Open Issues In Mobile Middleware
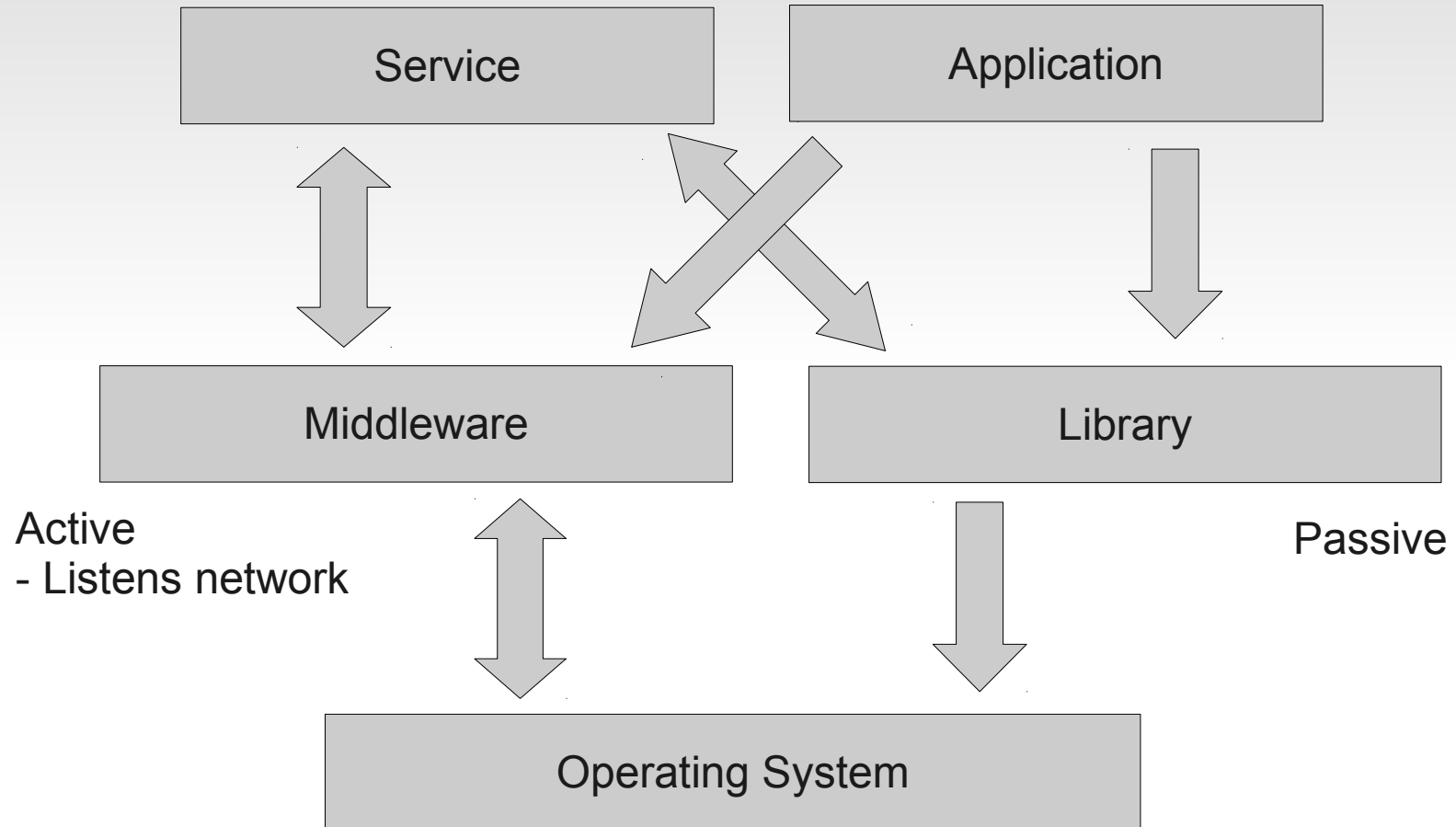
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Middleware

Mobile Device

Limited Environment

Dynamic Environment

Events to Services and Applications ?
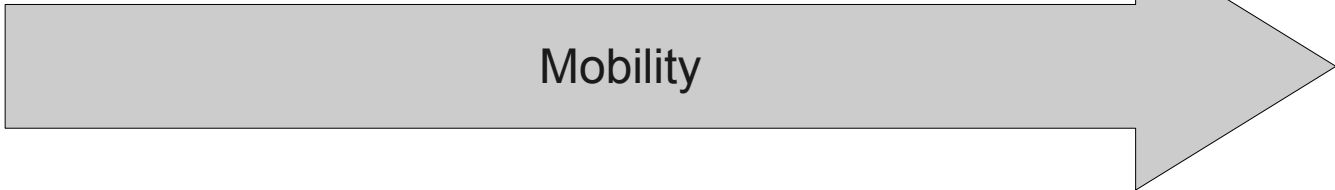
| Service | Application |

| Screen | CPU | Memory |

Power Saving Functionalities

Battery

| WLAN | Bluetooth | 3+G |

Physical – device moves
Logical – data moves
Network – address moves

Mobility

Reactivity ?

Service

Application

Can midlleware get all **relevant events ?**
- on fixed systems only communication was relevant, but in mobile all events are needed

Pro-activity ? Can middleware work behalf of the service or application ?
- due power saving, are pro-active arrangements possible ?

Middleware

Events ?

Screen Memory CPU Battery WLAN Bluetooth 3+G Mobility

Operating System

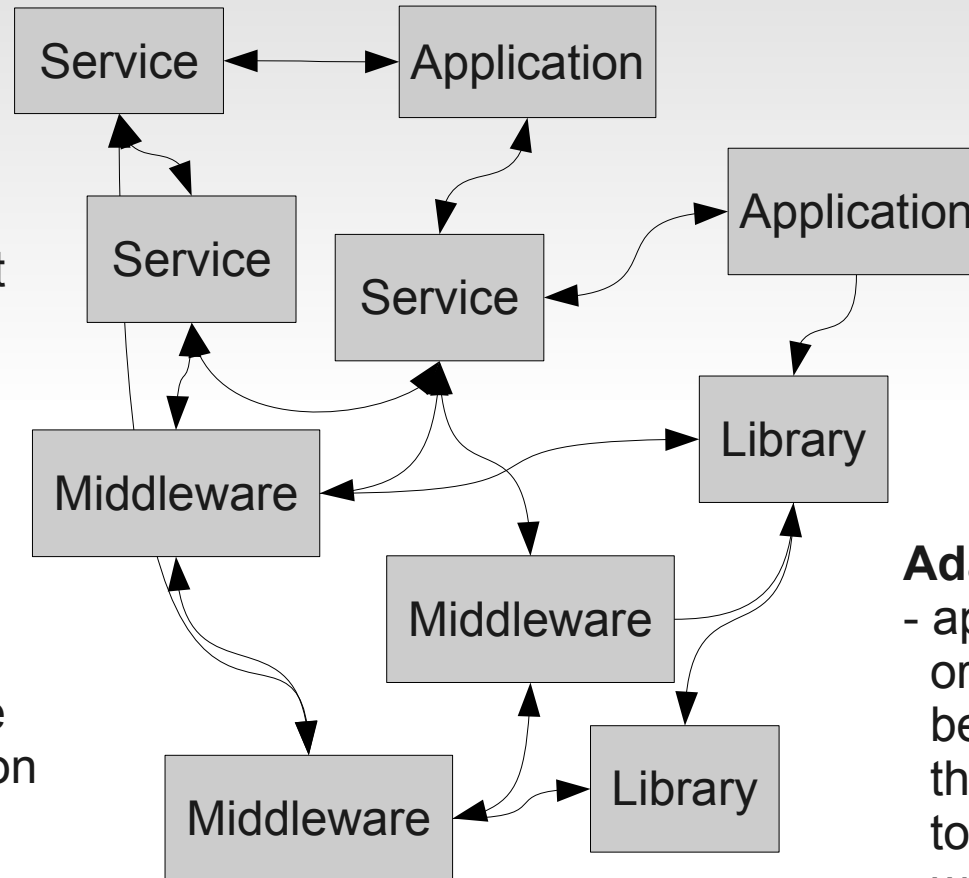# Architecture ?

Reuse ?
- resource saving
- collaboration ?
- combining different middlewares and libraries => my mainloop

Service ↔ Application

Service

Service

Application

Service

Library

Middleware

Middleware

Library

Middleware

Reflection ?
- resources to Provide it ?
- common reflection mechanism ?

Adaptation ?
- application or service or middleware have to be aware the states of the system and adapt to it
- where to adapt ?

Middleware Transparencies ?
- where to draw line between application and middleware ?

Discovery of Services ?

Addressing ?
- different kind of networks

Dynamic Discovery ?
- discover devices and services
- how to publish a service dynamically ?

Pro-activity ?
- can we discover Service beforehand ?
- mobility ?

Lifetime ?
- what is service lifetime in mobile environment ?

Service

Application

Service

Application

Service

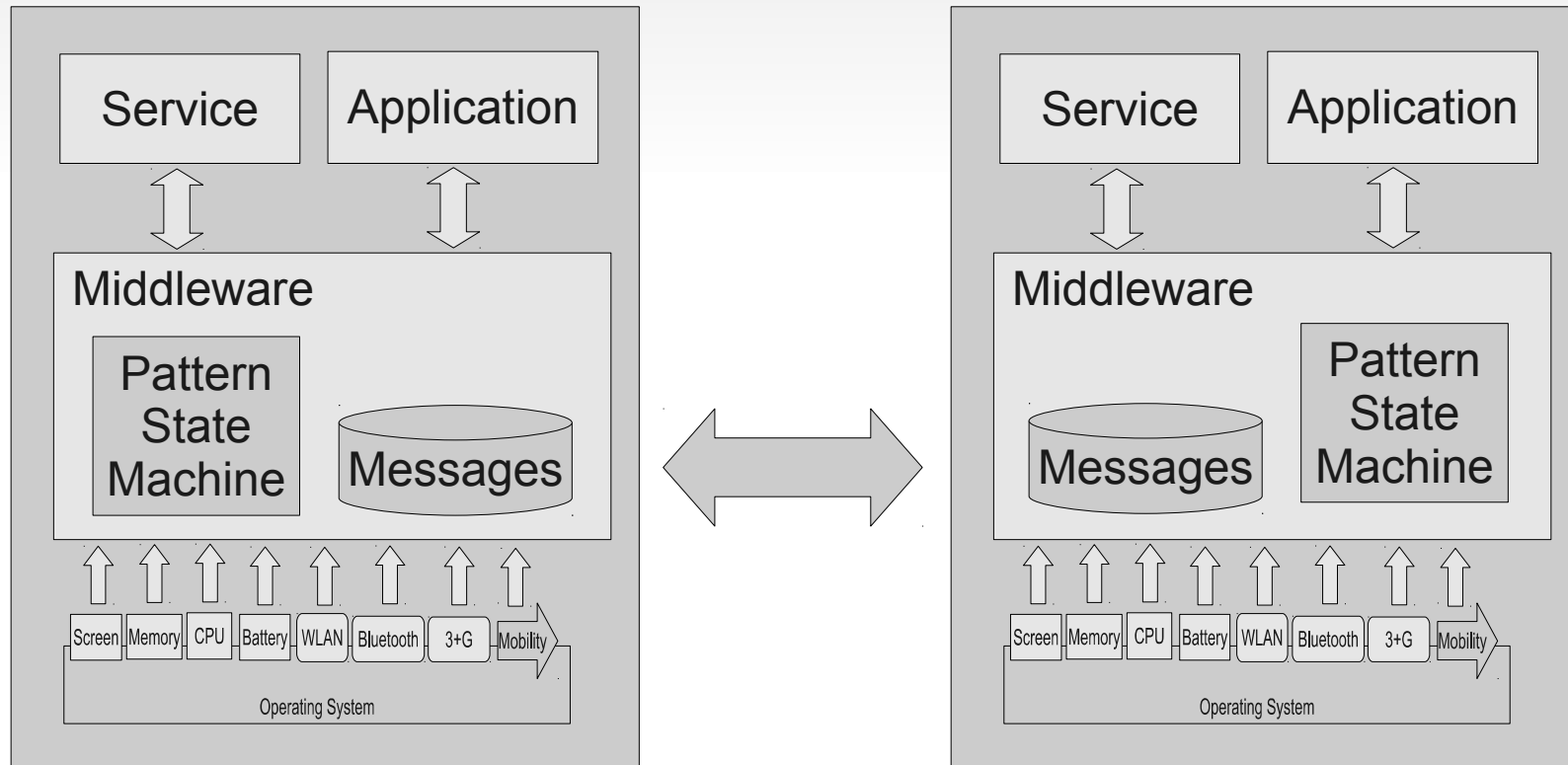Service

Service

Service

Application
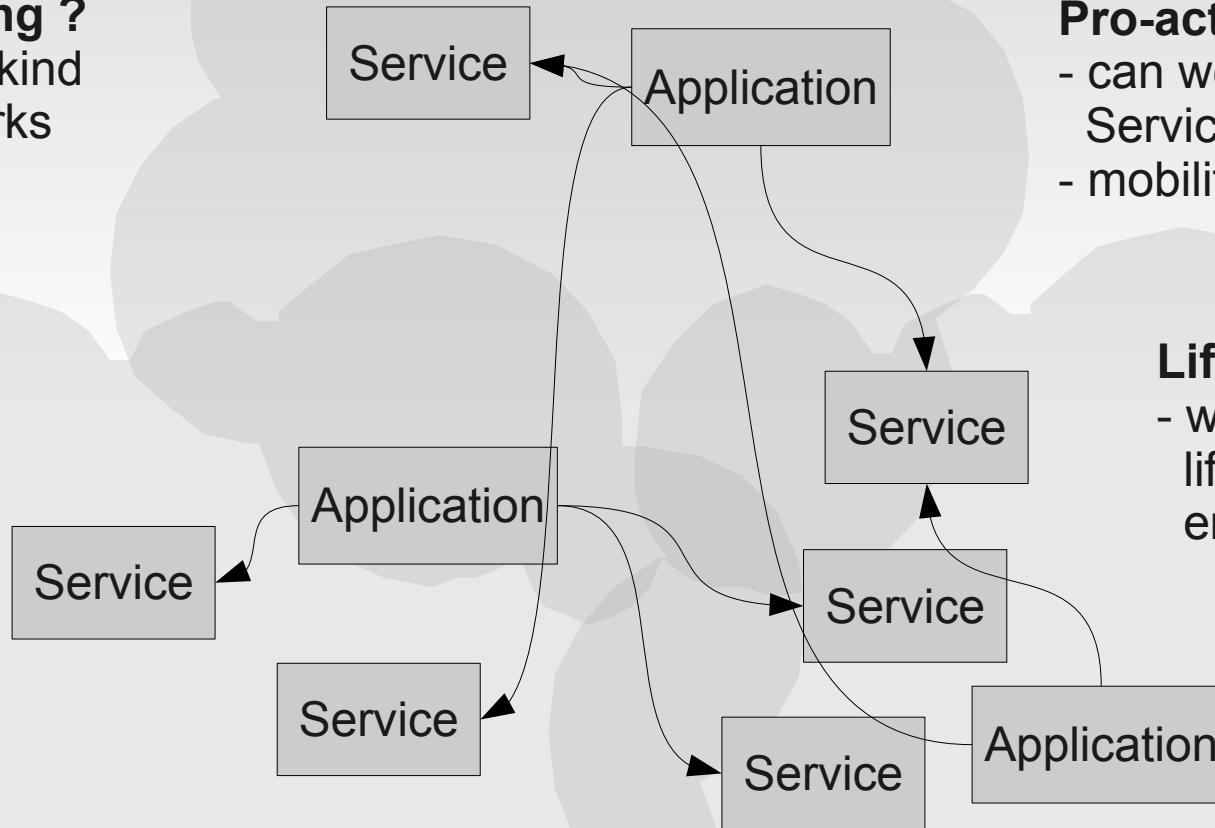
Communications Patterns ?

- **Disconnected operation**
  - Fault is norm in mobile environment
  - Loss of connectivity while moving
  - Asynchronous communication

- **Opportunistic communication**
  - Places and mobility
  - Short duration

- **Model ?**
  - Client – Server ? RPC ?
  - Peer – Hashmap – Peer ?
  - Application – Cache Broker – Service ?

Application
Middleware

Middleware
Service
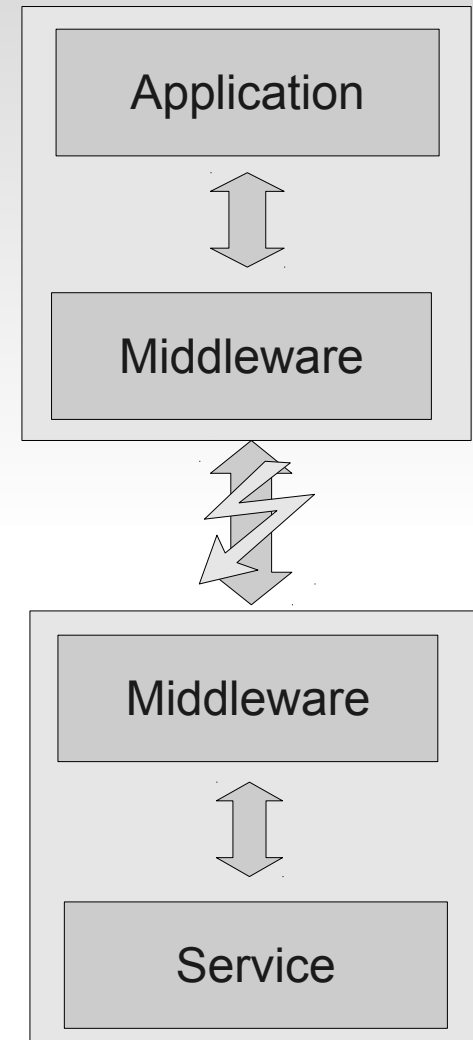
Communications Patterns ?

- Message caching with pattern rules (state machine) ?
  - Disconnected operations support
  - Resource usage ?

Thank you