

# RÉSEAUX ET TÉLÉCOMMUNICATION

UBIQUEST: Declarative approach for integrated network and data management in wireless multi-hop networks

Programme Blanc 2009



Data intensive systems

- Devices with limited resources
- Distributed data (horizontal fragmentation)
- Multi-hop ad-hoc networks
- Complex programming (e.g. routing, data management)

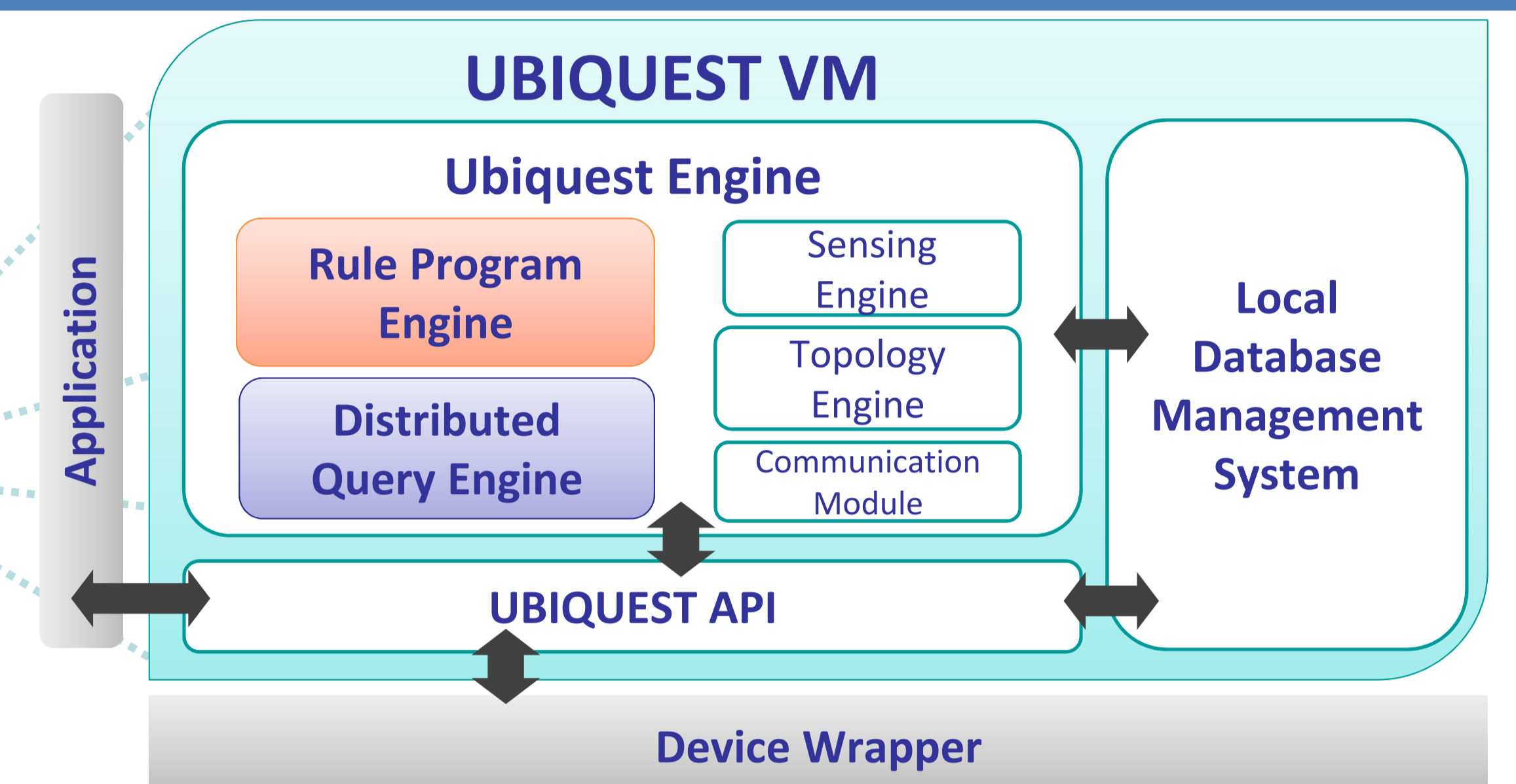
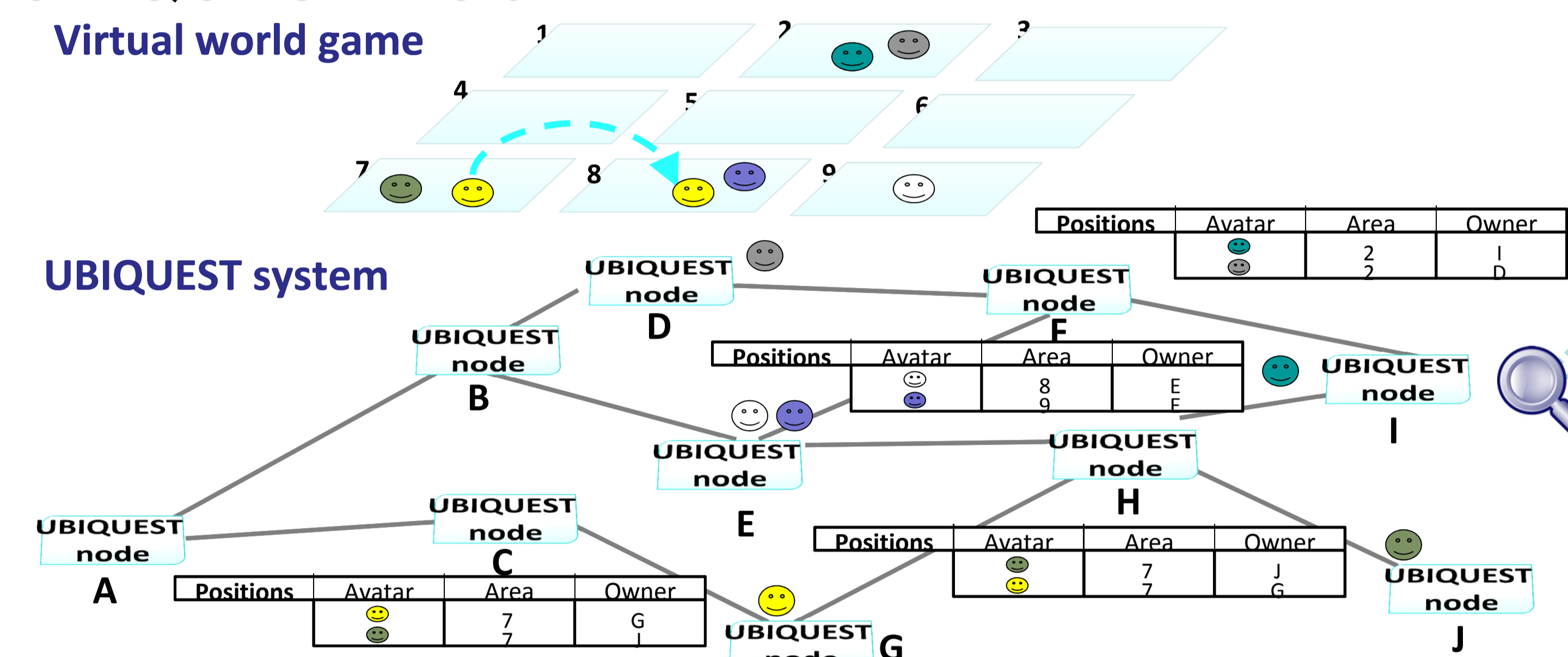


UBIQUEST proposal

- Combining declarative networking and distributed data based management
- Declarative and adaptive approach
- Query optimization by learning
- A UBIQUEST Virtual Machine (VM) on each node

An example of a data intensive system

## UBIQUEST vision



## Declarative and adaptive approach

### Query expression in DLAQL

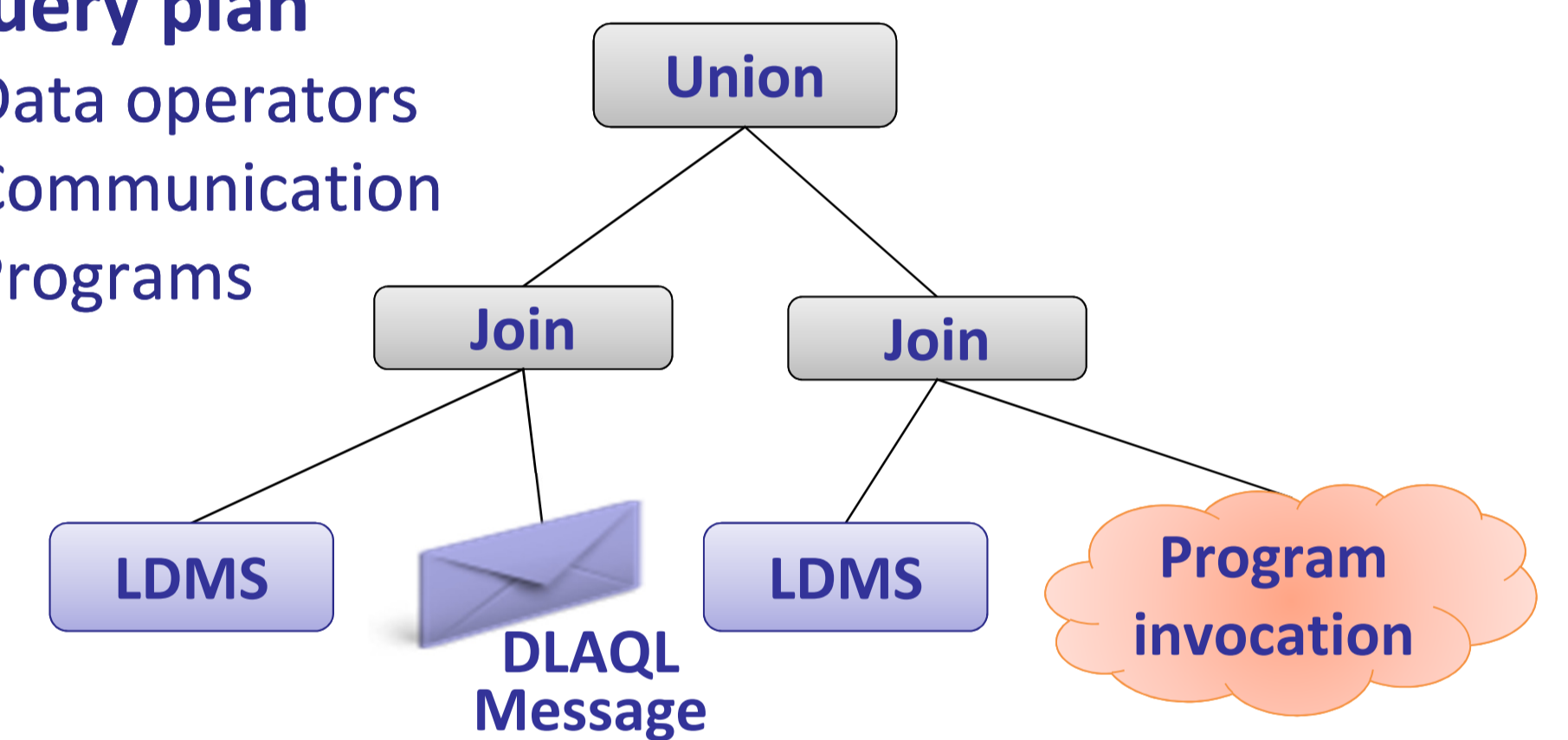
```
SELECT Area, Avatar FROM Positions SCOPE IS SELF WHERE Area = 7
```

### Synthetic expression of routing program in NetLog and QuestLog

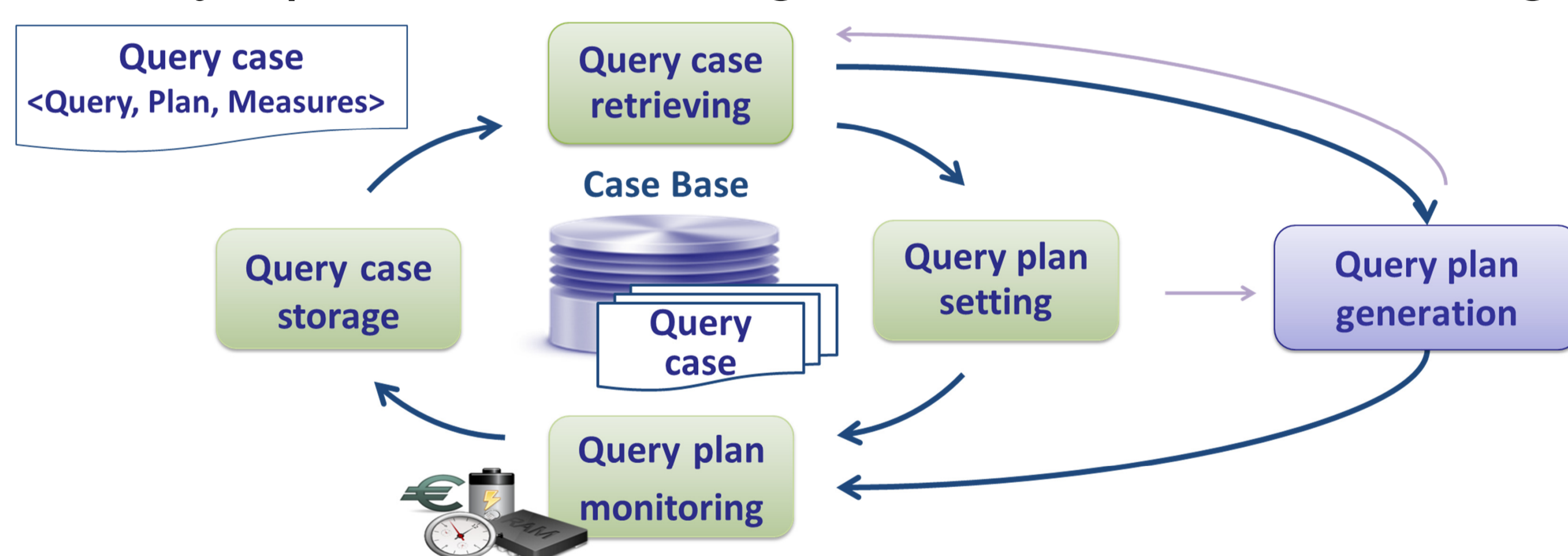
```
↑Route(SELF, d, d, 1) :- Link(SELF, d),
↑Route(SELF, d, n, l+1) :- Link(SELF, n), Route(n, d, _ , l)
↑Route(@orig, dest, dest, 1) :- Link(orig, dest)
↑Route(@orig, dest, nh, l+1) :- ~Link(orig, dest), Link(orig, nh), ?Route(@nh, dest, _ , l)
```

### Query plan

- Data operators
- Communication
- Programs



## Query optimization using Case-Based Reasoning



### Query case retrieval

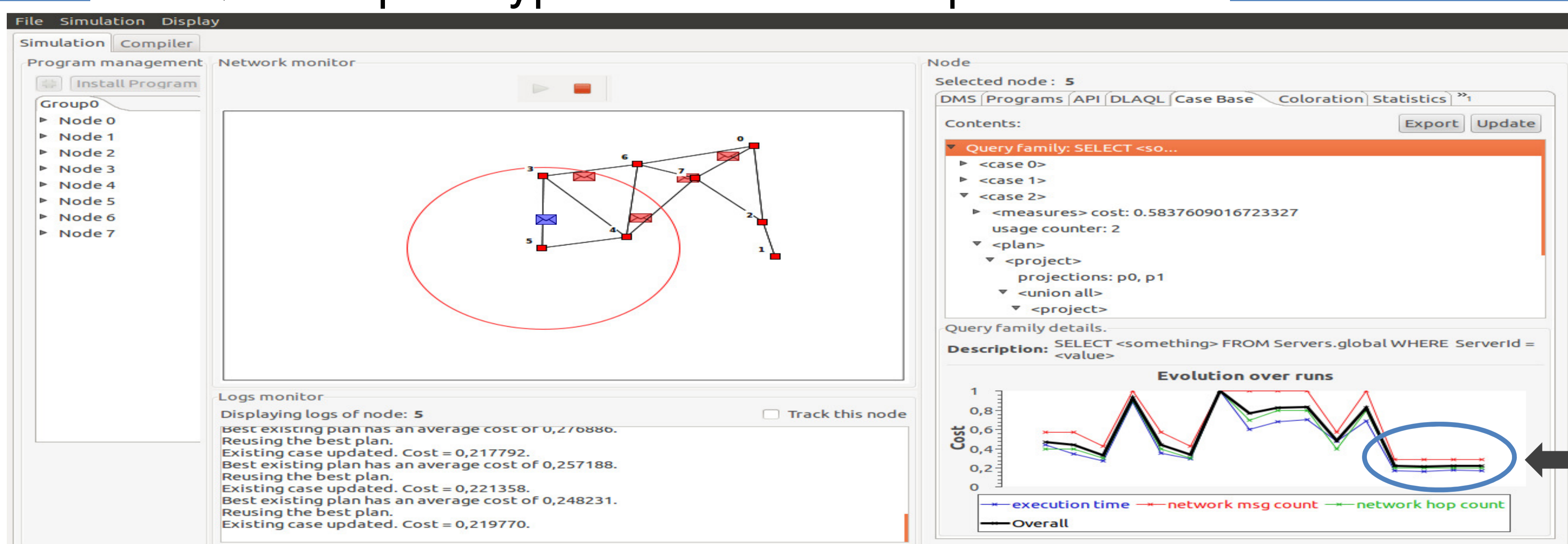
- Similarity function → query family
- Cost function → best case

### Query plan generation

- Pseudo-random
- Recursive
- Rule-based programs exploitation

### Learn real resource consumption for query families

## UBIQUEST prototype and simulation platform



Optimal query execution cost



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LES RENCONTRES DU NUMÉRIQUE

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