

# New Applications of the Consent Operator: **Detecting Incomplete Bindings & Erroneous Architectures**

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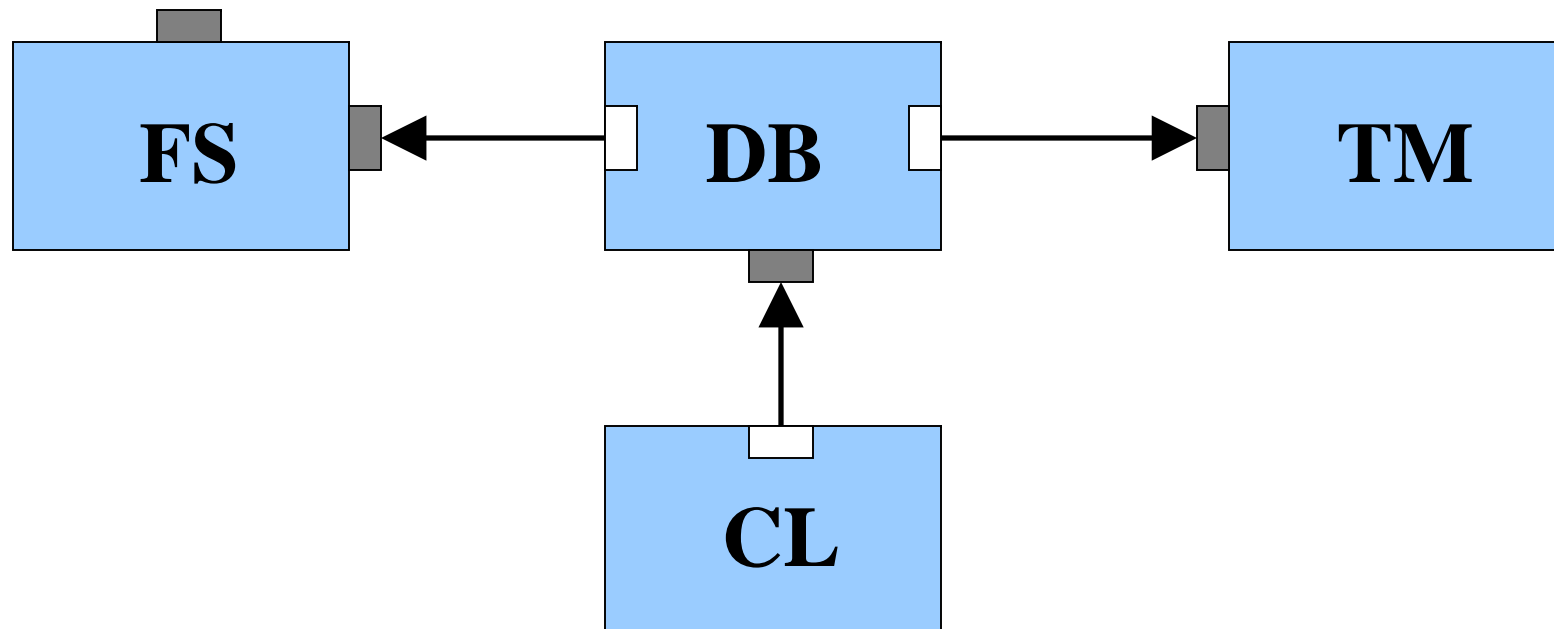
# Outline

- Consent operator
  - Composition errors
- Incomplete bindings
  - Detection using the consent operator
- Erroneous architectures
  - Detection using the consent operator

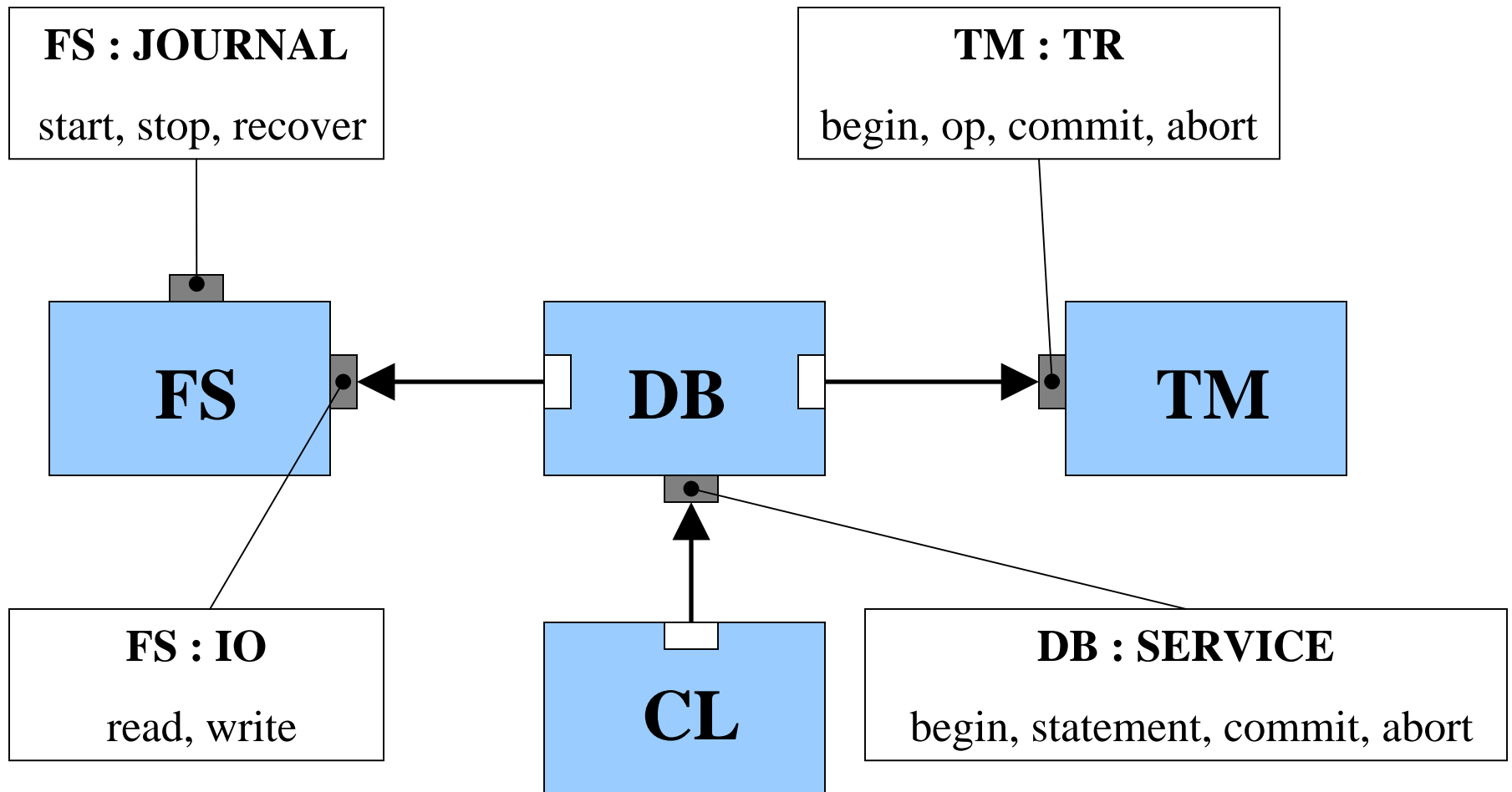
# Consent Operator

- Captures behavior of composed components
- Checks for composition errors
  - Bad activity
  - No activity (deadlock)
  - Infinite activity (divergence)

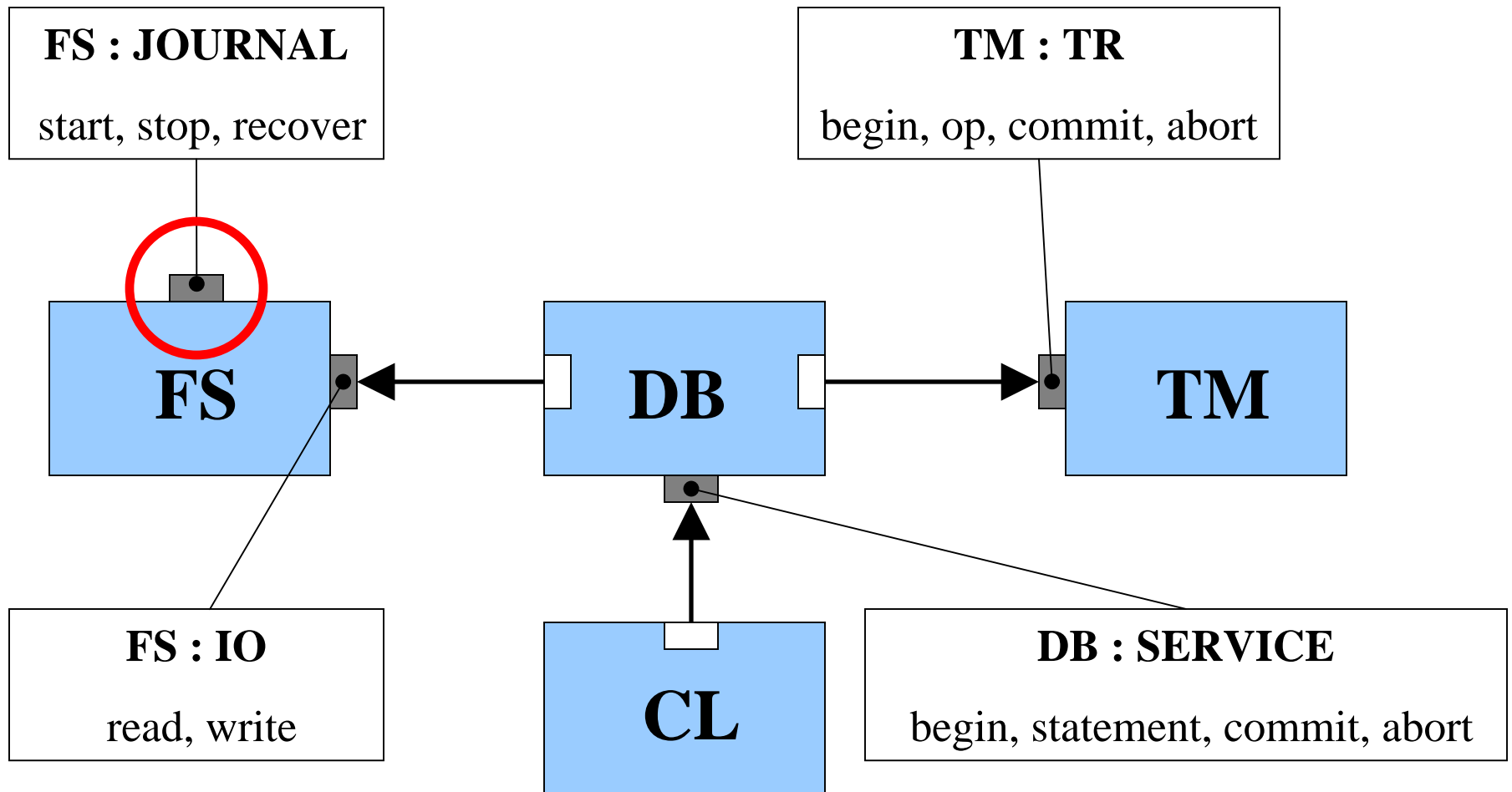
# Incomplete Bindings



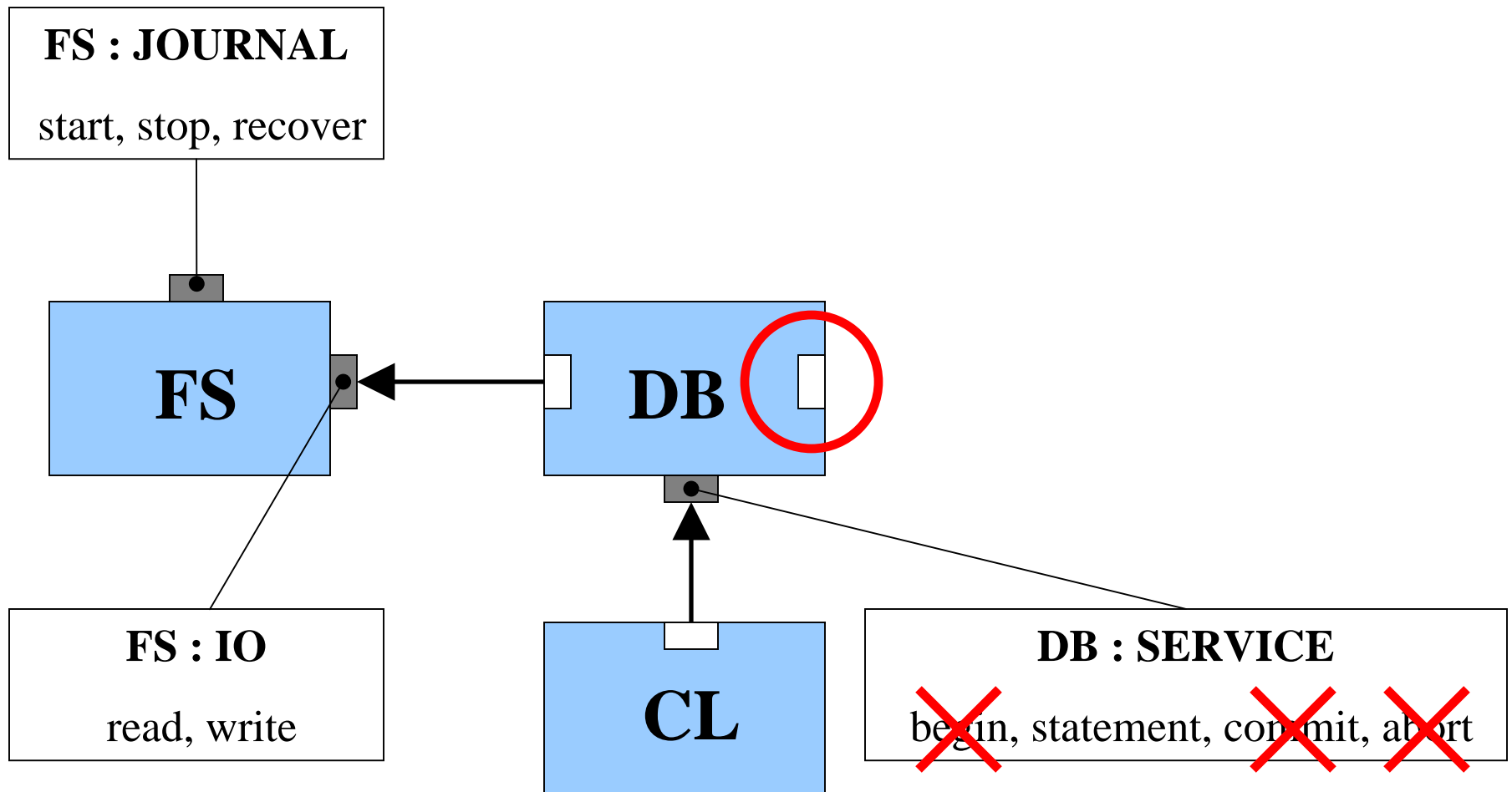
# Incomplete Bindings



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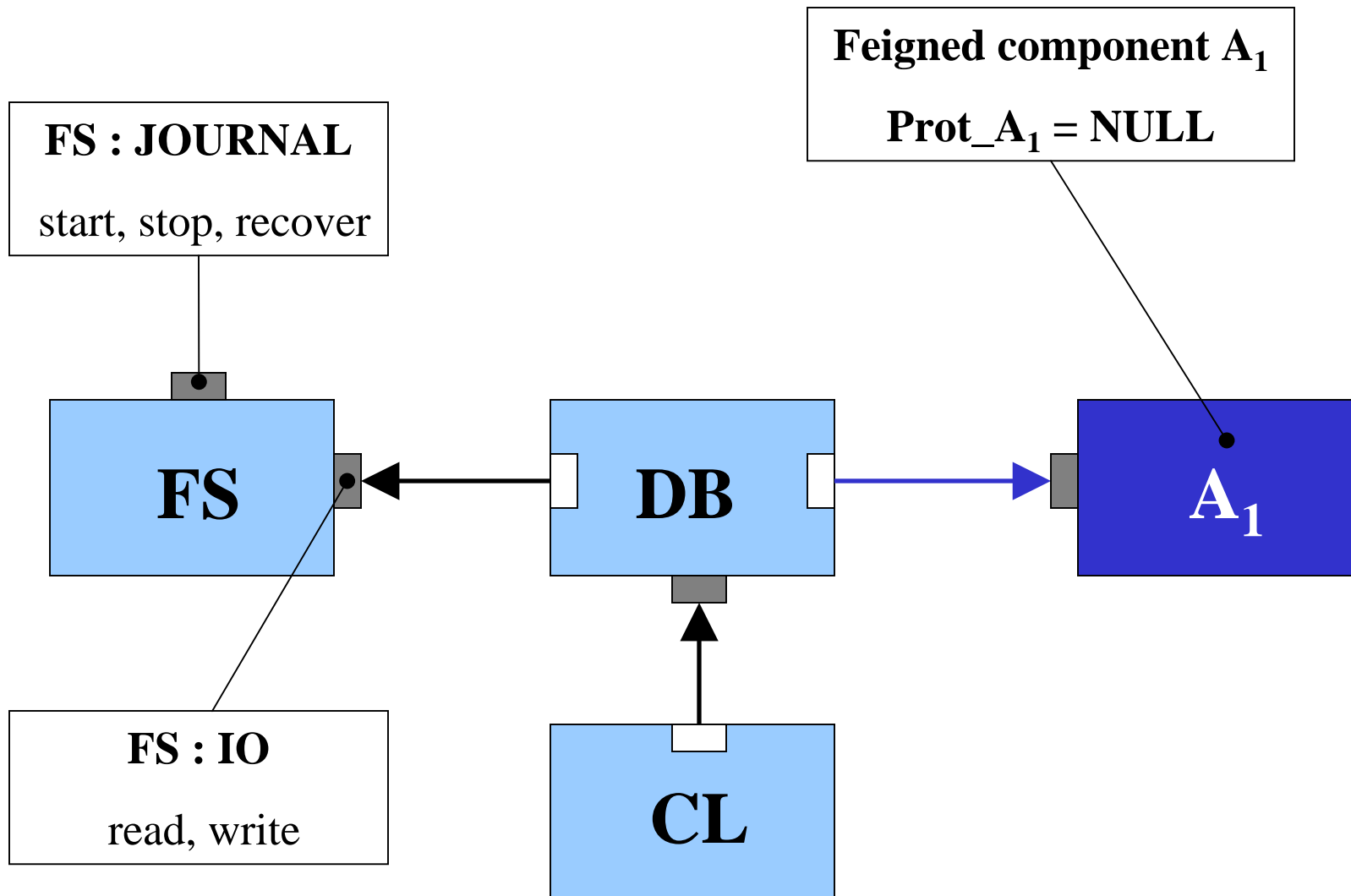


# Incomplete Bindings

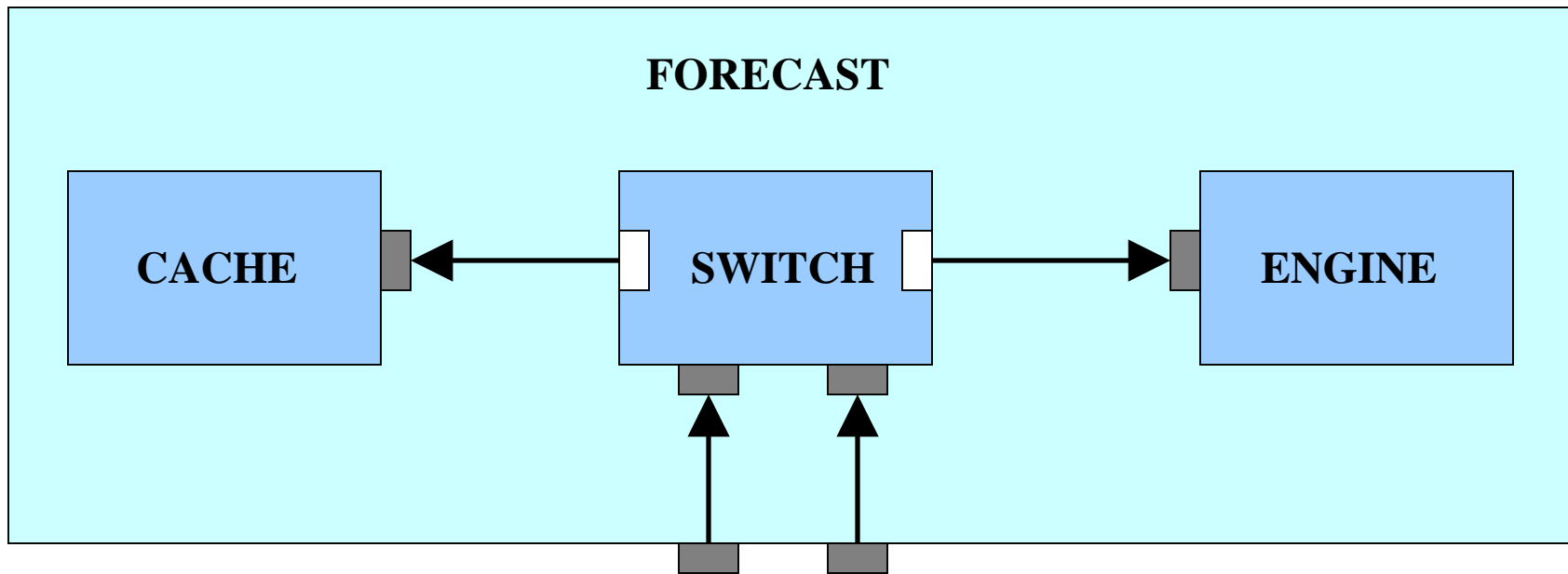
- Detection
  - Unbound provides interfaces can cause only bad activity and no activity errors
    - Detected by the consent operator
  - Unbound requires interfaces → **unbound requires errors**
    - Can be detected using so called **feigned component**



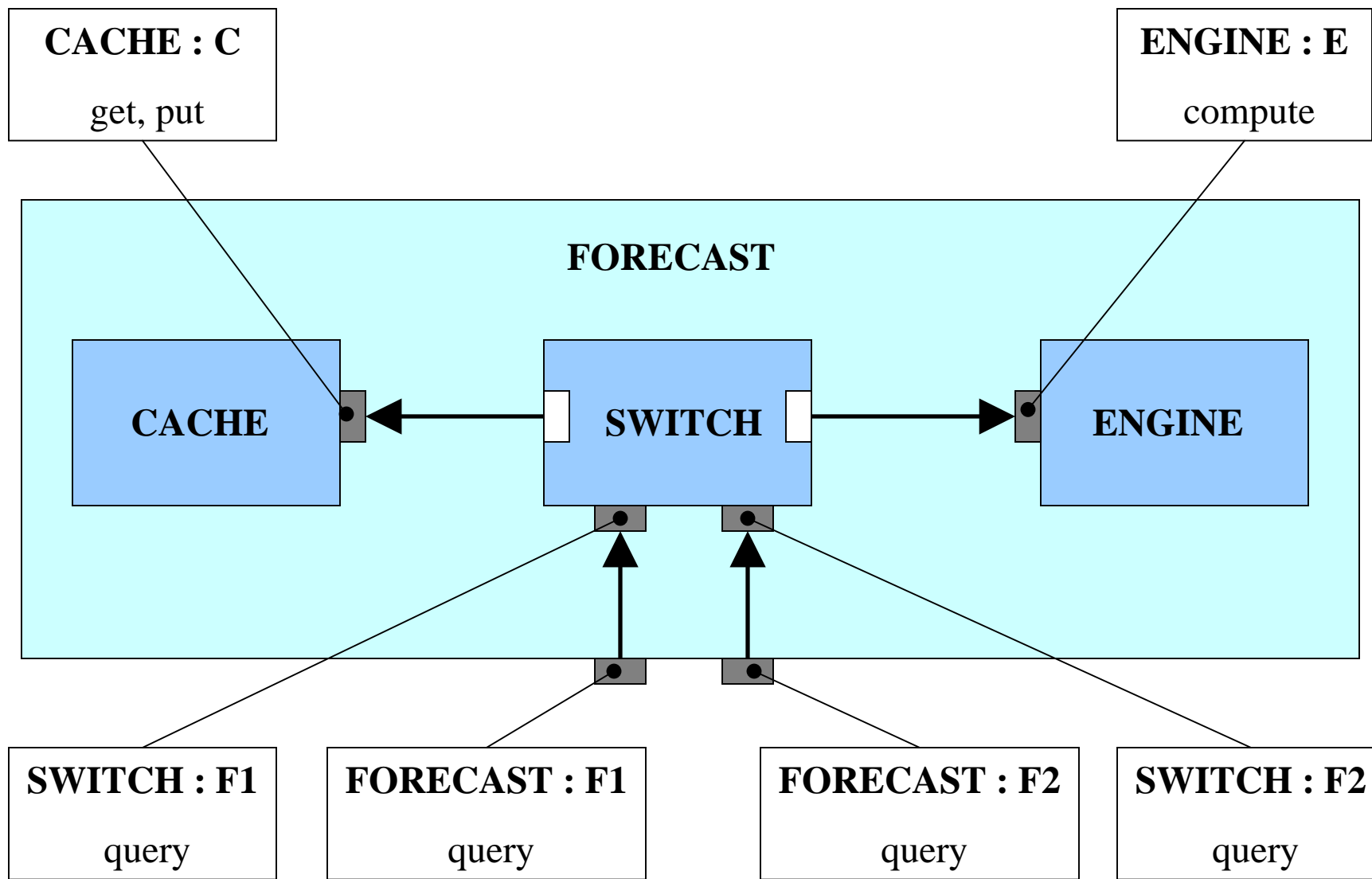
# Incomplete Bindings



# Erroneous Architectures



# Erroneous Architectures



# Erroneous Architectures

- Scenario 1
  - **ENGINE** is not reentrant
  - Frame protocol of **FORECAST** allows to call **query** on **FORECAST:F1** and **FORECAST:F2** in parallel
    - It eventually results in two calls of **ENGINE:E.compute** done in parallel → **composition error**

# Erroneous Architectures

- Scenario 2
  - **ENGINE** is not reentrant
  - Frame protocol of **FORECAST** does not allow to call **query** on **FORECAST:F1** and **FORECAST:F2** in parallel
    - Also calls of **ENGINE:E.compute** are serialized

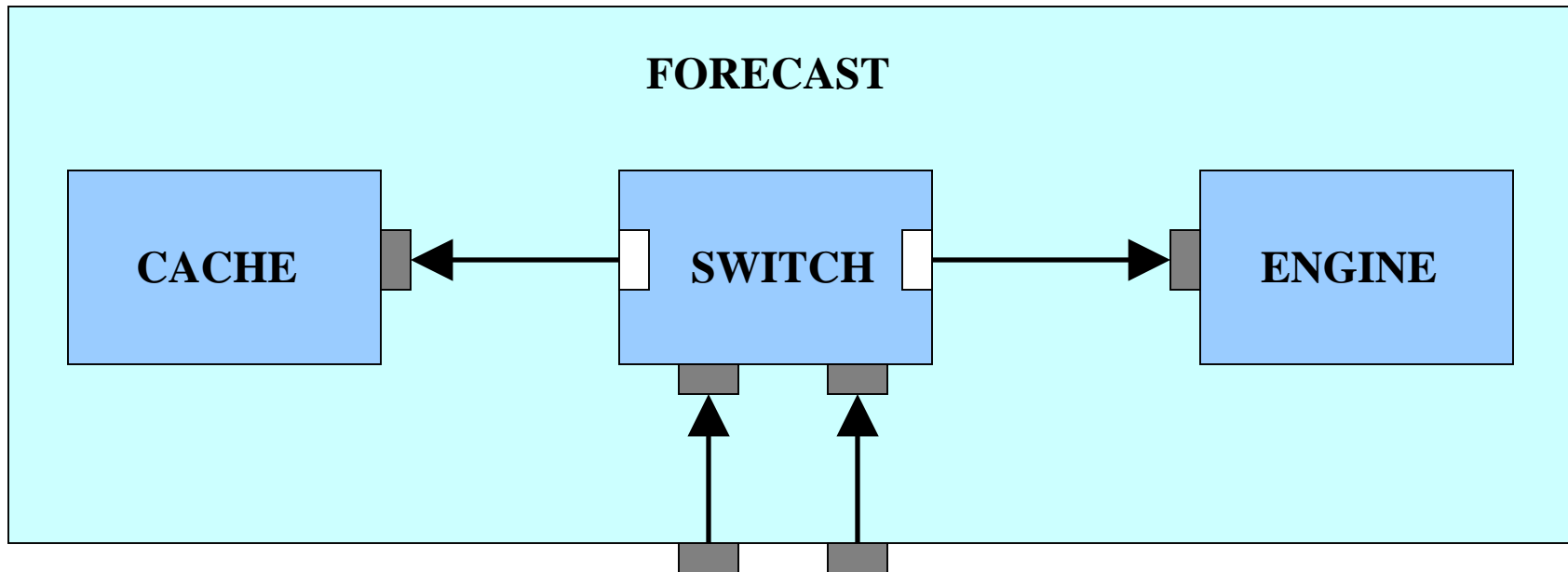
# Erroneous Architectures

- The component applications from Scenarios 1 and 2 differ only in the frame protocol of ***FORECAST***
  - The same architecture causes or doesn't cause a composition error, depending on the protocol of the frame
  - **Erroneous architecture is a relative concept**

# Erroneous Architectures

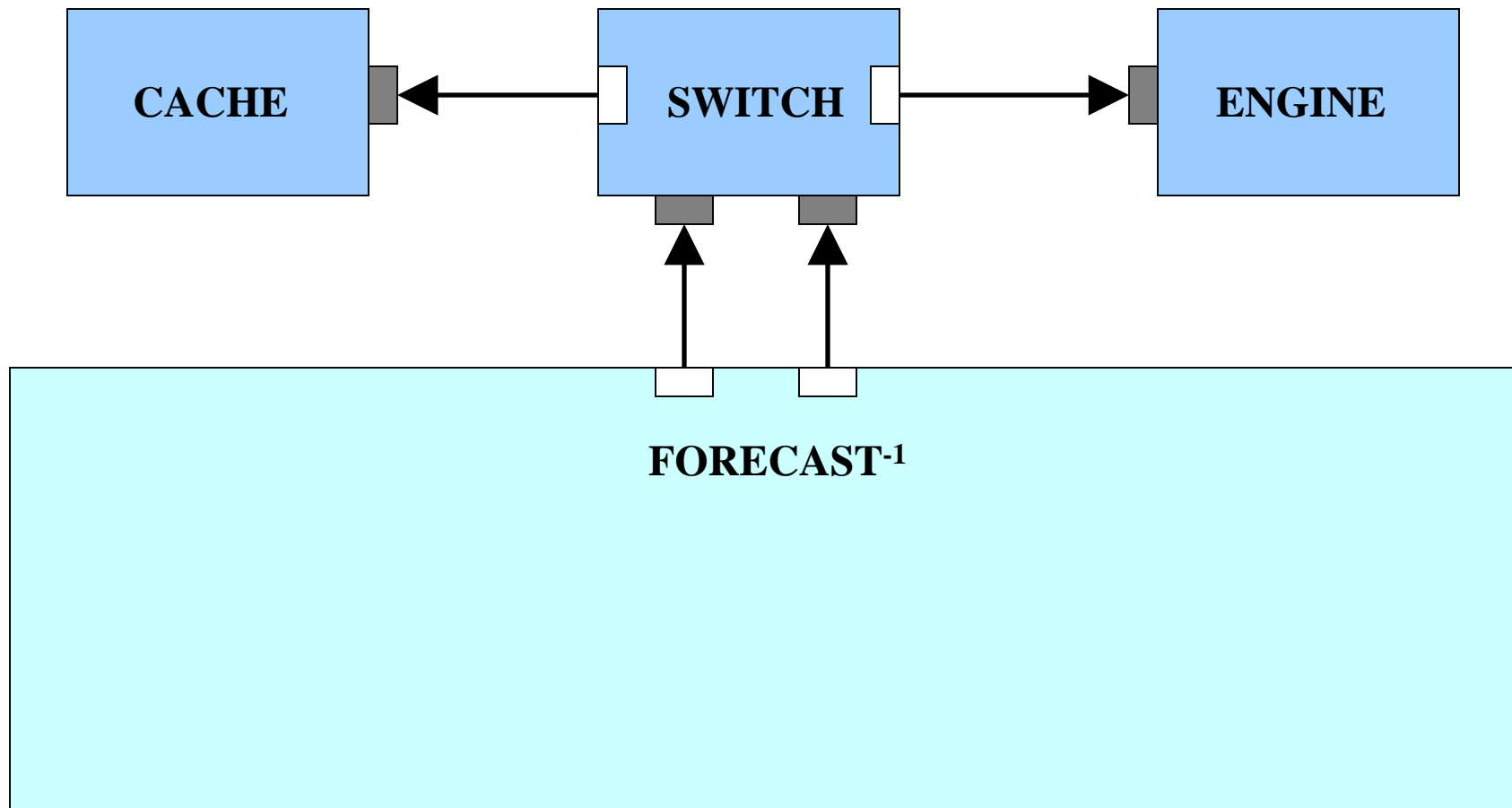
- Detection
  - Using the consent operator and the idea of **inverted frame protocol**
    - Emitting of events replaced by absorbing and vice versa

# Erroneous Architectures





# Erroneous Architectures



# Publications

- Adamek, J., Plasil, F.: **Partial Bindings of Components - any Harm?**, Accepted for presentation at the SACT 2004 Workshop, Busan, Korea and for publication in the Proceedings of APSEC 2004, Nov 2004
- Adamek, J., Plasil, F.: **Erroneous Architecture is a Relative Concept**, Accepted for publication in proceedings of the SEA conference, Cambridge, MA, USA, Nov 2004