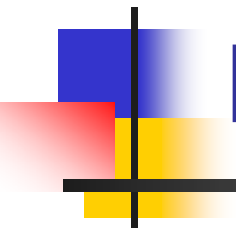

DREAM & Fractal

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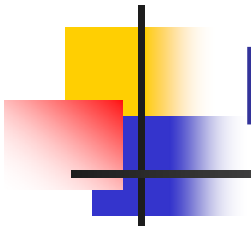
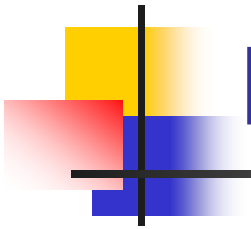
Projet Sardes, INRIA Rhône-Alpes

Fractal Workshop
January 29 2003



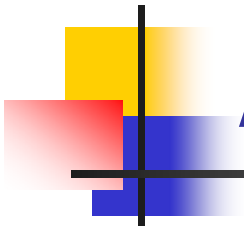
Plan

- Motivations
- DREAM overview
- Feedback



Motivations

- One objective of *Sardes* is to provide administration functions for scalable distributed systems
- The primary administration task is the system observation (monitoring)
  - Requirements of scalable observation functions
- Observation ?
  - Need to reify system state changes
    - ➔ What to monitor ? How to monitor ? …
  - Need of an infrastructure to send and receive events
    - ➔ ***Open technology for dynamic creation of events channel***

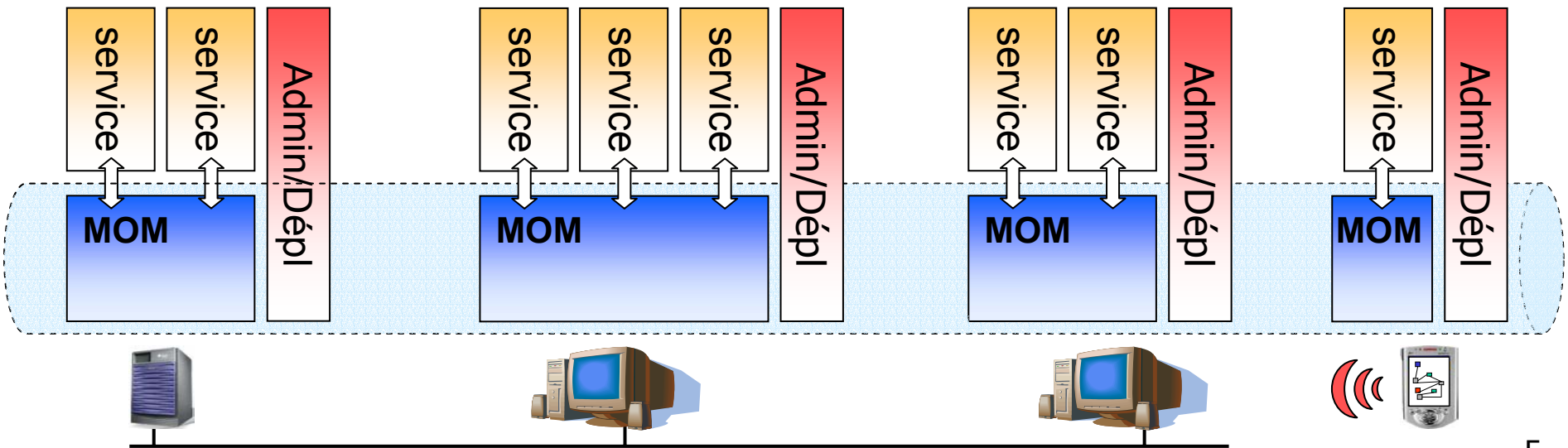


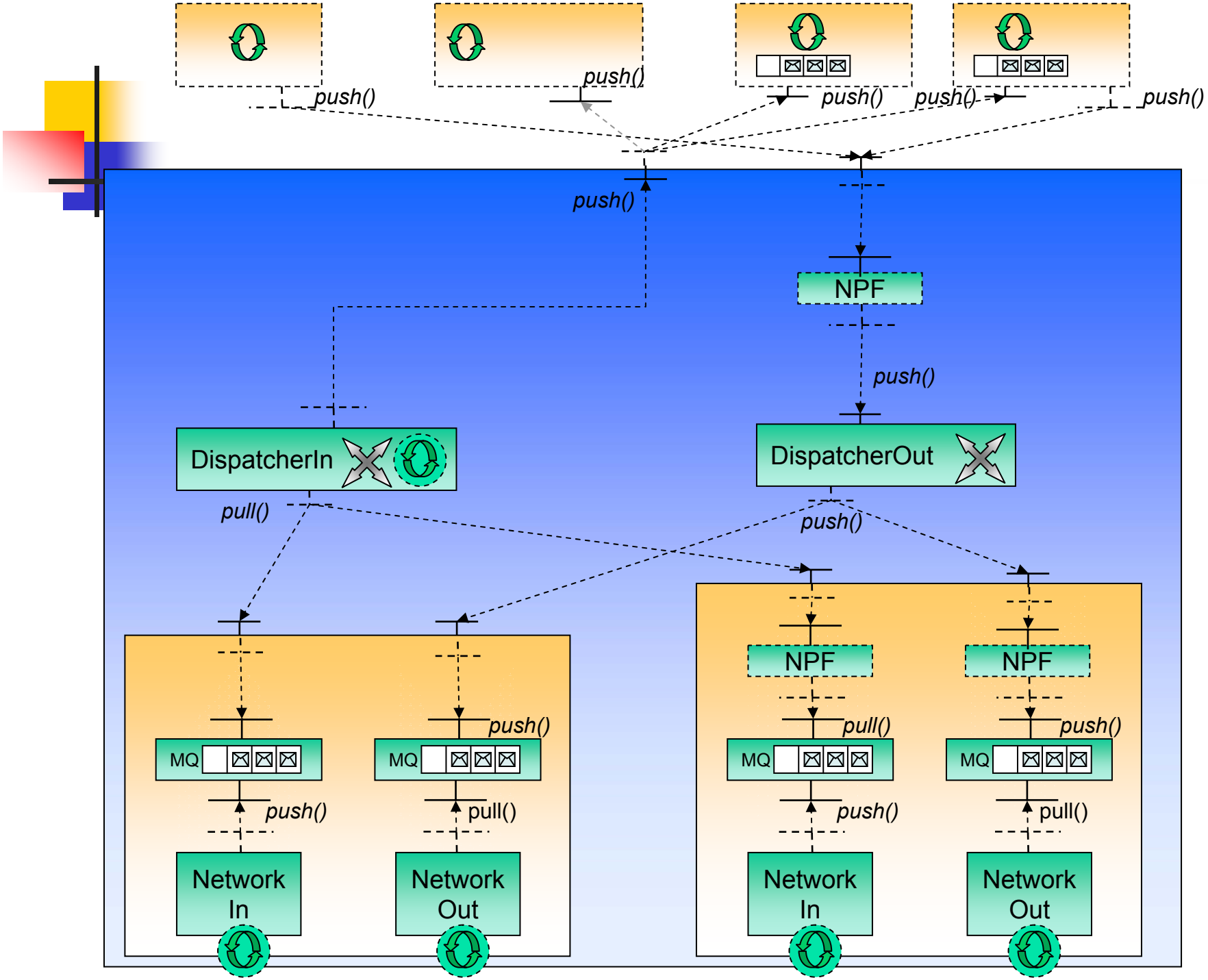
Adaptive asynchronous middleware

- Objectives
  - Asynchronous
  - Modular (component-based)
  - Configurable
  - Adaptive (dynamically reconfigurable)

DREAM : a Dynamic REflective Asynchronous Middleware

- Message-Oriented Middleware
  - Provides message queuing facilities
- Services use the MOM
  - Produce and consume messages
  - Implement a specific functionality
- Deployment and administration tool on each site




push()
push()
push()
push()
push()
push()
NPF
push()
DispatcherIn
DispatcherOut
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MQ
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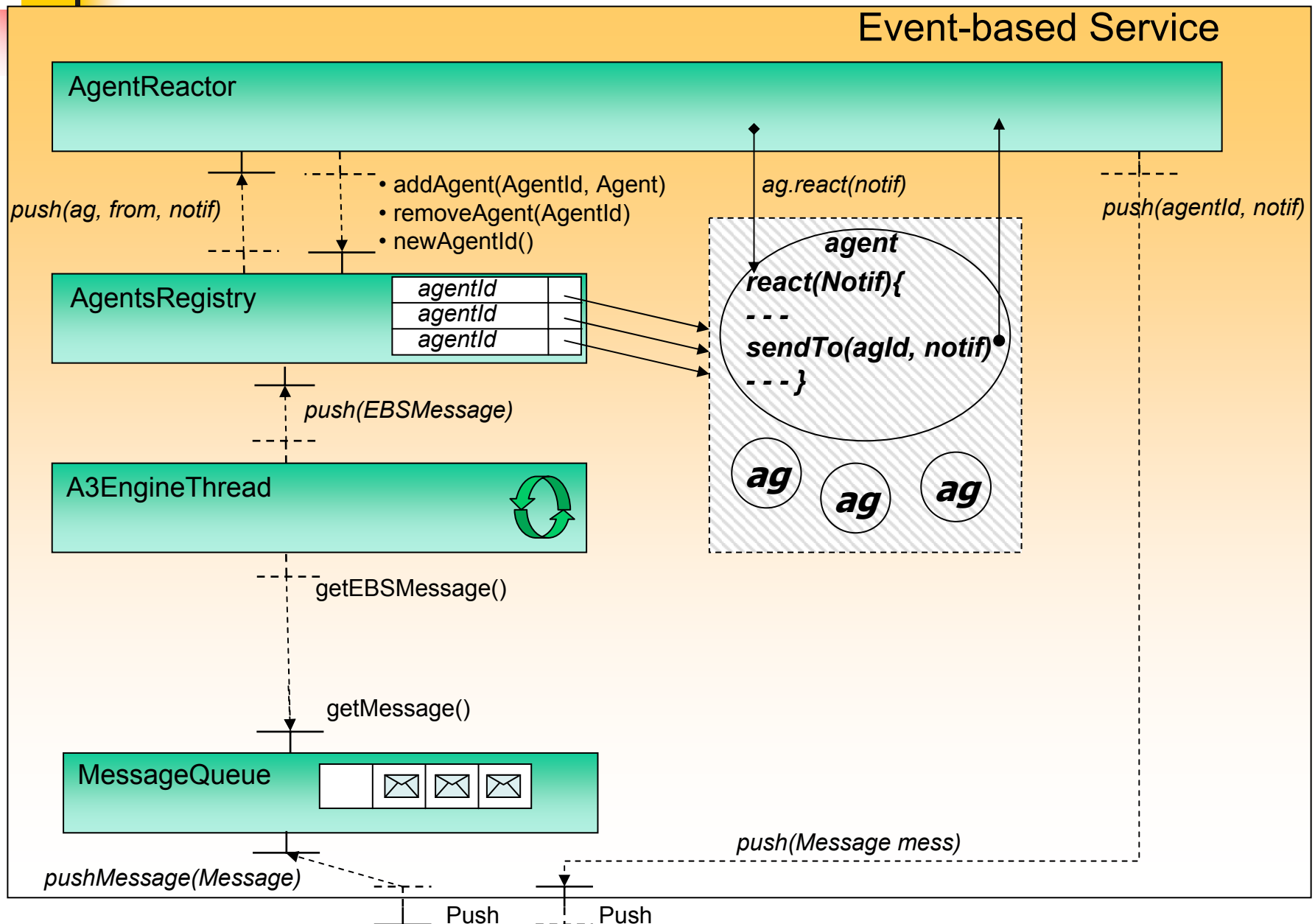
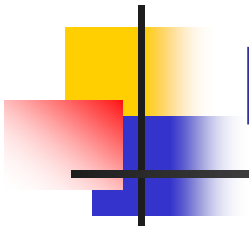
Network In
Network Out
Network In
Network Out

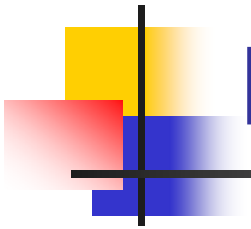
Event-based service





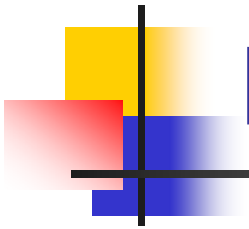
Feedback (1)

- This preliminary work had two objectives
  - Componentization of the A3 middleware
  - Learn the fractal framework and evaluate the advantages of fractal over traditional object languages and over other component models



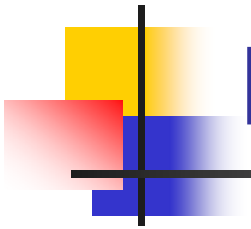
Feedback (1)

- Fractal is a minimal component model (not a framework dedicated to "business components")
  - Adapted to the construction of middleware
    - Non functional services are not provided
    - Control interfaces are not imposed by the framework
      - It is possible to define our own controllers to implement required control operations
    - It is possible to control the overhead induced by the Julia implementation thanks to code optimization



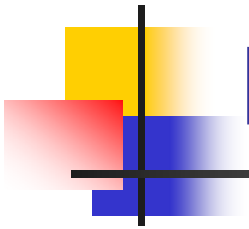
Feedback (2)

- Fractal
  - Allows to hierarchically structure the middleware
    - Primitive components for basic functions
      - Message queues
      - Sockets
      - Dispatchers
      - …
    - Composite components
      - Composing several components to form higher-level components
        - MOM, Services
        - Network



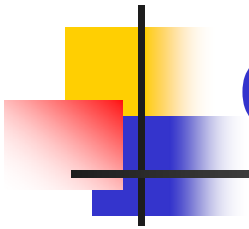
Feedback (3)

- Fractal is recursive
  - Composite may encapsulate other composite
    - Network composites are encapsulated in the MOM composite
  - That allows a hierarchical distribution of control operations
    - Each composite only manages the components it encapsulates
    - For example, 2 network composites may have different reconfiguration capabilities



Future work

- Study dynamic aspects of the MOM reconfiguration
  - Definition of other control interfaces ?
  - Specialization of existing controllers



Conclusion

- Questions ?