Athens University of
Economics and
Business

Mobile
Multimedia
Laboratory

Publish/Subscribe Rendezvous Network

Domain Level Rendezvous

General Background
Prototype Implementation
Conclusion

BACKGROUND

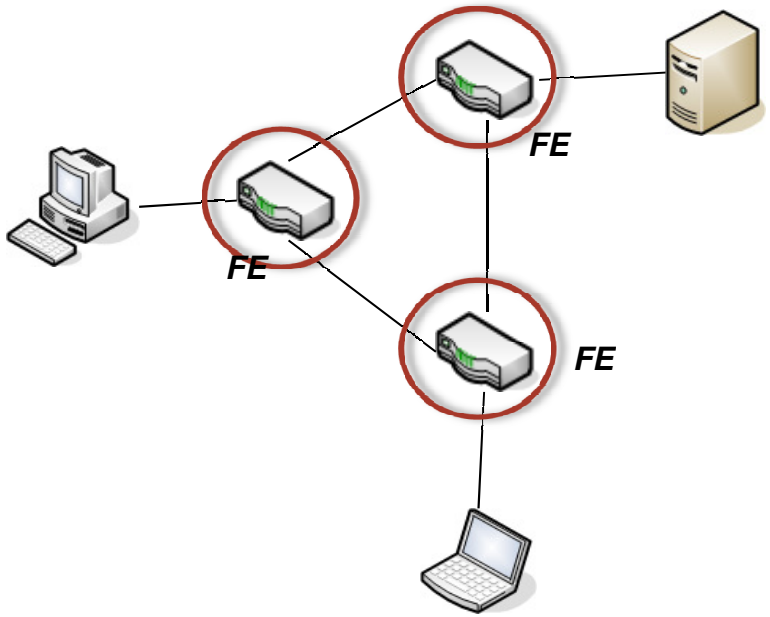
Background

- **RTFM based network**:
  1. Rendezvous: matches publication / subscription
  2. Topology: maintain topological information
  3. Forwarding : data transmission

- **Network Elements**:
  1. *Forwarding elements*
  2. *End hosts*
  3. *Rendezvous points (RVP)*

Network Elements

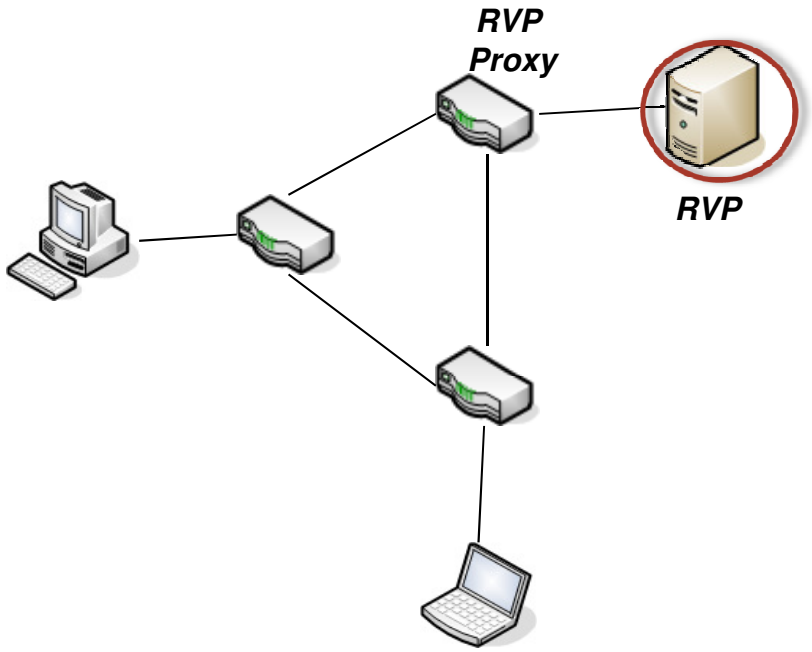
Forwarding Elements - FEs



- Packet Forwarding
- **Maintain topological information**
  - Link State Protocol
- Each FE assigned with a Node Id
  - Flat, topology independent

Network Elements

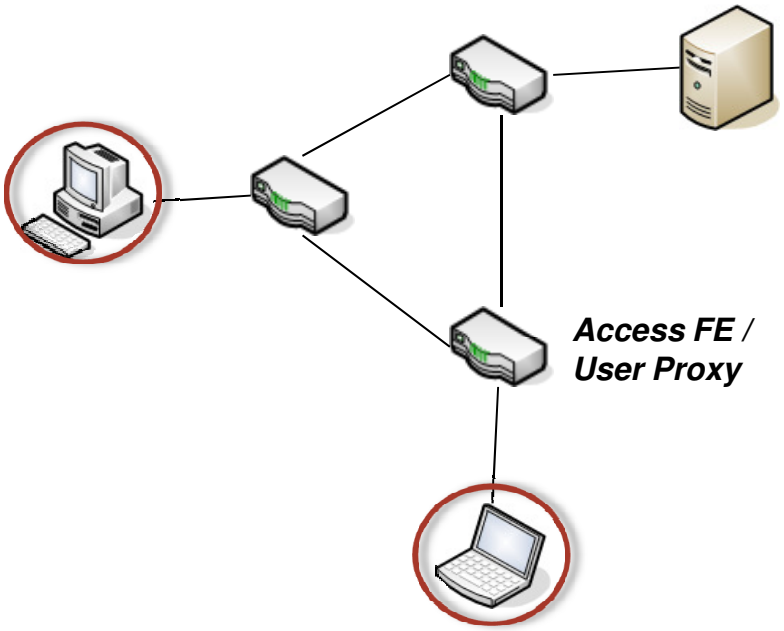
Rendezvous Point



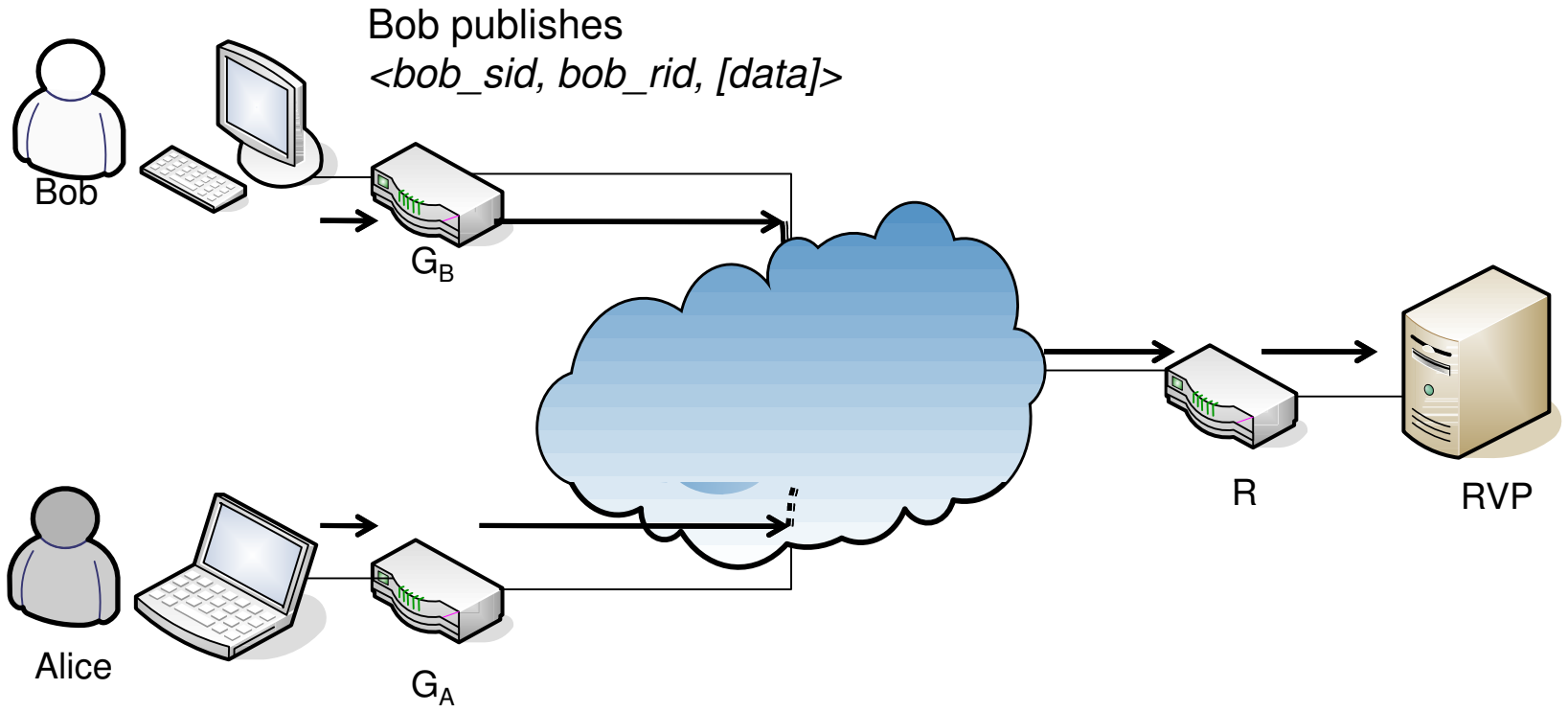
- Indexes publications
  - Matches subscriptions to publications
- Announces its presence to FEs in a push based manner
- FEs request RVP location in a pull based manner
- FEs store location of RVP

Network Elements

User hosts



- Interact with Access FE
- FEs proxy for users' publications / subscriptions

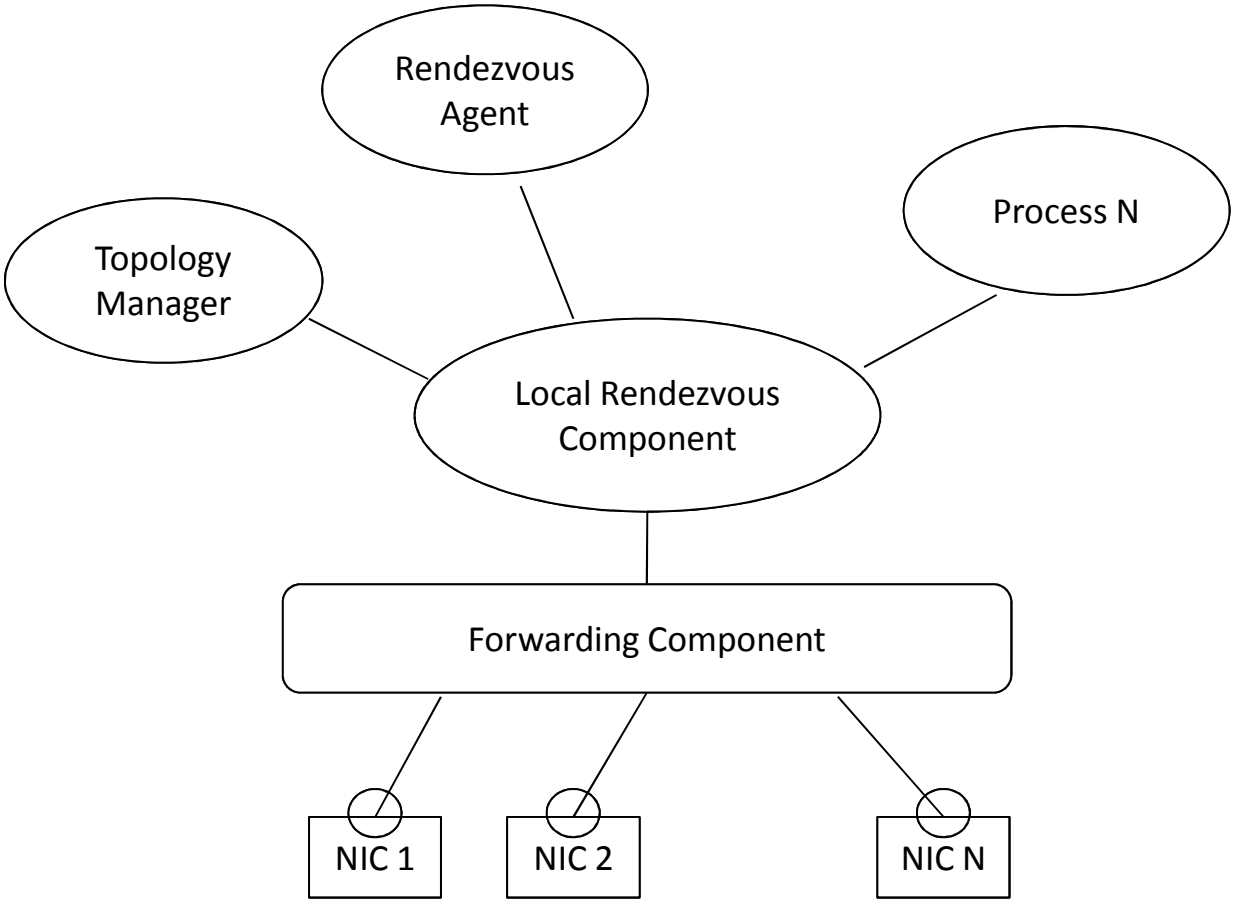

Bob publishes
<bob_sid, bob_rid, [data]>
Bob
G_B
R
RVP
Alice
G_A
Alice subscribes to
<bob_sid, bob_rid>

PROTOTYPE IMPLEMENTATION

PSI Implementation

- Fast/lean implementation
- Java based
- **Basis for**
  - Inter-domain rendezvous
  - Inter-domain routing/forwarding
- **Intend to integrate with Blackadder**

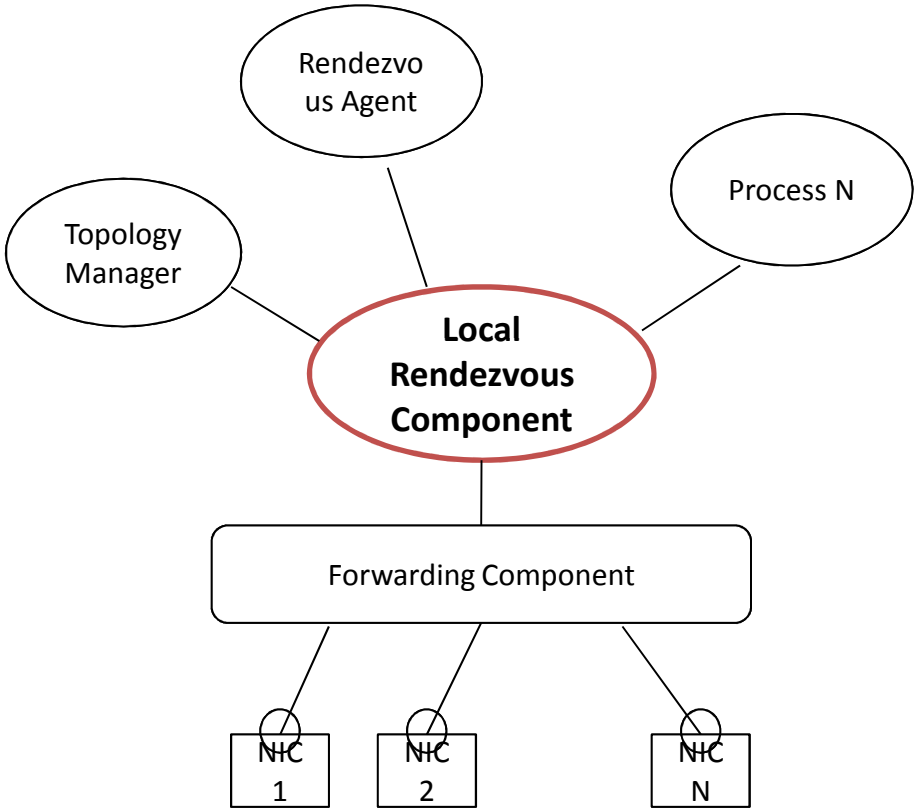
Inside a Node



Node implementation

Local Rendezvous Component (LocRC)

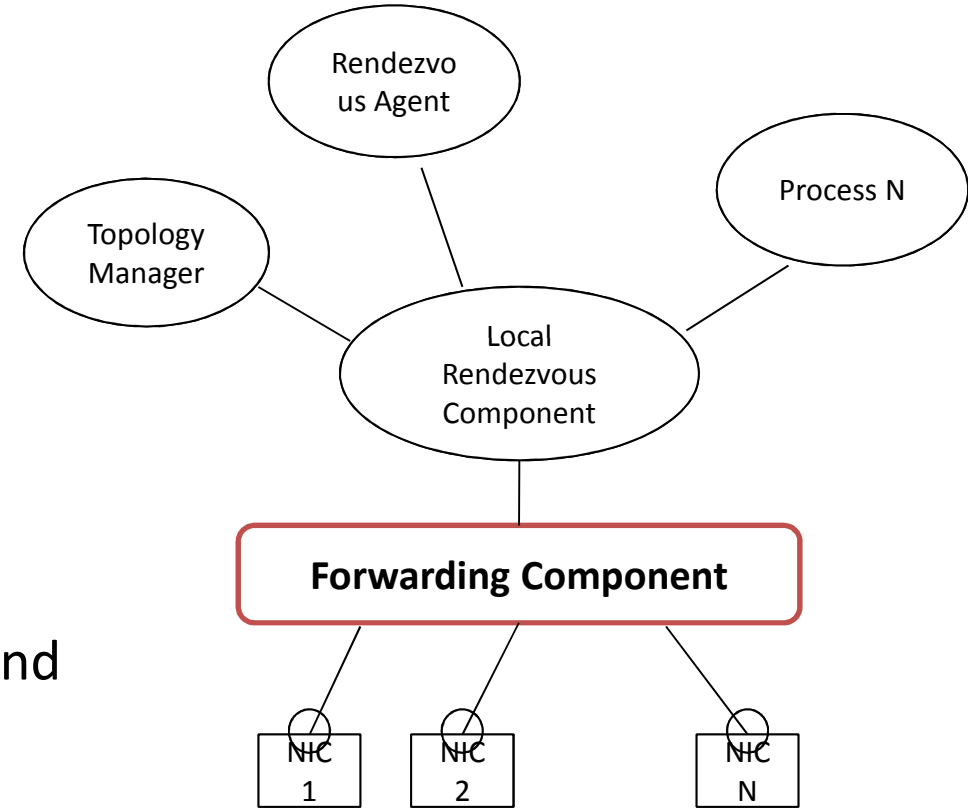
- **Event based, publish/subscribe inter-process communication mechanism**
- User space daemon
- Communication between processes and LocRC via TCP



Node Implementation

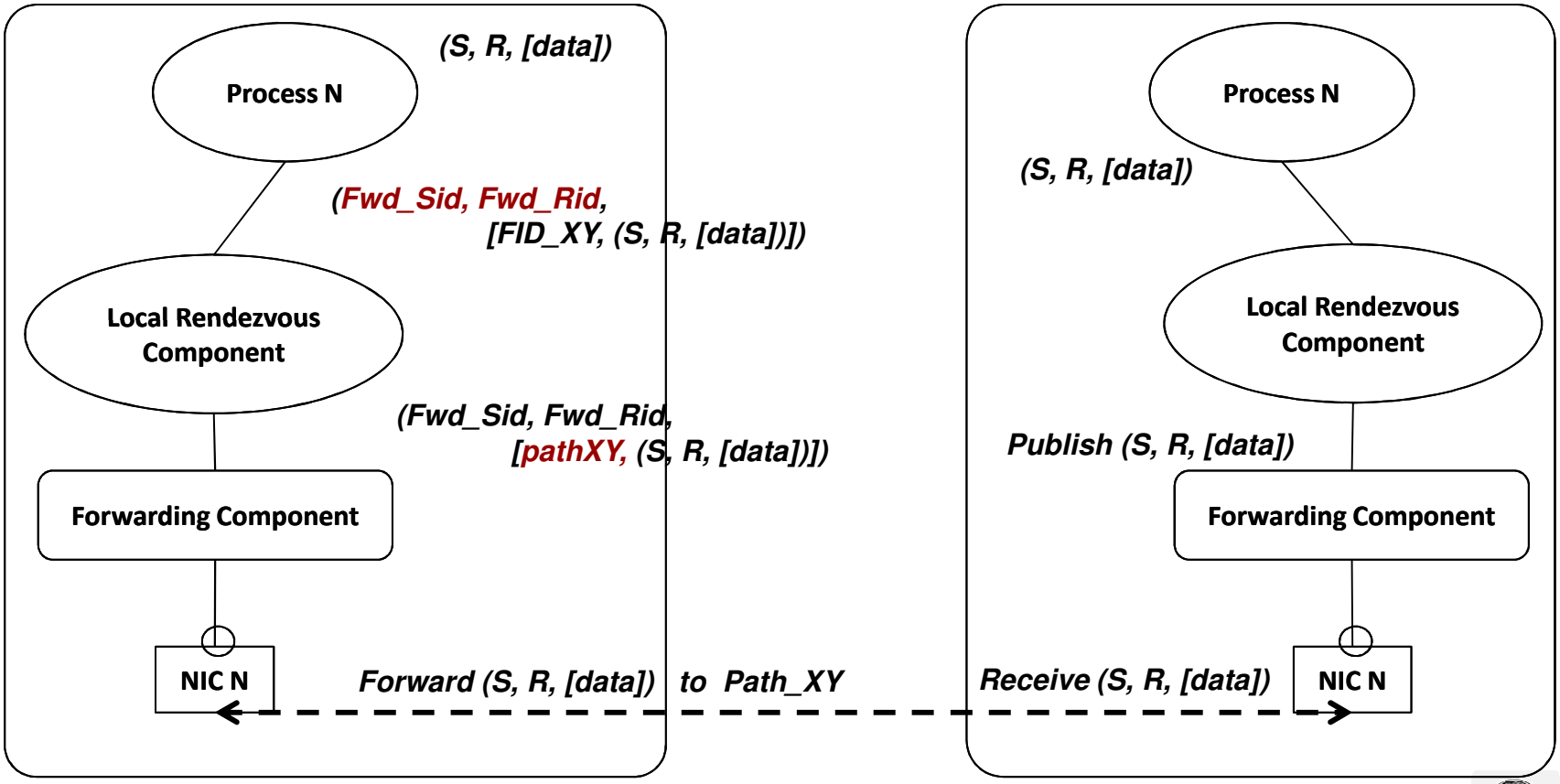
Forwarding Component (FwdC)

- "Connected" to node's NICs
  - Currently UDP based
- **LIPSIN based switching/forwarding**
- Announces to a local node:
  - link establishment
  - link failure to local node
  - Publishes outgoing Link ID (and neighbor's Virtual LID)



Node Implementation

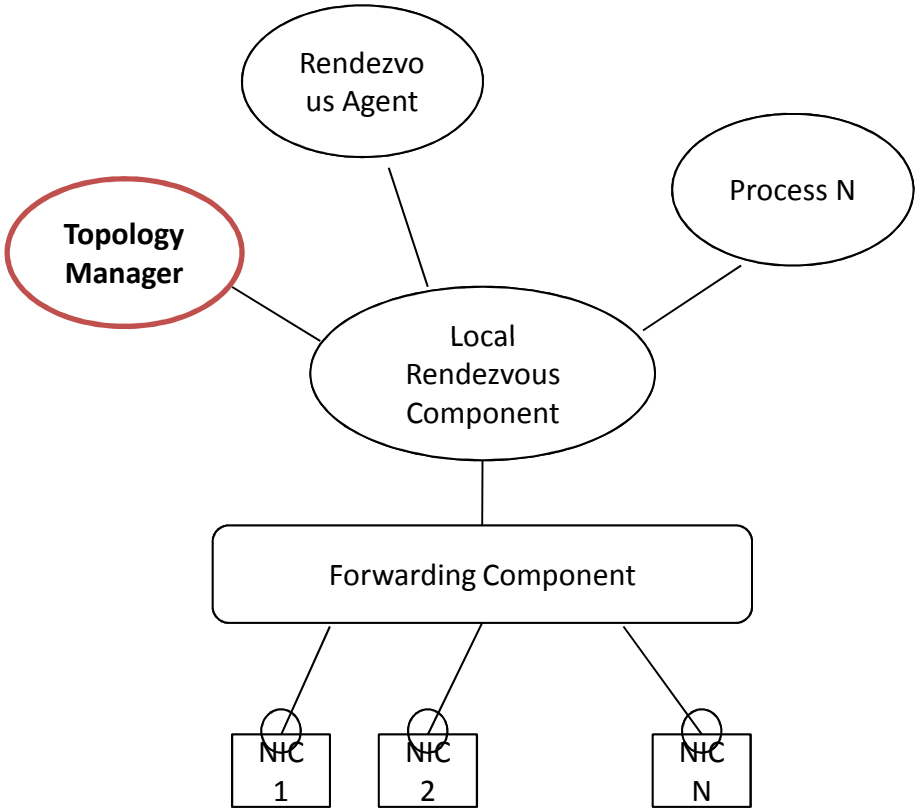
Forwarding Component (FwdC)



Node Implementation

Topology Management Component (TMC)

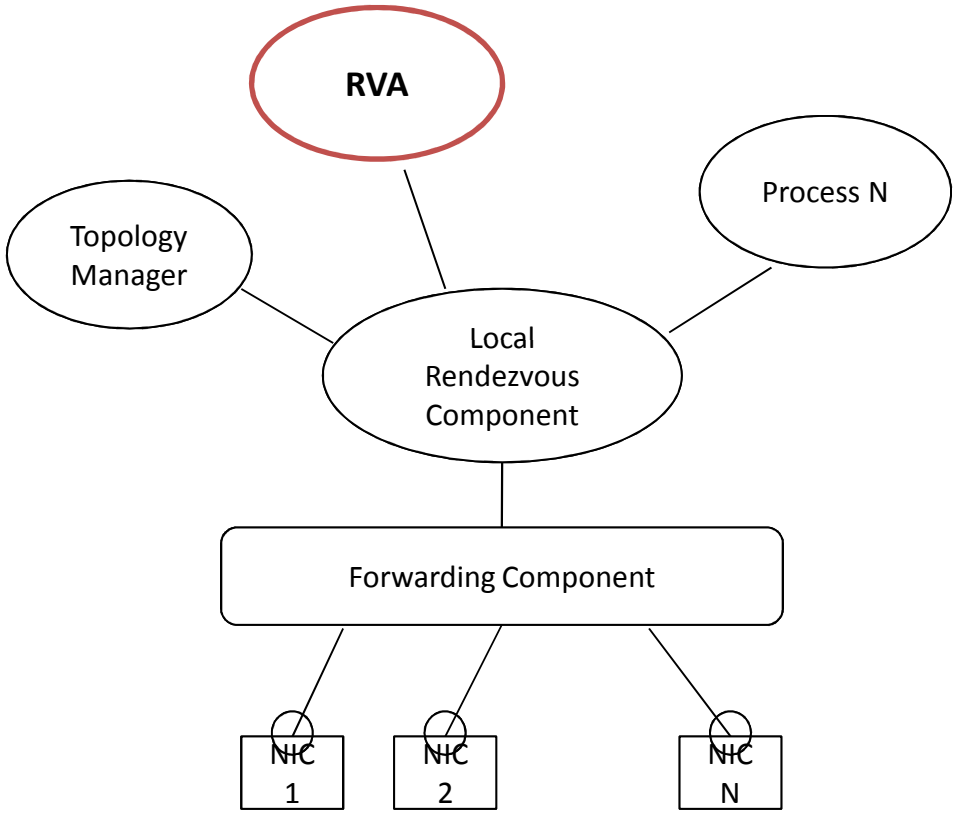
- **Run a distributed link state routing algorithm**
- Flood Link State Advertisements (LSA)
  - Publish/subscribe to well known Scope/Rendezvous Id
  - Transmit LSAs to neighbors
  - Neighbors update graph and forward LSAs
    - Discard duplicates



Node Implementation

Rendezvous Agent - RVA

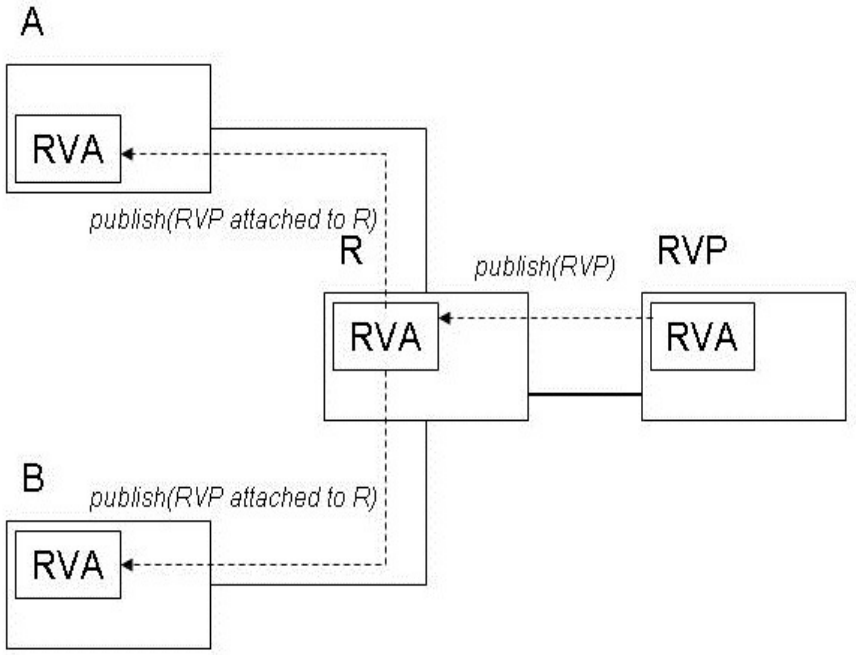
- Differentiated operation according resident node
  - End host, FE, RVP
- **Implements domain level Rendezvous Functionality**



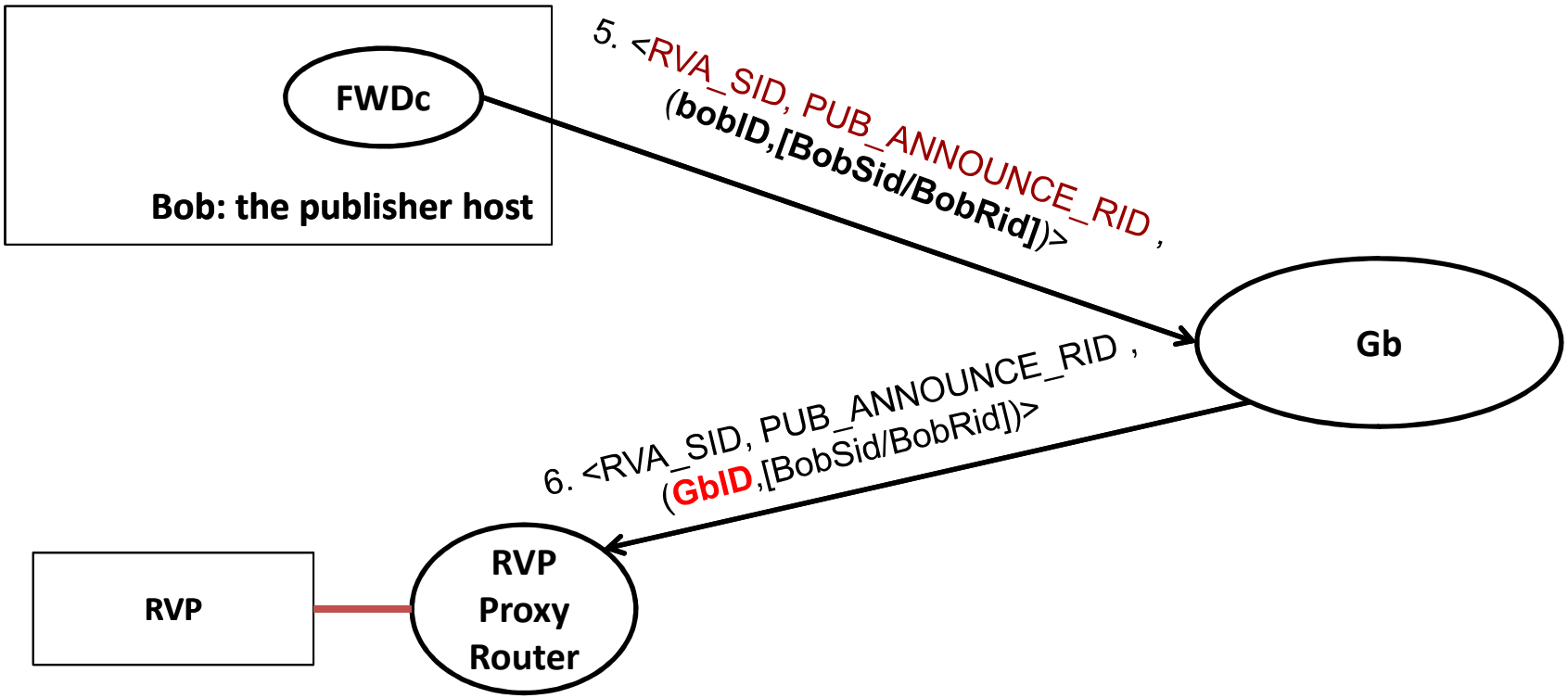
REndezvous NEtwork - RENE

Rendezvous System: RVAs and RVPs

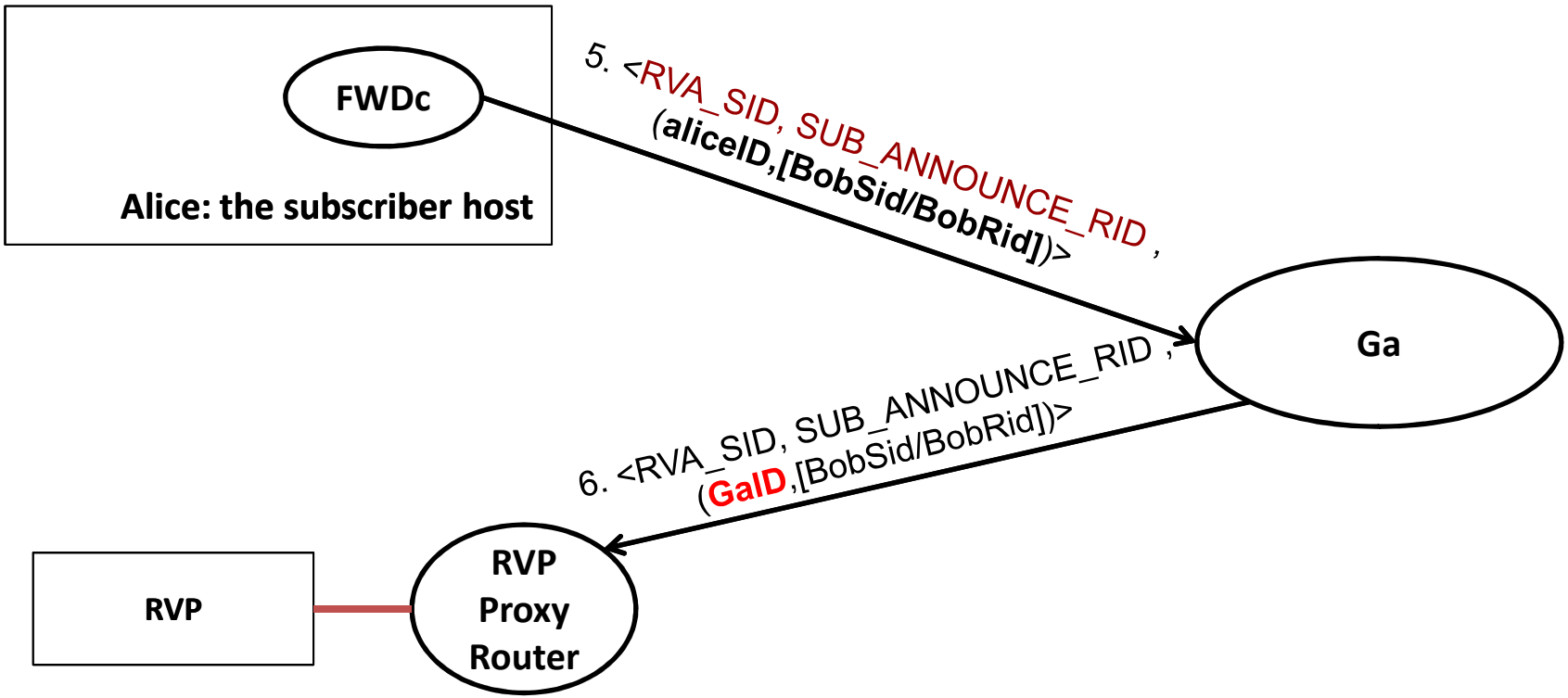
- *The RVP publishes its presence to R;*
- *R pushes the announcement to neighboring routers A and B*
- For a new router connected, its RVA pulls the RVP-proxy



Advertising a publication in RENE

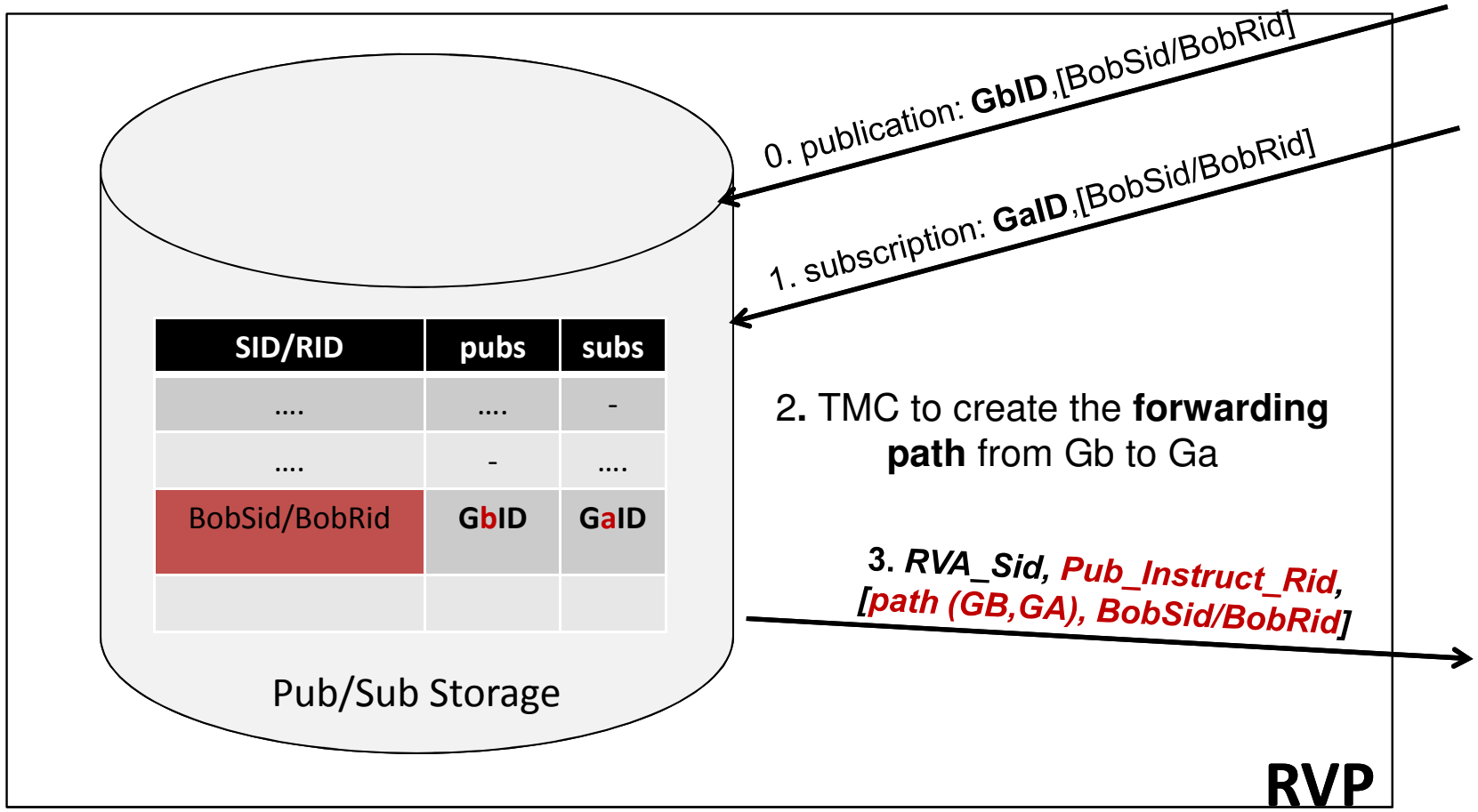


Advertising a subscription in RENE



Matching and instructing data transmission

Inside the RVP



Conclusions

- Fast/lean Java implementation **as a Basis for** Inter-domain rendezvous, routing/forwarding
- **Intend to integrate with Blackadder**

The End