

# An Extensible Monitoring and Adaptation Framework

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# Motivation

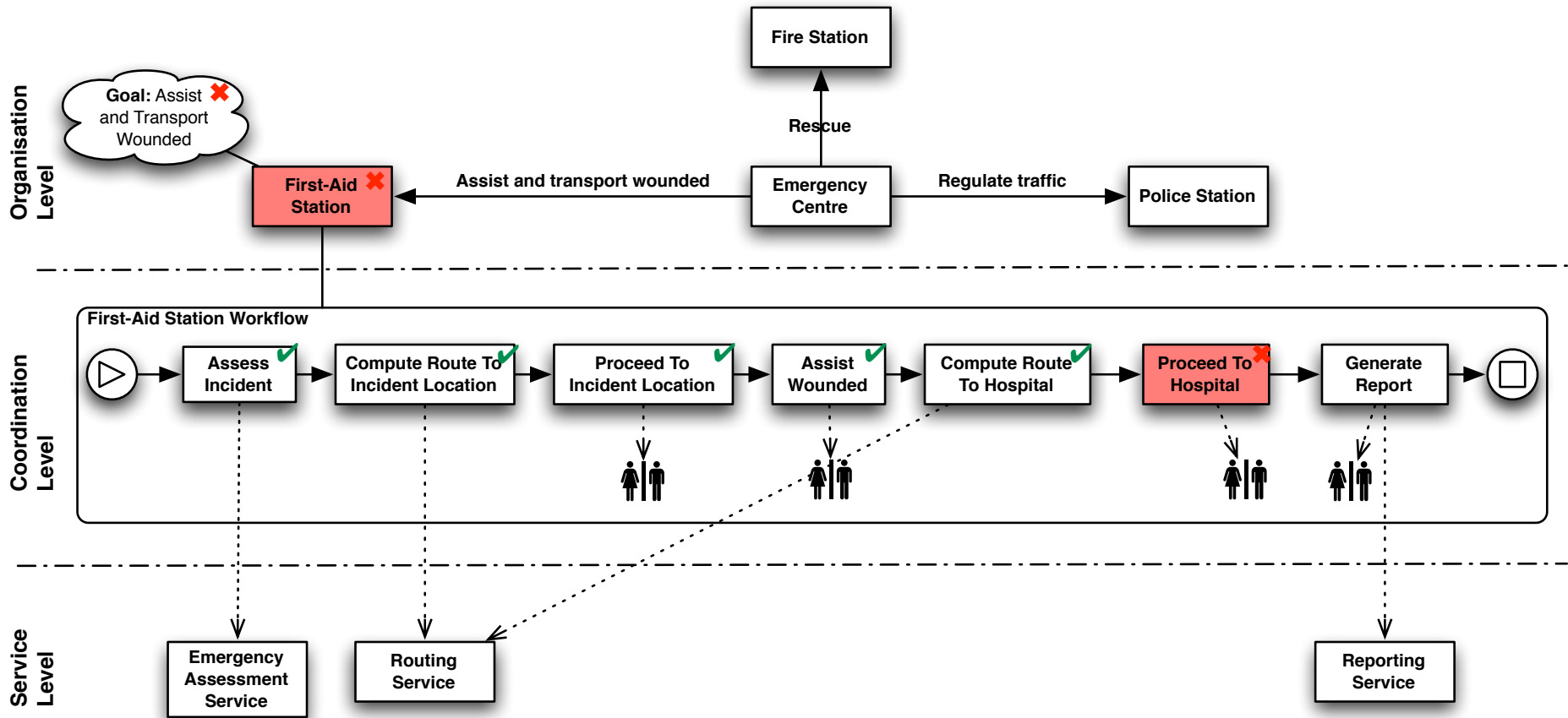
- Easier to re-write than to adapt.
- Existing adaptation frameworks are somewhat rigid:
  - Limited configurability & extensibility.
  - Limited integration between approaches.
  - Limited cross-layer adaptation.

# Core Goal

- Framework for the **easy deployment of application-tailored adaptations.**

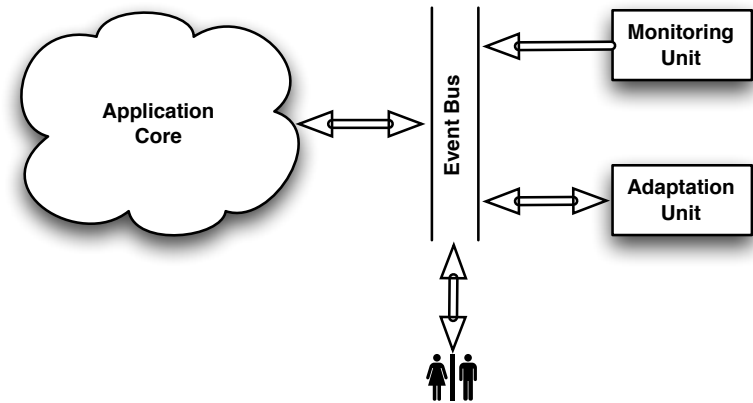
- MDE-based framework
- Service-oriented applications based on organisation and coordination mechanisms often seen in human and other societies.
- 3 layers: organisation, coordination, service.

# Crisis Management Case Study



# Framework Overview

- Monitoring
  - Events
  - Monitoring Units
- Adaptation
  - Adaptation Patterns
  - Adaptation Units



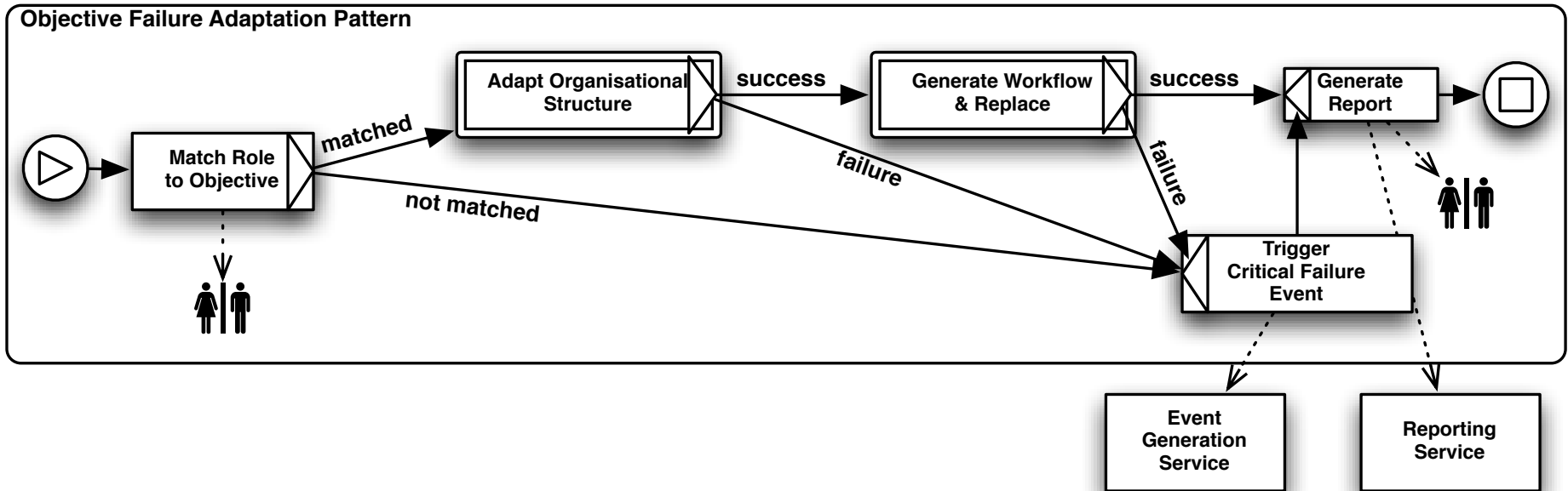
# Monitoring: Events

Application Level	Triggers	Events
Service Level	Service invocation fails repeatedly. Located better service. ...	Service Failure. Match & Replace Service. Adapt Service Behaviour. Critical Failure. ...
Coordination Level	Task execution has failed.	Task Failure. Generate Workflow & Replace. ...
Organisation Level	Objective cannot be achieved. ...	Objective Failure. Adapt Organisational Structure. ...
Designer/Operator	Requirements have changed. Environment has changed. ...	All of the above.

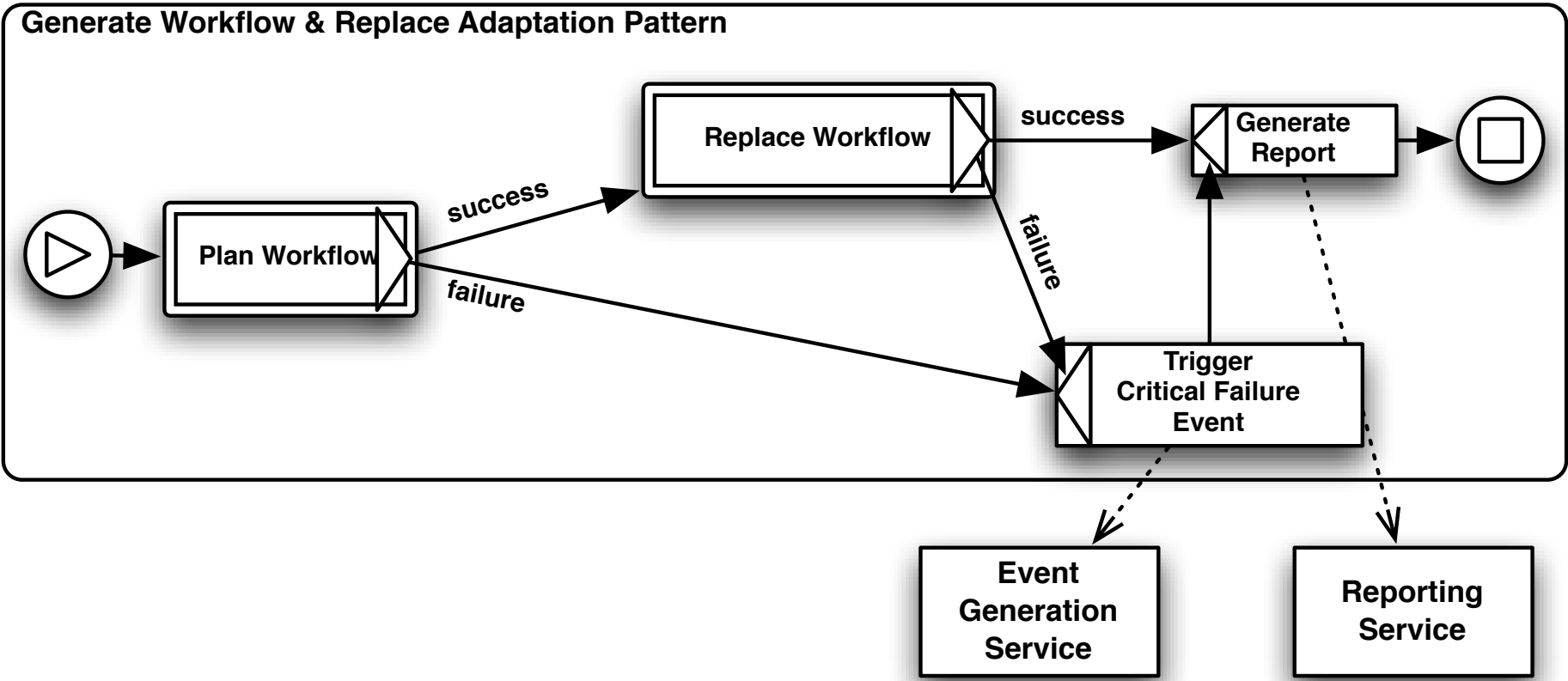
# Adaptation: Patterns

- High-level workflows of adaptation units.
- Patterns can be:
  - Composed (either directly or through events)
  - Customised (tailored to application)
  - Transformed/Deployed (other languages)
- YAWL
  - Formal language
  - WS integration
  - Translation to e.g., BPEL

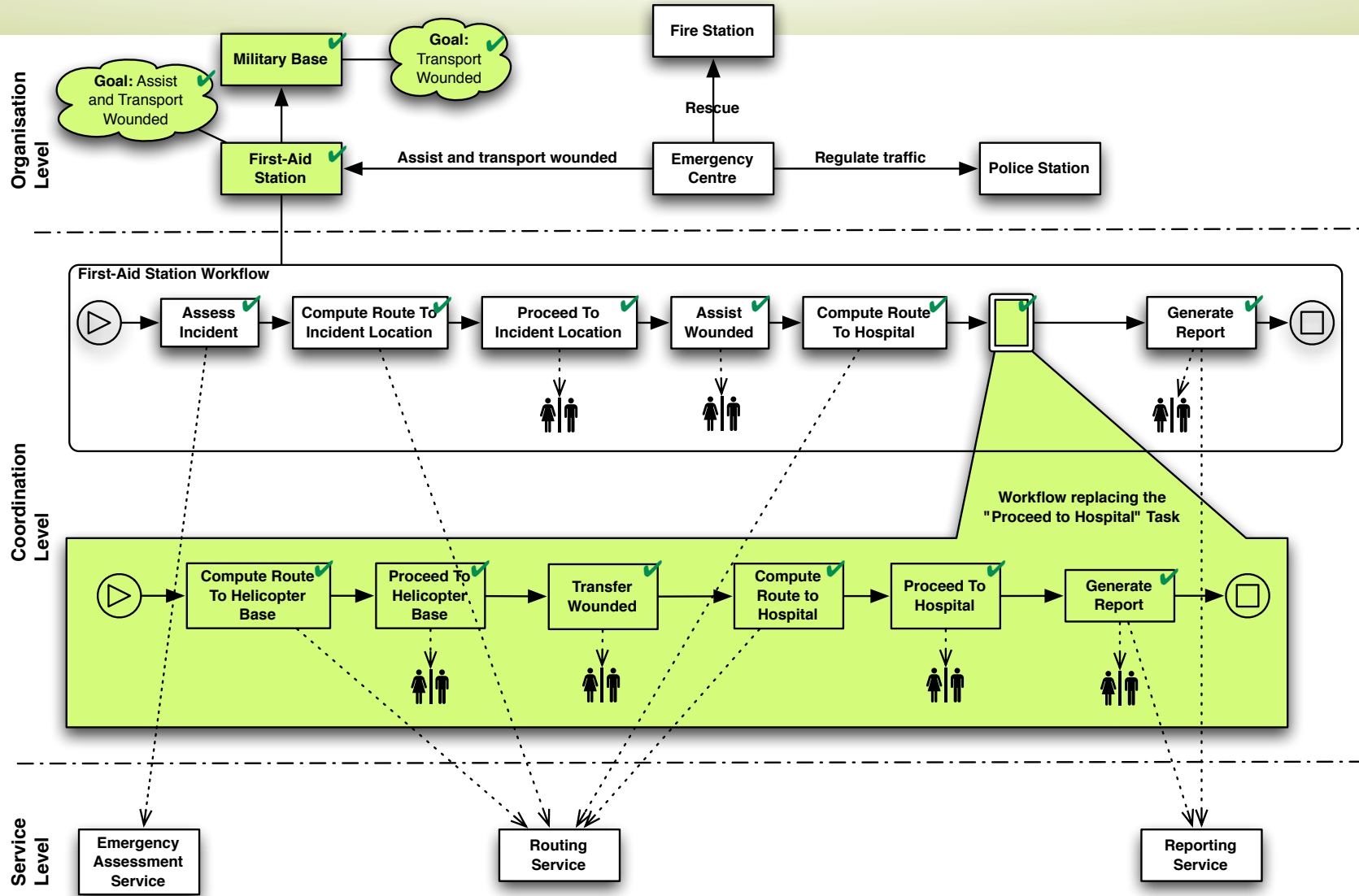
# 'Objective Failure' Adaptation Pattern



# 'Generate Workflow and Replace' Adaptation Pattern



# Crisis Management Solution



# Current Work

- Definition of a comprehensive **set of adaptation patterns**.
- Investigation of **run-time adaptation issues**.
- **MDE-based methodology and tools** to support the composition, customisation and deployment of application-tailored adaptation units from generic patterns.

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