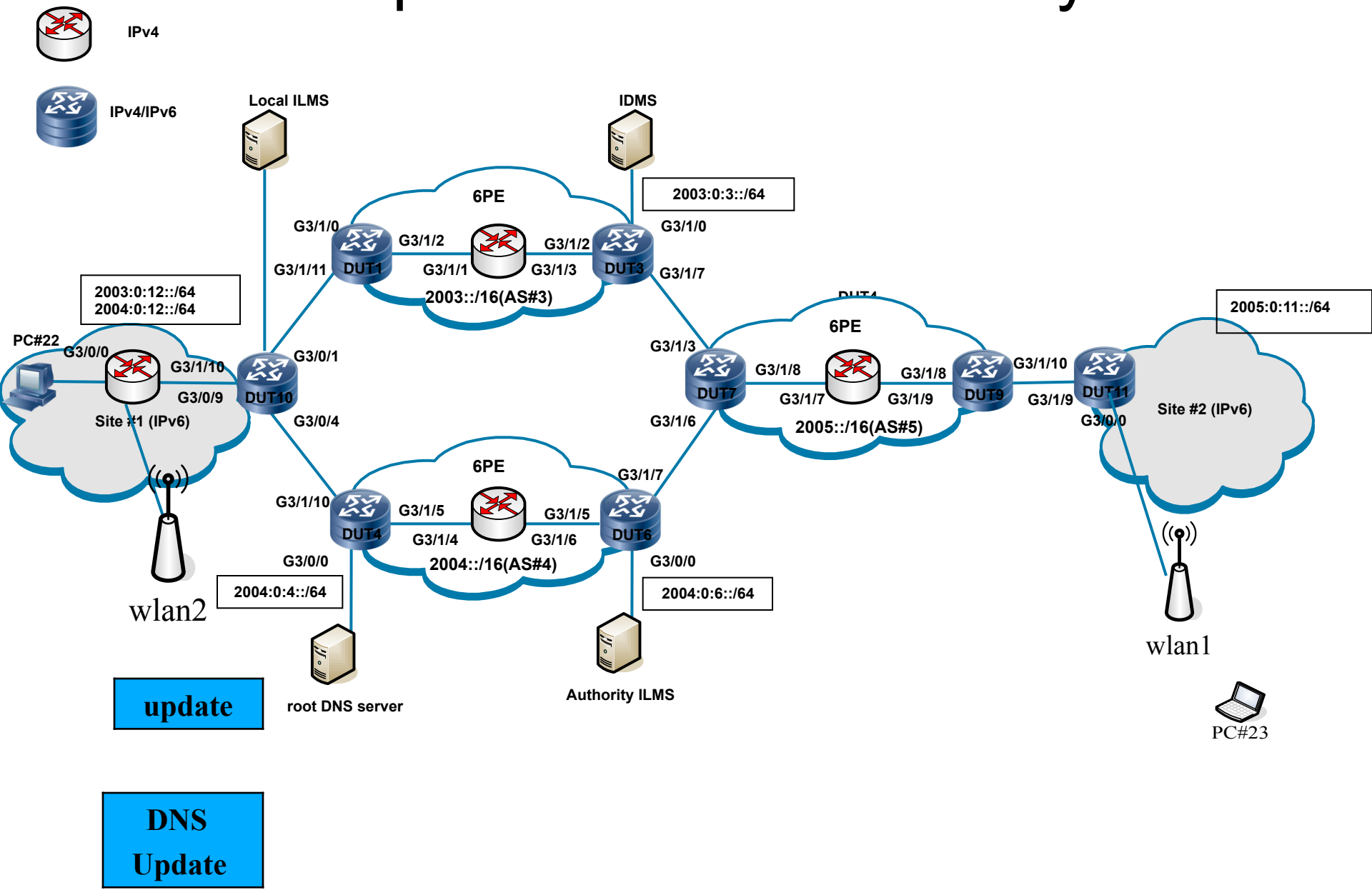
- ILMS based on DNS-DHT hybrid resolution
  - DNS is used to divide different management organizations
  - DHT is used to maintain the ID/Locator mapping information.
  - a DNS-DHT converter is needed for changing DNS message to DHT message



Host Mobility



Experiment: Host Mobility



Views from Network Operators

- Administration of ID namespace
  - AD ID is hierarchical, it consists of three administrative level: country level, authority level and region level. ID administrations have a corresponding hierarchical reverse tree structure.
  - the root part is a global administration which is similar as ICANN
  - the root administration divides the namespace into some ID sub-namespaces

Views from Network Operators

- Security Considerations
  - IDMS uses certification, signature and other techniques for authentication and message integrity protection.
  - ILMS
    - use DNSSEC to provide the source authentication and integrity protection for resource records;
    - use DNS transaction authentication protocol TSIG (Secret Key Transaction Authentication for DNS) to protect update operation of mapping information

Conclusion

- RANGI can effectively support ID/Locator split
- Support mobility, multi-homing and traffic engineering
- From the introduction of hierarchical concept, RANGI has a reasonable business model and clear trust boundaries
- Solve the problem of routing scalability

Any Comments?